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),

City of Brockton

is authorized to discharge from the facility located at

Brockton Advanced Water Reclamation Facility
303 Oak Hill Way
Brockton, Massachusetts 02301

to receiving water named **Salisbury Plain River**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein. The Towns of Abington and Whitman are co-permittees for Parts 1.B. Unauthorized Discharges and 1.C. Operation and Maintenance of the Sewer System, which include conditions regarding the operation and maintenance of the collection systems owned and operated by the Towns. The responsible Town authorities are:

Town of Abington
Sewer Department
350 Summer Street
Abington, MA 02351

Town of Whitman
Department of Public Works
100 Essex Street, P.O. Box 454
Whitman, MA 02382

This permit will become effective on the first day of the calendar month immediately following sixty days after signature. This permit expires at midnight, five (5) years from the last day of the month preceding the effective date. This permit supersedes the permit issued on May 11, 2005.

This permit consists of **Part I (**23 pages including effluent limitations and monitoring requirements); **Attachment A** (USEPA Region 1 Freshwater Chronic Toxicity Test Procedure and Protocol, March 2013); **Attachment B** (USEPA Region 1 Freshwater Acute Toxicity Test Procedure and Protocol, February 2011); **Attachment C** (USEPA Region 1 Reassessment of Technically Based Industrial Discharge Limits); **Attachment D** (USEPA Region 1 NPDES Permit Requirement for Industrial Pretreatment Annual Report) and **Part II (**25 pages including NPDES Part II Standard Conditions).

Signed this 11th day of January, 2017

/S/SIGNATURE ON FILE

Ken Moraff, Director
Office of Ecosystem Protection
Environmental Protection Agency
Boston, MA

/S/SIGNATURE ON FILE

Douglas E. Fine, Assistant Commissioner
Bureau of Water Resources
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

PART I

A.1. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall serial number **001** to the Salisbury Plain River. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC	**EFFLUENT LIMITS**						**MONITORING REQUIREMENTS** [1]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
FLOW[2]	*********	*********	*********	18.0 mgd	*********	Report mgd	CONTINUOUS	RECORDER
FLOW[2]	*********	*********	*********	Report mgd	*********	*********	CONTINUOUS	RECORDER
$CBOD_5$ [3] (May 1 to October 31)	750 lb/day	1200 lb/day	2250 lb/day	5 mg/l	8 mg/l	15 mg/l	1/DAY	24-HR COMP[4]
$CBOD_5$ [3] (November 1 to April 30)	2250 lb/day	3750 lb/day	4500 lb/day	15 mg/l	25 mg/l	30 mg/l	1/DAY	24-HR COMP[4]
TSS [3] (May 1 to October 31)	750 lb/day	1200 lb/day	2250 lb/day	5 mg/l	8 mg/l	15 mg/l	1/DAY	24-HR COMP[4]
TSS [3] (November 1 to April 30)	2250 lb/day	3750 lb/day	4500 lb/day	15 mg/l	25 mg/l	30 mg/l	1/DAY	24-HR COMP[4]
pH RANGE [5]	6.5 - 8.3 S.U. (SEE PERMIT PARAGRAPH I.A.1.b.)						1/DAY	GRAB
ESCHERICHIA COLI [5,6] (April 1 to October 1)	*********	*********	**********	126 cfu/100 ml	*********	409 cfu/100 ml	3/WEEK	GRAB
TOTAL RESIDUAL CHLORINE [7]	*********	*********	**********	11 ug/l	*********	19 ug/l	1/DAY	GRAB
TOTAL PHOSPHORUS [8] (April 1 to October 31)	15.2 lb/day	*********	*********	101 ug/l	*********	Report mg/l	2/WEEK	24-HR COMP[4]
TOTAL PHOSPHORUS (November 1 to March 31)	150 lb/day	*********	*********	1.0 mg/l	*********	Report mg/l	1/WEEK	24-HR COMP[4]
DISSOLVED OXYGEN [5] (April 1 to October 31)	NOT LESS THAN 6.0 mg/l						1/DAY	GRAB

Sampling location: 24-hour composites after disinfection; grab samples at foot of aeration cascade.

CONTINUED FROM PREVIOUS PAGE

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EFFLUENT CHARACTERISTIC	EFFLUENT LIMITS						MONITORING REQUIREMENTS[1]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
AMMONIA-NITROGEN (June 1 to October 31)	150 lb/day	150 lb/day	225 lb/day	1 mg/l	1 mg/l	1.5 mg/l	2/WEEK	24-HR COMP[4]
AMMONIA-NITROGEN (November 1 to November 30)	946 lb/day	*********	*********	6.3 mg/l	*********	Report mg/l	2/WEEK	24-HR COMP[4]
AMMONIA-NITROGEN (December 1 to April 30)	1,426 lb/day	*********	*********	9.5 mg/l	*********	Report mg/l	2/WEEK	24-HR COMP[4]
AMMONIA-NITROGEN (May 1 to May 31)	480 lb/day	*********	*********	3.2 mg/l	*********	Report mg/l	2/WEEK	24-HR COMP[4]
TOTAL NITROGEN [8, 9] (May 1 to October 31)	450 lb/day	*********	*********	Report mg/l	*********	Report mg/l	2/WEEK	24-HR COMP[4]
TOTAL NITRATE NITROGEN	Report lb/day			Report lb/day		Report lb/day		
TOTAL NITRITE NITROGEN	Report lb/day			Report lb/day		Report lb/day		
TOTAL KJELDAHL NITROGEN	Report lb/day			Report lb/day		Report lb/day		
TOTAL NITROGEN [10] (November 1 to April 30)	Report lb/day	*********	*********	Report mg/l	*********	Report mg/l	1/MONTH	24-HR COMP[4]
TOTAL NITRATE NITROGEN	Report lb/day			Report lb/day		Report lb/day		
TOTAL NITRITE NITROGEN	Report lb/day			Report lb/day		Report lb/day		
TOTAL KJELDAHL NITROGEN	Report lb/day			Report lb/day		Report lb/day		
TOTAL COPPER [11]	*********	*********	*********	10.3 ug/l	*********	13.7 ug/l	1/MONTH	24-HR COMP[4]

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EFFLUENT CHARACTERISTIC	**EFFLUENT LIMITS**						**MONITORING REQUIREMENTS**[1]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
WHOLE EFFLUENT TOXICITY [12,13,14,15]	Acute $LC_{50} \geq 100\%$ Chronic C-NOEC $\geq 98\%$						4/YEAR	24-HR COMP[4]
Hardness[16]	*********	*********		*********	*********	Report mg/l	4/YEAR	24-HR COMP[4]
Ammonia Nitrogen as N[16]	*********	*********		*********	*********	Report mg/l	4/YEAR	24-HR COMP[4]
Total Recoverable Aluminum[16]	*********	*********		*********	*********	Report mg/l	4/YEAR	24-HR COMP[4]
Total Recoverable Cadmium[16]	*********	*********		*********	*********	Report mg/l	4/YEAR	24-HR COMP[4]
Total Recoverable Copper[16]	*********	*********		*********	*********	Report mg/l	4/YEAR	24-HR COMP[4]
Total Recoverable Nickel[16]	*********	*********		*********	*********	Report mg/l	4/YEAR	24-HR COMP[4]
Total Recoverable Lead[16]	*********	*********		*********	*********	Report mg/l	4/YEAR	24-HR COMP[4]
Total Recoverable Zinc[16]	*********	*********		*********	*********	Report mg/l	4/YEAR	24-HR COMP[4]

Footnotes:

1. Effluent sampling shall be of the discharge and shall be collected at the point specified on page 2. Any change in sampling location must be reviewed and approved in writing by EPA and MassDEP.

   A routine sampling program shall be developed in which samples are taken at the same location, same time and same days of the week each month. Occasional deviations from the routine sampling program are allowed, but the reason for the deviation shall be documented in correspondence appended to the applicable discharge monitoring report.

   All samples shall be tested using the analytical methods found in 40 CFR § 136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR § 136.

2. Report annual average, monthly average, and the maximum daily flow. The 18.0 mgd limit is an annual average, which shall be reported as a 12-month rolling average. The value will be calculated as the arithmetic mean of the monthly average flow for the reporting month and the monthly average flows of the previous eleven months.

3. Sampling required for influent and effluent.

4. 24-hour composite samples ("24-hr Comp") will consist of at least twenty four (24) grab samples taken during one consecutive 24 hour period, either collected at equal intervals and combined proportional to flow or continuously collected proportionally to flow.

5. Required for State Certification.

6. The monthly average limit for E. coli is expressed as a geometric mean.

7. Total residual chlorine monitoring is required whenever chlorine is added to the treatment process and such sampling shall be representative of the effluent under conditions of chlorine addition. TRC sampling is not required if chlorine is not added for disinfection or other purposes that cause chlorine to be present in the plant effluent. The limitations are in effect year-round.

   The minimum level (ML) for total residual chlorine is defined as 20 ug/l. This value is the minimum level for chlorine using EPA approved methods found in the most currently approved version of Standard Methods for the Examination of Water and Wastewater, Method 4500 CL-E and G. One of these methods must be used to determine total residual chlorine. For effluent limitations less than 20 ug/l, compliance/non-compliance will be determined based on the ML.

8. The permittee shall comply with the new 101 ug/l and 15.2 lb/day total phosphorus limits and the 450 lb/day total nitrogen limit in accordance with the schedule contained in Section F below. The prior permit total phosphorus limit of 0.2 mg/l (April 1 to October 31) shall remain in effect as an interim limit until the date specified in Section F for

compliance with the new 101 ug/l total phosphorus limit. Upon the effective date of the permit, and until the date specified in Section F below for compliance with the total nitrogen final limit of 450 lb/day, the permittee shall optimize the operation of its existing treatment facility for nitrogen removal.

9. The total nitrogen values will be calculated by adding the results of the nitrite and nitrate nitrogen and the total Kjeldahl nitrogen sampling. The total nitrogen limit is a rolling seasonal average limit, which is effective from May 1 through October 31 of each year. The first value for the seasonal average will be reported after six months during which the limit is in effect following the effective date of the permit (results do not have to be based on data all from the same calendar year). For example, if the permit becomes effective on December 1, 2016, the permittee will calculate the first seasonal average from samples collected during the months of May through October 2017, and report this average on the October 2017 DMR. For each subsequent month that the seasonal limit is in effect, the seasonal average shall be calculated using samples from that month and the previous five months that the limit was in effect (e.g., the average of June 2016 through October 2016 and May 2018 shall be reported on the June 2018 DMR).

10. The permittee shall optimize the operation of the treatment facility for the removal of total nitrogen during the period November 1 through April 30. All available treatment equipment in place at the facility shall be operated unless equal or better performance can be achieved in a reduced operational mode. The addition of a carbon source that may be necessary in order to meet the total nitrogen limit from May 1 through October 31 is not required during the period November 1 through April 30.

11. The minimum level (ML) for copper is defined as 3 ug/l. This value is the minimum level for copper using the Furnace Atomic Absorption analytical method (EPA Method 220.2).

    Sampling results in connection with Whole Effluent Toxicity (WET) testing may be used to satisfy this monitoring requirement in those months in which WET testing is performed.

12. The permittee shall conduct acute and chronic toxicity tests two times per year. The permittee shall test the daphnid, <u>Ceriodaphnia dubia</u>, only. Toxicity test samples shall be collected during the second week of the months of August and November. The test results shall be submitted by the last day of the month following the completion of the test. The results are due September 30 and December 31, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachments A and B** of this permit.

    An additional two samples shall be collected and tests completed during days when treatment plant total daily flow exceeds 30 mgd. These two tests may be conducted during any month of the year. The results for these tests shall be submitted by the last day of the month following the completion of the test. See Permit Attachments A and B, Toxicity Test Procedure and Protocols.

Test Dates Second Week in	**Submit Results By:**	**Test Species**	**Acute Limit LC_{50}**	**Chronic Limit C-NOEC**
August November	September 30 December 31	Ceriodaphnia dubia (daphnid)	≥ 100%	≥ 98%

After submitting **one year** and a **minimum** of four consecutive sets of WET test results, all of which demonstrate compliance with the WET permit limits, the permittee may request a reduction in the WET testing requirements. The permittee is required to continue testing at the frequency specified in the permit until notice is received by certified mail from the EPA that the WET testing requirement has been changed.

13. The LC_{50} is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 100% limit means that a sample of 100% effluent (no dilution) shall cause no more than a 50% mortality rate.

14. C-NOEC (chronic-no observed effect concentration) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life cycle or partial life cycle test which causes no adverse effect on growth, survival, or reproduction, based on a statistically significant difference from dilution control, at a specific time of observation as determined from hypothesis testing. As described in the EPA WET Method Manual EPA 821-R-02-013, Section 10.2.6.2, all test results are to be reviewed and reported in accordance with EPA guidance on the evaluation of the concentration-response relationship. The **98**% or greater" limit is defined as a sample which is composed of **98**% (or greater) effluent, the remainder being dilution water.

15. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall either follow procedures outlined in **Attachment A (Toxicity Test Procedure and Protocol) Section IV., DILUTION WATER** in order to obtain an individual approval for use of an alternate dilution water, or the permittee shall follow the Self-Implementing Alternative Dilution Water Guidance, which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. This guidance is found in Attachment G of *NPDES Program Instructions for the Discharge Monitoring Report Forms (DMRs)*, which may be found on the EPA Region I web site at http://www.epa.gov/Region1/enforcementandassistance/dmr.html. If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachment A**. Any modification or revocation to this guidance will be transmitted to the permittees. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment A**.

16. For each whole effluent toxicity test, the permittee shall report on the appropriate discharge monitoring report (DMR) the concentrations of the hardness, ammonia

nitrogen as nitrogen, total recoverable aluminum, cadmium, copper, lead, nickel, and zinc found in the 100 percent effluent sample. All these aforementioned chemical parameters shall be determined to at least the minimum quantification level shown in **Attachment A**. Also the permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report.

Part I.A.1. (Continued)

a. The discharge shall not cause a violation of the water quality standards of the receiving waters.

b. The pH of the effluent shall not be less than 6.5 or greater than 8.3 at any time.

c. The discharge shall not cause objectionable discoloration of the receiving waters.

d. The effluent shall not contain a visible oil sheen, foam, or floating solids at any time.

e. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand. The percent removal shall be based on monthly average values.

f. The results of sampling for any parameter done in accordance with EPA approved methods above its required frequency must also be reported.

g. If the average annual flow in any calendar year exceeds 80 percent of the facility’s design flow, the permittee shall submit a report to MassDEP by March 31 of the following calendar year describing its plans for further flow increases and describing how it will maintain compliance with the flow limit and all other effluent limitations and conditions.

2. All POTWs must provide adequate notice to the Director of the following:

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants; and

b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

c. For purposes of this paragraph, adequate notice shall include information on:

(1) The quantity and quality of effluent introduced into the POTW; and

(2) Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

3. Prohibitions Concerning Interference and Pass Through:

    a. Pollutants introduced into POTW's by a non-domestic source (user) shall not pass through the POTW or interfere with the operation or performance of the works.

4. 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.

5. Numerical Effluent Limitations for Toxicants

    EPA or MassDEP may use the results of the toxicity tests and chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to Section 304(a)(1) of the Clean Water Act (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.

B. UNAUTHORIZED DISCHARGES

This permit authorizes discharges only from the outfall(s) listed in Part I.A.1, in accordance with the terms and conditions of this permit. Discharges of wastewater from any other point sources, including sanitary sewer overflows (SSOs), are not authorized by this permit and shall be reported to EPA and MassDEP in accordance with Section D.1.e.(1) of the General Requirements of this permit (Twenty-four hour reporting).

Notification of SSOs to MassDEP shall be made on its SSO Reporting Form (which includes DEP Regional Office telephone numbers). The reporting form and instruction for its completion may be found on-line at http://www.mass.gov/eea/agencies/massdep/service/approvals/sanitary-sewer-overflow-bypass-backup-notification.html.

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance of the sewer system shall be in compliance with the General Requirements of Part II and the following terms and conditions. The permittee is required to complete the following activities for the collection system which it owns:

1. Maintenance Staff

    The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit. Provisions to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

2. Preventive Maintenance Program

The permittee shall maintain an ongoing preventive maintenance program to prevent overflows and bypasses caused by malfunctions or failures of the sewer system infrastructure. The program shall include an inspection program designed to identify all potential and actual unauthorized discharges. Plans and programs to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

3. Infiltration/Inflow

The permittee shall control infiltration and inflow (I/I) into the sewer system as necessary to prevent high flow related unauthorized discharges from their collection systems and high flow related violations of the wastewater treatment plant's effluent limitations. Plans and programs to control I/I shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

4. Collection System Mapping

Within 30 months of the effective date of this permit, the permittee shall prepare a map of the sewer collection system it owns (see page 1 of this permit for the effective date). The map shall be on a street map of the community, with sufficient detail and at a scale to allow easy interpretation. The collection system information shown on the map shall be based on current conditions and shall be kept up to date and available for review by federal, state, or local agencies. Such map(s) shall include, but not be limited to the following:

a. All sanitary sewer lines and related manholes;
b. All combined sewer lines, related manholes, and catch basins;
c. All combined sewer regulators and any known or suspected connections between the sanitary sewer and storm drain systems (e.g., combination manholes);
d. All outfalls, including the treatment plant outfall(s), CSOs, and any known or suspected SSOs, including stormwater outfalls that are connected to combination manholes;
e. All pump stations and force mains;
f. The wastewater treatment facility(ies);
g. All surface waters (labeled);
h. Other major appurtenances such as inverted siphons and air release valves;
i. A numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;
j. The scale and a north arrow; and
k. The pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow.

5. Collection System Operation and Maintenance Plan

The permittee shall develop and implement a Collection System Operation and Maintenance Plan.

a. Within six (6) months of the effective date of the permit, the permittee shall submit to EPA and MassDEP

(1) A description of the collection system management goals, staffing, information management, and legal authorities;
(2) A description of the collection system and the overall condition of the collection system including a list of all pump stations and a description of recent studies and construction activities; and
(3) A schedule for the development and implementation of the full Collection System O & M Plan including the elements in paragraphs b.1. through b.8. below.

b. The full Collection System O & M Plan shall be completed, implemented and submitted to EPA and MassDEP within twenty-four (24) months from the effective date of this permit. The Plan shall include:

(1) The required submittal from paragraph 5.a. above, updated to reflect current information;
(2) A preventive maintenance and monitoring program for the collection system;
(3) Description of sufficient staffing necessary to properly operate and maintain the sanitary sewer collection system and how the operation and maintenance program is staffed;
(4) Description of funding, the source(s) of funding and provisions for funding sufficient for implementing the plan;
(5) Identification of known and suspected overflows and back-ups, including manholes. A description of the cause of the identified overflows and back-ups, corrective actions taken, and a plan for addressing the overflows and back-ups consistent with the requirements of this permit;
(6) A description of the permittee's programs for preventing I/I related effluent violations and all unauthorized discharges of wastewater, including overflows and by-passes and the ongoing program to identify and remove sources of I/I. The program shall include an inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts; and
(7) An educational public outreach program for all aspects of I/I control, particularly private inflow.
(8) An <u>Overflow Emergency Response Plan</u> to protect public health from overflows and unanticipated bypasses or upsets that exceed any effluent limitation in the permit.

6. Annual Reporting Requirement

The permittee shall submit a summary report of activities related to the implementation of its Collection System O & M Plan during the previous calendar year. The report shall be submitted to EPA and MassDEP annually by March 31. The summary report shall, at a minimum, include:

a. A description of the staffing levels maintained during the year;
b. A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year;
c. Expenditures for any collection system maintenance activities and corrective actions taken during the previous year;
d. A map with areas identified for investigation/action in the coming year;
e. If treatment plant flow has reached 80% of its design flow (14.4 mgd) based on the annual average flow during the reporting year, or there have been capacity related overflows, submit a calculation of the maximum daily, weekly, and monthly infiltration and the maximum daily, weekly, and monthly inflow for the reporting year; and
f. A summary of unauthorized discharges during the past year and their causes and a report of any corrective actions taken as a result of the unauthorized discharges reported pursuant to the Unauthorized Discharges section of this permit.

7. Alternate Power Source

In order to maintain compliance with the terms and conditions of this permit, the permittee shall provide an alternative power source(s) sufficient to operate the portion of the publicly owned treatment works[1] it owns and operates.

D. SLUDGE CONDITIONS

1. Standard Conditions

a. The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices and the Clean Water Act section 405(d) technical standards.

b. The permittee shall comply with the more stringent of either the state or federal requirements.

c. No person shall fire sewage sludge in a sewage sludge incinerator except in compliance with the requirements of 40 CFR part 503 subpart E.

2. Pollutant Limitations

a. Firing of sewage sludge shall not violate the requirements of the National

[1] As defined at 40 CFR §122.2, which references the definition at 40 CFR §403.3

Emission Standard for beryllium in 40 CFR part 61, subpart C - 10 grams per 24-hour period.

b. Firing of sewage sludge shall not violate the requirements in the National Emission Standard for mercury in 40 CFR part 61, subpart E - 3200 grams per 24-hour period.

c. The daily concentration of the metals in the sewage sludge fed to the incinerator shall not exceed the limits specified below (dry weight basis):

	Maximum Daily
Arsenic	732 mg/kg
Cadmium	1,601 mg/kg
Chromium	310,396 mg/kg
Lead	71,630 mg/kg
Nickel	136,438 mg/kg

3. Operational Standards

a. The exit gas from the sewage sludge incinerator stack shall be monitored continuously for Total Hydrocarbons (THC).

b. The monthly average concentration for Total Hydrocarbons (THC), corrected to zero percent moisture and to seven percent oxygen, in the exit gas from the sewage sludge incinerator stack shall not exceed 100 PPM on a volumetric basis.

c. The measured THC concentration shall be corrected to zero percent moisture using the correction factor below:

$$\text{Correction factor (percent moisture)} = \frac{1}{(1-X)}$$

Where:
X = the decimal fraction of the percent moisture in the sewage sludge incinerator exit gas in hundredths.

d. The measured THC concentration shall be corrected to seven percent oxygen using the correction factor below:

$$\text{Correction factor (oxygen)} = \frac{14}{(21-Y)}$$

Where:
Y = the percent oxygen concentration in the sewage sludge incinerator stack exit dry gas (dry volume/dry volume)

e. The measured THC value shall be multiplied by the correction factors in items b and c. The corrected THC value shall be used to determine compliance with Paragraph D.3.a.

4. Management Practices

a. An instrument that continuously measures and records the THC concentration in the sewage sludge incinerator stack exit gas shall be installed, calibrated, operated and maintained for each incinerator in accordance with the manufacturer's written instructions.

b. The total hydrocarbons instrument shall employ a flame ionization detector; shall have a heated sampling line maintained at a temperature of 150 degrees Celsius or higher at all times; and shall be calibrated at least once every 24-hour operating period using propane.

c. An instrument that continuously measures and records the oxygen concentration in the sewage sludge incinerator stack exit gas shall be installed, calibrated, operated and maintained for each incinerator in accordance with the manufacture's written instructions.

d. An instrument that continuously measures and records information used to determine the moisture content in the sewage sludge incinerator stack exit gas shall be installed, calibrated, operated and maintained for each incinerator in accordance with the manufacture's written instructions.

e. An instrument that continuously measures and records combustion temperatures shall be installed, calibrated, operated and maintained for each incinerator in accordance with the manufacture's written instructions.

f. Upon completion of the testing to demonstrate compliance with the performance specifications, but not later than 90 days from the effective date of this permit, the operator of the incinerators shall submit to EPA Region 1 a certification stating that the continuous emissions monitoring system meets the performance specifications detailed in the above referenced guidance.

g. Operation of the incinerator shall not cause the operating combustion temperature for the incinerator to exceed the performance test combustion temperature by more than 20 percent.

h. Any air pollution control devices shall be appropriate for the type of incinerator and operating parameters for the air pollution control device shall be adequate to indicate proper performance of the air pollution control device. For incinerators subject to the requirements of 40 CFR subpart O, operation of the air pollution control device shall not violate the air pollution control device requirements of that part.

i. Sewage sludge shall not be fired in an incinerator if it is likely to adversely affect a threatened or endangered species listed under Section 4 of the Endangered Species Act or its designated critical habitat.

j. The permittee shall notify the EPA and MassDEP if any continuous emission monitoring equipment is shut down or broken down for more than 72 hours while the incinerator continues to operate.

k. Notification shall include the following:

(1) The reason for the shut down or break down;
(2) Steps taken to restore the system;
(3) Expected length of the down time; and
(4) The expected length of the incinerator operation during the down time of the monitoring system.

l. Break downs or shut downs of less than 72 hours shall be recorded in the operations log along with an explanation of the event.

m. Copies of all manufacturer's instructions shall be kept on file and be available during inspections.

5. Monitoring Frequency

a. The frequency of monitoring beryllium shall be as required in 40 CFR part 61, subpart C.

b. The frequency of monitoring mercury shall be as required in 40 CFR part 61, subpart E.

c. The pollutants in paragraph 2c shall be monitored at the following frequency - **bimonthly (6 times per year)**.

d. After the sewage sludge has been monitored for the pollutants in paragraph 2c for two years at the frequency specified above, the permittee may request a reduction in the monitoring frequency.

e. The operating parameters for the air pollution control devices shall be monitored at the following frequency - **1/day**.

f. The THC concentration in the exit gas, the oxygen concentration in the exit gas, information from the instrument used to determine moisture content, and combustion temperatures shall be **continuously** monitored.

6. Sampling and Analysis

a. The sewage shall be sampled at a location which is prior to entering the incinerator and provides a representative sample of the sewage sludge being incinerated.

b. The sewage sludge shall be analyzed using “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods”, EPA publication SW-846, Second Edition (1982) with Updates I (April 1984) and II (April 1985) and Third Edition (November 1986) with Revision I (December 1987).

c. If emission testing is done for demonstration of NESHAPS, testing shall be in accordance with Method 101A in 40 CFR part 60, Appendix B, “Determination of Particulate and Gaseous Mercury Emissions from Sewage Sludge Incinerators”.

d. Sewage sludge samples for mercury shall be sampled and analyzed using Method 105 in 40 CFR part 61, Appendix B, “Determination of Mercury in Wastewater Treatment Plant Sewage Sludge”.

7. Record Keeping Requirements

The permittee is required to keep records for the following:

a. Report the maximum concentration of each pollutant listed in paragraph D.2.c above;

b. Report the average monthly THC concentration in the exit gas from the incinerator stack;

c. Information that demonstrates compliance with the National Emission Standard for beryllium;

d. Information that demonstrates compliance with the National Emission Standard for mercury. If sludge sampling is used, include calculation for compliance demonstration;

e. The operating combustion temperature for the sewage sludge incinerator;

f. Report the average monthly operating values for the air pollution control devices operating parameters;

g. The oxygen concentration and the information used to measure moisture content in the exit gas from the sewage sludge incinerator. Report the oxygen concentration and percent moisture results which were used to determine the THC values reported in paragraph D.3.b;

h. Record the average daily and average monthly sewage sludge feed rate to the incinerator;

i. The stack height of the incinerator;

j. The dispersion factor for the site where the incinerator is located;

k. The control efficiency for arsenic, lead, chromium, cadmium and nickel;

l. A calibration and maintenance log for the instruments used to measure the THC concentration and the oxygen concentration in the exit gas; the information need to determine moisture content in the exit gas, and the combustion temperatures.

8. Reporting

The permittee shall report the information in paragraphs 7 (a) through (l) annually by February 19 to EPA and MassDEP.

E. INDUSTRIAL USERS AND PRETREATMENT PROGRAM

1. The permittee shall develop and enforce specific effluent limits (local limits) for Industrial User(s), and all other users, as appropriate, which together with appropriate changes in the POTW Treatment Plant's Facilities or operation, are necessary to ensure continued compliance with the POTW's NPDES permit or sludge use or disposal practices. Specific local limits shall not be developed and enforced without individual notice to persons or groups who have requested such notice and an opportunity to respond. Within (120 days of the effective date of this permit), the permittee shall prepare and submit a written technical evaluation to the EPA analyzing the need to revise local limits. As part of this evaluation, the permittee shall assess how the POTW performs with respect to influent and effluent of pollutants, water quality concerns, sludge quality, sludge processing concerns/inhibition, biomonitoring results, activated sludge inhibition, worker health and safety and collection system concerns. In preparing this evaluation, the permittee shall complete and submit the attached form (see **Attachment C –** Reassessment of Technically Based Industrial Discharge Limits) with the technical evaluation to assist in determining whether existing local limits need to be revised. Justifications and conclusions should be based on actual plant data if available and should be included in the report. Should the evaluation reveal the need to revise local limits, the permittee shall complete the revisions within 120 days of notification by EPA and submit the revisions to EPA for approval. The permittee shall carry out the local limits revisions in accordance with EPA's Local Limit Development Guidance (July 2004).

2. The permittee shall implement the Industrial Pretreatment Program in accordance with the legal authorities, policies, procedures, and financial provisions described in the permittee's approved Pretreatment Program, and the General Pretreatment Regulations, 40 CFR 403. At a minimum, the permittee must perform the following duties to properly implement the Industrial Pretreatment Program (IPP):

    a. Carry out inspection, surveillance, and monitoring procedures which will determine independent of information supplied by the industrial user, whether the industrial user is in compliance with the Pretreatment Standards. At a minimum, all significant industrial users shall be sampled and inspected at the frequency established in the approved IPP but in no case less than once per year and maintain adequate records.

b. Issue or renew all necessary industrial user control mechanisms within 90 days of their expiration date or within 180 days after the industry has been determined to be a significant industrial user.

c. Obtain appropriate remedies for noncompliance by any industrial user with any pretreatment standard and/or requirement.

d. Maintain an adequate revenue structure for continued implementation of the Pretreatment Program.

3. The permittee shall provide the EPA and MassDEP with an annual report describing the permittee's pretreatment program activities for the twelve (12) month period ending 60 days prior to the due date in accordance with 403.12(i). The annual report shall be consistent with the format described in **Attachment D** (NPDES Permit Requirement for Industrial Pretreatment Annual Report) of this permit and shall be submitted no later than **March 1** of each year.

4. The permittee must obtain approval from EPA prior to making any significant changes to the industrial pretreatment program in accordance with 40 CFR 403.18(c).

5. The permittee must assure that applicable National Categorical Pretreatment Standards are met by all categorical industrial users of the POTW. These standards are published in the Federal Regulations at 40 CFR 405 et. seq.

6. The permittee must modify its pretreatment program, if necessary, to conform to all changes in the Federal Regulations that pertain to the implementation and enforcement of the industrial pretreatment program. The permittee must provide EPA, in writing, within 180 days of this permit's effective date proposed changes, if applicable, to the permittee's pretreatment program deemed necessary to assure conformity with current Federal Regulations. At a minimum, the permittee must address in its written submission the following areas: (1) Enforcement response plan; (2) revised sewer use ordinances; and (3) slug control evaluations. The permittee will implement these proposed changes pending EPA Region I's approval under 40 CFR 403.18. This submission is separate and distinct from any local limits analysis submission described in Part I.E.1.

F. COMPLIANCE SCHEDULE

In order to comply with the new permit limits for total phosphorus (101 ug/l and 15.2 lb/day monthly average) and total nitrogen (450 lb/day monthly average), the permittee shall take the following actions:

1. Within one year of the effective date of the permit, the permittee shall complete pilot testing and initiate modifications to the existing aeration tanks in order to convert to a Bardenpho treatment process.

2. Within two, three and four years of the effective date of the permit, the permittee shall submit to EPA and MassDEP an annual status report relative to modification of the aeration tanks and a summary of optimization efforts and results relative to total nitrogen and total phosphorus.

3. Within fifty-four (54) months of the effective date of the permit, the permittee shall substantially complete the facility improvements required to achieve the new total phosphorus and total nitrogen permit limits.

4. The new permit limits for total phosphorus and total nitrogen shall go into effect five years from the effective date of the permit. Until such time the permittee shall meet an interim phosphorus limit of 0.2 mg/l (60 day rolling average, April to October) and shall optimize wastewater treatment facility operations in order to maximize total nitrogen removal. While it is EPA's position that the treatment modifications to be completed during the five-year compliance schedule will allow for consistent compliance with the permit limits, EPA will authorize a reasonable amount of additional time in the event it is determined that an additional treatment step(s) needs to be planned, designed, and constructed.

5. If at any time the permittee believes it has sufficient new information to justify a revision of the total nitrogen limit, it may submit the information to EPA and MassDEP and the agencies will review the information and, if appropriate, act on a request for a permit modification if there exists "cause" under 40 CFR § 124.62 or incorporate the information in a new water quality-based permit limit analysis as part of permit reissuance.

G. MONITORING AND REPORTING

The monitoring program in the permit specifies sampling and analysis, which will provide continuous information on compliance and the reliability and effectiveness of the installed pollution abatement equipment. The approved analytical procedures found in 40 CFR Part 136 are required unless other procedures are explicitly required in the permit. The Permittee is obligated to monitor and report sampling results to EPA and the MassDEP within the time specified within the permit.

Unless otherwise specified in this permit, the permittee shall submit reports, requests, and information and provide notices in the manner described in this section.

1. Submittal of DMRs Using NetDMR

   The permittee shall continue to submit its monthly monitoring data in discharge monitoring reports (DMRs) to EPA and MassDEP no later than the 15th day of the month electronically using NetDMR. When the permittee submits DMRs using NetDMR, it is not required to submit hard copies of DMRs to EPA or MassDEP.

2. Submittal of Reports as NetDMR Attachments

Unless otherwise specified in this permit, the permittee shall electronically submit all reports to EPA as NetDMR attachments rather than as hard copies. Permittees shall continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP. (See Part I.G.6. for more information on state reporting.) Because the due dates for reports described in this permit may not coincide with the due date for submitting DMRs (which is no later than the 15th day of the month), a report submitted electronically as a NetDMR attachment shall be considered timely if it is electronically submitted to EPA using NetDMR with the next DMR due following the particular report due date specified in this permit.

3. Submittal of Pre-treatment Related Reports

All reports and information required of the permittee in the Industrial Users and Pretreatment Program section of this permit shall be submitted to the Office of Ecosystem Protection's Pretreatment Coordinator in Region 1 EPA's Office of Ecosystem Protection (OEP). These requests, reports and notices include:

A. Annual Pretreatment Reports,
B. Pretreatment Reports Reassessment of Technically Based Industrial Discharge Limits Form,
C. Revisions to Industrial Discharge Limits,
D. Report describing Pretreatment Program activities, and
E. Proposed changes to a Pretreatment Program

This information shall be submitted to EPA/OEP as a hard copy at the following address:

U.S. Environmental Protection Agency
Office of Ecosystem Protection
Regional Pretreatment Coordinator
5 Post Office Square - Suite 100 (OEP06-03)
Boston, MA 02109-3912

4. Submittal of Requests and Reports to EPA/OEP

The following requests, reports, and information described in this permit shall be submitted to the EPA/OEP NPDES Applications Coordinator in the EPA Office Ecosystem Protection (OEP).

A. Transfer of Permit notice
B. Request for changes in sampling location
C. Request for reduction in testing frequency
D. Request for Reduction in WET Testing Requirement
E. Report on unacceptable dilution water / request for alternative dilution water for WET testing

These reports, information, and requests shall be submitted to EPA/OEP electronically at R1NPDES.Notices.OEP@epa.gov or by hard copy mail to the following address:

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP NPDES Applications Coordinator
5 Post Office Square - Suite 100 (OEP06-03)
Boston, MA 02109-3912

5. Submittal of Reports in Hard Copy Form

The following notifications and reports shall be submitted as hard copy with a cover letter describing the submission. These reports shall be signed and dated originals submitted to EPA.

A. Written notifications required under Part II
B. Notice of unauthorized discharges, including Sanitary Sewer Overflow (SSO) reporting
C. Collection System Operation and Maintenance Plan (from co-permittees)
D. Report on annual activities related to O&M Plan (from co-permittees)
E. Sludge monitoring reports

This information shall be submitted to EPA/OES at the following address:

U.S. Environmental Protection Agency
Office or Environmental Stewardship (OES)
Water Technical Unit
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912

All sludge monitoring reports required herein shall be submitted only to:

U.S. Environmental Protection Agency, Region 7
Biosolids Center
Water Enforcement Branch
11201 Renner Boulevard
Lenexa, Kansas 66219

6. State Reporting

Unless otherwise specified in this permit, duplicate signed copies of all reports, information, requests or notifications described in this permit, including the reports, information, requests or notifications described in Parts I.G.3, I.G.4, and I.G.5 also shall be submitted to the State at the following addresses:

MassDEP – Southeast Region
Bureau of Resource Protection (Municipal)
20 Riverside Drive
Lakeville, MA 02347

Copies of toxicity tests and nitrogen optimization reports only shall be submitted to:

Massachusetts Department of Environmental Protection
Watershed Planning Program
8 New Bond Street
Worcester, Massachusetts 01606

7. Verbal Reports and Verbal Notifications

Any verbal reports or verbal notifications, if required in Parts I and/or II of this permit, shall be made to both EPA and to MassDEP. This includes verbal reports and notifications which require reporting within 24 hours. (As examples, see Part II.B.4.c.(2), Part II.B.5.c. (3), and Part II.D.1.e.) Verbal reports and verbal notifications shall be made to EPA's Office of Environmental Stewardship at:

U.S. Environmental Protection Agency
Office of Environmental Stewardship
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912
617-918-1510

H. 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.

FRESHWATER CHRONIC
TOXICITY TEST PROCEDURE AND PROTOCOL
USEPA Region 1

I. GENERAL REQUIREMENTS

The permittee shall be responsible for the conduct of acceptable chronic toxicity tests using three fresh samples collected during each test period. The following tests shall be performed as prescribed in Part 1 of the NPDES discharge permit in accordance with the appropriate test protocols described below. (Note: the permittee and testing laboratory should review the applicable permit to determine whether testing of one or both species is required).

- **Daphnid (Ceriodaphnia dubia) Survival and Reproduction Test.**

- **Fathead Minnow (Pimephales promelas) Larval Growth and Survival Test.**

Chronic toxicity data shall be reported as outlined in Section VIII.

II. METHODS

Methods to follow are those recommended by EPA in: Short Term Methods For Estimating The Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition. October 2002. United States Environmental Protection Agency. Office of Water, Washington, D.C., EPA 821-R-02-013. The methods are available on-line at http://www.epa.gov/waterscience/WET/ . Exceptions and clarification are stated herein.

III. SAMPLE COLLECTION AND USE

A total of three fresh samples of effluent and receiving water are required for initiation and subsequent renewals of a freshwater, chronic, toxicity test. The receiving water control sample must be collected immediately upstream of the permitted discharge's zone of influence. Fresh samples are recommended for use on test days 1, 3, and 5. However, provided a total of three samples are used for testing over the test period, an alternate sampling schedule is acceptable. The acceptable holding times until initial use of a sample are 24 and 36 hours for on-site and off-site testing, respectively. A written waiver is required from the regulating authority for any hold time extension. All test samples collected may be used for 24, 48 and 72 hour renewals after initial use. All samples held for use beyond the day of sampling shall be refrigerated and maintained at a temperature range of 0-6^{o} C.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol.

Sampling guidance dictates that, where appropriate, aliquots for the analysis required in this protocol shall be split from the samples, containerized and immediately preserved, or analyzed as per 40 CFR Part 136. EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection. Testing for the presence of total residual chlorine (TRC) must be analyzed immediately or as soon as possible, for all effluent samples, prior to WET testing. TRC analysis may be performed on-site or by the toxicity testing laboratory and the samples must be dechlorinated, as necessary, using sodium thiosulfate prior to sample use for toxicity testing.

If any of the renewal samples are of sufficient potency to cause lethality to 50 percent or more of the test organisms in any of the test treatments for either species or, if the test fails to meet its permit limits, then chemical analysis for total metals (originally required for the initial sample only in Section VI) will be required on the renewal sample(s) as well.

IV. DILUTION WATER

Samples of receiving water must be collected from a location in the receiving water body immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. EPA strongly urges that screening for toxicity be performed prior to the set up of a full, definitive toxicity test any time there is a question about the test dilution water's ability to achieve test acceptability criteria (TAC) as indicated in Section V of this protocol. The test dilution water control response will be used in the statistical analysis of the toxicity test data. All other control(s) required to be run in the test will be reported as specified in the Discharge Monitoring Report (DMR) Instructions, Attachment F, page 2,Test Results & Permit Limits.

The test dilution water must be used to determine whether the test met the applicable TAC. When receiving water is used for test dilution, an additional control made up of standard laboratory water (0% effluent) is required. This control will be used to verify the health of the test organisms and evaluate to what extent, if any, the receiving water itself is responsible for any toxic response observed.

If dechlorination of a sample by the toxicity testing laboratory is necessary a "sodium thiosulfate" control, representing the concentration of sodium thiosulfate used to adequately dechlorinate the sample prior to toxicity testing, must be included in the test.

If the use of an alternate dilution water (ADW) is authorized, in addition to the ADW test control, the testing laboratory must, for the purpose of monitoring the receiving water, also run a receiving water control.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable an ADW of known quality with hardness similar to that of the receiving water may be substituted. Substitution is species specific meaning that the decision to use ADW is made for each species and is based on the toxic response of that particular species. Substitution to an ADW is authorized in two cases. The first is the case where repeating a test due to toxicity in the site dilution water requires an **immediate decision** for ADW use be made by the permittee and toxicity testing laboratory. The second is in the case where two of the most recent documented incidents of unacceptable site dilution water toxicity requires ADW use in future WET testing.

For the second case, written notification from the permittee requesting ADW use **and** written authorization from the permit issuing agency(s) is required **prior to** switching to a long-term use of ADW for the duration of the permit.

Written requests for use of ADW must be mailed with supporting documentation to the following addresses:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency, Region 1
Five Post Office Square, Suite 100
Mail Code OEP06-5
Boston, MA 02109-3912

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
Five Post Office Square, Suite 100
Mail Code OES04-4
Boston, MA 02109-3912

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the most current annual DMR instructions which can be found on the EPA Region 1 website at http://www.epa.gov/region1/enforcementandassistance/dmr.html for further important details on alternate dilution water substitution requests.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

Method specific test conditions and TAC are to be followed and adhered to as specified in the method guidance document, EPA 821-R-02-013. If a test does not meet TAC the test must be repeated with fresh samples within 30 days of the initial test completion date.

V.1. Use of Reference Toxicity Testing

Reference toxicity test results and applicable control charts must be included in the toxicity testing report.

If reference toxicity test results fall outside the control limits established by the laboratory for a specific test endpoint, a reason or reasons for this excursion must be evaluated, correction made and reference toxicity tests rerun as necessary.

If a test endpoint value exceeds the control limits at a frequency of more than one out of twenty then causes for the reference toxicity test failure must be examined and if problems are identified corrective action taken. The reference toxicity test must be repeated during the same month in which the exceedance occurred.

If two consecutive reference toxicity tests fall outside control limits, the possible cause(s) for the exceedance must be examined, corrective actions taken and a repeat of the reference toxicity test must take place immediately. Actions taken to resolve the problem must be reported.

V.1.a. Use of Concurrent Reference Toxicity Testing

In the case where concurrent reference toxicity testing is required due to a low frequency of testing with a particular method, if the reference toxicity test results fall slightly outside of laboratory established control limits, but the primary test met the TAC, the results of the primary test will be considered acceptable. However, if the results of the concurrent test fall well outside the established **upper** control limits i.e. $\geq$3 standard deviations for IC25 values and $\geq$ two concentration intervals for NOECs, and even though the primary test meets TAC, the primary test will be considered unacceptable and must be repeated.

V.2. For the *C. dubia* test, the determination of TAC and formal statistical analyses must be performed using only the first three broods produced.

V.3. Test treatments must include 5 effluent concentrations and a dilution water control. An additional test treatment, at the permitted effluent concentration (% effluent), is required if it is not included in the dilution series.

VI. CHEMICAL ANALYSIS

As part of each toxicity test's daily renewal procedure, pH, specific conductance, dissolved oxygen (DO) and temperature must be measured at the beginning and end of each 24-hour period in each test treatment and the control(s).

The additional analysis that must be performed under this protocol is as specified and noted in the table below.

Parameter	Effluent	Receiving Water	ML (mg/l)
Hardness[1, 4]	x	x	0.5
Total Residual Chlorine (TRC)[2, 3, 4]	x		0.02
Alkalinity[4]	x	x	2.0
pH[4]	x	x	--
Specific Conductance[4]	x	x	--
Total Solids [6]	x		--
Total Dissolved Solids [6]	x		--
Ammonia[4]	x	x	0.1
Total Organic Carbon [6]	x	x	0.5
Total Metals [5]			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02
Other as permit requires			

Notes:

1. Hardness may be determined by:

- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
  -Method 2340B (hardness by calculation)
  -Method 2340C (titration)

2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.

- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
  -Method 4500-CL E Low Level Amperometric Titration
  -Method 4500-CL G DPD Colorimetric Method
- USEPA 1983. Manual of Methods Analysis of Water and Wastes
  -Method 330.5

3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing
4. Analysis is to be performed on samples and/or receiving water, as designated in the table above, from all three sampling events.
5. Analysis is to be performed on the initial sample(s) only unless the situation arises as stated in Section III, paragraph 4
6. Analysis to be performed on initial samples only

VII. TOXICITY TEST DATA ANALYSIS AND REVIEW

A. Test Review

1. Concentration / Response Relationship

A concentration/response relationship evaluation is required for test endpoint determinations from both Hypothesis Testing and Point Estimate techniques. The test report is to include documentation of this evaluation in support of the endpoint values reported. The dose-response review must be performed as required in Section 10.2.6 of EPA-821-R-02-013. Guidance for this review can be found at http://water.epa.gov/scitech/methods/cwa/ . In most cases, the review will result in one of the following three conclusions: (1) Results are reliable and reportable; (2) Results are anomalous and require explanation; or (3) Results are inconclusive and a retest with fresh samples is required.

2. Test Variability (Test Sensitivity)

This review step is separate from the determination of whether a test meets or does not meet TAC. Within test variability is to be examined for the purpose of evaluating test sensitivity. This evaluation is to be performed for the sub-lethal hypothesis testing endpoints reproduction and growth as required by the permit. The test report is to include documentation of this evaluation to support that the endpoint values reported resulted from a toxicity test of adequate sensitivity. This evaluation must be performed as required in Section 10.2.8 of EPA-821-R-02-013.

To determine the adequacy of test sensitivity, USEPA requires the calculation of test percent minimum significant difference (PMSD) values. In cases where NOEC determinations are made based on a non-parametric technique, calculation of a test PMSD value**,** for the sole purpose of assessing test sensitivity, shall be calculated using a comparable parametric statistical analysis technique. The calculated test PMSD is then compared to the upper and lower PMSD bounds shown for freshwater tests in Section 10.2.8.3, p. 52, Table 6 of EPA-821-R-02-013. The comparison will yield one of the following determinations.

- The test PMSD exceeds the PMSD upper bound test variability criterion in Table 6, the test results are considered highly variable and the test may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC). If the test results indicate that the discharge is not toxic at the PLC, then the test is considered insufficiently sensitive and must be repeated within 30 days of the initial test completion using fresh samples. If the test results indicate that the discharge is toxic at the PLC, the test is considered acceptable and does not have to be repeated.

- The test PMSD falls below the PMSD lower bound test variability criterion in Table 6, the test is determined to be very sensitive. In order to determine which treatment(s) are statistically significant and which are not, for the purpose of reporting a NOEC, the relative percent difference (RPD) between the control and each treatment must be calculated and compared to the lower PMSD boundary. See *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program,* EPA 833-R-00-003, June 2002, Section 6.4.2. The following link: Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program can be used to locate the USEPA website containing this document. If the RPD for a treatment falls below the PMSD lower bound, the difference is considered statistically insignificant. If the RPD for a treatment is greater that the PMSD lower bound, then the treatment is considered statistically significant.

- The test PMSD falls within the PMSD upper and lower bounds in Table 6, the sub-lethal test endpoint values shall be reported as is.

B. Statistical Analysis

1. General - Recommended Statistical Analysis Method

Refer to general data analysis flowchart, EPA 821-R-02-013, page 43

For discussion on Hypothesis Testing, refer to EPA 821-R-02-013, Section 9.6

For discussion on Point Estimation Techniques, refer to EPA 821-R-02-013, Section 9.7

2. *Pimephales promelas*

Refer to survival hypothesis testing analysis flowchart, EPA 821-R-02-013, page 79

Refer to survival point estimate techniques flowchart, EPA 821-R-02-013, page 80

Refer to growth data statistical analysis flowchart, EPA 821-R-02-013, page 92

3. *Ceriodaphnia dubia*

Refer to survival data testing flowchart, EPA 821-R-02-013, page 168

Refer to reproduction data testing flowchart, EPA 821-R-02-013, page 173

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Test summary sheets (2007 DMR Attachment F) which includes:
  - Facility name
  - NPDES permit number
  - Outfall number
  - Sample type
  - Sampling method
  - Effluent TRC concentration
  - Dilution water used
  - Receiving water name and sampling location
  - Test type and species
  - Test start date
  - Effluent concentrations tested (%) and permit limit concentration
  - Applicable reference toxicity test date and whether acceptable or not
  - Age, age range and source of test organisms used for testing
  - Results of TAC review for all applicable controls
  - Test sensitivity evaluation results (test PMSD for growth and reproduction)
  - Permit limit and toxicity test results
  - Summary of test sensitivity and concentration response evaluation

In addition to the summary sheets the report must include:

- A brief description of sample collection procedures
- Chain of custody documentation including names of individuals collecting samples, times and dates of sample collection, sample locations, requested analysis and lab receipt with time and date received, lab receipt personnel and condition of samples upon receipt at the lab(s)
- Reference toxicity test control charts
- All sample chemical/physical data generated, including minimum limits (MLs) and analytical methods used
- All toxicity test raw data including daily ambient test conditions, toxicity test chemistry, sample dechlorination details as necessary, bench sheets and statistical analysis
- A discussion of any deviations from test conditions
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review per species per endpoint

USEPA REGION 1 FRESHWATER ACUTE
TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable acute toxicity tests in accordance with the appropriate test protocols described below:

- **Daphnid (Ceriodaphnia dubia) definitive 48 hour test.**
- **Fathead Minnow (Pimephales promelas) definitive 48 hour test.**

Acute toxicity test data shall be reported as outlined in Section VIII.

II. METHODS

The permittee shall use 40 CFR Part 136 methods. Methods and guidance may be found at:

http://water.epa.gov/scitech/methods/cwa/wet/disk2_index.cfm

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. This protocol defines more specific requirements while still being consistent with the Part 136 methods. If, due to modifications of Part 136, there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

III. SAMPLE COLLECTION

A discharge sample shall be collected. Aliquots shall be split from the sample, containerized and preserved (as per 40 CFR Part 136) for chemical and physical analyses required. The remaining sample shall be measured for total residual chlorine and dechlorinated (if detected) in the laboratory using sodium thiosulfate for subsequent toxicity testing. (Note that EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection.) Grab samples must be used for pH, temperature, and total residual chlorine (as per 40 CFR Part 122.21).

Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1.0 mg/L chlorine. If dechlorination is necessary, a thiosulfate control (maximum amount of thiosulfate in lab control or receiving water) must also be run in the WET test.

All samples held overnight shall be refrigerated at 1- 6^{o}C.

IV. DILUTION WATER

A grab sample of dilution water used for acute toxicity testing shall be collected from the receiving water at a point immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. In the case where an alternate dilution water has been agreed upon an additional receiving water control (0% effluent) must also be tested.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable, an alternate standard dilution water of known quality with a hardness, pH, conductivity, alkalinity, organic carbon, and total suspended solids similar to that of the receiving water may be substituted **AFTER RECEIVING WRITTEN APPROVAL FROM THE PERMIT ISSUING AGENCY(S)**. Written requests for use of an alternate dilution water should be mailed with supporting documentation to the following address:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency-New England
5 Post Office Sq., Suite 100 (OEP06-5)
Boston, MA 02109-3912

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
5 Post Office Sq., Suite 100 (OES04-4)
Boston, MA 02109-3912

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the most current annual DMR instructions which can be found on the EPA Region 1 website at http://www.epa.gov/region1/enforcement/water/dmr.html *for further important details on alternate dilution water substitution requests.*

It may prove beneficial to have the proposed dilution water source screened for suitability prior to toxicity testing. EPA strongly urges that screening be done prior to set up of a full definitive toxicity test any time there is question about the dilution water's ability to support acceptable performance as outlined in the 'test acceptability' section of the protocol.

V. TEST CONDITIONS

The following tables summarize the accepted daphnid and fathead minnow toxicity test conditions and test acceptability criteria:

EPA NEW ENGLAND EFFLUENT TOXICITY TEST CONDITIONS FOR THE DAPHNID, CERIODAPHNIA DUBIA 48 HOUR ACUTE TESTS[1]

1.	Test type	Static, non-renewal
2.	Temperature (^oC)	20 $\pm$ 1^oC or 25 $\pm$ 1^oC
3.	Light quality	Ambient laboratory illumination
4.	Photoperiod	16 hour light, 8 hour dark
5.	Test chamber size	Minimum 30 ml
6.	Test solution volume	Minimum 15 ml
7.	Age of test organisms	1-24 hours (neonates)
8.	No. of daphnids per test chamber	5
9.	No. of replicate test chambers per treatment	4
10.	Total no. daphnids per test concentration	20
11.	Feeding regime	As per manual, lightly feed YCT and Selenastrum to newly released organisms while holding prior to initiating test
12.	Aeration	None
13.	Dilution water[2]	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q^R or equivalent deionized water and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	$\geq$ 0.5, must bracket the permitted RWC
15.	Number of dilutions	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution

		series.
16.	Effect measured	Mortality-no movement of body or appendages on gentle prodding
17.	Test acceptability	90% or greater survival of test organisms in dilution water control solution
18.	Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples must first be used within 36 hours of collection.
19.	Sample volume required	Minimum 1 liter

Footnotes:

1. Adapted from EPA-821-R-02-012.
2. Standard prepared dilution water must have hardness requirements to generally reflect the characteristics of the receiving water.

EPA NEW ENGLAND TEST CONDITIONS FOR THE FATHEAD MINNOW (<u>PIMEPHALES</u> <u>PROMELAS</u>) 48 HOUR ACUTE TEST[1]

1.	Test Type	Static, non-renewal
2.	Temperature (^{o}C)	20 $\pm$ 1 ^{o} C or 25 $\pm$ 1^{o}C
3.	Light quality	Ambient laboratory illumination
4.	Photoperiod	16 hr light, 8 hr dark
5.	Size of test vessels	250 mL minimum
6.	Volume of test solution	Minimum 200 mL/replicate
7.	Age of fish	1-14 days old and age within 24 hrs of each other
8.	No. of fish per chamber	10
9.	No. of replicate test vessels per treatment	4
10.	Total no. organisms per concentration	40
11.	Feeding regime	As per manual, lightly feed test age larvae using concentrated brine shrimp nauplii while holding prior to initiating test
12.	Aeration	None, unless dissolved oxygen (D.O.) concentration falls below 4.0 mg/L, at which time gentle single bubble aeration should be started at a rate of less than 100 bubbles/min. (Routine D.O. check is recommended.)
13.	dilution water[2]	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q^{R} or equivalent deionized and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	$\geq$ 0.5, must bracket the permitted RWC

15.	Number of dilutions	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution series.
16.	Effect measured	Mortality-no movement on gentle prodding
17.	Test acceptability	90% or greater survival of test organisms in dilution water control solution
18.	Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples are used within 36 hours of collection.
19.	Sample volume required	Minimum 2 liters

Footnotes:

1. Adapted from EPA-821-R-02-012
2. Standard dilution water must have hardness requirements to generally reflect characteristics of the receiving water.

VI. CHEMICAL ANALYSIS

At the beginning of a static acute toxicity test, pH, conductivity, total residual chlorine, oxygen, hardness, alkalinity and temperature must be measured in the highest effluent concentration and the dilution water. Dissolved oxygen, pH and temperature are also measured at 24 and 48 hour intervals in all dilutions. The following chemical analyses shall be performed on the 100 percent effluent sample and the upstream water sample for each sampling event.

Parameter	Effluent	Receiving Water	ML (mg/l)
Hardness[1]	x	x	0.5
Total Residual Chlorine (TRC)[2, 3]	x		0.02
Alkalinity	x	x	2.0
pH	x	x	--
Specific Conductance	x	x	--
Total Solids	x		--
Total Dissolved Solids	x		--
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
Total Metals			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02
Other as permit requires			

Notes:

1. Hardness may be determined by:
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     - Method 2340B (hardness by calculation)
     - Method 2340C (titration)
2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     - Method 4500-CL E Low Level Amperometric Titration
     - Method 4500-CL G DPD Colorimetric Method
3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing.

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration (Determined at 48 Hours)

Methods of Estimation:

- Probit Method
- Spearman-Karber
- Trimmed Spearman-Karber
- Graphical

See the flow chart in Figure 6 on p. 73 of EPA-821-R-02-012 for appropriate method to use on a given data set.

No Observed Acute Effect Level (NOAEL)

See the flow chart in Figure 13 on p. 87 of EPA-821-R-02-012.

VIII. TOXICITY TEST REPORTING

A report of the results will include the following:

- Description of sample collection procedures, site description
- Names of individuals collecting and transporting samples, times and dates of sample collection and analysis on chain-of-custody
- General description of tests: age of test organisms, origin, dates and results of standard toxicant tests; light and temperature regime; other information on test conditions if different than procedures recommended. Reference toxicant test data should be included.
- All chemical/physical data generated. (Include minimum detection levels and minimum quantification levels.)
- Raw data and bench sheets.
- Provide a description of dechlorination procedures (as applicable).
- Any other observations or test conditions affecting test outcome.

EPA - New England

Reassessment of Technically Based Industrial Discharge Limits

Under 40 CFR §122.21(j)(4), all Publicly Owned Treatment Works (POTWs) with approved Industrial Pretreatment Programs (IPPs) shall provide the following information to the Director: a written evaluation of the need to revise local industrial discharge limits under 40 CFR §403.5(c)(1).

Below is a form designed by the U.S. Environmental Protection Agency (EPA - New England) to assist POTWs with approved IPPs in evaluating whether their existing Technically Based Local Limits (TBLLs) need to be recalculated. The form allows the permittee and EPA to evaluate and compare pertinent information used in previous TBLLs calculations against present conditions at the POTW.

Please read direction below before filling out form.

ITEM I.

* In Column (1), list what your POTW's influent flow rate was when your existing TBLLs were calculated. In Column (2), list your POTW's present influent flow rate. Your current flow rate should be calculated using the POTW's average daily flow rate from the previous 12 months.

* In Column (1) list what your POTW's SIU flow rate was when your existing TBLLs were calculated. In Column (2), list your POTW's present SIU flow rate.

* In Column (1), list what dilution ratio and/or 7Q10 value was used in your old/expired NPDES permit. In Column (2), list what dilution ration and/or 7Q10 value is presently being used in your new/reissued NPDES permit.

  The 7Q10 value is the lowest seven day average flow rate, in the river, over a ten year period. The 7Q10 value and/or dilution ratio used by EPA in your new NPDES permit can be found in your NPDES permit "Fact Sheet."

* In Column (1), list the safety factor, if any, that was used when your existing TBLLs were calculated.

* In Column (1), note how your bio-solids were managed when your existing TBLLs were calculated. In Column (2), note how your POTW is presently disposing of its biosolids and how your POTW will be disposing of its biosolids in the future.

ITEM II.

* List what your existing TBLLs are - as they appear in your current Sewer Use Ordinance (SUO).

ITEM III.

* Identify how your existing TBLLs are allocated out to your industrial community. Some pollutants may be allocated differently than others, if so please explain.

ITEM IV.

* Since your existing TBLLs were calculated, identify the following in detail:

  (1) if your POTW has experienced any upsets, inhibition, interference or pass-through as a result of an industrial discharge.

  (2) if your POTW is presently violating any of its current NPDES permit limitations - include toxicity.

ITEM V.

* Using current sampling data, list in Column (1) the average and maximum amount of pollutants (in pounds per day) received in the POTW's influent. Current sampling data is defined as data obtained over the last 24 month period.

  All influent data collected and analyzed must be in accordance with 40 CFR §136. Sampling data collected should be analyzed using the lowest possible detection method(s), e.g. graphite furnace.

* Based on your existing TBLLs, as presented in Item II., list in Column (2), for each pollutant the Maximum Allowable Headwork Loading (MAHL) values derived from an applicable environmental criteria or standard, e.g. water quality, sludge, NPDES, inhibition, etc. For more information, please see EPA's Local Limit Guidance Document (July 2004).

Item VI.

* Using current sampling data, list in Column (1) the average and maximum amount of pollutants (in micrograms per liter) present your POTW's effluent. Current sampling data is defined as data obtained during the last 24 month period.

(Item VI. continued)

All effluent data collected and analyzed must be in accordance with 40 CFR §136. Sampling data collected should be analyzed using the lowest possible detection method(s), e.g. graphite furnace.

* List in Column (2A) what the Water Quality Standards (WQS) were (in micrograms per liter) when your TBLLs were calculated, please note what hardness value was used at that time. Hardness should be expressed in milligram per liter of Calcium Carbonate.

List in Column (2B) the current WQSs or "Chronic Gold Book" values for each pollutant multiplied by the dilution ratio used in your new/reissued NPDES permit. For example, with a dilution ratio of 25:1 at a hardness of 25 mg/l - Calcium Carbonate (copper's chronic WQS equals 6.54 ug/l) the chronic NPDES permit limit for copper would equal 156.25 ug/l.

