

**AUTHORIZATION TO DISCHARGE UNDER THE  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with the provisions of the Federal Clean Water Act, as amended, (33 U.S.C. §§1251 et seq.; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§ 26-53)

**Massachusetts Water Resources Authority (MWRA)  
Charlestown Navy Yard  
100 First Avenue, Building 39  
Boston, MA 02129**

is authorized to discharge from the facility located at

**John J. Carroll Water Treatment Plant  
84 D'Angelo Drive  
Marlborough, MA 01752**

to receiving water named

**Sudbury Reservoir (Segment MA82106)  
via the Wachusett Aqueduct Open Canal**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on the first day of the calendar month following 60 days after signature.

This permit and the authorization to discharge expire at midnight, five (5) years from the last day of the month preceding the effective date.

This permit consists of 15 pages in Part I including effluent limitations, monitoring requirements, and 25 pages in Part II including Standard Conditions.

Signed this 15<sup>th</sup> day of January, 2013

**/s/SIGNATURE ON FILE**

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Stephen S. Perkins, Director  
Office of Ecosystem Protection  
Environmental Protection Agency  
Region I  
Boston, MA

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David Ferris, Director  
Massachusetts Wastewater Management Program  
Department of Environmental Protection  
Commonwealth of Massachusetts  
Boston, MA

**PART I**

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

1. During the period beginning on the effective date and lasting through the expiration date, the Permittee is authorized to discharge dechlorinated drawdown water through Outfall Serial Number 001 to Sudbury Reservoir, via the Wachusett Aqueduct Open Canal. Such discharge shall: 1) be limited and monitored by the Permittee as specified below; and 2) not cause a violation of the State Surface Water Quality Standards of the receiving water.

Effluent Characteristic Parameter	Discharge Limitation		Monitoring Requirements	
	Average Monthly	Maximum Daily	Monitoring Frequency <sup>1</sup>	Sample Type <sup>2</sup>
Flow	--	25 MGD	1/week	Estimate
TSS	30 mg/L	50 mg/L	1/week	Composite
Temperature, Effluent <sup>3</sup>	--	Report °F	1/week	Grab
Temperature, Sudbury Reservoir <sup>3</sup>	--	Report °F	1/week	Grab
pH <sup>4</sup>	6.5-8.3 SU <sup>5,6</sup>		1/week	Grab
Total Residual Chlorine (TRC) <sup>7</sup>	110 µg/L	190 µg/L	1/week	Grab
Ammonia-Nitrogen	Report mg/L	Report mg/L	1/week	Grab
Total Recoverable Copper, Effluent <sup>8</sup>	Report µg/L	Report µg/L	1/week	Composite
Total Recoverable Copper, Sudbury Reservoir	--	Report µg/L	1/week	Grab
Total Recoverable Lead, Effluent <sup>9</sup>	Report µg/L	Report µg/L	1/week	Composite
Total Recoverable Lead, Sudbury Reservoir	--	Report µg/L	1/week	Grab
Hardness, Effluent	--	Report mg/L	1/week	Composite
Hardness, Sudbury Reservoir	--	Report mg/L	1/week	Grab

**Footnotes:**

<sup>1</sup>Samples must be collected weekly when the Plant is discharging drawdown water. Drawdown water is defined as treated drinking water held in the Plant’s storage tanks or operational appurtenances. **A minimum of one sample must be collected and reported for each drawdown event.** Discharges of drawdown water from the Plant are limited to those necessary to complete regular reoccurring maintenance or non-reoccurring maintenance, repair, testing or construction which assures efficient operation and/or

prevents loss of life, personal injury, or severe property damage. The Permittee must complete analyses using EPA approved methods found in 40 CFR Part 136.

<sup>2</sup>The composite samples shall be collected from the manhole adjacent to Outfall 001 and shall consist of at least 4 grab samples collected at approximately equal intervals on a flow weighted basis during the time at which the discharge is entering the Wachusett Aqueduct Open Canal after the start of the drawdown water discharge. The timing of composite samples shall correspond with the timing of grab samples for the other parameters collected at Outfall 001. Grab samples collected for the Sudbury Reservoir shall be collected from a location representative of ambient conditions. The timing of grab samples shall correspond with the timing of grab sampling for the other parameters collected at Outfall 001.

<sup>3</sup>The temperature must be reported for the effluent at the confluence of the Wachusett Aqueduct Open Canal with the Sudbury Reservoir and in the Sudbury Reservoir. The sampling location for the effluent at the confluence with the Sudbury Reservoir must be nearest the point at which the effluent enters the Sudbury Reservoir at Deerfoot Road. The sampling location for the Sudbury Reservoir temperature samples must be representative of ambient conditions. The timing of effluent sampling for temperature must be representative of when the effluent is present. If temperature impacts which result in a temperature rise of 1.5°F or greater or a temperature decrease of 5°F or greater are not found after representative data are collected, the Permittee may request elimination of temperature monitoring requirements.

<sup>4</sup>Requirement for State Certification.

<sup>5</sup>The pH of the effluent shall be in the range of 6.5 to 8.3 standard units but not more than 0.5 standard units outside of the naturally occurring range. There shall be no change from natural background conditions that would impair any use assigned to the class of the receiving water.

<sup>6</sup>If addition of chemicals is required to achieve pH limitations, such chemicals may be used, provided that they are identified in the permit application. If the addition of chemicals which were not disclosed in the permit application are required, such chemicals must be approved through subsequent communications with MassDEP and EPA. See Part I.A.14.e.iv. for requirements of the Best Management Practices Plan.

<sup>7</sup>The minimum level (ML) for Total Residual Chlorine (TRC) is defined as 20 µg/L. The ML is not the minimum level of detection, but rather the lowest point on the curve used to calibrate the test equipment for the pollutant of concern. If EPA approves a more sensitive method of analysis for TRC, the permit may be modified to require the use of the new method with a corresponding lower ML. When reporting sample data at or below the ML, see the latest EPA Region 1 [NPDES Permit Program Instructions for the Discharge Monitoring Report Forms \(DMRs\)](#) for guidance.

<sup>8</sup>Analysis must be completed for Total Recoverable Copper using a detection limit for analysis at least equal to the hardness-based chronic criteria, 1.90 µg/L.

<sup>9</sup>Analysis must be completed for Total Recoverable Lead using a detection limit for analysis at least equal to the hardness-based chronic criteria, 0.30 µg/L. If lead data demonstrates that there is no reasonable potential for the discharge to cause or contribute to

an exceedance of the hardness-based chronic water quality criteria, the Permittee may request a reduction in frequency for lead monitoring requirements.

2. During the period beginning on the effective date and lasting through the expiration date, the Permittee is authorized to discharge dechlorinated disinfection water through Outfall Serial Number 001 to Sudbury Reservoir, via the Wachusett Aqueduct Open Canal. Such discharge shall: 1) be limited and monitored by the Permittee as specified below; and 2) not cause a violation of the State Surface Water Quality Standards of the receiving water.

Effluent Characteristic Parameter	Discharge Limitation		Monitoring Requirements	
	Average Monthly	Maximum Daily	Monitoring Frequency <sup>1</sup>	Sample Type <sup>2</sup>
Flow	--	25 MGD	1/week	Estimate
TSS	--	50 mg/L	1/week	Composite
Temperature, Effluent <sup>3</sup>	--	Report °F	1/week	Grab
Temperature, Sudbury Reservoir <sup>3</sup>	--	Report °F	1/week	Grab
pH <sup>4</sup>	6.5-8.3 SU <sup>6,7</sup>		1/week	Grab
Total Residual Chlorine (TRC) <sup>7</sup>	--	190 µg/L	1/week	Grab
Ammonia-Nitrogen	--	Report mg/L	1/week	Grab
Total Recoverable Copper, Effluent <sup>8</sup>	--	Report µg/L	1/week	Composite
Total Recoverable Copper, Sudbury Reservoir	--	Report µg/L	1/week	Grab
Total Recoverable Lead, Effluent <sup>9</sup>	--	Report µg/L	1/week	Composite
Total Recoverable Lead, Sudbury Reservoir	--	Report µg/L	1/week	Grab
Hardness, Effluent	--	Report mg/L	1/week	Composite
Hardness, Sudbury Reservoir	--	Report mg/L	1/week	Grab

**Footnotes:**

<sup>1</sup>Samples must be collected weekly when the Plant is discharging disinfection water. Disinfection water is defined as treated drinking water that has been dosed with chlorine and held in the Plant’s storage tanks or operational appurtenances. **A minimum of one sample must be collected and reported for each drawdown event.** Discharges of disinfection water from the Plant are limited to those necessary to complete regular reoccurring maintenance or non-reoccurring maintenance, repair, testing or construction which assures efficient operation and/or prevents loss of life, personal injury, or severe property damage. The Permittee must complete analyses using EPA approved methods found in 40 CFR Part 136.

<sup>2</sup>The composite samples shall be collected from the manhole adjacent to Outfall 001 and shall consist of at least 4 grab samples collected at approximately equal intervals on a flow weighted basis during the time at which the discharge is entering the Wachusett Aqueduct Open Canal after the start of the disinfection water discharge. The timing of composite samples shall correspond with the timing of grab samples for the other parameters collected at Outfall 001. Grab samples collected for the

Sudbury Reservoir shall be collected from a location representative of ambient conditions. The timing of grab samples shall correspond with the timing of grab sampling for the other parameters collected at Outfall 001.

<sup>3</sup>The temperature must be reported for the effluent at the confluence of the Wachusett Aqueduct Open Canal with the Sudbury Reservoir and in the Sudbury Reservoir. The sampling location for the effluent at the confluence with the Sudbury Reservoir must be nearest the point at which the effluent enters the Sudbury Reservoir at Deerfoot Road. The sampling location for the Sudbury Reservoir temperature samples must be representative of ambient conditions. The timing of effluent sampling for temperature must be representative of when the effluent is present. If temperature impacts which result in a temperature rise of 1.5°F or greater or a temperature decrease of 5°F or greater are not found after representative data are collected, the Permittee may request elimination of temperature monitoring requirements.

<sup>4</sup>Requirement for State Certification.

<sup>5</sup>The pH of the effluent shall be in the range of 6.5 to 8.3 standard units but not more than 0.5 standard units outside of the naturally occurring range. There shall be no change from natural background conditions that would impair any use assigned to the class of the receiving water.

<sup>6</sup>If addition of chemicals is required to achieve pH limitations, such chemicals may be used, provided that they are identified in the permit application. If the addition of chemicals which were not disclosed in the permit application are required, such chemicals must be approved through subsequent communications with MassDEP and EPA. See Part I.A.14.e.iv. for requirements of the Best Management Practices Plan.

<sup>7</sup>The minimum level (ML) for Total Residual Chlorine (TRC) is defined as 20 µg/L. The ML is not the minimum level of detection, but rather the lowest point on the curve used to calibrate the test equipment for the pollutant of concern. If EPA approves a more sensitive method of analysis for TRC, the permit may be modified to require the use of the new method with a corresponding lower ML. When reporting sample data at or below the ML, see the latest EPA Region 1 NPDES Permit Program Instructions for the Discharge Monitoring Report Forms (DMRs) for guidance.

<sup>8</sup>Analysis must be completed for Total Recoverable Copper using a detection limit for analysis at least equal to the hardness-based chronic criteria, 1.90 µg/L.

<sup>9</sup>Analysis must be completed for Total Recoverable Lead using a detection limit for analysis at least equal to the hardness-based chronic criteria, 0.30 µg/L. If lead data demonstrates that there is no reasonable potential for the discharge to cause or contribute to an exceedance of the hardness-based chronic water quality criteria, the Permittee may request a reduction in frequency for lead monitoring requirement

3. During the period beginning on the effective date and lasting through the expiration date, the Permittee is authorized to discharge dechlorinated flush water through Outfall Serial Number 001 to Sudbury Reservoir, via the Wachusett Aqueduct Open Canal. Such discharge shall: 1) be limited and monitored by the Permittee as specified below; and 2) not cause a violation of the State Surface Water Quality Standards of the receiving water.

Effluent Characteristic	Discharge Limitation		Monitoring Requirements	
	Average Monthly	Maximum Daily	Monitoring Frequency <sup>1</sup>	Sample Type <sup>2</sup>
Flow	--	25 MGD	1/week	Estimate
TSS	--	50 mg/L	1/week	Composite
Temperature, Effluent <sup>3</sup>	--	Report °F	1/week	Grab
Temperature, Sudbury Reservoir <sup>3</sup>	--	Report °F	1/week	Grab
pH <sup>4</sup>	6.5-8.3 SU <sup>6,7</sup>		1/week	Grab
Total Residual Chlorine (TRC) <sup>7</sup>	--	190 µg/L	1/week	Grab
Ammonia-Nitrogen	--	Report mg/L	1/week	Grab
Total Recoverable Copper, Effluent <sup>8</sup>	--	Report µg/L	1/week	Composite
Total Recoverable Copper, Sudbury Reservoir	--	Report µg/L	1/week	Grab
Total Recoverable Lead, Effluent <sup>9</sup>	--	Report µg/L	1/week	Composite
Total Recoverable Lead, Sudbury Reservoir	--	Report µg/L	1/week	Grab
Hardness, Effluent	--	Report mg/L	1/week	Composite
Hardness, Sudbury Reservoir	--	Report mg/L	1/week	Grab

**Footnotes:**

<sup>1</sup>Samples must be collected weekly when the Plant is discharging flush water. Flush water is defined as treated drinking water used to flush disinfection water out of the Plant’s storage tanks or operational appurtenances. **A minimum of one sample must be collected and reported for each flush event.** Discharges of flush water from the Plant are limited to those necessary to complete regular reoccurring maintenance or non-reoccurring maintenance, repair, testing or construction which assures efficient operation and/or prevents loss of life, personal injury, or severe property damage. The Permittee must complete analyses using EPA approved methods found in 40 CFR Part 136.

<sup>2</sup>The composite samples shall be collected from the manhole adjacent to Outfall 001 and shall consist of at least 4 grab samples collected at approximately equal intervals on a flow weighted basis during the time at which the discharge is entering the Wachusett Aqueduct Open Canal after the start of the flush water discharge. The timing of composite samples shall correspond with the timing of grab samples for the other parameters collected at Outfall 001. Grab samples collected for the Sudbury

Reservoir shall be collected from a location representative of ambient conditions. The timing of grab samples shall correspond with the timing of grab sampling for the other parameters collected at Outfall 001.

<sup>3</sup>The temperature must be reported for the effluent at the confluence of the Wachusett Aqueduct Open Canal with the Sudbury Reservoir and in the Sudbury Reservoir. The sampling location for the effluent at the confluence with the Sudbury Reservoir must be nearest the point at which the effluent enters the Sudbury Reservoir at Deerfoot Road. The sampling location for the Sudbury Reservoir temperature samples must be representative of ambient conditions. The timing of effluent sampling for temperature must be representative of when the effluent is present. If temperature impacts which result in a temperature rise of 1.5°F or greater or a temperature decrease of 5°F or greater are not found after representative data are collected, the Permittee may request elimination of temperature monitoring requirements.

<sup>4</sup>Requirement for State Certification.

<sup>5</sup>The pH of the effluent shall be in the range of 6.5 to 8.3 standard units but not more than 0.5 standard units outside of the naturally occurring range. There shall be no change from natural background conditions that would impair any use assigned to the class of the receiving water.

<sup>6</sup>If addition of chemicals is required to achieve pH limitations, such chemicals may be used, provided that they are identified in the permit application. If the addition of chemicals which were not disclosed in the permit application are required, such chemicals must be approved through subsequent communications with MassDEP and EPA. See Part I.A.14.e.iv. for requirements of the Best Management Practices Plan.