ITEM VII.

* In Column (1), list all pollutants (in micrograms per liter) limited in your new/reissued NPDES permit. In Column (2), list all pollutants limited in your old/expired NPDES permit.

ITEM VIII.

* Using current sampling data, list in Column (1) the average and maximum amount of pollutants in your POTW's biosolids. Current data is defined as data obtained during the last 24 month period. Results are to be expressed as total dry weight.

All biosolids data collected and analyzed must be in accordance with 40 CFR §136.

In Column (2A), list current State and/or Federal sludge standards that your facility's biosolids must comply with. Also note how your POTW currently manages the disposal of its biosolids. If your POTW is planing on managing its biosolids differently, list in Column (2B) what your new biosolids criteria will be and method of disposal.

In general, please be sure the units reported are correct and all pertinent information is included in your evaluation. If you have any questions, please contact your pretreatment representative at EPA - New England.

REASSESSMENT OF TECHNICALLY BASED LOCAL LIMITS (TBLLs)

POTW Name & Address : ____

NPDES PERMIT # : ____

Date EPA approved current TBLLs : ____

Date EPA approved current Sewer Use Ordinance : ______________________

ITEM I.

In Column (1) list the conditions that existed when your current TBLLs were calculated. In Column (2), list current conditions or expected conditions at your POTW.		
	Column (1) EXISTING TBLLs	Column (2) PRESENT CONDITIONS
POTW Flow (MGD)		
Dilution Ratio or 7Q10 (from NPDES Permit)		
SIU Flow (MGD)		
Safety Factor		N/A
Biosolids Disposal Method(s)		

ITEM II.

EXISTING TBLLs			
POLLUTANT	NUMERICAL LIMIT (mg/l) or (lb/day)	POLLUTANT	NUMERICAL LIMIT (mg/l) or (lb/day)

ITEM III.

Note how your existing TBLLs, listed in Item II., are allocated to your Significant Industrial Users (SIUs), i.e. uniform concentration, contributory flow, mass proportioning, other. Please specify by circling.

ITEM IV.

Has your POTW experienced any upsets, inhibition, interference or pass-through from industrial sources since your existing TBLLs were calculated?
If yes, explain.

____

____

Has your POTW violated any of its NPDES permit limits and/or toxicity test requirements?

If yes, explain.

____

____

ITEM V.

Using current POTW influent sampling data fill in Column (1). In Column (2), list your Maximum Allowable Headwork Loading (MAHL) values used to derive your TBLLs listed in Item II. In addition, please note the Environmental Criteria for which each MAHL value was established, i.e. water quality, sludge, NPDES etc.				
Pollutant	Column (1) Influent Data Analyses Maximum (lb/day)	Average (lb/day)	Column (2) MAHL Values (lb/day)	Criteria
Arsenic				
Cadmium				
Chromium				
Copper				
Cyanide				
Lead				
Mercury				
Nickel				
Silver				
Zinc				
Other (List)				

ITEM VI.

Using current POTW effluent sampling data, fill in Column (1). In Column (2A) list what the Water Quality Standards (Gold Book Criteria) were at the time your existing TBLLs were developed. List in Column (2B) current Gold Book values multiplied by the dilution ratio used in your new/reissued NPDES permit.				
Pollutant	Column (1) Effluent Data Analyses Maximum (ug/l)	Average (ug/l)	Columns (2A) (2B) Water Quality Criteria (Gold Book) From TBLLs (ug/l)	Today (ug/l)
Arsenic				
*Cadmium				
*Chromium				
*Copper				
Cyanide				
*Lead				
Mercury				
*Nickel				
Silver				
*Zinc				
Other (List)				

*Hardness Dependent (mg/l - $CaCO_3$)

ITEM VII.

In Column (1), identify all pollutants limited in your new/reissued NPDES permit. In Column (2), identify all pollutants that were limited in your old/expired NPDES permit.			
Column (1) NEW PERMIT Pollutants	Limitations (ug/l)	Column (2) OLD PERMIT Pollutants	Limitations (ug/l)

ITEM VIII.

Using current POTW biosolids data, fill in Column (1). In Column (2A), list the biosolids criteria that was used at the time your existing TBLLs were calculated. If your POTW is planing on managing its biosolids differently, list in Column (2B) what your new biosolids criteria would be and method of disposal.

Pollutant	Column (1) Biosolids Data Analyses Average (mg/kg)	Columns (2A) Biosolids Criteria From TBLLs (mg/kg)	(2B) Biosolids Criteria New (mg/kg)
Arsenic			
Cadmium			
Chromium			
Copper			
Cyanide			
Lead			
Mercury			
Nickel			
Silver			
Zinc			
Molybdenum			
Selenium			
Other (List)			

NPDES PERMIT REQUIREMENT
FOR
INDUSTRIAL PRETREATMENT ANNUAL REPORT

The information described below shall be included in the pretreatment program annual reports:

1. An updated list of all industrial users by category, as set forth in 40 C.F.R. 403.8(f)(2)(i), indicating compliance or noncompliance with the following:
   - baseline monitoring reporting requirements for newly promulgated industries
   - compliance status reporting requirements for newly promulgated industries
   - periodic (semi-annual) monitoring reporting requirements,
   - categorical standards, and
   - local limits;

2. A summary of compliance and enforcement activities during the preceding year, including the number of:
   - significant industrial users inspected by POTW (include inspection dates for each industrial user),
   - significant industrial users sampled by POTW (include sampling dates for each industrial user),
   - compliance schedules issued (include list of subject users),
   - written notices of violations issued (include list of subject users),
   - administrative orders issued (include list of subject users),
   - criminal or civil suits filed (include list of subject users) and,
   - penalties obtained (include list of subject users and penalty amounts);

3. A list of significantly violating industries required to be published in a local newspaper in accordance with 40 C.F.R. 403.8(f)(2)(vii);

4. A narrative description of program effectiveness including present and proposed changes to the program, such as funding, staffing, ordinances, regulations, rules and/or statutory authority;

5. A summary of all pollutant analytical results for influent, effluent, sludge and any toxicity or bioassay data from the wastewater treatment facility. The summary shall include a comparison of influent sampling results versus threshold inhibitory concentrations for the Wastewater Treatment System and effluent sampling results versus water quality standards. Such a comparison shall be based on the sampling program described in the paragraph below or any similar sampling program described in this Permit.

At a minimum, annual sampling and analysis of the influent and effluent of the Wastewater Treatment Plant shall be conducted for the following pollutants:

a.) Total Cadmium	f.) Total Nickel
b.) Total Chromium	g.) Total Silver
c.) Total Copper	h.) Total Zinc
d.) Total Lead	i.) Total Cyanide
e.) Total Mercury	j.) Total Arsenic

The sampling program shall consist of one 24-hour flow-proportioned composite and at least one grab sample that is representative of the flows received by the POTW. The composite shall consist of hourly flow-proportioned grab samples taken over a 24-hour period if the sample is collected manually or shall consist of a minimum of 48 samples collected at 30 minute intervals if an automated sampler is used. Cyanide shall be taken as a grab sample during the same period as the composite sample. Sampling and preservation shall be consistent with 40 CFR Part 136.

6. A detailed description of all interference and pass-through that occurred during the past year;

7. A thorough description of all investigations into interference and pass-through during the past year;

8. A description of monitoring, sewer inspections and evaluations which were done during the past year to detect interference and pass-through, specifying parameters and frequencies;

9. A description of actions being taken to reduce the incidence of significant violations by significant industrial users; and,

10. The date of the latest adoption of local limits and an indication as to whether or not the permittee is under a State or Federal compliance schedule that includes steps to be taken to revise local limits.

NPDES PART II STANDARD CONDITIONS
(January, 2007)

TABLE OF CONTENTS

PART II. A. GENERAL REQUIREMENTS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

a. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirements.

b. The CWA provides that any person who violates Section 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any of such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Section 402 (a)(3) or 402 (b)(8) of the CWA is subject to a civil penalty not to exceed $25,000 per day for each violation. Any person who negligently violates such requirements is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both. Any person who knowingly violates such requirements is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

c. Any person may be assessed an administrative penalty by the Administrator for violating Section 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

Note: See 40 CFR §122.41(a)(2) for complete “Duty to Comply” regulations.

2. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or notifications of planned changes or anticipated noncompliance does not stay any permit condition.

3. Duty to Provide Information

The permittee shall furnish to the Regional Administrator, within a reasonable time, any information which the Regional Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Regional Administrator, upon request, copies of records required to be kept by this permit.

4. Reopener Clause

The Regional Administrator reserves the right to make appropriate revisions to this permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the CWA in order to bring all discharges into compliance with the CWA.

For any permit issued to a treatment works treating domestic sewage (including "sludge-only facilities"), the Regional Administrator or Director shall include a reopener clause to incorporate any applicable standard for sewage sludge use or disposal promulgated under Section 405 (d) of the CWA. The Regional Administrator or Director may promptly modify or revoke and reissue any permit containing the reopener clause required by this paragraph if the standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or contains a pollutant or practice not limited in the permit.

Federal regulations pertaining to permit modification, revocation and reissuance, and termination are found at 40 CFR §122.62, 122.63, 122.64, and 124.5.

5. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the CWA, or Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

6. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges.

7. Confidentiality of Information

a. In accordance with 40 CFR Part 2, any information submitted to EPA pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR Part 2 (Public Information).

b. Claims of confidentiality for the following information will be denied:

(1) The name and address of any permit applicant or permittee;
(2) Permit applications, permits, and effluent data as defined in 40 CFR §2.302(a)(2).

c. Information required by NPDES application forms provided by the Regional Administrator under 40 CFR §122.21 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

8. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Regional Administrator. (The Regional Administrator shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

9. State Authorities

Nothing in Part 122, 123, or 124 precludes more stringent State regulation of any activity covered by these regulations, whether or not under an approved State program.

10. Other Laws

The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, or local laws and regulations.

PART II. B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

4. Bypass

a. Definitions

(1) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.

(2) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can be reasonably expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of Paragraphs B.4.c. and 4.d. of this section.

c. Notice

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in paragraph D.1.e. of this part (Twenty-four hour reporting).

d. Prohibition of bypass

Bypass is prohibited, and the Regional Administrator may take enforcement action against a permittee for bypass, unless:

(1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and

(3) i) The permittee submitted notices as required under Paragraph 4.c. of this section.
ii) The Regional Administrator may approve an anticipated bypass, after considering its adverse effects, if the Regional Administrator determines that it will meet the three conditions listed above in paragraph 4.d. of this section.

5. <u>Upset</u>

a. Definition. *Upset* means an exceptional incident in which there is an unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph B.5.c. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;
(2) The permitted facility was at the time being properly operated;
(3) The permittee submitted notice of the upset as required in paragraphs D.1.a. and 1.e. (Twenty-four hour notice); and
(4) The permittee complied with any remedial measures required under B.3. above.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

PART II. C. MONITORING REQUIREMENTS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Except for records for monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application except for the information concerning storm water discharges which must be retained for a total of 6 years. This retention period may be extended by request of the Regional Administrator at any time.

c. Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;
(2) The individual(s) who performed the sampling or measurements;
(3) The date(s) analyses were performed;
(4) The individual(s) who performed the analyses;
(5) The analytical techniques or methods used; and
(6) The results of such analyses.

d. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.

e. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

2. Inspection and Entry

The permittee shall allow the Regional Administrator or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

PART II. D. REPORTING REQUIREMENTS

1. Reporting Requirements

a. Planned Changes. The permittee shall give notice to the Regional Administrator as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is only required when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR§122.29(b); or
(2) The alteration or addition could significantly change the nature or increase the quantities of the pollutants discharged. This notification applies to pollutants which are subject neither to the effluent limitations in the permit, nor to the notification requirements at 40 CFR§122.42(a)(1).
(3) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition or change may justify the application of permit conditions different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

b. Anticipated noncompliance. The permittee shall give advance notice to the Regional Administrator of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. Transfers. This permit is not transferable to any person except after notice to the Regional Administrator. The Regional Administrator may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the CWA. (See 40 CFR Part 122.61; in some cases, modification or revocation and reissuance is mandatory.)

d. Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(1) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Director for reporting results of monitoring of sludge use or disposal practices.

(2) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of the monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.

(3) Calculations for all limitations which require averaging or measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

e. Twenty-four hour reporting.

(1) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances.

A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(2) The following shall be included as information which must be reported within 24 hours under this paragraph.

(a) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR §122.41(g).)
(b) Any upset which exceeds any effluent limitation in the permit.
(c) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Regional Administrator in the permit to be reported within 24 hours. (See 40 CFR §122.44(g).)

(3) The Regional Administrator may waive the written report on a case-by-case basis for reports under Paragraph D.1.e. if the oral report has been received within 24 hours.

f. Compliance Schedules. Reports of compliance or noncompliance with, any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

g. Other noncompliance. The permittee shall report all instances of noncompliance not reported under Paragraphs D.1.d., D.1.e., and D.1.f. of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in Paragraph D.1.e. of this section.

h. Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Administrator, it shall promptly submit such facts or information.

2. <u>Signatory Requirement</u>

a. All applications, reports, or information submitted to the Regional Administrator shall be signed and certified. (See 40 CFR §122.22)

b. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 2 years per violation, or by both.

3. <u>Availability of Reports</u>.

Except for data determined to be confidential under Paragraph A.8. above, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statements on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA.

PART II. E. DEFINITIONS AND ABBREVIATIONS

1. <u>Definitions for Individual NPDES Permits including Storm Water Requirements</u>

Administrator means the Administrator of the United States Environmental Protection Agency, or an authorized representative.

Applicable standards and limitations means all, State, interstate, and Federal standards and limitations to which a “discharge”, a “sewage sludge use or disposal practice”, or a related activity is subject to, including “effluent limitations”, water quality standards, standards of performance, toxic effluent standards or prohibitions, “best management practices”, pretreatment standards, and “standards for sewage sludge use and disposal” under Sections 301, 302, 303, 304, 306, 307, 308, 403, and 405 of the CWA.

Application means the EPA standard national forms for applying for a permit, including any additions, revisions, or modifications to the forms; or forms approved by EPA for use in "approved States", including any approved modifications or revisions.

Average means the arithmetic mean of values taken at the frequency required for each parameter over the specified period. For total and/or fecal coliforms and Escherichia coli, the average shall be the geometric mean.

Average monthly discharge limitation means the highest allowable average of "daily discharges" over a calendar month calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

Average weekly discharge limitation means the highest allowable average of "daily discharges" measured during the calendar week divided by the number of "daily discharges" measured during the week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Best Professional Judgment (BPJ) means a case-by-case determination of Best Practicable Treatment (BPT), Best Available Treatment (BAT), or other appropriate technology-based standard based on an evaluation of the available technology to achieve a particular pollutant reduction and other factors set forth in 40 CFR §125.3 (d).

Coal Pile Runoff means the rainfall runoff from or through any coal storage pile.

Composite Sample means a sample consisting of a minimum of eight grab samples of equal volume collected at equal intervals during a 24-hour period (or lesser period as specified in the section on Monitoring and Reporting) and combined proportional to flow, or a sample consisting of the same number of grab samples, or greater, collected proportionally to flow over that same time period.

Construction Activities - The following definitions apply to construction activities:

(a) Commencement of Construction is the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

(b) Dedicated portable asphalt plant is a portable asphalt plant located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to. The term dedicated portable asphalt plant does not include facilities that are subject to the asphalt emulsion effluent limitation guideline at 40 CFR Part 443.

(c) Dedicated portable concrete plant is a portable concrete plant located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to.

(d) Final Stabilization means that all soil disturbing activities at the site have been complete, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

(e) Runoff coefficient means the fraction of total rainfall that will appear at the conveyance as runoff.

Contiguous zone means the entire zone established by the United States under Article 24 of the Convention on the Territorial Sea and the Contiguous Zone.

Continuous discharge means a "discharge" which occurs without interruption throughout the operating hours of the facility except for infrequent shutdowns for maintenance, process changes, or similar activities.

CWA means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, and Pub. L. 97-117; 33 USC §§1251 et seq.

Daily Discharge means the discharge of a pollutant measured during the calendar day or any other 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Director normally means the person authorized to sign NPDES permits by EPA or the State or an authorized representative. Conversely, it also could mean the Regional Administrator or the State Director as the context requires.

Discharge Monitoring Report Form (DMR) means the EPA standard national form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by permittees. DMRs must be used by "approved States" as well as by EPA. EPA will supply DMRs to any approved State upon request. The EPA national forms may be modified to substitute the State Agency name, address, logo, and other similar information, as appropriate, in place of EPA's.

Discharge of a pollutant means:

(a) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source", or

(b) Any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation (See "Point Source" definition).

This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works.

This term does not include an addition of pollutants by any "indirect discharger."

Effluent limitation means any restriction imposed by the Regional Administrator on quantities, discharge rates, and concentrations of "pollutants" which are "discharged" from "point sources" into "waters of the United States", the waters of the "contiguous zone", or the ocean.

Effluent limitation guidelines means a regulation published by the Administrator under Section 304(b) of CWA to adopt or revise "effluent limitations".

EPA means the United States "Environmental Protection Agency".

Flow-weighted composite sample means a composite sample consisting of a mixture of aliquots where the volume of each aliquot is proportional to the flow rate of the discharge.

Grab Sample – An individual sample collected in a period of less than 15 minutes.

Hazardous Substance means any substance designated under 40 CFR Part 116 pursuant to Section 311 of the CWA.

Indirect Discharger means a non-domestic discharger introducing pollutants to a publicly owned treatment works.

Interference means a discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

(a) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

(b) Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act (CWA), the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resources Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SDWA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection Research and Sanctuaries Act.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and which is not a land application unit, surface impoundment, injection well, or waste pile.

Land application unit means an area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for treatment or disposal.

Large and Medium municipal separate storm sewer system means all municipal separate storm sewers that are either: (i) located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and 40 CFR Part 122); or (ii) located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships, or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or (iii) owned or operated by a municipality other than those described in Paragraph (i) or (ii) and that are designated by the Regional Administrator as part of the large or medium municipal separate storm sewer system.

Maximum daily discharge limitation means the highest allowable "daily discharge" concentration that occurs only during a normal day (24-hour duration).

Maximum daily discharge limitation (as defined for the Steam Electric Power Plants only) when applied to Total Residual Chlorine (TRC) or Total Residual Oxidant (TRO) is defined as "maximum concentration" or "Instantaneous Maximum Concentration" during the two hours of a chlorination cycle (or fraction thereof) prescribed in the Steam Electric Guidelines, 40 CFR Part 423. These three synonymous terms all mean "a value that shall not be exceeded" during the two-hour chlorination cycle. This interpretation differs from the specified NPDES Permit requirement, 40 CFR § 122.2, where the two terms of "Maximum Daily Discharge" and "Average Daily Discharge" concentrations are specifically limited to the daily (24-hour duration) values.

Municipality means a city, town, borough, county, parish, district, association, or other public body created by or under State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribe organization, or a designated and approved management agency under Section 208 of the CWA.

National Pollutant Discharge Elimination System means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of the CWA. The term includes an "approved program".

New Discharger means any building, structure, facility, or installation:

(a) From which there is or may be a "discharge of pollutants";

(b) That did not commence the "discharge of pollutants" at a particular "site" prior to August 13, 1979;

(c) Which is not a "new source"; and

(d) Which has never received a finally effective NPDES permit for discharges at that "site".

This definition includes an "indirect discharger" which commences discharging into "waters of the United States" after August 13, 1979. It also includes any existing mobile point source (other than an offshore or coastal oil and gas exploratory drilling rig or a coastal oil and gas exploratory drilling rig or a coastal oil and gas developmental drilling rig) such as a seafood processing rig, seafood processing vessel, or aggregate plant, that begins discharging at a "site" for which it does not have a permit; and any offshore rig or coastal mobile oil and gas exploratory drilling rig or coastal mobile oil and gas developmental drilling rig that commences the discharge of pollutants after August 13, 1979, at a "site" under EPA's permitting jurisdiction for which it is not covered by an individual or general permit and which is located in an area determined by the Regional Administrator in the issuance of a final permit to be in an area of biological concern. In determining whether an area is an area of biological concern, the Regional Administrator shall consider the factors specified in 40 CFR §§125.122 (a) (1) through (10).

An offshore or coastal mobile exploratory drilling rig or coastal mobile developmental drilling rig will be considered a "new discharger" only for the duration of its discharge in an area of biological concern.

New source means any building, structure, facility, or installation from which there is or may be a "discharge of pollutants", the construction of which commenced:

(a) After promulgation of standards of performance under Section 306 of CWA which are applicable to such source, or

(b) After proposal of standards of performance in accordance with Section 306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with Section 306 within 120 days of their proposal.

NPDES means "National Pollutant Discharge Elimination System".

Owner or operator means the owner or operator of any "facility or activity" subject to regulation under the NPDES programs.

Pass through means a Discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

Permit means an authorization, license, or equivalent control document issued by EPA or an "approved" State.

Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to any pipe ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff (see 40 CFR §122.2).

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

(a) Sewage from vessels; or

(b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well is used either to facilitate production or for disposal purposes is approved by the authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Primary industry category means any industry category listed in the NRDC settlement agreement (Natural Resources Defense Council et al. v. Train, 8 E.R.C. 2120 (D.D.C. 1976), modified 12 E.R.C. 1833 (D. D.C. 1979)); also listed in Appendix A of 40 CFR Part 122.

Privately owned treatment works means any device or system which is (a) used to treat wastes from any facility whose operation is not the operator of the treatment works or (b) not a “POTW”.

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Publicly Owned Treatment Works (POTW) means any facility or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by a “State” or “municipality”.

This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

Regional Administrator means the Regional Administrator, EPA, Region I, Boston, Massachusetts.

Secondary Industry Category means any industry which is not a “primary industry category”.

Section 313 water priority chemical means a chemical or chemical category which:

(1) is listed at 40 CFR §372.65 pursuant to Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986);

(2) is present at or above threshold levels at a facility subject to EPCRA Section 313 reporting requirements; and

(3) satisfies at least one of the following criteria:

   (i) are listed in Appendix D of 40 CFR Part 122 on either Table II (organic priority pollutants), Table III (certain metals, cyanides, and phenols), or Table V (certain toxic pollutants and hazardous substances);
   (ii) are listed as a hazardous substance pursuant to Section 311(b)(2)(A) of the CWA at 40 CFR §116.4; or
   (iii) are pollutants for which EPA has published acute or chronic water quality criteria.

Septage means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Sewage Sludge means any solid, semisolid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater treatment, scum, septage, portable toilet pumpings, Type III Marine Sanitation Device pumpings (33 CFR Part 159), and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge.

Sewage sludge use or disposal practice means the collection, storage, treatment, transportation, processing, monitoring, use, or disposal of sewage sludge.

Significant materials includes, but is not limited to: raw materials, fuels, materials such as solvents, detergents, and plastic pellets, raw materials used in food processing or production, hazardous substance designated under section 101(14) of CERCLA, any chemical the facility is required to report pursuant to EPCRA Section 313, fertilizers, pesticides, and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills includes, but is not limited to, releases of oil or hazardous substances in excess of reportable quantities under Section 311 of the CWA (see 40 CFR §110.10 and §117.21) or Section 102 of CERCLA (see 40 CFR § 302.4).

Sludge-only facility means any "treatment works treating domestic sewage" whose methods of sewage sludge use or disposal are subject to regulations promulgated pursuant to Section 405(d) of the CWA, and is required to obtain a permit under 40 CFR §122.1(b)(3).

State means any of the 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Trust Territory of the Pacific Islands.

Storm Water means storm water runoff, snow melt runoff, and surface runoff and drainage.

Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. (See 40 CFR §122.26 (b)(14) for specifics of this definition.

Time-weighted composite means a composite sample consisting of a mixture of equal volume aliquots collected at a constant time interval.

Toxic pollutants means any pollutant listed as toxic under Section 307 (a)(1) or, in the case of "sludge use or disposal practices" any pollutant identified in regulations implementing Section 405(d) of the CWA.

Treatment works treating domestic sewage means a POTW or any other sewage sludge or wastewater treatment devices or systems, regardless of ownership (including federal facilities), used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated for the disposal of sewage sludge. This definition does not include septic tanks or similar devices.

For purposes of this definition, "domestic sewage" includes waste and wastewater from humans or household operations that are discharged to or otherwise enter a treatment works. In States where there is no approved State sludge management program under Section 405(f) of the CWA, the Regional Administrator may designate any person subject to the standards for sewage sludge use and disposal in 40 CFR Part 503 as a "treatment works treating domestic sewage", where he or she finds that there is a potential for adverse effects on public health and the environment from poor sludge quality or poor sludge handling, use or disposal practices, or where he or she finds that such designation is necessary to ensure that such person is in compliance with 40 CFR Part 503.

Waste Pile means any non-containerized accumulation of solid, non-flowing waste that is used for treatment or storage.

Waters of the United States means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide;

(b) All interstate waters, including interstate "wetlands";

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands", sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purpose;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in Paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in Paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds as defined in 40 CFR §423.11(m) which also meet the criteria of this definition) are not waters of the United States.

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Whole Effluent Toxicity (WET) means the aggregate toxic effect of an effluent measured directly by a toxicity test. (See Abbreviations Section, following, for additional information.)

2. Definitions for NPDES Permit Sludge Use and Disposal Requirements.

Active sewage sludge unit is a sewage sludge unit that has not closed.

Aerobic Digestion is the biochemical decomposition of organic matter in sewage sludge into carbon dioxide and water by microorganisms in the presence of air.

Agricultural Land is land on which a food crop, a feed crop, or a fiber crop is grown. This includes range land and land used as pasture.

Agronomic rate is the whole sludge application rate (dry weight basis) designed:

(1) To provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or vegetation grown on the land; and

(2) To minimize the amount of nitrogen in the sewage sludge that passes below the root zone of the crop or vegetation grown on the land to the ground water.

Air pollution control device is one or more processes used to treat the exit gas from a sewage sludge incinerator stack.

Anaerobic digestion is the biochemical decomposition of organic matter in sewage sludge into methane gas and carbon dioxide by microorganisms in the absence of air.

Annual pollutant loading rate is the maximum amount of a pollutant that can be applied to a unit area of land during a 365 day period.

Annual whole sludge application rate is the maximum amount of sewage sludge (dry weight basis) that can be applied to a unit area of land during a 365 day period.

Apply sewage sludge or sewage sludge applied to the land means land application of sewage sludge.

Aquifer is a geologic formation, group of geologic formations, or a portion of a geologic formation capable of yielding ground water to wells or springs.

Auxiliary fuel is fuel used to augment the fuel value of sewage sludge. This includes, but is not limited to, natural gas, fuel oil, coal, gas generated during anaerobic digestion of sewage sludge, and municipal solid waste (not to exceed 30 percent of the dry weight of the sewage sludge and auxiliary fuel together). Hazardous wastes are not auxiliary fuel.

Base flood is a flood that has a one percent chance of occurring in any given year (i.e. a flood with a magnitude equaled once in 100 years).

Bulk sewage sludge is sewage sludge that is not sold or given away in a bag or other container for application to the land.

Contaminate an aquifer means to introduce a substance that causes the maximum contaminant level for nitrate in 40 CFR §141.11 to be exceeded in ground water or that causes the existing concentration of nitrate in the ground water to increase when the existing concentration of nitrate in the ground water exceeds the maximum contaminant level for nitrate in 40 CFR §141.11.

Class I sludge management facility is any publicly owned treatment works (POTW), as defined in 40 CFR §501.2, required to have an approved pretreatment program under 40 CFR §403.8 (a) (including any POTW located in a state that has elected to assume local program responsibilities pursuant to 40 CFR §403.10 (e) and any treatment works treating domestic sewage, as defined in 40 CFR § 122.2, classified as a Class I sludge management facility by the EPA Regional Administrator, or, in the case of approved state programs, the Regional Administrator in conjunction with the State Director, because of the potential for sewage sludge use or disposal practice to affect public health and the environment adversely.

Control efficiency is the mass of a pollutant in the sewage sludge fed to an incinerator minus the mass of that pollutant in the exit gas from the incinerator stack divided by the mass of the pollutant in the sewage sludge fed to the incinerator.

Cover is soil or other material used to cover sewage sludge placed on an active sewage sludge unit.

Cover crop is a small grain crop, such as oats, wheat, or barley, not grown for harvest.

Cumulative pollutant loading rate is the maximum amount of inorganic pollutant that can be applied to an area of land.

Density of microorganisms is the number of microorganisms per unit mass of total solids (dry weight) in the sewage sludge.

Dispersion factor is the ratio of the increase in the ground level ambient air concentration for a pollutant at or beyond the property line of the site where the sewage sludge incinerator is located to the mass emission rate for the pollutant from the incinerator stack.

Displacement is the relative movement of any two sides of a fault measured in any direction.

Domestic septage is either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from a grease trap at a restaurant.

Domestic sewage is waste and wastewater from humans or household operations that is discharged to or otherwise enters a treatment works.

Dry weight basis means calculated on the basis of having been dried at 105 degrees Celsius (°C) until reaching a constant mass (i.e. essentially 100 percent solids content).

Fault is a fracture or zone of fractures in any materials along which strata on one side are displaced with respect to the strata on the other side.

Feed crops are crops produced primarily for consumption by animals.

Fiber crops are crops such as flax and cotton.

Final cover is the last layer of soil or other material placed on a sewage sludge unit at closure.

Fluidized bed incinerator is an enclosed device in which organic matter and inorganic matter in sewage sludge are combusted in a bed of particles suspended in the combustion chamber gas.

Food crops are crops consumed by humans. These include, but are not limited to, fruits, vegetables, and tobacco.

Forest is a tract of land thick with trees and underbrush.

Ground water is water below the land surface in the saturated zone.

Holocene time is the most recent epoch of the Quaternary period, extending from the end of the Pleistocene epoch to the present.

Hourly average is the arithmetic mean of all the measurements taken during an hour. At least two measurements must be taken during the hour.

Incineration is the combustion of organic matter and inorganic matter in sewage sludge by high temperatures in an enclosed device.

Industrial wastewater is wastewater generated in a commercial or industrial process.

Land application is the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of sewage sludge into the soil so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil.

Land with a high potential for public exposure is land that the public uses frequently. This includes, but is not limited to, a public contact site and reclamation site located in a populated area (e.g., a construction site located in a city).

Land with low potential for public exposure is land that the public uses infrequently. This includes, but is not limited to, agricultural land, forest and a reclamation site located in an unpopulated area (e.g., a strip mine located in a rural area).

Leachate collection system is a system or device installed immediately above a liner that is designed, constructed, maintained, and operated to collect and remove leachate from a sewage sludge unit.

Liner is soil or synthetic material that has a hydraulic conductivity of 1×10^{-7} centimeters per second or less.

Lower explosive limit for methane gas is the lowest percentage of methane gas in air, by volume, that propagates a flame at 25 degrees Celsius and atmospheric pressure.

Monthly average (Incineration) is the arithmetic mean of the hourly averages for the hours a sewage sludge incinerator operates during the month.

Monthly average (Land Application) is the arithmetic mean of all measurements taken during the month.

Municipality means a city, town, borough, county, parish, district, association, or other public body (including an intermunicipal agency of two or more of the foregoing entities) created by or under State law; an Indian tribe or an authorized Indian tribal organization having jurisdiction over sewage sludge management; or a designated and approved management agency under section 208 of the CWA, as amended. The definition includes a special district created under state law, such as a water district, sewer district, sanitary district, utility district, drainage district, or similar entity, or an integrated waste management facility as defined in section 201 (e) of the CWA, as amended, that has as one of its principal responsibilities the treatment, transport, use or disposal of sewage sludge.

Other container is either an open or closed receptacle. This includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer with a load capacity of one metric ton or less.

Pasture is land on which animals feed directly on feed crops such as legumes, grasses, grain stubble, or stover.

Pathogenic organisms are disease-causing organisms. These include, but are not limited to, certain bacteria, protozoa, viruses, and viable helminth ova.

Permitting authority is either EPA or a State with an EPA-approved sludge management program.

Person is an individual, association, partnership, corporation, municipality, State or Federal Agency, or an agent or employee thereof.

Person who prepares sewage sludge is either the person who generates sewage sludge during the treatment of domestic sewage in a treatment works or the person who derives a material from sewage sludge.

pH means the logarithm of the reciprocal of the hydrogen ion concentration; a measure of the acidity or alkalinity of a liquid or solid material.

Place sewage sludge or sewage sludge placed means disposal of sewage sludge on a surface disposal site.

Pollutant (as defined in sludge disposal requirements) is an organic substance, an inorganic substance, a combination or organic and inorganic substances, or pathogenic organism that, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food chain, could on the basis on information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction) or physical deformations in either organisms or offspring of the organisms.

Pollutant limit (for sludge disposal requirements) is a numerical value that describes the amount of a pollutant allowed per unit amount of sewage sludge (e.g., milligrams per kilogram of total solids); the amount of pollutant that can be applied to a unit of land (e.g., kilograms per hectare); or the volume of the material that can be applied to the land (e.g., gallons per acre).

Public contact site is a land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

Qualified ground water scientist is an individual with a baccalaureate or post-graduate degree in the natural sciences or engineering who has sufficient training and experience in ground water hydrology and related fields, as may be demonstrated by State registration, professional certification, or completion of accredited university programs, to make sound professional judgments regarding ground water monitoring, pollutant fate and transport, and corrective action.

Range land is open land with indigenous vegetation.

Reclamation site is drastically disturbed land that is reclaimed using sewage sludge. This includes, but is not limited to, strip mines and construction sites.

Risk specific concentration is the allowable increase in the average daily ground level ambient air concentration for a pollutant from the incineration of sewage sludge at or beyond the property line of a site where the sewage sludge incinerator is located.

Runoff is rainwater, leachate, or other liquid that drains overland on any part of a land surface and runs off the land surface.

Seismic impact zone is an area that has 10 percent or greater probability that the horizontal ground level acceleration to the rock in the area exceeds 0.10 gravity once in 250 years.

Sewage sludge is a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to:, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in treatment works.

Sewage sludge feed rate is either the average daily amount of sewage sludge fired in all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located for the number of days in a 365 day period that each sewage sludge incinerator operates, or the average daily design capacity for all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located.

Sewage sludge incinerator is an enclosed device in which only sewage sludge and auxiliary fuel are fired.

Sewage sludge unit is land on which only sewage sludge is placed for final disposal. This does not include land on which sewage sludge is either stored or treated. Land does not include waters of the United States, as defined in 40 CFR §122.2.

Sewage sludge unit boundary is the outermost perimeter of an active sewage sludge unit.

Specific oxygen uptake rate (SOUR) is the mass of oxygen consumed per unit time per unit mass of total solids (dry weight basis) in sewage sludge.

Stack height is the difference between the elevation of the top of a sewage sludge incinerator stack and the elevation of the ground at the base of the stack when the difference is equal to or less than 65 meters. When the difference is greater than 65 meters, stack height is the creditable stack height determined in accordance with 40 CFR §51.100 (ii).

State is one of the United States of America, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Trust Territory of the Pacific Islands, the Commonwealth of the Northern Mariana Islands, and an Indian tribe eligible for treatment as a State pursuant to regulations promulgated under the authority of section 518(e) of the CWA.

Store or storage of sewage sludge is the placement of sewage sludge on land on which the sewage sludge remains for two years or less. This does not include the placement of sewage sludge on land for treatment.

Surface disposal site is an area of land that contains one or more active sewage sludge units.

Total hydrocarbons means the organic compounds in the exit gas from a sewage sludge incinerator stack measured using a flame ionization detection instrument referenced to propane.

Total solids are the materials in sewage sludge that remain as residue when the sewage sludge is dried at 103 to 105 degrees Celsius.

Treat or treatment of sewage sludge is the preparation of sewage sludge for final use or disposal. This includes, but is not limited to, thickening, stabilization, and dewatering of sewage sludge. This does not include storage of sewage sludge.

Treatment works is either a federally owned, publicly owned, or privately owned device or system used to treat (including recycle and reclaim) either domestic sewage or a combination of domestic sewage and industrial waste of a liquid nature.

Unstable area is land subject to natural or human-induced forces that may damage the structural components of an active sewage sludge unit. This includes, but is not limited to, land on which the soils are subject to mass movement.

Unstabilized solids are organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Vector attraction is the characteristic of sewage sludge that attracts rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents.

Volatile solids is the amount of the total solids in sewage sludge lost when the sewage sludge is combusted at 550 degrees Celsius in the presence of excess air.

Wet electrostatic precipitator is an air pollution control device that uses both electrical forces and water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

Wet scrubber is an air pollution control device that uses water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

3. Commonly Used Abbreviations

BOD	Five-day biochemical oxygen demand unless otherwise specified
CBOD	Carbonaceous BOD
CFS	Cubic feet per second
COD	Chemical oxygen demand
Chlorine	
Cl_2	Total residual chlorine
TRC	Total residual chlorine which is a combination of free available chlorine (FAC, see below) and combined chlorine (chloramines, etc.)

TRO	Total residual chlorine in marine waters where halogen compounds are present
FAC	Free available chlorine (aqueous molecular chlorine, hypochlorous acid, and hypochlorite ion)
Coliform	
Coliform, Fecal	Total fecal coliform bacteria
Coliform, Total	Total coliform bacteria
Cont. (Continuous)	Continuous recording of the parameter being monitored, i.e. flow, temperature, pH, etc.
Cu. M/day or M^3/day	Cubic meters per day
DO	Dissolved oxygen
kg/day	Kilograms per day
lbs/day	Pounds per day
mg/l	Milligram(s) per liter
ml/l	Milliliters per liter
MGD	Million gallons per day
Nitrogen	
Total N	Total nitrogen
NH_3-N	Ammonia nitrogen as nitrogen
NO_3-N	Nitrate as nitrogen
NO_2-N	Nitrite as nitrogen
NO_3-NO_2	Combined nitrate and nitrite nitrogen as nitrogen
TKN	Total Kjeldahl nitrogen as nitrogen
Oil & Grease	Freon extractable material
PCB	Polychlorinated biphenyl
pH	A measure of the hydrogen ion concentration. A measure of the acidity or alkalinity of a liquid or material
Surfactant	Surface-active agent

Temp. °C	Temperature in degrees Centigrade
Temp. °F	Temperature in degrees Fahrenheit
TOC	Total organic carbon
Total P	Total phosphorus
TSS or NFR	Total suspended solids or total nonfilterable residue
Turb. or Turbidity	Turbidity measured by the Nephelometric Method (NTU)
ug/l	Microgram(s) per liter
WET	"Whole effluent toxicity" is the total effect of an effluent measured directly with a toxicity test.
C-NOEC	"Chronic (Long-term Exposure Test) – No Observed Effect Concentration". The highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specified time of observation.
A-NOEC	"Acute (Short-term Exposure Test) – No Observed Effect Concentration" (see C-NOEC definition).
LC_{50}	LC_{50} is the concentration of a sample that causes mortality of 50% of the test population at a specific time of observation. The LC_{50} = 100% is defined as a sample of undiluted effluent.
ZID	Zone of Initial Dilution means the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports.

RESPONSE TO COMMENTS
REISSUANCE OF NPDES PERMIT NO. MA0101010
CITY OF BROCKTON
BROCKTON ADVANCED WATER RECLAMATION FACILITY
BROCKTON, MASSACHUSETTS

In accordance with the provisions of 40 C.F.R. §124.17, this document presents the U.S. Environmental Protection Agency's (EPA or Region 1) responses to comments received on the draft National Pollutant Discharge Elimination System (NPDES) Permit, MA0101010. The responses to comments explain and support the EPA determinations that form the basis of the final permit. From February 20, 2015 through May 4, 2015, Region 1 of the EPA and the Massachusetts Department of Environmental Protection (MassDEP) (together, the "Agencies") solicited public comments on a draft NPDES permit to be reissued to the City of Brockton, Massachusetts (the "permittee").

Region 1 and MassDEP received written comments from the City of Brockton (permittee), U.S. Senators Markey and Warren and U.S. Congressman Lynch, Massachusetts State Representative Michelle DuBois, Taunton River Watershed Alliance, Inc., Save the Bay, The Nature Conservancy, Alternatives for Community and Environment, Krause & Hummel LLP, joint comments from William Carpenter (Brockton), Frank A. Hegarty (Avon), David Sheedy (East Bridgewater), Daniel Murphy (Easton), Nancy J. Maloney (West Bridgewater), Christopher Cooney (Metro-South Chamber of Commerce) and Pasquale Ciaramella (Old Colony Planning Council), and a comment from Tim Watts. EPA also held a public hearing in the City of Brockton on March 24, 2015 during which the following persons presented oral comments: Nicholas Giaquinto, Michelle DuBois, Tim Watts, Staci Rubin, Pat Ciaramella, Jim Bosco, Charles Kourufus, Chris Cooney, Jeff Hanson, and Kate Archard. Additionally, the City of Brockton submitted supplemental comments on June 17, 2015. Below are the comments received and EPA's responses to those comments with descriptions of any changes made to the public-noticed permit as a result of those comments.

Copies of the final permit may be obtained by writing or calling Michael Cobb, U.S. EPA, 5 Post Office Square, Suite 100 (Mail Code: OEP06-1), Boston, Massachusetts 02109-3912; Telephone (617) 918-1369. Copies may also be obtained from the EPA Region 1 website at http://www.epa.gov/region1/npdes/index.html.

Changes from the Draft Permit to the Final Permit

1. Language has been added to footnote 9 of the final permit specifying that the total nitrogen limit is a seasonal (6 month) rolling average limit. See Response A.32.

2. The load limit for ammonia-nitrogen for the month of May has been changed from 450 lb/day to 480 lb/day in the Final Permit. This corrects a typo from the Draft Permit. See Response A.52.

3. The orthophosphorus monitoring has been removed from the Final Permit. See Response A.58.

4. The copper limits have been adjusted based upon the use of daily effluent copper data. See Response A.64.

5. Language has been added to footnote 7 specifying that total residual chlorine monitoring is not required unless chlorine is added for purposes that cause chlorine to be present in the plant effluent. See Response A.66.

6. The WET testing requirements have been reduced from 6 tests to 4 tests per year. See Response A.68.

7. The nutrient compliance schedule has been modified to reflect the milestones necessary to achieve conversion of the existing aeration tanks to a Bardenpho treatment process. The schedule also includes two new provisions. Firstly, in the event an additional treatment step(s) needs to be planned, designed and constructed, EPA will authorize a reasonable amount of additional time in the compliance schedule for such improvements. Secondly, the permittee may submit sufficient new information to justify a revision of the total nitrogen limit and the agencies will review the information and, if appropriate, act on a request for a permit modification or incorporate the information in a new water quality-based permit limit analysis as part of permit reissuance. See Response A.69.

Applicable Background Information from the Taunton Wastewater Treatment Plant NPDES Permit, MA 0100897.

Many of the comments on the Brockton draft permit are similar, if not identical, to those lodged in other permitting actions, notably those submitted on the 2013 NPDES draft permit for the Taunton Wastewater Treatment Plant, MA0100897 ("Taunton Permit"). The Taunton Permit, issued on April 10, 2015, authorizes the City of Taunton, Massachusetts ("City") to discharge wastewater effluent from its advanced secondary wastewater treatment facility ("Plant") into the Taunton River and subsequently to Mount Hope Bay, in Massachusetts. The City filed a Petition for Review ("Petition") to the EPA Environmental Appeals Board ("Board") to appeal the permit. Following the close of the public comment period for the Brockton draft permit, EPA's Environmental Appeals Board ("Board") rendered a decision on the Petition. Among other things, the Taunton Permit includes a limit on nitrogen discharges from the Plant. The decision addressed and disposed of many of the issues raised in these response to comment and for convenience the Region has attached, and incorporates, the decision into this Response to Comments.[1] The Region employed the same overall methodology in the Brockton permit as it did in the Taunton permit; this methodology, generally and in its particulars, was affirmed by the Board in its decision.

[1] The decision is available at https://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/30b93f139d3788908525706c005185b4/0a045314b61e682785257fa80054e600!OpenDocument.

In Taunton, the City challenged both the need for a nitrogen limit in the Taunton Permit and the specific nitrogen limit imposed. The City further challenged other aspects of the Taunton Permit's nitrogen provisions, including the use of data and studies generated by the Massachusetts Estuary Program, and the requirement to reduce nitrogen year-round.

The Board denied the City's Petition for Review ("Petition"). The Board concluded that:

1. The Region did not clearly err or abuse its discretion when it determined that NPDES regulations required the Region to include a nitrogen limit in the Permit:
    a. The Region reasonably determined that the City's discharge of nitrogen to the Taunton River and Mount Hope Bay has the "reasonable potential" to cause or contribute to exceedances of applicable water quality standards, including nitrogen over-enrichment.
    b. The CWA section 303(d) listing process is distinct from the NPDES permitting process, and the Massachusetts 303(d) list of impaired waters does not represent either a Massachusetts or EPA determination of whether the Taunton River is nitrogen-impaired.
    c. NPDES regulations do not require the Region to use any particular methodology or conduct any specific modeling to determine whether the "reasonable potential" standard is met, and the Region is not required to demonstrate that nitrogen is causing impairment before setting a nitrogen limit.
    d. The Region considered potential improvements in conditions in the Taunton River and Mount Hope Bay and based its decision on all the relevant data.

2. The Region did not clearly err or abuse its discretion in determining the specific nitrogen limit for the Permit:
    a. The Region reasonably determined and provided support for a threshold nitrogen concentration for the receiving waters that was consistent with unimpaired conditions in the Taunton River and Mount Hope Bay as determined by the available data. The threshold nitrogen concentration was also consistent with the range of nitrogen concentrations found to be protective of water quality in other southeastern Massachusetts estuaries and with available Massachusetts guidance on developing site-specific nitrogen thresholds.
    b. The Region reasonably determined a nitrogen limit for the City's Plant, taking into account the overall flow of the Taunton River, the reduction needed to achieve the threshold nitrogen concentration in the receiving waters, the size of the City's discharge, and the limits of available technology.
    c. Additionally, the City failed to demonstrate that the Region erred in relying on the monitoring station referred to as "MHB16" as a reference location from which to derive the threshold nitrogen concentration, and the Region's reliance on MHB16 as a reference location for unimpaired conditions is

> supported by Massachusetts and EPA guidance. Moreover, the Board found that, even without relying on MHB16 as a reference location, the Permit's nitrogen limit is well supported by the administrative record.

The Taunton and Brockton permitting actions share many methodological commonalities, although each permit proceeding was conducted on a case-by-case basis using site-specific facts and circumstances:

Scale

First, the Region evaluated the Taunton River and Mount Hope Bay as two parts of a single, integrated estuarine system that share many common characteristics, and that have some differences, like depth and width. In the Region's view, MHB 16 and 19 are part of a continuous estuarine complex. This choice of scale makes sense given the particular approach adopted by the Region, a simplified one that was designed to use currently available information to identify gross watershed-wide reductions over relatively long averaging periods necessary to achieve water quality standards throughout the estuarine complex, including those of downstream affected States, in accordance with the Act. Indeed, SMAST refers to the "Taunton River-Mount Hope Bay estuarine complex," SMAST 2007[2] at 21, and recognizes the contiguous nature of these waters, concluding, at 58, "It is likely that restoration of the Taunton River Estuary will have a significant positive effect on the habitat quality of the main basin of Mt. Hope Bay." The City opts for an alternative approach, first segmenting the estuary into more discrete pieces, and then speculating on the possible impact perceived differences among sites will have on the response to nitrogen loading.

Variability

Second, in both permitting actions, the Region accounted for variability among the different monitoring locations in the estuary. EPA evaluated all stations, explicitly recognized the variability between stations, chose a threshold value that was not the most conservative choice, and confirmed the reasonableness of the value by comparing it against the published, peer-reviewed scientific literature. Station MHB16 was a reference location for unimpaired conditions as described in paragraph 2.c above and Station MHB19 was used to represent the reference location for meeting the target threshold in the Upper Taunton Estuary, because it was the uppermost station that appeared clearly nitrogen limited based on the Mount Hope Bay Monitoring Program data (See Fact Sheet at 46). The Region fully acknowledges that there are differences between the various monitoring stations, including MHB16 and MHB19. The Region's approach inherently accounted for variations among sites in the estuary in arriving at a protective instream target. This decision was primarily based not on models or statistical

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[2] Summary of Water Quality Monitoring Program for the Mount Hope Bay Embayment System (2004-06). School for Marine Science and Technology, University of Massachusetts Dartmouth. August 16, 2007.

regressions, but actual observed instream conditions. In determining a protective reference value, the Region assessed conditions at almost two dozen sites throughout the estuary, not just one, and its decision on a nitrogen target was not dependent on conditions at any single location. These sites were characterized by a wide range of physical characteristics—different depths, different widths, different temperatures, different levels of stratification, different velocities. And with the exception of MHB 16, the Region found evidence of pervasive and long-standing eutrophication at all these sites throughout the estuary, some with nitrogen concentrations slightly above 0.45 mg/l, some with concentrations slightly below. This was consistent with the predictions of widely accepted conceptual models for eutrophication in estuarine systems.

This approach necessarily takes into account variation in nitrogen load response throughout the estuary. The claim that the Region established the instream nitrogen target based on a single, non-representative site far removed from the Taunton River and simply assumed that all stations would respond to nitrogen loading in precisely the same way is not correct. EPA did not rely on any presumptions; the available evidence regarding TN concentrations, algal levels and DO depletions strongly supports EPA's conclusion that the well-understood mechanism of nutrient enrichment and cultural eutrophication is operative in the Taunton River/Mount Hope Bay system. In choosing a protective threshold, the Region compared the spectrum of conditions at almost two dozen different locations within the estuary – that is, a system-wide continuum of actual observed instream conditions, not merely conjecture or assumption. Overall, the patterns in the data observed by the Region in the Fact Sheet and the Response to Comments—elevated TN concentrations; elevated plant growth; DO swinging from low, even hypoxic, to supersaturated—are precisely the type that would be predicted by that broadly recognized conceptual model of eutrophication, one that even the City of Taunton concedes in its comments is "well-recognized."

Method

To derive the instream nitrogen target under 40 C.F.R. § 122.44(d)(1), the Region chose a simplified approach using information at available at the time of permit issuance. The Region assessed the weight of all that scientific evidence, using multiple lines of evidence, including 12 years of observed instream water quality conditions; identification of a protective value and recommended values from the scientific literature. Specifically, the Region determined reasonable potential and established a protective total nitrogen target for the Taunton River Mount Hope Bay Estuarine system based upon the weight of all the scientific evidence available at the time of permit issuance.

The Region used multiple lines of evidence, including

a. twelve years of system-wide nitrogen, chlorophyll a and DO data;
b. identification of an observed instream reference condition in the estuary where water quality standards were being consistently achieved over the long-term;

c. site-specific water quality reports on nitrogen impacts in the estuary, including those by Howes and Deacutis that were commissioned by Massachusetts and Rhode Island to guide implementation nutrient water quality standards;
d. recommended instream targets from the relevant scientific literature; and
e. actual instream targets being utilized in more than a dozen nitrogen TMDLs in Southeastern Massachusetts.

The choice of instream target was not a precise calculation but is intended to identify the scale of nutrient reductions required under the Clean Water Act. As the Board and First Circuit Court of Appeals have made clear, the Region was not required to demonstrate cause-and-effect in each link in the chain of eutrophication or to establish exact relationships between a discharge and instream impacts. Nor was it required to wait for a mechanistic model or collect more data sufficient to support statistical regressions. The Region did *not* base its permit limits on statistical regressions because the available datasets do not support statistically significant results. [3]

<u>MEP</u>

EPA did use an approach that followed the MEP procedures to the extent the available information allowed. Similar to MEP, EPA used a weight of the evidence approach that included site-specific reference site information and to determine a target nitrogen threshold. Additionally, EPA used the available information to estimate the watershed load of nitrogen being delivered to the estuary system. For this system, available data allowed for this estimate to be based on actual watershed loading measurements as opposed to a theoretical land use based loading model that is typically used in the MEP approach. Finally, in the absence of a mechanistic hydrodynamic/water quality model, EPA used a salinity-based mass balance model to determine the nitrogen reductions necessary to achieve the total nitrogen threshold in the most impaired part of the estuary. EPA believes the level of complexity in its analysis was adequate to develop a nitrogen target and was not “far too approximate for use in developing permit limits.” Importantly, EPA never claims that it performed a full MEP analysis, which requires more extensive data collection and water quality modeling. Had a full MEP analysis been completed, MassDEP would have used it to develop a TMDL and EPA would not have needed to conduct its own analysis of the necessary nitrogen reductions. The Fact Sheet specifically states that the full MEP analysis, and the TMDL that would result from it, had not been completed.

[3] EPA has repeatedly emphasized that the Region did not use regression or stressor-response analysis to derive its nitrogen limitation, and cautions that the SMAST data collection efforts were not designed for stressor-response analysis and are not sufficient to produce statistically significant results.

<u>Outcome</u>

The value chosen by the Region was at the very mid-point of all the recommended values in the administrative record and fell within a zone of reasonableness. The Region's nitrogen target was not guesswork, but was supported by the Commonwealth, Rhode Island, as well as a sister federal agency, and was close to recommended values proposed by SMAST, Cape Cod Commission, Buzzards Bay Coalition, and indeed was less stringent than recommended by the study commissioned by Rhode Island and submitted to EPA by the City of Taunton itself as part its comments.

A. The City of Brockton submitted comments dated May 4, 2015.

Comment A.1. Comments regarding EPA's Proposed Nitrogen Limitations

The draft effluent limitation for total nitrogen ("TN") is based on EPA's determination of a "protective" threshold nitrogen concentration for the Taunton River Estuary to preclude an alleged nutrient impairment and violation of the State's narrative criteria. The basis for this determination is presented in the Fact Sheet (*See* Brockton Fact Sheet, at 24-50). Over these 26 pages, the Fact Sheet asserts that a nitrogen impairment threshold of 0.45 mg/l TN may not be exceeded, estimates the TN loads from point and non-point sources entering the receiving waters occurring in the Upper Taunton Estuary, and concludes that the Brockton Advanced Water Reclamation Facility ("AWRF") must meet the limits of technology (3 mg/l TN – expressed as an average monthly mass limit from May through October) to ensure attainment of the dissolved oxygen ("DO") water quality standard in the Taunton River Estuary and Mount Hope Bay (MHB).

The basis for the TN threshold determination is limited to some consideration of water quality monitoring data collected over a three year period (2004 – 2006) throughout Mount Hope Bay. EPA's analysis excluded consideration of the 2006 data, based on the assertion that this was an unusually wet year and not representative of expected conditions (Taunton Response to Comments at 81; Attachment A). This analysis has a single location (MHB16) in the far southeast corner of Mount Hope Bay near the Sakonnet River confluence (this location is outside of and farthest from the Taunton River Estuary), where water quality standards for DO are not violated in order to identify a nitrogen concentration consistent with DO criteria attainment. The Fact Sheet asserts that this approach is consistent with EPA guidance regarding the use of reference conditions for the purposes of developing nutrient water quality criteria and is a proper application of Massachusetts Estuaries Program (MEP) procedures (Brockton Fact Sheet, at 43). Based on an examination of the available data, EPA determined that Station MHB16 was the appropriate sentinel site for determining the protective TN concentration for the system because DO standards were met at this site. This site had a growing-season average total nitrogen concentration of 0.45 mg/l for the 2004-2005 period. Therefore, EPA selected 0.45 mg/l TN as the TN threshold necessary to achieve the dissolved oxygen water quality standard of 5.0 mg/l and claimed that the upper Taunton River Estuary (~11 miles away) must meet this same TN concentration at Station MHB19 to achieve compliance with the DO water quality standard at that location.

No analysis of whether or how these locations were similar or different was included in the assessment in the Fact Sheet. No analysis of algal levels present at each location was considered (the basic purpose for controlling nutrient levels is to improve DO conditions). No analysis of non-nutrient factors affecting DO in either MHB or the Taunton Estuary was performed. No analysis of system hydrodynamics affecting the DO regime at various locations was presented. In fact, there is no analysis of any data for the entire system that could form a basis confirming that the stated cause and effect relationship is accurate for this system (*i.e.,* a demonstration showing how TN causes increased algal growth, causing decreases in DO levels in MHB, and how MHB conditions accurately reflect conditions occurring in the upper Taunton Estuary). Moreover, predictions or calculations presented in the Fact Sheet are not based on current wastewater or ambient conditions, contrary to the express provisions of 40 CFR 122.44(d).

"The regulations direct permit issuers to consider the following factors in determining whether a discharge has the 'reasonable potential' to cause or contribute to an exceedance of a narrative or numeric water quality criterion:
[T]he permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or polluting parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water. 40 C.F.R. § 122.44(d)(1)(ii)."

In re: Town of Newmarket Wastewater Treatment Plant Permit No. NH 0100196 (EAB 12-05) December 2, 2013, Order Denying Review at 52 (hereafter "Newmarket decision").

As discussed in greater detail below, the analysis presented in the Fact Sheet does not provide a credible basis for (1) identifying a required nutrient criteria or endpoint (2) identifying necessary nutrient reductions or (3) for concluding that remediation of DO conditions in the upper Taunton Estuary requires major reductions in TN discharges to be achieved. In fact, the growing season algal level at the chosen "fully protective" level for DO sentinel station is higher than the algal level occurring in the Upper Taunton Estuary. As an algal level of 10.4 mg/l at the MHB16 sentinel station does not result in DO criteria violations, there is no objective basis for EPA to assert that the *lower* algal level occurring in the upper Taunton Estuary (averaging approximately 8 μg/l) constitutes (a) "nutrient impairment" (b) a "violation of the state's narrative criteria" or (c) "are causing or contributing to DO conditions less than 5 mg/l."). [1]

[1] The City repeatedly refers to the "Upper Taunton Estuary" as the place where the necessary demonstration must be made. This is because the loading analysis only considered point source loads originating from the Taunton River and the effluent limitation and criteria compliance analyses only consider the dilution and inputs occurring in the upper Taunton Estuary. In actuality, it is apparent that the low DO condition occurring in the Taunton Estuary likely originates from low DO waters transferred up the estuary from Mount Hope Bay. EPA completely ignored this documented condition which occurs because over 90% of the water in the upper estuary enters on a daily basis from MHB. Thus, whatever condition is occurring in MHB near the mouth of the estuary will greatly control water quality conditions in the Upper Taunton

Estuary. (*See* report of Kincaid (2006) confirming that lower DO waters are more prevalent as salinity increases, confirming that the transport of saline waters into the estuary brings in the low DO condition).

Response A.1.

This introductory comment has been included here as part of the administrative record and EPA has responded to these issues as they were raised in more detail in the following comments.

Comment A.2. EPA's permit action violates state, federal, and Clean Water Act (CWA) procedures and requirements - a) EPA's action violates Clean Water Act procedures and requirements and is inconsistent with the established impairment designations based on Massachusetts Law

The Massachusetts 2014 § § 303(d) list ("MA § 303(d) list" or "MA § 303(d) report") has the Taunton River, Segment MA62-02 listed as impaired due to pathogens.[2] The segments downstream of MA62-02 from the mouth of the River at the Braga Bridge in Fall River (MA62- 03 and MA62-04; segment MA62-04 is also listed for fishes bioassessments), are listed as impaired for pathogens and low dissolved oxygen.[3] Further downstream, in Mount Hope Bay, a total nitrogen impairment is designated for the entire Massachusetts portion of the Bay (segments MA62-06 and MA62-07, which are also listed for impairments of chlorophyll a, fecal coliform, fishes bioassessments, and water temperature), and a dissolved oxygen impairment is designated only for the western portion of the Massachusetts Mount Hope Bay (segment MA62-07), and not segment 62-06, which is the segment into which the Taunton River estuary discharges into Mount Hope Bay. The Fact Sheet at 31-32, on the other hand, states "The State of Massachusetts has identified Mount Hope Bay and the lower reaches of the Taunton River Estuary for impairments due to low dissolved oxygen, and with Total Nitrogen specified identified as a cause of impairments in Mount Hope Bay." As presented above, this statement is not an accurate representation on the Commonwealth's §303(d) list, which does not include a low dissolved oxygen impairment in the eastern portion of Mount Hope Bay, nor does it indicate that total nitrogen is the cause of low dissolved oxygen.

A dissolved oxygen impairment designation is *not* equivalent to a nutrient impairment designation as evidenced by MassDEP having two separate impairment designations for the pollutant causes. All Section 303(d) listing designs, like decisions under 40 CFR 122.44(d), are to be based on "all available information." MassDEP was certainly aware of the studies EPA referenced as the basis for its positions, having funded and assisted in the coordination of those studies. MassDEP was also aware of the MassDEP/SMAST Massachusetts Estuaries Project report, *Site-Specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical Indicators – Interim Report* (Howes, *et al.,* 2003 – Attachment B) ("Critical Indicators Interim Report.") If MassDEP had concluded that the Taunton Estuary waters (*e.g.*, segments MA62-03 and MA62-04) are "nutrient" impaired then such waters would have been designated as such (*See, e.g.*, designations for various sections of Mount Hope Bay as chlorophyll *a* and nitrogen impaired).

Thus, the state does not presently identify the Taunton Estuary as impaired by nutrients regardless of any potential "indicators" discussed in the Critical Indicators Interim Report, a decade old report MassDEP has never embraced as reflecting narrative criteria compliance. In particular, *MassDEP (as explained* infra*) does not and never has considered estuarine waters nutrient impaired simply because long term average algal levels are above 3-5 μg/l chlorophyll* a*, as EPA has assumed in its analysis*. Through Brockton's Fact Sheet, EPA has unilaterally amended the state's published, EPA-approved impairment designation via this permit action and EPA has interpreted the state's narrative criteria in a manner inconsistent with MassDEP's understanding of its own rules. The Fact Sheet states that the existing conditions of the Upper Taunton Estuary constitute a violation of the existing state narrative standard, a conclusion that MassDEP criteria compliance evaluations do not agree with. Under the Clean Water Act ("CWA" or "Act"), EPA had the opportunity and the duty to follow specific statutory procedures (discussed below) to amend the Massachusetts impairment listing if it was believed to be deficient; however, no such action was ever undertaken by EPA.

EPA never notified MassDEP that the impairment designation was in error as required by Section 303(d)(2). Moreover, EPA lacks authority to simply create a new narrative criteria interpretation of state law that is inconsistent with MassDEP's prior practice and procedures (*See*, *In re Ina Road Water Pollution Control Facility,* 2 E.A.D. 99 (CJO 1985) (Region should ordinarily defer to State's interpretation of its own water quality standard regulations unless that interpretation is clearly erroneous)). Thus, EPA's action violates the requirements of the Act regarding designation and determination of impairments, interpretation of state narrative criteria and the alleged causes of nutrient impairment.

[2] Fact Sheet, at 4-5.
[3] *Id.*

Response A.2.

First, EPA disagrees with the main thrust of the comment, that water quality-based limits for a pollutant may only be included in an NPDES permit when the discharge's receiving water is listed on the state's list of impaired waters for that pollutant. There is no regulatory support for this contention. A 303(d) listing of impairment may require a TMDL for that pollutant in that receiving water, but absence of such a listing does not preclude a reasonable potential determination under 122.44(d), because of the differing standards applicable to these determinations. While the State includes in the list "the specific cause(s) of the impairment (if known)", see *Massachusetts Year 2012 Integrated List of Waters* at 18, effluent limits are based on a determination that pollutant discharges "cause, have a reasonable potential to cause, or contribute" to a violation. 40 CFR § 122.44(d)(1). Even if the evidence is unclear that a pollutant is currently causing an impairment, a limit may be required if the pollutant has the reasonable potential to cause, or contribute to an exceedance of a water quality standard (i.e., the permit limit may be preventative). Similarly, the pollutant need not be the sole cause of an impairment before an NPDES limit may be imposed; an effluent limit may still be required, if the pollutant "contributes" to a violation. *See In re Town of Newmarket, NH*, NPDES Appeal No. 12-05, slip op. at 54 n.23 (EAB Dec. 2, 2013) ("The plain language of the regulatory requirement (that a permit issuer determine whether a source has the 'reasonable potential to cause or contribute' to an exceedance of a water quality standard) does not require a conclusive demonstration of 'cause and effect.'").

Second, the comment misstates both the actual impairment designation and the conclusions set forth in the Fact Sheet. The Massachusetts 2014 § 303(d) list designates MA62-03, MA62-04, MA62-06, and MA62-07 as all being impaired for dissolved oxygen. This is contrary to the comment which states that MA62-06 was not designated for dissolved oxygen. EPA notes that segments of Mount Hope Bay (MA61-06 and MA61-07) were both impaired for total nitrogen and chlorophyll and only MA61-07 was impaired for dissolved oxygen. Assuming that MA61-06 was the segment the commenter intended to refer to as not being listed as impaired for dissolved oxygen, it is hardly a compelling argument that total nitrogen and dissolved oxygen are not demonstrating significant impairments throughout the receiving waters impacted by the Brockton AWRF discharge. Further, EPA notes that the Fact Sheet's conclusion that nutrient concentrations in the Taunton River estuary are excessive are based on (1) monitoring data for multiple sites in the Taunton River Estuary showing extremely high TN concentrations, elevated chlorophyll-a concentrations and widespread DO depletion; (2) extensive scientific literature documenting the relationships among nutrient levels, primary production (evidenced by chlorophyll-a concentrations) and DO depletion; (3) thresholds for nutrient concentrations identified in guidance documents; (4) proposed and adopted criteria from other states; (5) thresholds identified in other Massachusetts estuaries; and (6) conclusions from research within the Taunton River estuary and Mount Hope and Narragansett Bays. The Region did not base its conclusions regarding nitrogen, and the need for nitrogen reductions, simply on the impairment designation.

The Fact Sheet does not state that a dissolved oxygen impairment designation is equivalent to a designation of nutrient impairment. Rather, the Fact Sheet cites the impairment designation, among other evidence, in support of EPA's conclusion that dissolved oxygen and nutrient standards are violated in the Taunton River estuary. EPA disagrees that its conclusion regarding the need for nitrogen reductions is in any way inconsistent with or unsupported by the impairment designation. While EPA has not assumed that a dissolved oxygen impairment is equivalent to a nutrient impairment, such an impairment is certainly not inconsistent with nutrient impairments (indeed, the mechanism by which nutrients cause DO depletions is through increased organic matter). The designation does not amount to a conclusion that nutrients were not the cause of low DO conditions, or that the State has determined that something other than nutrient enrichment had been identified as the cause of DO violations in the water body. EPA's conclusion that nitrogen discharges "cause, have the reasonable potential to cause, or contribute to" dissolved oxygen and nutrient impairments is amply supported by the record and does not address the "wrong impairment."

While Massachusetts in its 303(d) listing process has not yet designated the Taunton River estuarine segments for nutrient impairments, this does not control permitting decisions. The State does not have the "statutory authority to render … decisions" regarding the need for water quality-based effluent limits under 40 CFR § 122.44(d). That authority is specifically given to "the permitting authority," and EPA is the permitting authority for NPDES permits in Massachusetts.

Finally, even if the State disagreed with the need for water quality-based limits (which it does not) this would not control EPA's permitting decision. Where EPA is the permitting authority the State's formal role under NPDES permitting regulations is through the process for State certification under 40 CFR § 124.53 and 124.55, which do not allow a State to overrule EPA's determinations regarding the need for water quality-based effluent limits. See 40 CFR § 122.55(c) ("A State may not condition or deny a certification on the grounds that State law allows a less stringent permit condition."). Nor do EPA's regulations require that determinations on water quality-based effluent limits be consistent with state 303(d) listing designations. While 40 CFR § 122.44 does require consistency with some state determinations, for example requiring that effluent limit be "consistent with the requirements of any available wasteload allocation for the discharge prepared by the State and approved by EPA," § 122.44(d)(1)(vii)(B), there is no such mention of State listing decisions pursuant to CWA sections 305 and 303(d). Indeed, the State listing materials are not even mentioned in the list of "relevant information" set forth in § 122.44(d)(1)(vi)(A). It should also be noted that impairment designations are not made according to the same standard that governs NPDES permitting decisions; permitting regulations require the imposition of effluent limits whenever a pollutant discharge "causes, has the reasonable potential to cause, or contributes to" a water quality violation.

Further, it is likely that the impairment designations for the Taunton River watershed simply are not up to date. MassDEP commonly defers revisions in impairment designation until completion of new assessments of a particular watershed in connection with its rotating watershed monitoring and assessment schedule. As stated in MassDEP's responses to comments on the 2012 Integrated List:

> MassDEP follows a rotating watershed monitoring and assessment schedule that does not allow for new assessments to be completed for every watershed in each listing cycle. For example, since the time the 2010 Integrated List was prepared, new assessments have been completed for the Blackstone, Boston Harbor (including Mystic, Neponset and Weymouth/Weir), Merrimack and Parker watersheds and the Cape Cod

> coastal drainage areas, and these assessments furnished the majority of new information in support of the 2012 listing decisions.

Final Massachusetts Year 2012 Integrated List of Waters at 301. The last Taunton River Watershed Assessment Report was completed in 2001. *See* http://www.mass.gov/eea/agencies/massdep/water/watersheds/water-quality-assessment-reports.html. EPA, in its role approving the Integrated List of Waters, recognizes the resource constraints of the state agencies and accommodates MassDEP's rotating watershed assessment cycle.

Comment A.3. The Clean Water Act requires a causal demonstration based on data and analysis, not a presumed conceptual model.

The CWA is a "science-based" statute that requires the establishment of criteria "accurately reflecting the latest scientific information" regarding "…the *effects* of pollutants on biological community diversity, productivity and stability…" 33 U.S.C. § 1314(a)(1); *accord*, 40 CFR § 131.3(c) (criteria developed by EPA are based on "the *effect* of a constituent on a particular aquatic species"). No criteria (including a narrative criteria interpretation) can be approved unless it is "based on a sound scientific rationale" (*Id.* § 131.11 (a)).[4] Impairment listings only occur where it is demonstrated that the applicable criteria (narrative or numeric) are exceeded. *See* 33 U.S.C. §1313(d).[5] 40 CFR 122.44(d) requires EPA's analysis to demonstrate that an exceedance (*i.e.*,violation of an applicable standard) will exist under the assessed conditions to allow for the imposition of an effluent limitation for that parameter (Newmarket Decision at 21 "If a discharge is found to cause, have the reasonable potential to cause, or contribute to such an exceedance, the permit writer must calculate WQBELs for the relevant pollutants. *Id.* § 122.44(d)(1)(i), (iii)-(vi).").

Given the language of the CWA and the implementing regulations, it is not surprising that courts have determined "that neither the language of the Act nor the intent of Congress appears to contemplate liability without causation." *See Nat'l Metal Finishers Ass'n*, 719 F.2d. at 640; *Ark. Poul. Fed. v. EPA*, 852 F. 2d 324, 328 (8th Cir. 1988) (stating the discharge must at least be "a cause" of the violation). As noted earlier, the lack of analysis showing that existing nutrient concentrations in the Upper Taunton Estuary have caused excessive algal growth and that algal growth is the primary or a major reason that the upper estuary periodically experiences low DO conditions renders EPA's permitting decision arbitrary and capricious and not otherwise in accordance with statutory and regulatory requirements (*e.g.*, both Section 301(b)(1)(c) and 122.44(d) require that EPA demonstrate that a limitation is "necessary" to attain water quality standards compliance. Without confirming the critical connections between nutrients, algal growth, and DO, and without consideration of the major factors influencing the DO regime in MHB or the Upper Taunton Estuary, the proposed effluent limitation is not verified to be correct or necessary.

[4] The Agency's guidance on nutrient criteria development broadly discusses the need to address how causal (nutrients) and response (algal growth) variables are documented for particular water bodies.

[5] It is a general principle of the CWA, or any environmental statute, that pollutants be regulated if, and only if, they are causing harm or impairment. In generating numeric water quality criteria, EPA must abide by the same principle. *See* 33 U.S.C. §§ 1313(c)(2)(A), 1314 (a); 40 CFR § 131.3(b); *Leather Indus. of Am.*, 40 F.3d at 401 ("EPA's mandate to establish standards 'adequate to protect public health and the environment from any reasonably anticipated adverse effects of each pollutant,' does not give the EPA blanket one-way ratchet authority to tighten standards.").

Response A.3.

This comment relies on a variety of inapplicable standards. First, while EPA's analysis is based on sound science and the best available information, this is not a process for approval of water quality criteria under 40 CFR § 131.3(c) or § 131.11(a). Second, the determination to include a water quality-based effluent limit is not the same as an impairment listing determination; permit limits are included not "only … where it is demonstrated that applicable criteria are exceeded" but whenever a discharge "causes, has reasonable potential to cause, or contributes" to an excursion. 40 CFR § 122.44(d); see Response A.9. Third, this permit action concerns the establishment of protective permit limits, not establishing liability. The cases cited by the commenter, *Nat'l Metal Finishers Ass'n*, 719 F.2d. at 640; *Ark. Poul. Fed. v. EPA*, 852 F. 2d 324, 328 (8th Cir. 1988), disapproved an EPA regulation that imposed liability for interference with POTW operations on indirect dischargers without any evidence that the indirect discharge caused the interference. The cases did not overturn the limit-setting aspect of the pretreatment regulations, which do not require a showing of causation; i.e. 40 CFR 403.8(f)(4) requires POTWs with pretreatment programs to set local limits unless the POTW "demonstrate[s] that they are not necessary."

The actual legal and regulatory standard governing this action is discussed in detail in Response A.10.

Comment A.4. EPA's action is inconsistent with adopted state procedures for narrative criteria implementation.

There are no indications in the state's section 303(d) procedures (which govern application of the narrative criteria for nutrients) that the nutrient or chlorophyll a levels identified in the Critical Indicators Interim Report control whether or how low dissolved oxygen designations are interpreted or nutrient impairment designations are rendered, as EPA has assumed in its analyses. According to Massachusetts impairment listing procedures, state waters are only identified as nutrient impaired where excessive algal growth *causes* DO related violations. These procedures constitute MassDEP's published methodology for interpreting its narrative criteria with respect to nutrients, which 122.44(d)(1)(vi) requires EPA to use in its permitting assessment. In determining that the Taunton River was nutrient impaired, EPA abandoned those procedures and created a new approach to identifying nutrient impairments based on low algal levels (3-5 μg/l), never before used by MassDEP[6], presuming that nitrogen levels were excessive based on DO conditions at MHB16. Specifically, the new approach assumes that elevated nutrients cause low dissolved oxygen levels in the Upper Taunton Estuary, which is not confirmed by objective scientific facts/data analyses, state or federal law, or the state's published approach to evaluating nutrient impacts via its narrative standard. Thus, EPA's action effectively amends existing state law, which is patently illegal and not authorized under 122.44(d).[7] Moreover, this set of presumptions is contrary to the Agency's own understanding of the system having acknowledged in the Taunton Response to Comments that (1) DO in the Upper Taunton Estuary is significantly affected by non-nutrient factors, (2) the Upper Taunton responds differently to nutrients than MHB and (3) the conditions occurring at the sentinel site (MHB16) chosen to represent nutrient impacts is a function of unique hydrodynamic characteristics occurring at that location (Taunton Response to Comments at 92, 95, 102, 110). In short, EPA not only abandoned the required approach, it has admitted that the DO levels it used to drive the analyses and TN levels it used to impose stringent reductions are significantly affected by factors that have nothing to do with nutrients.

[6] Personal communication between John C. Hall and Bethany Card of Massachusetts DEP, circa March 20, 2015.
[7] *See, e.g., Iowa League of Cities v. EPA*, 711 F.3d 844, 868, No. 11-3412, 2013 U.S. App. LEXIS 5933 (8th Cir. Mar. 25, 2013).

Response A.4.

The comment is incorrect in stating that (1) the nitrogen and chlorophyll-a levels in the *Critical Indicators Interim Report* are not used in nutrient impairment designations; and (2) that waters are only identified as nutrient impaired where excessive algal growth *causes* DO related violations. Examination of the *2012 CALM* http://www.mass.gov/dep/water/resources/2012calm.pdf, refutes both of these claims. First, while the *2012 CALM* does not specifically cite the *Critical Indicators Interim Report*, nutrient assessments under the *2012 CALM* do utilize the MEP indicators process set forth in that document:

> For embayments in Southeastern Massachusetts the MEP has also generated a significant amount of enrichment indicator data based on a weight-of-evidence approach that includes several response variables (e.g., eelgrass, infauna, macroalgae, chlorophyll *a*, DO, Secchi disk, TN concentrations). Since this project is intended to develop site-specific nutrient (nitrogen) thresholds for these systems, their overall analysis of habitat health are utilized to make *Aquatic Life Use* attainment decisions.

Id. at 21. Second, the 2012 CALM does not require a demonstration that "algal growth causes DO violations." Rather, the 2012 CALM states:

> Nutrient enrichment is not considered to be problematic when indicators, as described above, are absent even if nutrient concentrations exceed their recommended criteria. However, when the multiple, supporting indicators show nutrient enrichment to be problematic and concentration data exceed their criterion, the nutrient is also identified as a cause of impairment.

Id. Under this procedure, the conjunction of multiple indicators and elevated nutrient concentrations is sufficient to support the designation of a nutrient impairment, without any specific causal demonstration. This interpretation of the state narrative standard, albeit in a different context involving the identification of "specific cause(s)" for listing purposes as opposed to the standard of "cause, reasonable potential to cause, or contribute" for permitting purposes, is consistent with EPA's approach in development of the draft permit limits.

The comment's characterization of a "new approach" by EPA that abandons the state interpretation and "identif[ies] nutrient impairments based on low algal levels (3-5 µg/l)," is not supported in the record. EPA did not state that DO compliance cannot occur with chlorophyll-a outside the specified range, but rather that in this system algal levels are elevated above this range and DO is in fact not in compliance. The Fact Sheet further describes the relationship between nutrients, primary production and dissolved oxygen as follows:

> When nutrients exceed the assimilative capacity of a water body, the ensuing eutrophic cycle can negatively impact in-stream dissolved oxygen levels. Through respiration, and the decomposition of dead plant matter, excessive algae and plant growth can reduce instream dissolved oxygen concentrations to levels that could negatively impact aquatic life. During the day, primary producers (*e.g.*, algae, plants) provide oxygen to the water as a by-product of photosynthesis. At night, however, when photosynthesis ceases but respiration continues, dissolved oxygen concentrations decline. Furthermore, as primary producers die, they are decomposed by bacteria that consume oxygen, and large populations of decomposers can consume large amounts of dissolved oxygen. Many aquatic insects, fish, and other organisms become stressed and may even die when dissolved oxygen levels drop below a particular threshold level.

Fact Sheet at 28. As the Fact Sheet clearly indicates, the mechanism of the impact of nutrients on dissolved oxygen is through an increase in algae and plant growth. DO is one of the indicators used by MassDEP in its interpretation of its narrative criteria. *See 2012 CALM* at 21.

Further, even if the process set forth in the *2012 CALM* differed significantly from that utilized in the development of the draft permit limits, this would not indicate error in the permit decision or an attempt to amend State law. While the State includes in the list "the specific cause(s) of the impairment (if known)", see Massachusetts Year 2012 Integrated List of Waters at 18, effluent limits are based on a determination that pollutant discharges "cause, have a reasonable potential to cause, or contribute" to a violation. 40 CFR § 122.44(d)(1)(vi). Even if the evidence is unclear that a pollutant is currently causing an impairment, a limit may be required if the pollutant has the reasonable potential to cause, or contribute to an exceedance of a water quality standard (i.e., the permit limit may be preventative). Similarly, the pollutant need not be the sole cause of an impairment before an NPDES limit may be imposed; an effluent limit may still be required, if the pollutant "contributes" to a violation. *See In re Town of Newmarket, NH*, NPDES Appeal No. 12-05, slip op. at 54 n.23 (EAB Dec. 2, 2013) ("The plain language of the regulatory requirement (that a permit issuer determine whether a source has the 'reasonable potential to cause or contribute' to an exceedance of a water quality standard) does not require a conclusive demonstration of 'cause and effect.'"). Hence, impairment assessment and § 303(d) listings are subject to an entirely different standard than permit determinations; there is no regulatory requirement that permit water quality determinations be consistent with § 303(d) listings; and EPA as the permitting authority has authority to make determinations with respect to water quality-based limits even where the State disagrees with the need for such limits.

Finally, the comment references the Taunton Response to Comments ("Taunton RTC") and lists three conclusions that supposedly reflect the Agency's understanding of the system. EPA notes that each of these conclusions is misleading in the context suggested by the comment and does not support the claim that nutrients are not contributing to the impairments in the system. First, EPA does not indicate in the Taunton RTC that DO in the Upper Taunton Estuary is "significantly" affected by non-nutrient factors. Secondly, EPA acknowledges that there are differences between the Taunton River estuary and Mount Hope Bay, but notes that it was the Taunton River estuary that appeared to be more sensitive to nutrient enrichment. Thirdly, the comment implies that MHB16 should not have been chosen as a reference site since it is a function of unique hydrodynamic conditions at that location. As described in the Brockton Fact Sheet (pages 43-45), MHB16 was chosen as a reference site by looking down the estuary for a point where water quality transitions from impaired to unimpaired. However, EPA did not merely rely on MHB16 but further supported the determination of the TN threshold through an evaluation of the scientific literature. If EPA did not use MHB16 based on hydrodynamic and depth differences but instead looked at MHB12, 13, 14, 15, and MOOR, all in an area where the transition to unimpaired is not evident, EPA would not have reached a different conclusion. From Fact Sheet Table 5 (page 35), three of the stations (MHB12, 13, and 15) support a determination that the threshold for TN that is consistent with attaining minimum DO standards is 0.45 mg/l or less and two of the stations (MHB14 and MOOR) suggest that the threshold might be higher than 0.45 mg/l. In light of this variability and in light the fact that the minimum DO values in Table 5 do not actually reflect actual minimum DO values expected at these stations, EPA's determination of a 0.45 mg/l threshold is a reasonably conservative determination. Had EPA chosen not to consider a reference site in making our determination, EPA would have necessarily relied on the scientific literature which also points to a value of 0.45 mg/l as being a reasonably conservative threshold.

Comment A.5. The state narrative criteria required cause and effect and excessive plant growth demonstrations.

The state narrative criteria, like federal law, require a "cause and effect" demonstration that nutrients actually are causing or are expected to cause excessive plant growth and such growth is a primary reason that low DO condition exist. Without such information or demonstrations, a claim of existing or projected narrative criteria violation cannot be sustained. The Critical Indicators Interim Report specifies that nutrients "shall not exceed site-specific limits *necessary* to control accelerated or cultural eutrophication." (Critical Indicators Interim Report, at 9; emphasis added).[8]

However, nowhere does EPA present an analysis showing the Taunton River is subject to "cultural eutrophication" (as defined by MassDEP rules) or that the specific values chosen from station MHB16 are "necessary" to ensure control of such unacceptable "cultural eutrophication" conditions in the Taunton River. As no such analysis is presented in the Fact Sheet, it is apparent that EPA has not undertaken the analyses needed to properly interpret or apply state law.

Moreover, the Fact Sheet should have contained some demonstration that a specific reduction in algal level is needed to produce a specific improvement in DO in the Taunton River as state law is expressly intended to control excessive eutrophication (*i.e.,* excessive algal growth). No such analysis presented in this Fact Sheet. Furthermore, the algal levels at the sentinel site are higher than algal levels at the Upper Taunton Estuary site. Thus, it is apparent that EPA's assessment that a narrative criteria violation is or will exist in the Upper Taunton Estuary is without foundation and contrary to their own conclusion that MHB16 represents the type of conditions that will meet applicable DO criteria.

State rules do not regulate or prohibit "elevated nutrient levels *per se*; the rules only prohibit such nutrient levels to the degree that they are the cause of "cultural eutrophication."[9] These are the required demonstrations under state law and the Fact Sheet analysis failed to provide them to support the proposed nitrogen limitations. In fact, the EPA analysis confirms "cultural eutrophication" does not exist in the Upper Taunton Estuary, based on the acceptable algal conditions occurring at MHB16. EPA's attempt to separately claim algal levels are excessive simply because the Critical Indicators Interim Report (labeled as interim from a non-governmental entity and has never received MassDEP approval) exists, is arbitrary and capricious in light of EPA's conclusion that the conditions at MHB16 meet applicable water quality objectives and are protective of uses.

[8] *See also* 314 CMR 4.05(5)(c) (Nutrients –"unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses …").

[9] This "reference station" approach was also used by EPA to develop numeric nutrient criteria for streams in Florida based on a narrative standard and was struck down by the Court (*Fla Wildlife Fed'n, Inc., et. al. v. Jackson*, Case 4:08-cv-00324-RH-WSC, Doc. 351; N.D. Fla., Feb. 18, 2012) as insufficient to show that the criteria were *necessary* to maintain designated uses. Massachusetts law requires the same confirmation rendering this EPA approach deficient also.

Response A.5.

EPA properly implemented the state narrative criteria for nutrients. EPA's conclusion that nitrogen discharges are causing cultural eutrophication in the Taunton River Estuary and Mount Hope Bay is clearly described in the Fact Sheet, at 31:

> The Taunton River Estuary and Mount Hope Bay have reached their assimilative capacity for nitrogen and are suffering from the adverse water quality impacts of nutrient over-enrichment, including cultural eutrophication. They are, consequently, failing to attain the water quality standards described above. The impacts of excessive nutrients are evident throughout the Taunton River Estuary and Mount Hope Bay.

The Fact Sheet goes on to describe the extensive evidence supporting EPA's conclusion that nitrogen is causing water quality standards violation, including extensive monitoring evidence indicating elevated chlorophyll-a concentrations and DO depletions and the conclusion of the SMAST technical report that recommended implementation of the MEP nitrogen loading approach focusing on restoration of the Taunton River Estuary. EPA did not base its permit limit approach on elevated nutrient levels in isolation but based on an analysis of impairment thresholds using indicators that have been accepted by the state for determining cultural eutrophication. The state has not required "demonstration that a specific reduction in algal level is needed to produce a specific improvement in DO" in determining cultural eutrophication and the comment cites no state document containing such an interpretation.

The development of the specific numeric TN threshold associated with nutrient impairment, for purpose of setting a water quality-based permit limit, is not specifically addressed by the Massachusetts SWQS narrative nutrient criterion. Rather, that process is governed by EPA's permitting regulations regarding narrative criteria at 40 CFR 122.44(d)(1)(vi), which state:

> **(vi)** Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the following options:
>
>> **(A)** Establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Such a criterion may be derived using a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water

> quality criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents; or
> **(B)** Establish effluent limits on a case-by-case basis, using EPA's water quality criteria, published under section 304(a) of the CWA, supplemented where necessary by other relevant information; or
> **(C)** Establish effluent limitations on an indicator parameter for the pollutant of concern, provided . . .

In this case EPA applied 40 CFR 122.44(d)(1)(vi)(A) and established the effluent limit based on threshold receiving water concentration that would comply with the narrative criterion for nutrients, based on a comprehensive evaluation of the entire Taunton River Estuary/Mount Hope Bay system to identify the transition point from impaired to unimpaired conditions. The state narrative standard does not impose a higher standard of causation for purposes of permit limits, and such an interpretation, if it existed, would not override the requirements of 40 C.F.R. § 122.44(d).

The comment also claims that algal levels at MHB16 are higher than algal levels in the Upper Taunton Estuary (MHB19). This is simply not true based on the typical years of 2004 – 2005 and only in the unusually wet year of 2006 were Taunton River chlorophyll-a values lower than Mount Hope Bay chlorophyll-a values. See Response A.14.

Regarding the Florida court decision referenced in footnote 9 of the comment, see Response A.35 below.

Comment A.6. Low DO is not a nutrient impairment designation. Therefore, there is no demonstration that a nutrient requirement under 40 CFR § 122.44(d) is triggered for the Taunton River.

In the Fact Sheet, the Region concludes that a low DO impairment designation is basically equivalent to designating waters as nutrient impaired (*e.g.*, Brockton Fact Sheet, at 26). Based on this assumption, the Region concludes that nutrients and chlorophyll a levels are excessive and that stringent TN reduction is needed to address low DO occurring in the estuary pursuant to 40 CFR § 122.44(d).[10] However, the Region's assessment addresses the wrong impairment in the Draft Permit; the Taunton River is impaired for *low DO* which is *not* equivalent to a nutrient impairment (noting that the Taunton River is not listed as impaired for nutrients in Massachusetts' 303(d) list). Low DO is affected by many inputs other than algal levels. While algae may have a greater influence in MHB because other sources of organic and inorganic oxygen demanding materials have been oxidized, that certainly is not true for the Upper Taunton Estuary (*See* Taunton Response to Comments at 39). This certainly explains why periodic low DO exists even with lower algal levels than occur at MHB16 – the protective sentinel site. EPA's failure to address or consider the numerous forms of oxygen demanding material that contribute and cause the lower DO conditions to exist in the Upper Taunton Estuary despite non-excessive algal levels was arbitrary and capricious. Because EPA has regulated an impairment that was not determined to exist by the agency that is given statutory authority to render such decisions (*i.e.*, MassDEP), EPA's proposed permit limitations for TN should be withdrawn as it is inconsistent with the adopted, EPA-approved impairment listing and EPA's acknowledgement that this area is, in fact, subject to elevated oxygen demanding loads that have nothing to do with the nutrient levels present.

[10] *See* discussion on nutrients and chlorophyll *a* levels in DEP/SMAST Massachusetts Estuaries Project report, *Site-Specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical Indicators – Interim Report* (Howes *et. al.*, 2003 – Attachment B) ("Critical Indicators Interim Report").

Response A.6.

Refer to Response A.2 above for response to the issues raised in this comment regarding impairment designation.

Additionally, the comment claims that the Upper Taunton Estuary contains significant organic and inorganic oxygen demanding substances. EPA notes that all significant dischargers to the Taunton River watershed have had advanced treatment requirements for BOD since well before 2004 and the commenter has not identified any data supporting the claim of significant levels of oxygen demanding substances from "other sources" in the Taunton River. EPA also notes that, contrary to the comment, algal levels in typical years (e.g., 2004-2005) are actually lower at MHB16 than at MHB19. See Response A.14. Hence, this claim is misleading and unfounded.

Comment A.7. EPA violated 122.44(d) by failing to account for existing treatment affecting Taunton River DO.

When determining the need for and level of nutrient control, EPA based all of its analysis on data and conditions occurring 8-10 years ago and did not account for any changed conditions occurring since then (Brockton Fact Sheet, at 31-45). The Taunton River and tributaries to Mount Hope Bay have had extensive reduction of organic discharge due to CSO corrective measures, improved wastewater plant performance, and nutrient reduction since 2004. Effluent CBOD and nutrient levels have decreased dramatically from all discharges in the past 10 years. EPA's failure to account for these federally mandated actions impacting the need for TN reductions in the Taunton River is a facial violation of applicable NPDES rules and the requirements of the Act. (*See* 40 CFR § 122.44(d)(1)(ii) (states in determining the need for permit limitations "the authority *shall* use procedures that account for *existing* controls on point and non-point sources…") (emphasis added)).

It is axiomatic that an agency's permitting decisions should be based upon the latest available scientific information regarding the receiving water conditions and related regulatory efforts to address water quality (*See Nw. Ecosystem Alliance v. Rey*, 380 F. Supp. 2d 1175, 1195-1996 (W.D. Wash. 2005) (finding an agency may not "simply rest on the previous EIS or [supplemental] EIS if there is new information that may alter the environmental analysis" and ultimately finding the agencies improperly relied upon outdated data in determining the supplemental EIS)). Nowhere in EPA's analysis has the agency accounted for the extensive changes in facility operations that have reduced nutrients, oxygen demanding loads (CBOD/NH_3) and CSO discharges impacting this estuary as well as Mount Hope Bay.[11] Thus, EPA's proposed permit asserting a need for stringent TN limitations at the Brockton AWRF is plainly in violation of federal law because it is not based on the latest available scientific information or even remotely current water quality information for either Mount Hope Bay or the Taunton River.[12] Until the current water quality is known, one cannot project the degree of nutrient reduction required, assuming that nutrients are significantly affecting the DO of the Upper Taunton River.

Furthermore, in addition to the CSO reductions throughout Mount Hope Bay, the Fall River WWTP is a major contributor to total nitrogen load to MHB, and by proxy the Taunton River Estuary. The average total nitrogen load from the Fall River WWTP to MHB was 4,800 lb/day and the average total nitrogen concentration 17.4 mg/l from January, 2012 through March, 2015 according to the facility's DMR reports available via EPA's EnviroFacts database. This discharge of total nitrogen to MHB is greater than the average summer 2004/2005 total nitrogen load for the entire Taunton River Estuary of 4,228 lb/day as cited in the Fact Sheet. The omission of this major source of total nitrogen to MHB is significant, as it suggests that dissolved oxygen and nutrient impairments existing in MHB are most certainly not solely or primarily driven by Brockton and the other Taunton River Estuary dischargers as the Fact Sheet indicates.

11 The saline water inputs to MHB primarily originate from Narragansett Bay (Kincaid, 2006). Thus, reductions in nutrients loads and algal levels in that system have the primary effect on nutrient conditions in MHB. (*Id.*). EPA's assertion in the Taunton Response to Comments that Narragansett Bay conditions do not influence MHB water quality is incorrect (*See*, Taunton Response to Comments at 48).

12 As the preamble to § 122.44(d) states, when developing a defensible water quality based limitation the "permitting authority should use all available scientific information on the effect of a pollutant on human health and aquatic life." 54 Fed. Reg. 23,868, 23,876 (June 2, 1989). EPA Region 1 has admitted that NPDES permits must be based on "all available scientific information." *See* EPA Response to Newmarket EAB NPDES Appeal 12-05, at 47. If the information used is not based on current conditions and fails to reflect known improvements in water quality occurring in the past 8 years, the analysis is neither "reliable" nor "scientific."

Response A.7.

First, EPA notes that all significant dischargers to the Taunton River watershed have had advanced treatment requirements for BOD since well before 2004. See Response A.6. Furthermore, contrary to the assertion of the comment, EPA did include information about current conditions in the Fact Sheet, including data that elevated chlorophyll-a concentrations and persistent DO depletion below 5 mg/l continue in Mount Hope Bay based on the most recent available monitoring data. For example, the Fact Sheet at 38 presents data sonde data for 2011 showing a pattern of supersaturated daytime surface DO during algae blooms, accompanied by DO deficits in bottom waters. Additionally, the Fact Sheet at 39 presents 2013 daily average data showing long periods of daily average DO below the Massachusetts water quality standard of 5.0 mg/l, and among the highest chlorophyll-a concentrations on record. Furthermore, according to the Brayton Point 2014 annual report, Mount Hope Bay is still impaired for DO and aquatic life. See further discussion at Responses A.17 and A.18.

These recent data indicate that any reductions in pollutant loads that have been achieved through improved treatment have not been sufficient to achieve water quality standards, a result that is consistent with the prediction from EPA's analysis that a substantially greater reduction in nitrogen loadings would be necessary in order for water quality standards to be achieved. The reductions that have been achieved are neither as "extensive" nor "dramatic" as characterized in the comment and water quality continues to be impacted as reflected in the chlorophyll-a and DO indicators of eutrophic condition. See Response A.17 which states that CSO reductions have not significantly reduced organic and nutrient loads to critical areas, and reduction in nitrogen loads from treatment plants is smaller than characterized.

The analysis performed by EPA was based primarily on the only comprehensive dataset available for determination of system-wide nutrient impacts; the recent data (from URI and the Narragansett Bay Commission) is limited both in location and in parameters monitored (one site in Mount Hope Bay with data sonde and sampling data; one site in Taunton River with no indicator data, and sampling for DIN/TDN and PO4 only until 2012).

The comment also points out that the Fall River WWTP is a significant point source contribution to the total nitrogen load to MHB. While the loading analysis and nitrogen target in the Fact Sheet were based primarily on the wastewater treatment plants contributing to the Taunton River, EPA certainly agrees that there are other sources of total nitrogen to MHB which also must be addressed in future permitting actions. In fact, page 50 of the Fact Sheet states "[w]hile other loads to Mount Hope Bay (particularly the Fall River WWTP) will need to be addressed as well, the reduction in nitrogen loadings from the Taunton River will ensure that those discharges do not cause or contribute to nitrogen-related impairments in Mount Hope Bay."

Comment A.8. Critical Indicators Interim Report never adopted as guidance by MassDEP; can't use as such under 122.44(d)

The Fact Sheet (at 30) cites the MassDEP and University of Massachusetts at Dartmouth School for Marine Science and Technology (SMAST) Critical Indicators Interim Report. EPA's interpretation of this report is inaccurate and inconsistent with the report's conclusions, as no nutrient criteria are set based on this document. The authors of the Critical Indicators Interim Report go on to state in the caption to Table 1, "Threshold values need to be site-specific, the values presented are for Great, Green and Bournes Ponds in the City of Falmouth." As such, the citation of the total nitrogen thresholds in the Fact Sheet is a misrepresentation of the discussion in this report, as these numbers are meant to be an example of possible site-specific numeric thresholds observed in several recent studies of nutrient enrichment and eelgrass growth. Therefore, these values are irrelevant to the site-specific conditions of the Taunton estuary and cannot be credibly cited to demonstrate that it is reasonable to apply either of these endpoints.

Furthermore, the Fact Sheet's assertion that this study identified protective chlorophyll a levels also misrepresents the discussion in the Critical Indicators Interim Report. In the Critical Indicators Interim Report, the authors discuss "a preliminary attempt at integrating quantitative and qualitative information on the key indicators," suggesting generalized characteristics of "Excellent" and "Excellent/Good" waters. "Excellent" waters have chlorophyll a concentrations "typically less than 3 µg/l," and "Excellent/Good" waters have chlorophyll a concentrations "in the 3 to 5 µg/l range." It is inappropriate to interpret this statement to mean that acceptable DO conditions cannot exist with chlorophyll a concentrations in excess of 5 µg/l[13]. As noted earlier, MassDEP has never adopted the Critical Indicators Interim Report recommendations and their recommendations nowhere appear in the MassDEP Consolidated Assessment and Listing Methodology (CALM) documents (Attachment C), which control the proper application of the state's narrative criteria.

[13] EPA has approved of the State of Florida's estuarine nutrient objectives with total nitrogen and chlorophyll a concentrations above those typical of the Taunton Estuary and Mount Hope Bay (*See*, attachment JJ). Total nitrogen targets (expressed as annual geometric means) routinely exceed 1.0 mg/l with a maximum of 1.29 mg/l. Several of the chlorophyll a targets (expressed as annual geometric means) exceed 10.0 µg/l and reach as high as 17.5 µg/l. These approved targets confirm that protective nutrient and chlorophyll a targets in estuarine settings may exceed those found in the Critical Indicators Interim Report and therefore, site-specific analyses are necessary.

Response A.8.

EPA specifically states in the Fact Sheet that the ranges set forth in the Critical Indicators Report are examples and that site-specific information should also be used. See Fact Sheet at 30, quoting the Critical Indicators Report ("initial results of the Massachusetts Estuaries Project (Chatham Embayment Report 2003) indicate that the total nitrogen level associated with a particular ecological response can vary by over 1.4 fold (e.g. Stage Harbor versus Bassing Harbor in Chatham MA). Although between embayments nitrogen criteria may be different, it does appear that within a single embayment a consistent quantitative nitrogen criterion can be developed.") EPA did not mischaracterize this aspect of the Critical Indicators Report. EPA's analysis is based on site specific data, including the conclusions of the SMAST study (performed by the author of the Critical Indicators Report). EPA did not state that DO compliance cannot occur with chlorophyll-a outside the specified range, however the data in this system indicate that DO is in fact not in compliance. EPA's regulations allow for the use of a broad range of data sources in interpreting narrative criteria and EPA appropriately considered the Critical Indicators Report in its determinations under 40 CFR § 122.44(d)(iv). Furthermore, the comment mischaracterizes the CALM, which does use Critical Indicator Report recommendations in determining nutrient impairments. See Response A.4; CALM at 21.

Regarding the State of Florida's nutrient objectives, EPA notes that total nitrogen and chlorophyll-a targets vary based on geographical region. As one would expect, these targets in the State of Florida may be quite different than targets in southeast Massachusetts. As further discussed in Response A.21 below, EPA conducted a reference-based approach by examining the continuum of water quality conditions in the Taunton River Estuary and Mount Hope Bay to identify a transition point from impaired to unimpaired conditions.

Comment A.9. EPA failed to adhere to applicable statutory and regulatory requirements.

EPA's action compounds a series of legal and regulatory errors. EPA never adhered to its statutory responsibility of notifying Massachusetts and/or the public of its decision to reject the DO impairment determination made by the state and instead list the Taunton River as nutrient impaired (*See* 40 CFR § 303(d)(2)). Similarly, contrary to statutory procedures, EPA never notified Massachusetts or the public of its decision that Massachusetts' impairment identification procedures (CALM), as they pertain to nutrients, were insufficient or deficient in any matter. *Id.* Likewise, EPA never informed MassDEP that their application of state narrative criteria was misplaced and should instead allow for a *presumption*, rather than an actual demonstration, that nutrients are causing excessive algal growth or low DO based on the Critical Indicators Interim Report. Likewise, EPA has never informed MassDEP that they must designate estuarine waters exceeding 3-5 μg/l chlorophyll a as nutrient impaired.[14]

Under the CWA, EPA must review and either approve or disapprove a state's § 303(d) list. 33 U.S.C. § 1313(d)(2); 40 CFR § 130.7(d)(2). If EPA disapproves the list, then it must, amongst other things, identify the deficiency and propose a proper revision. *Id.* EPA is only authorized to modify a state listing after it expressly disapproves of a state determination. *Id.* Therefore, in this case, if EPA believed that the Taunton River was impaired for nutrients it should have rejected the MA § 303(d) list, based on the sampling data presented in the 2007 report (Howes and Samimy, 2007 – *see* Attachment E). It is improper for EPA, after repeatedly approving the MA § 303(d) list to later, in a draft NPDES permit, attempt to change an impairment listing by creating a water quality criterion for nutrients when the waters are impaired for organic enrichment/low dissolved oxygen. Likewise, if EPA disagreed with the MassDEP approach to narrative criteria implementation with respect to nutrients, EPA should have raised that objection pursuant to procedures under CWA Section 303(c). The Critical Indicators Interim Report, cited by EPA as a basis to indicate the water quality that would constitute nutrient impairment, is not even referenced in the MassDEP 303(d) procedures for rendering nutrient impairment determinations. This approach runs counter to the structure and responsibilities outlined by Congress in the CWA.

Communities have a right to rely on that process and that EPA will not create a wholesale reversal of the impairment assessment and designation process during the permitting process. Section 122.44(d) plainly indicates that state regulatory interpretation regarding narrative criteria compliance need to be respected (unless obviously incorrect). *See Kentucky Waterways Alliance v. Johnson*, 540 F.3d 493, 469 n.1 (6th Cir. 2008) ("In interpreting a state's water quality standard, ambiguities must be resolved by 'consulting with the state and relying on authorized state interpretations."); *Marathon Oil Co. v. EPA*, 830 F.2d 1346, 1351-1352 (5th Cir. 1987) (EPA is merely an "interested observer" as to how a state interprets its WQS provisions); *American Paper Inst. v. EPA*, 996 F.2d 346, 351 (D.C. Cir. 1993) ("Of course, that does not mean that the language of a narrative criterion does not cabin the *permit writer's* authority at all; rather, *it is an acknowledgement that the writer will have to engage in some kind of interpretation to determine what chemical-specific numeric criteria—and thus what effluent limitations—are most consistent with the state's intent as evinced in its generic standard.*") (emphasis added). EPA's entire permitting approach discards those technical and regulatory findings rendered and approved by EPA by the same EPA division under its Section 303(d) responsibilities. Adherence to the state's current procedures for confirming whether a nutrient impairment exists or that excessive algal growth is the cause of low DO readings, is required by federal law.

EPA has violated federal law and misapplied 40 CFR § 122.44(d) by creating (or assuming) a nutrient impairment exists where one has not been determined to exist by the agency statutorily responsible for such determinations[15] (*See, e.g., Ass'n of Pac. Fisheries v. EPA*, 615 F.2d 794, 811-812 (9th Cir. 1980) (As these records confirmed that EPA ignored the relevant information and "proceed[ed] upon assumptions that were entirely fictional or utterly without scientific support" EPA's action is not legally defensible)). EPA has also violated federal law by substituting assumptions, unadopted numeric nutrient and chlorophyll a thresholds as the basis for presuming a nutrient impairment exists in Massachusetts waters to trigger permit requirements under § 122.44(d) (*See infra* footnote 16). As the NPDES regulations provide no such authority to EPA, this permit action must be withdrawn pending a demonstration that (1) algal growth levels are excessive and (2) some estimate of the degree to which such excessive plant growth is the cause of low DO conditions in the Taunton Estuary. This may or may not require algal levels to be reduced below the current levels occurring in the system.

[14] This notion of presumed impairments was specifically challenged by the New England Interstate Water Pollution Control Commission as technically flawed. (*See* Attachment D - the Commonwealth of Massachusetts is part of the New England Interstate Water Pollution Control Commission).

[15] By "assuming" we mean that EPA is relying on a general "conceptual model" to assert that algal levels have significantly impacted the DO regime in the Upper Taunton Estuary. Some form of data analysis of existing SMAST data would be needed to demonstrate that this is actually true for the Upper Taunton Estuary. The fact that MHB16 easily meets DO standards with an algal level that is higher than that occurring in the Upper Taunton Estuary confirms that factors, other than the algal level, are causing periodic low DO to occur in the Taunton River Estuary.

Response A.9.

The statutory and regulatory requirements the comment refers to are simply inapplicable to this permitting action. EPA is not rejecting any Massachusetts impairment identification or related procedures through this permit action, which is an independent proceeding subject to a different substantive standard. This permit action does not indicate any disagreement with EPA with respect to MassDEP's application of state narrative criteria; the permit is consistent with the state's interpretation (including the use of critical indicators for nutrient impairment designations, see Response A.4) and the regulatory standard.[4]

EPA does not believe the New England Interstate Water Pollution Control Commission (NEIWPCC) position paper supports the comment. EPA understands the NEIWPCC objection to pertain to the "imposition of independent applicability of numeric nutrient criteria"; the Commission expressed its concern by stating that "a waterbody that is meeting environmental response criteria should be listed as attaining standards even it if exceeds a numeric nutrient criterion." *Id.* The Taunton River/Mount Hope Bay system does not meet environmental response criteria and the permit analysis is response-based, as recommended in that document. ("We understand that EPA has concerns about implementing response-based criteria, but we feel that this is a question that is dealt with in permitting, not standards development. Further, the Northeast states have solid experience in crafting defensible and robust permits with effluent limits derived from these same response-based criteria.") *Id.*

Nor is this a case of differences in resolving ambiguities in the meaning of a state narrative standard. Rather, the commenter attempts to supplant the clearly applicable regulatory burden of proof (that a pollutant discharge "causes, has reasonable potential to cause, or contributes" to a water quality violation) with a standard more to its liking – that a state must have already made a determination that the pollutant in question is actually causing a specific water quality impact. As this simply is not the applicable standard, and EPA's analysis meets the standard actually applicable to permit issuance, EPA rejects the comment.

Comment A.10. Federal rules and guidance require a demonstration of causation.

A "cause and effect" (*e.g.,* cause or contribute)[16] demonstration is necessary under 40 CFR § 122.44(d) to regulate nutrients (*i.e.*, setting limits based on specific information confirming such effects actually occurred rather than generalizations regarding nutrient effects).[17,18] On its face, §122.44(d) itself indicates that more restrictive limits only apply if the discharge "causes" a water quality criteria excursion.[19] The *Upper Blackstone* decisions repeatedly refer to the fact that nutrients were demonstrated to be "causing" extensive "cultural eutrophication" as the basis for imposing more restrictive limitations. Both the MERL model and the field measurements demonstrated that as nitrogen

[4] Nor did EPA employ a "presumption"; see Response A.12 below

loadings increase, dissolved oxygen decreases and chlorophyll a increases, with both becoming less stable and subject to greater swings at higher levels of nitrogen. The EPA concluded that the basic causal relationship demonstrated in the MERL experiments "corresponds to what is actually occurring in the Providence/Seekonk River system." *Upper Blackstone v. EPA*, 690 F.3d 9, 25-26 (1st Cir. 2012).20

The Rhode Island narrative criteria at issue in *Upper Blackstone* were also based on preventing "cultural eutrophication" as evidenced by nutrients causing excessive algal growth, low DO and related effects. In that case, the court first looked to see if the effects of "cultural eutrophication" existed and were documented to be caused by nutrients: "An influx of nitrogen and phosphorus from sewage treatment plants is *causing* serious problems for the River's waters and those downstream. The Blackstone, Seekonk, and Providence Rivers, and Narragansett Bay, *all suffer from severe cultural eutrophication*." *Id.* at 11 (emphasis added). The court observed "[h]ere, the EPA states, and the record reflects, that the MERL *model demonstrated the relationship between nitrogen loading, dissolved oxygen, and chlorophyll* a *production* for a range of loading scenarios *in a water environment similar to the Bay's*." *Id.* at 27 (emphasis added).

Further, the court noted:

Subsequently, in order to address the severe and ongoing phosphorus-driven cultural eutrophication in the Blackstone River, the EPA incorporated a more stringent phosphorus limit into the 2008 permit. In formulating this limit, the EPA considered the national and regional guidance criteria and recommended values it had recently published. *Id.* at 31 (emphasis added).

The April 2010 SAB Report on EPA's stressor–response evaluations underscored the need for science-based "cause and effect" demonstrations when regulating nutrients: "Without a mechanistic understanding and a *clear causative link* between nutrient levels and impairment, there is no assurance that managing for particular nutrient levels will lead to the desired outcome." *Id.* at 4 (emphasis added). For criteria that meet EPA's stated goal of "protecting against environmental degradation by nutrients," the underlying *causal models* must be correct." *Id.* at 37 (emphasis added). As noted earlier, EPA's 2010 Stressor-Response guidance issued in response to the SAB concerns recognized the need to establish the "cause and effect" relationship when regulating nutrients. No such analyses were presented in this permit action.

The use of reference approaches do not eliminate the requirement for EPA to show that the reference condition is due to the "causal relationship" between the pollutant and the habitat factors monitored, as explained by the steps of that process[21]:

EPA Rivers and Streams document at 10-13 – "Ecoregional nutrient criteria will be developed to account for the natural variation existing within various parts of the country. *Different waterbody processes and responses dictate that nutrient criteria be specific to the waterbody type*. No single criterion will be sufficient for each waterbody, therefore we anticipate system classification within waterbody type for appropriate criteria derivation (*see* Section 1.5, item 2). …

6. *Analyze data*. Statistical analyses are used to interpret monitoring data for criteria development. *Nutrient criteria development should relate nutrient concentrations in streams, algal biomass, and changes in ecological condition (e.g., nuisance algal accrual rate and deoxygenation).* In addition, the relative magnitude of an enrichment problem can be determined by examining total nutrient concentration and chl a frequency distributions for stream classes. *These analyses provide water quality managers with a tool for measuring the potential extent of overenrichment*.

Because the proposed limits are not based on any demonstrated "cause and effect" relationship for the Taunton Estuary regarding "cultural eutrophication" and its current impact on the DO regime, the analysis is facially deficient and therefore, arbitrary and capricious and otherwise not in accordance with law. As discussed later in these comments, had the Fact Sheet attempted to show a causal relationship between increasing nutrients, increasing algal levels, and low DO for the Taunton River data, such an assessment would have shown those relationships do not exist in this estuary.

[16] The Region's claim that § 122.44(d) requires causal analysis is a facial misreading of the provision.

[17] EPA's position seems to be that it may impose nutrient requirements without such a demonstration. This, however, is a major reinterpretation of 40 CFR § 122.44(d), without rulemaking and contrary to the structure of the Act. It is therefore illegal and may not be applied in this instance. *U.S. Telecom. Ass'n v. Fed. Commc'ns Comm'n*, 400 F.3d 29, 35 (D.C. Cir. 2005) ('a substantive change in the regulation,' requires notice and comment) (*quoting Shalala v. Guernsey Mem'l Hosp.*, 514 U.S. 87, 100 (1995)).

[18] As set forth in each document, the elements that EPA expects States and authorized Tribes to consider in developing a nutrient criterion are:

1. Historical data and other information (published literature);
2. Current reference conditions;
3. Models to simulate physical and ecological processes or determine empirical relationships among causal (nutrients) and response (biological or physical conditions) variables; and
4. Evaluation of downstream effects. EPA also expects States and authorized Tribes to make use of expert judgment when examining the information and establishing criteria.

66 Fed Reg 1671 (Jan. 9, 2001)

[19] The "or contributes" language means it is contributing to the "cause" of the violation. The structure of the rule and "relevant" preamble discussion confirms this approach. Under §122.44(d)(1)(ii), the permit writer first determines if "a discharge… causes or contributes to an instream excursion". In the case of a narrative standard one looks to see if the characteristics that are intended to be prevented are evidenced in the waters (*i.e.,* cultural eutrophication causing some type of system imbalance). If it is determined that an excursion is occurring (or likely to occur) then, and only then, under § 122.44(d)(1)(iii) "the permitting authority must establish effluent limits using one or more of the following methods…" The structure of the rule is clear, the methods for picking a protective instream level are only used to set the effluent limits, *not* to decide that the waters are in violation of the narrative standard. The 1989 preamble discussion confirmed this sequence:

Subparagraph (i) should assist the permitting authority in determining whether it is necessary, under Federal regulations, to establish limits for a pollutant. *Note, however, this is different from calculating water quality-based effluent limits*. …Proposed subparagraph (iv) addresses the situation in which…the permitting authority does not have a numeric criteria to use *in deriving a water quality-based limit.* 54 Fed. Reg. 1,303, 1,304 (Jan. 12, 1989) (emphasis added).

[20] *Upper Blackstone*, 690 F.3d at 14 ("State water quality standards generally supplement these effluent limitations, so that where one or more point source dischargers, otherwise compliant with federal conditions, are nonetheless *causing a violation of state water quality standards*, they may be further regulated to alleviate the water quality violation. [30 U.S.C.] § 1311(b)(1)(C) …") (emphasis added).

[21] EPA response on Reference Waters proposal on Jan. 6, 2003 confirms cause-and-effect demonstration or stressor response analysis is required:

> …the root cause of eutrophication, as demonstrated by excess primary productivity, is typically nitrogen and phosphorus. For more effective prevention, it is important to measure the level and extent of the causal agents. The criteria are based directly on these primary causal elements of total nitrogen and phosphorus plus two early response variables. These are algal biomass (*e.g.*, chlorophyll *a* for microalgae, dry mass for macroalgae) and water clarity, which most often indicate the early vegetative response to nutrient enrichment. 68 Fed Reg 560

Response A.10.

EPA's NPDES regulations do not require cause-and-effect proof between a pollutant discharge and an existing water quality impairment before the permit writer can derive a numeric in-stream target to interpret a narrative water quality criterion, or impose a water quality-based effluent limitation to implement that criterion. The comment simply misstates the plain text of 40 C.F.R. § 122.44(d)(1). *See In re Town of Newmarket, NH*, NPDES Appeal No. 12-05, slip op. at 54 n.23 (EAB Dec. 2, 2013) ("The plain language of the regulatory requirement (that a permit issuer determine whether a source has the 'reasonable potential to cause or contribute' to an exceedance of a water quality standard) does not require a conclusive demonstration of 'cause and effect.'") Under this regulation, permit issuers are required to determine whether a given point source discharge "cause[s], ha[s] the reasonable potential to cause, or contribute[s] to an excursion above" the narrative or numeric criteria set forth in state water quality standards. 40 C.F.R. § 122.44(d)(1)(i). Thus, the regulations require nothing more than a *reasonable potential to cause, or contribute to* an excursion of a numeric or narrative state water quality criterion; whenever such a potential exists, a permit must contain effluent limits to meet state water quality standards. *See id.* § 122.44(d)(1), (5) (providing in part that a permit must incorporate any more stringent limits required by CWA § 301(b)(1)(C)). "'Reasonable potential' requires some degree of certainty greater than a mere possibility, but it leaves to the permit writer's scientific and technical judgment how much certainty is necessary." *In re Upper Blackstone Water Pollution Abatement Dist.*, NPDES Appeal Nos. 08-11 to 08-18 & 09-06, slip op. at 32-33, n.29 (EAB May 28, 2010). As EPA's preamble to its final rulemaking promulgating 40 C.F.R. § 122.44(d)(1) explained:

> Some commenters said that the phrase "reasonable potential to cause" was too vague and could apply to permittees that are not actually exceeding a water quality criterion. EPA does not believe that it is appropriate to be more specific because a permitting authority has a significant amount of flexibility in determining whether a particular discharge has a reasonable potential to cause an excursion above a water quality criterion, taking the factors in subparagraph (ii) into account.

54 Fed. Reg. 23,868, 23,873 (June 2, 1989). This regulatory provision has been upheld as a reasonable, authorized approach of necessary gap-filling in the CWA statutory scheme as it provides permit writers with guidance on how to interpret state narrative water quality standards in deriving effluent limitations. *See Am.*

> *Paper Inst. v. EPA,* 996 F.2d 346, 348, 351 (D.C. Cir. 1993); *see also Am. Iron & Steel Inst. v. EPA,* 115 F.3d 979, 990-991 (D.C. Cir. 1997).
>
> In addition, EPA specifically found that nitrogen discharges are in fact causing cultural eutrophication in the Taunton River Estuary and Mount Hope Bay. The Fact Sheet states:
>
>> The Taunton River Estuary and Mount Hope Bay have reached their assimilative capacity for nitrogen and are suffering from the adverse water quality impacts of nutrient over-enrichment, including cultural eutrophication. They are, consequently, failing to attain the water quality standards described above. The impacts of excessive nutrients are evident throughout the Taunton River Estuary and Mount Hope Bay.
>
> The Fact Sheet goes on to describe the extensive evidence supporting EPA's conclusion that nitrogen is causing water quality standards violation, including the conclusion of the SMAST technical report that recommended implementation of the MEP nitrogen loading approach focusing on restoration of the Taunton River Estuary.
>
> The comment's reference to stressor-response documents is not applicable, as the permit limit analysis was not based on stressor-response relationships. However, the causal relationship among nitrogen, chlorophyll-a and dissolved oxygen is in fact well understood and is supported by data in this system. See discussion in Response A.4.
>
> EPA also notes that the SAB review pertained to scientific methods for developing statewide numeric nutrient criteria and is not applicable to a site-specific determination of a protective nutrient threshold based on limited available information.

Comment A.11. EPA failed to provide a cause and effect demonstration as required by state and federal law.

As noted earlier, the Fact Sheet is bereft of analyses confirming that nutrients are the actual cause of low DO measured in the Taunton River in 2004/5. This is a fatal deficiency of EPA's proposed permit action. Rather, EPA has employed a simplified form of "reference waters" assessment to select the "protective" TN concentration that must be achieved in the Taunton River, unrelated to the level of algal growth produced by this action (Brockton Fact Sheet, at 43, 45-46).

As noted earlier, EPA's selection of a TN endpoint for Mount Hope Bay was divorced from the safer algal level found at that station. Moreover, it was not based on a demonstrated impairment threshold needed to produce a minimum DO of 5.0 mg/l in the Taunton River given the factors influencing DO at that location. Moreover, the selection of the TN level failed to identify the relevant algal growth response which is necessary to produce the specific level of DO improvement to meet applicable numeric standards (assuming that the algal component is significant in controlling DO in the Taunton River) as required by state law.[22] Choosing a TN level without confirming that it is (1) necessary to produce the protective algal level and (2) that it can ensure DO compliance violates the requirement that the approach is sufficient to ensure standards compliance (*See* 40 CFR § 122.44(d)(1)(vi)(A) (requiring a narrative standard-based effluent limitation to "fully protect the designated use")). This plainly fails to meet regulatory prerequisites.

[22] When EPA recently proposed estuarine nutrient criteria for Florida, EPA proposed chlorophyll *a* levels that were deemed sufficient to protect beneficial uses.

> EPA is proposing this [reference] approach to derive numeric chlorophyll a criteria for Florida's coastal waters because the scientific data and information available were insufficient to establish accurate quantifiable relationships between TN and TP concentrations and harmful, adverse effects due to the limited TN and TP data available. Therefore, EPA is proposing to rely upon the reference condition approach to identify numeric chlorophyll a criteria concentrations that protect the designated uses, and avoid any adverse change in natural populations of aquatic flora or fauna in Florida's coastal waters. EPA, *Water Quality Standards for the State of Florida's Estuaries, Coastal Waters, and South Florida Inland Flowing Waters* (2012), at 87.

Response A.11.

The commenter again ignores the regulatory standard governing imposition of water quality-based limits. See Response A.10 above. The governing standard is not that EPA "confirm [] that nutrients are the actual cause of low DO measured" in the receiving water. Rather, the regulations require an effluent limit if a pollutant discharge "causes, has reasonable potential to cause, or contributes" an exceedance of a water quality standard. 40 C.F.R. § 122.44(d); *In re Town of Newmarket, NH*, NPDES Appeal No. 12-05 (EAB Dec. 2, 2013). In the absence of detailed mechanistic models EPA is obligated to rely on the best available information to derive an impairment threshold and has done so here. There is inevitably some scientific uncertainty associated with the analysis of complex systems, even when detailed models are available, and EPA has appropriately moved forward with permit limits in the face of uncertainty here. *See In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577, 606 (EAB 2010) ("[S]cientific uncertainty is not a basis for delay in issuing an NPDES permit."). EPA disagrees with the contention, unsupported by any citation, that it is required under state law to identify a specific algal growth response that is associated with a specific level of DO improvement prior to instituting permit limits. EPA notes that TMDLs developed under MEP and approved by MassDEP do not engage in that sort of analysis.

Comment A.12. EPA's claim that an impairment exists without demonstrating causation violates federal and state law.

EPA's approach (presuming a pollutant is causing a specific adverse ecological effect or causing a narrative criteria violation based simply on a conceptual model, absent site specific data analysis) is precisely what the CWA does not allow. (*See* 40 CFR § 131.11 (criteria determinations must be based on scientifically defensible information); 40 CFR § 122.44(d) (demonstrating that limitations are necessary must be based on all available scientific information for the area affected by the discharge and other discharges); *see also Natural Res. Def. Council v. EPA*, 16 F.3d 1395, 1398 (4th Cir. Va. 1993) ("The court agrees with EPA that its duty, under the CWA and the accompanying regulations, is to ensure that the underlying criteria which are used as the basis of a particular state's water quality standard, are scientifically defensible . . ."); *Chem. Mfrs. Ass'n v. EPA*, 28 F.3d 1259, 1265 (D.C. Cir. 1994) (stating, when challenged, EPA must provide a "full analytical defense of its model" and show "there is a rational relationship between the model and the known behavior of the …pollutant to which it is applied."); *Columbia Falls Aluminum v. EPA*, 139 F. 3d 914, 923 (D.C. Cir 1998) (EPA "retains the duty to examine key assumptions as part of its affirmative burden of promulgating a non-arbitrary, non-capricious rule.")). Likewise, EPA may not rely on a flawed or inaccurate study to render decisions under the Act (*Texas Oil & Gas Ass'n v. EPA*, 161 F. 3d 923, 935 (5th Cir. 1998)). In this case as basic information is missing to determine that EPA's approach is in fact necessary, the decision is *per se* flawed and unsupported.