<sup>7</sup>The minimum level (ML) for Total Residual Chlorine (TRC) is defined as 20 µg/L. The ML is not the minimum level of detection, but rather the lowest point on the curve used to calibrate the test equipment for the pollutant of concern. If EPA approves a more sensitive method of analysis for TRC, the permit may be modified to require the use of the new method with a corresponding lower ML. When reporting sample data at or below the ML, see the latest EPA Region 1 NPDES Permit Program Instructions for the Discharge Monitoring Report Forms (DMRs) for guidance.

<sup>8</sup>Analysis must be completed for Total Recoverable Copper using a detection limit for analysis at least equal to the hardness-based chronic criteria, 1.90 µg/L.

<sup>9</sup>Analysis must be completed for Total Recoverable Lead using a detection limit for analysis at least equal to the hardness-based chronic criteria, 0.30 µg/L. If lead data demonstrates that there is no reasonable potential for the discharge to cause or contribute to an exceedance of the hardness-based chronic water quality criteria, the Permittee may request a reduction in frequency for lead monitoring requirements.

**PART I.A. (continued)**

4. The discharge shall not cause a violation of the water quality standards of the receiving water.
5. Any discharge of floating solids, foam, visible oil sheen, or settleable solids is prohibited.
6. The discharge shall not cause objectionable discoloration of the receiving water.
7. The effluent shall not contain materials in concentrations or in combinations which are hazardous or toxic to aquatic life or which would impair the uses designated by the classification of the receiving water.
8. Pollutants which are not limited by this permit, but which have been specifically disclosed in the permit application, may be discharged up to the frequency and level disclosed in the application, provided that such discharge does not violate Section 307 or 311 of the Clean Water Act (CWA) or applicable state water quality standards.
9. Notwithstanding specific conditions of this permit, the effluent must not lower the quality of any classified body of water below such classification, or lower the existing quality of any body of water if the existing quality is higher than the classification.
10. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe (40 CFR §122.42):
  - a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
    - i. One hundred micrograms per liter (100 µg/l);
    - ii. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or
    - iii. Any other notification level established by the Director in accordance with 40 CFR §122.44(f) and Massachusetts regulations.
  - b. That any activity has occurred or will occur which would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
    - i. Five hundred micrograms per liter (500 µg/l);
    - ii. One milligram per liter (1 mg/l) for antimony;
    - iii. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or
    - iv. Any other notification level established by the Director in accordance with 40 CFR §122.44(f) and Massachusetts regulations.

- c. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.
11. Toxics Control
  - a. The Permittee shall not discharge any pollutant or combination of pollutants in toxic amounts.
  - b. Any toxic components of the effluent shall not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standard, this permit may be revised or amended in accordance with such standards.
12. Numerical Effluent Limitations for Toxicants
  - a. U.S. Environmental Protection Agency (EPA) or the Massachusetts Department of Environmental Protection (MassDEP) may use the results of the chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to Section 304(a)(1) of the CWA, state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants, including but not limited to those pollutants listed in Appendix D of 40 CFR Part 122.
13. The Permittee shall report, to EPA and MassDEP, the results of any testing above that required herein, if it is conducted in accordance with EPA approved methods consistent with the provisions of 40 CFR §122.41 (I)(4)(ii).4.
14. Best Management Practices (BMP) Plan
  - a. The Permittee shall develop, implement, and maintain a Best Management Practices (BMP) Plan designed to reduce or prevent the discharge of pollutants in wastewater to waters of the United States. The BMP Plan shall be a written document that is consistent with the terms of the permit and identifies and describes the BMPs employed by the facility in operating wastewater controls (see Part I.A.14.e. below).
  - b. The BMP Plan shall be completed or updated and certified by the Permittee within 90 days after the effective date of this permit. The Permittee shall certify the BMP Plan has been prepared, that it meets the requirements of this permit, and that it reduces the pollutants discharged in wastewater to the extent practicable. The BMP Plan and certification shall be signed in accordance with the requirements identified in 40 CFR §122.22. A copy of the BMP Plan and certification shall be maintained at the facility and made available to EPA and MassDEP upon request.
  - c. The Permittee shall amend and update the BMP Plan within 14 days for any changes at the facility affecting the BMP Plan. Such changes may include, but are not limited to changes in the design, construction, operation, or maintenance of the facility, which have a significant effect on the potential for

the discharge of pollutants to the waters of the United States.

The amended BMP Plan shall be certified as described in Part I.A.14.b. above.

- d. The Permittee shall certify at least annually that the facility is in compliance with the BMP Plan. If the facility is not in compliance with any aspect of the BMP Plan, the annual certification shall state the non-compliance and the remedies which are being undertaken. Such annual certifications also shall be signed in accordance with the requirements identified in 40 CFR §122.22. The Permittee shall keep a copy of the current BMP Plan and all BMP Plan certifications (the initial certification, re-certifications, and annual certifications) signed during the effective period of this permit at the facility and shall make it available for inspection by EPA and MassDEP.
- e. The BMP Plan shall include, at a minimum, the following items:
  - i. A description of the pollution control equipment and procedures used to minimize the discharge to surface waters of suspended solids, floating solids, foam, visible oil sheen, and settleable solids, in order to comply with the permit requirements.
  - ii. Preventative maintenance procedures for the pollution control equipment to ensure that equipment failures are avoided.
  - iii. A characterization of tank bottom residuals removed from the Plant, a description of how residuals are produced, managed, and disposed, and the techniques used to prevent the residuals from entering the surface waters; if the material is to be removed from the site, describe who receives the material and its method of disposal and/or reuse.
  - iv. A record of the following information for all water additives used at the facility, (Water additives include chemicals used for coagulation, pH neutralization, dechlorination, control of biological growth, control of corrosion and scale in water pipes, etc.):
    - Product name, chemical formula, and manufacturer of the additive;
    - Purpose or use of the additive;
    - Material Safety Data Sheet (MSDS) and Chemical Abstracts Service (CAS) Registry number for each additive;
    - The frequency (hourly, daily, etc.), duration (hours, days), quantity (maximum and average), and method of application for the additive;
    - If available, the vendor's reported aquatic toxicity (NOAEL and/or LC50 in percent for aquatic organism(s)).
  - v. A description of the training to be provided for employees to assure they understand the goals, objectives, and procedures of the BMP Plan, the requirements of the NPDES Permit, and their individual responsibilities

for complying with the goals and objectives of the BMP Plan and the NPDES permit.

- vi. Documentation of operational and preventive maintenance activities, equipment inspections, procedure audits, and personnel training. Also, records of the calculations done at the time of sampling must be maintained at the facility so that an inspector may verify that the sampling was properly conducted. All documentation of BMP Plan activities shall be kept at the facility for at least three years and provided to EPA or MassDEP upon request.
15. The Permittee shall provide written notification to EPA and MassDEP at least 10 days in advance, where practicable, of the initiation of discharges resulting from any non-reoccurring maintenance, repair, testing or construction activity, which assures efficient operation and/or prevents loss of life, personal injury, or severe property damage. In the event of an unanticipated discharge, the Permittee shall provide notification to EPA and MassDEP in accordance with Part II.D.1.e. of this permit (Twenty-four hour reporting).

## **B. UNAUTHORIZED DISCHARGES**

This permit authorizes the Permittee to discharge only in accordance with the terms and conditions of this permit and only from the outfall listed in Part I.A.1, I.A.2., and I.A.3 of this permit. Discharges of wastewater from any other point sources which are not authorized by this permit or other NPDES permits shall be reported in accordance with Part II.D.1.e. of the this permit (Twenty-four hour reporting).

## **C. REOPENER CLAUSE**

This permit may be modified, or revoked and reissued in accordance with 40 CFR §122.62. The reason for modification or revocation may include, but is not limited to:

1. Material and substantial alterations or additions to the Facility or activity have occurred;
2. New information is received which was not available at the time of permit issuance and that would have justified the application of different permit conditions at the time of issuance; or
3. An applicable effluent standard or limitation is issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the CWA, which:
  - a. contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or
  - b. controls any pollutant not limited by this permit.

If the permit is modified or reissued, it shall be revised to reflect all currently applicable requirements of the CWA.

**D. MONITORING AND REPORTING**

For a period of one year from the effective date of the permit, the Permittee may either submit monitoring data and other reports to EPA in hard copy form or report electronically using NetDMR, a web-based tool that allows permittees to electronically submit discharge monitoring reports (DMRs) and other required reports via a secure internet connection. Beginning no later than one year after the effective date of the permit, the Permittee shall begin reporting using NetDMR, unless the facility is able to demonstrate a reasonable basis that precludes the use of NetDMR for submitting DMRs and reports. Specific requirements regarding submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

a. Submittal of Reports Using NetDMR

NetDMR is accessed from: <http://www.epa.gov/netdmr>. Within one year of the effective date of this permit, the Permittee shall begin submitting DMRs and reports required under this permit electronically to EPA using NetDMR, unless the facility is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports (“opt out request”). DMRs shall be submitted electronically to EPA no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a Permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees shall continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

b. Submittal of NetDMR Opt Out Requests

Opt out requests must be submitted in writing to EPA for written approval at least sixty (60) days prior to the date a facility would be required under this permit to begin using NetDMR. This demonstration shall be valid for twelve (12) months from the date of EPA approval and shall thereupon expire. At such time, DMRs and reports shall be submitted electronically to EPA unless the Permittee submits a renewed opt out request and such request is approved by EPA. All opt out requests should be sent to the following addresses:

Attn: NetDMR Coordinator  
U.S. Environmental Protection Agency, Water Technical Unit  
5 Post Office Square, Suite 100 (OES04-4)  
Boston, MA 02109-3912

and

Massachusetts Department of Environmental Protection  
Surface Water Discharge Permit Program  
627 Main Street, 2nd Floor  
Worcester, Massachusetts 01608

c. Submittal of Reports in Hard Copy Form

Monitoring results shall be summarized for each calendar month and reported on separate hard copy Discharge Monitoring Report Form(s) (DMRs) postmarked no later than the 15th day of the month following the completed reporting period. Signed and dated originals of the DMRs, and all other reports or notifications required herein or in Part II shall be submitted to the Director at the following address:

U.S. Environmental Protection Agency  
Water Technical Unit (OES04-SMR)  
5 Post Office Square - Suite 100  
Boston, MA 02109-3912

Duplicate signed copies of **DMRs, and all other reports or notifications** required above, shall be submitted to the State at the following address:

Massachusetts Department of Environmental Protection  
Bureau of Resource Protection  
Northeast Regional Office  
205B Lowell Street  
Wilmington, Massachusetts 01887

And, **without DMRs**, to the State at the following address:

Massachusetts Department of Environmental Protection  
Surface Water Discharge Permit Program  
627 Main Street, 2<sup>nd</sup> Floor  
Worcester, Massachusetts 01608

Any verbal reports, if required in Parts I and/or II of this permit, shall be made to both EPA New England and to MassDEP.

**E. STATE PERMIT CONDITIONS**

1. This authorization to discharge includes two separate and independent permit authorizations. The two permit authorizations are (i) a federal National Pollutant Discharge Elimination System permit issued by the U.S. Environmental Protection Agency (EPA) pursuant to the Federal Clean Water Act, 33 U.S.C. §§1251 et seq.; and

(ii) an identical state surface water discharge permit issued by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and 314 C.M.R. 3.00. All of the requirements contained in this authorization, as well as the standard conditions contained in 314 CMR 3.19, are hereby incorporated by reference into this state surface water discharge permit.

2. This authorization also incorporates the state water quality certification issued by MassDEP under § 401(a) of the Federal Clean Water Act, 40 C.F.R. 124.53, M.G.L. c. 21, § 27 and 314 CMR 3.07. All of the requirements (if any) contained in MassDEP's water quality certification for the permit are hereby incorporated by reference into this state surface water discharge permit as special conditions pursuant to 314 CMR 3.11.
3. Each agency shall have the independent right to enforce the terms and conditions of this permit. Any modification, suspension or revocation of this permit shall be effective only with respect to the agency taking such action, and shall not affect the validity or status of this permit as issued by the other agency, unless and until each agency has concurred in writing with such modification, suspension or revocation. In the event any portion of this permit is declared invalid, illegal or otherwise issued in violation of state law such permit shall remain in full force and effect under federal law as a NPDES Permit issued by the U.S. Environmental Protection Agency. In the event this permit is declared invalid, illegal or otherwise issued in violation of federal law, this permit shall remain in full force and effect under state law as a permit issued by the Commonwealth of Massachusetts.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
NEW ENGLAND - REGION I  
5 POST OFFICE SQUARE, SUITE 100  
BOSTON, MASSACHUSETTS 02109-3912

**FACT SHEET**

**DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)  
PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES PURSUANT TO  
THE CLEAN WATER ACT (CWA)**

**NPDES PERMIT NUMBER:** MA0040398

**PUBLIC NOTICE START AND END DATES:** September 25, 2012 – October 24, 2012

**NAME AND MAILING ADDRESS OF APPLICANT:**

Massachusetts Water Resources Authority (MWRA)  
Charlestown Navy Yard  
100 First Avenue, Building 39  
Boston, MA 02129

**NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:**

John J. Carroll Water Treatment Plant (CWTP)  
86 D'Angelo Drive  
Marlborough, MA 01752

**RECEIVING WATER:** Sudbury Reservoir (Segment MA82106)  
via the Wachusett Aqueduct Open Canal

**RECEIVING WATER CLASSIFICATION:** A

**SIC CODE:** 4941 (Water Supply)

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Attachments:

Attachment 1: John J. Carroll Water Treatment Plant Topographic Map

Attachment 2: John J. Carroll Water Treatment Plant Aerial Map

Attachment 3: Monitoring Data

Attachment 4: Massachusetts Water Resources Authority Treatment Plants and Other Water  
Facilities Map

Attachment 5: John J. Carroll Water Treatment Plant Schematic of Water Flow

**1. Proposed Action, Type of Facility, and Discharge Location**

The above named applicant has applied to the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) for the issuance of a National Pollutant Discharge Elimination System (NPDES) permit to discharge their process water (dechlorinated drinking water) into the designated receiving water. The John J. Carroll Water Treatment Plant (the “Plant”) began operating on July 27, 2005. During the construction of the Plant between 1999 and 2005, the Plant received two NPDES permits for discharges from the Plant while it was under construction: permits MA0103373 and MA0103381. The Draft Permit for permit number MA0103373 was issued on May 18, 2002 and the final issuance of the permit occurred July 15, 2002. Final Permit MA0103373 was terminated on September 21, 2004. The Draft Permit for permit number MA0103381 was issued on April 29, 2004 and the final issuance of the permit occurred June 28, 2004. Final Permit MA0103381 was terminated on August 11, 2005.

EPA received an application for a NPDES individual permit on November 2, 2009 and deemed the application complete. On November 5, 2009, EPA sent a letter pursuant to Section 308 of the Clean Water Act (“308 letter”) requesting more information related to discharges from the Plant to the Wachusett Aqueduct Open Canal, tributary to the Sudbury Reservoir (Segment MA82106). The Plant submitted the information requested in the 308 letter in three responses dated December 14, 2009, January 27, 2010, and February 26, 2010, and a revised individual permit application dated July 23, 2010. MWRA provided additional information in correspondences dated July 6, 2012, July 20, 2012, and July 23, 2012. The Draft Permit is based on the information provided in the original and revised applications, and the additional information provided to EPA through the above mentioned correspondences.

The Plant is located in Marlborough, MA and is designed to treat drinking water for 2.2 million people in 44 Massachusetts communities. The Plant is supplied with water from the Wachusett Reservoir through the Cosgrove Intake and Tunnel. The water undergoes disinfection, corrosion control, and fluoridation at the Plant. The treated drinking water is conveyed to customer communities in the MetroWest and Metro Boston areas through the MetroWest Water Supply Tunnel and the Hultman Aqueduct.