As noted earlier, the Critical Indicators Interim Report, referenced by EPA, specifically states that site-specific analyses are required to properly set nutrient objectives and that analysis must assess the other factors that could cause the same condition to occur (*See*, Critical Indicators Interim Report at 2-3, 11, 16). Courts have long held that EPA decisions may not be based on "sheer guess work." *Leather Indus. of Am. v. EPA*, 40 F.3d 392, 408 (D.C. Cir. 1994) (citing *Am. Petroleum Inst.*, 665 F. 2d 1176, 1186-87 (D.C. Cir. 1981)). EPA may not regulate based on "probabilistic evidence" or "correlations" as a substitute for reasonably addressing causation. *Tex Tin Corp. v. EPA,* 992 F. 2d 353, 356 (D.C. Cir. 1993). Likewise, EPA may not claim that nitrogen is the cause of impairment in the Taunton River because it has caused impairment in other waters. The CWA and applicable state law require a site-specific demonstration of an impairment and its cause (*See, e.g.*, § 303(d), 40 CFR § 130; 314 CMR 4.05(5)(c), Critical Indicators Interim Report at 2-3).

Consequently, evidence that a TN level in a remote section of Mount Hope Bay is apparently not associated with DO violations at that location does not provide any credible evidence that the same TN level is necessary for the Taunton River, a physically distinct and hydrodynamically different area. Without an assessment of the major factors known to affect DO in tidal estuaries and a demonstration of the degree to which TN is causing excessive algal growth and, thus, causing or contributing to DO violation in the Taunton estuary, EPA's approach is pure guesswork and therefore, arbitrary and capricious (*Leather Industries of Am., 40 F.3d 392).* Consequently, EPA lacks a credible, objective scientific basis for imposing the stringent TN limitations proposed in the draft NPDES permit. Failure of EPA to assess the well-known and documented factors influencing the existence and occurrence of low DO in this system renders EPA's analysis arbitrary and capricious (*Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (U.S. 1983).[23]

[23] There are numerous reports on the system hydrodynamics and how that controls nutrient effects and the DO regime for this system (*See, infra* at 61, Kincaid, 2006 – Attachment F; Zhao, Chen & Cowles, 2006 – Attachment G; Chen *et al*., 2008 – Attachment H; Krahforst & Carullo, 2008 – Attachment I). EPA's evaluation considers none of that information, but rather rests on presumptions that those reports confirm to be incurred (*e.g.*, only point source loads to MHB and Taunton Estuary: wrong (Krahforst & Carullo, 2008); MHB16 reflects conditions expected in the Taunton Estuary: wrong (Kincaid, 2006); DO in the Taunton is controlled by nutrient sources entering the Taunton River: wrong – (Krahforst & Carullo, 2008); it is acceptable to use the Critical Indicators Interim Report without conducting additional site specific analyses: wrong (personal communication with B. Howes); EPA followed the MEP process in creating the nutrient reduction targets for this system: wrong (personal communication with B. Howes).

Response A.12.

The contention that a demonstration of actual causation is necessary before instituting permit limits is simply wrong; that argument has been specifically rejected by the Environmental Appeals Board. *In re Town of Newmarket, NH*, NPDES Appeal No. 12-05, slip op. at 54 n.23 (EAB Dec. 2, 2013) ("The plain language of the regulatory requirement (that a permit issuer determine whether a source has the 'reasonable potential to cause or contribute' to an exceedance of a water quality standard) does not require a conclusive demonstration of 'cause and effect.'"). See Response A.10 for further discussion. EPA again emphasizes that the setting of NPDES limits, including the interpretation of narrative criteria and assessment of reasonable potential, is governed by the specific provisions of the NPDES regulations and CWA § 402 and not by regulations governing the adoption of water quality standards, 303(d) listing or other provisions. Thus (and although EPA's analysis is not inconsistent with state approaches), caselaw under other CWA sections are only relevant to the extent they are consistent with NPDES requirements.

In any case, EPA did not rely on "guess work"; the available evidence regarding TN concentrations, algal levels and DO depletions strongly supports EPA's conclusion that the well-understood mechanism of nutrient enrichment and cultural eutrophication is operative in the Taunton River/Mount Hope Bay system. See Fact Sheet at 24-39; also see Responses A.38 for further discussion of this relationship. EPA disagrees that thresholds developed for other waters are irrelevant to the setting of permit limits under 40 CFR § 122.44(d), but in any case performed a site-specific analysis using extensive data within this system. The Taunton River Estuary section is an integral part of the overall system, and the available evidence indicates that area is equally vulnerable to dissolved oxygen impacts from nutrient enrichment as other portions of the estuary. See Response A.27 regarding the impact of specific physical conditions the commenter claims may vary within this system.

Comment A.13. EPA provides no rational or substantive demonstration of a DO-related, nutrient impairment occurring in the Taunton River.

As noted above, state and federal law require a demonstration that the nutrient is in fact causing the impairment to demonstrate that more restrictive water quality based limitations are necessary (*See e.g.,* CWA § 301(b)(1)(C) and 40 CFR § 122.44(d) where both use the word "necessary" in authorizing the imposition of water quality-based limitations). The federal Administrative Procedure Act also requires technical conclusions to be based on substantial evidence.[24] EPA's Brockton Fact Sheet (at 39), simply concludes that excessive nutrients are the cause of DO impairments in the Taunton River. The entire analysis is nothing more than a series of unsupported assumptions that nowhere demonstrates that (1) the nutrients are causing excessive plant growth in the Taunton River or (2) that periodic low DO occurring in the Taunton Estuary is significantly related to algal growth and not some other factor unrelated to algal growth (*e.g.,* organic loadings from wastewater or CSO discharges known to exist in the system, periodic system stratification, natural deposition of organic materials from the watershed, or low DO entering the estuary from Mount Hope Bay). Without consideration of these conditions, it is simply impossible to determine whether or how nutrients could possibly be responsible for any low DO conditions.

[24] 5 U.S.C. § 706(2)(E); *see Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 414 (1971) ("the agency action is to be set aside if the action was not supported by 'substantial evidence.'").

Response A.13.
This comment misstates the legal standard applicable to permit proceedings. Neither state nor federal law require a determination that a pollutant "is in fact causing the impairment"; the standard is whether the pollutant discharge "causes, has reasonable potential to cause, or contributes" to an impairment. 40 CFR § 122.44(d)(1)(i). *In re Town of Newmarket, NH,* NPDES Appeal No. 12-05 (EAB Dec. 2, 2013). Further, while EPA's conclusions and determinations in this proceeding are amply supported by evidence, it is simply not the case that the APA "substantial evidence" standard of review on appeal applies to this proceeding; that standard of review applies to formal rule-making and adjudications with trial-like proceedings, not to administrative actions such as permit issuance. 5 U.S.C. § 706.

EPA provided a detailed description of both the well-established connection between nutrient, algal levels and DO, and the specific evidence indicating the problem in this system, including TN concentrations in the Taunton River Estuary well in excess of any recognized thresholds for nitrogen impairments, elevated chlorophyll-a concentrations consistently exceeding the range of concentrations considered acceptable for SB waters in Massachusetts, and widespread violations of water quality criteria for DO. See further discussion at Responses A.18 and A.27.

EPA notes that in complex systems such as estuaries, DO conditions are affected by a number of interacting factors and it is generally not the case that algal growth

> (or any other single condition) is the *only* factor influencing DO concentrations. Nor is it ever possible to establish actual causation to a scientific certainty, as that can be achieved only through controlled experiments that are impossible to conduct in a natural system. Despite these limitations, the consistent pattern of high TN concentration, elevated chlorophyll-a, and depleted DO provide strong evidence that the well understood mechanism of nutrient over-enrichment is operative in this system. EPA is not required to indefinitely defer permit limits to await the possibility of better quantifying the extent to which other factors are also contributing to the impairment.

Comment A.14. Algal growth in the Upper Taunton is *not* demonstrated to be excessive.

The primary effect of nutrient over enrichment is excessive algal growth. If algal growth is not excessive the secondary symptoms, particularly low DO, do not occur due to nutrient enrichment. Consequently, EPA must show that nutrients are stimulating algal growth (measured as chlorophyll a), the levels of chlorophyll a in the water column are excessive, and that the excessive levels of algae are, in fact, causing the observed low DO. In making this demonstration, EPA needs to identify a level of chlorophyll *a* that is excessive and it must also include an evaluation showing that the nutrient reduction target selected will reduce algal growth to non-excessive levels that will raise DO levels to comply with the MassDEP water quality standards.

The analysis presented in the Fact Sheet establishing the TN endpoint did not address *any* of these considerations. Rather, EPA identified a sentinel station that meets the DO standard and presumed that the annual average TN concentration at this station was the reason such compliance occurred. The approach stated in the Fact Sheet is incorrect for several reasons. TN does not have an oxygen demand. The existence of elevated TN does not create low DO. TN loadings only cause lower DO via causing excessive plant growth, which then causes increased sediment oxygen demand and night time algal respiration. The average chlorophyll a level occurring at a location is therefore, under EPA's approach, the best indicator of the degree of plant growth that the system may have without causing DO violations to occur. At the sentinel station, the algal is 10.3 – 14.1 μg/l (*See* Brockton Fact Sheet at 35, Table 5). This average algal level is *higher* than is present in the Taunton River at MHB19, which ranges from 5.5 – 10.5 μg/l. *Id.* Prior studies of the system have confirmed that the Taunton Estuary has the lowest algal growth, despite elevated nutrient levels (Krahforst & Carullo, 2008). This also confirms that other system parameters are controlling the degree of algal growth in the Taunton Estuary, not the nitrogen level present.

Therefore, based on the DO response to algal growth at MHB16, it is apparent that excessive algal growth is (1) *not* occurring in the Taunton River Estuary and (2) some other factor *must* be causing the DO to drop below 5.0 mg/l in that area.[25]

[25] This is the same conclusion reached by technical studies evaluating similar tidal rivers in the Great Bay estuary. *See* Attachment J. In that matter review by the EAB, EPA sought to defend correlation analyses as a basis for creating stringent TN limits. As EPA is well aware, that approach was rejected by a team of top

estuarine experts as not scientifically defensible. EPA did not even attempt correlations in this case rendering its approach even less defensible that the Great Bay studies and nutrient criteria it helped to develop.

Response A.14.

Algal growth is excessive in the Taunton River Estuary and Mount Hope Bay. Average chlorophyll-a concentrations at all the Taunton River Estuary sites are above the range identified in the *Critical Indicators Report* for unimpaired SB waters (3-5 ug/l) and include high peak chlorophyll-a concentrations, associated with blooms that can result in greatest DO depletions. *See Site-Specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical Indicators - Interim Report* (Howes et al., 2003) at 22.

The comment's contention that EPA "must show that nutrients are stimulating algal growth" and that the algae levels "are, in fact, causing the observed low DO" is not, in fact, the standard set forth in the CWA regulations. The actual test is whether the discharge of pollutants "causes, has the reasonable potential to cause, or contributes to" a violation of water quality standards. 40 CFR § 122.44(d). This test does not require the strict proof of causation the commenter wishes to apply. If nutrient discharges are one of a number of identified contributors to low DO violations, § 122.44(d)(1) applies and a permit limit must be set. If nutrient discharges are not currently causing or contributing to water quality violations but have the reasonable potential to do so in the future - such as where a facility is operating below its design flow and would be expected to cause water quality violations as its flow increases – § 122.44(d)(1) applies and a permit limit must be set.

Nor do EPA's regulations require that EPA analyze with precision each step in a chain of impacts on water quality. The type of analysis the commenter suggests is often a goal of stressor-response approaches to nutrient criteria, although not specifically necessary even in those analyses. That is not the type of analysis that EPA needs to perform to determine reasonable potential to cause or contribute to an impairment in order to issue a NPDES permit. Rather, EPA examined the entirety of system data in order to identify a threshold associated with the transition to unimpaired conditions.

The contention that algal levels are higher at MHB16 is based on 2006 monitoring results. 2006 was an extremely wet year that was not used by EPA in its permit limit analysis. Examination of the monitoring data for 2006 indicates that MHB16 chlorophyll-a was indeed quite high (14.1 ug/l) but that TN concentrations were also high (0.50 mg/l). Fact Sheet Table 5. On the other hand, chlorophyll-a concentrations at MHB19 were relatively low in 2006 (5.5 ug/l) despite high TN (0.99 mg/l), but orthophosphate concentrations were relatively low (0.047 mg/l, compared to the 2004-05 average of 0.63 mg/l) and the DIN/DIP molar ratio was 28, indicative of phosphorus limitation rather than nitrogen limitation. SMAST, *Summary of Water Quality Monitoring Program for* *the Mount Hope Bay Embayment System (2004 – 2006)* (2007), Appendix D. This indicates that the system was simply behaving differently under those wet weather conditions and that high flows and the resulting reduced salinity may have shifted the transition point of phosphorus-limitation to nitrogen-limitation farther down the estuary, so that in 2006 MHB16 would not be a comparable site of MHB19. EPA anticipates that the system might well respond differently under those extreme wet weather conditions, but has based its loading and permit limit analysis on the more typical years. These data are entirely consistent with EPA's permit analysis.

Furthermore, EPA notes that the reference to Krahforst & Carullo (2008) does not indicate that "the Taunton Estuary has the lowest algal growth, despite elevated nutrient levels" nor does it support the conclusion that "other system parameters are controlling the degree of algal growth in the Taunton Estuary, not the nitrogen level present," as suggested in the comment. In fact, the Summary and Conclusions section of that reference, at page 413, states:

"Land uses that experienced the greatest gains since 1985—residential and urban—reflect increases in human population to the area and pose concerns about the potential for increases in impervious cover and greater volumes of wastewater, and hence *N delivery to the system*. The loss of river herring from tributaries feeding into Mount Hope Bay has been linked to excessive anthropogenic pollution since the beginning of the 20th century, most notably from wastewater pollution. However, changes in land use within the Mount Hope Bay watershed that accompanies continued development contribute important factors, such as increases in the percentage of impervious cover, that affect the *efficiency of N transport to bay waters*. **With respect to eutrophication of Mount Hope Bay, therefore, an ecosystem-based management strategy should consider improvements to wastewater treatment foremost**, but should also consider concurrent efforts to better manage stormwater and on-site wastewater systems because of the impending rapid growth and development projected for the watershed (SRPEDD, 2005)." (Emphasis added)

Before stating this conclusion, the document lists the Brockton WWTF in Table 13.7 (at page 408) as one of the primary contributors of N to Mount Hope Bay, making up 32% of the total estimated load. Hence, the commenter's claim that "other system parameters are controlling the degree of algal growth in the Taunton Estuary, not the nitrogen level present" is entirely unsupported and misleading as the reference clearly supports the opposite conclusion.

Finally, footnote 25 of the comment raises the issue of the Great Bay Peer Review. EPA notes that there were two peer reviews, one a favorable peer review from reviewers familiar with CWA/permiting programs and requirements, and one negative peer review from a peer review panel consisting of academics. Unremarkably, the academic peer review recommended that more study be conducted in order to improve the accuracy of the TN threshold. This peer review did not conclude that TN was not a concern in Great Bay. Also, contrary to the commenter's suggestion, the negative peer review is not the reason that EPA did not conduct correlation analyses. EPA did not conduct these analyses because the SMAST data set was not designed to support such analyses. The data set was designed to support the analytical approach used in the MEP program which does not include correlation analyses.

Comment A.15. Non-nutrient conditions, ignored by EPA control system DO and are a function of the system hydrodynamics.

The existing analysis of DO and chlorophyll a and its relationship to TN concentrations confirms that the minor, infrequent low DO is not apparently algal driven (*i.e.,* this is not a situation where diurnal DO changes are causing the occurrence of low DO). The occurrence of low DO is significantly affected by stratification and the condition is influenced by (1) the low DO entering from the Bay and (2) the deoxygenation of stratified waters due to sediment oxygen demand in the tidal river (Zhao, Chen & Cowles, 2006). Reduced winds allow stratification to occur in MHB which allows low DO to occur in the bottom layers. Changing algal levels in the Upper Taunton Estuary will have no effect on that condition.

Given the dramatic CSO reductions and reduced algal growth that have taken place over the past 10 years, SOD that exists in MHB that causes, in part, the low DO condition would have been reduced. Of course it takes time for the SOD of the system to change (*see* EPA Great Bay Joint Press Release – Attachment K) Whether or not the remaining DO condition (to the degree that it exists) has any relationship to algal mechanics in the Taunton Estuary is not known at this time. Therefore, there is no basis at this time to assert that the discharge is presently causing or contributing to either a violation of the DO criteria for the Taunton River or any narrative criteria related to nutrients. As in the Great Bay tidal rivers, the stratification and reduced wind condition is a natural occurrence that, under certain conditions, will inevitably produce lower DO conditions. However, until EPA can demonstrate that the existing DO still fails to meet applicable criteria and that the remaining DO condition is a result of anthropogenic factors related to excessive algal growth, it is not reasonable to presume that further nutrient regulation is necessary.

Response A.15.

EPA disagrees that nutrient driven algal levels are not contributing to low DO in MHB. First, the 2006 Zhao, Chen & Cowles reference in the comment does not support the claim being made in the comment. The paper does mention that "It is believed that the occurrence of the low DO concentration area (or hypoxia) in the Providence River is due to the reduced air-sea exchange and mixing as a result of this increased stratification." Furthermore, the paper states that "[h]ot water injected from the power plant in MHB represents an anthropogenic source of heat to the bay water" but it is "unclear if this water tends to increase the overall vertical stratification since it also contributes to increased mixing through shear instability." However, nowhere does it state that the low DO in the Taunton River is caused from low DO waters entering from MHB nor does the paper comment at all on sediment oxygen demand (SOD). This appears to be the City's own theory which is unsupported in the literature cited.

The comment claims that "low DO is significantly affected by stratification and the condition is influenced by (1) the low DO entering from the Bay and (2) the deoxygenation of stratified waters due to sediment oxygen demand in the tidal river." While stratification is often a contributing factor to low DO, it is a physical attribute that tends to make the system more susceptible to nutrient-induced DO violations and does not eliminate the need for nutrient controls. The hypothesis that low DO is driven by waters entering from the Bay is contradicted by the fact that DO is consistently lower in the Taunton River than in Mount Hope Bay.

However, as stated in Response A.14, even if nutrient discharges are one of a number of identified contributors to low DO violations, along with stratification and SOD, § 122.44(d)(1) still applies and a permit limit must be set. Although it is not possible to parse out specific contributors to low DO from the SMAST monitoring data, the 2011 through 2015 data sonde data from MHB clearly show supersaturated surface DO, algae blooms and depleted bottom waters, all consistent with eutrophication. See Fact Sheet at 38-39. This is contrary to the claim in the comment that "this is not a situation where diurnal DO changes are causing the occurrence of low DO." Rather, EPA believes nutrient discharges are clearly contributing to the diurnal DO changes and low DO violations, which may also be exacerbated by other factors such as those described in the comment.

EPA also notes that the SMAST surface DO data were not taken at critical predawn conditions which would reflect worst case DO and that low DO measured in bottom waters is entirely consistent with the effects of nutrient enrichment. This is discussed in more detail in Response A.37 below.

Furthermore, EPA disagrees with the claim that "algal levels in the Upper Taunton estuary will have no effect" on DO in the bottom layers of MHB. Elevated SOD levels in bottom waters are directly related to water column chlorophyll-a levels as a result of the settling and subsequent decay of the vegetative matter in the water column, as measured by chlorophyll-a. While it is reasonable to expect a lag time relative to SOD recovery, recovery cannot take place until chlorophyll-a levels are controlled and the current data indicate that chlorophyll-a levels are still elevated.

Finally, the extent of CSO reductions and its impact on recent data is discussed in more detail in Response A.17 below. In brief, while there have been reductions in nitrogen loads since 2004-05 they are not as significant as the comments suggest, and nutrient-related water quality issues continue based on the limited more recent data. See Response A.17 for a more thorough discussion.

Comment A.16. Missing technical assessments preclude a determination that EPA's approach is rational and scientifically based and therefore render the proposed limitations arbitrary and capricious.

To determine if a limitation is "necessary" to resolve a "narrative criteria exceedance," the analysis must address, at a minimum, the major factors influencing the DO regime at both the sentinel location and the Upper Taunton Estuary. Missing technical assessments needed to render a defensible permit evaluation include: (a) how TN affects algal growth in both parts of the system; (b) how algal growth affects DO; (c) where the algae found in the estuary are growing (upstream in fresh waters, in the Bay or in the tidal river); (d) the degree to which non-algal factors including watershed loads of oxygen demanding materials control DO in the Taunton system; (e) whether low DO is caused by SOD, diurnal DO variation or stratification; (f) how system hydrodynamics affect the occurrence of low DO including transport of low DO into the Taunton River; and (g) whether natural factors are responsible for the DO condition. Without some evaluations of these factors, which are well documented as affecting DO of any tidal river, EPA's contention that nutrients are the cause or even a significant cause and, therefore, a necessary part of the solution to the DO condition is all presumption. This is not a case where the City is demanding any form of conclusive analyses; rather, the City is observing that there is a complete absence of any credible analyses of these issues. In short, as there is no substantial evidence supporting this scientific conclusion and therefore is no objective way to know that it is scientifically correct, EPA's proposed TN limitation is therefore arbitrary and capricious.[26]

[26] As noted before, a central presumption of EPA's effluent limit determination is that station MHB16 defines the level of nutrients (and therefore the degree of algal growth) that would be protective of the Taunton Estuary. *See supra,* at 1. These open waters in a bay, highly influenced by the ocean, bear no objective resemblance to the physical setting occurring at Taunton River station (MHB19). That is precisely the conclusion reached by prior hydrodynamic assessments of this system which have identified the sentinel location as unique and not representative of conditions even in MHB (Kincaid, 2006). At a minimum, EPA would need to demonstrate that the conditions influencing TN dynamics and the DO regime at MBH16 are similar to the Taunton River site to support its position. No such demonstration is made because the physical conditions are radically different and there is no rational basis to believe that TN effects at MHB16 are similar in any way to TN effects at MHB19. From the data it is clear that (1) the algal growth in the Taunton River is *less than that occurring at MHB16* and (2) the unusual tidal exchange with the Sakonnet River, not algal growth, is the primary factor influencing DO levels in MHB16. *Id*.

Response A.16.

This comment is premised on the misconception that EPA must rule out all other possible explanations for the observed water quality responses before it can include a nutrient limit. This is not the case. The need for permit limits is not restricted to situations where the pollutant is the single cause of a water quality issue and all other factors can be discounted or eliminated. Rather, a permit limit is required whenever a pollutant discharge "causes, has reasonable potential to cause, or contributes" to an impairment. 40 CFR § 122.44(d)(1)(i). EPA is not required to show that there are no other factors influencing DO in the Taunton River Estuary and indeed that would be impossible, as DO conditions are the result of interaction of a number of factors. The question for permit limits is whether the nutrient discharges and the accompanying elevated algal population (clearly seen in the Taunton River Estuary) contribute to the problem or have reasonable potential do so. Given the well understood effect of nutrients on algal and DO and the indicators that this mechanism is operative in this system, EPA's conclusion is amply supported and is neither presumption, speculation nor guesswork.

The comment footnote clearly overstates its case with the insistence that there "is no objective resemblance" between Mount Hope Bay and the contiguous Taunton River Estuary, and that they are "radically different" with "no rational basis to believe [they] are similar in any way." Despite the hyperbole, these are in fact a series of segments of the same estuarine system, characterized by different levels of mixing of the same two source waters, continual exchange of waters among the estuarine segments, the same sources for sediment, the same climatic conditions, minor difference in depth range (Taunton River depths range from 4 to 10 meters; Mount Hope Bay from 3.5 to 12 meters) and different widths (the Taunton River is one-third to one-half mile across; while Mount Hope Bay is over 2 miles across at its widest point). More specifically, chlorophyll-a concentrations are not less at station MHB19 than at MHB16 in a normal year (see Response A.14), and the hypothesis that stratification is the primary factor influencing DO in Mount Hope Bay, but not in the Taunton River, is entirely unsupported (see Response A.15).

Furthermore, as described in the Brockton Fact Sheet (pages 43-45) and as summarized in Response A.4 above, MHB16 was chosen as a reference site by looking down the estuary for a point where water quality transitions from impaired to unimpaired. However, EPA did not merely rely on MHB16 but further supported the determination of the TN threshold through an evaluation of the scientific literature. If EPA did not use MHB16 based on hydrodynamic and depth differences but instead looked at MHB12, 13, 14, 15, and MOOR, all in an area where the transition to unimpaired is not evident, EPA would not have reached a different conclusion. From Fact Sheet Table 5 (page 35), three of the stations (MHB12, 13, and 15) support a determination that the threshold for TN that is consistent with attaining minimum DO standards is 0.45 mg/l or less and two of the stations (MHB14 and MOOR) suggest that the threshold might be higher than 0.45 mg/l. In light of this variability and in light the fact that the minimum DO values in Table 5 do not actually reflect actual minimum DO values expected at these stations, EPA's determination of a 0.45 mg/l threshold is a reasonably conservative determination. Had EPA chosen not to consider a reference site in making our determination, EPA would have necessarily relied on the scientific literature which also points to a value of 0.45 mg/l as being a reasonably conservative threshold.

Comment A.17. Major improvements in water quality have occurred since 2004/5 that must be accounted for in setting permit limitations.

Under the structure of the Act and its implementing regulations, permitting decision must be based on current information. Despite this mandate EPA has relied upon out of date water quality impacts information in deriving the narrative translator and proposed TN limits (*See, e.g.*, CWA Section 304(a) (requiring EPA to use the latest scientific information); 40 CFR Part 130 (requiring impaired waters list be updated every 2 years in order to be based on current information for the estuary); 122.44(d) which requires the analyses to be based on current information reflecting existing conditions and imposed regulatory requirements).[27]

In this case, the analysis in the Fact Sheet cites data from 2004/5 to conclude that major nutrient reductions are required to address DO concerns in both the Taunton River and, indirectly Mount Hope Bay (Brockton Fact Sheet, at 39). Since 2004/5 there have been dramatic reductions in organic and nutrient loadings to these waters; therefore, the data from 2004/5 are not representative of current conditions.[28] EPA's Taunton Response to Comments acknowledged that significant load reductions had occurred post 2004/5 as demonstrated by numerous studies of the system (Taunton Response to Comments at 61-62, 107). EPA's failure to analyze and account for these changes renders their analyses arbitrary and capricious.

For example, the reports entitled *Spatial and Temporal Patterns in Nutrient Standing Stock and Mass-Balance in Response to Load Reductions in a Temperate Estuary* (Attachment L)[29] and *Draft Nutrient Conditions in Narragansett Bay & Numeric Nutrient Criteria Development Strategies for Rhode Island Estuarine Waters* (Attachment M)[30], discuss the extent of nutrient reduction measures implemented by both Rhode Island and Massachusetts. From October 2003 to June 2008, at least eight Rhode Island wastewater treatment facilities, including the bay's second largest, were upgraded to remove excess nitrogen.[31] The largest, Field's Point WWTF, completed its upgrades in 2013 to achieve a total nitrogen limit of 5 mg/l which will further reduce the bay's nitrogen levels. In fact, it is expected that completion of the Field's Point WWTF upgrades will result in the bay meeting the nitrogen target goal set by Rhode Island General Law § 46-12-3(25).[32] EPA's Taunton Response to Comments erroneously asserted that load reductions to Narragansett Bay were irrelevant to conditions in MHB. (Taunton Response to Comments at 58, 61-62). That assertion is incorrect as over 90% of the saline water entering MHB originates in Narragansett Bay (Kincaid, 2006). EPA's basic misunderstanding of the systems' hydrodynamics and lack of use of current information led to its completion of a flawed analysis in support of its permit decision.

Between the years 2000 and 2010, both the Taunton River and Narragansett Bay experienced significant reductions in TN loads. In the Taunton River, the average annual load of TN dropped from 1.64×10^6 kg to 5.28×10^5 kg from the periods 2003-2004 to 2008-2010.

Adjusting for the difference in average annual flow, this represents a significant TN concentration reduction to the Mount Hope Bay system (estimates range from 30 to 48%).[33] The reduction in TN concentration is greater than the reduction in mass load cited above due to differences in flow between the two monitoring periods. These reductions have greatly decreased total nitrogen levels in Mount Hope Bay and such levels are now well below the level EPA has indicated would be protective for Mount Hope Bay – 0.45 mg/l (*Infra* at 27-30).

A comparison of nutrient and organic loadings for the Taunton River demonstrates that major reductions in both parameters have occurred since 2004/5. The City of Brockton is in the process of undertaking additional modifications that will reduce its nitrogen loading even further. Overall point source nitrogen loadings (**Table 1)** to the Upper Taunton Estuary have decreased by approximately 25% since 2005 (excluding the CSO related TN reductions). In 2014, EPA issued the MFN (Mansfield, Foxboro, and Norton) Regional Wastewater Facility a permit to achieve a mass limit equivalent to 5 mg/l TN on a monthly average basis. This requirement, nowhere addressed by EPA in Brockton's permit development, will reduce BOD loadings to negligible levels and reduce TN loading from that facility by 80%.

In response to these changes algal levels have also dropped in Mount Hope Bay by approximately 25% (data presented later in this document). Moreover, the Cities of Taunton and Fall River (at the mouth of the estuary) have implemented extensive wet weather controls that have reduced organic loadings to the river since 2004 (*See* **Table 2** below detailing the degree of CSO reduction occurring. (Personal communication between Joe Federico, BETA Inc. and Nancy Beaton, CDM Smith)). The Fall River reductions are particularly important as a very low DO was recorded at the mouth of the Taunton Estuary in July 2006, following the wettest 45 days in approximately 100 years. Obviously, that condition, which occurred in the area heated by the Brayton Point thermal discharge had an impact on DO readings taken nearby.

Finally, the Brayton Point generating facility (at the mouth of the estuary) has implemented two new cooling towers that will lower temperatures in the Bay and Taunton River. (*See* Attachment N - Brayton Point Station Fact Sheet). The lower temperature will have a direct impact on promoting higher DO by (1) increasing DO saturation, (2) reducing the organic deoxygenation rates of the system, and (3) decreasing the intensity of stratification which will reduce depletion of oxygen in the bottom waters of the Bay. EPA's failure to account for the impact of these changes in treatment affecting algal growth and the DO regime is contrary to the requirements of 40 CFR § 122.44(d).[34] For this reason, use of 2004-2006 data at the mouth of the estuary to predict the effects of reducing Brockton's TN discharge is improper (*See*, EPA Response to Comments for Taunton at 91, 100). Radical changes have occurred affecting water quality at the mouth of the estuary and water quality at Stations MHB1 and MHB22, and these changes basically reflect conditions in the Bay proper. The water quality at this location cannot be attributed to nitrogen loads occurring at the head of the estuary. This was documented by the Krahforst & Carullo (2008) survey completed in 2003

(Attachment I). Those analyses confirmed that the lowest algal growth occurs in the Taunton River, despite containing elevated nutrient levels. The higher algal growth

Table 1: Comparison of 2004-2005 and 2011-2012 Average Summer BOD and TN Discharge from Taunton River Estuary Wastewater Treatment Facilities

WWTF	Design Flow (mgd)	Receiving Stream	EPA Calculation Average 2004 - 05 Summer TN Discharge (lb/day)	May to October BETA Calculation Avg.			
				2004-05 Summer Discharge (lb/day)		2011-12 Summer Discharge (lb/day)	
				BOD	TN	BOD	TN
Taunton2	8.4	Taunton River Estuary	610	474	681	116	502
Somerset[1]	4.2	Taunton River Estuary	350	244	412	160	398
MCI Bridgewater	0.55	Taunton River	37	202	No Data	341	24
Brockton[2]	18	Salisbury Plain River	1,303	358	1,434	117	6,18
Bridgewater	1.44	Town River	138	43	164	43	208
Mansfield	3.14	Three Mile River	376	24	431	19	383
Middleboro[2]	2.16	Nemasket River	208	11	282	11	397
		Total Load:	3,020	1,355	3,404	807	2,530

Notes:

1: Nitrogen data provided was monthly maximum day value.
2: CBOD measured during summer reporting period.
3: Values calculated with reported monthly averages unless otherwise noted.
4. Average Brockton AWRF TN load was even lower in May-October 2014 at 498 lb/day.

originates in central MHB, waters heavily influenced by conditions occurring in Narragansett Bay. EPA's analyses, frozen in time, failed to account for how any of these changes would alter the DO conditions in the Taunton River, 10 years later. EPA's analyses, in a word, got the impacts completely reversed.

Table 2: CSO Reduction in Taunton and Fall River, MA

Description	Pre-CSO Program	Current	Reduction
Estimated Annual CSO Volume	1,293 MG/year	278 MG/year (Overall) <65 MG/year (South/Central)	78% (Overall) >94% (South/Central)

One would expect that the major change in TN and oxygen demanding pollutant loads occurring in the head end of the Taunton Estuary since 2004/5 would be profound on the DO regime of that area, assuming EPA's position regarding the factors controlling low DO is correct.

However, EPA's evaluation failed to consider that the Bay delivers the vast majority of the water entering the Taunton River every day. EPA estimates that the salt water contribution is triple the fresh water component (Brockton Fact Sheet, at 46-47). Improved DO and reduced algal levels should now be associated with these tidal flows. Likewise, millions of gallons of untreated wastewater releases have been reduced since 2004 via CSO control. This would reduce the organic enrichment of the estuary and reduce the low DO load associated with those combined sewer overflows. Given the scope of pollution reduction efforts occurring since 2004/5, it is inappropriate for EPA to claim that nutrient controls are necessary based on data reflecting 2004/5 conditions. It is irrelevant that this is the "only comprehensive data set" as EPA claims in defense of its continued reliance on this information (Taunton Response to Comments at 34, 58, 65). Complete or not, the data are certainly not current and its use is prohibited by 122.44(d) under the circumstances.

It is certainly possible, if not likely, that the minor DO violations found to occur in the Taunton River based on 2004/5 conditions (4.5-4.7 mg/l DO versus a 5 mg/l standard), no longer exist. In any event, the failure to account for these changes influencing the need for and extent of TN reduction is contrary to applicable rules and norms of administrative agency decision making.

Studies indicate that closure of the Brayton Point facility will produce about a 0.3 mg/l DO improvement (*see* Attachment O). Furthermore, the recent changes to the cooling tower operation have already had a significant effect on DO in MHB, and these changes are not accounted for in the analysis in Brockton's Fact Sheet. Since compliance only required at best a 0.5 mg/l DO improvement, it is apparent that less restrictive TN reductions would be needed at this point in time.

In summary, to support its claim that Brockton's discharge is the cause of narrative or DO criteria violation, EPA must utilize current data since numerous changes promoting improved DO have occurred since 2005. Therefore, EPA must update its analyses to reflect the known water quality improvements occurring since 2005 and determine, based on current data, whether or not the Taunton River Estuary is actually still impaired for DO given the broad load reductions that have occurred.

[27] The 11th Circuit Court of Appeals stated:
The CWA requires that states identify all waterbodies within their boundaries that do not meet or are not expected to meet water quality standards. *See* 33 U.S.C. § 1313(d)(1)(A); 40 CFR §§ 130.2(j), 130.7(b)(1). EPA regulations require states to "assemble and *evaluate all* existing and readily available water quality-related data and information to develop [their impaired waters lists]." 40 CFR § 130.7(b)(5) (emphasis added). While § 130.7(b)(6)(iii) implies that Florida has a right to decide not to *use* certain data, it does not obviate the requirement in § 130.7(b)(5) that Florida *evaluate* all existing and readily available data. By taking the hard-line approach of not considering any data older than 7.5 years—even when there is no more current data for a particular waterbody—Florida has not fulfilled § 130.7(b)(5)'s evaluation requirement. Moreover, states are required by the CWA to identify *all* waterbodies that fail to meet water quality standards, 33 U.S.C. § 1313(d)(1)(A); states cannot shirk this responsibility simply by claiming a lack of current data. The district court misinterpreted the CWA's statutory and regulatory scheme when it held to the contrary, and we must therefore remand this issue for an analysis under the correct legal standard. *Sierra Club v. Leavitt*, 488 F.3d 904, 913 (11th Cir. 2007).

[28] After the 2003 fish kill in the Providence River, the Rhode Island legislature directed facilities to achieve a 50% reduction in nitrogen discharges. Tom Uva of the Narragansett Bay Commission indicated that the present TN discharges from Rhode Island have decreased by 48% and that ambient TN levels are the lowest measured to date. (Personal communication with John C. Hall on June 11, 2013).
[29] Jason Seth Krumholz, *Spatial and Temporal Patterns in Nutrient Standing Stock and Mass-Balance in Response to Load Reductions in a Temperate Estuary*, (2012).
[30] Christopher Deacutis and Donald Pryer, *Draft Nutrient Conditions in Narragansett Bay & Numeric Nutrient Criteria Development Strategies for Rhode Island Estuarine Waters* (June 2011).
[31] *Id.* at 2, 28.
[32] *Id.* at 97.
[33] *Id.* at 167.
[34] EPA was responsible, in part for mandating that nutrient reduction occur broadly in the Narragansett Bay and CSO reduction in Massachusetts. Those and other changes have produced major improvements in water quality such that the 2004/5 conditions referenced by EPA are no longer relevant.

Response A.17.

The characterization of EPA's analysis is incorrect. EPA did not rely upon out of date water quality impacts information in deriving the narrative translator and proposed TN but considered all of the data from all SMAST stations as well as the available more recent URI data. EPA included charts and references to the 2011 and 2013 published indicator data in Mount Hope Bay documenting continued nutrient impacts and water quality impacts in the Bay. Fact Sheet at 38-39.

The references to reductions by Rhode Island treatment plants are not relevant to this system as those treatment plants discharge to Narragansett Bay proper and not to Mount Hope Bay.[5] The actual reduction in total nitrogen loads to Narragansett Bay achieved to date, as described in Krumholz (2012) has been "only about 17% of the annual ecosystem budget," *id.* at 25, although it is expected to reach about 50% when all the larger plants have upgraded to tertiary treatment. *Id.* at 25 and 38. Krumholz concluded that there was no observable response in chlorophyll-a or primary productivity from the reduction to date but that a 50% reduction would warrant a reanalysis. *Id* at 25.

The comment's claim that TN concentrations in the Taunton River have decreased by 48% is simply untrue. The comment cites to a Table in the Krumholz Ph.D dissertation comparing loads from the period 2003-04 and 2008-2010, but the comment does not include the information from the document text indicating that these loads were not calculated in comparable ways:

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[5] While Narragansett Bay proper and Mount Hope Bay are connected and part of a larger system, research indicates that Mount Hope Bay is a net transporter of nitrogen to Narragansett Bay proper, rather than vice versa, so that reductions to loads in Narragansett Bay proper are not expect to result in discernible improvement in Mount Hope Bay. SMAST, *Framework for Formulating the Mt. Hope Bay Natural Laboratory: A Synthesis and Summary* (2003) at 99.

> The discrepancy in measurement comes in part from the fact that Nixon et al. (1995, 2008) scaled up the flow of the Taunton to account for the large un-gauged area between the measurement station, at State Farm in Bridgewater MA, and the mouth of the river. By land area, slightly more than half of the watershed is un-gauged because the river has tidal influence for about 10 miles from its mouth. This results in increasing the flow from the Bridgewater gauge by about 40%, as calculated by (Boucher 1991). We elected not to scale this flow up primarily because the Taunton River at Bridgewater, where it was sampled both for flow and for concentration, during low flow periods is more than half sewage effluent by volume. Even during high flow periods, the effluent from the Brockton AWRF, at a relatively constant 17-20 million gallons per day, is close to 10% of the total flow of the river. Therefore, we feel it may not be accurate to apply concentration data taken at the Bridgewater gauge, and assume that it will hold constant as the volume essentially doubles with 300 square miles of ungauged area below this station. This is much less of a concern for other rivers, where the volume of effluent is small compared to the volume of water, and the ratio of gauged to un-gauged area is small (for most of the other rivers, the ratio of gauged to total area is <1.2).
>
> When we calculate the Taunton River using Boucher's (1991) coefficient, we get 82 million moles TN and about 1.22 million moles TP. This TN estimate is still **a 30% reduction** over Nixon et al. and the phosphorus reduction is still about 77% of the earlier estimate. These numbers are probably a more accurate representation of the change which has gone on over time in that system. We expect the large phosphorus reduction, since Nixon et al.'s values are from data collected in the 1980's, before large scale reductions in phosphorus load became mainstream (Litke 1999). However, for the purpose of attempting to quantify as accurately as possible the total flows into and out of the system, we believe that adding the un-gauged portion of the Taunton River to our 'unmeasured drainage' term, and representing it with the average load per acre across the entire system provides a more accurate picture of the actual contribution from the Taunton, though we admit there is a fair amount of uncertainty either way on this matter. [emphasis added]

Thus the dissertation calculates a 30% reduction in loads through 2010; even this however, is an overestimate because the location of sampling is different between the 2003-04 and 2008-2010 surveys. While the 2003-04 data was taken at the Bridgewater gauge (as indicated in the dissertation), the 2008-10 NBC data was collected at the Berkley Bridge in Dighton, which is subject to dilution by both the flow from ungauged areas of the watershed (about 40% of total watershed) and by ocean water (this site is located in the estuary). Given the large contribution of the Brockton discharge, upstream of the Bridgewater gage, it would be expected that concentrations would be lower further downstream and that comparing loads calculated from the two sites would result in a spurious "reduction", although the presence of the Taunton discharge between these two sites complicates attempts to calculate what the true reduction might be.

This is not to say that there have not been reductions to nitrogen loads in connection with improved treatment, but just that they are not as substantial as the comment contends. In particular EPA agrees that the City of Brockton's upgrade to its treatment plant, completed in 2010, has resulted in a significant decrease in total nitrogen loads of about 700 lb/d as of 2010, although that reduction is not sufficient to meet the target thresholds in the estuary. EPA agrees that the total reduction in WWTP loads has been approximately 25%, although the reduction in total TN load (including nonpoint sources) is only about 17%.[6] These reductions would not be predicted to be sufficient to achieve the target TN concentration or achieve water quality standards, and in fact the available data indicate that elevated chlorophyll-a concentrations and DO depletions continued through 2010 consistent with EPA's analysis. See Response A.18. EPA's analysis did in fact consider the impact of reductions in nitrogen discharges from Brockton and other WWTPs; indeed, the 3 mg/l TN permit limit is premised on new permit limits at all the other major dischargers in the Taunton River watershed, which will result in further reductions below those already achieved at those facilities.

The CSO reductions cited in the comment, while important in addressing other pressing water quality problems, are not expected to have a significant impact on DO conditions in the upper Taunton River estuary where the Fact Sheet analysis was conducted. While the comment portrays a lump sum of "1,293 MG/year" as being reduced by "the Cities of Taunton and Fall River," this volume, and the associated reductions, are related essentially entirely to reductions in Fall River CSO discharges and not to City of Taunton discharges. Within the Fall River system almost the entire reduction has occurred in discharges from the South/Central regions which discharge to the Quequechan River and Mount Hope Bay in connection with the South Tunnel construction.[7] *See* City of Fall River, *CSO Abatement Program North System Plan and Program Update Report – Supplemental Report* (2011). These Fall River CSOs are located more than 6 miles downstream of the station used as the locus for the loading analysis and discharge only during wet weather, when flows from the Taunton River are at their highest and flows move most strongly away from the mouth of the estuary. In addition, most of these CSO discharges addressed occur primarily in wet months and therefore have limited effect on the summer conditions that are analyzed in the Fact Sheet.

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[6] EPA notes that the comment contains estimates of TN loading in 2004-05 which are higher than those used by EPA in its loading analysis; this is because EPA's loads were calculated for June to September to match the data in the rest of the loading analysis (the period for which receiving monitoring data was collected), while the comment loads include May and October. The scale of reduction due to Brockton's treatment upgrade is approximately 25% of point source loads for either time period.

[7] While not stated in the comment's table, of the 1,293 MG prior to the tunnel, 1,032 MG was from the South/Central sewer areas. Of the total reduction of 1,015 MG the vast majority (967 MG) was in the South Central area, with a much smaller amount (approximately 45 MG/yr or 0.12 mgd) was in the lowermost portion of the Taunton River.

Moreover, these CSO reductions did not eliminate organic and nutrient loadings from these flows. The flows did not disappear; the CSO reduction plan implemented by the City of Fall River involves primarily increased capacity at the treatment plant (particularly increased capacity for primary treatment of wet weather flows), storage, and satellite disinfection and screening. Thus a portion of the flow (and the only treatment for CSO discharges in the North region) receives only screening and disinfection, which would not be expected to substantially reduce nutrient and BOD_5 loads. Another portion of the flow receives only primary treatment, providing no substantial nutrient removal and limited BOD_5 removal. Even for those flows now receiving secondary treatment it is unclear that any organic and nutrient reduction is being provided due to the dilute nature of the CSO discharges; based on monitoring provided in connection with the Cove Street screening and disinfection facility, the influent to that facility has quite low BOD_5 (12-16 mg/l) and TN (3.4 to 3.8 mg/l) concentrations that are lower than the effluent from the WWTP. *City of Fall River, CSO Abatement Program North System CSO Control Plan and Program Update Report – Supplemental Report* (2011) at 1-1 to 1-3 and Table 2-2. Thus, while wet weather controls are providing important reductions in pathogen loads and other pollutants, there does not seem to be evidence that a substantial reduction in organic and nutrient loads can be expected from the CSO mitigation efforts to date.

Brayton Point thermal discharges may also have contributed incrementally to dissolved oxygen depletion in Mount Hope Bay, although the limitations on thermal discharges were not based on DO impacts, see EPA, *Clean Water Act NPDES Permitting Determinations for Thermal Discharge and Cooling Water Intake from Brayton Point Station in Somerset, MA* (2002), and extensive modeling efforts in connection with the Brayton Point permit proceedings were unable to quantify the impact of those thermal discharges on DO concentrations. See EPA, *Response to Comments, Brayton Point Station NPDES Permit No. MA0003654* at III-10 (http://www.epa.gov/region1/braytonpoint/pdfs/finalpermit/sectionIII.pdf). However, the influence of the thermal plume is negligible in the Taunton River Estuary portion of the system, where temperatures are naturally higher than in Mount Hope Bay. Furthermore, while thermal loads have been dramatically reduced since 2011, DO depletions have continued within Mount Hope Bay as shown by continuous data sonde measurements from 2011 through 2013. See Fact Sheet at 38-39 and Responses A.7 and A.18.[8] This conclusion is also supported by ongoing monitoring performed by the Brayton Point Station, which

[8] Results from monitoring done under the Brayton Power Plant NPDES permit are consistent with these results, with DO measurements in 2011, 2012 and 2013 below their long term mean in summer months with frequent results below 5 mg/l. *Brayton Point Station Hydrographical and Biological Monitoring Program – 2013 Annual Report* at 3-1 to 3-86; *Brayton Point Station Hydrographical and Biological Monitoring Program – 2012 Annual Report* at 3-1 to 3-85; *Brayton Point Station Hydrographical and Biological Monitoring Program – 2011 Annual Report* at 3-1 to 3-83.

found that the proportion of DO readings below 5 mg/l (indicating violation of the MA SWQS for DO in SB waters) is greater than the long-term mean in both the most recent year (2013) and in the most recent four year period (2010-2013). *Brayton Point Energy, LLC, Brayton Point Station Hydrographical and Biological Monitoring Program, 2013 Annual Report* (August 26, 2014). The commenter's theory that reduction in thermal loads from Brayton Point has resolved the DO issue in the upper Taunton Estuary is unsupported by any evidence at all.

With respect to Krahforst & Carullo (2008), refer to Response A.14 above. The commenter's claim that nutrient loads are not the primary cause of algal growth in the system is entirely unsupported. Krahforst & Carullo actually conclude that "[w]ith respect to eutrophication of Mount Hope Bay, therefore, an ecosystem-based management strategy should consider improvements to wastewater treatment foremost…"

In sum, EPA relied on the best available data (the only comprehensive data set and one collected through a MassDEP approved program) in performing its analysis. While there have been reductions in nitrogen loads since 2004-05 they are not as significant as the comments state, and nutrient-related water quality issues continue based on the limited more recent data. The draft permit limits are necessary both to reduce present loads and to address loadings as treatment plants reach their design flows in future years, when all available data from all time periods are considered.

Comment A.18. EPA's analysis failed to account for Narragansett Bay load reductions influencing MHB conditions

EPA's analysis relied solely on water quality data collected by SMAST at the University of Massachusetts – Dartmouth to develop the TN endpoint of 0.45 mg/l. These data were collected from 2004 – 2006, but EPA only used the data from 2004 – 2005 for station MHB16 to calculate its protective threshold concentration (*See* Brockton Fact Sheet, at 45). EPA excluded the 2006 data because it was the wettest period in 100 years and not reflective of reasonably expected conditions. *Id.* EPA chose MHB16 as the key station for setting the nutrient objective, asserting this was the only station meeting DO objective (Brockton Fact Sheet at 45). However, SMAST collected data from 21 other stations that were summarized in Table 5 of the Brockton Fact Sheet (at 35). One of those stations, MHB-MOOR, centrally located in Mount Hope Bay, reported an average TN concentration of 0.48 mg/l. This no longer is the case.

Ongoing monitoring data at Station MHB-MOOR, contained in a report by the Narragansett Bay Estuary Program[35], demonstrate that annual average nutrient concentrations ranged from 0.3 – 0.4 mg/l from 2006 – 2009 (illustrated in **Figure 1**, reproduced from page 35 of the Narragansett Bay Estuary Program report). The May – October average concentration (approximately, Julian date 120 – 304) is even lower, particularly in 2009. The 2009 TN concentration at the MHB-MOOR station was only 0.22 mg/l for the period from May – October.

Thus, TN concentrations are within the range EPA has asserted reflect "excellent" water quality for Bay systems (Brockton Fact Sheet, at 30). Under EPA's own characterization, TN levels should be considered "excellent" (Brockton Fact Sheet, at 30 - citing a 0.3 – 0.39 mg/l TN level as "excellent"). This has occurred because of the extensive TN reductions occurring in Rhode Island waters that control conditions occurring in MHB (*See* Kinkaid, 2006).

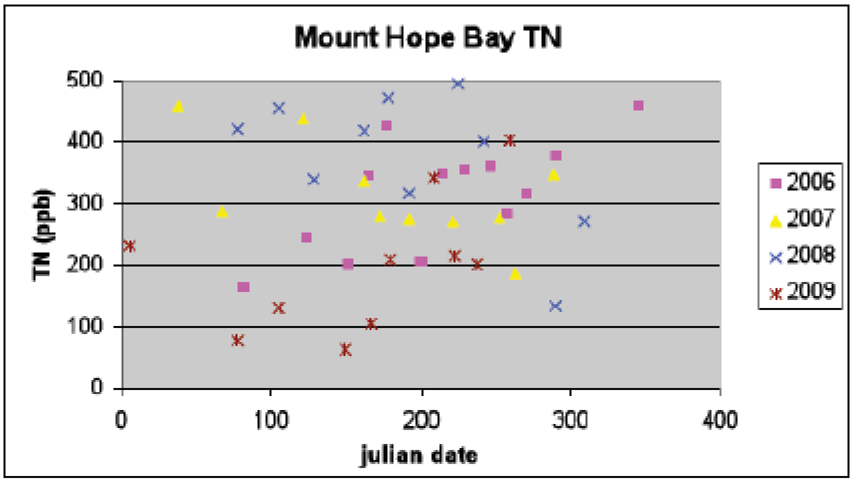

Figure 1: Mount Hope Bay Total Nitrogen. Reproduced from the Narragansett Bay Estuary Program Report

Algal levels in Mount Hope Bay have also dropped significantly since 2004/5, as illustrated in **Figures 2 and 3** based on daily data collected by the Narragansett Bay Water Quality Monitoring Network near MHB13 over the period from 2005 - 2010. As noted earlier, the algal level at MHB16 which allowed DO objectives to be attained was a seasonal average of 10.4 µg/l as chlorophyll *a*. Thus, the data for the system indicate that DO attainment should occur, once SOD has stabilized from the new reduced algal inputs. Assuming the algal levels are controlling system SOD and causing low system DO (as EPA observes in the Brockton Fact Sheet at 39), these changes would produce far better DO conditions in the Bay, which greatly influences DO in the Taunton River. Again, given the minor DO improvement potentially needed to eliminate existing DO exceedances, there is no reason to believe that existing plant improvements will be insufficient to meet the state DO objectives in the Taunton estuary.[36]

As noted earlier, the TN levels in the Taunton River have also dropped dramatically over this period of time (*infra*, note 37). Significant TN reductions have been achieved by facilities tributary to the river. These data indicate at least a 25% reduction in direct point source TN loadings. BOD discharge, which affects DO, has also improved. CSO reductions have also reduced TN and organic loads. These changes in nitrogen loading have produced about a 50% reduction in the Taunton system TN concentrations based upon a recently published PhD thesis (Krumholz, *supra* note 29).[37] Based on this information, the Taunton River likely meets EPA's suggested TN objective of 0.45 mg/l at MHB19, since the average TN concentration at this location was 0.70 mg/l TN in the 2004/2005 period. A 50% reduction in TN concentration would place TN concentration levels well below the 0.45 mg/l target EPA has chosen, assuming the TN target were actually necessary to maintain DO standards. Therefore, the need for further reduction at Brockton is not evident based upon current data that EPA is required to use under 122.44(d) and applicable criteria derivation approaches under MEP and EPA Reference Waters guidance.

The Narragansett Bay Estuary Program data demonstrate that significant improvements in TN and algal concentrations have occurred since the earlier SMAST study, with present annual average TN concentration of approximately 0.3 mg/l and average chlorophyll *a* less than 8 μg/l in the Bay. The conditions in the Bay now reflect the TN level EPA found protective of DO from the sentinel station – therefore, under EPA's logic and analysis DO conditions in the main area of MHB must have improved. The lower algal levels in MHB will improve DO levels in the Taunton River Estuary because so much of the flow in the estuary originates from the Bay (over 1,100 cfs as predicted by EPA). At a minimum, the more-relevant new data must be used to assess current conditions in the Taunton River Estuary and the need for TN reductions at the Brockton AWRF.

[35] Deacutis and Pryor, supra note 16.
[36] EPA repeatedly references DO readings at various system locations from 2010 and 2012, which is (1) prior to the major load reductions and (2) does not allow the system sufficient time to stabilize to the lower SOD level, which can take several years. Thus, the data cited by EPA does not support the position that system conditions have not improved. To the opposite the graphs plainly show improvements have occurred and TN is meeting the sentinel station criteria selected by EPA. EPA just avoided plotting the data in a manner that would make this point obvious (*See* for example EPA graph – in Taunton Response to Comments that plainly shows TN levels on a consistent downward slope – EPA left out the line).
[37] The concentration of TN in the Taunton River has decreased from 1.74 mg/l in 2003-2004 to 0.91 mg/l in 2008-2010. Krumholtz, *supra* note 29, at 167, Table 3-2.

Response A.18.

The characterization of EPA's analysis is incorrect. EPA did not rely "solely" on the 2004-05 SMAST data for MHB16 but considered all of the data from all SMAST stations as well as the available more recent URI data. See Response A.17 above.

EPA notes that the URI data reported in the NBEP document do indicate significantly lower TN concentrations than those reported by the SMAST, including for the one year (2006) that the monitoring programs overlapped. EPA does not agree with the conclusions set forth in the comment based on those results, however. The comment argues that these data indicate a trend toward lower concentrations, which is not in fact the case. While the data through 2009 might appear to reflect a lowering trend because 2009 had the lowest concentration of those four years, the full URI-GSO dataset shows that concentrations in 2010 and 2011 were similar to those in 2006 and 2007, so there the URI-GSO data does not provide evidence of a decline. There also clearly has not been a real drop in concentrations from the SMAST levels (in the 0.55 mg/l range) to the URI-GSO levels (in the 0.35 range), since the two datasets show the same discrepancy for the year of overlap between the two datasets, 2006. While EPA expects there will be some improvement in concentrations at this station from the reduction in loads to the Taunton River achieved to date, such reductions are not readily apparent from these data (they may be mitigated by the influence of the Sakonnet River or the Fall River discharge in this area). Nor does EPA agree that the recent monitoring indicates "excellent" conditions at the MHB station. As discussed in the Fact Sheet, the data from the Narragansett Bay Water Quality Network fixed monitoring site indicates continued elevated chlorophyll-a and depletion of DO through 2015. Furthermore, according the Brayton Point 2014 annual report, Mount Hope Bay is still impaired for DO and aquatic life.

Hence, EPA disagrees that there is a documented trend of decrease in algal levels in MHB. There is a significant amount of interannual variability and no significant evidence of a trend either way; while 2010 had relatively low average chlorophyll-a (about 8 ug/l), 2009 was the highest recorded and 2013 average chlorophyll-a was 10.53 mg/l over the entire monitoring season and 12.28 mg/l in the July to September period[9], while the highest daily average chlorophyll-a was 32.65 mg/l. URI/GSO, *B12.GSO Mt. Hope Bay Water Column Time-Series 2013* (data available at http://www.narrbay.org/d_projects/buoy/buoydata.htm). These values are comparable to earlier periods; in fact, the 32.65 mg/l maximum is higher than any year recorded other than 2006. (See daily average data for all years at http://www.narrbay.org/d_projects/buoy/buoydata.htm). There is also, therefore, no evidence of resulting reduced SOD levels from this source. EPA also disagrees with the characterization of DO violations as "minimal"; as stated in the Fact Sheet, since the data was not collected under critical DO conditions EPA believes the DO violations are extensive.

Furthermore, the comment claims that TN concentrations in the Taunton River have decreased 50%. This is simply untrue. As described in Response A.17 above, the comment cites to a Table in the Krumholz PhD dissertation comparing loads from the period 2003-04 and 2008-2010, but the comment does not include the information from the document text indicating that these loads were not calculated in comparable ways. See Response A.17 for the actual text and further response to this portion of the comment.

It is also not true that present average algal concentrations are less than 8 ug/l in MHB. This was the case for a single year (2010) and years since have been higher; as noted above in 2013 average chlorophyll *a* was 10.53 mg/l over the entire monitoring season and 12.28 mg/l in the July to September period.

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[9]EPA notes that the full season data are not strictly comparable from year to year as the starting and ending dates vary – from May 14 to June 29 for start dates and October 14 to November 9 for ending dates.

Although the footnote claims that DO readings from 2010 to 2012 are prior to major load reductions, this is not the case. TN load reductions from the Brockton upgrade took place as of 2010. Most Narragansett Bay load reductions were in place by 2006. Krumholz Table at 175. Additionally, DO data in 2013 were still below criteria (see Fact Sheet at 40).

Comment A.19. EPA's new data from the Mansfield, MA permit (MA0101702) indicate no impairment for Brockton

The response to comments document for the MNF Water Pollution Abatement Facility NPDES permit (MA0101702) in Mansfield, MA contains updated total dissolved nitrogen (TDN) data for Brockton from as recently as 2012. The data indicate that, in comparing 2006-2009 data with 2010-2013 data, the median TDN in the Taunton River, downstream of Brockton, decreased by 23% from 1.46 mg/l to 1.125 mg/l. This coincides with upgrades at the Brockton treatment facility in 2010. These upgrades, as of 2010, accounted for a decrease of 700 lb/day of TN. Consideration of these nitrogen reductions were not taken into account in the derivation of Brockton's permit limits. This omission results in erroneous permit limits that are no longer representative of current conditions.

Response A.19.

EPA agrees that Brockton has already achieved a portion of the reductions required of it under the new permit limit, as compared to the baseline loading analysis from 2004-05, and stated that in the Fact Sheet. EPA's analysis indicated that a larger reduction is required from Brockton, as well as from other dischargers to the Taunton River, in order to achieve an overall 50% reduction in loads to meet water quality standards. EPA's load analysis clearly "took into account" substantial load reductions from the Brockton AWRF; indeed the load allocation is premised on achieving those reductions. To the extent the City is claiming that EPA must stop and perform a completely new assessment each time incremental steps toward achieving load reduction goals are reached, EPA disagrees with that contention.

Comment A.20. New Data from Mount Hope Bay and Taunton Estuary Are Unreliable – Issues with New Data and Remote Sampling Reliability

Brockton's Fact Sheet (at 41, 47-48) referenced specific remote sampling conducted by others, such as the Narragansett Bay Commission and the State of Rhode Island, whose data still confirms the need for more stringent TN reductions at the Brockton AWRF. The more recent data used for this analyses were from remote sensors in MHB (TN, DO and chlorophyll *a*) and nutrient monitoring in the Taunton Estuary. No algal data were collected or presented for the Taunton Estuary.

This new information provided by EPA does not address the specific technical issues raised in the earlier comments (*e.g.*, it is inappropriate to compare conditions in MHB with those in the Taunton River as these are distinct locations; the chlorophyll *a* target was arbitrarily selected; the data do not confirm an ongoing problem in the Taunton Estuary). EPA's position is based on the ongoing claim that such data support using 5 μg/l chlorophyll *a* level as necessary to protect aquatic life uses in this system. An observation that aquatic resources are "unimpacted" for these low levels of algal growth (Critical Indicators Interim Report) does not provide a basis for asserting that such algal growth level is essential to protect estuarine resources of the Taunton Estuary. EPA has accepted far higher chlorophyll *a* levels as protective of estuarine resources (*see, e.g.*, EPA TMDLs for Long Island Sound and Chesapeake Bay). EPA is required to demonstrate, not presume, that a 5 μg/l algal level is necessary to protect aquatic life resources via some type of "stressor-response" analysis and no such analysis is presented with the new sampling data.

Finally, regarding more recent monitoring in MHB and the Taunton Estuary, EPA previously acknowledged that "NBC monitoring does not include eutrophication indicators…so their data cannot be used for assessment of the response of the system to the load reduction" (USEPA 2014 Mansfield Permit Response). Thus, nutrient data for the Taunton River cannot be used to assess (1) current algal levels or (2) current DO levels. Likewise, any data for MHB do not provide a basis to conclude how algal levels are reacting in the Taunton Estuary. Finally, EPA's reliance on remote monitoring for algal levels in MHB is not defensible. In the Great Bay Estuary, such data sonde readings for chlorophyll *a* were repeatedly found by EPA to be unreliable (*See*, Attachment P, *Upper Piscataqua and Cocheco Rivers Monitoring Project*, EPA 2012 and Attachment Q, *Cocheco River Estuary and Upper Piscataqua River Sonde Deployed Data Review*, EPA 2014). EPA's analysis provides no demonstration that these data are reliable. Consequently, EPA would have to confirm the reliability of those data with concurrent grab samples before they may be used to estimate current algal growth in that system.

What little data that were presented by EPA shows that algal levels have, in fact, decreased in the MHB (*See* overlay of algal plots presented by EPA with earlier algal measurements for the system). This will result in reduced SOD levels and it will therefore result in improved DO levels in the Taunton Estuary. Given the minimal DO violations that were measured in the Taunton in 2004/5, there is no credible basis to assert that further major TN reductions are still necessary for protection of aquatic resources in this system.

Response A.20.

EPA's discussion of the new data is accurately set forth in the Fact Sheet. The new data do not allow updated assessment in the Taunton River Estuary because no eutrophication indicator data have been measured there; therefore, it is not surprising that the new data do not address the specific issues regarding the Taunton River Estuary identified by the City. The comment mischaracterizes EPA's assessment, which did not presume that a 5 ug/l algal level is necessary; the assessment is based on the suite of eutrophication indicators including chlorophyll, DO, TN and turbidity pursuant to the Critical Indicators Report, the

2012 CALM and the SMAST MHB Report. This has been discussed in more detail in Response A.4 above.

EPA also disagrees that remote monitoring for algal levels in MHB is not defensible because "[i]n the Great Bay Estuary, such data sonde readings for chlorophyll-a were repeatedly found by EPA to be unreliable." EPA acknowledges that there was poor correlation between probe and grab sample chlorophyll-a data measured in Great Bay, but the data were never determined by EPA to be unreliable. Rather, both data reports referred to in the comment state that the "probe chlorophyll data should be considered estimated" data. This directly contradicts the commenter's assertion that probe data in MHB must be confirmed with "concurrent grab samples before they may be used to *estimate* current algal growth" (emphasis added).

Finally, EPA disagrees that there is a documented trend of decrease in algal levels in MHB. Refer to Response A.18 for a thorough discussion of this issue.

Comment A.21. EPA's approach is inconsistent with accepted scientific methods for assessing nutrient and DO impacts in flowing waters.

The Fact Sheet analysis uses an area of Mount Hope Bay that was meeting DO criteria as a "reference station" and simply presumes that whatever TN level that exists at that station is the necessary TN level to be achieved in the Taunton River (Brockton Fact Sheet, at 43-45). This was a form of truncated "stressor-response" evaluation the likes of which have been expressly rejected by EPA's Science Advisory Board and EPA's own published guidance on nutrient criteria derivation. The claim that the method is appropriate, consistent with EPA's Reference Waters approach and followed the MEP process is thoroughly unsupported, not scientifically defensible, and inconsistent with the relevant published guidance on these issues. The approach employed by EPA for choosing necessary and appropriate nutrient controls for estuarine waters is without any known basis in accepted scientific methods or published EPA guidance.[38] As such, this method for setting the nitrogen limit in the permit is plainly arbitrary and capricious.

[38] Based on the Supreme Court's decision in *Daubert v. Merrell Dow Pharms*., no agency may base an analysis on scientific information that fails to meet minimum standards of reliability. 509 U.S. 579, 590 n.9 (1993). Daubert incorporates the administrative law principle that an agency cannot disregard the advice of its own experts or take action inconsistent with the facts demonstrated in the record. *Id.* at 593. Thus, for scientific evidence to be considered reliable for agency decision making, it must be based on an analysis that is accepted in the scientific community

Response A.21.

EPA's approach examined the continuum of water quality conditions in the Taunton River Estuary and Mount Hope Bay to identify a transition point from impaired to unimpaired conditions. It is not a stressor-response approach, "truncated" or otherwise, and the cited guidance documents on stressor-response

> analyses and criteria development are not applicable to reference-based approaches to site-specific analyses for permit limits.[10]
>
> Rather, this approach is a form of reference-based approach and a similar approach has been widely applied in TMDLs developed under the MEP and approved by MassDEP and EPA. Importantly, EPA did not rely solely on reference site information but backstopped its determination using protective thresholds identified in the scientific literature.
>
> The results are consistent with ranges and thresholds for acceptable TN concentrations found in other estuaries within and outside of Massachusetts. Although this is a simplified approach that does not attempt to quantify individual subprocesses involved in eutrophication, it is entirely appropriate for assessing large scale nutrient load reductions over relatively long averaging periods. This is a scientifically defensible approach that is neither arbitrary nor capricious.

Comment A.22. EPA ignored its own relevant guidance and procedures identifying the necessary analyses to establish defensible nutrient criteria.

EPA has numerous documents showing how to relate nutrients to algae to DO in flowing waters (*See* EPA, *Nutrient Criteria Technical Guidance Manual: Estuarine and Coastal Marine Waters*, (Oct. 2001) ("Estuaries Guidance Document"); EPA, *Nutrient Criteria Technical Guidance Manual: Rivers and Streams* (July 2000); EPA EcoRegional

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[10] The Supreme Court decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), is not applicable to this proceeding. In *Daubert*, the Supreme Court established the standard by which judges must determine the admissibility of expert scientific testimony in federal trials. 509 U.S. at 592-93. The Court listed four factors for federal trial judges to consider when evaluating the reasoning or methodology underlying the expert testimony, including: (1) whether the theory or technique can be tested, (2) whether the theory or technique has been subject to peer review, (3) whether the technique has a high known or potential rate of error, and (4) whether the theory has attained general acceptance within the scientific community. *Id.* at 593-94. On its face, *Daubert* is inapposite to these permit proceedings, which involve not a trial, but an expert agency establishing an effluent limit under a statute it was charged by Congress with administering. Indeed, the Environmental Appeals Board has expressly concluded elsewhere that the "*Daubert* factors are not controlling principles" for administrative agencies, even in cases involving testimony. *In re Solutia Inc.,*10 E.A.D. 193, 211-12, n.22 (EAB 2001); *accord In re Town of Newmarket, NH*, NPDES Appeal No. 12-05, slip op. at 46-47 (EAB Dec. 3, 2013); *see also Edison Elec. Inst. v. EPA*, 391 F.3d 1267, 1269 n.2 (D.C. Cir. 2004) (holding that *Daubert* standard for scientific evidence was inapplicable to EPA rulemaking and stating "Evidentiary rules govern the admissibility of evidence at trial, not the establishment of the processes whereby such evidence will be created"); *Sierra Club v. Marita*, 46 F.3d 606, 621-22 (7th Cir. 1995) (rejecting the use of the *Daubert* test in determining whether to defer to agency decisions where petitioner asserted that the agency employed "bad" science). Unlike a trial where a lay trier of fact must assess the expert testimony presented, a court must afford great deference to EPA decisions that involve technical analyses and scientific judgments within the Agency's expertise under the Act. *See Envtl. Def. Ctr., Inc.* v. *U.S. EPA*, 344 F.3d 832, 869 (9th Cir. 2003); *Am. Iron & Steel Inst.* v. *U.S. EPA*, 115 F.3d 979, 1006 (D.C. Cir. 1997) (per curiam). The comment's contention that Daubert (at page 593) incorporates an "administrative law principle" is simply untrue and there is no such statement in that opinion.

Guidance (66 Fed Reg 1671)).[39] Each of these documents requires EPA to account for the particular physical conditions influencing nutrient dynamics in the estuary to reasonably determine how the DO regime is impacted. These approaches all require detailed scientific data assessments and some degree of modeling to confirm that causal relationships actually exist for the water body in question (*See, e.g*., 66 Fed Reg 1671 stating that when using a reference waters approach it is expected the analysis will use (1) current conditions (2) models to confirm the causal relationships between the nutrient and parameter of concern (3) relevant literature and (4) consult with the local experts). The Region's analysis did none of this and plainly does not conform to accepted procedures for using a reference waters approach.

Likewise, EPA's 2010 document entitled "Using Stressor-Response Relationships to Derive Numeric Nutrient Criteria" ("Stressor Response Guidance") stresses that a proper assessment must account for the factors that could influence the endpoint of concern (*e.g.,* DO) to ensure that nutrient criteria are necessary and properly established. For estuarine settings, that means that the evaluation must account for the physical setting, water column transparency, hydrology, hydrodynamics (in particular stratification), and factors affecting algal growth rate, temperature, and detention time. The Brockton Fact Sheet did not present any data or analysis to show any relationship exists between DO, chlorophyll *a* and TN for either the Taunton Estuary or Mount Hope Bay. Thus, there is nothing that shows the presumed conceptual model (TN caused excessive algal growth and low DO) is applicable to this estuary. There is no evidence in the record showing that achieving a 0.45 mg/l TN level is required in the Taunton River is necessary or sufficient to achieve DO standards. There is no information showing that TN reduction is required to correct a 0.5 mg/l DO deficit that occurred in the 2004/5 data sets in the Taunton River, which may not continue today.

Under the MEP process the same site-specific causal/response demonstrations are also required. Sentinel stations for estuaries are only chosen after confirming how hydrodynamics affects pollutant dynamics at the sentinel site versus the site of application (*See*, *supra* note 18 at 14). Likewise, the major factors that could influence the ecological conditions of concern are evaluated to ensure that nutrients are the primary factor affecting the condition (DO, eelgrass health, macroinvertebrate populations, etc.):

Assessment of embayment health and subsequent determination of critical nutrient thresholds capable of maintaining or restoring the ecological health for a specific embayment must be conducted relative to scientifically justifiable and agreed upon habitat measures. There are a wide variety of measures that give indication of the ecological health of an embayment. Some of the indicators are biological (eelgrass, macroalgae, benthic animals) while others are chemical (dissolved oxygen, organic and inorganic nitrogen, phytoplankton pigments, etc.), physical (water clarity, temperature) or geochemical (sediment characteristics). For the purposes of the Massachusetts Estuaries Project and the use of the Linked Nutrient Management Model Approach, habitat indicators that are of primary concern in gaging embayment health and nitrogen assimilative capacity are:

- plant presence and diversity (eelgrass, macroalgae, etc.)
- animal species presence and diversity (finfish, shellfish, infauna)
- nutrient concentrations (nitrogen species)
- chlorophyll concentration
- dissolved oxygen levels in the embayment water column

These indicators form the basis of an assessment of a system's present health. When coupled with a full water quality synthesis and projections of future conditions based upon water quality modeling, site-specific thresholds can be developed for these systems. Additional information on temporal changes within each sub-embayment and its watershed further strengthens the analysis. (Critical Indicators Interim Report at 11).

Therefore, EPA's selection of the MHB16 as the sentinel location applicable to the Taunton Estuary, without considering any of the relevant factors influencing DO at either of these locations, without any type of causal response analysis and without any consideration of system hydrodynamics plainly does not follow the MEP process as EPA had claimed in its Taunton Response to Comments (at 50, 99). These plainly deficient analyses are arbitrary and capricious as inconsistent with applicable documents confirming the degree of analyses needed to have a scientifically defensible assessment. Without a causal analysis using the site-specific information as required by all relevant EPA and state guidance, the proposed limitations cannot be defensible.

[39] *See also infra* note 29.

Response A.22.

EPA disagrees with the characterization of its technical guidance. Inter alia, 66 Fed. Reg. 1671 does not state that it is expected that a reference waters approach is expect to use (1) current conditions, (2) models, (3) relevant literature and (4) consult with local experts. The actual statement in 66 Fed. Reg. 1671 is:

> "EPA strongly encourages States, Territories and authorized Tribes to refine these [Eco-Region Nutrient Criteria] recommendations based on the key elements of nutrient criteria development (historical information, reference conditions, models, consideration of downstream effects, and expert judgment) discussed in EPA's published Technical Guidance Manuals . . ."

EPA rejects the contention that a protective TN threshold cannot be determined or the required TN reduction cannot be required until a full MEP study is completed with additional habitat studies and additional monitoring. Rather, EPA's permitting regulations authorize and require EPA to interpret narrative water quality standards in terms of calculated numeric criteria in establishing permit limits, even where there is not sufficient data to permit the detailed scientific data assessment and modeling of all possible parameters influencing water quality conditions that the commenter contemplates. EPA's approach is not inconsistent with the nutrient criteria guidance documents, which recognize reference-based approaches as well as mechanistic models and stressor-response analysis (EPA 2010). The guidance regarding stressor-response analyses is not applicable to the completely different approach used by EPA here. See Response A.21. EPA notes that the data collected in the SMAST survey were intended for a MEP analysis and were not designed for stressor-response analyses. EPA therefore did not apply the data in that manner, and does not expect the dataset to support statistically significant analyses when used for that purpose. However, data plots that EPA developed in response to comments only support EPA's application of the conceptual model to this system, with correlations consistent with EPA's interpretation of the data.

The evidence supports EPA's determination that 0.45 mg/l TN concentration, which is the midpoint of acceptable TN loadings in the Massachusetts Critical Indicators Report, is associated with the transition from impaired to unimpaired conditions within the Taunton River Estuary/Mount Hope Bay system. This approach does not attempt to model details in physical conditions. While there are variations in the physical settings within this system, there is no indication that the Taunton River Estuary is less sensitive than Mount Hope Bay in terms of DO response. See Response A.37. While continuous monitoring is not available for characterization of the frequency and duration of DO deficits, the fact that violations are seen at all sites in the Taunton River Estuary and in all years, based on six monitoring dates per year, indicates a pervasive impairment. Where continuous monitoring is available in Mount Hope Bay, DO deficits are frequent and well-documented.

Comment A.23. EPA FOIA Response on Sentinel Method Confirms Method Has No Indicia of Reliability and Is Not an Accepted Methodology for Setting Nutrient Criteria or Nutrient Limitations.

It is axiomatic that NPDES permit limitation derivation (like other EPA technical decisions) must be based on reliable, scientifically defensible methods. In this case, the permit derivation required EPA to identify the applicable numeric nutrient criteria necessary to ensure compliance with the state's narrative criteria. As stated in 40 CFR 131.11, only scientifically defensible methods may be employed for deriving water quality criteria. As stated by 40 CFR 122.44(d)(1)(vi) EPA is required to use published state and federal guidance and criteria derivation methodologies and must "demonstrate [the approach] will attain and maintain applicable narrative criteria." The types of documents that EPA is required to utilize (Section 304(a) criteria, draft criteria documents; draft and final state procedures for narrative criteria implementation) are all documents that are vetted for scientific reliability. As confirmed by the Freedom of Information Act (FOIA) response from EPA HQ, the so called "Sentinel Method" as used and applied by EPA Region I, has never been found to be an accepted, peer-reviewed methodology for identifying appropriate nutrient criteria in estuarine waters and has never been determined by EPA to be a "scientifically defensible" methodology for translating narrative criteria into numeric values or for deriving nutrient limitations under Section 122.44(d) (Attachment R – FOIA Request; Attachment S – FOIA Response; Attachment T – EPA's Supplemental FOIA Response). Moreover, the Science Advisory

Board ("SAB") has never reviewed such a methodology, unlike all of the other nutrient criteria derivation guidance published by EPA under Section 304(a) and relied upon by EPA to render scientifically defensible decisions. Therefore, (1) the methodology is not an approved Section 304(a) approach for generating nutrient criteria; (2) the technical basis for this approach has never undergone the required public/SAB scrutiny required of all criteria derivation approaches; and, (3) the approach has never been identified in either state guidance or any published EPA methodology as appropriate for identifying nutrient criteria in estuarine waters and/or setting nutrient limitations. In short, this invented "hybrid" simplified method has no indicia of reliability, whatsoever. Therefore, EPA cannot claim this approach is scientifically defensible as no independent documentation supports that claim, other than the region's conclusory statements in the Fact Sheet. As discussed later, multiple experts, both local and national, have opined that the simplified approach used by EPA has no credible scientific basis (Great Bay Peer Review, Opinion of Dr. Steven Chapra, analysis of Dr. Craig Swanson).

Absent confirmation, with site-specific information, that the method is capable of producing reliable results (*e.g.*, accurately predicting the effect of TN on algal growth and the DO regime) and/or is an accepted approach by the scientific community (or EPA for that matter), and confirmation that the chosen numeric TN criteria will ensure narrative standards compliance, the utilization of this unprecedented and undocumented approach under 40 CFR 122.44(d) is unauthorized (*American Iron & Steel Inst. v. EPA*, 115 F.3d 979, 990-991 (D.C. Cir. 1997)).

In summary, there is no objective basis to conclude that the methodology employed by EPA Region I is in any way defensible or appropriate for demonstrating that nitrogen is causing a violation of the state's narrative criteria in the Taunton Estuary (or elsewhere) or that the limitations derived from the TN target selected by using the Sentinel Method are necessary to ensure compliance with applicable standards. Therefore, the Region's application of this method to identify the nitrogen limitations claimed necessary to ensure compliance with narrative criteria is not supported by substantial evidence, is contrary to applicable rules and arbitrary and capricious.

Response A.23.

EPA first notes that the reference in the comment to EPA's threshold nitrogen concentration analysis as "the so called 'Sentinel Method'" is a term coined by the City in an attempt to characterize this approach as a new and untested methodology. The term "sentinel method" does not appear in the Brockton Fact Sheet and is not how EPA would describe the method employed. Rather, the methodology used by EPA to interpret the narrative nutrient criteria and select a threshold nitrogen concentration is a weight of the evidence based approach that includes site specific reference site analyses and is modelled on the Massachusetts Estuaries Project approach for selecting nitrogen targets in southeastern Massachusetts embayments. As such, this approach is consistent with EPA guidance regarding the use of available information for the purposes of interpreting narrative nutrient water quality criteria.

For clarification, EPA uses the term "reference site" in the Brockton Fact Sheet when referring to "a location within the estuary where water quality standards are not violated, in order to identify a nitrogen concentration consistent with unimpaired conditions." Hence, MHB16 is the "reference site" chosen in this analysis. (See Brockton Fact Sheet, at 43-45) With regard to the Brockton analysis, this site is only referred to, erroneously, as a "sentinel" location in the City's comments and not in EPA's analysis or responses. However, in the recent Taunton Fact Sheet EPA also chose MHB16 as the reference site but erroneously referred to it using the incorrect term "sentinel site" (see Taunton Fact Sheet, at 30). As noted here, this error in terminology has been corrected in the Brockton analysis to be consistent with the terminology used in the MEP analysis. The term "sentinel" is used in the MEP analysis and is referenced in footnote 29 of the Brockton Fact Sheet, stating "[t]he Massachusetts Estuaries Project use the term "sentinel" location to describe the critical location(s) that are targeted for nitrogen reductions, such that 'restoration or protection of the sentinel sub-embayment will necessarily create high quality habitat throughout the estuary.'" MHB19 is the "sentinel site" used in EPA's analysis in accordance with MEP's definition because it is the site targeted for nitrogen reduction to restore a high quality habitat throughout the estuary.

The comment also mischaracterizes the FOIA responses, which indicate only that EPA HQ does not conduct peer reviews of specific permit limit determinations, including those involving interpretation of narrative criteria. See January 16, 2015 letter from Kenneth J. Kopocis (EPA Deputy Assistant Administrator) to Mr. John C. Hall.

The "expert opinions" cited by the City are unpersuasive. The Great Bay Peer Review concerned an entirely different analysis conducted by NHDES for the Great Bay Estuary, centered on a stressor-response approach in an estuarine system where large segments are dominated by macroalgae rather than phytoplankton, and thus represented a different set of issues than the MHB/Taunton River system (see NHDES 2009); further the questions posed to the peer review did not address standards for permit limit derivation (e.g. reasonable potential) (see also Response A.14).

Dr. Chapra has opined, inter alia, that using total nutrient concentrations for criteria at all is invalid, as well as claiming that the derivation in this case is invalid; EPA has made clear its position in support of numeric nutrient concentration criteria in multiple documents, including Nutrient Criteria Technical Guidance, a June 1998 *National Strategy for Development of Regional Nutrient Criteria*, a November 2001 national action plan for the development and establishment of numeric nutrient criteria, and a May 2007 memo from the Assistant Administrator for Water calling for accelerated progress towards the development of numeric nutrient water quality standards, and similarly disagrees with his dismissal of the application of this principle in this case. Dr. Chapra's

> legitimate difference in technical opinion on this point is noted but unpersuasive, particularly as he offers no alternative approach toward setting a nitrogen target. Dr. Swanson is an expert on thermal modelling but the opinion he offers on DO impacts is based purely on theoretical impacts that EPA has determined are unlikely to hold true here (while temperature affects DO saturation point, that does not appear to be controlling here as bottom DO is consistently well below saturation and surface waters swing from supersaturated to undersaturated, consistent with expected impacts from eutrophication); and the data supports EPA's position in that MHB DO has not improved since elimination of the thermal discharge in 2012. [NBFSNM data through 2013; Brayton Point Monitoring Reports for 2012, 2013 and 2014].
>
> Hence, in EPA's assessment, the weight of the evidence methodology used by EPA to interpret the narrative nutrient criteria and select a threshold nitrogen concentration is scientifically defensible and appropriate. See further discussion in Response A.24 below.

Comment A.24. The conceptual model does not support the sentinel station approach.

EPA identified a sentinel station (MHB16) and merely assumed, without *any presentation of data analysis or evaluation of nutrient impact responses*, that the average TN concentration at the station should equal the allowable TN endpoint in the Taunton River.[40] The sentinel station approach presumes that the observed DO is caused by the observed TN – this is clearly a "stressor-response" determination of conclusion. However, nowhere is any form of "stressor-response" analysis provided. EPA did not provide *any* objective assessment or written analysis of the available data that would allow a person to objectively assess the validity of EPA's claims (*i.e.*, an analysis evaluating the causes of low DO or an assessment of what fraction of the DO deficit is attributed to TN versus those other factors). Consequently, the proposed effluent limit is merely a guess at the relationship between TN and DO, which is, in fact, objectively incorrect. This approach does not demonstrate that the conceptual model identified in the Fact Sheet is applicable to the Taunton River (*See* Fact Sheet, at 26). This conceptual model is based on a well-recognized progression of symptoms that begins with the excessive growth of phytoplankton and macroalgae.

As discussed in the Fact Sheet, the "primary" symptoms of nutrient over enrichment include an increase in the rate of organic matter supply (*e.g.,* phytoplankton), changes in algal dominance, and the loss of water clarity. These primary symptoms are followed by one or more secondary symptoms such as the loss of submerged aquatic vegetation, nuisance/toxic algal blooms, and low dissolved oxygen. While such conditions *may* occur, the presented analysis in the Fact Sheet nowhere demonstrates that these conditions are occurring in the Taunton River. In fact, earlier studies confirmed that the Taunton Estuary had much lower algal growth despite the highest nitrogen levels in the system (Krahforst & Carullo, 2008). This confirms that the Taunton River is not responding to TN loadings as claimed by EPA: higher TN is not producing higher algal levels and lower DO (*Id*. at 404).

The “sentinel station” approach is demonstrably incorrect based on a consideration of the conceptual model, as illustrated in EPA’s Estuaries Guidance Document. TN has no direct impact on DO. **Figure 4** from the Estuaries Guidance Document illustrates the role of nutrients in phytoplankton growth, and **Figure 5** from the Estuaries Guidance Document illustrates the relationship between nutrients, phytoplankton and deep-water DO.

These figures *only* address the manner in which nutrients *may* influence phytoplankton growth and, subsequently, DO. It is obvious that this possible relationship does not provide a basis to simply presume that algal growth at a specific location caused or significantly contributed to the existence of periodic low DO in the Taunton River Estuary. DO is also influenced by reaeration, organic matter (BOD), photosynthesis, and non-algal sediment oxygen demand as discussed in EPA’s WLA Guidance Document. **Figures 6 and 7** from the WLA Guidance Document illustrates these interactions.

Together, these figures illustrate the complex relationship between nutrients, numerous other factors, and DO that must be addressed to competently determine what is causing a particular DO condition to occur. TN does not directly affect DO. Rather, any influence of TN is mediated through the growth of algae. Algae influences DO through photosynthesis (in the upper, photic zone), respiration, and decay (typically after settling). The influence of sediment oxygen demand on DO may be exacerbated by stratification which limits mixing between the upper and lower layers of water or mediated by increased turbulence and/or mixing with higher DO waters.

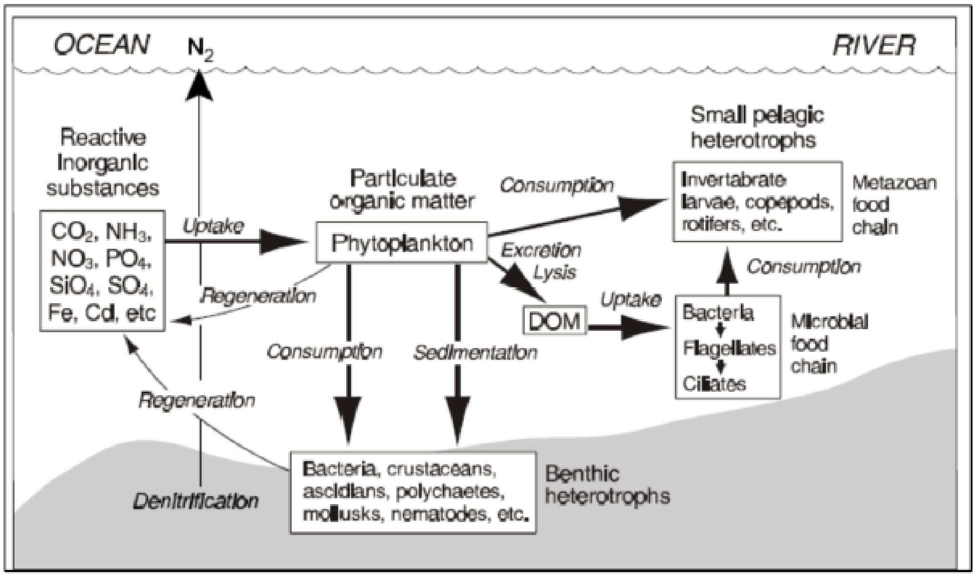


Figure 4: Schematic illustrating the central role of phytoplankton as agents of biogeochemical change in shallow coastal Ecosystems. Phytoplankton assimilate reactive inorganic substances and incorporate these into particulate (POM) and dissolved organic matter (DOM) which support the production of pelagic and benthic heterotrophs. Arrows indicate some of the material fluxes between these different compartments. Denitrification has been added to the figure. (Reproduced from Figure 2-4 in the Estuaries Guidance Document, citing Cloern, 1996).

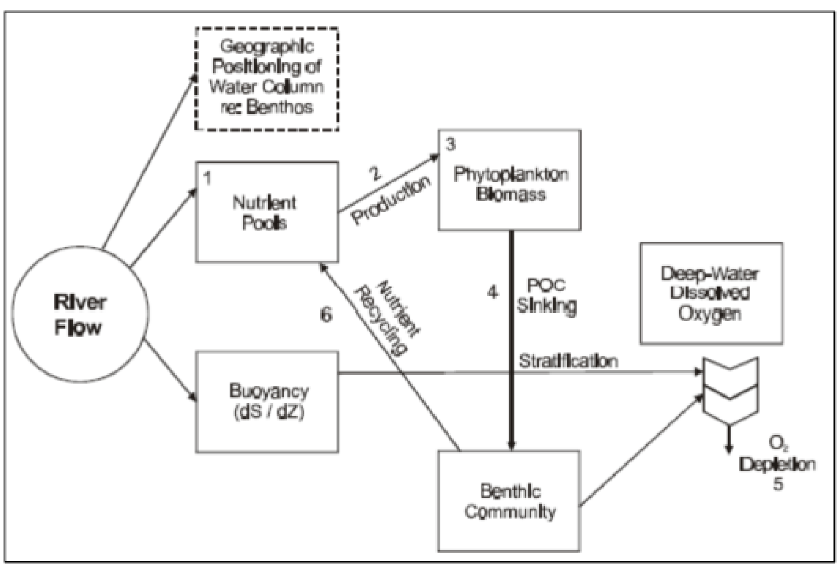


Figure 5: Simple schematic diagram showing the influences of river flow on ecosystem stocks and processes examined in this study. (Reproduced from Figure 2-9 in the Estuaries Guidance Document, citing Boynton and Kemp, 2000).

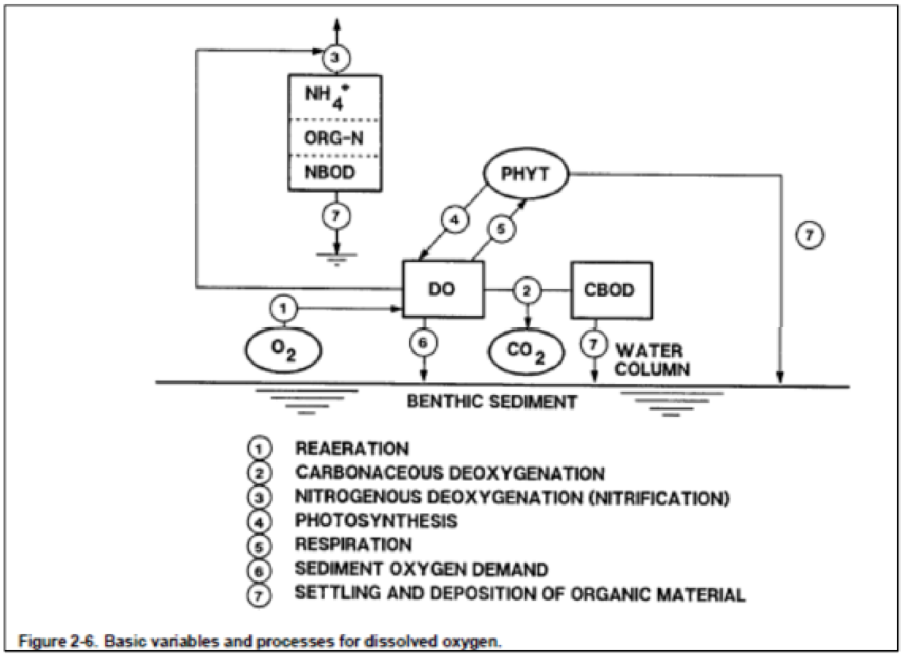


Figure 6: Basic Variables and Processes for Dissolved Oxygen (Reproduced from Figure 2-6 in the WLA Guidance Document)

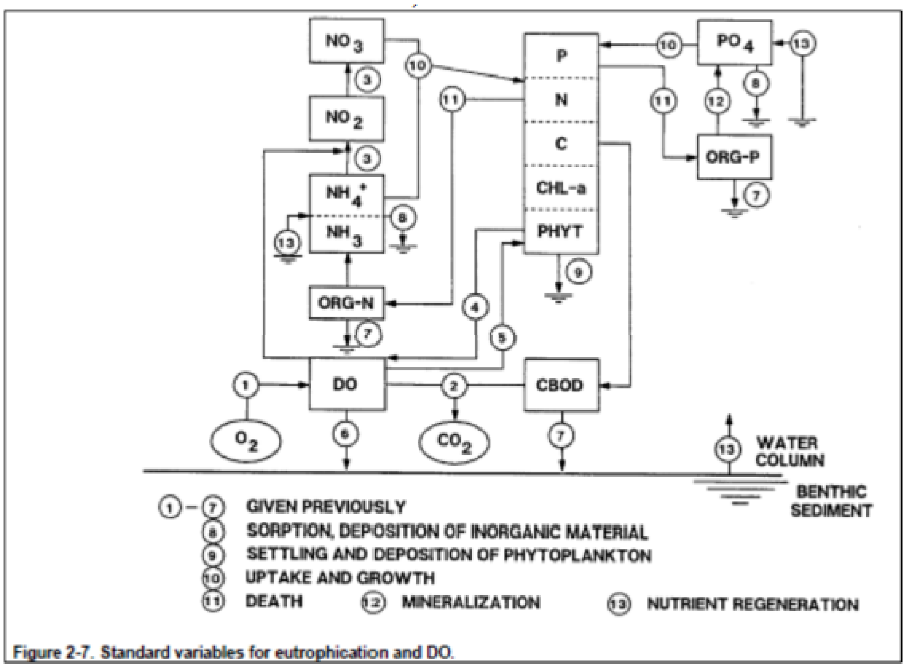


Figure 7: Standard Variables for Eutrophication and DO. (Reproduced from Figure 2-7 in the WLA Guidance Document).

System DO is also influenced by the decay of organic substances entering the system and the DO entering the system. However, the Fact Sheet presents no evaluation to determine the degree to which any of these factors influence DO in the Taunton River Estuary or Mount Hope Bay.

Consequently, it is not possible to determine whether TN reduction is necessary or appropriate to address DO conditions in the Estuary. In fact, the Taunton Response to Comments confirmed that this part of the system is affected more by other oxygen demanding inputs (Taunton Response to Comments at 92, 95). Given this acknowledgement, EPA was required to assess the significance of those factors before leaping to the conclusion that stringent TN control was the solution to the problem (*Ohio Valley Environmental Coalition, et al. v. Elk Run Coal Company, Inc., et al.*, 3:12-cv-00785 (44 ELR 20124 (S.D. W. Va 2014))). In summary, the proposed limits on TN have not been demonstrated to be necessary to attain the dissolved oxygen water quality standard and EPA has admittedly failed to address the impact of oxygen demanding loads on the DO conditions occurring in the upper Taunton Estuary.

[40] EPA did not seek to plot a single data point from the 2004-2006 MEP study to confirm that the assumed causal relationship between TN, algae and DO was correct for this system. EPA stated that it selected MHB16 as the sentinel site because DO criteria were met at that location

Response A.24.

The comment mischaracterizes EPA's analysis. EPA did not rely on a single station but considered the entire array of data throughout the MHB/Taunton River system. EPA's conclusion that nutrient enrichment is related to the eutrophication indicators documented in this system is based on the monitoring data and consistent with the findings of SMAST, the experts under contract to MassDEP to evaluation the system.

This is not a "stressor-response" analysis within the meaning of EPA guidance. EPA guidance document *Using Stressor-Response Relationships to Derive Numeric Nutrient Criteria*, November 2010, page 2, states that "[e]mpirical stressor-response modeling is used when data available to accurately estimate a relationship between N and P concentrations and a response measure that is directly or indirectly related to a designated use of the waterbody (e.g., a biological index or recreational use measure). … These data requirements usually extend beyond measurements of concentrations and responses, and include measurements of other environmental factors that potentially can confound the estimated relationships." Hence, simply because the City uses the terms stressor and response to describe the pollutant and the indicator variable, does not indicate a "stressor-response" analysis was performed by EPA. Rather, the analysis performed was not a stressor-response approach but a weight of the evidence-based approach that includes site specific reference site information consistent with EPA guidance regarding the use of reference conditions for the purposes of developing nutrient water quality criteria.

The comment also mistakenly presumes that a reference-based approach must be able to specifically determine all factors influencing a particular DO condition at a high level of complexity in order to be "scientifically defensible" for the purpose of setting permit limits. This is not the case.

The highly detailed modeling the comment appears to contemplate is generally associated with mechanistic modeling, an approach that represents ecological systems using equations that represent ecological processes and parameters for these equations that can be calibrated empirically from site-specific data. These models can then be used to predict changes in the system, given changes in nitrogen and phosphorus concentrations. The mechanistic modeling approach requires sufficient data to identify the appropriate equations for characterizing a waterbody or group of waterbodies and sufficient data to calibrate parameters in these equations. While such complex models are sometimes preferable, they are not without drawbacks. A danger in complex mathematical models is that error propagation is difficult to explicitly measure, and there is a tendency to use a more complex model than required, which drives costs up substantially and unnecessarily. Another consideration that is gaining acceptance is that mathematical models need to be appropriately scaled to spatial and temporal processes, or they may suffer problems similar to empirical models when one extrapolates the results of scaled experiments to full-sized systems. Also, empirical coefficients introduced into equations often hide the degree of uncertainty concerning the fundamental nature of processes being represented. EPA, *Nutrient Criteria Technical Guidance Manual – Estuarine and Coastal Waters* (2001) at 9-1 to 9-2.

The comment does not, and cannot, contend that there is an existing model available to represent this system at this level of complexity, or even that there is actually sufficient data available for development of such a model. Rather, the comment seeks to characterize any less complex analysis as insufficient, so that permit limits would be deferred until a complex model can be developed. This is a recipe for inaction that is inconsistent with CWA requirements. As stated by the Environmental Appeals Board:

> The [Upper Blackstone Water Pollution Abatement] District has cited no law, regulation, or Agency policy that would allow a permit application to remain pending for an indefinite, unlimited extension of time to allow additional scientific data or analysis to be developed to support the applicant's claim that its discharges will not violate the water quality standards of affected states. To the contrary, scientific uncertainty is not a basis for delay in issuing an NPDES permit. The Board has specifically held that "[i]n the face of unavoidable scientific uncertainty, the Region is authorized, if not required, to exercise reasonable discretion and judgment." *In re Dominion Energy Brayton Point*, *LLC*, 13 E.A.D. 407, 426 (EAB 2007).
>
> The federal courts in reviewing Agency decisions have similarly recognized that scientific uncertainty is not a bar to administrative

> decision-making: "We do not demand certainty where there is none. There may be no strong reason for choosing [a particular numerical standard] rather than a somewhat higher or lower number. If so, we will uphold the agency's choice of a numerical standard if it is within a 'zone of reasonableness.'" *Small Refiner Lead Phase-Down Task Force v. EPA,* 705 F.2d 506, 525 (D.C. Cir. 1983) (citation omitted); *see also Hercules, Inc. v. EPA,* 598 F.2d 91, 116-17 (D.C. Cir. 1978). More than three decades ago, the D.C. Circuit aptly described the CWA's balance when confronted with a difficult situation and the obligation to eliminate water quality impairments: "* * * EPA may issue permits with conditions designed to reduce the level of effluent discharges to acceptable levels. This may well mean opting for a gross reduction in pollutant discharge rather than the fine-tuning suggested by numerical limitations. *But this ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all.*" *Natural Resources Defense Council, Inc. v. Costle,* 568 F.2d 1369, 1380 (D.C. Cir. 1977) (emphasis added) (finding unlawful a rule that would have exempted certain discharges from permitting requirements based on the difficulty in setting limits). Here, the District's "wait and see" approach would allow the District to continue discharging without any limit on total nitrogen discharges – effectively abdicating the responsibility to set permit limits when faced with difficulty establishing the limit.

UBWPAD, 14 E.A.D. 577, 606.

For a further discussion of the "zone of reasonableness" mentioned above, see Response A.29 below.

Finally, the Comment mischaracterizes the Taunton RTC, which concluded that statistical regressions were too weak to be relied upon but, if anything, indicated that the Taunton River was more vulnerable to DO depletion from chlorophyll-a than other portions of this system. EPA noted in that document its assessment that the SMAST data did not support statistical analyses of the type attempted by the City of Taunton, and EPA did not rely on them for that reason. See Response A.37 for a more detailed discussion of this point.

Comment A.25. EPA's simplified method must address confounding factors and reasonably confirm its presumed causal relationships are correct in the Upper Taunton Estuary.

EPA's sentinel approach is a form of stressor-response analysis and is an empirical method that relies on the measured data from the MEP program for predicting system responses. It presumes that the effect of nutrients on DO and algal growth occurring at MHB16 will be mirrored in the Upper Taunton Estuary, if the same TN level is achieved. It is not accepted within the scientific community (or by the MEP process used by the

Commonwealth of Massachusetts) that stressor-response analyses used to identify numeric criteria, can be based on mere assumption.

EPA has been harshly admonished by its own Science Advisory Board in drawing broad-based, unsupported and unverified conclusions with respect to nutrient control in similar circumstances:

> In order to be scientifically defensible, empirical methods must take into consideration the influence of other variables. EPA, *SAB Stressor Response Review*, at 24 (Apr. 27, 2010).
>
> The statistical methods in the Guidance require careful consideration of confounding variables before being used as predictive tools…. *Without such information, nutrient criteria developed using bivariate methods may be highly inaccurate.*

Id. The approach used in Brockton's Fact Sheet is fundamentally flawed because it seeks to compare areas with radically different ecological settings—enclosed tidal rivers and well flushed open bay waters—without any analysis of the relevant factors influencing nitrogen impacts and other related factors influencing DO at these different locations.[41] This analysis ignored the rather extensive published literature on this system's hydrodynamics that confirm conditions at MHB16 are unique and have no apparent relationship to nutrient dynamics occurring in the upper Taunton Estuary (*See*, Attachments F, G, H, I—studies confirming unique nature of MHB16 and different algal responses in the Taunton Estuary). There is no treatise or EPA guidance manual that indicates such an assessment is scientifically defensible or in any way accepted in the scientific community. In fact, in April 2010, EPA's SAB has expressly stated the opposite: that only similar ecological settings should be evaluated when developing nutrient criteria and conducting stressor/response analyses based on empirical evidence.

> For criteria that meet EPA's stated goal of "protecting against environmental degradation by nutrients," the underlying causal models must be correct. *Habitat condition is a crucial consideration in this regard (e.g., light [for example, canopy cover], hydrology, grazer abundance, velocity, sediment type) that is not adequately addressed in the Guidance.* Thus, a major uncertainty inherent in the Guidance is accounting for factors that influence biological responses to nutrient inputs. *Addressing this uncertainty requires adequately accounting for these factors in different types of water bodies.*

Id. at 36, 37.

> *Numeric nutrient criteria developed and implemented without consideration of site specific conditions can lead to management actions that may have negative social and economic and unintended environmental consequences without additional environmental protection.*

Id. at 37. The analytical approach used by EPA to derive the required nutrient criteria and permit limits is also directly at odds with EPA's own 2010 Stressor Response Guidance[42] on proper derivation of nutrient criteria:

"…, in the first step of the analysis, *classification*, the analyst attempts to control for the possible effects of other environmental variables by identifying classes of waterbodies that have *similar characteristics* and are expected to have similar stressor-response relationships."

Id. at 32. (Emphasis added)

> "… prior to estimating the stressor-response relationships, classes of waterbodies identified that are *as similar as possible*, except with regard to nutrient concentrations."

Id. at 56.

> "Beyond the possible effects of confounding variables, one should also consider whether assumptions inherent in the chosen statistical model are supported by the data."

Id. at 67. EPA completed none of these necessary evaluations for producing a defensible nutrient objective for the Taunton River Estuary, assuming that the system even exhibits a nutrient-induced DO impairment.

[41] This is the same error Dr. Steven Chapra informed EPA was fundamentally flawed when reviewing the EPA supported approach to generate nutrient criteria for Great Bay. (Attachment U, Dr. Chapra Declaration). His expert affidavit is applicable here because the same error is made in this instance and is even more egregious as EPA did not even attempt to show that the TN level caused excessive algal growth or that such algal growth was the likely cause of low DO conditions when proposing the Taunton permit. A second Chapra declaration was made after he reviewed EPA's "scientific analyses" in this case – *See* Attachment V. The conclusion is that EPA's Taunton Estuary analysis is completely indefensible and one of the worst analyses he has reviewed in the past 40 years.).

[42] EPA, *Using Stressor-Response Relationships to Derive Numeric Nutrient Criteria* (Nov. 2010).

Response A.25.

The City's characterization of EPA's analysis is incorrect. EPA conducted a weight of the evidence-based approach that included reference site information and not a statistical stressor-response analysis. Therefore, the various deficiencies highlighted in the comment that would be necessary to consider when conducting a "stressor-response" analysis are inapplicable to the reference-based approach conducted by EPA. See Response A.24.

Furthermore, the approach taken by EPA is consistent with the approach used in multiple TMDLs developed through MEP, and supported by the consistency of the results with published concentration ranges and thresholds in other systems.

EPA acknowledges that it is a "simplified" approach in comparison to the more extensive analysis and/or modeling of data (which in this case does not exist) that the commenter suggests should be pursued. However, this does not render it scientifically indefensible. See Response A.23.

Comment A.26. EPA is required to consider/address confounding factors – *Ohio Valley* case.

Additionally, in a recent U.S. District Court case, *Ohio Valley Environmental Coalition, et al. v. Elk Run Coal Company, Inc., et al.*, (3:12-cv-00785 (44 ELR 20124 (S.D. W. Va 2014)) the Court confirmed the need to specifically demonstrate, not presume, a cause-and-effect relationship when asserting a narrative criteria violation/exceedance exists due to a particular pollutant. The court also repeatedly underscored the need to consider and address confounding factors when asserting that a particular pollutant causes or contributes to a narrative criteria violation. As noted above, no such confounding factors analyses or specific causation demonstration were undertaken in the supporting documents of the Draft Permit. The assessment simply assumed that lower DO conditions periodically occurring in the Taunton Estuary were caused (in whole or in part) by nutrients, and that the only corrective measure to address the situation was stringent nutrient reduction. Consequently, this assessment did not provide a legally sufficient basis for concluding a numeric or narrative criteria violation was being caused by the City's nitrogen discharge.

Response A.26.

This permit action concerns the establishment of protective permit limits, not establishing liability. Liability cases, such as the one referenced in this comment, have a different causation standard than that set forth in EPA's regulations for setting permit limits.

Comment A.27. EPA ignored the influence of stratification, a confounding factor.

All of EPA's guidance and SAB-issued commentary, as well as MassDEP guidance, states that the physical conditions of the receiving water must be evaluated to determine whether or how nutrients may cause adverse impacts. Stratification is particularly important with regard to the development of minimum DO conditions in the Estuary and Bay. When fresh and saline waters interact, they may become stratified with the denser, cold bottom saline water isolated from the less saline and warmer surface water. This situation is demonstrated to occur in the Bay and to be the primary factor triggering low DO conditions in the bottom waters where the waters are deeper and less subject to turbulent mixing. Under stratified conditions, oxygen exchange with the surface waters is reduced and the effect of sediment oxygen demand (affected by algal and non-algal particulates) is pronounced, particularly when thermally-stratified conditions are prolonged in the bay due to tides, large freshwater inputs and/or reduced wind. Thus, (1) the depth of the water, (2) the duration of the stratification event, (3) winds (4) water temperature and (5) the degree of the SOD all act to control the resultant DO condition in the stratified segment. For MHB, numerous analyses have confirmed that low DO coincides with stratification that occurs, primarily in MHB proper (Kincaid, 2006; Krahforst & Carullo, 2008). **Figure 8** (below) illustrates the pattern of temporal DO at the MHB-"Data Sonde" station operated by the Narragansett Bay Water Quality Monitoring Network (near MHB13) in relation to the tidal cycle.[43] Based upon the figure, periods of low DO in the bottom waters and maximum difference in surface-to-bottom-water DO appear to coincide with neap tides, when tidal displacement in the Bay is at a minimum and stratification is prolonged. Temperature gradients also play a major role in stratification in Mount Hope Bay proper.

Farther upstream in the Estuary, stratification is far less intense and primarily caused by the tides. During the flood tide, marine waters rush in to the estuary with denser, lower temperature, saline waters flowing below the less-dense fresh water. When the tide ebbs, these marine waters flow back into the bay. One consequence of this movement is that stratified conditions do not persist in the estuary because mixing is much greater than at station MHB16 (the "sentinel station") (Kincaid, 2006). Consequently, the DO differences between the surface and bottom waters at MHB16 are far less than in the Bay closer to the Taunton Estuary and minimum DO concentrations tend to be associated with saline bay water that moves upstream during the flood tide. This means that DO in Mount Hope Bay has a *primary* control on the low DO condition present in the Taunton estuary, *not* algal growth occurring in the Taunton River. That is why low DO occurs despite significantly lower algal growth in that area of the system (*See*, **Figures 13 and 14** of hydrodynamics of system **–** *infra* at 63). **Figure 9** (below) illustrates the differences in DO and salinity for the sentinel station in Mount Hope Bay (MHB16) and the upper Taunton River Estuary (MHB19) showing the physical condition are *not* comparable based on the 2005 database. In fact, MHB16 is completely unique given its depth and degree of turbulence documented by various hydrodynamic models. The DO, algal, and TN response are completely different at this location due to its physical settings at the Sakonnet River inlet to the Bay.

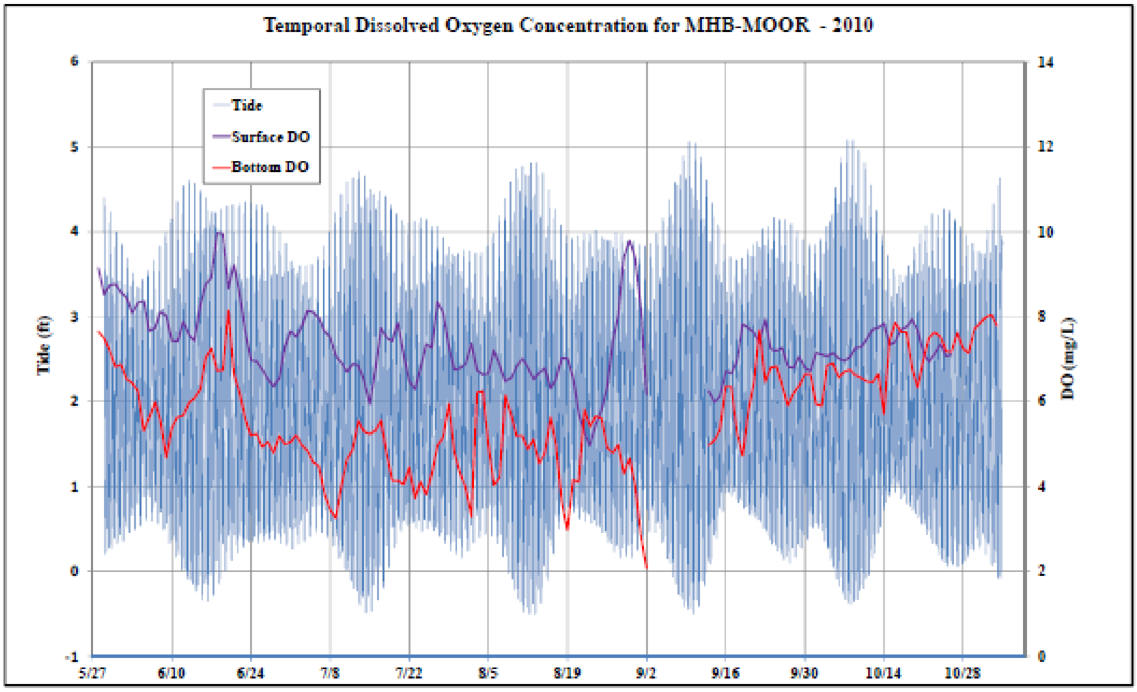


Figure 8: Tidal Stage versus Dissolved Oxygen in Mt. Hope Bay

As discussed above, the conditions that control the frequency of minimum DO conditions in the Bay are not the same as the conditions causing low DO in the Taunton River Estuary. Far less stratification occurs in the Taunton River for a shorter period and far less frequently. Consequently, the Taunton River station (MHB19) has a maximum DO variation of 0-3 mg/l (top to bottom). MHB16 has a variation of 1-5 mg/l. Therefore, unlike the majority of MHB, the data indicate that low DO condition and stratification in the Taunton River is very infrequent and far less intense. Consequently, the use of the Bay sentinel station to project the effect of TN on DO in the Taunton River estuary is arbitrary and capricious as the physical conditions controlling DO are markedly different at these two sites.

[43] Tidal stage data were obtained from NOAA for the Wickford gauging station. (Station I.D.: 8454538).

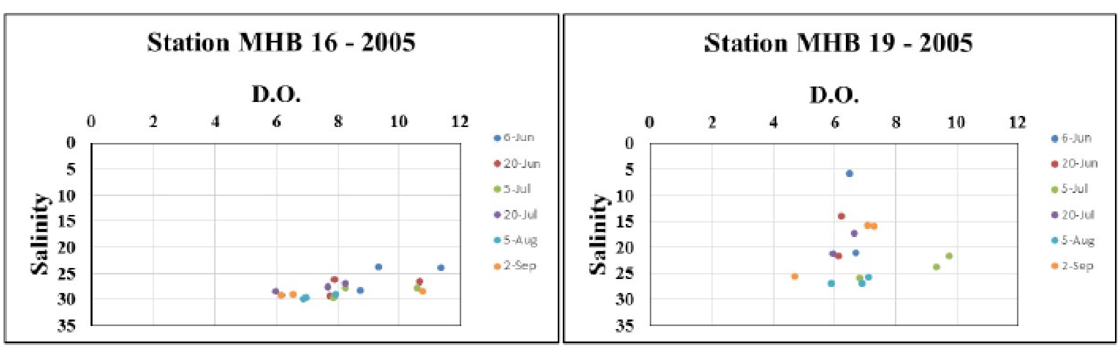


Figure 9: Salinity and DO variability in Mt. Hope Bay and the Upper Taunton River Estuary

Response A.27.

EPA agrees that stratification is a factor in the development of minimum DO conditions, but disagrees with the commenter's contention that this factor plays a role in Mount Hope Bay but not the Taunton River Estuary, a contention unsupported by any evidence. The City's contention that Kincaid 2006 indicates more stratification in MHB is untrue; Kincaid concluded that the profile in the Taunton River (Brightman Street bridge) was essentially the same as the profile on the transect near Narragansett Bay; only the Sakonnet River transect showed less stratification. Krahforst & Carullo noted widespread stratification in MHB but did not assess stratification in the Taunton River. Their description of DO influences differs from that proffered by the City here, however, as they state:

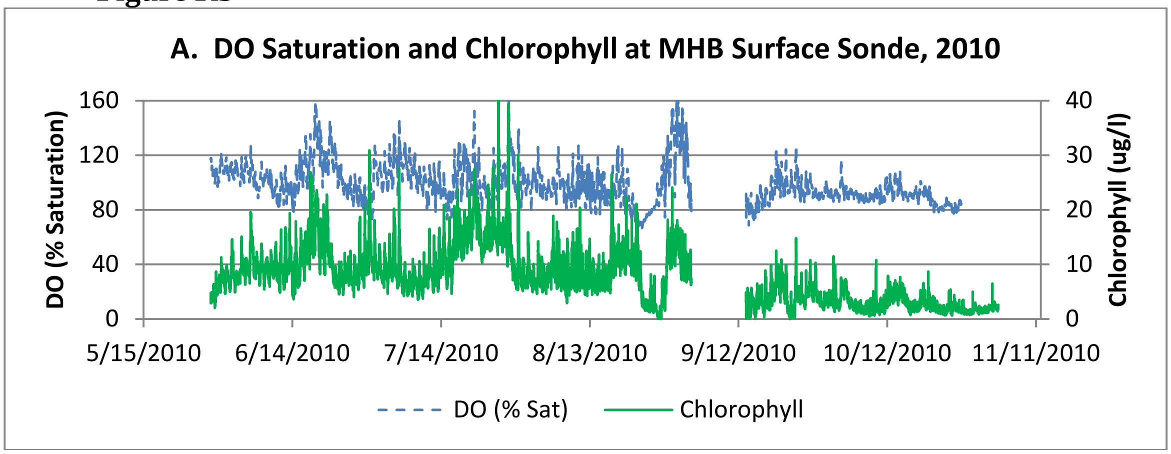
> The role of the Taunton River on summer dissolved oxygen concentrations in Mount Hope Bay may be important, and is implied by the data from the lower Taunton River station (Fig. 13.4, top panel, center). Here, water column dissolved oxygen concentrations < 3 mg/L persisted for nearly 40 h in mid-August, 2000. Recovery of dissolved oxygen concentrations followed a series of step-like increases over a period of 5–6 days. However, this transient low dissolved oxygen event was not evident at the midbay State Line station where dissolved oxygen concentrations were observed to be ≥ 6 mg/L.

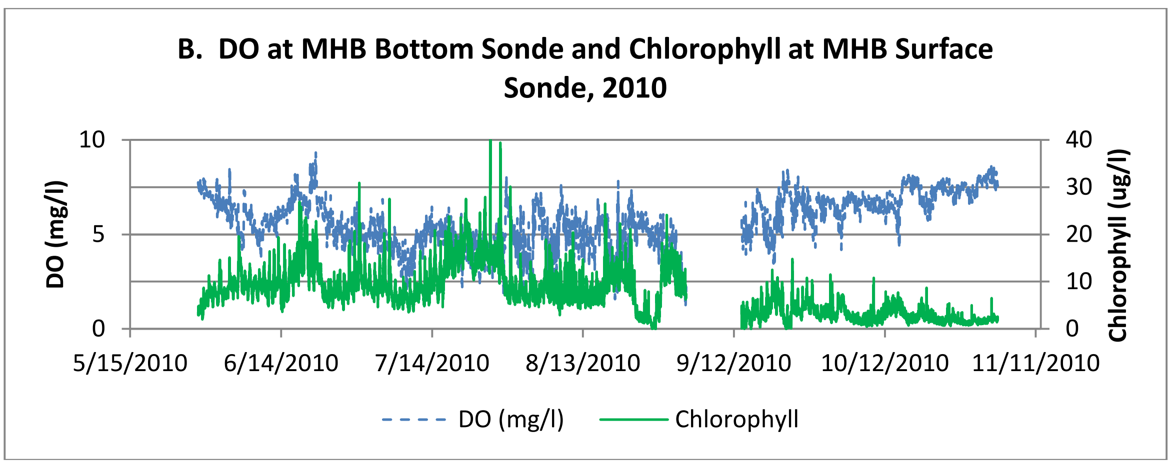
Thus, while generally stratification increases as you move up-estuary (i.e. from Mount Hope Bay into the Taunton River Estuary), consistent with the greater salinity-driven density differences, the evidence indicates that stratified conditions appear in both Mount Hope Bay and the Taunton River Estuary.

While EPA agrees that stratification and SOD are also factors influencing DO in estuarine waters, the commenter's hypothesis that stratification is "the primary factor triggering low DO" is unsupported by any evidence (and clearly not "demonstrated" as claimed in the comment). Stratification does exacerbate other processes that deplete DO, including algal blooms. High algae levels result in large diel swings between supersaturated and undersaturated conditions due to photosynthesis during the day and excess respiration at night (these are not apparent in the comment figure because it is based on average daily DO data), and result in DO depletions in bottom waters as dead algae sink to the bottom and decompose (this occurs in the water column and potentially increases sediment oxygen demand). Where waters are stratified bottom water depletion is intensified due to the lack of exchange with surface waters.

The comment's Figure 1 does not appear to demonstrate a consistent relationship with neap tides, as the September neap tides do not coincide with large differences in surface-to-bottom-water DO. In contrast, the full dataset from this data sonde provides evidence for DO impacts from high algae populations, as shown in Figure R3. Periods with chlorophyll consistently above 5 ug/l (mid-June, mid-late July and early September) are accompanied by highly supersaturated DO peaks (over 120% saturation), and the elevated chlorophyll-a levels are also accompanied by depletion of DO in bottom waters. After September 13, when chlorophyll-a concentrations are low, no relationship to neap tide appears and DO is not supersaturated at the surface or depleted in bottom waters. While stratification may well be a factor in intensifying DO depletions at this site, the primary control appears to be algae.

Figure R3





Charts by EPA. Source data: Narragansett Bay Fixed-Site Monitoring Network (NBFSMN), 2010. 2010 Datasets. Rhode Island Department of Environmental Management, Office of Water Resources. Data available at www.dem.ri.gov/bart

The charts presented as Figure 9 in the comment also do not support the commenter's claims. First, the comment argues that the magnitude of DO variation is much higher at MHB16 (1-5 mg/l) than at MHB19 (0-3 mg/l); however, this argument relies entirely on a single date of monitoring at MHB16, where DO concentration varied by 4.63 mg/l. Without that single data point the range of DO variation at MHB16 is between 1 and 3 mg/l, comparable to that at MHB19. No general conclusions can be drawn from a single monitoring datum – for example, the larger variation at MHB16 could be explained by the fact that the

> site was sampled two hours earlier in the morning (9:15 am, versus 11:30 am for MHB19), closer to the predawn hours generally recognized as the critical time for DO minima. Second, as noted by the commenter, stratification in estuaries is generally related to salinity differences; the charts show little salinity difference between surface and bottom waters at MHB16, while significantly more salinity variation at MHB19. This is consistent with the available research literature that indicates stratification is more prevalent in the upper estuarine waters. Finally, it should be noted that MHB19 also shows indications of stratification on the same date that MHB16 has the maximum DO variation; on September 2, 2005 the MHB19 station had a salinity variation of 10 ppt between surface and bottom (compared to 0.7 ppt at MHB16); both stations have very high surface chlorophyll-a concentration (31.5 ug/l at MHB19 and 33.3 ug/l at MHB16); and it is at MHB19 that a violation of the water quality criteria for DO (5 mg/l) occurred.