The Plant is located adjacent to Crane Swamp on D’Angelo Drive in Marlborough, Massachusetts (see Attachment 1). The Plant is located along the southern edge of the Wachusett Aqueduct Open Canal. Outfall 001 is located at Latitude 42° 18’ 44.7” Longitude 71° 34’ 53.4.” Attachment 2 shows an aerial view of the Plant, the location of Outfall 001, and the Wachusett Aqueduct Open Canal.

## 2. Description of Discharge

The Permittee has requested authorization to discharge process water from Outfall 001. The receiving water is the Sudbury Reservoir via the Wachusett Aqueduct Open Canal. The Wachusett Aqueduct Open Canal flows from northwest to southeast near the Plant. The discharge consists of dechlorinated drinking water that overflows or is pumped from the Plant during annual maintenance operations. MWRA submitted effluent monitoring data from annual maintenance for 2009 through 2012 for Outfall 001 in the original application, revised application, response to the 308 letter, and additional correspondence. EPA used these data in the development of the Draft Permit. A summary of these data is provided in Attachment 3.

## 3. Receiving Water Description

The facility discharges through Outfall 001 to the Sudbury Reservoir (Segment MA82106) via the Wachusett Aqueduct Open Canal. MassDEP classifies the Sudbury Reservoir and Wachusett Aqueduct Open Canal as Class A (public water supply)<sup>1</sup>. The Sudbury Reservoir and Wachusett Aqueduct Open Canal are part of the Massachusetts Water Resources Authority's backup drinking water supply for the metropolitan Boston area (see Attachment 4).

Class A waters and their tributaries are designated in the Commonwealth of Massachusetts Water Quality Standards (314 CMR 4.05(3)(b)) as “*a source of public water supply...as excellent habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation, even if not allowed. These waters shall have excellent aesthetic value. These waters are protected as Outstanding Resource Waters.*” CMR 4.05(3)(a) describes the criteria that apply to Class A waters, including dissolved oxygen (DO), Temperature, pH, bacteria, and solids.

Section 303(d) of the Federal Clean Water Act (CWA) requires states to identify those water bodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such require the development of total maximum daily loads (TMDL). Sudbury Reservoir (MA82106) is listed in the Massachusetts Year 2010 Integrated List of Waters (December 2008) as Category 4a water. Category 4a includes waters for which the required TMDL(s) have been completed and approved by EPA. Sudbury Reservoir was included in the Northeast Regional Mercury TMDL, which was based on atmospheric deposition, and approved by EPA in December 2007. As of 2008, the Sudbury Reservoir was removed from the 303(d) list.

## 4. Permit Limitations and Conditions

The permit effluent limitations of the Draft Permit, the monitoring requirements, and any implementation schedule (if required) may be found in the Draft Permit.

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<sup>1</sup> <http://www.mass.gov/dep/water/laws/tblfig.pdf>

## **5. Permit Basis: Statutory and Regulatory Authority**

The effluent limitations, monitoring requirements, and any implementation schedule, if required, may be found in Part 1 (Effluent Limitations and Monitoring Requirements) of the Draft Permit. The permit application is part of the administrative file (Permit No. MA0040398).

### **5.1. General Requirements**

The Clean Water Act (CWA) prohibits the discharge of pollutants to waters of the United States without a NPDES permit unless such a discharge is otherwise authorized by the CWA. The NPDES permit is the mechanism used to implement technology and water quality-based effluent limitations and other requirements including monitoring and reporting. The Draft Permit was developed in accordance with various statutory and regulatory requirements established pursuant to the CWA and applicable State regulations. During development, EPA considered the most recent technology-based treatment requirements and water quality-based requirements. The regulations governing the EPA NPDES permit program are generally found at 40 CFR Parts 122, 124, 125, and 136. The general conditions of the Draft Permit are based on 40 CFR §122.41 and consist primarily of management requirements common to all permits. The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308(a) of the CWA in accordance with 40 CFR §122.41(j), §122.44(i), and §122.48.

### **5.2. Technology-Based Requirements**

Subpart A of 40 CFR §125 establishes criteria and standards for the imposition of technology-based treatment requirements in permits under Section 301(b) of the CWA, including the application of EPA promulgated effluent limitations and case-by-case determinations of effluent limitations under Section 402(a)(1) of the CWA.

Technology-based treatment requirements represent the minimum level of control that must be imposed under Sections 301(b) and 402 of the CWA (see 40 CFR §125 Subpart A) to meet best practicable control technology currently available (BPT) for conventional pollutants and some metals, best conventional control technology (BCT) for conventional pollutants, and best available technology economically achievable (BAT) for toxic and non-conventional pollutants. In general, technology-based effluent guidelines for non-POTW facilities must be complied with as expeditiously as practicable but in no case later than three years after the date such limitations are established and in no case later than March 31, 1989 [See 40 CFR §125.3(a)(2)]. Compliance schedules and deadlines not in accordance with the statutory provisions of the CWA cannot be authorized by a NPDES permit.

EPA has not promulgated technology-based National Effluent Guidelines for Water Supply (SIC 4941) in 40 CFR Subchapter N Parts 425 through 471. In the absence of technology-based

effluent guidelines, the permit writer is authorized under Section 402(a)(1)(B) of the CWA to establish effluent limitations on a case-by-case basis using Best Professional Judgment (BPJ).

### **5.3. Water Quality-Based Requirements**

Section 301(b)(1)(C) of the CWA requires that effluent limitations based on water quality considerations be established for point source discharges when such limitations are necessary to meet state or federal water quality standards that are applicable to the designated receiving water. This is necessary when technology-based limitations would interfere with the attainment or maintenance of water quality in the receiving water.

Under Section 301(b)(1)(C) of the CWA and EPA regulations, NPDES permits must contain effluent limits more stringent than technology-based limits where more stringent limits are necessary to maintain or achieve state or federal water quality standards. Water quality standards consist of three parts: (1) beneficial designated uses for a water-body or a segment of a water-body; (2) numeric and/or narrative water quality criteria sufficient to protect the assigned designated use(s); and (3) anti-degradation requirements to ensure that once a use is attained it will not be degraded. The Massachusetts Surface Water Quality Standards (WQSs), found at 314 CMR 4.00, include these elements. The State will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained or attained. These standards also include requirements for the regulation and control of toxic constituents and require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless site specific criteria are established.

The draft permit must limit any pollutant or pollutant parameter (conventional, non-conventional, and toxic) that is or may be discharged at a level that causes or has the "reasonable potential" to cause or contribute to an excursion above any water quality standard (40 CFR §122.44(d)). An excursion occurs if the projected or actual in-stream concentration exceeds an applicable water quality criterion. In determining "reasonable potential," EPA considers: (1) existing controls on point and non-point sources of pollution; (2) pollutant concentration and variability in the effluent and receiving water as determined from the permit's re-issuance application, monthly discharge monitoring reports (DMRs), and State and Federal Water Quality Reports; (3) sensitivity of the indicator species used in toxicity testing; (4) known water quality impacts of processes on waste waters; and (5) where appropriate, dilution of the effluent in the receiving water.

### **5.4. Anti-Backsliding**

Anti-backsliding as defined in 40 CFR §122.44(l)(1) requires reissued permits to contain limitations as stringent as or more stringent than those of an permit, unless the circumstances allow application of one of the defined exceptions to this regulation. Anti-backsliding applies to limits contained in the existing permit and, therefore, these limits are continued in the draft

permit. Since this Draft Permit is a new issuance, anti-backsliding requirements of the CWA do not apply (see Sections 402(o) and 303(d)(4) of the CWA and 40 CFR §122.44(l)(1 and 2)).

### **5.5. Anti-Degradation**

Federal regulations found at 40 CFR § 131.12 require that all existing uses in the receiving water, along with the level of water quality necessary to protect those existing uses, are maintained and protected. The Commonwealth of Massachusetts' anti-degradation provisions found in 314 CMR § 4.04 ensure that provisions in 40 CFR Section 131.12 are met. The effluent limits in the draft permit should ensure that provisions in 314 CMR § 4.04 are met. In accordance with Section 301(b)(1)(C) of the CWA, EPA is required to obtain certification from the state in which the discharge is located that WQSs or other applicable requirements of state law are met. Therefore, permit requirements for the Plant's discharges to the Sudbury Reservoir must comply with the Massachusetts Surface Water Quality Standards' anti-degradation requirements and may require a specific anti-degradation authorization from the Commonwealth. EPA has requested that the Commonwealth conduct an anti-degradation review for this permit and inform EPA of the results of its review.

## **6. Explanation of the Permit's Effluent Limitations**

### **6.1. Facility Information**

The Plant is located in Marlborough, MA and came online in July 2005. The current annual average production of the Plant is 200 MGD and it is designed for a total capacity of 405 MGD at peak level. The water undergoes disinfection, corrosion control, and fluoridation at the Plant. Each year, the Massachusetts Water Resources Authority (MWRA) performs annual maintenance at the Plant. In order to conduct this maintenance, MWRA first removes one half of the Plant from service, and then the second half. This can only be done during the low-demand period for the treated water, which typically begins in November and ends by late March. In order to drain one half of the Plant, MWRA pumps or overflows water in the tanks to the Plant 120-inch plant overflow line through the storage tank effluent structure.

The Plant discharges wastewater during annual maintenance to the Wachusett Aqueduct Open Canal. The Open Canal continues for approximately three miles before reaching the confluence with the Sudbury Reservoir at the Lower Dam, Deerfoot Road in Southborough. The Open Canal is 10 to 12 feet deep and has a design capacity of 320 MGD and was constructed as part of the transmission system between the Wachusett Reservoir and the Sudbury Reservoir. The Open Canal also receives a small volume of baseflow from the adjacent Crane Swamp. The Wachusett Aqueduct Forebay is located upstream of the Open Canal and is separated from the Open Canal by a small dam. The Wachusett Aqueduct Forebay, Open Canal and Sudbury Reservoir continue to be a part of MWRA's emergency backup water supply system.

**6.2. Permitted Outfall and Dilution Factor**

As part of its annual maintenance activities, the Plant must drawdown storage tank water, disinfect the storage tanks, and then flush the disinfected storage tanks with clean water. This results in three distinct wastewater discharges: storage tank drawdown water, storage tank disinfection water, and storage tank flush water (Attachment 5). Each of the three processes is described in further detail in the table and text below. A typical discharge sequence includes 10 to 14 days to drain one half of the Plant (i.e., storage tank drawdown), followed by several weeks of maintenance activity during which there are no discharges. When the maintenance activity is complete, the tanks are filled with “disinfection water,” which is held for 24 hours. This process takes 2-3 days, during which there are no discharges until the “disinfection water” is released to the Plant overflow line through the storage tank effluent structure. Once the “disinfection water” has released, the third process begins, which is to flush the tanks. This process requires 2-3 days. The process is then repeated for the second half of the Plant.

<b>Discharge Description</b>	<b>Water Quality</b>	<b>Estimated Volume (MG)</b>	<b>Estimated Rate (MGD)</b>	<b>Typical Approximate Time/Duration</b>	<b>Discharge Point</b>
<i>Storage Tank (Train) Drawdown Water</i>	Treated water but without fluoride. Dechlorinated.	21 from each half of the Plant	1.5-2.0 (Average 1.65)	Early to mid-November and mid-December; 10-14 days to drain each half	Open Canal
<i>Storage Tank Disinfection Water</i>	Treated water without fluoride but with high chlorine (up to 25 mg/L). Dechlorinated.	21 from each half	8-25 (Average 12)	Mid December and late January; 2-3 days to fill, hold and release, each half	Open Canal
<i>Storage Tank Flush Water</i>	Treated water with or without fluoride. Dechlorinated.	21 from each half	8-25 (Average 12)	Mid December and late January; 2-3 days, each half	Open Canal

***Storage Tank (Train) Drawdown Water: Draining of post treatment area and storage tank***

Prior to shutting down a treatment train for storage tank draining, plant operators reduce Plant production to allow the storage tank level to drop to the low end of the normal operating range. Approximately 21 MG remain in the storage tank area for each process train (Train A or B).

During the initial storage tank dewatering, the tank water flows through the tank bottom drain valves (“mud valves”) to the storage tank drain pumping station that pumps water at a rate of 2 MGD. Water in this tank has been treated to meet drinking water standards, as follows:

1. Ozonation for primary disinfection and ozone quenching with sodium bisulfite ( $\text{NaHSO}_3$ ).
2. Chloramination for residual disinfection with sodium hypochlorite ( $\text{NaOCl}$ ) and aqueous ammonia ( $\text{NH}_3$ ) to form monochloramines (bound chlorine that will carry through and provide disinfection for the entire path of the drinking water after it leaves the Plant).
3. Corrosion control with pH adjustment with sodium carbonate ( $\text{Na}_2\text{CO}_3$ ) and carbon dioxide ( $\text{CO}_2$ ).
4. Fluoridation with hydrofluorosilicic acid ( $\text{H}_2\text{SiF}_6$ ).

At least eight hours prior to shutting down a treatment train (Train A or B) for draining, the fluoride feed to the train is shut down. This will reduce fluoride levels in the discharge water to background levels.

Upon isolation of the area to be drained, the storage tank mud valves are opened to fill the storage tank drain pump station sump. The pump discharge valves are set to pump the storage tank drawdown water to the 120” Plant overflow line, which ultimately flows to the Wachusett Aqueduct Open Canal. Operation of the sodium bisulfite feed system is initiated with addition of bisulfite to the storage tank effluent structure and the chemical feed rate is set to dechlorinate to the level of chlorine found in the drinking water at that time. After the preliminary steps are completed, the drain pumps are activated and operate at a rate of 1.5-2.0 MGD to pump the water through the Plant overflow line to the Open Canal through Outfall 001. Plant operators take chlorine residual and pH readings at Outfall 001 and adjust the sodium bisulfite feed to the storage tank effluent structure accordingly.

Tank drainage can take 10 to 14 days depending on the pump rate and amount of leakage from the mud valves on the active half of the Plant. When 2-3 inches of water remain in the tanks, the pump station is shut down. The remaining water, any settled solids, and wash down water are directed to the sewer system. The sewer connection with pump station permit #W030345 issued by MassDEP allows conveyance of up to 600,000 gallons of silt/algae laden wash water to the municipal sewer system that ultimately flows to the Marlborough Westerly Wastewater Treatment Plant.

At all times except during winter maintenance, the tank drain pump station discharge valves are set to pump any leakage and flow resulting from operation, testing, or maintenance of the storage tank drain pump station to the sewer system.

***Storage Tank Disinfection Water: Disinfection of post treatment area and storage tanks***

When all maintenance activities are completed after approximately six weeks, the Plant areas must be disinfected prior to being put back into service. The post treatment area and storage tank are filled with “disinfection water.” Sodium hypochlorite is added to obtain a minimum residual of 10 mg/L after 24 hours contact time; the typical dose is 12 to 15 mg/L. The pH is adjusted with sodium carbonate and carbon dioxide so that final pH (after dechlorination) will be within the range of 6.5 to 8.3. After the tank is filled with disinfection water, it is held for 24 hours. After 24 hours with a chlorine residual of at least 10 mg/L, the disinfection water is dechlorinated in the storage tank effluent structure, and released to the Plant overflow line. Treated drinking water (without the addition of fluoride) is introduced into the storage tanks as the disinfection water is released. This begins the flushing process.