Comment A.28. Dr. Steven Chapra expert opinion

The City asserts that the "sentinel approach" was not scientifically defensible and was not demonstrated to be an acceptable or reliable approach for nutrient criteria development or nutrient limit establishment in estuarine settings. Dr. Steven Chapra, one of the nation's leading experts on nutrient dynamics and water quality assessment has observed the following regarding the validity of the methods employed to develop the Draft Permit:

> "The sentinel approach is predicated on the assumption that the total nutrient concentration at a single location provides a valid predictor of the dissolved oxygen concentration directly below that location and is similarly controlling the DO regime in other locations. Even for standing waters, like lakes, where vertical transport usually dominates, this is a tenuous assumption. *For a flowing system such as an estuary, it is ludicrous.* As is well documented in the literature, the oxygen at any estuarine location depends on a variety of factors including oxygen reaeration, depth, sediment oxygen demand, sediment-water exchange of nutrients, nitrification and denitrification, point source carbonaceous and nitrogenous loadings, degree of vertical mixing, horizontal transport from both upstream and downstream directions, algal productivity, hydrolysis, organic carbon and organic nitrogen loads from allochthonous sources in the watershed, etc., etc., etc. *The failure to evaluate and consider any of these factors renders the present assessment pure speculation, which is, in an[y] event, demonstrably in error. TN could not possibly be the single factor controlling the DO regime in the Taunton estuary given the numerous non-nutrient factors known to influence this and other estuarine systems.* […]
>
> As mentioned previously, no modeling was employed to establish the reliability of the TN criterion. *At a minimum, the analysis should have demonstrated how TN influenced phytoplankton growth at the various locations, since this is a prerequisite for causing effects on the DO regime*. No such analysis exists.

> Because of the complexity of this system and its economic and environmental value the absence of any serious modeling to support nutrient criteria development verges on negligent. […]
>
> *In summary, I have concluded that the technical analysis underlying the permit is severely flawed, and does not reflect the current or accepted state of the science for making such assessments.* It is based on naive and simplistic reasoning that is weak and clearly not consistent with the available information or expected conditions controlling the DO regime in estuarine settings. *No published EPA guidance document on assessment of DO and nutrient conditions in estuarine settings indicates that this is an accepted method of analysis.* […]
>
> I have critiqued many water quality plans and management schemes as an environmental engineer and water-quality expert and *I must state that this is the most technically weak effort I have examined over my 42 year career*." (emphasis added).[44]

In short, the analysis supporting the draft permit is not simply flawed, it is grossly flawed and cannot be attributed to an exercise of agency expertise. This analysis is completely ineffectual due to its lack of consideration of any of the well-known factors influencing nutrient dynamics, generally and specifically known for this system.

[44] Chapra, Steven. (September 2014 – Attachment V). Supplemental Comments on Taunton Draft Permit Assessment of the Scientific Basis of the Taunton Wastewater Treatment Plant Draft NPDES Permit (MA0100897).

Response A.28.

Regarding the comment that EPA based its analysis on a "single location," Dr. Chapra is clearly mistaken (see Responses A.4 and A.45)

As far as Dr. Chapra's opinion that a more complete understanding of all factors affecting DO in the Taunton River/Mt. Hope Bay estuary system is necessary before a permit determination can be made, he again is mistaken (see Responses A.24 and A.29). EPA has not claimed that TN is the single factor controlling the DO regime.

In Responses A.23 and A.24 above, EPA notes that Dr. Chapra's technical opinion against the use of total nutrient concentrations for criteria is unpersuasive in this context, particularly as he offers no alternative approach toward setting a nitrogen target or establishing a permit limit as required by the CWA. Furthermore, even without using the reference-based approach the EPA used in this analysis, the TN threshold could be defensible based on the range of threshold values from other studies of estuaries. See Response A.29 below.

Comment A.29. Great Bay Peer Review confirms simplified methods unreliable.

EPA previously supported the development of other simplified data assessment methods for predicting the allowable nitrogen criteria for Great Bay Estuary. Those analyses at least attempted to demonstrate specific correlations between nutrient concentrations and various ecological impacts (reduced transparency, low DO, etc.), which were not performed in support of Brockton's draft permit.[45] Four nationally recognized experts issued a review of that analysis in the February 13, 2014 Joint Report of Peer Review Panel for Numeric Nutrient Criteria for the Great Bay Estuary (*See*, Attachment W - Peer Review Report). The experts thoroughly rejected that simplified correlations could be used to create a defensible nutrient criteria without clearly documenting causation. The relevant quoted responses are provided verbatim (critical text are highlighted in italics), below. Given the Peer Review Report findings, the State of New Hampshire has abandoned its support of such methods and the technical conclusions based on those analyses (*See*, Attachment X - settlement agreement). Following the release of the Peer Review Report, the reviewers provided responses (*See*, Attachment Y - Supplementary Responses) to clarify and expand on their previous answers, further confirming that the use of simplified methods for DO impact assessment in estuaries is not scientifically defensible. The creation of an even more simplified approach to addressing DO impacts for Brockton's Draft Permit is untenable, given the recent results confirming EPA's earlier supported approach was thoroughly misplaced. This pattern of using simplified methods known to lack scientific validity confirms that EPA's analyses are neither objective nor reasonable. It also confirms that EPA lacks a presumption of correctness of its analyses having been repeatedly informed that these deficient methods should not be employed and, nonetheless, EPA continues to utilize them to create "state of the art" nutrient reduction mandates.

The peer reviewers affirmed that the uses of reference or sentinel approaches without consideration of the effect of differences in the physical, chemical, and biological factors at each location is not scientifically defensible. The Peer Review Report discounted similar assumptions as scientifically invalid where system responses at the mouth of the harbor and from other estuaries were used to predict nutrient impacts in upstream waters (in the bay and its upper tidal rivers) of the Great Bay Estuary. This is essentially the same approach used by EPA in applying its "sentinel station" found in the open waters of Mount Hope Bay to the upper reaches of the Taunton Estuary near the City. The germane Peer Review Report conclusions follow:

> Also, important differences in some of the physical characteristics of Great Bay and the embayments of Massachusetts were not acknowledged, implying that DES did not consider the relevance of the differences and how they could affect interpretation of water quality monitoring data. *Furthermore, by making a simple comparison to the MEP program without a comprehensive evaluation of the status of that program, DES was irresponsible in making the comparison and implying that it supports total nitrogen criteria proposed for the Great Bay*. (Peer Review Report, Dr. W. Judson Kenworthy at 50).

> The principle 'no one suit fits all' was applied appropriately in MA. This resulted in some embayments having different nitrogen criteria in MA, and recognition that no one concentration value will fit for all of the different systems. *Although DES explicitly recognizes different segments of the Great Bay estuary, in order to discover nitrogen criteria the method DES used failed to consider potentially important differences that could affect nitrogen, symptoms of nitrogen loading, and the eelgrass response. For example, the lower salinity tributaries of Great Bay have distinctly different biophysical characteristics and much tighter coupling to the watersheds than further downstream which is more coupled to oceanic influences.* (Peer Review Report, Kenworthy at 51).

In the Supplementary Responses, Dr. Kenworthy continued:

> One important initial step in this process of factor consideration has already been partially completed by DES and its Great Bay collaborators. DES has already zoned the Bay into distinct geographically defined segments. *This geospatial approach implicitly recognizes that there may be different (or similar) biological (e.g., eelgrass and macroalgae distribution), hydrological (e.g., currents, wave exposure, water residence time, salinity, optical properties) and geological characteristics (e.g., bathymetry, sediment type) in each segment, as well as different watershed features influencing the Bay's water quality (e.g. land use, nonpoint and point source nutrient discharges). Simply stated, this acknowledges that not all segments are alike and the list of priority and confounding factors in each segment that influence the growth and survival of eelgrass can be different (or similar)* and significantly less than 20. […] While zonation provides the spatial context for prioritizing and evaluating the most important factors, it reduces the scale of the problem and provides an opportunity to: 1) organize and simplify the structure of the models used to evaluate nitrogen cycling and loading processes and their effects on eelgrass in each segment, 2) more readily identify and model the bio-physical connectivity between segments (hydraulic flushing and residence times) as opposed to modeling the entire Bay, and 3) more easily and quantitatively link the water column and the substrate of the Bay to the specific watershed characteristics influencing nitrogen loading and the priority factors in each segment. *Lastly, the process of designating specific zones allows for scientists to identify which segments are most immediately threatened by nitrogen loading and enables managers to prioritize actions in a framework of adaptive management. This will better enable state and municipal managers to determine how and when to allocate financial and infrastructural resources to remediate the impacts in particular segments as opposed to the entire Bay, which likely has segments which are not as seriously threatened as others.*

(Supplementary Responses, Kenworthy Question 1).

> In practice, application of the DES conceptual model to the Great Bay Estuary *failed to address several influencing factors identified by the NEEA [National Estuarine Eutrophication Assessment] protocol* and needed to fully evaluate the

> effects of nitrogen on eelgrass. *Many of the factors explicitly indicated by the NEEA, for example, hydraulic flushing and water residence time (Bricker 1999), were not considered in the DES model. These two physical factors (among several others) are especially important in controlling nitrogen loading, processes of nitrogen cycling, and nitrogen concentrations in New England Estuaries* (Latimer and Rego 2010). (Peer Review Report, Kenneth H. Reckhow at 11-12).

The data and arguments provided in the DES 2009 Report to support the weight of evidence for a relationship between nitrogen concentration, macroalgal abundance and eelgrass loss are neither compelling nor scientifically defensible. […] *On page 38 in their report DES correctly acknowledged it is not clear whether the same threshold would apply to other sections of the estuary where environmental conditions (e.g., substrate type, sediment stability, water depth, wave energy) may affect the growth and abundance of macroalgae and the interactions between macroalgae and eelgrass.* (Peer Review Report, Kenworthy at 27-28).

As with the analyses reviewed for Great Bay Estuary, it is clear that DO at MHB16 and MHB19 are affected by distinctly different physical, chemical, biological and hydrodynamic characteristics. MHB16 is over 40 feet deep, subject to the highest tidal velocities in the system and has virtually no watershed loading of oxygen demanding pollutants or freshwater flow influences. The Upper Taunton River is 10-15 feet at its deepest, is the deposition area for the entire watershed and has a significant freshwater component. These are not even remotely comparable stations.

The Brockton Draft Permit used the most simplified analysis possible – it claims that meeting a specific TN value at two distinctly different locations will result in achieving identical minimum DO concentrations. This analysis did not even attempt to show that the DO level occurring at MHB16 was a function of the degree of algal growth present, as was claimed in the New Hampshire 2009 Numeric Nutrient Criteria document. Thus, the methods used for the Brockton permit were even less "robust" than those rejected in the Great Bay peer review as deficient and not scientifically defensible.

Because of the lack of any explicitly demonstrated cause-and-effect relationship or consideration of confounding factors in the DO analyses, all four peer reviewers confirmed that such simplified analyses have no scientifically defensible basis:

> With the exception of the *nitrification process, nitrogen concentrations are not directly linked to DO, but are only indirectly linked through primary production and the subsequent sequence of physiological processes that utilize the produced organic matter. These include respiration, oxidation of DOC exudates, oxidation of POC, and sediment oxygen demand (SOD). Another necessary and confounding factor, with regard to lower DO, is physical stratification/vertical stability of the water column.*
>
> For the above reasons, development of scientifically credible statistical relationships between nutrient concentrations as a causal variable and DO as a

> response variable is difficult under any circumstances. *In fact, even EPA itself was unwilling to demonstrate such a relationship in its own guidance. A notable omission, not generally recognized, is that the EPA Technical Guidance Document for Stressor-Response Relationships (EPA 2010b) does not contain a single example for dissolved oxygen as a response variable.*
>
> My opinion is that the results in Figures 28-29 of the DES 2009 Report for *statistical relationships between DO and nitrogen concentrations, and the conclusions drawn from these results, are weak and unreliable because univariate linear regression approaches do not adequately represent the underlying direct/indirect cause-effect mechanisms.* Conditions in Great Bay are driven by a set of physical, chemical and biological dynamics for which process-based mass balance models would be more appropriate tools for assessing water quality and resulting eutrophication. See my response to Question 4a for a more complete discussion. (Peer Review Report, Bierman at 31).
>
> Relative to weight of evidence, the data presented are likely sound but are not properly applied to linking benthic conditions with low DO and subsequently to linking low DO with total nitrogen concentrations. *Much of the problem is with the analysis approach being limited to simple linear regressions, which do not properly evaluate the influence of covarying factors that confound conclusions regarding total nitrogen concentration as being the causal factor for DO and benthic conditions.* (Diaz at 46).

Dr. Bierman's supplemental comments reiterated that EPA's Stressor-Response Guidance never discusses using DO as a response variable for developing nutrient criteria using these simplified methods. He also strongly recommended a model be developed to accurately determine site-specific relationships between nutrients and DO.

> [D]evelopment of scientifically credible statistical relationships between nutrient concentrations as a causal variable and dissolved oxygen as a response variable is difficult under any circumstances. *The reason is that dissolved oxygen dynamics in aquatic systems are complex and highly site-specific. It is significant to note that the EPA Technical Guidance Document for Stressor-Response Relationships (cited on Page 31 as EPA 2010b) does not contain a single example for dissolved oxygen as a response variable. My opinion is that process-based load-response models are a more appropriate approach for dissolved oxygen than the reference condition approach or empirical (statistical) stressor-response analyses.* Such models could be used to link watershed loads directly to ambient dissolved oxygen concentrations, and then to develop TMDLs and/or NPDES permit limits. They could also be used to back-calculate numeric nutrient concentration criteria corresponding to ambient dissolved oxygen concentration criteria. (Supplementary Responses, Bierman).

The Brockton permit analyses also erroneously assumed a direct cause-and-effect relationship between TN and excessively low DO at MHB19, though as noted by the peer review, no such relationship exists. Implicit in this assumption is that TN instigated excessive algal growth, resulting in unacceptably low DO conditions. However, inexplicably, no analysis of TN effects on algal growth at MHB19 or MHB16 was included in the permit analysis. As with the Great Bay analyses, the influences of relevant confounding factors at each location were ignored for the Taunton Estuary DO assessment. These include bathymetry, residence time, tidal exchange, stratification, carbon and ammonia oxygen demand, SOD and light transmission, among a host of others. The Taunton River Estuary analysis thus shares and amplifies key inadequacies with the Great Bay Nitrogen Criteria analysis which were identified and criticized by renowned experts in the field. Thus, by the same token, the Taunton River Estuary analysis of low DO is likewise scientifically invalid. A site-specific water quality model considering the various factors influencing the occurrence of DO less than 5 mg/l must be developed for the Taunton River Estuary for scientifically defensible limitations to be established. It should be noted that this comment does not intend to directly compare the two estuaries; the comment presents expert opinions on scientifically defensible and indefensible approaches to determining and quantifying the causes of low DO conditions and eelgrass loss in an estuary.

[45] See, 2009 Numeric Nutrient Criteria for Great Bay Estuary – already in EPA's possession.

Response A.29.

EPA disagrees with the comment that the method used to develop a nitrogen limit in the Brockton Fact Sheet is unreliable simply because a different method in a different watershed was criticized in a peer review done by academics that were not tasked with determining the merits of the analysis in establishing permit limits specifically. The analysis conducted in Great Bay was a stressor-response regression analysis approach, not a reference-based approach such as the one used in Brockton. Further, the peer reviewers were tasked with evaluating the Great Bay analysis for definitively establishing numeric nutrient criteria, not on its merits to interpret narrative criteria based on available information for the purpose of setting permit limits. Prior to the peer review referenced in the comment, two other national experts conducted a peer review of EPA's approach and concluded that it was a sound methodology for establishing numeric nitrogen criteria.[11] As described previously, the methodology used by EPA to interpret the narrative nutrient criteria and select a threshold nitrogen concentration for MHB is a weight of the evidence based approach that includes site specific reference site analyses and is modelled on the Massachusetts Estuaries Project approach for selecting nitrogen targets in southeastern Massachusetts embayments. As such, this approach is consistent with EPA guidance regarding the use of available

[11] This 2010 peer review by Boynton and Howarth is posted (as Attachment A and B) on the following NHDES website: http://des.nh.gov/organization/divisions/water/wmb/coastal/documents/20100629-peer-review.pdf

information for the purposes of interpreting narrative nutrient water quality criteria. See Responses A.4 and A.23.

As mentioned in Response A.24, the limited data available in the Brockton analysis did not allow for a more complex analysis or the development of a complex model. This comment seeks to characterize any less complex analysis as unreliable, so that permit limits would be deferred until a complex model can be developed. This is a recipe for inaction that is inconsistent with CWA requirements. As referred to in Response A.24, the Environmental Appeals Board (EAB) states the following:

> The federal courts in reviewing Agency decisions have similarly recognized that scientific uncertainty is not a bar to administrative decision-making: "We do not demand certainty where there is none. There may be no strong reason for choosing [a particular numerical standard] rather than a somewhat higher or lower number. If so, we will uphold the agency's choice of a numerical standard if it is within a 'zone of reasonableness.'" *Small Refiner Lead Phase-Down Task Force v. EPA,* 705 F.2d 506, 525 (D.C. Cir. 1983) (citation omitted); *see also Hercules, Inc. v. EPA*, 598 F.2d 91, 116-17 (D.C. Cir. 1978).

EPA established such a "zone of reasonableness" in the Brockton Fact Sheet in stating "EPA notes that concentrations previously found to be protective of DO in other southeastern Massachusetts estuaries have ranged between 0.35 and 0.55 mg/l.[12]" See Fact Sheet at 43. EPA further clarified this zone of reasonableness on page 45 by stating "The average TN concentration at MHB13 between 2004 and 2006 was 0.473 mg/l, indicating that the threshold concentration must be lower than that value." EPA also notes on page 45 of the Fact Sheet that "a probable range of criteria for total nitrogen 'in the vicinity of 0.35 to 0.40 mg/l' is suggested in Deacutis & Pryor, *Nutrient Conditions in Narragansett Bay & Numeric Nutrient Criteria Development Strategies for Rhode Island Estuarine Waters* (2011)." Hence, the chosen threshold total nitrogen concentration of 0.45 mg/l chosen in the analysis is clearly a reasonable conservative choice and not the most conservative TN threshold we could have chosen. See Response A.4 for a more detailed discussion of how EPA chose this threshold.

While collecting more complex data and performing a more complex analysis, such as that described by the peer reviewers, may result in a slightly different threshold value, EPA contends that it would still be within this zone of reasonableness. Response A.37 below further expands on this point, indicating that even if a higher threshold number were chosen within the established zone of reasonableness, the resulting total nitrogen permit limit would remain unchanged given the significance of the Brockton discharge within the watershed.

[12] See, e.g. MassDEP, *FINAL West Falmouth Harbor Embayment System Total Maximum Daily Loads For Total Nitrogen* (2007) (Harbor Head threshold 0.35 – SA water); MassDEP, *Oyster Pond Embayment System Total Maximum Daily Loads For Total Nitrogen* (2008) (threshold 0.55).

Comment A.30. EPA incorrectly applies the MEP analysis approach

The Fact Sheet states that "EPA applies the procedure developed by the Massachusetts Estuaries Project ("MEP") …" (Brockton Fact Sheet at 43). While it may be accurate to state that the procedure laid out in the Fact Sheet *roughly* follows the procedure used in the MEP studies, the analysis differs from the MEP procedure in several key ways. The differences between the approach in the Fact Sheet and the MEP procedure[46] is outlined in the **Table 3**.

Based on the information presented in this table, it is clear that the Fact Sheet analysis follows a few of the components in the structure of the MEP procedure – it roughly estimates the watershed load, estimates the hydrodynamics of the embayment, and then estimates the water quality impacts – but it does not provide a detailed nitrogen loading analysis, define the nitrogen cycling with the sediments, select a reasonable and representative sentinel station, present alternatives to improve nitrogen in the estuary/bay system, or involve the communities in the process. Nor does the Fact Sheet analysis use the same rigorous techniques employed by the MEP as is dictated by complex estuarine-coastal systems. The MEP procedure predicates its analysis on comprehensive, site-specific models for all three components; this comprehensive approach ensures that the resulting water quality recommendations are realistic and reproducible. The Fact Sheet analysis performs a rough first-cut analysis of this information, but does not use any site specific information to refine the estimates. For this reason the Fact Sheet analysis is far too approximate to use in developing permit limits, as there is no guarantee that the results of the general, approximate model will hold true in a complex estuary like the Taunton River Estuary/Mount Hope Bay complex.

[46] MEP, *Nitrogen Modeling to Support Watershed Management: Comparison of Approaches and Sensitivity Analysis*, at 8-16. Prepared for MassDEP and EPA (2001) (Attachment AA).

Table 3: Comparison of MEP Linked Watershed-Embayment Model Procedure with the Brockton Fact Sheet Analysis

Procedure Component	MEP Linked Watershed-Embayment Model	Fact Sheet Analysis
Water Quality Data Collection	Typically, collect 3 years of receiving water quality data and 1 year of tributary data. Collect data on sediment nitrogen flux.	Collect 3 years of receiving water quality data and 1 year of tributary data
Watershed nonpoint source load	Develop a highly discretized, site-specific, land-use based nitrogen loading model to estimate the watershed load. This model uses parcel data to estimate nonpoint sources including stormwater runoff, septic system loads, and fertilizer from residential lawns and agricultural inputs. Attenuation of nitrogen in wetlands and other surface water bodies is explicitly accounted for in the watershed modeling. The model is calibrated and validated using available data.	Uses data collected by MEP for model development from selected tributaries to Mount Hope Bay to estimate watershed loads. This methodology may not be representative of loads from ungauged areas of the watershed, potentially over- or under-estimating the total nonpoint source load. It also does not account for attenuation in surface water bodies.
Sediment Interactions	Dynamics of nitrogen flux between the water column and sediment are explicitly considered.	No consideration of sediment nutrient interaction.
Hydrodynamic Modeling and Analysis	Site-specific, hydrodynamic modeling is performed using RMA-2, a two-dimensional, depth-averaged finite element model capable of simulating hydrodynamic in complex river and estuary systems. The hydrodynamic model is developed using shoreline positions, bathymetry data, and boundary conditions specific to the embayment under consideration, and is calibrated to measured field data.	Uses a simplistic, one-dimensional, steady-state analytical model to predict the net transport of nitrogen within the estuary. This model is not calibrated or validated against observed data, nor does it consider the shoreline, bathymetry, or boundary conditions specific to the embayment.
Embayment Water Quality Analysis	Water quality modeling within the estuary is performed using RMA-4, a two-dimensional water quality model that uses the hydrodynamic information generated by the RMA-2 model and watershed load information generated by the site-specific watershed model. The RMA-4 model is typically calibrated to match observed salinity within the embayment and validated against observed nutrient data.	Assumes instantaneous lateral and vertical mixing of nitrogen, and is not calibrated to observed conditions within the embayment.
Sentinel Station Selection	Station is selected to represent a location where achieving the target concentration will achieve restoration goals throughout the embayment. The station is selected to be close to the inland-most reach so restoration or protection of the sentinel location will create high quality habitat throughout the estuary. The sub-embayment around the sentinel station should be sufficiently large to prevent steep horizontal water quality gradients. The sentinel station should be able to obtain the minimum level of habitat quality acceptable for the greater system (*See,* Attachment BB at 204).	Station was selected at one of the inlets to the complex system being studied. Given its location at the mouth of the system and the very different hydrodynamic characteristics here from the rest of the system, nutrient response at this site would not be representative of the expected response elsewhere in the system.
Alternatives Analysis	Using the above models to provide output, MEP evaluates several alternatives of changes in loading or factors controlling hydrodynamics as options for consideration for improving water quality. Communities have the opportunity to have different alternatives run.	No community involvement in the process of alternatives.

Response A.30.

EPA never claims that it performed a full MEP analysis, which requires more extensive data collection and water quality modeling. Had a full MEP analysis been completed, MassDEP would have used it to develop a TMDL and EPA would not have needed to conduct its own analysis of the necessary nitrogen reductions. The Fact Sheet specifically states that the full MEP analysis, and the TMDL that would result from it, had not been completed. See Fact Sheet at 36.

EPA did use an approach modelled on MEP procedures to the extent the available information allowed. Similar to MEP, EPA used a weight of the evidence approach that included site specific reference site information to determine a target nitrogen threshold. Additionally, we used the available information to estimate the watershed load of nitrogen being delivered to the estuary system. For this system, available data allowed for this estimate to be based on actual watershed loading measurements as opposed to a theoretical land use based loading model that is typically used in the MEP approach. Finally, in the absence of a mechanistic hydrodynamic/water quality model, EPA used a salinity based mass balance model to determine the nitrogen reductions necessary to achieve the total nitrogen threshold in the most impaired part of the estuary. EPA believes the level of complexity in its analysis was adequate to develop a nitrogen target and was not “far too approximate for use in developing permit limits.” As stated in Response A.29 above, the threshold chosen was well within a “zone of reasonableness” as prescribed by the Environmental Appeals Board for establishing a numerical standard and calculating a permit limit.

Comment A.31. Dr. Craig Swanson confirms sentinel approach used by EPA is not defensible.

An analysis dated January 13, 2015, from Dr. Craig Swanson to Curt Spalding assessed the Taunton Estuary hydrothermal model being used and cited by government agencies, the Brayton Point Station operator, and other interested parties (Attachment Z). Dr. Swanson’s analysis of EPA’s use sentinel station is as follows:

> Finally, the use by USEPA of a sentinel station located in the far southeast corner of the Bay is not an appropriate methodology to predict DO conditions and nutrient reduction requirements in the Taunton Estuary since the hydrodynamics and therefore the transport and flushing at this site are significantly different from the rest of the Bay. Consequently, there is no reasonable basis to anticipate that nitrogen levels at the sentinel site provide a basis for predicting DO or algal growth potential at the other sites further up in the Bay or the Taunton River. […]

A sentinel station approach was used by USEPA as part of its analysis of Total Nitrogen (TN) impacts from the Taunton WWTF discharge [NB: this is the same analysis as is used for Brockton’s Draft Permit]. A station included in the SMAST (2007) field program conducted in 2004-2006, MHB16, was chosen by EPA as the sentinel station.

This station is located in the extreme southeast corner of the Bay just north of the connection of the Bay with the Sakonnet River, one of two connections (the other being to the East Passage of Narragansett Bay) to Rhode Island Sound and the Atlantic Ocean. From the perspective of the hydrodynamics in the Bay this is an unsupportable approach. The flow through the Sakonnet River Narrows is only 10 to 20% (Kincaid, 2006) of the flow through the main interface to Narragansett Bay so the flushing characteristics and factors influencing the DO regime would be entirely different from most of the rest of the Bay and certainly differ dramatically from conditions occurring in the Taunton Estuary. Consequently, one could not reasonably anticipate that the hydrodynamic conditions (including stratification) or algal growth influencing the DO regime at this location would be similar to the conditions controlling DO in the Taunton estuary that is subject to an entirely different set of oxygen demanding inputs and physical conditions.

Dr. Swanson's conclusion is precisely supported by the relevant hydrodynamic studies for MHB, which were not considered when selecting this sentinel location in Brockton's draft permit as the basis for predicting water quality responses to nitrogen elsewhere in the system. As noted earlier, EPA itself has published different guidance manuals for rivers, lakes (bays) and estuaries because of the need to consider the effects of such different physical characteristics on nutrient impacts and criteria assessment.[47] None of these documents indicate it is acceptable to pick a data point from a remote area of a system to predict the impact of nitrogen or any other nutrient at some other location. EPA's Reference Waters guidance most certainly contains no support for such a truncated and facially deficient analysis. Because the approach to develop total nitrogen limits in Brockton's draft permit uses procedures that are not demonstrated to be scientifically defensible in any published treatise, are an incomplete and over-simplified implementation of the MEP procedures, which are stated to be the structure of the analysis, are directly at odds with the admonitions of the Science Advisory Board, Great Bay's independent expert peer review panel, the expert opinions of Dr. Craig Swanson and Dr. Chapra and are contrary to EPA's own published guidance on how to properly evaluate a claimed nutrient-related DO impairment in an estuarine water, the approach is not scientifically defensible and cannot be ascribed to agency expertise. Consequently, these overly simplistic and arbitrary procedures may not be used as a basis to establish water quality-based limitations under § 122.44(d).

[47] EPA, *Technical Guidance Manual for Developing Total Maximum Daily Loads Book 2: Rivers and Streams; Part 1: Biochemical Oxygen Demand/ Dissolved Oxygen and Nutrients/Eutrophication*, at 4-27 (Mar. 1997).

Response A.31.

EPA disagrees with this characterization of how the threshold was established. As described in Response A.4, EPA used a weight of the evidence approach that included a reference site. Response A.4 also points out that had EPA chosen not to consider a reference site in making this determination, EPA would have necessarily relied on other nearby stations or simply the scientific literature which also point to a value of 0.45 mg/l as being a reasonably conservative threshold. As described in Response A.16 and A.36, these stations are all part of a continuous estuarine system characterized by different levels of mixing of the same two source waters, continual exchange of waters among the estuarine segments, the same sources for sediment, and the same climatic conditions. EPA also notes that none of the sampling stations in the Taunton River are suitable locations to be chosen as reference sites because in all of the Taunton River stations that were nitrogen limited, chlorophyll-a is elevated and the DO criterion is not met (see Table 5 in Fact Sheet at 35). There are some nearby stations in Mount Hope Bay (see Response A.4) that could be used as a reference site and justify a higher TN threshold but they are balanced by other nearby sites that are showing impairment at TN levels of 0.45 mg/l or lower. Although there remains some uncertainty associated with the precise nutrient concentration at which each station within the Taunton River Estuary would be brought into compliance, EPA has clearly demonstrated that the threshold chosen is within a "zone of reasonableness" and, perhaps more importantly, any threshold within such a reasonable range would result in an identical total nitrogen permit limit given the significance of the Brockton discharge within the watershed. See Response A.29.

For a more detailed response to the expert opinions of Dr. Swanson and Dr. Chapra raised in the comment, refer to Response A.23 above.

EPA also notes that the comment did not cite which "relevant hydrodynamic studies" are being referred to here, or explain how they would change EPA's conclusions regarding necessary load reductions. Thus, EPA is not able to respond to this aspect of the comment.

Comment A.32. Establishment of Monthly Average Limitations is Incorrect

In setting the monthly average effluent limitations for total nitrogen for Brockton, EPA took the results of a long term, growing season analysis and created a not to exceed monthly maximum limitation. That limitation is misplaced and inconsistent with the underlying analysis. In responding to comments on Taunton's draft permit, EPA agreed that the proper way to express the limit was as a growing season (6 month) rolling average load (*See* Taunton Response to Comments at 12). The same correction is necessary for Brockton's permit if a nitrogen limitation is to be set.

Response A.32.

EPA agrees that its loading allocation was based on a long-term growing season analysis. The final permit has been changed to a seasonal (six month) rolling average limit consistent with the Taunton permit. The language now indicates:

> The total nitrogen limit is a rolling seasonal average limit, which is effective from May 1 through October 31 of each year. The first value for the seasonal average will be reported after six months during which the limit is in effect following the effective date of the permit (results do not have to be based on data all from the same calendar year). For example, if the permit becomes

effective on December 1, 2016, the permittee will calculate the first seasonal average from samples collected during the months of May through October 2017, and report this average on the October 2017 DMR. For each subsequent month that the seasonal limit is in effect, the seasonal average shall be calculated using samples from that month and the previous five months that the limit was in effect (e.g., the average of June 2016 through October 2016 and May 2018 shall be reported on the June 2018 DMR).

Comment A.33. The TN endpoint was miscalculated, inappropriate, scientifically indefensible and does not assure DO criteria attainment.

Assuming, *arguendo*, that the sentinel station method is appropriate for establishing a TN threshold, the appropriate TN endpoint is miscalculated. The purpose of the calculation was to establish a TN concentration to ensure compliance with the applicable DO water quality standard.

The selected TN endpoint, 0.45 mg/l, corresponds with a minimum DO concentration of approximately 6.0 mg/l, but the actual criterion target is 5.0 mg/L (*See* Brockton Fact Sheet, at 35, Table 5). The data for MHB16 in 2006 (not utilized by in the analysis) show a minimum DO of 5.3 mg/l with a mean TN of 0.50 mg/l. Using these data, the TN endpoint necessary to achieve the DO criterion of 5.0 mg/l is a TN concentration *greater than* 0.50 mg/l, assuming that the Taunton River Estuary responded to TN in the same manner as observed in Mount Hope Bay. If a sentinel approach is defensible, it requires adjustment to reflect the TN load required to meet applicable standards (5 mg/l DO), not a 6.0 mg/l DO criteria has done in the analysis supporting the Brockton draft permit.

Response A.33.

EPA disagrees with the comment that the selected endpoint corresponds with a minimum DO concentration of 6.0 mg/l. The Fact Sheet clearly states that the total nitrogen threshold “represents the threshold protective of the dissolved oxygen water quality standard of 5.0 mg/l.” See Fact Sheet at 45. Furthermore, the 2006 data referenced in the comment were not used for reasons described in Response A.14 above. Hence, EPA based its analysis on the appropriate 5.0 mg/l DO endpoint and used all available data, purposely excluding 2006 data for reasons stated earlier.

EPA also notes that the SMAST DO data were not minimum values. For comparison, the minimum DO at the URI buoy data where data were collected continuously was approximately 2.0 mg/l, much less than the minimum DO from nearby SMAST stations where DO data were collected randomly.

Comment A.34. The proposed TN endpoint is insufficient to achieve the DO criterion.

Water quality data presented in Table 5 of the Brockton Fact Sheet (at 35) show that several Mount Hope Bay stations, closer to the Taunton Estuary, do not achieve the DO criterion while in compliance with the proposed "protective" TN endpoint. These stations, MHB11 and MHB12, are illustrated in **Figure 10** (below). Station MHB11 achieved the TN endpoint in 2004 and 2005, but was significantly below the minimum DO water quality standard in both of those years. Conversely, in 2006 this station exceeded the TN endpoint by a significant margin but was in full compliance with the minimum DO criterion. Similarly, MHB12 was below the TN endpoint in 2004, but was also well below the DO criterion, confirming that some other process must be operating to cause the low DO condition. In the subsequent years, this station exceeded the TN endpoint but alternatively failed (2005) and then exceeded (2006) the DO criterion.

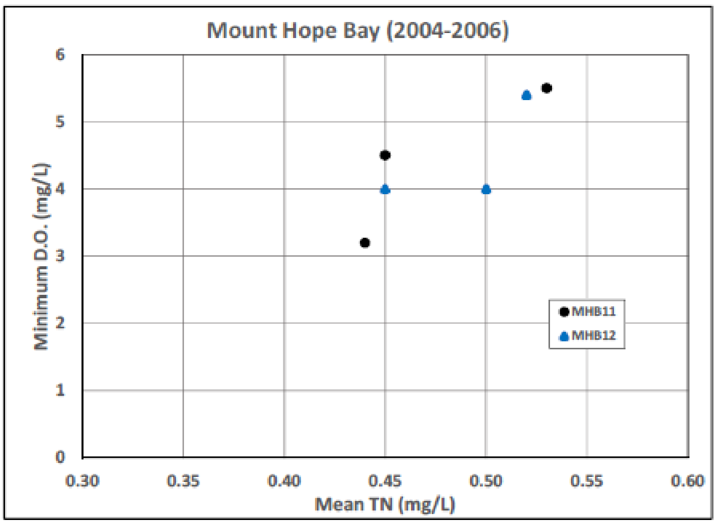


Figure 10: Minimum DO Concentration versus Mean TN (Stations 11, 12)

These data indicate that the selected TN endpoint is not rationally based and will not even ensure DO compliance as claimed throughout the analysis. Data from MHB8 also confirmed the TN criteria selection did not result in DO criteria attainment (*e.g.*, 2005 TN at 0.45 mg/l; minimum DO 2.6 mg/l) (*See* Brockton Fact Sheet at 35). Moreover, the trend exhibited by the data from these stations indicates that the minimum DO *improves* with increasing TN concentration, contrary to the conceptual model. This discrepancy with the conceptual model is a clear indication that other factors control the DO response.

EPA asserts it based its selection of the protective TN level by review of "all available data from all time periods" (Taunton Response to Comments at 65). The Fact Sheet inexplicably fails to report that data from several MHB stations confirm EPA's approach does not reflect the reality of this system (a requirement for a non-arbitrary and capricious analysis – *see*, *Columbia Falls Aluminum*). It is arbitrary and capricious for EPA to ignore this data confirming the simplified sentinel approach is not effective in controlling low DO conditions and to selectively chose a single "sentinel" location that fits EPA's regulatory theory when the majority of the data do not.

Response A.34.

The commenter's selective use of two out of twenty-two data stations as somehow establishing a different "trend" does not demonstrate a meaningful discrepancy with the overall causal model. There are of course other factors that influence DO, including in this case variability in sampling conditions relative to critical DO time periods as well as physical factors such as stratification, wind mixing, tidal variation (e.g. neap vs. spring tide), etc. It is quite likely that small selected subsets of data can be found that appear to support any number of theories. A defensible statistical approach, on the other hand, includes all data unless a clear basis exists for its exclusion (e.g., the 2006 data for reasons described in Response A.14). As discussed in Response A.4, EPA has explicitly recognized the variability in the existing available data and has chosen a reasonably conservative threshold value, albeit not as conservative as EPA could have. Five other nearby stations (3, 5, 14, 15, and MOOR) indicate that a threshold of 0.45 mg/l is supportive of achieving the minimum DO criteria. As shown in Response A.37, the available data also support EPA's conceptual model of increased algal growth in response to TN and resulting low DO.

EPA disagrees with the comment's contention that the proposed TN threshold of 0.45 mg/l is insufficient. EPA's analysis was based on 2-year average concentrations. EPA acknowledges that a slightly different result may be reached if annual average TN is used as suggested by the comment's Figure 5. The use of a 2-year averaging period is intended to ensure that steady state conditions apply, consistent with the assumption of the loading model, and is a reasonable approach to balancing the need for a simplified model against the objective to achieve a load that is protective under all conditions.

Further, even if there were merit to the claim that the TN threshold is "insufficient," it would not change the TN permit limit for this facility. If the analysis were done based on a lower TN threshold, for example 0.435 mg/l, the target watershed load would be approximately 6% lower (1,952 lb/d) and would require a 3 mg/l permit limit from all facilities along with a 21% NPS reduction (compared to 20% NPS reduction in the Fact Sheet analysis). This would not impact the permit limit for the Brockton AWRF, which would still be based on the 3 mg/l limit of technology.

Comment A.35. The TN endpoint used to derive the TN effluent limit is not scientifically defensible.

The "sentinel station" approach, as applied by in Brockton's Fact Sheet, is not a rational or scientifically defensible basis for establishing a water quality standard because:

- It is contrary to EPA's own guidance[48] on the need to confirm the causal relationship, and, *inter alia*, carefully consider relevant literature for the area and,
- It presumes, without any demonstration, that the factors influencing DO conditions at station MHB16 are the same factors that influence DO in the Taunton River Estuary.

The Brockton Fact Sheet likens the selection of a sentinel station as being consistent with the use of reference conditions to establish water quality criteria for nutrients. That, however, is simply not true. A reference approach requires confirmation of causal relationships with the available data, ensure the physical characteristics are similar, consult with relevant local experts and carefully assess relevant literature to ensure that the elected reference location is representative of nutrient effects for the system in question (*supra* at 17). The Fact Sheet analysis did none of this – in fact, EPA claimed that it was not required to confirm the accuracy of its causal relationship, which is precisely the opposite of what EPA's guidance indicates is necessary to set a defensible reference waters criteria (Taunton Response to Comments at 42, 49, 71).
Moreover, the "reference station" approach was used by EPA to develop numeric nutrient criteria for streams in Florida and was struck down by the Court (*See Florida Wildlife Federation, Inc., et. al. v. Jackson*, Case 4:08-cv-00324-RH-WSC, Doc. 351) as insufficient to show that the criteria were necessary to maintain designated uses, absent the causal connection. As in Florida, the "reference" approach is also insufficient for use in Massachusetts. In this case, EPA cannot make a scientifically justified claim that the TN endpoint is necessary to meet a minimum DO concentration of 5.0 mg/l because the Fact Sheet has not demonstrated that a TN concentration of 0.45 mg/l is a threshold, above which the DO criterion will be even violated at station MHB16, absent some rational cause and effect analysis showing how the excessive algal growth is causing the DO criteria exceedance.

EPA's guidance documents on the development of numeric nutrient criteria and the development of wasteload allocations for dissolved oxygen in estuaries confirm that the primary effect of nutrients is to stimulate algal growth, which may influence DO in the estuary (*Supra* note 48). However, many other factors influence DO levels in the Upper Taunton Estuary, as EPA admits, and the Fact Sheet presents no assessment to determine to what extent TN is causing the observed affects. Consequently, establishing a wasteload allocation for TN to address DO impairments in the estuary is arbitrary and capricious. Moreover, the Fact Sheet presents no evaluation to show that DO at the Bay station (MHB16) responds in the same way as DO in the Taunton River Estuary (MHB19) or that the physical/chemical/hydrodynamic conditions at station MHB16 make it an appropriate reference site for the Taunton River Estuary. The Fact Sheet has not made any demonstration that the observed DO concentration is caused by the observed TN concentration. Without such a cause-and-effect demonstration, there is no reasonable assurance that controlling for TN will have any influence on minimum DO. Consequently, the draft TN effluent limit based on this TN endpoint is arbitrary and capricious since obviously essential analyses are missing from the Fact Sheet's permit derivation analysis (*Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (U.S. 1983)).

[48] *See* Estuaries Guidance Document; EPA, *Technical Guidance Manual for Performing Wasteload Allocations: Book III – Estuaries* (Part 1) (1990) ("WLA Guidance Document").

Response A.35.

This comment, like Comment A.10 above, mistakenly contends that a causal relationship (or cause-and-effect demonstration) must be established in order to develop a total nitrogen threshold for the protection of DO. This is not the case. As stated in Response A.10, EPA's NPDES regulations do not require cause-and-effect proof between a pollutant discharge and an existing water quality impairment before the permit writer can derive a numeric in-stream target to interpret a narrative water quality criterion, or impose a water quality-based effluent limitation to implement that criterion. Rather, the regulations require nothing more than a *reasonable potential to cause, or contribute to* an excursion of a numeric or narrative state water quality criterion; whenever such a potential exists, a permit must contain effluent limits to meet state water quality standards. See Response A.10.

This comment, like Comment A.24 above, mistakenly presumes that a reference-based approach must be able to specifically determine the factors influencing a particular DO condition at a high level of complexity in order to be "scientifically defensible" for the purpose of setting permit limits. This is not the case. As stated in Response A.24, the comment seeks to characterize any less complex analysis as insufficient, so that permit limits would be deferred until a complex model can be developed. This is a recipe for inaction that is inconsistent with CWA requirements. See Response A.24.

Finally, this comment, like Comment A.5 above, mistakenly contends that the Florida court decision struck down the reference-based approach used in the Brockton analysis as insufficient to show that the criteria were necessary to maintain designated uses, absent the causal connection. The comment mischaracterizes the Florida court decision regarding reference-based approaches. That decision struck down only nutrient criteria that were based on a statistical characterization of a set of unimpaired waters (the 90th percentile for four of the regions and at the 75th percentile for the fifth region), because the threshold had not been tied to actual impairment. See Florida Wildlife Federation, supra at 63. As the court stated:

> [T]he Administrator set the stream criteria based on naturally occurring ambient conditions—those that exist now, on average, in unimpaired streams—without building in an adjustment for increases in nutrients that are not harmful. Instead, a stream is deemed impaired—in four of the regions—if a nutrient level exceeds that of 90% of the sample set. This is the criterion even though the other 10% are apparently unimpaired at a higher nutrient level. The Administrator explained the 90% mark in terms

> that make sense if the target is a criterion that identifies any increase in nutrients and thus any change in flora and fauna: one can say with some confidence that a stream with a nutrient level that exceeds that of 90% of the sample set probably has suffered an increase in nutrients and a resulting change in flora and fauna. But if the target is a criterion that identifies a harmful increase in nutrients, there is an unexplained disconnect. The Administrator has not explained how the 90% mark correlates with a harmful increase in nutrients.
>
> . . . The stream criteria thus cannot be upheld as an appropriate means of identifying nutrient levels that will cause harmful effects.

Id. at 65-66.

In contrast, the type of reference approach applied by EPA here is specifically designed to identify the threshold concentration associated with a transition from impaired to unimpaired conditions. This approach is a rational and scientifically defensible basis for establishing a target TN threshold that is consistent with numerous TMDLs and related studies in Massachusetts as well as permitting regulations for using available data to inform the interpretation of narrative criteria. The approach uses a continuum of stations in the Taunton River Estuary/Mount Hope Bay system to establish the transition to unimpaired conditions in these subareas of a connection system and is the best available information for establishing a target threshold in this system. This type of analysis is consistent with the Florida court decision analyses because it is tied to actual impairment. Reference based approaches based on impairment thresholds are also being applied currently in Florida nutrient criteria analyses by Florida DEP. See Florida DEP Workshop Presentation: Development of Numeric Nutrient Criteria for Florida's Estuaries (April 2013) (http://www.dep.state.fl.us/water/wqssp/nutrients/)

The comment confirms that nutrients have a "primary effect" of stimulating algal growth that may influence DO. This confirmed relationship supports EPA's finding of reasonable potential for the Brockton WWTP nutrient discharge to cause or contribute to violation of the narrative nutrient criterion. EPA is not in fact required to determine to what extent TN, as opposed to other factors, is actually causing observed effects. Rather, EPA is charged with determining an effluent limit that is "necessary . . . [t]o achieve water quality standards," 40 CFR 122(d)(1) and "will attain and maintain applicable narrative water quality criteria and will fully protect the designated use."

Comment A.36. EPA's Approach is Inconsistent with the Critical Indicator Report

In developing the proposed TN endpoint, EPA noted that Massachusetts has not adopted numeric criterion for TN (Brockton Fact Sheet, at 29). Rather, MassDEP uses a number of indicators to interpret its narrative nutrient standard. EPA asserts that MassDEP/SMAST developed the Critical Indicators Interim Report for this purpose. However, the Critical Indicators Interim Report notes that the recommended ranges of appropriate TN thresholds must be further refined based on the specific physical, chemical, and biological characteristics of the system being evaluated (*See supra* at 33; Critical Indicators Interim Report, at 11, 13, 16). No such consideration was made for the Taunton River Estuary. Instead, EPA identified a threshold TN concentration for a site in *Mount Hope Bay* farthest from the Taunton River Estuary and assumed that this threshold concentration was appropriate in the Taunton River Estuary without any demonstration that the two locations behave in the same manner, as required by the MEP process. In fact, the physical, chemical, and biological characteristics of the two areas (MHB16 and the Taunton River Estuary) are dramatically different. Station MHB16 is one of the deepest stations in the Bay and is closest to the Atlantic Ocean and Narragansett Bay while the Estuary consists of a very narrow channel of variable depth. These and other critical characteristics that dramatically affect how TN could possibly contribute to low DO via excessive algal growth were not considered in the Fact Sheet's highly simplistic analysis. Thus, EPA's approach is also not consistent with the methods described in the Critical Indicators Interim Report.

Response A.36.

EPA agrees that MassDEP/SMAST developed the *Critical Indicators Report* to provide, as stated in the Fact Sheet, "a translator between the current narrative standard and nitrogen thresholds (as they relate to the ecological health of each embayment) which can be further refined based on the specific physical, chemical and biological characteristics of each embayment. This report is intended to provide a detailed discussion of the issue and types of indicators that can be used, as well as propose an acceptable range of nitrogen thresholds that will be used to interpret the current narrative standard."

However, the comment mischaracterizes the Critical Indicators Report. The cited section of the report regarding classification refers to establishing generalized TN criteria that would apply to systems based on their particular physical, chemical and biological characteristics. The quoted section does not address site specific analysis of a single integrated system, which are appropriately addressed through the type of site specific analysis performed by EPA here.

While the comments repeatedly cite the "dramatic difference" between the sites in the Taunton River Estuary and Mount Hope Bay, the contention that the differences should result in significantly different TN criteria is entirely conjectural. These sites are all part of a continuous estuarine system characterized by different levels of mixing of the same two source waters, continual exchange of waters among the estuarine segments, the same sources for sediment, and the same climatic conditions. See Response A.16. The areas differ physically in that the Taunton River Estuary is a linear feature, although characterizing this 2000-foot wide estuary as "very narrow" is questionable; depth variability is actually similar between the two areas at 4-10 meters for the Taunton and 3.5-12 meters for Mount Hope Bay. This would be expected to lead to higher tidal velocities in the Taunton River Estuary, although high velocities are also associated with the Sakonnet River inlet to Mount Hope Bay (this is the narrowest point in the estuary, while termed a “River” the Sakonnet is actually a main source of marine waters to Mount Hope Bay).

More importantly, there is simply no evidence that a higher target TN concentration would be sufficiently protective in the Taunton River Estuary. While some variability in response can be seen in dataplots, see Comment and Response A.4 and A.37, the evidence indicates that the Taunton River Estuary is just as sensitive to eutrophication from nutrient enrichment in terms of DO depletion. Comparison to other tidal rivers would not lead to a different threshold. Tidal rivers leading to Narragansett Bay have not had numeric criteria set for nitrogen, but the Narragansett Bay Estuary Project analyzed the gradient from the Providence/Seekonk River through lower Narragansett Bay and states that “if RI were to develop estuarine nutrient criteria, it is likely that Total Nitrogen would be the most useful nutrient measure, and target TN concentrations would probably be in the vicinity of 0.35- 0.40 mg/l.” See Deacutis and Pryor (2011) at 27. (See Response A.37 for discussion of impacts on permit limits under alternative TN thresholds).

Therefore, as discussed in Response A.22, while EPA’s approach does not attempt to model the variations in the physical settings within this system, there is no indication that the Taunton River Estuary is less sensitive than Mount Hope Bay in terms of DO response. The evidence supports EPA’s determination that 0.45 mg/l TN concentration, which is the midpoint of acceptable TN loadings in the Massachusetts *Critical Indicators Report*, is associated with the transition from impaired to unimpaired conditions within the Taunton River Estuary/Mount Hope Bay system. See Responses A.22 above and A.37 below.

Comment A.37. EPA failed to evaluate the available data which would have confirmed that the response to TN differs in the Taunton River Estuary compared to MHB.

EPA took the sentinel TN concentration at station MHB16 to prepare a mass balance analysis for the Taunton River Estuary at station MHB19. In doing so, EPA presumed, without any demonstration or engineering/water quality analysis, that the conditions responsible for the DO readings in Mount Hope Bay Station 16 are the same as in the Taunton River Estuary. Using the data presented in the Fact Sheet on Table 5 (Fact Sheet, at 35) it is apparent that Bay stations and Estuary stations do not respond in a similar manner (*See* **Figures 11 and 12**). **Figure 11** illustrates the apparent response of mean chlorophyll *a* to mean TN in the Mount Hope Bay stations in comparison with the response in the upper Taunton River stations (stations MHB18, MHB19, and MHB21).[49] The apparent response in the Taunton River is basically flat over a wide range of

TN concentrations (R2 of 0.01, implying no relationship), while the response in Mount Hope Bay suggests a significant influence of inorganic nitrogen on plant growth. Based on this comparison, it should be apparent that these systems behave very differently and the response at the sentinel station cannot be superimposed to predict how TN concentrations affect waters in the Taunton River estuary or the acceptable level of TN for the Taunton River. The higher TN concentrations occurring in the Taunton Estuary *do not* produce higher algal growth (the entire purpose for regulating TN). This observation would occur regardless of conducting a formal "stressor-response" analysis – one needs to merely look at the data to confirm this reality.

As these analyses indicate that EPA's conceptual model does not apply in the Taunton River and certainly confirms algal dynamics in the Taunton Estuary greatly differ from MHB, application of the sentinel model to derive more restrictive TN limitations is inappropriate (*See* EPA Stressor Response Guidance, at 37).

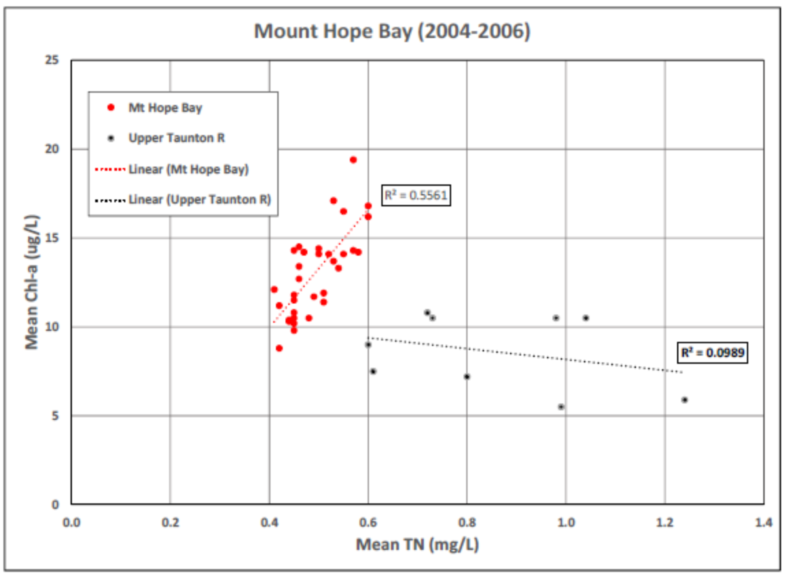


Figure 11: Mean Chlorophyll *a* Concentration versus Mean TN in Mt. Hope Bay and Upper Taunton River (Stations 18, 19, 21)

[49] EPA's Response to Comments on Taunton's draft permit claims that MHB Station MHB21 is not a TN limited station but provides no credible basis for this conclusion. All nutrients are well in excess of those that could limit algal growth and therefore the ratio of the nutrient concentrations at this site is meaningless. Also, EPA observed that use of 2006 data was not proper – one gets the same result by just using the 2004/2005 data. Finally, use of MHB1 and MHB2 were not included because (a) these stations are directly affected by Fall River's inputs that are nowhere considered in EPA's assessment and (b) they are more directly impacted by MHB water quality – MHB2 is essentially part of MHB. It should be noted that the DO and algal conditions at MHB1 are similar to those occurring at the upstream stations and exhibit algal growth well below that occurring at MHB16. Minimum DO at this station is also good between 4.7-5.0 mg/l in 2004/5.

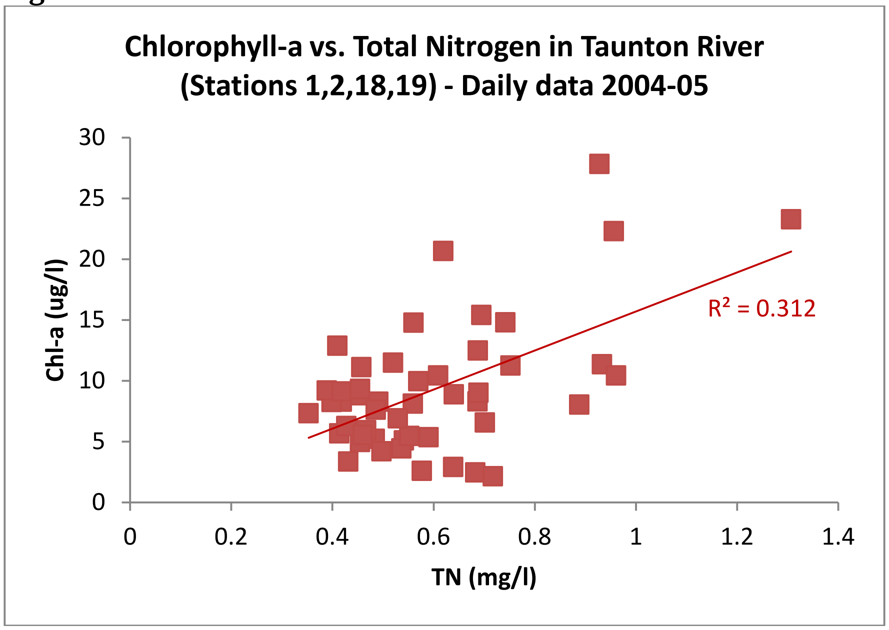
Response A.37.

EPA disagrees that the available data indicate that Mount Hope Bay relationships are inapplicable in the Taunton River Estuary or that the response in the Taunton River is "flat". EPA performed its own analysis of the data in light of these comments and concluded that the contentions set forth in the comments are based on a selective use of the available data and are not supported by a more thorough statistical analysis. The results of EPA's analysis are shown below; however, EPA notes that the data collection effort for this dataset was not designed for the type of stressor-response analysis performed by the commenter and is generally expected to be insufficient to support statistically significant correlations. This is the reason EPA did not perform this type of analysis in its original permit development. EPA therefore emphasizes that the following analysis, while generally supporting EPA's conclusions when all appropriate data are considered, is not expected to provide statistically significant results for determining TN criteria for these waters.

First, EPA notes that the chart supplied in the comment includes data from Station MHB21, which was specifically excluded from EPA's analysis on the grounds that the location did not appear to be nitrogen limited based on the available data. EPA notes, however, that including Station 21 has a minimal effect on the relationship shown in Figure R4 below. In addition, the chart excludes data from Stations MHB1 and MHB2 that are located lower down on the Taunton River. This selection of data would be expected to (1) produce a flat response to nitrogen enrichment as Station 21 is expected to be unresponsive to nitrogen and (2) create the illusion of a stark data gap between the Mount Hope Bay and Taunton River conditions.

EPA's own analysis of the available data does not indicate a "flat" response in the Taunton River. Examination of daily water quality data for stations other than MHB21 in the Taunton River in 2004 and 2005 (the period used in EPA's loading analyses) indicates an upward trend in chlorophyll-a with increasing total nitrogen concentrations, consistent with the conceptual model underlying EPA's analysis.

Figure R4.



Charts by EPA. Source data: SMAST, *Summary of Water Quality Monitoring Program for the Mount Hope Bay Embayment System (2004 – 2006)* (2007), Appendix D.

Again, EPA cautions against drawing firm conclusions based on such low power statistical relationships and did not use such regression analyses as the basis for its permit limits. However, to the extent that such data is informative as to processes operating in Mount Hope Bay and the Taunton River, these regression analyses support EPA's conceptual model regarding the relationship between TN and chlorophyll-a.

EPA does agree that there are some differences between the Taunton River and Mount Hope Bay with regards to nutrient enrichment response. As noted in other comments, the Taunton River appears to be more sensitive to oxygen depletion than Mount Hope Bay. Figure R5's comparison of TN/Chlorophyll-a relationships shows a similar slope of response, but with chlorophyll-a concentrations in the Taunton River below that in Mount Hope Bay for a given nitrogen concentration. These results do indicate some difference in the detailed response, with a somewhat subdued response in terms of algal growth.

Figure R5.

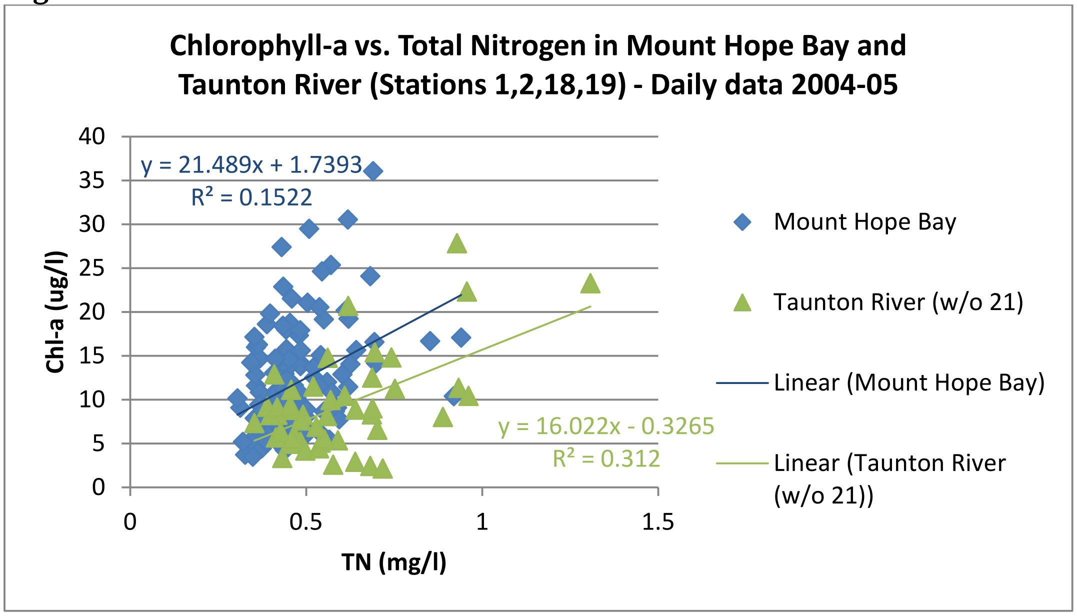


Chart by EPA. Source data: SMAST, *Summary of Water Quality Monitoring Program for the Mount Hope Bay Embayment System (2004 – 2006)* (2007), Appendix D.

While clearly it would be preferable to have reference points within the Taunton River Estuary to determine the target nitrogen concentration at which standards would be met, it is unfortunately the case that the monitoring data indicates no station with the Taunton River Estuary where water quality standards were met. Indeed a significant challenge to establishing an appropriate water quality target is that nitrogen concentrations so greatly exceed the range associated with healthy ecosystems, with average concentrations over the three year monitoring period ranging from 0.6 to over 1.0 mg/l among the five Taunton River stations. This raises concerns about the extent to which relationships that currently exist in the Taunton River can be extrapolated to lower concentrations, such as the possibility that the system is nutrient-saturated and therefore may be unresponsive to increased nutrient concentrations once they reach a saturation threshold. A similar issue was raised in Deacutis and Pryor (2011); it notes that at high concentrations seasonal patterns in DIN "are effectively obliterated . . . as nutrient loads appear to overwhelm assimilative capacity." *Id.* at 23.

Comment A.38. Unique conditions which exist in Mount Hope Bay are not relevant to Taunton River Estuary.

EPA is regulating TN in the Draft Permit under the belief that such control will "cure" low DO conditions in the Taunton River Estuary. This presumption is plainly incorrect based on the available monitoring data. **Figure 12** (below) illustrates the apparent response of minimum DO to mean TN in the Mount Hope Bay stations in comparison with the response in the upper Taunton River stations. Again, the apparent response in the Taunton River is flat over a wide range of TN concentrations while the response in

Mount Hope Bay suggests no relationship between TN concentration and minimum DO.[50] In Mount Hope Bay, minimum DO levels range from 2 – 7 mg/l for essentially identical TN levels, ranging from 0.4 – 0.6 mg/l, with an $R^2 = 0.0001$. This exceedingly low R^2 indicates that minimum DO varies randomly with regard to TN concentration (*i.e.*, the two parameters are unrelated). The Taunton River Estuary shows a much smaller range in minimum DO levels (3.8 – 4.8 mg/l) over a far *larger* TN range of 0.6 – 1.2 mg/l, with an $R^2 = 0.0097$. This exceedingly low R^2 means there is no apparent relationship between TN and minimum DO (*i.e.*, TN explains less than 1% of the variation in minimum DO in the Taunton River Estuary). EPA's failure to analyze such available data was, itself, arbitrary and capricious.

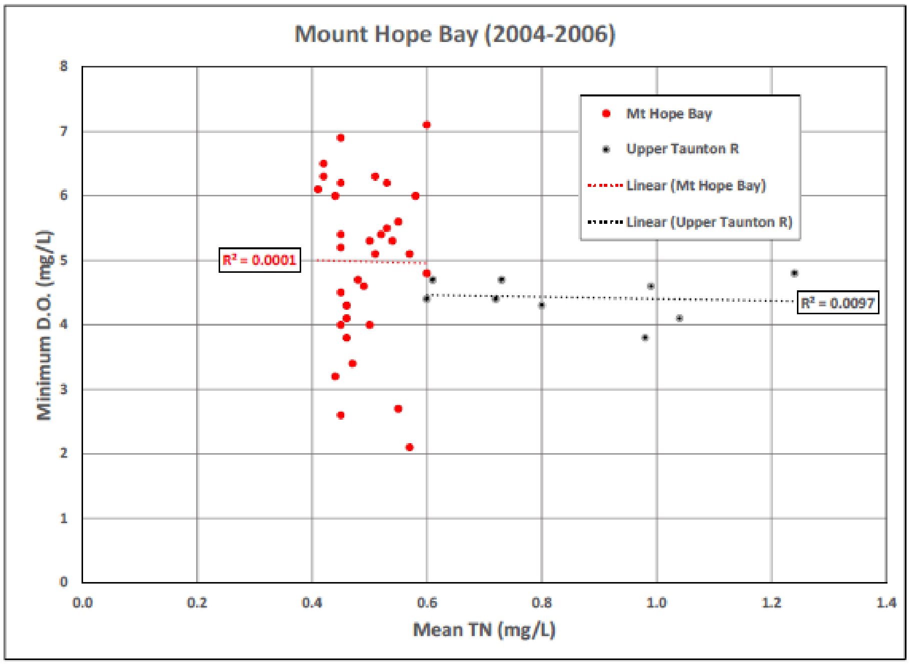


Figure 12: Minimum DO Concentration vs. Mean TN in Mt. Hope Bay and Upper Taunton River (Stations 18, 19, 21)

This complete lack of any meaningful relationship between TN and minimum DO in the Mount Hope Bay stations confirms that other factors, unrelated to TN, are strongly influencing minimum DO and nitrogen control is not likely to achieve compliance with the DO standard. The data assessment also confirms it is improper to presume that the Taunton River Estuary would respond to TN inputs in the same manner that Mount Hope Bay does, as one data set (Mount Hope Bay) indicates a vertical pattern while the Taunton River has a horizontal pattern. EPA, itself, has noted that nutrient criteria should not be developed if the impairment is insensitive to changes in nutrient concentration. Endpoints that were found to be insensitive to changes in nutrient concentrations in a particular estuarine system were not considered further in deriving numeric nutrient criteria for a system. 77 Fed. Reg. 74,924, 74,950 (Dec. 18, 2012).

Site-specific data for Mount Hope Bay and for the Upper Taunton River Estuary show that the minimum DO concentration does not show a defined response to increasing TN concentration. Since the purpose of this TN endpoint is to significantly mitigate exceedances of the minimum DO criterion in the Taunton River Estuary, consistent with EPA's approach to numeric nutrient criteria development in Florida, the proposed endpoint for TN should be deleted from the permit. Consequently, the proposed effluent limit, which is based on restoring a use that is insensitive to increasing TN concentration, is arbitrary and capricious.

[50] EPA's data assessment in the Taunton Response to Comments confirmed that the DO responses for each area are quite different and that the DO response to TN in the Taunton River is flat as confirmed by the regression line. EPA used data from the worst flow period in 2006 at MHB2 near Fall River to create a graph implying a stronger response than documented by Brockton. That was analysis certainly inappropriate given the massive watershed and CSO loads occurring at that time.

Response A.38.

EPA acknowledges that the SMAST data collection efforts were not designed for stressor-response analysis and are not sufficient to produce statistically significant results. See Response A.37. Further, minimum DO in particular is difficult to use for statistical analysis; without continuous DO monitoring the dataset clearly does not reflect actual "minima" and in this case was not even collected in a manner that would be expected to correspond to DO minima, since samples were collected at various times during the day and not at critical predawn conditions. See Response A.27. The commenter is confusing the lack of evidence of a relationship with proof of the lack of a relationship. This is a statistical fallacy.

The comment is also internally inconsistent in stating that the statistical analysis shows no meaningful relationship, but then arguing that the analysis shows different relationships in Mount Hope Bay and the Taunton River (vertical vs. horizontal). There is no vertical or horizontal "pattern" to the data presented; as expected minimum DO concentrations are variable and the Taunton River data cover a much broader range of TN concentrations (with uniformly low DO concentrations).

The comment's citation of 77 Fed. Reg. 74,924, the supporting document for the most recent proposed nutrient criteria for Florida waters, is inapposite. That document states the unexceptionable premise that, for those waters where a stressor-response statistical analysis was used to develop relationships between nutrient concentrations and specific endpoints, and the endpoints were "not sufficiently sensitive to increases in TN or TP concentrations . . ., then the statistical models were not used to derive candidate criteria for the particular nutrient." Here, however, EPA did not use a stressor-response approach in determining the target nitrogen concentration. See Responses A.21 and A.25.

Moreover, the commenter's conclusions rely on a selective use of data. As discussed in Response A.37, the commenter excluded two Taunton River stations from the analysis, essentially creating the illusion of a large break between the two datasets by omitting the stations located between the two areas. The comment chart also includes data from Station MHB21, which EPA determined not to use in its analysis because it appears that station may not be nitrogen-limited. See Fact Sheet at 34.

The comment's suggestion that EPA was arbitrary and capricious in failing to analyze the data in the manner suggested in the comment is without merit. EPA did not rely on a stressor-response statistical analysis in developing the nitrogen limit in the Draft Permit. Rather, EPA performed a reference-based analysis consistent with the MEP process and supported by the available data. It was, and remains, EPA's opinion that the available data are not sufficient to establish statistically significant stressor-response relationships, both because of the small dataset (three years of data) and because of the nature of the monitoring program (no continuous monitoring [fixed network data limited to a single site from a different program] and not designed to measure critical DO conditions). However, to the extent conclusions can be drawn from the statistical evidence, the data does not contradict – indeed tends to support – EPA's conclusions, and the comment's attempt to show otherwise is based on flawed analysis.

Comment A.39. MHB16 located at mouth of Sakonnet River is not representative of conditions at MHB19 in the Taunton River Estuary or other areas of MHB

Multiple hydrodynamic studies have demonstrated that the Sakonnet River, a unique tidal strait, 1) accounts for only 10% of the flow to and from Mount Hope Bay and 2) at times, experiences flow patterns in the opposite direction of the other 90% of flow (*See* **Figures 13 and 14** below, approximate MHB16 location marked with red 'X'; Kincaid, 2006; Zhao, Chen & Cowles, 2006; Chen, Zhao, Cowles & Rothschild, 2008). This means that during flood tides, 90% of the flow into Mount Hope Bay originates from the western sections of Narragansett Bay while the 10% passing through the Sakonnet River originates directly from the Atlantic Ocean. Moreover, if water quality samples are taken at MHB16 without taking into account the flow reversals in the Sakonnet River, it cannot be known whether the sample represents conditions in the Atlantic Ocean or Mount Hope Bay given the circular eddy pattern exhibited at this location which is unique to the entire system. The Sakonnet River's swift and turbulent flows (flows > 1.50 m/s (Kincaid, 2006)) and direct connection to the Atlantic Ocean likely account for the consistent high DO readings at MHB16 since stratification would be difficult. In addition, the depth at MHB16 is 12.50 m while the depth at MHB19 is 5.78 m, a difference of 6.78 m (22.2 ft; Howes & Samimy, 2007). This provides far greater dilution from the effects of SOD, should they exist at this turbulent site. Accordingly, MHB16 cannot be expected to respond or behave similarly as MHB19, located several miles up the Taunton River, as the sentinel site approach would require.

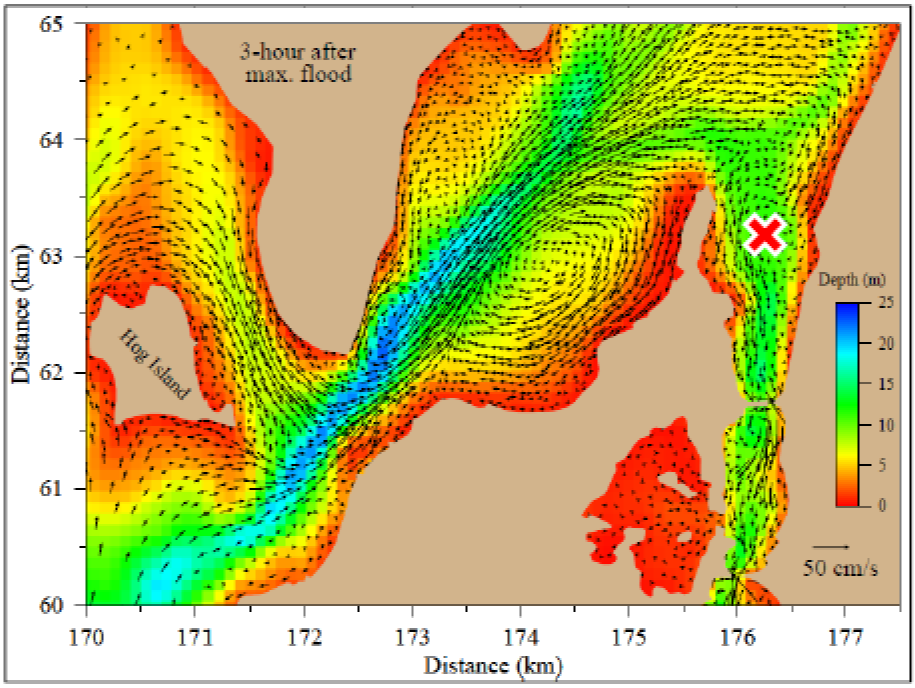


Figure 13: FVCOM Model Output, 3-hour After Maximum Flood

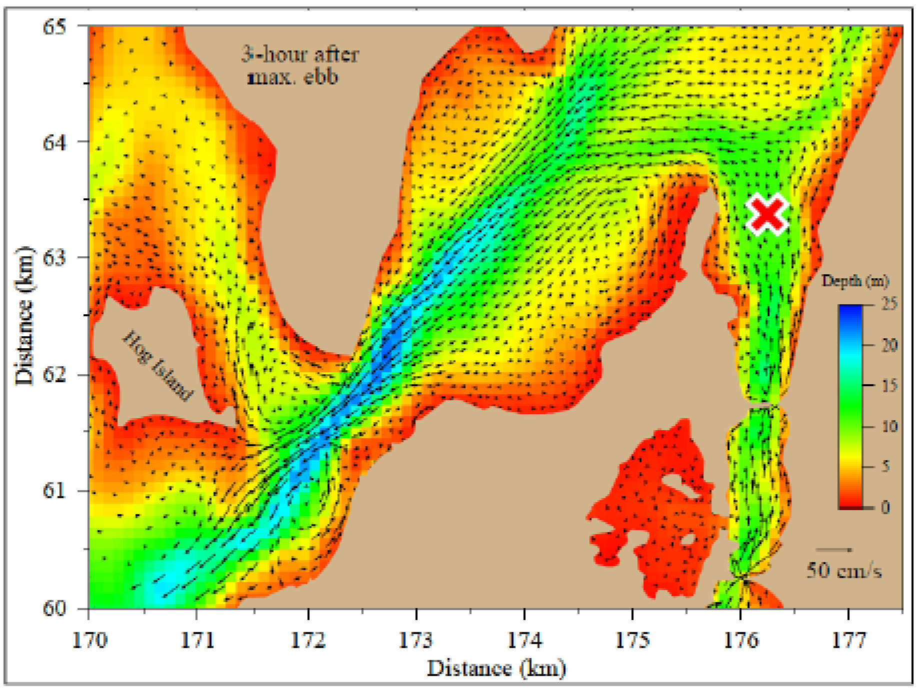


Figure 14: FVCOM Model Output, 3-hours After Maximum Ebb

It is inaccurate to represent tidal hydrodynamics in Mount Hope Bay with observations from Sakonnet River Narrows. The hydrodynamic modeling studies indicate that while the system acts as a whole, there are dramatic differences in the exchange across the northern and southern flow boundaries. Mount Hope Bay is controlled by two narrow channels, the East Passage and the Sakonnet River. The East Passage channel is approximately 800 m wide, while the Sakonnet River is only 70 m (Zhao *et al*., 2006). The Sakonnet River Narrows is 70 m wide at the Sakonnet River Bridge (the northern end of the narrows) and 150 m wide at the Stone Bridge (the southern end of the narrows).

Kincaid (2006) used four Acoustic Doppler Current Profiler (ADCP) transects to identify flow patterns in Mount Hope Bay (**Figure 15**). Transect T2 is located at the northern entrance of the Sakonnet River. It was located in such a fashion to be outside of the vigorous flow conditions represented by extremely high water velocities (> 150 cm/s), turbulent boils with surface expressions, and standing waves. In addition, the ADCP surveys indicate that flow in the East Passage (T1) is out of phase with that in the Sakonnet River (T2) during certain phases of the tide.

The East Passage is more efficient in tidal exchange such that on flood tides, there is a setup of water surface elevation resulting in ebbing flow through the Sakonnet River. And during ebb tides, a resultant set down relative to the East Passage and the Sakonnet River results in flooding flow through the Sakonnet River. However, the ADCP transect at the Taunton River Estuary more closely matched the East Passage and was in phase with that location, with flow rates 4 to 5 times lower.

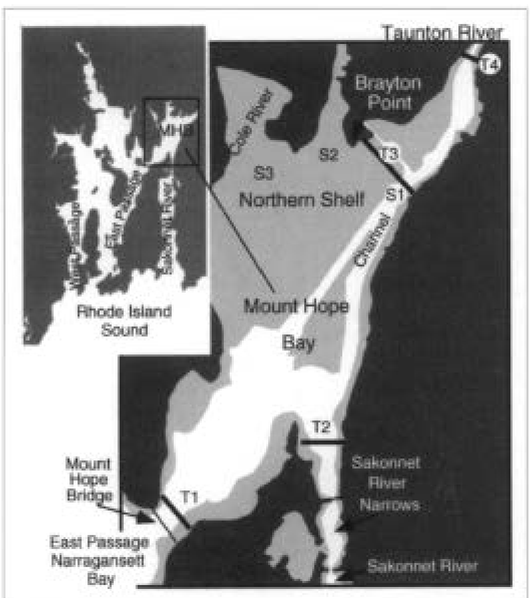


Figure 15: Map of Mount Hope Bay estuary and the locations of ADCP transect lines (T1, T2, T3, and T4). [From Kincaid, 2006]

Zhao *et al*. (2006, Attachment G) applied the Finite-Volume, primitive equation Community Ocean Model (FVCOM) to the Mount Hope Bay – Narragansett Bay system to obtain spatially and temporally varying flow patterns missing from observations. FVCOM is an unstructured grid finite-volume ocean model that was applied to Mount Hope Bay with a high resolution grid to appropriately identify the complex flow associated with the narrow passages (**Figure 16**). The volume transport through Mount

Hope Bay channel on a spring tide is greater than 5 x 103 m^3/s whereas volume transport is much smaller through the Sakonnet River channel is less than 103 m^3/s. The model computed water volume transport to be 10 to 20% different between the two passages into Mount Hope Bay. These findings were in agreement with the observations of Kincaid (2006) with the difference in volumetric flow between the two passages.
In addition, the model exhibited eddies along the edge of the flow in the narrow channels. These eddies can be responsible for increased flushing as their turbulent nature.

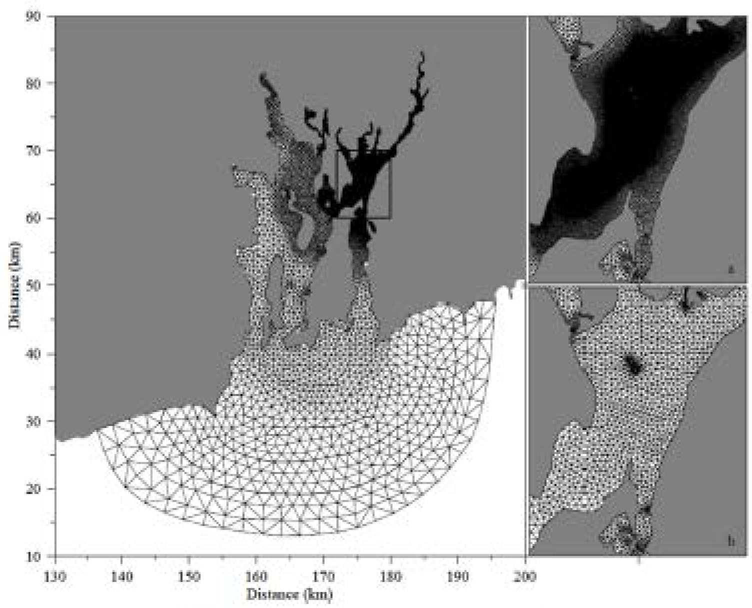


Figure 16: Unstructured FVCOM grid used in Zhao, *et al.* (2006).

The analysis performed in support of the TN limits in the Brockton draft permit are not comparable to the above cited studies, and the City also notes that the MEP predicates its analysis on a highly discretized steady-state hydrodynamic model that uses site-specific bathymetric data to understand the mixing dynamics in the water body under consideration. EPA instead uses a simplistic salt balance-based analysis, described in Fischer (1979) that does not account for any unique bathymetric features. Fischer (1979) cautions against such use of the simplified salt-balance approach, stating that it is a good first approximation.

> We use the one-dimensional analysis mostly as a matter of practical necessity; two- and three-dimensional analyses, even using very sophisticated computer codes[51], are not workable for many practical problems. Use of a one-dimensional model is usually acceptable if the following tests are met:
>
> 1. The time scale for mixing across the estuary, approximately 0.4 W^2/ε_t, where W is the width and ε_t the transverse mixing coefficient, is significantly less than the time required for the effluent to pass out of the estuary or into a section of greatly changed cross section, or for the substance to decay.

2. The estuary is not significantly stratified, so that the effluent can be expected to mix uniformly over the depth (although if the estuary is strongly stratified it is sometimes possible to use separate one-dimensional analyses in each layer).

3. Allowance is made in the analysis for higher concentrations expected near the source, before cross-sectional mixing takes place, and for distributed sources and sinks in the case of a naturally occurring substance such as nutrients, dissolved oxygen, etc.

If these tests cannot be met the engineer may elect to use the one-dimensional analysis anyway, for valid practical reasons, but he should be careful to take account of the possibility for error.

Fischer *et al*., 1979 (Attachment CC)

A rough, approximate estimate of the transverse mixing scale across the estuary can be found by using observed transport rates from Kinkaid (2006) along the T3 transect shown in **Figure 15** above. The T3 transect is 1,450 m wide, has a cross sectional area of 16,000 m2, and an average depth of 11 m. Based on the ADCP measurements taken at this location, the average transport rate was 300 m^3/s out of the Taunton River; combined with the cross sectional area, this yields a tidally averaged velocity of 0.02 m/s. This is consistent with the description in Kinkaid, where one defining feature of this estuary (Kinkaid, 2006 at 1), is that the velocity across the northern shelf was sluggish, and significantly lower than the velocity within the deeper channel.

This means that the low average velocity is counteracted by significantly larger velocities within the deep channel. Based on the average velocity and the geometric properties of Mount Hope Bay at transect T3, the transverse mixing time is on the order of 100s of days, significantly greater than the flushing time. This means that the discharge from the Taunton River is not well mixed across the estuary – the low velocities across the northern shelf inhibit transverse mixing – and therefore a one dimensional model will overestimate nutrient concentrations attributable to the Taunton River across the northern shelf and underestimate concentrations attributable to the Taunton River in the deeper and faster moving channels.

Mount Hope Bay and the Taunton River are significantly stratified, as noted in Taunton Response to Comments C23, "EPA agrees that stratification is a factor in the development of minimum DO conditions." EPA goes on to state that "stratified conditions appear in both Mount Hope Bay and the Taunton River Estuary" (Taunton Response to Comments at 87). According to the criteria cited above in Fischer *et al*., at a minimum the analysis in the Fact Sheet was required to acknowledge the possibility of error in its calculation due to the stratified conditions observed within the estuary. Nonetheless, the existence of significant stratification within the estuary precludes the application of such a one-dimensional model for the purposes of calculating the allowable load required to achieve the target total nitrogen concentration.

Finally, the third test cited in Fischer *et al*. is that an allowance was made for naturally occurring substances, such as nutrients and dissolved oxygen. While EPA did use attenuation factors to account for decay in nitrogen from the source (*e.g.*, Brockton AWRF), no other allowances are made to account for additional sources or sinks of total nitrogen within Mount Hope Bay, including the Fall River WWTP, a major source of nitrogen to the Bay.

The failure of Mount Hope Bay to meet the requirements of the three tests as cited in Fischer *et al*. suggests that this one-dimensional approach is a good first cut approximation, but that it falls short of the comprehensive, highly discretized hydrodynamic modeling used in the MEP studies to best characterize nutrient fate and transport within the estuary. As such, the methodology employed by EPA is good starting point for future study, but it is too coarse to base decisions that will have high economic impact, such as stringent nutrient limits on the Brockton AWRF discharge.

[51] Note that Fischer's textbook, although still considered to be one of the best references in the field, was published in 1979 when computing power was significantly limited compared with today's capabilities.

Response A.39.

EPA disagrees with the main thrust of this comment that MHB16 might not be used as a reference site since the tidal hydrodynamics at MHB16 vary significantly from MHB19. EPA acknowledges that significant differences exist between these two sites, including physical characteristics, stratification and tidal hydrodynamics. However, MHB16 was not chosen as a reference site because it matched MHB19 in all of these attributes. Rather, MHB16 was chosen as the reference site because it was demonstrated to be the uppermost site within the embayment where dissolved oxygen standards were met. See Fact Sheet, at 45. As noted in Response A.4, even if EPA had not used MHB16 due to depth and hydrodynamic differences, the other stations in Mount Hope Bay do not lead to a different threshold.

EPA also notes that if DO levels at MHB16, as the comment describes, are significantly influenced by tidal hydrodynamics such as high currents, large depth and lack of stratification, all these would function to make DO depletion in the vicinity of MHB16 more resistant to elevated TN levels. Since the upper Taunton River would therefore have higher levels of stratification than MHB16, the processes that deplete DO, including algal blooms, would be exacerbated beyond levels seen at MHB16. This would only indicate that the TN threshold of 0.45 mg/l may not be low enough when applied in the upper Taunton River where such hydrodynamic forces are not impacting the system. See Response A.27. This interpretation of the hydrodynamic differences would be consistent with a lower target range of 0.35-0.40 mg/l based on Narragansett Bay data. See Deacutis and Pryor (2011) at 27.

However, EPA did not directly incorporate the impacts of tidal hydrodynamics in its analysis. The complexity involved with comparing the impact on DO due to the relative hydrodynamics of these two sites is beyond the scope of what the available data would allow. EPA affirms its conclusion that MHB16 is a reasonable choice as a reference site for achieving DO standards throughout the Taunton River Estuary and Mount Hope Bay.

While EPA agrees that more complex modeling analyses often yield more precise results, EPA does not agree that the mixing analysis performed in the Fact Sheet was "too coarse to base decisions" on. The comment states that "[w]e use the one-dimensional analysis mostly as a matter of practical necessity; two- and three-dimensional analyses, even using very sophisticated computer codes, are not workable for many practical problems." EPA notes that while computing power is greater now, a hydrodynamic/water quality model has not been developed for the Taunton River. Furthermore, the loading analysis performed in the Fact Sheet was done on the upper Taunton River while the critiques in the comment focus on an area that is much farther down the embayment and that is wider with more complex circulation. Even if the loading analysis in the Fact Sheet should be regarded as an "approximation," EPA notes that this would still result in a reasonable estimate of the required loading reductions. See Responses A.24 and A.29 regarding a "zone of reasonableness."

Comment A.40. 2000 report data indicate that high chl-a levels originate in Cole River and are not associated with elevated nutrients from the Taunton Estuary

Data collected in the summer of 2000 demonstrate (like the 2004/5 MEP data) that high chlorophyll *a* levels originate in the Cole River (*see* **Figure 17** below; Krahforst & Carullo, 2008). Perhaps more importantly, **Figure 17** indicates that increased algal levels do not occur in the Taunton Estuary response to elevated nutrients (NO_3, NH_4+, o-PO_4) as the lowest chlorophyll *a* concentrations (located in the Taunton River) are associated with the highest nutrient inputs. This is opposite of the underlying presumption made in the Fact Sheet's derivation of the nutrient limits. Thus, it is apparent that (1) the Taunton River does not respond like MHB and (2) the sentinel station DO has virtually nothing to do with nutrient or algal conditions in the estuary.

Response A.40.

EPA disagrees with the comment that chlorophyll-a levels are not associated with elevated nutrient loads from the Taunton Estuary simply because the measured levels are at different locations within the estuary. See Response A.37 relative to differences between Taunton River and Mt. Hope Bay as far as chlorophyll-a response to elevated total nitrogen levels. Further, the suggestion that chlorophyll-a from the Cole River is somehow the cause of high chlorophyll elsewhere in the estuary is completely without merit, especially when the 2004-2006 data indicate that chlorophyll-a levels in the Cole River are not actually higher than most of the estuary stations. The comment is also misleading in that it only cites to dissolved inorganic nitrogen which would be expected to

> significantly decrease as you move down the estuary due to uptake by algae growth.

Comment A.41. EPA conclusions and inconsistencies from Taunton permit (MA0100897) Response to Comments confirm nutrient effluent limit derivations are unsupported and inappropriate

In the Taunton permit (MA0100897) Response to Comments, EPA makes a number of claims regarding the defensibility of the permit's nutrient limit derivations and subsequently contradicts these claims in the same document. The following provides examples of EPA's admission of the indefensibility and inappropriateness of the permitted nutrient limits, thoroughly undercutting the reasonableness of EPA's proposed permit action for Brockton.

Response A.41.

See below (Responses A.42 through A.50) for relevant response to each comment.

Comment A.42. Taunton Estuary and Mount Hope Bay Are Distinctly Different Waterbodies:

EPA originally refutes comments that assert the Taunton Estuary and Mount Hope Bay are distinctly different waterbodies and should be analyzed as such.

> The comment footnote clearly overstates its case with the insistence that there "is no objective resemblance" between Mount Hope Bay and the contiguous Taunton River Estuary, and that they are "radically different" with "no rational basis to believe [they] are similar in any way." […] these are in fact a series of segments of the same estuarine system, characterized by *different* levels of mixing of the same source waters, continual exchange of waters among the estuarine segments, the same sources for sediment, the same climatic conditions, *minor difference* in depth range (Taunton River depths range from 4 to 10 meters; Mount Hope Bay from 3.5 to 12 meters) and *different* widths (the Taunton River is *one-third to one-half mile across*; while Mount Hope Bay is *over 2 miles across* at its widest point). More specifically, chlorophyll-a concentrations are not less at station MHB 19 than at MHB 16 in a normal year. (emphasis added; Taunton Response to Comments at 48).

While EPA's response attempts to refute these comments, it also concedes that there are differences that would certainly be expected to result in dissimilar responses to changes in water quality in the two waterbodies. Subsequently in the response to comments, EPA more explicitly notes there are meaningful differences between the two waterbodies:

> However, *EPA agrees that there are differences between the Taunton River and Mount Hope Bay in these relationships*; the differences appear to be related to

> other water quality conditions that differ in the two locations. As noted in other comments, the Taunton River appears to be more sensitive to oxygen depletion than Mount Hope Bay, likely *due to the presence of other oxygen demands in the Taunton River*. (emphasis added; Taunton Response to Comments at 92). While a half kilometer to kilometer of difference in location might not be expected to produce such difference in concentration in this area of Mount Hope Bay *there may be variability in conditions due to the proximity to the Fall River discharge and to the Sakonnet River which is known to create unusual flow patterns and reversals under some tidal conditions*. (Taunton Response to Comments at 110).

Given the admitted differences affecting the DO regime at each site, it is simply unreasonable or EPA to claim that TN levels found at MHB19 serve as a reliable predictor of acceptable TN levels at MHB19.

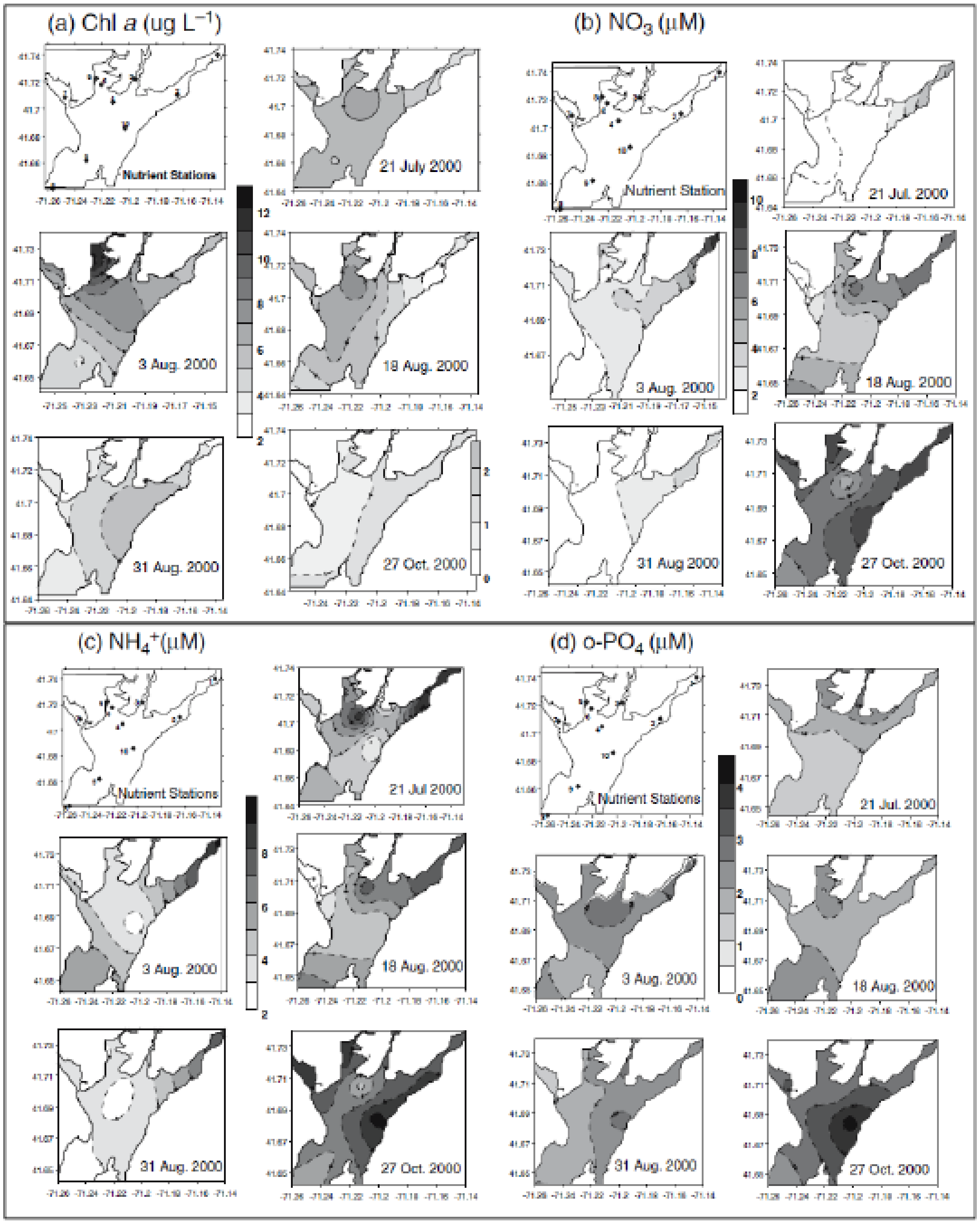


Figure 17: Generalized Surface Water Concentrations of Chl *a* (µg/l), NH_4^+, NO_3, and o-PO_4 (µM) Derived from Water Quality Monitoring by MCZM During the Summer, 2000 (Reproduced from Figure 13.8 in Krahforst & Carullo, 2008)

Response A.42.

EPA disagrees that the references above constitute a contradiction regarding EPA's understanding of the relationship between the Taunton Estuary and Mount Hope Bay. Rather, in the two references EPA is highlighting the fact that there

> are some similarities and other differences between the two waterbodies which were considered when conducting the Taunton analysis. This was a necessary clarification in response to the commenter's view that there "is no objective resemblance" between Mount Hope Bay and the contiguous Taunton River Estuary, and that they are "radically different" with "no rational basis to believe [they] are similar in any way."

Comment A.43.

II. Appropriateness of SMAST Data:

a) Reliability and Sufficiency of SMAST Data

EPA acknowledges:

> […] the data collected in the SMAST survey was intended for a MEP analysis and was not designed for stressor-response analyses. EPA therefore did not apply the data in that manner, and does not expect the dataset to support statistically significant analyses when used for that purpose. (Taunton Response to Comments at 51).
>
> […] the SMAST data collection was not designed for such an approach [stressor-response] and more recent data collection is extremely limited. (Taunton Response to Comments at 54).

However, EPA then claims that these SMAST data are sufficient, but newer datasets are insufficient:

> The analysis performed by EPA was based on the only comprehensive dataset available for determination of system-wide nutrient impacts; the recent data (from URI and the Narragansett Bay Commission) is limited both in location and in parameters monitored […]. (Taunton Response to Comments at 58).
>
> As noted above the more recent data are too limited to provide a basis for a new analysis (the data used by EPA continues to be the only comprehensive dataset available that is usable to determine watershed loads and reductions), but EPA's analysis is consistent with the recent data […]. (Taunton Response to Comments at 58).

EPA is however concerned that there is such a large discrepancy between SMAST data and URI-GSO data for the Mount Hope Bay buoy site for the one year overlap […] (Taunton Response to Comments at 109).

> For these reasons EPA has concerns about the comparability of these [URI and Narragansett Bay Commission] data and is not revising its conclusions on this basis. (Taunton Response to Comments at 112).

EPA seemingly immediately contradicts these assertions:

> The commenter has provided references to additional data that EPA did not have in its possession in development of the permit limits (particularly unpublished data collected by the University of Rhode Island) and *EPA agrees that these data should also be considered*. (emphasis added; Taunton Response to Comments at 58).

Throughout the responses to comments, EPA uses Figures R1-R13 to defend its conclusions (Taunton Response to Comments at 91-114). These figures cite SMAST data from 2004-2011 as well as EPA and NOAA data from 2006, URI/GSO data from 2006-2013 and Narragansett Bay Fixed-Site Monitoring Network data from 2010. At times, EPA includes 2006 SMAST data even though "2006 was an extremely wet year that was not used by EPA in its permit limit analysis." (Taunton Response to Comments at 81). EPA originally asserts that newer data are "too limited" to be useful, then agrees these data should be considered and ultimately uses the data to defend its conclusions. If the data were not sufficient to allow any type of stressor-response analysis to be conducted, EPA should not have used the SMAST data to predict the necessary levels of TN (stressor) to control minimum DO (response) in the Taunton Estuary.

Response A.43.

There is no inconsistency in how EPA used the data. EPA was clear that the 2004 – 2006 data set was by far the most comprehensive data set and therefore the most appropriate for use in a weight of the evidence determination of necessary nitrogen reduction requirements. EPA and SMAST were clear that the 2004-2005 data set was not designed to support stressor/response analyses and only conducted this type of analysis in response to misleading stressor/response analyses provided by the commenter. EPA was abundantly clear that these types of analyses were not used to establish the permit limits.

The comment completely mischaracterizes how EPA used the URI-GSO data. EPA was clear that this data is not sufficient to support a weight of the evidence analysis of necessary nitrogen reductions since it is from a single station in Mt. Hope Bay. It is however very useful for documenting that chlorophyll-a is still elevated and dissolved oxygen is still impaired at this single station. EPA's concerns with the comparability of the URI-GSO data set were clearly limited to the total nitrogen data and EPA thoroughly explained those concerns.

See Responses A.37 and A.38.

Comment A.44.

b) Minimum DO Cannot Be Determined
EPA acknowledges "[…] continuous monitoring is not available for characterization of the frequency and duration of DO deficits" because only daily DO data are available (Taunton Response to Comments at 52, 88). Therefore, the SMAST minimum DO data cannot be used to develop statistically sound thresholds for comparing DO between the two locations.

Response A.44.

While continuous monitoring would be useful for determining the frequency and duration of DO deficits, is was not available so those determinations could not be made. However, daily DO data were available which EPA was able to use in developing thresholds for protective nitrogen levels. This issue is discussed in more detail in Responses A.37 and A.38 above, which state that minimum DO in particular is difficult to use for statistical analysis; without continuous DO monitoring the dataset clearly does not reflect actual "minima" and in this case was not even collected in a manner that would be expected to correspond to DO minima, since samples were collected at various times during the day and not at critical predawn conditions. Further, while EPA does not expect strong statistical results from the available DO data because of its limited nature and the sampling conditions (collected at different times of day rather than under critical near dawn conditions), the data appear to support the relationship between chlorophyll-a and DO. While EPA made a reasonably conservative determination of a protective total nitrogen threshold based on the limited data set available, we acknowledge that, if minimum dissolved oxygen data were available for all stations, a lower total nitrogen threshold may have been determined to be necessary.

Comment A.45.

II. TN Threshold Derivation:

a) Sentinel Method

EPA claims refutes that the "basis for the TN threshold is not 'a single location' in Mount Hope Bay, but consideration of data from a full dataset of twenty-two monitoring stations in the Mount Hope Bay and Taunton River Estuary system […]" (Taunton Response to Comments at 35). While EPA considered other stations, the TN threshold is based off admittedly insufficient data, "based on a location" (*i.e.*, a single station/location) over a two year span (Brockton Fact Sheet at 45). Thus, EPA admits, in fact, its selected endpoint is based on the results of a single location.

Response A.45.

EPA disagrees that the references above constitute a contradiction regarding EPA's use of all available data in both the Taunton and Brockton analyses. As stated, the basis for the TN threshold is not "a single location" in Mount Hope Bay, but consideration of data from a full dataset of twenty-two monitoring stations in the Mount Hope Bay and the Taunton River Estuary system, along with information from scientific literature and research in other estuarine systems. These sources of information are appropriately considered by EPA in interpreting narrative criteria in accordance with 40 CFR § 122.44(d)(1)(vi).

Using the full suite of data from this comprehensive monitoring of the Taunton River Estuary/Mount Hope Bay system, EPA was able to characterize the transition from unimpaired to impaired conditions associated with increasing TN concentrations, expressed in terms of a location in Mount Hope Bay which represented the highest TN concentration where impairments were not identified. This analysis is supplemented by consideration of TN thresholds identified in other systems (a range of 0.39 to 0.50 mg/l identified for SB waters in Massachusetts). Specifically, the frequency of DO violations and elevated chlorophyll-a concentrations at TN concentrations above 0.45 mg/l at multiple sites throughout Mount Hope Bay and the Taunton River Estuary provided a strong indication that the upper end of the range (0.39 to 0.50 mg/l) identified in the Critical Indicators Report is not sufficiently protective in this system and that a threshold of 0.45 mg/l is necessary to achieve dissolved oxygen and nutrient water quality standards.[13] EPA therefore used that threshold to calculate allowable loads to the system and associated permit limits to meet that load.

Comment A.46.

b) No Cause-and-Effect Demonstration

EPA states that 1) it does not have to demonstrate cause-and-effect with respect to nutrients causing low DO in the system and 2) due to insufficient available data, it did not demonstrate said cause-and-effect (Taunton Response to Comments at 68, 71). Yet, EPA made "predictions" about the levels of nutrient reduction required to cause an effect, an increase in DO to above 5.0 mg/l. In the context of science, a prediction implies and requires a cause-and-effect demonstration.

Moreover, EPA acknowledges that:

[13] EPA also notes that a probable range of criteria for total nitrogen "in the vicinity of 0.35 to 0.40 mg/l" is suggested in Deacutis & Pryor, Nutrient Conditions in Narragansett Bay & Numeric Nutrient Criteria Development Strategies for Rhode Island Estuarine Waters (2011). While this range is lower than the endpoint identified by EPA for this analysis, EPA believes the site specific information supports the 0.45 mg/l target. See Response A.37 for further discussion.

> […] indeed, the mechanism by which nutrients *cause* DO depletions is through increased organic matter. (emphasis added; Taunton Response to Comments at 37). *EPA's conclusion that nitrogen discharges are causing cultural eutrophication in the Taunton River Estuary and Mount Hope Bay* is clearly described in the Fact Sheet:
>
>> *The Taunton River Estuary and Mount Hope Bay have reached their assimilative capacity for nitrogen and are suffering from the adverse water quality impacts of nutrient over-enrichment, including cultural eutrophication*. They are, consequently, failing to attain the water quality standards described above. *The impacts of excessive nutrients are evident throughout the Taunton River Estuary and Mount Hope Bay.*
>
> The Fact Sheet goes on to describe the *extensive evidence supporting EPA's conclusion that nitrogen is causing water quality standards violation, including extensive monitoring evidence indicating elevated chlorophyll-a concentrations and DO depletions* […]

(emphasis added; Taunton Response to Comments at 68).

In several instances, EPA discusses demonstrating the connections between minimum DO violations and their causes (*i.e.*, cause-and-effect). However, no such scientifically sound analysis has been provided or demonstrated in the Taunton River Estuary or Mount Hope Bay. As EPA admits it could do no cause-and-effect analysis, its statements in the Brockton Fact Sheet to the contrary are false.

Response A.46.

EPA disagrees that the references above constitute a contradiction regarding EPA's characterization of both the Taunton and Brockton analyses. Simply because EPA uses the terms "causing" or "impacts" to describe the relationship between nutrients and eutrophication, does not indicate that a "stressor-response" regression analysis was performed by EPA. Rather, the analysis performed was not a stressor-response approach but a weight of the evidence-based analysis that included consideration of a reference site in the estuary and is consistent with regulations for conducting reasonable potential analyses and establishing water quality based nitrogen limits using a narrative nutrient criterion. See Response A.24

Furthermore, the governing standard is not that EPA "confirm[] that nutrients are the actual cause of low DO measured" in the receiving water. Rather, the regulations require an effluent limit if a pollutant discharge "causes, has reasonable potential to cause, or contribute to" an exceedance of a water quality standard. 40 CFR § 122.44(d); *In re Town of Newmarket, NH*, NPDES Appeal No. 12-05 (EAB Dec. 2, 2013). In the absence of detailed mechanistic models, EPA is obligated to rely on the best available information to derive an impairment threshold and has done so here. There is inevitably some scientific uncertainty associated with the analysis of complex systems, even when detailed models are available, and EPA has appropriately moved forward with permit limits in the face of uncertainty here. *See In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577, 606 (EAB May 28, 2010) ("[S]cientific uncertainty is not a basis for delay in issuing an NPDES permit.").

Given this uncertainty, EPA also notes that the causal relationship among nitrogen, chlorophyll-a and dissolved oxygen is in fact well understood and is supported by data in this system. See Response A.18.

Comment A.47.

c) No Stressor-Response Analysis

Similarly, EPA claims, "[t]he comment's reference to stressor-response documents is not applicable as the permit limit analysis was not based on stressor-response relationships" (Taunton Response to Comments at 72). However, EPA also claims that excessively elevated nutrients are causing excessive algal blooms (stressor) resulting in minimum DO violations (response).

Response A.47.

Both "claims" cited in the comment are true. As EPA has indicated in numerous other responses, stressor/response analyses were not used in establishing the permit limit and the causal relationship among nitrogen, chlorophyll-a and dissolved oxygen is in fact well understood and is supported by data in this system. See Responses A.10, A.18 and A.46 above.

Comment A.48.

III. No Analysis of Confounding Factors:

EPA acknowledges that:

> […] in complex systems such as estuaries, DO conditions are affected by a number of interacting factors and it is generally not the case that algal growth (or any other single condition) is the *only* factors influencing DO concentrations. (emphasis in original; Taunton Response to Comments at 46).

However, EPA provides no analysis of consideration of these other factors in order to provide evidence that these other factors are negligible or that nitrogen is a controlling parameter.

EPA further asserts:

> These recent data indicate that any reductions in pollutant loads that have been achieved through improved treatment have not been sufficient to achieve water quality standards, a result that is consistent with the prediction from EPA's analysis that a substantially greater reduction in nitrogen loadings would be necessary in order for water quality standards to be achieved. (Taunton Response to Comments at 58).
>
> Krumholz concluded that there was no observable response in chlorophyll or primary production from the [17%] reduction to date […]. (Taunton Response to Comments at 62).

Without considering confounding factors, these statements equally support the contention that nutrients are not driving DO concentrations in the system and therefore, nutrient reductions will have no substantial impact on DO or another factor may be more influential.

Response A.48.

EPA disagrees that the references above constitute a contradiction regarding EPA's consideration of "confounding factors" in both the Taunton and Brockton analyses. In fact, these references both appear to be supporting the same position, namely that there are many factors, including nutrient loading and algal growth, that contribute to DO impairment. This matter of "confounding factors" has also been addressed in Responses A.25, A.26, A.27, and A.29 above. In brief, EPA considered all available information related to the "confounding factors," including stratification, to the extent necessary in supporting the reference-based approach conducted for the purpose of setting permit limits.

Contrary to the comment, there is no indication, from EPA or Krumholz, that nutrients are not driving DO concentrations in the system. In fact, following the conclusion of Krumholz referenced in the comment, he goes on to say that "a 50% reduction [in total nitrogen loads] would warrant a reanalysis." See Response A.17. This reference to a 50% reduction is in accordance with EPA's recommended reduction in watershed loads of 51% in order to meet water quality standards in the Taunton River Estuary. See Brockton Fact Sheet, at 47.

Comment A.49.

IV. EPA Inconsistently and Inappropriately Uses 2006 and MHB21 Data:

EPA acknowledges that 2006 was an extremely wet year with a particularly wet May-July period, resulting in conditions not representative of the system (*see* **Figure 18** and **Table 4** below). EPA acknowledges this fact in the Taunton Response to Comments: "2006 was an extremely wet year that was not used by EPA in its permit limit analysis." (at 81).

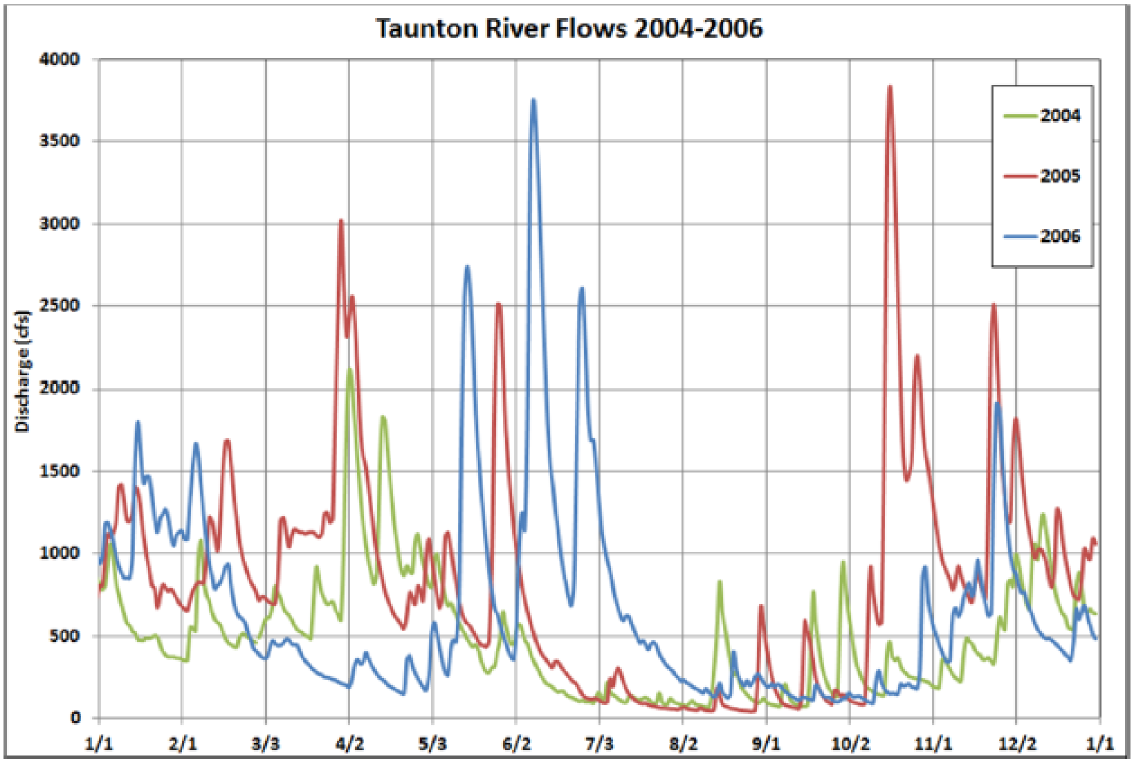


Figure 18: Taunton River Flows, 2004-2006

Table 4: Average Taunton River Flows (cfs), June 5-July 5, 2004-2006

Year	2004	2005	2006
Flow (cfs)	204	311	1,776

In Figure R5 in the Response to Comments, the outlying low DO datum was averaged from 2006 data. This same datum is used in Figure R6 and drives the green Taunton DO trendline downward, artificially supporting the appearance that DO responds similarly to chlorophyll *a* changes in the Taunton River and Mount Hope Bay. It should also be noted that Figure R6 as well as Figures R5 and R8 use MHB21 data for which EPA noted:
The comment chart also includes data from Station MHB21, which EPA determined not to use in its analysis because it appears that station may not be nitrogen-limited. (Taunton Response to Comments at 99).

EPA's use of data which in its own words should not be included in permit limit analyses is inappropriate and such analyses and resulting permit limits should be revised accordingly.

Response A.49.

EPA disagrees that the references above constitute a contradiction regarding EPA's use of 2006 and MHB21 data in both the Taunton and Brockton analyses. The first reference indicates that EPA did not use 2006 data in its permit limit analysis. This statement is true based on the analysis performed in the Taunton Fact Sheet. It was not until the Taunton Response to Comments that EPA reevaluated the dataset using the 2006 data in order to respond to unsupported claims made in a comment. See Taunton Response C25. The same is true with regard to MHB21 data. Regarding Figure R6 referenced above, the Taunton Response to Comments clearly states "Station 21 and 2006 is included in this dataplot because chlorophyll-a/DO relationships are not expected to differ significantly based on the difference in limiting nutrient (phosphorus v. nitrogen), while Station 21 and 2006 are excluded from nitrogen plots." See Taunton Response to Comments at 93. Clearly there is no contradiction in EPA's use of these data.

Comment A.50.

V. EPA Dismisses Consideration of Great Bay Estuary DO Processes:

EPA dismisses considering expert analysis of non-nutrient components driving DO in Great Bay Estuary because it is "an entirely different system located nearly 100 miles away" and provides no evidence to make that determination (Taunton Response to Comments at 74). Yet, EPA admits to considering "ranges and thresholds for acceptable TN concentrations found in other estuaries within and *outside of Massachusetts*" (emphasis added; Taunton Response to Comments at 50). In other words, EPA admits to considering TN thresholds and DO responses in "entirely different system[s] located nearly 100 miles away." In any case, the purpose of the comment was to provide an example of analysis of non-nutrient-related estuarine processes that can significantly impact DO, not directly compare Great Bay Estuary with the Taunton River Estuary.

Response A.50.

EPA acknowledges that there are many factors that can impact DO, in addition to nutrients. These factors, as analyzed in Great Bay and other estuaries, have been considered by EPA in the Taunton River/Mt. Hope Bay Estuary and the available evidence provides no basis for concluding that total nitrogen does not cause or contribute to the well documented water quality impairments. See Responses A.23, A.24 and A.29.

Comment A.51.

a.) Winter total nitrogen limit

Footnote No. 11 (Draft Permit at 6) requires that in the period from November through April, the plant should be operated to "optimize…removal of total nitrogen removal", and indicates that "all available equipment in place at the facility shall be operated…" Other than the clarification regarding supplemental carbon use, it is not clear what would constitute compliance (or non-compliance) with this permit requirement. As an example, what if the plant schedules maintenance on a tank outside the permit season from May – October, and therefore is not operating "all available treatment equipment?" Would that constitute a permit violation? Please provide further clarification regarding permit compliance/non-compliance and necessary maintenance regarding this footnote.

Furthermore, this requirement is contrary to existing NPDES rule and Section 301 of the Act. It is beyond EPA's authority to include in this permit as it is not necessary to achieve either (1) standard's compliance or (2) technology-based limitations. Water quality-based limits are only required as "necessary" to achieve standards and operation of the TN reduction facilities from November – April is not necessary to attain any applicable standard – narrative or numeric. Therefore, EPA is acting beyond its authority in seeking to impose this requirement.

Response A.51.

EPA believes the condition requiring optimization of total nitrogen removal using "all available treatment equipment" is sufficiently clear as written. The full permit condition reads:

> "The permittee shall optimize the operation of the treatment facility for the removal of total nitrogen during the period November 1 through April 30. All available treatment equipment in place at the facility shall be operated unless equal or better performance can be achieved in a reduced operational mode. The addition of a carbon source that may be necessary in order to meet the total nitrogen limit from May 1 through October 31 is not required during the period November 1 through April 30."

Although EPA considered whether to revise the condition to provide greater specificity or other examples, EPA ultimately determined that a more prescriptive and detailed condition could curtail the operator's ability to achieve the objective of the provision. EPA recognizes that operation of the POTW is a complex undertaking and a more generalized, narrative condition will afford the operator with the opportunity to balance and fine tune operations under then prevailing conditions (which obviously cannot be predicted with certainty). EPA concurs that routine, necessary maintenance is part of proper operation and would not be construed as a violation of the permit requirements. This interpretation is consistent with the language of the condition, as equipment taken offline for maintenance would not be "available." EPA encourages the permittee to interpret and implement the permit condition in light of its plain language and its objective. All things being equal, if the operator is presented with a choice between operational modes during the non-growing season, the operator should choose the one that results in greater removal of nitrogen from the effluent.

Secondly, EPA's imposition of a requirement to optimize total nitrogen removal during winter months is necessary and appropriate given the nature of nutrient-driven impacts on aquatic systems. Several general points are important to bear in mind. First, "[i]n flowing systems, nutrients may be rapidly transported downstream and the effects of nutrient inputs may be uncoupled from the nutrient source, [which] complicat[es] source control." *See* Nutrient Technical Guidance Manual at 3. Second, eutrophic conditions are often exacerbated around impoundments and in other slow moving reaches of rivers, where detention times increase relative to free flowing segments of rivers and streams. *Id.* at 32. Third, once the cycle of eutrophication begins, it can be difficult to reverse. This is because "nutrients can be re-introduced into a waterbody from the sediment, or by microbial transformation, potentially resulting in a long recovery period even after pollutant sources have been reduced." *Id.* at 3. Therefore, one key function of a nutrient removal optimization requirement is preventive, because nitrogen has the ability to persist and accumulate in the water column and sediments. A second key objective is to protect downstream receiving waters "regardless of [their proximity] in linear distance." *See* Gold Book at 241; Nutrient Technical Guidance Manual at 11.

EPA decided to impose optimization of nitrogen removal consistent with the foregoing principles. The winter optimization requirement is based upon the concern that the nitrogen in the treatment plant's effluent can accumulate in downstream sediments and contribute to excessive growth during the growing season. This in turn could lead to further settling of biomass and nutrients into the sediments, where they would be available for future uptake by aquatic plants. In order to restore the receiving waters to health, it is important for the eutrophic cycle to be prevented by placing reasonable limitations on nitrogen inputs at their source rather than trying to later remediate far field impacts once such nitrogen loading has accumulated in the sediments. For the above reasons, EPA has determined that this November through April optimization requirement is necessary to ensure the attainment of water quality standards.

Comment A.52.

5. Ammonia

The effluent limits table (Draft Permit at 3), includes average monthly concentration and load limits for ammonia-nitrogen at 3.2 mg/l and 450 lb/day, respectively. Note that load limit is in error. In the event that EPA does not reconsider the average flow limit of 18 mgd, the load limit corresponding to 3.2 mg/l is 480 lb/day. Please correct this error.

Response A.52.

EPA agrees that this load limit is in error. The correct load based on a concentration limit of 3.2 mg/l and a flow of 18 mgd is 480 lb/day. The final permit has been updated accordingly.

Comment A.53.

6. Total Phosphorus

Similar to the objections noted above with respect to nitrogen limitations, the need for a limit on phosphorus has not been demonstrated, no support for the same exists beyond generalized observations and, accordingly, this requirement should be removed from the permit. No measurements are presented for levels of algae or other parameters that would indicate an impairment to an existing or designated use as required under the Commonwealth of Massachusetts' (Commonwealth) narrative nutrient criteria. Furthermore, we note that all streams can have periphyton, and its presence does not mean that a nutrient impact is occurring. Periphyton can grow well with a total phosphorus concentration of 10 μg/l, and natural conditions likely exceed this level (Smith *et al*., 2003 – Attachment DD; Chapra, 2014 – Attachment EE).

The claim that nutrients are causing adverse impacts in this system is inconsistent with the available studies. There is no evidence that phosphorus is limiting any form of plant growth in this system nor affecting the macroinvertebrate community nor is there information indicating that a narrative criteria violation is occurring due to the TP discharge (a prerequisite for triggering limitations under 40 CFR 122.44(d)). Ignoring all these lines of evidence for a lack of impairment, EPA instead relied on nutrient guideline concentrations from the Gold Book because (Brockton Fact Sheet at 23) "its effects based approach … is more directly associated with an impairment to a designated use (*e.g.,* fishing). The effects-based approach provides a threshold value above which water quality impairments are likely to occur." Further, EPA justifies increasing the Gold Book threshold value for exactly the same reasons that there is no demonstrated impairment of a narrative nutrient criteria (*i.e.*, sandy bottom, canopy shading making light – and not phosphorus – the limit variable in algal growth, EPA's own field observations of "minor amounts of aquatic plant and algal growth"). The simple presence of phosphorus in a receiving water without any evidence of impact is an entirely insufficient and unfounded reason for including a permit limit for total phosphorus.

The rationale in the Fact Sheet seems to be that because concentrations are above a "threshold" value, there simply must be an impairment that, however, is precisely what the Gold Book criteria states is *not* true. The Gold Book discusses the need to regulate phosphate phosphorus for eutrophication in some situations but specifically states that "a total phosphorus criterion to control nuisance aquatic growths is not presented." Therefore, claiming that the Gold Book created nutrient criteria that should be presumed applicable in this instance, in accordance with 40 CFR 122.44(d), is plainly in error. While the Gold Book suggests TP criteria of 100 μg/l may be appropriate for some streams, the Gold Book observes also that "there may be waterways wherein higher concentrations or loadings of total phosphorus do not produce eutrophy […]". Such conditions are influenced by natural confounding factors such as "naturally occurring phenomena [which] may limit the development of plant nuisances," "natural silts or colors which reduce the penetration of sunlight needed for plant photosynthesis," "morphometric features of steep banks, great depth, and substantial flows [which] contribute to a history of no plant problems," and "nutrient[s] other than phosphorus […] limiting plant growth". The Gold Book specifically indicates the need to consider such site-specific factors, not that such factors or lack of response be ignored in setting nutrient limitations for phosphorus. The Gold Book phosphate phosphorus discussion ends with a reiteration that "no national criterion is presented for phosphate phosphorus for the control of eutrophication."