***Storage Tank Flush Water: Disinfection water is flushed from storage tanks and replaced with drinking water***

Flushing of the disinfection water occurs at a flow rate ranging from 8 to 25 MGD. The goal of the flushing is to replace tank disinfection water from the post treatment area and storage tank with drinking water quality water. Flushing water discharges through the storage tank effluent structure, where it is then dechlorinated with sodium bisulfite and pumped to the Plant overflow line. The chemical feed rate is set to reduce the level of chlorine measured in the overflow between the storage tank and the storage tank effluent structure.

When the measured chlorine residual of water from the tank prior to dechlorination is less than 4 mg/L (i.e. drinking water levels), samples are collected and analyzed in accordance with drinking water standards. Flushing continues for approximately 18 hours until the sample analysis is completed. If the samples results meet drinking water standards, flushing ends. In the unlikely event of unsatisfactory sample results, flushing will continue while additional drinking water samples are collected and analyzed.

The Draft Permit authorizes the discharge of process water from the three aforementioned sources at the Plant through Outfall 001 to the Sudbury Reservoir (Segment MA82106) via the Wachusett Aqueduct Open Canal. As described above, the Sudbury Reservoir is a Class A waterbody and emergency backup water supply for MWRA.

EPA considers available dilution to determine water quality based limitations in a NPDES permit. 314 CMR 4.03(3)(c), which applies to lakes and ponds, states that “the Department will establish extreme hydrologic conditions at which aquatic life criteria must be applied on a case-by-case basis. In all cases existing uses shall be protected and the selection shall not interfere with the attainment of designated uses.” MassDEP determined that the dilution factor for the Plant is 10:1.

## 7. Derivation of Effluent Limits under the Federal CWA and the Commonwealth of Massachusetts' Water Quality Standards

### 7.1. Flow

As described above, the volume of process water discharged through Outfall 001 depends on the specific step that the Plant is executing during its annual maintenance. The maximum daily flow discharged at the Plant may range from 8 to 25 MGD. The maximum flow value is anticipated during the "Storage Disinfection Water" and "Storage Tank Flush Water" steps of the maintenance process. Therefore, the Draft Permit contains a maximum daily flow limit of 25 MGD as well as weekly monitoring for flow when the Plant is discharging during annual maintenance.

### 7.2. Total Suspended Solids (TSS )

CWTP has reported zero average concentration and zero maximum daily concentration of TSS. The Draft Permit contains a monthly average TSS limitation of 30 mg/l and a maximum daily TSS limitation of 50 mg/l when the Plant is discharging. These limitations are established using best professional judgment (BPJ) pursuant to Section 402(a)(1) of the CWA. The limits are based upon the TSS concentrations estimated to be achievable by using sedimentation basins/tanks/ponds to treat wastewaters from potable water treatment facilities (PWTf). The limits are sufficiently stringent to achieve the water quality standards of Massachusetts.

### 7.3. Temperature

The monitoring requirements in the Draft Permit for temperature are based on state certification requirements under Section 401(a)(1) of the CWA, as described in 40 CFR Parts 124.53 and 124.55. Massachusetts Water Quality Standards define numeric limits for temperature increases for Class A waters to not more than 1.5 °F.

In addition, the Massachusetts Surface Water Quality Standards (314 CMR 4.05(3)(2)(b)) contains narrative criteria for temperature, for Class A receiving waters, which state, "*Natural seasonal and daily variations that are necessary to protect existing and designated uses shall be maintained. There shall be no changes from natural background conditions that would impair any use assigned to this Class, including those conditions necessary to protect normal species diversity, successful migration, reproductive functions or growth of aquatic organisms.*"

MassDEP and EPA have consulted with Massachusetts Division of Fisheries and Wildlife (MassDFW) to establish a guideline for temperature decreases that is protective of aquatic life. This guideline is intended to prevent a rapid decrease in ambient water temperature that could impact aquatic life, particularly fish. MDFW determined that a drop in temperature less than 5°F below ambient conditions is protective of aquatic life.

EPA does not have enough information for the effluent or the Sudbury Reservoir to determine if discharges from the Plant are likely to exceed Massachusetts Water Surface Quality numeric or

narrative criteria. Therefore, the Draft Permit contains weekly temperature monitoring requirements for the effluent at the confluence with the Sudbury Reservoir when the discharge is present and ambient conditions in the Sudbury Reservoir when the Plant is discharging. Since temperature stratification in the water supply treated at the Plant (i.e., the Wachusett Reservoir) and the receiving water (i.e., the Sudbury Reservoir) is unlikely during the portion of the year in which maintenance at the Plant occurs, the Draft Permit allows for the possibility of eliminating the temperature testing if representative sampling indicates that the discharge is not likely to result in an increase of the ambient water temperature greater than 1.5 °F nor result in a decrease of the ambient water temperature greater than 5 °F.

#### **7.4. pH**

The Draft Permit requires a pH limitation range of 6.5-8.3 standard units (SU) when the Plant is discharging. The pH limits are based on the Massachusetts Surface Water Quality Standards, 314 Code of Massachusetts Regulations (CMR), Inland Water, Class A at 4.05(3)(a)3. These standards require that the pH of the receiving water be in the range of 6.5 to 8.3 standard units but not more than 0.5 units outside the background range. There shall be no change from background conditions that would impair any use assigned to this Class. The water quality criteria have been adopted as discharge limitations based on certification requirements under Section 401(a)(1) of the CWA, as described in 40 CFR Parts 124.53 and 124.55.

Part 6.2 of this Fact Sheet describes how MWRA treats the discharge to dechlorinate the water and bring pH levels to between 6.5 and 8.3. As aforementioned, MWRA uses sodium carbonate and CO<sub>2</sub> to control pH.

#### **7.5. Total Residual Chlorine (TRC)**

Potable water sources are typically chlorinated to minimize or eliminate pathogens. 40 CFR §141.72 stipulates that a public water system's residual disinfectant concentration in the water entering the distribution system cannot be less than 0.2 mg/l for more than 4 hours. As aforementioned, the Plant discharges the final treated water containing residual disinfectant. Therefore, the wastewater discharges from PWTFS have the potential to exceed water quality standards for TRC.

The Massachusetts Water Quality Standards Implementation Policy for the Control of Toxic Pollutants in Surface Waters, dated February 23, 1990, states that waters shall be protected from unnecessary discharges of excess chlorine. In addition, The Commonwealth of Massachusetts' surface water quality standards require the use of federal water quality criteria where a specific pollutant could reasonably be expected to adversely affect existing or designated uses (314 CMR 4.05 (5)(e)).

The acute and chronic concentrations of TRC allowed in the effluent are based on the National Recommended Water Quality Criteria as follows:

Freshwater acute (Class A or B) = 19 ug/l (0.019 mg/l)  
Freshwater chronic (Class A or B) = 11 ug/l (0.011 mg/l)

limits are calculated using the water quality criteria above and the available dilution in the Sudbury Reservoir, according to the following equation:

$$\text{Effluent Limit} = (\text{Dilution Factor}) \times (\text{Water Quality Criteria})$$

Since the dilution factor for the Sudbury Reservoir is 10:1, the Draft Permit contains a daily maximum effluent limit of 190 µg/L and a monthly average effluent limit of 110 µg/L when the Plant is discharging.

EPA notes that the TRC limits in the Draft Permit are below the analytical detection limit for this pollutant. In these situations, EPA Region 1 is following guidance set forth in the Technical Support Document for Water Quality Based Toxics Control (EPA 505/2-90-001, March 1991), page 111, which recommends that “the compliance level be defined in the permit as the minimum level (ML).” Therefore, the limit at which compliance determinations will be based is the ML. For this Draft Permit, the ML for total residual chlorine is defined at 20 ug/L and any value below 20 ug/L shall be reported as non-detect. This value may be reduced by permit modification as EPA and the State approve more sensitive tests.

#### **7.6. Ammonia Nitrogen**

Ammonia can impact the receiving water’s dissolved oxygen level and can also be toxic at elevated levels. As described in Part 6.2, the Plant discharges water containing chloramines (formed with chlorine and ammonia) as a residual disinfectant. Sodium bisulfite is used prior to the effluent being discharged, thus causing the chloramines to be resuspended in solution as ammonia and chlorides. Concentrations of ammonia in solution could potentially be toxic to aquatic life.

EPA’s recommended chronic criteria for ammonia are based on temperature, pH and the presence of early life stages of fish in the receiving water. Information provided to EPA by MWRA dated January 10, 2002 indicates that surface water temperatures in the Sudbury Reservoir range from 32°F in the winter to as much as 80°F in the summer. Information in the NPDES permit applications states that the optimum pH for producing chloramines is 8.4 SU, however, the Draft Permit limits the pH of the effluent to 8.3 SU.

According to the 1999 Update of Ambient Water Quality Criteria for Ammonia, when the pH of the receiving water is 8.3 SU and the receiving water temperature is 0 to 14°C (32 to 57.2°F), the recommended acute criterion value for early life stages present in the receiving water is 2.47 mg/L. when the pH of the receiving water is 8.3 SU and the receiving water temperature is 0 to

7°C (32 to 44.6°F), the recommended chronic criterion value for early life stages present in the receiving water is 1.52 mg/L. These values were chosen for calculation of the effluent limitations because according to the update, the ammonia nitrogen limits decrease as pH and temperature increase. The maximum allowable pH under Massachusetts WQSs for the Sudbury Reservoir is 8.3 SU and the maximum ambient temperature of the Sudbury Reservoir during the months the discharge is expected to occur is expected to be similar to the temperatures measured in Crane Swamp during annual maintenance from 2011 to 2012 (i.e., within the range at which the acute and chronic limits apply, 0 to 14 °C and 0 to 7 °C, respectively). See Attachment 3.

Since the dilution factor for the Sudbury Reservoir is 10:1, the Draft Permit includes an acute ammonia nitrogen limit of 24.7 mg/L that applies to the three discharges from the Plant and a chronic ammonia nitrogen limit of 15.2 mg/L that applies to the storage tank drawdown water discharge when the Plant is discharging.

#### 7.7. Aluminum (Al)

EPA recognizes the potential adverse impacts of elevated aluminum concentrations. The Criterion Maximum Concentration (CMC) for aluminum is 750 µg/L and the Criterion Continuous Concentration (CCC) for aluminum is 87 µg/L (see *National Recommended Water Quality Criteria*). Based on sample results for aluminum between 2009 and 2012, the Plant's discharge occasionally contains low concentrations of aluminum, similar to concentrations measured in the Wachusett Reservoir (i.e., the water supply treated at the Plant).<sup>2</sup> The Plant does not add aluminum during the treatment process. EPA completed a reasonable potential analysis to determine if these discharges could cause or contribute to an exceedance of the freshwater aluminum criteria. As shown below, when EPA compares the projected effluent concentrations of aluminum<sup>3</sup> using the effluent data provided by MWRA to these criteria, the Plant's discharge does not have reasonable potential to exceed the CMC freshwater criteria for aluminum.

Aluminum:	Acute	99 <sup>th</sup> percentile projected concentration = 47.5 µg/L
		= 47.5 µg/L < 750 µg/L (acute criterion)
		= No reasonable potential

However, EPA does not have enough information to determine if concentrations of aluminum in the Plant's discharge have reasonable potential to exceed the CCC for aluminum because the minimum detection limits used for analyses were generally higher than the CCC. In addition, EPA does not have enough information for ambient concentrations of aluminum in the Sudbury Reservoir to determine if the effluent contributes to an exceedance of the CCC for aluminum.

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<sup>2</sup> Water quality data for the Wachusett Reservoir was obtained from MWRA's monthly Water Quality Update reports are available at <http://www.mwra.state.ma.us/monthly/wqupdate/qual3wq.htm>.

<sup>3</sup> The procedure used to obtain the 95<sup>th</sup> and 99<sup>th</sup> percentile projections is the standard method described in EPA's *Technical Support Document for Water Quality-based Toxics Control*: EPA/505/2-90-001, 1991.

Therefore, the Draft Permit contains monitoring requirements for total recoverable aluminum in the effluent and in the Sudbury Reservoir. The Draft Permit allows for the possibility of reducing the sampling frequency for aluminum after testing is completed for two cycles of maintenance provided the data demonstrates there is no reasonable potential to cause or contribute to an exceedance of the water quality criteria.

#### **7.8. Hardness-Dependent Metals (Cd, Cu, Pb and Zn)**

Certain metals in water can be toxic to aquatic life. In addition, the toxicity of some metals can be affected by the hardness of the ambient water and/or effluent. Sample results for discharges from the Plant during the maintenance activities conducted between 2009 and 2012 indicated that the hardness-based metals occasionally present in the discharge include low concentrations of cadmium, copper, lead and zinc. EPA completed a reasonable potential analysis to determine if these discharges could cause or contribute to an exceedance of hardness-dependent freshwater metals criteria. EPA's analysis is discussed in detail below.

##### Hardness

Sampling completed between 2009 and 2012, indicates a median effluent hardness of 15.5 mg/L, similar to the median hardness in the Wachusett Reservoir, 13.8 µg/L. To support the determination of freshwater criteria for hardness-based metals, the Draft Permit contains a monitoring requirement for hardness in the effluent and in the Sudbury Reservoir. The Draft Permit allows for the possibility of reducing the sampling frequency for hardness provided the metals data demonstrates there is no reasonable potential to cause or contribute to an exceedance of the hardness-based water quality criteria.

##### Cadmium

Sampling completed between 2009 and 2012, indicates a median effluent cadmium concentration of <0.03 µg/L, similar to the median cadmium concentration in the Wachusett Reservoir, <0.5 µg/L. Based on the median effluent hardness of 15.5 mg/L, the hardness-based CMC and CCC total recoverable freshwater criteria for cadmium are 0.32 µg/L and 0.07 µg/L, respectively, as shown in the calculations below. EPA determined the chronic and acute criteria (total recoverable) for cadmium as follows:

$$\exp\{m [\ln(h)] + b\}/CF$$

Where:

m = Pollutant-specific coefficient for acute or chronic criteria

b = Pollutant-specific coefficient for acute or chronic criteria

ln = Natural logarithm

h = hardness of the receiving water

CF = conversion factor for dissolved metals

Therefore:

Cadmium: Acute criteria  $e\{1.0166*[\ln 15.5] + -3.924\}/1.022 = 0.32 \mu\text{g/L}$

$$\text{Chronic criteria} = e^{\{0.7409 * [\ln 15.5] + -4.719\} / 0.987} = 0.07 \mu\text{g/L}$$

As shown below, when EPA compares the projected effluent concentrations of cadmium to these criteria using the effluent data provided by MWRA and the dilution factor for the Sudbury Reservoir, the Plant's discharge does not have reasonable potential to exceed the hardness-based CMC or CCC freshwater criteria for cadmium.

Cadmium:	Acute	99 <sup>th</sup> percentile projected concentration = 0.0045 $\mu\text{g/L}$
		= 0.0045 $\mu\text{g/L}$ < 0.32 $\mu\text{g/L}$ (acute criterion)
		= No reasonable potential
	Chronic	95 <sup>th</sup> percentile projected concentration = 0.0045 $\mu\text{g/L}$
		= 0.0045 $\mu\text{g/L}$ < 0.07 $\mu\text{g/L}$ (chronic criterion)
		= No reasonable potential

Therefore, the Draft Permit does not contain effluent limits for cadmium.

### Copper

MWRA occasionally uses copper sulfate, a common algaecide, to control levels of nuisance algae in the Wachusett Reservoir (i.e., the water supply treated at the Plant) that may impart a taste or odor to the water supply. Application of copper sulfate often occurs in June, but not necessarily in consecutive years, in order to control *Anabaena* blooms, a blue-green algae that imparts a musty or septic taste to water. Other treatments are used on an as-needed basis to control golden-brown algae, particularly *Synura*, which imparts a fishy taste to water. Copper sulfate may be applied at the surface or at a depth of up to 24 feet. Discharges from the Plant do not occur during the time of year copper sulfate application in the Wachusett Reservoir typically occurs.

Sampling completed between 2009 and 2012, indicated a median effluent copper concentration of 1.41  $\mu\text{g/L}$ , similar to the median copper concentration in the Wachusett Reservoir, <3  $\mu\text{g/L}$ . Based on the median effluent hardness of 15.5 mg/L, the hardness-based CMC and CCC total recoverable freshwater criteria for copper<sup>4,5</sup> are 2.42  $\mu\text{g/L}$  and 1.90  $\mu\text{g/L}$ , respectively,<sup>6</sup> as shown in the calculations below. EPA determined the chronic and acute criteria (total recoverable) for copper as follows:

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<sup>4</sup> For hardness-dependent criteria, see *National Recommended Water Quality Criteria, Appendix B - Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent*:

<http://water.epa.gov/scitech/swguidance/standards/current/index.cfm>.

<sup>5</sup> 314 CMR 4.05(5)(e) requires that "permit limits will be written in terms of total recoverable metals." Dissolved metal criteria have been converted to total recoverable metals, See *Appendix A - Conversion Factors for Dissolved Metals*: <http://water.epa.gov/scitech/swguidance/standards/current/index.cfm#appendxa>

<sup>6</sup> For the mixing equation used to determine estimated downstream concentrations, see *Technical Support Document for Water Quality-based Toxics Control*: EPA/505/2-90-001, 1991.

$$\exp\{m [\ln(h)] + b\}(\text{see above for definitions})$$

Therefore:

Copper:            Acute criteria  $e\{0.9422*[\ln 15.5] + -1.700\}/0.960 = 2.42 \mu\text{g/L}$   
                       Chronic criteria  $e\{0.8545*[\ln 15.5] + -1.702\}/0.960 = 1.90 \mu\text{g/L}$

As shown below, when EPA compares the projected effluent concentrations of copper to these criteria using the effluent data provided by MWRA and the dilution factor for the Sudbury Reservoir, the Plant's discharge does not have reasonable potential to exceed the CMC or CCC hardness-based freshwater criteria for copper.

Copper:	Acute	99 <sup>th</sup> percentile projected concentration = 0.329 $\mu\text{g/L}$ = 0.329 $\mu\text{g/L}$ < 2.42 $\mu\text{g/L}$ (acute criterion) = No reasonable potential
	Chronic	95 <sup>th</sup> percentile projected concentration = 0.264 $\mu\text{g/L}$ = 0.264 $\mu\text{g/L}$ < 1.90 $\mu\text{g/L}$ (chronic criterion) = No reasonable potential

However, because copper sulfate is applied to the water supply treated at the Plant (i.e. the Wachusett Reservoir) and copper is present in the discharge, the Draft Permit contains monitoring requirements for total recoverable copper in the effluent. In addition, EPA does not have enough information for ambient concentrations of copper in the Sudbury Reservoir to determine if the effluent contributes to an exceedance of the hardness-based freshwater criteria for copper. Therefore, the Draft Permit also contains monitoring requirements for total recoverable copper in the Sudbury Reservoir.

Lead

Sampling completed between 2009 and 2012, indicates a median effluent lead concentration of <0.5  $\mu\text{g/L}$ , similar to the median lead concentration in the Wachusett Reservoir, <0.05  $\mu\text{g/L}$ . Based on the median effluent hardness of 15.5 mg/L, the hardness-based CMC and CCC total recoverable freshwater criteria for lead are 7.61  $\mu\text{g/L}$  and 0.30  $\mu\text{g/L}$ , respectively, as shown in the calculations below. EPA determined the chronic and acute criteria (total recoverable) for lead as follows:

$$\exp\{m [\ln(h)] + b\}/CF \text{ (see above for definitions)}$$

Therefore:

Lead:            Acute criteria  $e\{1.2730*[\ln 15.5] + -1.460\}/1.063 = 7.61 \mu\text{g/L}$   
                       Chronic criteria  $e\{1.2730*[\ln 15.5] + -4.705\}/1.063 = 0.30 \mu\text{g/L}$

As shown below, when EPA compares the projected effluent concentrations of copper to these criteria using the effluent data provided by MWRA and the dilution factor for the Sudbury



Therefore, the Draft Permit does not contain effluent limits for zinc.

### **7.9. Whole Effluent Toxicity Testing**

Sections 402(a)(2) and 308(a) of the CWA provide EPA and States with the authority to require toxicity testing. Section 308 specifically describes biological monitoring methods as techniques that may be used to carry out objectives of the Act. Under certain State narrative WQSs, and Sections 301, 303 and 402 of the CWA, EPA and the States may establish toxicity-based limits to implement the narrative "no toxics in toxic amounts."

Massachusetts has narrative criteria in their water quality regulations (See Massachusetts 314 CMR 4.05(5)(e)) that prohibits toxic discharges in toxic amounts. Excepting chemicals used for pH neutralization and/or dechlorination, the Draft Permit prohibits the addition of toxic materials or chemicals to the discharges and prohibits the discharge of pollutants in amounts that would be toxic to aquatic life. WET testing is conducted to determine whether certain effluents, often containing potentially toxic pollutants, are discharged in a combination which produces a toxic amount of pollutants in the receiving water.

MWRA provided the results of WET testing conducted during maintenance activities between 2010 through 2012 to EPA. MWRA completed eight acute WET tests for two organisms, which indicated an LC<sub>50</sub> percent of 100 in 13 of 16 results, 95 in 2 of 16 results, and 90 in 1 of 16 results (see Attachment 3). The LC<sub>50</sub> is the concentration of effluent which causes mortality to 50% of the test organisms. Based on these results, regular WET testing is not required in the Draft Permit.

### **7.10. Best Management Practices (BMPs)**

The Draft Permit contains new requirements for the Permittee to develop, implement, and maintain a Best Management Practices (BMP) Plan for wastewater discharges from the Plant. The purpose of the BMP Plan is to prevent or minimize the concentration of pollutants (biological, chemical and physical) in the wastewater discharged to surface waters. The new BMP Plan will ensure both that the wastewater produced by the Plant is protective of the quality of the receiving water from the Sudbury Reservoir is water safe for human consumption.

Therefore, the Draft Permit requires that the Permittee develop a BMP Plan with BMPs that are selected and implemented to satisfy effluent limitations. The BMP Plan includes the following:

1. A description of the pollution control equipment and procedures;
2. Preventative maintenance procedures for the pollution control equipment;
3. A characterization of tank bottom residuals removed from the Plant, a description of how residuals are produced, managed, and disposed, and the techniques used to prevent the residuals from entering the surface waters;

4. A record of all water additives (including amounts) used for pH neutralization, dechlorination, control of biological growth, control of corrosion and scale, or similar chemicals;
5. A description of the training to be provided for employees to assure they understand the goals, objectives, and procedures of the BMP Plan, the requirements of the NPDES Permit, and their individual responsibilities for complying with the goals and objectives of the BMP Plan and the NPDES permit; and
6. Documentation of operational and preventive maintenance activities, equipment inspections, procedure audits, personnel training and sampling calculations.

### **8. Essential Fish Habitat**

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Service (NMFS) if EPA's actions or proposed actions that it funds, permits, or undertakes, may adversely impact any essential fish habitat, such as waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C. § 1802(10)). "Adversely impact" means any impact which reduces the quality and/or quantity of EFH (50 CFR §600.910(a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. §1855(b)(1)(A)) EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

EPA has determined that the Sudbury Reservoir is not covered by the EFH designation for riverine systems at Latitude 42° 18' 44.7" Longitude 71° 34' 53.4" as determined by the NOAA EFH Mapper.<sup>7</sup> EPA's review of available EFH information indicated that the only EFH species that may possibly be present in the general vicinity of the Sudbury Reservoir is the Atlantic salmon (*Salmo salar*). However, EPA received guidance from NMFS that the Sudbury Reservoir for the CWTP is not listed as EFH for Atlantic salmon.<sup>8</sup> Since this water body is not designated EFH for any federally managed species, consultation with NMFS is not required.

### **9. Endangered Species Act**

Under Section 7(a) of the Endangered Species Act, every federal agency is required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize federally listed endangered or threatened species of fish, wildlife, or plants, or result in the adverse modification of critical habitat of such species. EPA initiates consultation concerning listed species under their

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<sup>7</sup> NOAA EFH Mapper available at [http://sharpfin.nmfs.noaa.gov/website/EFH\\_Mapper/map.aspx](http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx)

<sup>8</sup> Correspondence from Michael R. Johnson, NMFS, to John H. Nagle, EPA Region 1, June 4, 2012.

purviews with the United States Fish and Wildlife Service (USFWS) for freshwater species, and the National Marine Fisheries Service (NMFS) for marine species and anadromous fish.

No federally listed threatened or endangered species have been identified for the Town of Marlborough.<sup>9</sup> However, EPA has reviewed the federal endangered or threatened species of fish, wildlife, and plants in Middlesex County to determine if the re-issuance of this NPDES permit could potentially impact any such listed species. One threatened species was identified for Middlesex County.<sup>10</sup> According to the USFWS, the small whirled pogonia (*Isotria medeoloides*) is found in “forests with somewhat poorly drained soils and/or a seasonally high water table.” This species is not aquatic. The proposed permit action will have no impact on this protected species.

The two endangered species of anadromous fish which occur in Massachusetts, shortnose sturgeon (*Acipenser brevirostrom*) and Atlantic sturgeon (*Acipenser oxyrinchus*), have not been identified in the Sudbury Reservoir.<sup>11</sup> Based on the expected normal distribution of these species, it is highly unlikely that they would be present in the vicinity of this discharge. Therefore, consultation with NMFS under Section 7 of the ESA is not required.

### **10. Monitoring**

The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308 (a) of the CWA in accordance with 40 CFR §§122.41 (j), 122.44 (l), and 122.48.

The Draft Permit includes new provisions related to Discharge Monitoring Report (DMR) submittals to EPA and the State. The Draft Permit requires that, no later than one year after the effective date of the permit, the Permittee submit all monitoring data and other reports required by the permit to EPA using NetDMR, unless the Permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports (“opt out request”).

In the interim (until one year from the effective date of the permit), the Permittee may either submit monitoring data and other reports to EPA in hard copy form, or report electronically using NetDMR.

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<sup>9</sup>See listings for Marlborough in “Rare Species Occurrences by Town” at [http://www.mass.gov/dfwele/dfw/nhosp/info\\_by\\_town.htm](http://www.mass.gov/dfwele/dfw/nhosp/info_by_town.htm)

<sup>10</sup>See listings for Middlesex County in *Federally Listed Endangered and Threatened Species in Massachusetts* at [http://www.fws.gov/newengland/EndangeredSpec-Consultation\\_Project\\_Review.htm](http://www.fws.gov/newengland/EndangeredSpec-Consultation_Project_Review.htm)

<sup>11</sup>See documents for shortnose sturgeon and Atlantic sturgeon at [http://www.mass.gov/dfwele/dfw/nhosp/species\\_info/esa\\_list/esa\\_list.htm](http://www.mass.gov/dfwele/dfw/nhosp/species_info/esa_list/esa_list.htm)

NetDMR is a national web-based tool for regulated Clean Water Act permittees to submit DMRs electronically via a secure Internet application to EPA through the Environmental Information Exchange Network. NetDMR allows participants to discontinue mailing in hard copy forms under 40 CFR § 122.41 and § 403.12. EPA currently conducts free training on the use of NetDMR, and anticipates that the availability of this training will continue to assist permittees with the transition to use of NetDMR. NetDMR can be accessed at <http://www.epa.gov/netdmr>. Further information about NetDMR, including contacts for EPA Region 1, information on upcoming trainings, and contact information for Massachusetts, is provided on this website.

The Draft Permit requires the Permittee to report monitoring results obtained during each calendar month using NetDMR, no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a Permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees must continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

The Draft Permit also includes an “opt-out” requests process. Permittees who believe they cannot use NetDMR due to technical or administrative infeasibilities, or other logical reasons, must demonstrate the reasonable basis that precludes the use of NetDMR. These permittees must submit the justification, in writing, to EPA at least sixty (60) days prior to the date the facility would otherwise be required to begin using NetDMR. Opt-outs become effective upon the date of written approval by EPA and are valid for twelve (12) months from the date of EPA approval. The opt-outs expire at the end of this twelve (12) month period. Upon expiration, the Permittee must submit DMRs and reports to EPA using NetDMR, unless the Permittee submits a renewed opt out request sixty (60) days prior to expiration of its opt out, and such a request is approved by EPA.

Until electronic reporting using NetDMR begins, or for those permittees that receive written approval from EPA to continue to submit hard copies of DMRs, the Draft Permit requires that submittal of DMRs and other reports required by the permit continue in hard copy format.

### **11. State Certification Requirements**

EPA may not issue a permit unless the Massachusetts Department of Environmental Protection certifies that the effluent limitations included in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The MassDEP has reviewed the Draft Permit and advised EPA that the limitations are adequate to protect water quality and continue to meet the requirements of the antidegradation policy. EPA has requested permit certification by the State pursuant to 40 CFR §124.53 and expects the Draft Permit will be certified.

### **12. Comment Period, Hearing Requests, and Procedures for Final Decisions**

All persons, including applicants, who believe any condition of the Draft Permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to Shauna Little, U.S. EPA, Office of Ecosystem Protection, Industrial Permits Branch, 5 Post Office Square – OEP06-1, Boston, MA 02109-3912. Any person, prior to such date, may submit a request in writing for a public hearing to consider the Draft Permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public meeting may be held if the criteria stated in 40 CFR §124.12 are satisfied. In reaching a final decision on the Draft Permit, EPA will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period, and after any public hearings, if such hearings are held, the EPA will issue a Final Permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Within 30 days following the notice of the Final Permit decision, any interested person may submit a petition for review of the permit to EPA's Environmental Appeals Board consistent with 40 CFR §124.19.

### **13. EPA and MassDEP Contacts**

Additional information concerning the Draft Permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays, from the EPA and MassDEP contacts below:

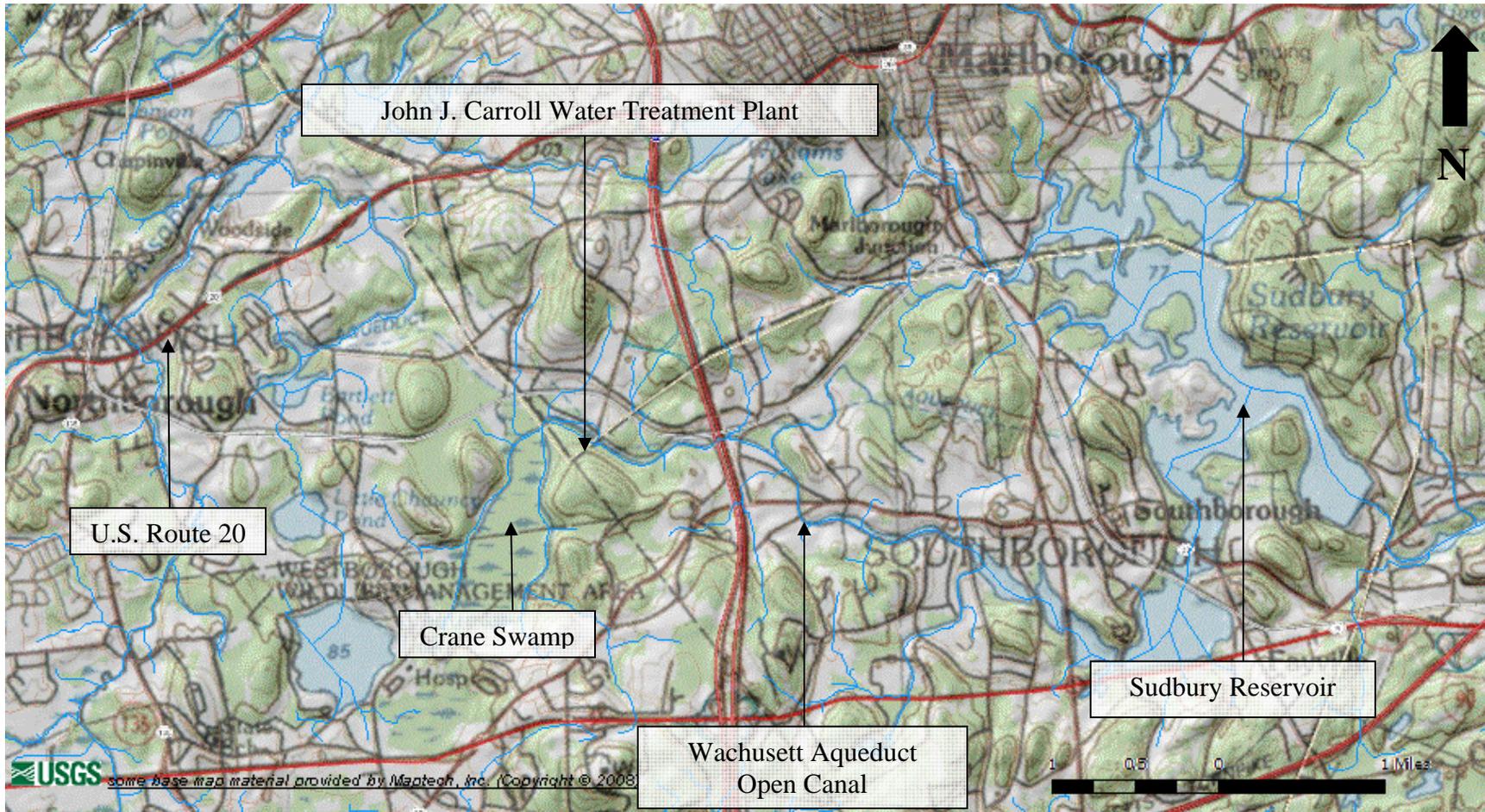
Shauna Little, EPA New England - Region 1  
5 Post Office Square, Suite 100 (OEP06-1)  
Boston, Massachusetts 02109-3912  
Telephone: (617) 918-1989 FAX: (617)  
918-0989  
Email: [little.shauna@epa.gov](mailto:little.shauna@epa.gov)

Kathleen Keohane, Massachusetts  
Department of Environmental Protection  
Division of Watershed Management,  
Surface Water Discharge Permit Program  
627 Main Street, 2nd Floor  
Worcester, Massachusetts 01608  
Telephone: (508) 767-2856 FAX: (508)  
791-4131  
Email: [kathleen.keohane@state.ma.us](mailto:kathleen.keohane@state.ma.us)

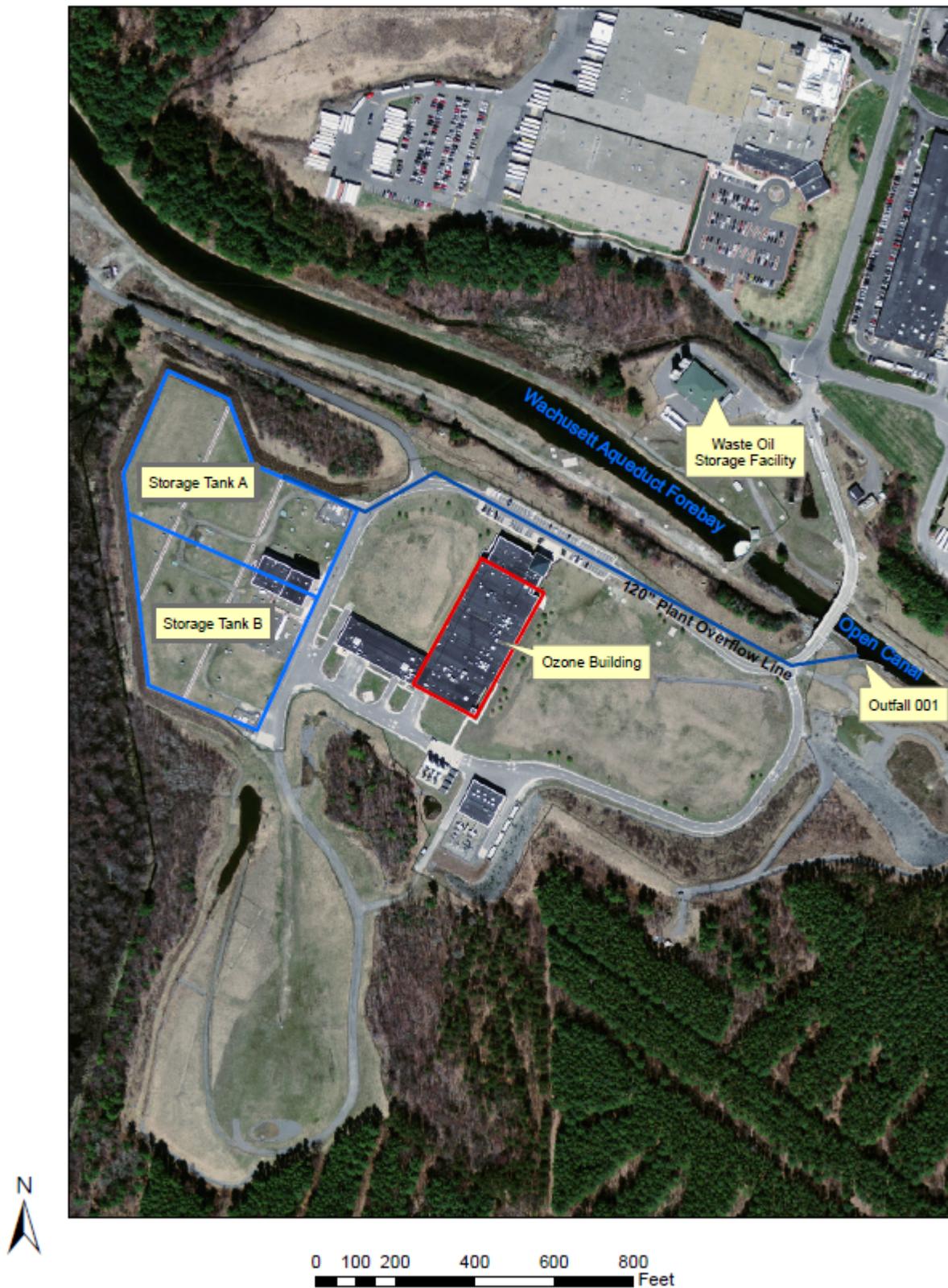
9/20/2012

**Stephen S. Perkins, Director**  
**Office of Ecosystem Protection**  
**U.S. Environmental Protection Agency**

Attachment 1: John J. Carroll Water Treatment Plant Topographic Map



Attachment 2: John J. Carroll Water Treatment Plant Aerial Map







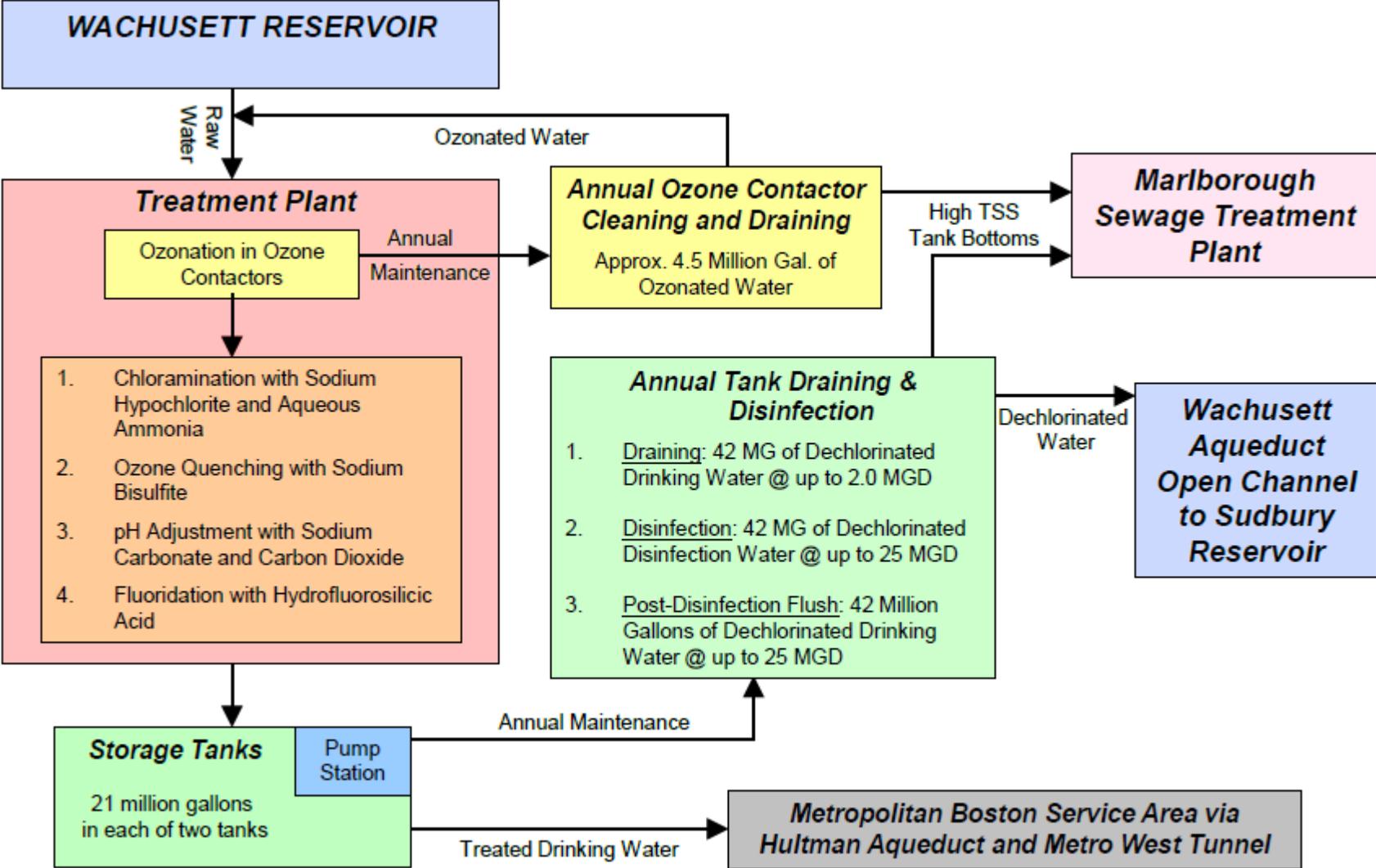
Sample Month and Year	Hardness (mg/L)	Al Total (µg/L)	Cu Total (µg/L)	Cd Total (µg/L)	Lead Total (µg/L)	Zinc Total (µg/L)
<b>Wachusett Reservoir</b>						
May-12	---	---	<3	---	---	<1.5
Apr-12	15.3	19.1	<3	<0.5	<0.05	<1.5
Mar-12	---	---	<3	---	---	---
Jan-12	14.4	15.3	---	<0.5	<0.05	<1.5
Dec-11	---	---	<3	---	---	<1.5
Oct-11	13.8	21.2	<3	<0.5	0.05	<1.5
Sep-11	---	---	37.8	---	---	1.8
Aug-11	---	---	27	---	---	<1.5
Jul-11	13.4	17.2	<3	<0.5	0.05	<1.5
Jun-11	---	---	<3	---	---	1.6
May-11	---	---	<3	---	---	2.3
Apr-11	13.6	18.6	<3	<0.5	0.08	<1.5
Mar-11	---	---	<3	---	---	<1.5
Feb-11	---	---	<3	---	---	<1.5
Jan-11	13.6	<15	<3	<0.5	<.05	<1.5
Dec-10	13.2	---	<3	---	---	<1.5
Nov-10	---	---	<3	---	---	<1.5
Oct-10	12.4	<15	<3	<0.5	<.05	<1.5
Sep-10	---	---	<3	---	---	<1.5
Aug-10	---	---	<3	---	---	---
Jul-10	13.8	<15	<3	<0.5	<.05	<1.5
Jun-10	15.9	---	<3	---	---	---
May-10	---	---	<3	---	---	---
Apr-10	15.1	48.9	<3	<0.5	<.05	2.9
Mar-10	---	---	<3	---	---	2.4
Feb-10	---	---	<3	---	---	---
Jan-10	14.8	<15	<3	<0.5	<.05	<1.5
Dec-09	---	---	<3	---	---	<1.5
Nov-09	---	---	<3	---	---	<1.5
Oct-09	14	<15	<3	<0.5	<.05	<1.5

Sample Date	Temp (°C)
<b>Crane Swamp</b>	
1/3/2011	1.7
2/15/2011	0.3
1/24/2012	1.3
4/3/2012	4.4

### Attachment 4: Massachusetts Water Resources Authority Treatment Plants and Other Water Facilities Map



Attachment 5: John J. Carroll Water Treatment Plant Schematic of Water Flow



### **Response to Public Comments**

In accordance with the provisions of 40 C.F.R. §124.17, this document presents EPA's responses to comments received on the draft NPDES Permit, #MA0040398. The response to comments explains and supports the EPA determinations that form the basis of the final permit. From September 25, 2012 to October 24, 2012, the United States Environmental Protection Agency ("EPA") and the Massachusetts Department of Environmental Protection ("MassDEP") (together, the "Agencies") solicited public comments on a draft NPDES permit, #MA0040398, developed pursuant to an individual permit application from the Massachusetts Water Resources Authority ("MWRA") for the issuance of a National Pollutant Discharge Elimination System ("NPDES") permit to discharge dechlorinated drawdown water, dechlorinated disinfection water, and dechlorinated flush water from the John J. Carroll Water Treatment Plant Outfall number 001 to the Wachusett Aqueduct Open Canal, tributary to the Sudbury Reservoir (Segment MA82106) in Marlborough, Massachusetts.

After a review of the comments received, EPA and MassDEP have made a final decision to issue this permit authorizing these discharges. The Final Permit is substantially identical to the Draft Permit that was available for public comment.

Although EPA's decision-making process has benefitted from the comments and additional information submitted, the information and arguments presented did not raise any substantial new questions concerning the permit. EPA did, however, make minor changes in response to comments which are listed below. The analyses underlying these changes are explained in the responses to individual comments that follow and are reflected in the Final Permit. Comments are paraphrased.

Copies of the Final Permit may be obtained by writing or calling EPA's NPDES Industrial Permits Section (OEP 06-1), Office of Ecosystem Protection, 5 Post Office Square, Suite 100, Boston, MA 02109-3912; Telephone: (617) 918-1989.

#### **Summary of Changes in the Final Permit**

##### **1. Cover Page**

Correction: The facility address noted as 86 D'Angelo Drive has been corrected to 84 D'Angelo Drive.

Correction: A typographical error in "to receiving water named Sudbury Reservoir (Segment MA82106) via the Wachusett Aqueduct Open Channel" has been corrected to read "to receiving water named Sudbury Reservoir (Segment MA82106) via the Wachusett Aqueduct Open Canal."

Change: The permit effective date sentence which stated, "If no comments are received, this permit shall become effective upon signature," has been removed, as public comments were received.

##### **2. Part I.A.1.**

Correction: The authorized discharge noted as “storage tank drawdown water,” has been corrected to “drawdown water.”

Correction: The receiving water body noted as “Wachusett Aqueduct Open Channel,” has been corrected to “Wachusett Aqueduct Open Canal.”

Change: Effluent limitations for ammonia have been changed to a report-only requirement.

Change: Effluent limitations for aluminum and monitoring requirements for aluminum for the Sudbury Reservoir have been removed.

Change: Sampling requirements for effluent hardness has been changed from grab to composite.

Change: Footnote 1 has been clarified to state “Samples must be collected weekly when the Plant is discharging drawdown water. Drawdown water is defined as treated drinking water held in the Plant’s storage tanks or operational appurtenances. **A minimum of one sample must be collected and reported for each drawdown event.** Discharges of drawdown water from the Plant are limited to those necessary to complete regular reoccurring maintenance or non-reoccurring maintenance, repair, testing or construction which assures efficient operation and/or prevents loss of life, personal injury, or severe property damage. The Permittee must complete analyses using EPA approved methods found in 40 CFR Part 136.”

Change: Footnote 3 has been clarified to state “The temperature must be reported for the effluent at the confluence of the Wachusett Aqueduct Open Canal with the Sudbury Reservoir and in the Sudbury Reservoir.” A superscript notation has been added to the Sudbury Reservoir effluent characteristic for clarity.

Correction: The reference included in footnote 6 to the Best Management Practices Plan requirements has been corrected from Part I.A.12.e.iv. to Part I.A.14.e.iv.

Change: Footnote 8, which applied to monitoring requirements for aluminum, no longer applies and has been removed. Footnotes 9 and 10 were renumbered 8 and 9 as a result.

### 3. Part I.A.2.

Correction: The authorized discharge noted as “storage tank disinfection water,” has been corrected to “disinfection water.”

Correction: The receiving water body noted as “Wachusett Aqueduct Open Channel,” has been corrected to “Wachusett Aqueduct Open Canal.”

Change: Effluent limitations for ammonia have been changed to a report-only requirement.

Change: Effluent limitations for aluminum and monitoring requirements for aluminum for the Sudbury Reservoir have been removed.

Change: Sampling requirements for copper, and lead in the Sudbury Reservoir has been changed from composite to grab. Sampling requirements for aluminum no longer apply.

Change: Sampling requirements for effluent hardness has been changed from grab to composite.

Change: Footnote 1 has been clarified to state “Samples must be collected weekly when the Plant is discharging disinfection water. Disinfection water is defined as treated drinking water that has been dosed with chlorine and held in the Plant’s storage tanks or operational appurtenances. **A minimum of one sample must be collected and reported for each drawdown event.** Discharges of disinfection water from the Plant are limited to those necessary to complete regular reoccurring maintenance or non-reoccurring maintenance, repair, testing or construction which assures efficient operation and/or prevents loss of life, personal injury, or severe property damage. The Permittee must complete analyses using EPA approved methods found in 40 CFR Part 136.”

Change: Footnote 3 has been clarified to state “The temperature must be reported for the effluent at the confluence of the Wachusett Aqueduct Open Canal with the Sudbury Reservoir and in the Sudbury Reservoir.” A superscript notation has been added to the Sudbury Reservoir effluent characteristic for clarity.

Correction: The reference included in footnote 6 to the Best Management Practices Plan requirements has been corrected from Part I.A.12.e.iv. to Part I.A.14.e.iv.

Change: Footnote 8, which applied to monitoring requirements for aluminum, no longer applies and has been removed. Footnotes 9 and 10 were renumbered 8 and 9 as a result.

#### 4. Part I.A.3.

Correction: The authorized discharge noted as “storage tank flush water,” has been corrected to “flush water.”

Correction: The receiving water body noted as “Wachusett Aqueduct Open Channel,” has been corrected to “Wachusett Aqueduct Open Canal.”

Change: Effluent limitations for ammonia have been changed to a report-only requirement.

Change: Effluent limitations for aluminum and monitoring requirements for aluminum for the Sudbury Reservoir have been removed.

Change: Sampling requirements for copper and lead in the Sudbury Reservoir has been changed from composite to grab. Sampling requirements for aluminum no longer apply.

Change: Sampling requirements for effluent hardness has been changed from grab to composite.

Change: Footnote 1 has been clarified to state “Samples must be collected weekly when the Plant is discharging flush water. Flush water is defined as treated drinking water used to flush disinfection water out of the Plant’s storage tanks or operational appurtenances.

**A minimum of one sample must be collected and reported for each flush event.**

Discharges of flush water from the Plant are limited to those necessary to complete regular reoccurring maintenance or non-reoccurring maintenance, repair, testing or construction which assures efficient operation and/or prevents loss of life, personal injury, or severe property damage. The Permittee must complete analyses using EPA approved methods found in 40 CFR Part 136.”

Change: Footnote 3 has been clarified to state “The temperature must be reported for the effluent at the confluence of the Wachusett Aqueduct Open Canal with the Sudbury Reservoir and in the Sudbury Reservoir.” A superscript notation has been added to the Sudbury Reservoir effluent characteristic for clarity.

Correction: The reference included in footnote 6 to the Best Management Practices Plan requirements has been corrected from Part I.A.12.e.iv. to Part I.A.14.e.iv.

Change: Footnote 8, which applied to monitoring requirements for aluminum, no longer applies and has been removed. Footnotes 9 and 10 were renumbered 8 and 9 as a result.

5. Part I.A.10.a.i.

Correction: A typographical error which read “100 ug/L” has been corrected to “100 µg/L.”

6. Part I.A.14.a.,b.,c., and d.

Correction: Six instances of a typographical inconsistency which read “permittee” have been corrected to “Permittee.”

7. Part I.A.15

Addition: This condition has been added to require notification to EPA and MassDEP for any discharges related to non-reoccurring maintenance, repair, testing or construction.

8. Part B.

Correction: One instance of a typographical inconsistency which read “permittee” has been corrected to “Permittee.”

9. Part D.a.

Correction: A formatting error in the internet address for NetDMR has been corrected to “<http://www.epa.gov/netdmr>.”

10. Part D.a., and b.

Correction: Five instances of a typographical inconsistency which read “permittee” have been corrected to “Permittee.”

### **Public Comments**

#### **A. Comments submitted by Michael J. Hornbrook, Chief Operating Officer, Massachusetts Water Resources Authority:**

##### **Comment A1:**

MWRA respectfully requests that the requirement to perform weekly sampling for Total Recoverable Aluminum be deleted from the permit. MWRA believes that monitoring aluminum is appropriate where an aluminum-based coagulant is used, similar to the requirements of the Potable Water Treatment Facility General Permit MAG640000. MWRA does not use an Aluminum-based coagulant at the CWTP.

##### **Response to Comment A1:**

Monitoring requirements for aluminum established in the Potable Water Treatment Facility General Permit (MAG640000) apply specifically to facilities that discharge less than 1 MGD and are known to use a process similar across facilities (i.e., the process of coagulation using aluminum-based coagulants) with known water quality impacts of this process on wastewaters. While the Plant does not use aluminum-based coagulants, the Plant, through its processes, generates effluent which may contain aluminum. While EPA expects that the aluminum concentrations in the effluent likely reflect the ambient concentrations in the Wachusett Reservoir, EPA must consider potential impacts to the Sudbury Reservoir that could result from the transfer of water from the Wachusett Reservoir.

As described in the Fact Sheet accompanying the Draft Permit, a NPDES permit must limit any pollutant (e.g., aluminum) that is or may be discharged at a level that causes, or has “reasonable potential” to cause or contribute to an excursion above any water-quality criterion in the Massachusetts water quality standards (see 40 CFR § 122.44(d)(1)). An excursion occurs if the projected or actual in-stream concentration exceeds the applicable criterion. In determining “reasonable potential,” EPA considers existing controls on point and non-point sources of pollution, pollutant concentration and variability in the effluent and receiving water, sensitivity of the indicator species used in toxicity testing, known water quality impacts of processes on waste waters, and dilution of the effluent in the receiving water.

As to whether the inclusion of aluminum limits is appropriate for discharges from the Plant, EPA reviewed the analysis completed to determine if discharges could cause or contribute to an excursion above the freshwater aluminum criteria. EPA acknowledges that aluminum was not detected above the minimum detection limit for analyses in samples collected between 2009 and 2012 in 11 of 14 samples. However, the minimum detection limit used for these 11 samples, 90 µg/L, exceeds the applicable freshwater

chronic criterion for aluminum, 87 µg/L. Therefore, EPA assumes the worst-case scenario for these 11 samples (e.g., the effluent concentration is equal to the minimum detection limits used for analysis, 90 µg/L). EPA projected the maximum monthly average effluent concentrations for each type of discharge generated by the Plant by calculating the 95<sup>th</sup> percentile concentrations as shown below (also see Attachment 1).

**Aluminum:**

Drawdown water 95<sup>th</sup> percentile concentration = 180 µg/L

Disinfection water 95<sup>th</sup> percentile concentration = 207 µg/L

Flush water 95<sup>th</sup> percentile concentration = 342 µg/L

The standard approach to determine reasonable potential is to use the projected effluent concentrations and the median upstream ambient concentration of aluminum in a steady-state mixing equation to determine if the discharge has reasonable potential to cause or contribute to a violation of WQC under critical conditions. Since all of the aluminum in the discharge is a result of influent water, sampling to date includes background conditions. Therefore, EPA compared the 95<sup>th</sup> percentile concentration accounting for the dilution available in the Sudbury Reservoir (10:1) to the applicable criterion as follows:

**Aluminum:**

Drawdown water Chronic C<sub>r</sub> =  $\frac{180 \mu\text{g/L}}{10} < 87 \mu\text{g/L}$   
= No reasonable potential

Disinfection water Chronic C<sub>r</sub> =  $\frac{207 \mu\text{g/L}}{10} < 87 \mu\text{g/L}$   
= No reasonable potential

Flush water Chronic C<sub>r</sub> =  $\frac{342 \mu\text{g/L}}{10} < 87 \mu\text{g/L}$   
= No reasonable potential

As a result, the Final Permit removes the monitoring requirement for aluminum in the effluent and the Sudbury Reservoir. Footnote 8 in the Draft Permit, which specified a lower minimum level (ML) for analysis of aluminum and allowed for the possibility of reducing the sampling frequency for aluminum no longer applies, and has also been removed.

**Comment A2:**

MWRA notes that the sampling requirements for Aluminum, Copper and Lead in Sudbury Reservoir differ between the three discharges. MWRA respectfully suggests that the reservoir sampling be made consistent, and that grab sampling is appropriate given the size of the Sudbury Reservoir and the stability of its water quality.

**Response to Comment A2:**

EPA has changed the sample type for copper and lead analysis from composite to grab for samples collected from the Sudbury Reservoir (Part I.A.2. and Part I.A.3. now consistent with sampling requirements in Part I.A.1.). EPA has removed Sudbury Reservoir aluminum monitoring requirements. As a result, the sample type for aluminum no longer applies.

**Comment A3:**

MWRA also notes that the hardness sampling for the effluent for all three discharges is a grab sample while the metals are composite samples. As they use the same analytical procedures, MWRA respectfully requests that the hardness sampling be similar to the metals sampling.

**Response to Comment A3:**

EPA has changed the sample type for effluent hardness from grab to composite to be consistent with the metals analyses required for the effluent. (Part I.A.1., Part I.A.2. and Part I.A.3.)

**Comment A4:**

Footnote 3 could be clarified to read in part, “The temperature must be reported for the effluent at the confluence of the Wachusett Aqueduct Open Canal with the Sudbury Reservoir and in the Sudbury Reservoir.”

**Response to Comment A4:**

EPA agrees with the MWRA that the suggested wording provides additional clarity to footnote 3 on pages 3 of 15, 6 of 15 and 8 of 15 of the Draft Permit. The Final Permit has been changed to incorporate this wording. EPA also added footnote 3 to the Effluent Limitations and Monitoring Requirements for the Sudbury Reservoir in Part I.A.1., I.A.2., and I.A.3. for clarity.

**Comment A5:**

MWRA understands from EPA and DEP that the official designation for Clean Water Act purposes is the “Wachusett Aqueduct Open Canal,” however, in several places the draft permit refers to the “Wachusett Aqueduct Open Channel.”

**Response to Comment A5:**

“Wachusett Aqueduct Open Canal” is the appropriate designation and has been corrected the Final Permit where necessary.

**Comment A6:**

The first sentence in the discussion of detection limits and Total Residual Chlorine in the Fact Sheet no longer appears to be appropriate as the draft permit limits are 190 µg/l (acute) and 110 µg/l (chronic). This discussion may have referred to a situation without a dilution factor. The remainder of the paragraph may need to be edited for clarity.

**Response to Comment A6:**

EPA agrees that the detection limits for Total Residual Chlorine are not a concern in the Final Permit, given the available dilution. Since Fact Sheets are final documents that accompany Draft NPDES Permits, they are not changed in response to comments. EPA's "Response to Comments" may acknowledge Fact Sheet errors or inconsistencies, and then provide the necessary rationale for changes that may be required in the Final NPDES Permit.

Therefore, EPA notes that the following paragraph of the Draft Permit Fact Sheet does not apply to the limits included in the Final Permit, as the limits are not lower than the current method detection limit:

EPA notes that the TRC limits in the Draft Permit are below the analytical detection limit for this pollutant. In these situations, EPA Region 1 is following guidance set forth in the Technical Support Document for Water Quality Based Toxics Control (EPA 505/2-90-001, March 1991), page 111, which recommends that "the compliance level be defined in the permit as the minimum level (ML)." Therefore, the limit at which compliance determinations will be based is the ML. For this Draft Permit, the ML for total residual chlorine is defined at 20 µg/L and any value below 20 µg/L shall be reported as non-detect. This value may be reduced by permit modification as EPA and the State approve more sensitive tests.

In this case, no change to the NPDES Permit is necessary. The Response to Comments serves as the official correction.

**Comment A7:**

On page 10 of 23 of the Fact Sheet, in the fourth line of first paragraph under Storage Tank Flush Water, the words "...and pumped to the Plant overflow..." should read "...and released to the Plant overflow..."

**Response to Comment A7:**

Since Fact Sheets are final documents that accompany Draft NPDES Permits, they are not changed in response to comments. EPA's "Response to Comments" may acknowledge Fact Sheet errors or inconsistencies, and then provide the necessary rationale for changes that may be required in the Final NPDES Permit.

Therefore, EPA notes that the sentence included on page 10 of 23 of the Fact Sheet which read “Flushing water discharges through the storage tank effluent structure, where it is then dechlorinated with sodium bisulfite and pumped to the Plant overflow line” should read “Flushing water discharges through the storage tank effluent structure, where it is then dechlorinated with sodium bisulfite and released to the Plant overflow line.”

In this case, no change to the NPDES Permit is necessary. The Response to Comments serves as the official correction.

**Comment A8:**

MWRA notes that it may occasionally use sodium hydroxide to adjust pH of the discharge into permit range. MWRA intends that this comment letter serve as notification and request for EPA and DEP approval that sodium hydroxide be included as an allowed chemical under this permit.

**Response to Comment A8:**

EPA acknowledges that the Plant may occasionally use sodium hydroxide to adjust the pH of the effluent in order to meet permit requirements. The Final Permit includes water quality-based effluent limitations which require that the pH of the effluent is within the range of 6.5 to 8.3 standard units but not more than 0.5 standard units outside of the naturally occurring range. EPA believes the conditions of the Final Permit are sufficient to protect the water quality of the Sudbury Reservoir and meet Mass WQSs. Therefore, additional monitoring requirements or limitations are not needed at this time. All water additives used by the facility must be listed in the Best Management Practices Plan as required by Part I.A.14.e.iv. of the Final Permit.

**B. Additional comments were received from the MWRA in correspondence dated December 14, 2012 in response to discussions between EPA and MWRA regarding maintenance and construction activities at the Plant. EPA notes that these comments were received after the close of the public comment period, so EPA is not obligated to respond to them (see 40 CFR § 124.13). Nonetheless, as a courtesy, and because the comments provide additional clarification for conditions included in the Final Permit, EPA is providing a summary of these comments, with response. Since the Final Permit is substantially identical to the draft available for public comment, these comments do not result in changes to the Final Permit which warrant reopening of the public comment period (see 40 CFR § 124.14).**

**Comment B1:**

We request clarification from EPA that the discharges relating to upcoming construction-related projects at the Carroll facility that will require discharge of treated drinking water substantially identical in nature to the types of discharges currently included in the draft individual permit and other currently unanticipated construction and maintenance-related discharges substantially identical to the winter maintenance flows described in the draft permit are allowable under this permit. We note that the Fact Sheet is substantially

accurate in its description of plant operation and nature of anticipated regular reoccurring discharges. It does not discuss non-reoccurring discharges which could occur during any portion of the year.

To summarize, two upcoming construction-related projects at the Carroll facility require discharge of treated drinking water substantially identical in nature to the types of discharges currently covered in the draft individual permit. They include the following:

The soil cover over the treated water storage tanks was determined to present a potential sanitary risk to the drinking water in the tanks. A construction project will include the replacement of the soil cover and water-proofing membrane over the tanks. This work will require that each of the storage tanks be taken out of service one at a time, drained, disinfected, and flushed in a manner virtually identical to the winter maintenance procedure described in the draft individual permit. This procedure will result in the discharge of treated drinking water substantially identical in chemical characteristics and quantity to the flows generated during the tank related portions of winter maintenance. Soil on one half of the tank will be replaced and that tank cell will put back into service and repeated for the other tank. The only difference between this activity and the winter maintenance is that this discharge will take place during the spring through late fall rather than during the winter.

A second construction project includes the addition of UV disinfection facilities to the water treatment plant to comply with EPA's Long Term 2 Enhanced Surface Water Treatment Rule. This project includes the addition of UV equipment, 208 feet of 120-inch piping, 630 feet of 48-inch piping, and concrete chlorine contact channels. Following the completion of the construction but prior to placing this new treatment system into service, the new system will be filled with water for testing. Following this test the new treatment system will be disinfected with chlorinated water and then flushed with treated drinking water. This testing and disinfection process will result in the generation of approximately 6 million gallons of water substantially identical in chemical characteristics and of smaller volume than the flows generated during the winter maintenance. It will be discharged over four days in an identical fashion to the winter maintenance discharges.

### **Response to Comment B1:**

EPA acknowledges that the Draft Permit thoroughly characterizes anticipated regular reoccurring discharges at the Plant (i.e., storage tank maintenance during low demand, referred to as "winter maintenance," above), but does not provide a complete description of non-reoccurring discharges at the Plant (i.e., maintenance, repair, testing or construction related to the Plant's storage tanks or operational appurtenances, referred to as "construction and maintenance-related discharges," above). Since Fact Sheets are final documents that accompany Draft NPDES Permits, they are not changed in response to comments. EPA's "Response to Comments" may acknowledge Fact Sheet errors or

inconsistencies, and then provide the necessary rationale for changes that may be required in the Final NPDES Permit.

Therefore, EPA notes that the following inconsistencies appear in the Fact Sheet and has provided further clarification:

1. Part 2, Page 4 of 24 does not adequately define the discharge to include non-reoccurring discharges resulting from maintenance, repair, testing or construction related to the Plant's storage tanks or operational appurtenances;
2. Part 6.1, Page 7 of 24 does not adequately describe the conditions resulting from non-reoccurring discharges that are substantially identical to those described for anticipated regular reoccurring discharges in the Draft Permit in chemical characteristics, the manner of discharge and the quantities expected;
3. Part 6.2, Page 8 through 10 of 24 does not adequately define the discharges contributing to the permitted outfall, as described above;
4. Part 7.1, Page 11 of 24 does not adequately define the process flows, as described above;
5. Part 7.3, Page 12 of 24 does not adequately define the rationale for a request of reduction in the frequency of temperature monitoring since non-reoccurring discharges could potentially occur outside of the portion of the year in which anticipated regular reoccurring discharges occur; and
6. Part 7.6, Page 13 of 24 does not adequately define the discharge conditions for the selection of applicable ammonia criteria, since non-reoccurring discharges could potentially occur outside of the portion of the year in which anticipated regular reoccurring discharges occur.

As a result of these inconsistencies, correction and clarification in the Final Permit is also necessary. The "Response to Comments" provides additional rationale for the following requirements in the Final Permit:

1. Part I.A.1. through 3. have been corrected from "storage tank drawdown water," "storage tank disinfection water," and "storage tank flush water," to "drawdown water," "disinfection water," and "flush water," respectively because these discharges are generated in the Plant's storage tanks or operational appurtenances, depending upon the type of maintenance, repair, testing or construction;
2. Footnote 1 in Part I.A.1. through 3. has been clarified to define each of these discharges and limits discharges to only those necessary to complete regular reoccurring maintenance or non-reoccurring maintenance, repair, testing or construction which assures efficient operation and/or prevents loss of life, personal injury, or severe property damage. Unanticipated non-reoccurring maintenance is expected to occur with low frequency and with magnitude and duration equal to or less than discharges expected during regular reoccurring maintenance. These discharges are further expected to be substantially identical in chemical characteristics and manner of discharge to those of regular reoccurring maintenance.

3. Part I.A.15. includes an additional requirement that the Permittee inform EPA and MassDEP in writing of any non-reoccurring maintenance, repair, testing or construction activity at least 10 days in advance of the initiation of discharge, where practicable. In the event of an unanticipated discharge, the Permittee must inform EPA and MassDEP in accordance with twenty-four hour reporting described in the Standard Conditions of the Final Permit.

**Comment B2:**

Regarding the ammonia standard in the draft permit we request review and clarification from EPA given that discharges could occur year round. In addition MWRA requests that EPA re-evaluate the need for ammonia limits given that data previously provided does not appear to have reasonable potential to violate the proposed water quality-based limits.

**Response to Comment B2:**

The Draft Permit included acute and chronic ammonia nitrogen limits that accounted for the dilution available in the Sudbury Reservoir (10:1). The criteria used to calculate these limits were derived from EPA's *1999 Update of Ambient Water Quality Criteria for Ammonia* based on the allowable pH of the receiving water, expected instream temperatures and presence or absence of salmonids and/or early life stages, depending on the criterion. The temperatures for criteria selection were based on available instream temperature data for the portion of the year anticipated regular reoccurring discharges are expected to occur. EPA reviewed the selection of these criteria based on the information described above and has made the following corrections:

1. When the pH of the receiving water is 8.3 SU (i.e., the maximum allowable under MA WQSs), and salmonids are absent in the receiving water, the recommended acute criterion value is 4.71 mg/L; this criterion applies year-round since salmonids are not expected in the Sudbury Reservoir (see Part 8 of the Draft Permit Fact Sheet);
2. When the pH of the receiving water is 8.3 SU and the receiving water temperature is 0 to 7°C (32 to 44.6°F i.e., the instream temperature from approximately October through April expected to be similar to the temperatures measured in Crane Swamp during annual maintenance from 2011 to 2012), and early life stages are absent, the recommended chronic criterion value is 2.47 mg/L.
3. When the pH of the receiving water is 8.3 SU, and the receiving water temperature is 28°C (82.4°F i.e., nearest the maximum allowable instream temperature under MA WQSs), and early life stages are present, the recommended chronic criterion value is 0.639 mg/L.

Applicable effluent limits are then calculated using the water quality criteria above and the available dilution in the Sudbury Reservoir, according to the following equation:

$$\text{Effluent Limit} = (\text{Dilution Factor}) \times (\text{Water Quality Criteria})$$

As to whether the inclusion of ammonia limits is appropriate for discharges from the Plant, EPA reviewed the analysis completed to determine if discharges could cause or contribute to an excursion above the freshwater ammonia criteria. EPA projected the maximum daily effluent concentrations for each type of discharge generated by the Plant by calculating the 99<sup>th</sup> percentile concentrations of the effluent data from 2009 through 2012. EPA then calculated the 95<sup>th</sup> percentile concentrations to characterize the maximum monthly average concentrations.

Ammonia: 95<sup>th</sup> percentile concentration = 1.4997 mg/L  
 Drawdown water 99<sup>th</sup> percentile concentration = 2.2439 mg/L

Ammonia: 95<sup>th</sup> percentile concentration = 0.981 mg/L  
 Disinfection water 99<sup>th</sup> percentile concentration = 0.170 mg/L

Ammonia: 95<sup>th</sup> percentile concentration = 0.4755 mg/L  
 Flush water 99<sup>th</sup> percentile concentration = 0.8242 mg/L

The standard approach to determine reasonable potential is to use the projected effluent concentrations and the median upstream ambient concentration of ammonia in a steady-state mixing equation to determine if the discharge has reasonable potential to cause or contribute to a violation of WQC under critical conditions. However, ambient concentrations immediately upstream of the influence of the discharge were not available. Therefore, the projected effluent concentrations are compared directly to the applicable limits as follows:

Ammonia:	Chronic C <sub>r</sub>	= 1.4997 mg/L < 24.7 mg/L
Drawdown water	No early life stages	= No reasonable potential
	Chronic C <sub>r</sub>	= 1.4997 mg/L < 6.39 mg/L
	Early life stages	= No reasonable potential
	Acute C <sub>r</sub>	= 2.2439 mg/L < 47.1 mg/L
	No salmonids	= No reasonable potential
Ammonia:	Chronic C <sub>r</sub>	= 0.981 mg/L < 24.7 mg/L
Disinfection water	No early life stages	= No reasonable potential
	Chronic C <sub>r</sub>	= 0.981 mg/L < 6.39 mg/L
	Early life stages	= No reasonable potential
	Acute C <sub>r</sub>	= 0.170 mg/L < 47.1 mg/L
	No salmonids	= No reasonable potential
Ammonia:	Chronic C <sub>r</sub>	= 0.4755 mg/L < 24.7 mg/L
Flush water	No early life stages	= No reasonable potential
	Chronic C <sub>r</sub>	= 0.4755 mg/L < 6.39 mg/L
	Early life stages	= No reasonable potential
	Acute C <sub>r</sub>	= 0.8242 mg/L < 47.1 mg/L
	No salmonids	= No reasonable potential

Based on this analysis, discharges of ammonia from the Plant do not have “reasonable potential” to cause or contribute to an excursion above water quality criteria. Therefore,

the Final Permit has removed the numeric water quality-based limits for ammonia. However, because ammonia is occasionally present in the discharges during regular reoccurring maintenance above applicable criteria (before mixing) and discharges from non-reoccurring maintenance, repair, testing or construction have not been characterized for the portion of the year when the applicable chronic ammonia criterion is lowest, the Final Permit requires monitoring, the type and frequency dependent upon the type of discharge. Monitoring requirements for pH and temperature, necessary to complete additional “reasonable potential” analyses, are included in the Effluent Limitations and Monitoring Requirements for the effluent in Part I.A.1., I.A.2., and I.A.3.

**Comment B1:**

The street address for the facility in the draft permit is incorrect. The correct address is 84 D’Angelo Drive.

**Response to Comment B1:**

EPA acknowledges this error and has provided correction in the Final Permit, where appropriate. Since Fact Sheets are final documents that accompany Draft NPDES Permits, they are not changed in response to comments. EPA’s “Response to Comments” may acknowledge Fact Sheet errors or inconsistencies, and then provide the necessary rationale for changes that may be required in the Final NPDES Permit.

Therefore, EPA notes that the incorrect address is noted on page 1 of 24 of the Fact Sheet. The correct address is 84 D’Angelo Drive.

**Other Changes to Permit**

EPA also noted in its final review of the Draft Permit a need to correct several typographical errors. These errors do not result in a change to any condition or requirement in the Final Permit. Therefore, additional rationale is not provided. Corrections are noted above.

Attachment 1: Projected Effluent Concentrations for Aluminum

1. Drawdown Water:

**Al - (Lognormal distribution assumed )**

<b>Estimated Daily Maximum Effluent Concentration</b>		
k = number of daily samples =		7
Max Concentration		90.00
cv(x)= Coefficient of Variation* =		0.6
99th percentile multiplication factor**		3.6
95th percentile multiplication factor**		2
<b>Daily Max Estimate = Max*99th percentile multiplication factor**</b>		
Estimated Daily Max 99th percentile =	<b>324.0000</b>	<b>ug/L</b>
Estimated Daily Max including Dilution Factor =	<b>32.4000</b>	<b>ug/L</b>
<b>Daily Max Estimate = Max*95th percentile multiplication factor**</b>		
Estimated Daily Max 95th Percentile =	<b>180.0000</b>	<b>ug/L</b>
Estimated Daily Max including Dilution Factor =	<b>18.0000</b>	<b>ug/L</b>

\*Conservative estimate of CV. See box 3-2 in *Technical Support Document for Water Quality Based Toxics Control*.

\*\*Multiplication factors from Table 3-1 and Table 3-2 in *Technical Support Document for Water Quality Based Toxics Control*.  
 These factors are based on the number of samples (up to 10) entered in the data table.

2. Disinfection Water

**A1 - (Lognormal distribution assumed )**

<b>Estimated Daily Maximum Effluent Concentration</b>		
k = number of daily samples =		5
Max Concentration		90.00
cv(x)= Coefficient of Variation* =		0.6
99th percentile multiplication factor**		4.2
95th percentile multiplication factor**		2.3
<b>Daily Max Estimate = Max*99th percentile multiplication factor**</b>		
Estimated Daily Max 99th percentile =	<b>378.0000</b>	<b>ug/L</b>
Estimated Daily Max including Dilution Factor =	<b>37.8000</b>	<b>ug/L</b>
<b>Daily Max Estimate = Max*95th percentile multiplication factor**</b>		
Estimated Daily Max 95th Percentile =	<b>207.0000</b>	<b>ug/L</b>
Estimated Daily Max including Dilution Factor =	<b>20.7000</b>	<b>ug/L</b>

\*Conservative estimate of CV. See box 3-2 in *Technical Support Document for Water Quality Based Toxics Control*.

\*\*Multiplication factors from Table 3-1 and Table 3-2 in *Technical Support Document for Water Quality Based Toxics Control*.  
 These factors are based on the number of samples (up to 10) entered in the data table.

3. Flush Water

**A1 - (Lognormal distribution assumed )**

<b>Estimated Daily Maximum Effluent Concentration</b>		
k = number of daily samples =		2
Max Concentration		90.00
cv(x)= Coefficient of Variation* =		0.6
99th percentile multiplication factor**		7.4
95th percentile multiplication factor**		3.8
<b>Daily Max Estimate = Max*99th percentile multiplication factor**</b>		
Estimated Daily Max 99th percentile =	<b>666.0000</b>	<b>ug/L</b>
Estimated Daily Max including Dilution Factor =	<b>66.6000</b>	<b>ug/L</b>
<b>Daily Max Estimate = Max*95th percentile multiplication factor**</b>		
Estimated Daily Max 95th Percentile =	<b>342.0000</b>	<b>ug/L</b>
Estimated Daily Max including Dilution Factor =	<b>34.2000</b>	<b>ug/L</b>

\*Conservative estimate of CV. See box 3-2 in *Technical Support Document for Water Quality Based Toxics Control*.

\*\*Multiplication factors from Table 3-1 and Table 3-2 in *Technical Support Document for Water Quality Based Toxics Control*.  
 These factors are based on the number of samples (up to 10) entered in the data table.