The Salisbury Plain River exhibits the type of physical characteristics that do not promote periphyton growth: sandy bottom and shaded. Therefore, the TP discharge would not be expected to cause excessive plant growth. The Fact Sheet analysis failed to account for these factors though the Gold Book specifies that they must be considered in designing whether it is reasonable to apply its criteria. As noted earlier, implementing a requirement inconsistent with the very recommendations and limitations presented in an expert report is, *per se*, arbitrary and capricious.

As EPA's reference document specifically notes that TP does not cause uniform impacts in streams and site-specific response should control decision making, EPA decision to include TP reductions in Brockton's draft permit even where an adverse stream response is not found is not a defensible action.

Response A.53.

As a preliminary matter in responding to this comment, EPA Region 1 observes that some of the legal/regulatory objections to the permit underlying the City's comments on total phosphorus are premised on whether EPA must demonstrate a water quality impairment before establishing a permit limit. This matter has been squarely addressed in past decisions by the United States Environmental Appeals Board and by the United States Court of Appeals for the First Circuit. *See Upper Blackstone Water Pollution Abatement Dist. v. U.S. EPA*, 690 F.3d 9, 33 (1st Cir. 2012), *cert. denied* 133 S. Ct. 2282 (2013) (upholding the Region's overall methodology for imposing a phosphorus limit, including use of the *Gold Book*, among other information, to establish a site-specific TP limit applicable to that particular discharge); *In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577 (EAB May 28, 2010) (same); *see also In re City of Attleboro*, NPDES Appeal No. 8-08 (EAB Sept. 15, 2009) (same). More recently, the EAB comprehensively addressed the Region's approach to interpreting the State's narrative nutrient criterion to derive an effluent limitation in *In re Town of Newmarket Treatment Plant*, NPDES Appeal No. 12-05 (EAB Dec. 2, 2013).

EPA encourages the City to consult the specific portions of these decisions noted below in conjunction with reviewing the Region's responses below. They are available at:

Upper Blackstone First Circuit Decision Affirming Imposition of Phosphorus and Nitrogen Limits

http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/2D0D249E441A18F185257B6600725F04/$File/1st%20cir..pdf

Page	Issue
30, 33-34	Finding that the CWA and EPA regulations allow EPA to proceed with permit reissuance even where there is uncertainty in the existing data without waiting until better science can be developed or more data gathered
31	Discussing risk associated with waiting to address nutrient-based cultural eutrophication
32	Addressing claim that EPA should have "relied on more recent data" where EPA has no reason to question the continuing validity of data on which it relied
36	Discussing MERL model's use of correlations between data sets, rather than cause-and-effect models, in development of nutrient permit limit
50-53	Upholding EPA's use of national and regional guidance criteria, including the Gold Book value of 0.1 mg/l, in conjunction with site-specific data in determining phosphorus limit

Upper Blackstone EAB Decision Affirming Imposition of Phosphorus and Nitrogen Limits

http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/NPDES%20Permit%20Appeals%20(CWA)/34E841C87F346D94852577360068976F/$File/Denying%20Review....pdf

Page	Issue
31-32	Finding that affirmative reasonable potential determination requires neither demonstration of causation nor certainty ("greater than a mere possibility")
80-83	Finding EPA's approach of establishing a range of target ambient values for phosphorus from EPA nationally recommended criteria guidance to be a regulatorily-authorized method for determining a phosphorus limit
83	Rejecting request for delay in imposition of phosphorus limit pending additional data or causal demonstrations in light of, *inter alia*, Region's conservative approach to nutrient permitting and overall objectives of the CWA

Attleboro EAB Decision Affirming Imposition of Phosphorus and Nitrogen Limits

http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/NPDES%20Permit%20Appeals%20(CWA)/D506EBEE22A1035E8525763300499A78/$File/Denying%20NPDES%2008...84.pdf

Page	**Issue**
63	Upholding EPA's use of recommended Gold Book values and low flow conditions in determining phosphorus limit
65	Finding that EPA need not demonstrate actual impacts to the receiving water prior to imposing a permit effluent limit
72-73	Finding that EPA may reasonably consider current background conditions despite any expected future reductions

Newmarket EAB Decision Affirming Implementation of the Narrative Nutrient Criterion

http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/Recent~Additions/97CCD304C9B7E58585257C3500799108/$File/Order%20Denying%20Review.pdf

Page	**Issue**
49-51	Rejecting request for delay in imposition of nutrient limit pending additional data or causal demonstrations in light of, *inter alia*, Region's conservative approach to nutrient permitting and overall objectives of the CWA
54 n 23	Finding that "reasonable potential" determination does not require a conclusive demonstration of cause and effect

Taunton EAB Decision Affirming Implementation of the Narrative Nutrient Criterion

https://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/NPDES%20Permit%20Appeals%20(CWA)/0A045314B61E682785257FA80054E600/$File/Denying%20Review....pdf

As established by the decisions cited above, and as evidenced by the plain language of the statute and regulations, a waterbody need not be listed as impaired for a pollutant in order for the Region to impose an effluent limitation for that pollutant in an NPDES permit. Sections 301 and 402 of the Act, and implementing regulations at 40 C.F.R. § 122.44(d), are the provisions that govern this permitting action, not Section 303(d).

Under CWA section 402, permits "for the discharge of any pollutant, or combination of pollutants" if the permit conditions assure that the discharge complies with certain requirements, including those of section 301 of the CWA, of the Act requires that NPDES permits include effluent limits more stringent than technology-based limits whenever:

> necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any State law or regulations…or any other Federal law or regulation, or required to implement any applicable water quality standard established pursuant to [the CWA].

NPDES permits must contain effluent limitations necessary to attain and maintain WQS, without consideration of the cost, availability or effectiveness of treatment technologies. *See Upper Blackstone Water Pollution Abatement Dist. v. U.S. EPA*, 690 F.3d 9, 33 (1st Cir. 2012), *cert. denied* 133 S. Ct. 2282 (2013).

EPA's regulations lay out the process for the Agency to determine whether permit conditions are necessary to achieve state water quality standards and for the formulation of these conditions. See 40 CFR § 122.44(d). They establish, among other things, methods for EPA to translate or interpret a State's narrative water quality criterion into numeric effluent limitations, since "EPA's legal obligation to ensure that NPDES permits meet all applicable water quality standards, including narrative criteria, cannot be set aside while a state develops [numeric] water quality standards." National Pollutant Discharge Elimination System; Surface Water Toxics Control Program; Final Rule, 54 Fed. Reg. 23,868, 23,877 (June 2, 1989).

Permit writers are first required to determine whether pollutants "are or may be discharged [from a point source] at a level which will cause, have the reasonable potential to cause, or contribute to an excursion" of the narrative or numeric criteria set forth in state water quality standards. 40 CFR § 122.44(d)(1)(i). EPA guidance directs that this "reasonable potential" analysis be based on "worst-case" conditions. *In re Washington Aqueduct Water Supply Syst*., 11 E.A.D. 565, 584 (EAB 2004); *accord Am. Iron & Steel Inst. v. EPA*, 115 F.3d 979, 1001 (D.C. Cir. 1997) (discussing EPA's policy that reasonable potential analysis be based on the worst case scenario). If a discharge is found to cause, have the reasonable potential to cause, or contribute to an excursion of a state water quality criterion, then a permit *must* contain effluent limits as stringent as necessary to achieve state water quality standards. 40 CFR § 122.44(d)(1), (5) (providing in part that a permit must incorporate any more stringent limits required by CWA § 301(b)(1)(C)).

EPA in issuing an NPDES permit must, by necessity, translate existing narrative criteria into in-stream numeric concentrations when developing water quality-based effluent limitations. As explained by the District of Columbia Circuit Court of Appeals:

> As long as narrative criteria are permissible…and must be enforced through limitations in particular permits, a permit writer will inevitably have some discretion in applying the criteria to a particular case. The general language of narrative criteria can only take the permit writer so far in her task. Of course, that does not mean that the language of a narrative criterion does not cabin the permit writer's authority at all; rather, it is an acknowledgement that the writer will have to engage in some kind of interpretation to determine what chemical-specific numeric criteria—and thus what effluent limitations—are most consistent with the state's intent as evinced in its generic standard.

Am. Paper Inst., Inc. v. EPA, 996 F.2d 346, 351 (D.C. Cir. 1993) (citations omitted). The process of translating a narrative criterion is specifically governed by 40 CFR § 122.44(d)(1)(vi), which implements Sections 301 and 402 of the Act. Subsection (A) of that provision mandates at the outset that in translating a state narrative criterion, EPA is to calculate a protective *numeric* concentration for the pollutant:

> Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the following options:
>
> (A) Establish effluent limits *using a calculated numeric water quality criterion* [emphasis added] for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Such a criterion may be derived using a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents[.]

See also Upper Blackstone, 690 F.3d at 23.

In establishing numeric permit limits to meet the in-stream criteria, EPA accounts for the concentration of a given pollutant in the effluent (discharge concentration); the percentage of effluent in the receiving water immediately downstream of the discharge under the critical low flow conditions identified in the state water quality standards (available dilution); and the concentration of pollutants upstream of the discharge (background) to determine how much the discharge can contribute such that the resulting mix downstream does not exceed the criterion. Where the discharge concentration exceeds the criterion, and there is no available dilution or remaining assimilative capacity in the receiving water for the pollutant, then the permit writer may establish the permit limit at the criteria level, to ensure the resulting discharge will not cause or contribute to an exceedance of the numeric criterion in-stream.

Even assuming that there is no evidence of exceedances of water quality standards related to total phosphorus — a conclusion with which the Region disagrees, as described below — it is well established under Board precedent and guidance that **EPA does *not* need to wait for water quality violations to occur prior to imposing a protective effluent limitation in an NPDES permit**. The requirement to impose a permit limit is not only premised on a finding that the pollutant discharges "are" at a level that "causes" violation of the applicable water quality standards, but the requirement is also triggered by a finding that the facility's pollutant discharges "may" be at a level that "contributes" to or has the "reasonable potential" to cause a violation. 40 CFR § 122.44(d)(1)(i). The regulation requires water quality-based effluent limits even when there is some degree of uncertainty regarding both the precise pollutant discharge levels and the potential causal effects of those discharges, so long as the record is sufficient to establish that there is a "reasonable potential" for that discharge to cause or contribute to a violation of water quality standards. EPA in the Final Rule Preamble for 40 CFR § 122.44(d)(1) dispels any doubt over the necessity of proving an impairment and causation of that impairment prior to either deriving a numeric in-stream target to implement a narrative water quality criterion, or imposing a water quality-based effluent limitation to implement that criterion:

> "Several commenters asked if it was necessary to show in-stream impact, or to show adverse effects on human health before invoking [§122.44(d)(1)(vi)] as a basis for establishing water quality-based limits on a pollutant of concern. It is not necessary to show adverse effects on aquatic life or human health to invoke this paragraph []. The CWA does not require such a demonstration and it is EPA's position that it is not necessary to demonstrate such effects before establishing limits on a pollutant of concern." 54 Fed. Reg. 23,868, 23,878 (June 2, 1989).

"Reasonable potential" requires some degree of certainty greater than a mere possibility, but it leaves to the permit writer's scientific and technical judgment how much certainty is necessary. *In re Upper Blackstone*, 14 E.A.D. at 599 n.29. The regulations, thus, require a precautionary approach when determining whether the permit must contain a water quality-based effluent limit for a particular pollutant. *Id.* at 599.

In this case, not only has EPA determined the need for total phosphorus limits based upon a reasonable potential to exceed the *Gold Book* threshold (discussed in more detail below), but the receiving water is also listed for nutrient-related impairments on the State's 303(d) list (See Fact Sheet at 4). More specifically, the segment of the Salisbury Plain River to which the Brockton AWRF discharges (segment 62-06) is listed in the Massachusetts 303(d) list for impairments due to, among other things, aquatic macroinvertebrate bioassessments, excess algal growth, dissolved oxygen, and total phosphorus. The Salisbury Plain River joins Beaver Brook in East Bridgewater to form the Matfield River (segment 62-32), which is also listed in the 303(d) list for impairments due to, among other things, aquatic macroinvertebrate bioassessments, excess algal growth, dissolved oxygen and total phosphorus. While these impairments are based on data prior to the facility upgrade, receiving water monitoring performed by the City's consultants as part of a Supplemental Environmental Project in 2010 indicated that impaired benthic macroinvertebrate conditions continue subsequent to the improvements in the facility (See Fact Sheet at 12).

To obtain further site-specific evidence, EPA conducted a site visit to the Salisbury Plain River on July 7, 2016 and documented various in-stream impacts just downstream of the discharge. These downstream impacts include discoloration of the receiving water and the presence of extensive macrophytes, filamentous algae, and Duck Weed. Attachment A of this Response to Comments document is EPA's full Memorandum documenting this site visit, which includes a narrative and photographs of various locations along the receiving water.

The commenter quarrels with EPA's use of the *Gold Book* threshold for protecting water quality in the Salisbury Plain River. The fact that Massachusetts does not have a numeric nutrient criterion does not relieve EPA of its duty to translate the applicable narrative criterion into a numeric limit, as explained below. The permit, which utilized the *Gold Book* value as relevant information among other data, studies and observations consistent with EPA regulations, reflects this process of translation. EPA also notes that the two referenced articles in the comment (by Smith and Chapra) both suggest that a protective criterion value could be lower than 100 ug/l. Furthermore, the Chapra article addresses nutrient impacts on periphyton-dominated streams, and it has been well documented that the Salisbury Plain River is not a periphyton-dominated receiving water. See Response A.55 below.

Contrary to the commenter's assertion, the record clearly does not support the view that EPA applied the *Gold Book* threshold of 100 ug/l while ignoring site-specific factors or lack of response in the receiving water. Page 23 of the Fact Sheet describes the site-specific factors that were considered in EPA's determination that the 100 ug/l threshold, in this case, would best protect designated uses. EPA does not believe that any of the factors cited in the *Gold Book* would lead to a less restrictive threshold in this receiving water. In preparing the permit limit, the Region expressed a step-by-step methodology to guide it toward reasonable and sufficiently protective permit limits to interpret the State's narrative water quality for nutrients, as well as other applicable water quality criteria, through the imposition of a numeric phosphorus limitation. The Region had substantial information at its disposal in setting the permit's discharge limitations, including national EPA guidance, State water quality reports and assessments, and years of on-the-ground measurements and observations of conditions in the Salisbury Plain River.

EPA has concluded that the available data clearly show that the discharge of total phosphorus from the Brockton AWRF has the reasonable potential to cause or contribute to exceedances of Massachusetts' water quality standards. Based upon this *Gold Book* numeric threshold, the facility's effluent data, the projected receiving water concentrations, and the impaired benthic macroinvertebrate conditions of the receiving water, the Brockton AWRF discharge was determined to have reasonable potential to cause or contribute to an excursion above water quality standards.[14] Hence, a total phosphorus limit of 101 ug/l was required to be included in the permit.[15]

Comment A.54.

a) Data used to conclude nutrient impairment are taken out of context

The Fact Sheet notes that the Salisbury Plain River was listed on the Massachusetts 303(d) list prior to the Brockton AWRF upgrade, and therefore EPA uses data collected by CDM Smith in 2010 as its basis for stating that the Salisbury Plain River is impaired as a result of the AWRF discharge. Specifically, the Fact Sheet quotes the CDM Smith sampling report, stating that,

> One of the most striking aspects of the biological samples from the Salisbury Plain River and Matfield River is the near absence of pollution intolerant taxa, especially the EPT taxa.
>
> - The caddisflies Cheumatopsyche sp. and Hydropsyche betteni were the only EPT taxa consistently found, yet these are among the most tolerant stream caddisflies and are often used as indicators of organic pollution rather than indicators of clean water.

[14] EPA consulted 40 CFR § 122.44(d)(1)(vi)(A) for guidance on how to interpret the narrative criterion. As discussed above, EPA in issuing an NPDES permit must, by necessity, translate existing narrative criteria into in-stream numeric concentrations when developing water quality-based effluent limitations. *Am. Paper Inst., Inc. v. EPA*, 996 F.2d 346, 351 (D.C. Cir. 1993). The process of translating or interpreting a narrative criterion is governed by 40 CFR § 122.44(d)(1)(vi), subsection (A) of which describes a process for calculating a protective in-stream numeric concentration for the pollutant of concern. This calculated numeric in-stream target, along with other information relied on by EPA such as impaired benthic macroinvertebrate conditions in the receiving waters, is facially relevant and material to EPA's determination of whether the receiving water's assimilative capacity for phosphorus had been reached, and whether a reasonable potential for the discharge to cause, or to contribute to, a water quality criterion exceedance exists.

[15] The Region takes into account site-specific circumstances particular to each discharge before imposing an effluent limitation. The commenter should note, however, that the Region's overall approach to calculating numeric phosphorus limits to implement narrative water quality criteria has been upheld by the U.S. Environmental Appeals Board and the First Circuit Court of Appeals.

- No stoneflies and only two individual mayflies were detected, despite the presence of suitable habitat in four of the survey sites.

Macroinvertebrate samples were comprised of a low diversity of habitat generalists that are tolerant of a range of conditions in wastewater streams.

CDM Smith, 2011 at 12 (Attachment FF)

EPA makes several broad overarching conclusions from the above cited description. "The impairment downstream of the facility appears to be directly related to the discharge; while impaired conditions exist both upstream and downstream of the facility, the nature of the macroinvertebrate population changes in a manner consistent with the nutrient-enriched discharge of the Brockton AWRF" (Fact Sheet at 12). EPA goes on to state "The impairment is thought to be related to nutrient discharges from the AWRF" (Fact Sheet at 22). While the statements cited and used by EPA to draw the conclusions stated in the Fact Sheet are directly quoted from the benthic macroinvertebrate survey summary as described in the 2011 CDM Smith Supplemental Environmental Project report, these statements are selectively taken entirely out of context, thereby distorting the actual facts in an attempt to support the fact that the AWRF has a significant, observable impact on the benthic macroinvertebrates found during the CDM Smith survey.

The results from the benthic macroinvertebrate survey tell a profoundly different story.

At Site 1, the most upstream site along the Salisbury Plain River intended to be the "upstream control" (Biodrawversity, 2011 at 16, Attachment GG), the survey found that the macroinvertabrate community "was comprised of a low diversity of pollution-tolerant taxa […] This severely impaired benthic macroinvertebrate community may be the result of poor water quality and poor habitat; *the habitat score for Site 1 was the lowest of all the survey sites*." [emphasis added] (*Id.* at 10).

Site 2, located immediately downstream of the AWRF discharge on the Salisbury Plain River, was found to have a very similar macroinvertebrate community to Site 1: "The macroinvertebrate sample collected at Site 2 was comprised of a low diversity of pollution-tolerant taxa […] Overall, this impaired benthic macroinvertebrate community may be the result of poor water quality and poor habitat; the habitat score for Site 2 (94) was the third lowest among all the survey sites" (*Id.* at 10-11).

Site 3, located farther downstream from the AWRF discharge on the Salisbury Plain River was observed to have a macroinvertebrate community very similar to Sites 1 and 2, where "The macroinvertabrate sample collected at Site 3 was comprised of a low diversity of pollution-tolerant and moderately sensitive taxa, dominated by the caddisflies Cheumatopsyche sp. and Hydropsyche betteni […] Overall, the benthic macroinvertebrate community was less impaired than it was at Sites 1, 2 and 9, and very similar to Site 5. *The habitat score of 131 was the second highest among the six survey sites*" [emphasis added] (*Id.* at 11).

Site 5, located on the Matfield River downstream of the confluence of Beaver Brook and the Salisbury Plain River (and still dominated by the Brockton AWRF effluent), was better with respect to the macroinvertebrate community, which was "comprised of a relatively high diversity (compared to other sites) of pollution-tolerant and moderately sensitive taxa, dominated by the caddisflies Cheumatopsyche sp. and Hydropsyche betteni […] *The habitat score of 162 was the highest among the six survey sites*" [emphasis added] (*Id.* at 12).

Based on the information presented above, the conditions in the Salisbury Plain River described in the Biodrawversity Biological Monitoring report tell a vastly different story than was told in the Fact Sheet. The data presented in the Brodrawversity report in fact directly contradict EPA's assertion that the poor habitat quality within the Salisbury Plain River is a direct consequence of the Brockton AWRF discharge. In fact, Biodrawversity notes that "Based solely on an upstream-downstream study, one could argue that the *AWRF improves water quality of the Salisbury Plain River*, and at the very least does not seem to affect the biota in an adverse way" [emphasis added]. The report goes on to state that its conclusion is similar to the findings of a DWM report from 1996 that "determined that their 'control' site upstream of Brockton's AWRF was the most impaired of all sites surveyed in the Taunton River watershed that year" and that "The 1996 data corroborates the findings of this study and strengthens the conclusion that the treated effluent from the AWRF may improve the water quality of the Salisbury Plain River" (*Id.* at 16).

Response A.54.

EPA recognizes and clearly states in the Fact Sheet (at 12) that the impaired benthic macroinvertebrate conditions "are present both upstream and downstream of the [Brockton AWRF] facility." The Fact Sheet does not state, as the commenter suggests, that "the Salisbury Plain River is impaired *as a result* of the AWRF discharge" (emphasis added), implying that the discharge is the sole cause of the impairment. Rather, the Fact Sheet states that "impaired benthic macroinvertebrate conditions *continue* subsequent to the improvements in the facility" and that the "impairment downstream of the facility appears to be *directly related* to the discharge" (emphasis added). Furthermore, page 12 of the Fact Sheet includes a footnote which states the following:

> As summarized in the *Brockton Receiving Water Assessment SEP* at 12-13: "There seems to be a general trend from a highly polluted, fungal/bacterial-dominated river upstream of Brockton's AWRF to a more typical nutrient-rich, algal-dominated river downstream. It is difficult to quantify the effects of Brockton's AWRF on biological communities because of the highly degraded state of the Salisbury Plain River upstream of the facility. A suitable upstream control does not exist."

In other words, EPA was not intending to establish that the Brockton AWRF discharge is the sole *cause* of impaired benthic macroinvertebrate conditions in the receiving water, an assertion which would indeed be a mischaracterization of the *SEP*. Rather, EPA was establishing that, based on the *SEP*, both upstream and downstream impairments exist and the AWRF discharge has the reasonable potential to cause or *contribute to* the downstream impairment. Significantly, the downstream, effluent-dominated segment maintains this impairment status and is characterized as a “nutrient-rich, algal dominated river” in the *SEP* (distinctly different than the upstream segment). Hence, EPA’s decision to include an effluent limit for total phosphorus of 101 ug/l (based on the *Gold Book* threshold) is also necessary to ensure that this discharge does not cause *or contribute to* this downstream water quality impairment.

EPA also points out the lack of merit in a claim that the relatively small upstream flow compared to the large effluent flow can somehow control water quality conditions downstream. Further, it is not even clear how much the low biological score upstream of the discharge is due to pollutants and how much is due to unsuitable habitat for the biological community. The upstream site had the lowest habitat score by far, including large nearby deposits of asphalt or tar.

The CWA requirement is to ensure attainment of standards and not just improve upon poor upstream water quality as the commenter would suggest. The upstream site had very little aquatic plant and algae growth while the downstream sites had abundant levels of plant and algae growth including the particularly problematic filamentous green algae.

Comment A.55.

b) Data indicate acceptable periphyton and chlorophyll *a* levels downstream of Brockton discharge

Periphyton and algae sampling data conducted by CDM Smith in 2010 indicated acceptable and relatively low periphyton growth downstream of the Brockton discharge. EPA has indicated that periphyton levels up to 150 mg/m^2 are acceptable (EPA Nutrient Criteria Technical Guidance – Rivers and Streams, 2000 at 31, 102-103). The sample results are more than an order of magnitude below this acceptable level. Site 1 is upstream and Site 2 is downstream of the Brockton discharge. The resulting data are presented in **Table 5** (*See* Attachment GG at 9)**.**

The river segment downstream of the Brockton outfall has been characterized as heavily shaded by tree canopy. During the growing season, tree foliage effectively limits periphyton growth by blocking sunlight, thereby reducing photosynthetic activity in periphyton. In addition, the river bed is composed of predominantly sandy substrate. Sandy substrate is not conducive for periphyton growth; periphyton require rocky substrate to anchor to.

In-stream chlorophyll *a* sampling also demonstrated relatively low concentrations.

Chlorophyll *a* and pheophytin were measured by CDM Smith (*See* Table 4 in Attachment FF at 10) in September, 2010, and are described in **Table 6** below for the three sites on the Salisbury Plain River in the vicinity of the Brockton AWRF discharge.

Table 5: Periphyton Survey Data collected by CDM Smith, August-September, 2010

Site	Ash Free Dry Mass (AFDM) (mg/m^2)	Chlorophyll *a* (mg/m^2)	Autotrophic Index (AI)	Productivity (mg/m^2/day)
Site 1 (upstream Brockton AWRF)	1,059	0.33	3,175	58.8
Site 2 (downstream Brockton AWRF)	1,877	1.07	1,760	104.3
Site 3 (downstream Brockton AWRF)	310	5.39	57.6	17.2

Table 6: CDM Smith Algae Sampling Data, September 2010

Site	Chlorophyll *a* (µg/l)	Pheophytin (µg/l)	Total Pigment (µg/l)
Site 1 (upstream Brockton AWRF)	1.03	<0.05	1.06
Site 2 (downstream Brockton AWRF)	0.62	0.11	0.72
Site 3 (downstream Brockton AWRF)	0.56	0.07	0.62

Further evidence that the Salisbury Plain River has acceptable periphyton and chlorophyll *a* concentrations in the vicinity of the AWRF discharge comes from a comparison of conditions observed during the 2010 biological survey with the Aquatic Life Use criteria contained in the Massachusetts CALM Guidance Manual (MassDEP, 2012 at 15). The CALM criteria for periphyton and algal blooms is summarized in **Table 7** below.

Table 7: Aquatic Life Use Criteria from the Massachusetts CALM Guidance Manual

Use is Supported	Use is Impaired
No/infrequent algal blooms or growths; ≤25% cover noxious aquatic plants (*e.g.*, Lemna); filamentous algal cover with riffle/reach ≤40%	Frequent and/or prolonged algal blooms or growths; cyanobacteria blooms that result in advisories (recurring and/or prolonged); >25% cover noxious aquatic plants (*e.g.*, Lemna); filamentous algal cover with riffle/reach >40%

The ecological survey conducted by Biodrawversity in 2010 found levels of periphyton that indicate that conditions in the Salisbury Plain River support the designated use as described in the CALM. Site 1, located upstream of the AWRF discharge, had a trace amount of algae observed during the field visit. Site 2, located downstream of the AWRF discharge, had 5% coverage, and the field crew noted that "algae growth limited by poor/shifty substrate (sand)." Site 3, located farther downstream from the AWRF discharge on the Salisbury Plain River had less than 20% periphyton cover. Thus, all sites along the Salisbury Plain River are not impaired based on the criteria set forth in the CALM.

Given these natural limiting factors, the lack of a scientifically defensible causal relationship between TP and periphyton growth, and the fact that observed conditions meet the criteria set forth in the CALM, the TP limit should be removed from Brockton's permit, or at a minimum remain unchanged.

Response A.55.

EPA acknowledges that the periphyton results presented in this comment do not indicate a level of concern in and of themselves. It should be noted, however, that the reasonable potential determination for total phosphorus was not premised on the presence of a periphyton or chlorophyll-a impairment in the receiving water. Rather, as stated in the Fact Sheet and in Response A.53 above, the reasonable potential determination is premised on the exceedance of the *Gold Book* threshold target of 100 ug/l total phosphorus and supported by the benthic macroinvertebrate impairment conditions which continue subsequent to the facility's upgrade. EPA also notes that the downstream impacts from nutrient enrichment are not the result of high periphyton or water column algae but are the result of excessive aquatic plant growth and filamentous algae covering nearly all suitable substrate. Any suggestion that the downstream receiving waters are completely shaded and/or sandy bottomed is plainly false based on the site descriptions and photographs throughout the March 2011 Biodrawversity Biological Monitoring report. Furthermore, as described in Response A.53 above, even assuming that there is no evidence of exceedances of water quality standards related to total phosphorus — a conclusion with which the Region disagrees — it is well established under Environmental Appeals Board precedent and guidance that EPA does *not* need to wait for water quality violations to occur prior to imposing a protective effluent limitation in an NPDES permit. Hence, EPA affirms its conclusion that a total phosphorus limit of 101 ug/l is necessary to ensure the discharge does not cause or contribute to water quality violations.

Comment A.56.

c) Analysis Timeframe Is in Error

EPA created the effluent limitations by evaluating plant growth under 7Q10 conditions

(Brockton Fact Sheet at 16, 18-19, 23, 52). EPA Guidance, however, specifies that nutrient impacts should be assessed on a growing season basis (EPA Protocol for Developing Nutrient TMDLs, Nov. 1999). Moreover, EPA's recent issuance of the Taunton permit recognized that the proper evaluation of nutrient impacts is on a seasonal basis using seasonal flows (Taunton Fact Sheet at 12, 27, 33-34). In general, nutrient impacts are manifested over the growing season. As plant growth does not respond quickly to short term variations in nutrient levels and is not a function of minimum stream flows used for applying WQS that have a direct toxic effect on aquatic life, EPA's analysis needs to be revised to apply the Gold Book criteria under the growing season average flow, if those criteria are to be applied at all (*See* Attachment K). If the higher seasonal average flow is used, further assimilative capacity is available. In fact, it is apparent from the recent stream data that a 0.2 mg/l monthly average TP limitation is sufficient to maintain a 0.1 mg/l TP concentration instream over the growing season.

As plant growth does not respond quickly to short-term variations in nutrient levels and is not a function of minimum stream flows (which are used for applying WQS that have a direct toxic effect on aquatic life), EPA's analysis needs to be revised to apply the Gold Book criteria under the growing season average flow, if those criteria are to be applied at all. If the higher seasonal average flow is used, further assimilative capacity is available. In fact, it is apparent from the recent stream data that a 0.2 mg/l monthly average TP limitation is sufficient to maintain a 0.1 mg/l TP concentration instream over the growing season (*See* Attachment K).

Response A.56.

As described in the Fact Sheet at 23, the 1986 Quality Criteria of Water ("*Gold Book*") follows an effects-based approach. It sets forth maximum threshold concentrations that are designed to prevent or control adverse nutrient-related impacts from occurring. Specifically, the Gold Book recommends in-stream phosphorus concentrations of no greater than 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l for any stream not discharging directly to lakes or impoundments, and 0.025 mg/l within the lake or reservoir.

A more recent technical guidance manual, the Nutrient Criteria Technical Guidance Manual: Rivers and Streams (EPA 2000) ("Nutrient Criteria Technical Guidance Manual"), cites to a range of ambient concentrations drawn from the peer-reviewed scientific literature that are sufficiently stringent to control periphyton and plankton (two types of aquatic plant growth commonly associated with eutrophication). This guidance indicates in-stream phosphorus concentrations between 0.01 mg/l and 0.09 mg/l will be sufficient to control periphyton growth and concentrations between 0.035 mg/l and 0.070 mg/l will be sufficient to control plankton (Table 1 shows the range of literature values cited in the Nutrient Criteria Technical Manual, and Table 2 shows a range of phosphorus criteria established by various states)

Table 1						
Nutrient (ug/l) and algal biomass criteria limits recommended to prevent nuisance conditions and water quality degradation in streams based either on nutrient-chlorophyll *a* relationships or preventing risks to stream impairment as indicated.						
PERIPHYTON Maximum in mg/m^3						
TN	**TP**	**DIN**	**SRP**	**Chlorophyll *a***	**Impairment Risk**	**Source**
				100 – 200	nuisance growth	Welch et al. 1988, 1989
275 – 650	38 – 90			100 – 200	nuisance growth	Dodds et al. 1997
1500	75			200	Eutrophy	Dodds et al. 1998
300	20			150	nuisance growth	Clark Fork River Tri-State Council, MT
	20				*Cladophora* nuisance growth	Chetelat et al. 1999
	10 – 20				*Cladophora* nuisance growth	Stevenson unpubl. Data
		430	60		Eutrophy	UK Environ. Agency 1988
		100[1]	10[1]	200	nuisance growth	Biggs 2000
		25	3	100	reduced invertebrate diversity	Nordin 1985
			15	100	nuisance growth	Quinn 1991
		1000	10[2]	~ 100	Eutrophy	Sosiak pers. comm.
PLANKTON Mean in ug/l						
TN	**TP**	**DIN**	**SRP**	**Chlorophyll *a***	**Impairment Risk**	**Source**
300[3]	42			8	Eutrophy	Van Nieuwenhuyse and Jones 1996
	70			15	chlorophyll action level	OAR 2000
250[3]	35			8	Eutrophy	OECD 1992 (for lakes)

1 30-day biomass accrual time
2 Total Dissolved P
3 Based on Redfield ratio of 7.2N:1P (Smith et al. 1997)

Source: *Nutrient Criteria Technical Guidance Manual – Rivers and Streams*. EPA-822-B-00-002. U.S.EPA. July, 2000.

Table 2
Examples of Numeric Criteria and Guidelines for Total Phosphorus in the U.S.

State and Waters	Phosphorus Criteria Values	Reference
Arizona River Specific	Annual Mean 0.05 – 0.20 mg/l 90 Percentile: 0.10 – 0.33 mg/l Single Sample Maximum: 0.20 - 1.0 mg/l	AAC R18-11-109
Arkansas All Waters	Maximum limit: 0.100 mg/l (guideline)	2 AAC 2.509
Hawaii Inland Streams	Geometric Mean, not to exceed 0.05 mg/l – Wet Season (Nov.1 – Apr.30) 0.030 mg/l – Dry Season (May 1 – Oct. 31)	HAR 11-54-5.2
Illinois Streams at entrance to reservoir or lake with surface area of 8.1 hectares or more	Maximum limit: 0.05 mg/l	35 IAC 302.205
Nevada* River Specific	Monthly, average: 0.1 mg/l	NAC 445A
New Jersey Streams	Maximum limit: 0.1 mg/l, unless demonstrate TP is not a limiting nutrient and will not render the waters unsuitable for designated uses.	NJAC 7:9B-1.14(c)
New Mexico Perennial reaches of specific waters in Rio Grande, Pecos River, and San Juan River basins	Maximum limit (single sample): 0.1 mg/l	20 NMAC 6.4.109 20 NMAC 6.4.208 20 NMAC 6.4.404 20 NMAC 6.4.407
North Dakota Class I, IA, II and III streams	Maximum limit: 0.1 mg/l (interim guideline limit)	NDAC 33-16-02-09
Oregon Yamhill River and its tributaries	Monthly median: 0.070 mg/l as measured during summer low flow	OAR 340-041-0350
Utah Streams and rivers to protect aquatic life; 3B, 3C waters	Maximum limit: 0.05 mg/l (used as pollution indicator; when exceeded, further investigations are conducted)	UAC R317-2 (Table 2.14.2)
Vermont Upland streams (> 2,500 ft.)	Maximum limit: 0.010 mg/l at low median monthly flow	VWQS 3-01-B2
Washington Spokane River (river mile 34 – 58)	Average euphotic zone: 0.025 mg/l (during June 1 to October 1)	WAC 173-201A-130
* Different requirements may exist to maintain existing higher quality streams.		

Source: *A Literature Review for use in Nutrient Criteria Development for Freshwater Streams and Rivers in Virginia*. Virginia Polytechnic Institute and State University – Virginia Water Resources Research Center. 2006.

> EPA's *Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Nutrient Ecoregion XIV* ("*Ecoregional Nutrient Criteria*"), meanwhile recommends criteria under a reference-based approach. As mentioned in the Fact Sheet, the facility is in Ecoregion XIV, Eastern Coastal Plains, which presents a total phosphorus criterion of 24 ug/l.
>
> Based on these materials, EPA determined that an in-stream numeric phosphorus threshold of 0.1 mg/l would fully protect uses designated by the State for the Salisbury Plain River and implement the State's narrative nutrient criteria. *See* 40 CFR § 122.44. In selecting an instream phosphorus target of 0.1 mg/l, at the high end of the effects-based protective range that is deemed most appropriate (0.01 mg/l to 0.1 mg/1), the Region recognized that the lower values recommended by the *Nutrient Criteria Guidance* and the *Ecoregional Nutrient Criteria* represent targets based on seasonal averages and corresponding seasonal river flows (as opposed to worst-case, low-flow conditions). Thus, by establishing the 0.1 mg/l limit at low-flow conditions, instream phosphorus concentrations would be lower than 0.1 mg/l when calculated over the seasonal average period, which includes higher flow conditions that provide more dilution. This is reasonable given EPA's conservative approach to nutrient permitting. On the other hand, in the Taunton permit a seasonal average receiving water value for the nitrogen threshold was used and therefore the impacts of the discharge on the receiving water were evaluated under seasonal average flows.
>
> Hence, EPA believes its selection of the "high end" *Gold Book* value inherently accounts for the time frame issue raised in this comment. If EPA were to conduct this analysis using seasonal average flows, as suggested by the commenter, the receiving water target used for phosphorus would be similar or equal to the ecoregional value referenced above and given the lack of available dilution the permit limit would be much lower than 0.1 mg/l.

Comment A.57.

d) Changes Needed to the TP Limit
In the event that EPA somehow fails to modify the permit based on the above comments, at a minimum, the City requests the concentration limit be removed for the permit and that phosphorous be regulated based on mass, recognizing that the impact of phosphorus on the environment is a function of load, not concentration. This is certainly appropriate and is consistent with other recent NPDES permits issued for Massachusetts treatment plants. In addition, the City requests that the TP limit be specified on a growing season average basis, as discussed above. Or, at a minimum, the limit be retained as a 60-day running average as if [stet] contained in the current Brockton NPDES permit.

Response A.57.

Firstly, regarding the request to apply the phosphorus limit as a seasonal or 60-day average, refer to Response A.56 above. EPA has selected an instream phosphorus target of 0.1 mg/l as a monthly average limit which is at the high end of the effects-based protective range that it deemed most appropriate. The Region recognized that the lower values recommended by the *Nutrient Criteria Guidance* and the *Ecoregional Nutrient Criteria* represent targets based on seasonal averages and corresponding seasonal river flows (as opposed to worst-case, low-flow conditions). Thus, by establishing the higher 0.1 mg/l monthly average limit at low-flow conditions, EPA expects instream phosphorus concentrations to be lower than 0.1 mg/l when calculated over the seasonal average period, which includes higher flow conditions that provide more dilution. This is reasonable given EPA's conservative approach to nutrient permitting. Hence, the limit is maintained in the final permit as a monthly average limit. EPA recognizes and intends that if the discharge is in compliance with a monthly average limit of 0.1 mg/l throughout the growing season, the seasonal average would likely be even lower.

Secondly, the Region is willing to limit phosphorus in this permit as mass-only in order to address the nutrient load directly. This approach has been done in similar POTWs within the Region, but requires a slightly different mass-balance calculation than that done when both mass and concentration limits are applied. In order to ensure a mass-based limit is protective under worst-case conditions, the limit must be calculated using the lowest expected receiving water flow and effluent flow. Otherwise, the facility could discharge the full nutrient load allowed in its permit, but at a lower effluent flow, resulting in a downstream concentration much higher than the *Gold Book* threshold. Hence, the upstream 7Q10 receiving water flow (0.39 mgd) and the lowest monthly average effluent flow during the review period (9.1 mgd, from October 2013 as shown in Table 1 of the Fact Sheet) are used in the calculation below. The numeric mass-based limit is determined based upon the following equations:

$$Q_d C_d + Q_S C_S = Q_r C_r$$

$$M_d = Q_d C_d * 8.345$$

combining these equations and solving for M_d results in:

$$M_d = Q_d C_d * 8.345 = (Q_r C_r - Q_S C_S) * 8.345$$

where:

M_d = mass-based phosphorus limit
Q_d = effluent flow in mgd (lowest effluent monthly average flow = 9.1 mgd)

C_d = effluent phosphorus concentration in mg/L
Q_S = upstream 7Q10 flow (0.39 mgd)
C_S = upstream river phosphorus concentration (0.048 mg/l)
Q_r = downstream 7Q10 flow ($Q_S + Q_d$ = 9.49 mgd)
C_r = downstream river phosphorus concentration (Gold Book target = 0.100 mg/l)
8.345 = factor to convert from *mgd * mg/l* to *lb/d*

Solving for M_d gives the maximum allowable mass the facility may discharge without violating water quality standards under worst-case low flow conditions. This allowable mass discharge is **7.76 lb/d**, which is equivalent to approximately 52 ug/l at the permitted flow (18 mgd) and approximately 102 ug/l at the lowest monthly average flow (9.1 mgd). Given these "effective" concentration limits under the AWRF's typical range of effluent flow, this mass-only limit would be much more stringent than the combination of mass and concentration limits as applied in the draft permit (15.2 lb/day and 101 ug/l, respectively) under all effluent flows above 9.2 mgd. Hence, EPA has chosen to maintain the less stringent but fully protective limits that were in the draft permit rather than incorporate a more stringent mass-only limit.

Comment A.58.

e) Orthophosphate sampling requirements
The draft permit adds an orthophosphate sampling requirement to the City's monthly reporting. No justification is given in the draft permit or Fact Sheet for this requirement, and it imposes unnecessary analytical burdens on the City. We ask that the orthophosphate monitoring requirement be removed from the permit.

Response A.58.

EPA agrees that orthophosphate monitoring is not necessary. The orthophosphate monitoring requirement has been removed from the final permit.

Comment A.59.

6. Flow Limit
a) Flow is Not a Pollutant
The Draft Permit would impose explicit limitations on "flow" as an effluent parameter. The City disputes the legal rationale for imposition of flow requirements in the Draft Permit as provided in the Draft Permit and Fact Sheet. The regulation of flow as a pollutant parameter is beyond the scope of the CWA and is therefore prohibited. Accordingly, the City requests that the flow limitation in the permit be removed or be designated as a "report only" requirement.

In consideration of the question of whether water itself may be regulated as a pollutant under the CWA, the answer is a resounding "No." Several courts have held that water is not a pollutant under the CWA (Orleans Audubon Society v. Lee, 742 F.2d 901, 910 (5th

Cir. La. 1984) ("Clear water is not within the definition of a pollutant under the CWA") see also Bettis v. Ontario, 800 F. Supp. 1113, 1118 (W.D.N.Y. 1992) ("Water itself, however, is not a pollutant")).

Additionally, EPA itself has long recognized that flow is not a regulated parameter, because it is not a "pollutant" and, as such, should not be included with a limit in the permit. Specifically, EPA published a statement on July 13, 2000, in the Federal Register, which stated that "EPA does not consider flow to be a pollutant, and therefore the final rule does not require TMDLs for flow." F.R. 65,135 (July 13, 2000). A recent district court opinion, which was not appealed by EPA, concurred with EPA's historical interpretation and ruled, again, that EPA lacks authority to regulate flow. In *Va. DOT v. United States EPA*, the court stated:

> Claiming that the stormwater maximum load is a surrogate for sediment, which is a pollutant and therefore regulable, does not bring stormwater within the ambit of EPA's TMDL authority. Whatever reason EPA has for thinking that a stormwater flow rate TMDL is a better way of limiting sediment load than a sediment load TMDL, EPA cannot be allowed to exceed its clearly limited statutory authority.

2013 U.S. Dist. LEXIS 981, 15 (E.D. Va. 2013). As such, the uncontroverted rule is that water/flow, terms which are used interchangeably, is not a pollutant discharge regulated under the CWA. In essence, then, the Draft Permit is seeking to not only re-write the adopted NPDES rules that only regulate "pollutant" discharges, it is seeking to re-write the CWA to regulate flow, regardless of the pollutant levels present – something which federal courts have repeatedly confirmed is simply not permissible (*See, e.g., Iowa League of Cities v. EPA*, 711 F.3d 844 (8th Cir. 2013)).

As noted, EPA has long recognized that flow is not a regulated parameter because it is not a "pollutant" and as such should not be included with a limit in the permit. This understanding is reflected in NPDES permits issued all over the country, including the recent permit issued by EPA to Nashua, NH, which contained no flow limitation. The Fact Sheet, however, improperly EPA describes effluent flow as a "non-conventional" pollutant (Brockton Fact Sheet at 11), citing the CWA:

The term "pollutant" means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.
33 U.S.C. §1362(6)

While pollutants may accompany a flow, that for not render flow itself to be a pollutant. Flow is only a measurement of the *quantity* of water; the pollutant is the measure of the *quality* of the water. Accordingly, the City of Brockton disagrees with EPA's assertion that the flow of water is considered a pollutant in 33 U.S.C. §1362(6). As such, the uncontroverted rule is that water/flow, terms which are used interchangeably, is not a pollutant discharge regulated under the CWA. In essence, then, the Draft Permit is seeking to not only re-write the adopted NPDES rules, it is seeking to re-write the CWA to regulate flow, regardless of the pollutant levels present – something which federal courts have repeatedly confirmed is simply not permissible (*See, e.g.*, *Iowa League of Cities v. EPA*, 711 F.3d 844 (8th Cir. 2013)). Consequently, the City requests that the flow limit in its permit be deleted, recognizing that EPA does not have the authority to regulate flow.

Response A.59.

The final permit includes an effluent flow limit of 18.0 MGD.[16] This effluent flow is reflected in the calculation of mass load limits for $CBOD_5$, TSS, ammonia, total phosphorus and total nitrogen. The effluent flow limit is expressed as an annual average, to be reported as a rolling average. The value is calculated as the arithmetic mean of the monthly average flow for the reporting month and the monthly average flow of the previous eleven (11) months. The draft permit's approach to determining an effluent flow limit reasonably accounts for seasonal variations in the facility's effluent flow.

EPA Region 1 and MassDEP have included such conditions in POTW permits throughout Massachusetts. Moreover, States and other EPA Regions have issued permits with similar conditions in other parts of the country. EPA has determined that inclusion of an effluent flow limit condition in the Brockton AWRF permit is authorized by CWA § 402(a)(2), which provides that "[t]he Administrator shall prescribe conditions for such permits to assure compliance with the requirements of" CWA § 402(a)(1) – including, by reference, CWA §301 - "and such other requirements as [she] deems appropriate." Furthermore, page 6 of the Brockton Fact Sheet states the following:

> Sewage treatment plant discharge is encompassed within the definition of "pollutant" and is subject to regulation under the CWA. The CWA defines "pollutant" to mean, inter alia, "municipal . . . waste" and "sewage...discharged into water." 33 U.S.C. § 1362(6). The limitation on sewage effluent flow is within EPA's authority to condition a permit in order to carry out the objectives of the Act. See CWA §§ Sections 402(a)(2) and 301(b)(1)(C); 40 C.F.R. §§ 122.4(a) and (d); 122.43 and 122.44(d). Regulating the quantity of pollutants in the discharge through a restriction on the quantity of wastewater effluent is consistent with the overall structure and purposes of the CWA.

40 C.F.R. §§ 122.41(d) and (e) require the permittee to (1) "take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment," and (2) "at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which

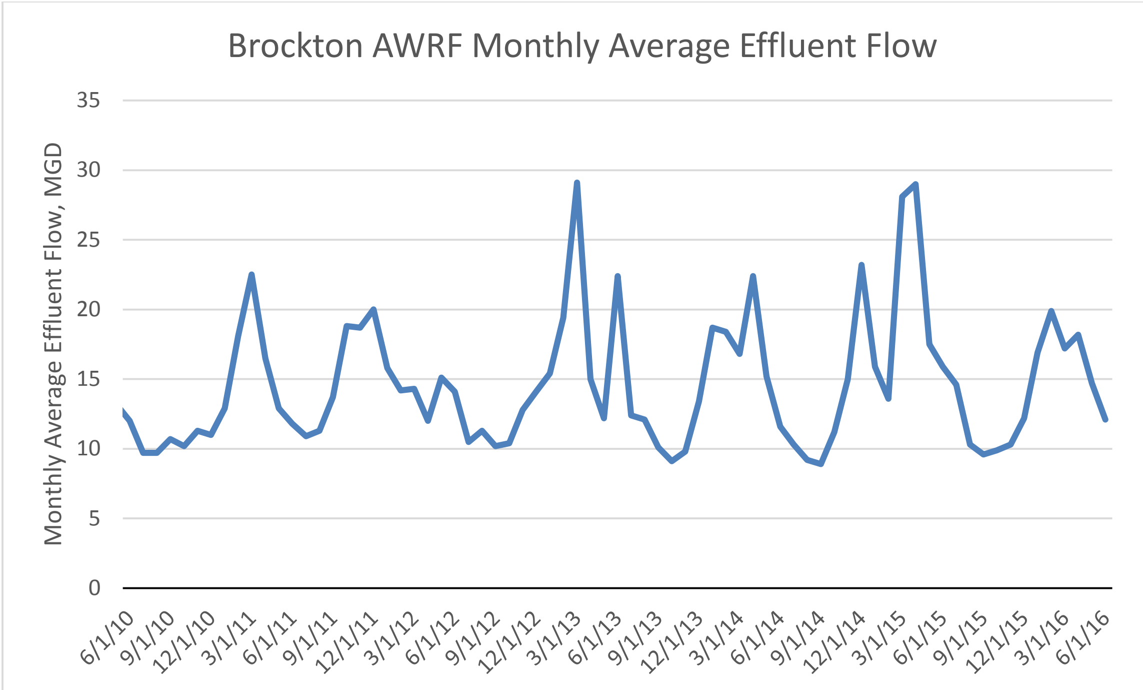
[16] The use of the word "flow" under the column heading "effluent characteristic" in Part I.A.1 of the Draft and Final Permits is to wastewater effluent flow discharged from the facility.

are installed or used by the permittee to achieve compliance with the conditions of the permit." The Region has determined that the effluent flow limit is authorized by section 402(a)(2) and appropriate in order to assure that the Brockton WWTF operates its facility to comply with its permit's technology- and water quality-based effluent limitations.

EPA has also included the effluent flow limit in the permit to minimize or prevent infiltration and inflow (I/I) that may result in unauthorized discharges and compromise proper operation and maintenance of the facility. Improper operation and maintenance may result in non-compliance with permit effluent limitations. Infiltration is groundwater that enters the collection system though physical defects such as cracked pipes or deteriorated joints. Inflow is extraneous flow added to the collection system that enters the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems. Significant I/I in a collection system may displace sanitary flow, reducing the capacity available for treatment and the operating efficiency of the treatment works and to properly operate and maintain the treatment works. As mentioned on page 7 of the Fact Sheet, the City of Brockton has significantly reduced I/I in its system pursuant to a judicial consent order with EPA resulting in a reduction of the rolling annual average flow below 18.0 MGD since 2010.

In addition, the extraneous flow due to significant I/I greatly increases the potential for sanitary sewer overflows (SSOs) in separate systems. Consequently, the effluent flow limit is a permit condition that relates to the permittee's duty to mitigate (*i.e.*, minimize or prevent any discharge in violation of the permit which has a reasonable likelihood of adversely affecting human health or the environment) and to properly operate and maintain the treatment works. *See* 40 C.F.R. §§ 122.41(d) and (e).

A review of Brockton's DMRs over the current permit term shows that the facility's monthly average flows exhibit significant seasonal variation. The magnitude of the variation in monthly average effluent flows indicates that significant amounts of extraneous flows are entering the collection system during periods of wet weather. The figure below demonstrates these seasonal variations over the past 7 years.



According to the 2011 permit application, the permittee estimated that an average of 0.2 MGD of I/I flowed into the treatment works. At the time of the application, the City had already removed significant peak I/I from its system, having completed nine (9) phases of I/I removal since 2000.

In addition to the DMRs and the permit application, EPA also examined a listing of SSOs the City of Brockton reported to MassDEP from 2010 through 2015. As shown in the table below, SSOs have occurred on 14 separate occasions during this time period, a further indication of significant extraneous flows entering the collection system.

Address/ Location	Incident Start Date & Time	Cause	Quantity Released	Ultimate Disposition
91-93 Maplewood Circle	3/9/10 1:50 PM	Blockage	3,000	ground
8 locations	3/15/10 9:15 AM	High flows	unknown	ground
12 locations	3/16/10 11:35 AM	High flows	unknown	ground
20 locations	3/30/11 12:00 AM	High Flows	unknown	ground
Santee Rd	3/14/12 1:00 PM	Roots and other debris	10,000	"No overflow to street"
Fletcher St - Easement	3/27/13 3:30 PM	Blockage	200	"swamp"
Centre St easement	10/4/13 11:00 AM	Blockage	200	swamp

885 Belmont St	12/22/13 7:20 PM	Blockage	75	River
Centre St easement	1/15/14 9:00 AM	Blockage	350	"direct to receiving water"
Upton St Easement, off East Ashland St	4/11/14 7:00 PM	Roots and Grease	750	"catch basin to receiving water"
Thornell St	4/24/14 9:20 AM	Grease Blockage	150	Salisbury River
Thornell St	5/8/14 8:30 AM	Roots and Grease	200	Salisbury River
12 Baldwin Rd	5/14/14 11:00 AM	Grease	50	"direct to receiving water"
Intervale St. @ Bellevue Ave.	5/27/15 1:30 PM	Blockage	300-400	Trout Brook

Although some of these SSOs may have been due to blockages or other factors, EPA notes that the frequency and volume of these SSOs can be exacerbated by high flows. EPA has determined that, despite the City's collection system remediation efforts, inclusion of a condition limiting effluent flow is both authorized and appropriate to ensure that the facility is able to operate in a manner that will at all times meet its CWA requirements.

Section 301(b)(1)(C) of the Act requires EPA to *ensure* that the permit will meet applicable water quality standards. Section 301 of the CWA requires achievement of "any more stringent limitation, including those necessary to meet water quality standards… established pursuant to any State law or regulations…." *See also* 40 C.F.R. § 122.4(d) (prohibiting issuance of a permit "when the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected States"); 40 C.F.R. § 122.44(d)(1) (providing that a permit must contain effluent limits as necessary to protect state water quality standards). The permit condition limiting effluent discharge flow is also an authorized and appropriate condition under these provisions.

Comment A.60.

b) EPA's Design Flow Assessment Is Misplaced

EPA's draft permit analysis also expended considerable time asserting that an 18 mgd flow is the approved "design flow" for this facility for all regulatory purposes, including setting flow limits and triggering antidegradation analyses (Brockton Fact Sheet at 3, 6-9, 17-20). EPA's understanding is again misplaced. As noted in the attached letter (*See* attachment HH, during the last facility upgrade and expansion in 2003, MassDEP approved a 20.5 mgd design flow for the existing facilities. Thus, the design flow is, in fact, 20.5 mgd as an annual average. The City's data since 1995 confirmed that this was a proper design flow approval consistent with then existing conditions. The fact that the

City has implemented additional I/I measures and has recently decreased that flow does not authorize EPA to claim a lower design flow is applicable to this facility or that some type of extensive antidegradation analyses are needed to authorize the City to operate within the 20.5 mgd flow.[52] The City expects that this would occur in a wet year, such as occurred in the last 15 years (see **Figures 19 and 20**).

52 The City disputes EPA's Fact Sheet claim that assessment of non-regulated pollutants and or emerging containments is necessary to meet antidegradation requirements. As the City was already authorized by MassDEP to operate at the higher flow level 12 years ago, there is no reason to challenge EPA's unsupported assertions, which are plainly inconsistent with the existing MassDEP antidegradation evaluation procedures, in any event.

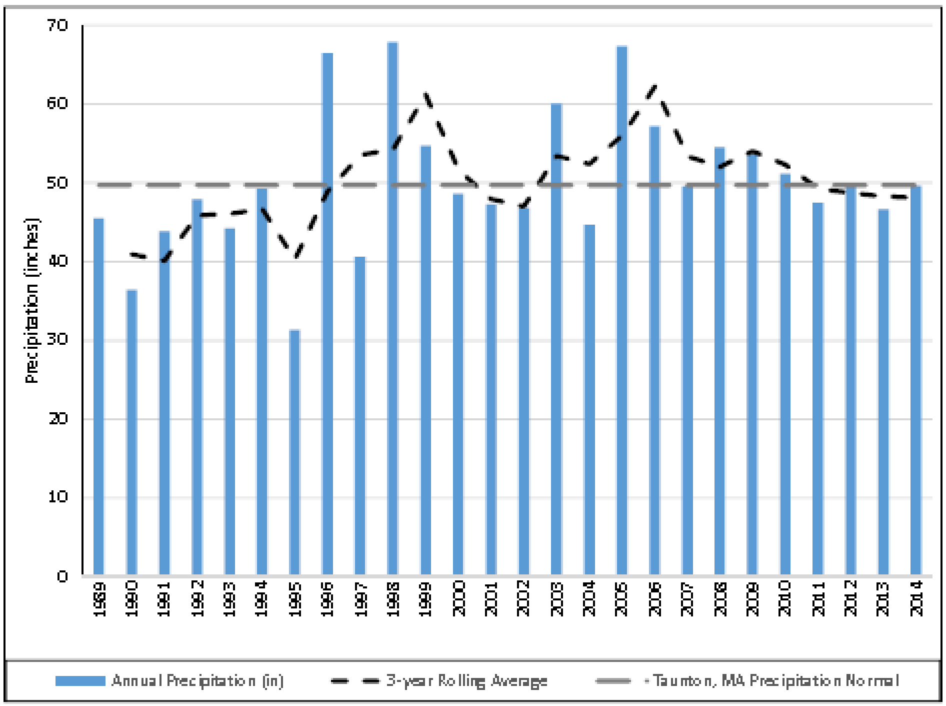


Figure 19: Average Annual Precipitation, 3-year Rolling Average Precipitation at Brockton[53]

53 Precipitation data from National Weather Service Cooperative Observer Program station USC00190860, Brockton, MA. Taunton, MA Precipitation Normal obtained from the National Climatic Data Center for the period 1981-2010.

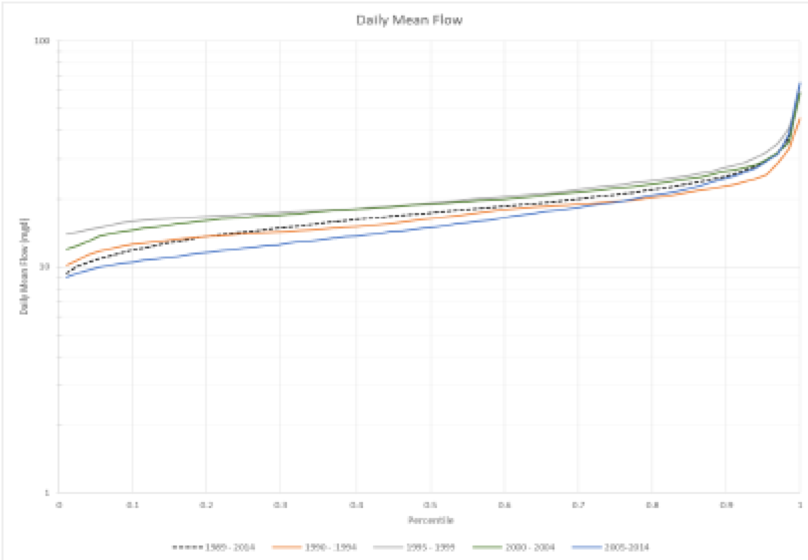


Figure 20: Cumulative Frequency Distribution Plot of Brockton AWRF Flow, 1989-2014

Response A.60.

Attachment HH is a letter from the Massachusetts Executive Office of Environmental Affairs, dated October 24, 2003, which states that, among other things, the upgrade to the Brockton AWRF does not require an Environmental Impact Report under Massachusetts Environmental Policy Act (MEPA) regulations but does require environmental review subject to 301 CMR 11.03(5)(b)(2). As stated in the Fact Sheet at 15,

> "EPA acknowledges that, as pointed out by the City, the upgraded capacity was subject to a certificate from the Massachusetts Executive Office of Environmental Affairs pursuant to the MEPA process in 2003. However, the MEPA process itself does not establish consistency with antidegradation requirements pursuant to the Massachusetts Antidegradation Implementation Procedures. Indeed, even if the full CWMP/SRF approval process were followed (not the case here as neither Brockton nor its current copermittees has a CWMP), that process is relevant to only one of the four requirements for antidegradation authorization, that of economic and social importance.[17] In addition the EOEA certificate was issued based on design documents indicating that the facility's existing flow had averaged 19.79 mgd from 1998 to 2002, Design Memorandum W1-A (July 2003), so that the upgraded facility was

[17] The CWMP process does not, and is not designed to, establish the other three factors for authorization. For example, an antidegradation authorization for a significant lowering of water quality requires that "no less environmentally damaging alternative . . . is reasonably available and feasible"; this is a far different standard from the CWMP direction to select the alternative with "the greatest environmental and cost benefit." See MassDEP, *Guide to Comprehensive Wastewater Management Planning* (1996) at 26. http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/wwtrfpg.pdf

> sized essentially to treat existing flows; a revised assessment of economic and social importance would be justified in light of the substantial reduction in flow achieved through the I/I mitigation work performed under the City's consent decree which has reduced current flows well below the 18.0 mgd permitted flow."

It should also be noted that the AWRF's 2005 permit reissuance, which was issued well after the 2003 letter referenced in this comment) used 18 mgd as the permitted flow (not 20.5 mgd). In the Response to Comments (RTC) document for that 2005 permit, EPA clearly stated that "the facilities plan which proposes this design flow increase has not yet been approved by MADEP, it has not been shown that Class B water quality standards can be attained at the increased flow, nor has the state conducted a review which demonstrates that this increase can be authorized under its antidegradation policy." As noted in the 2005 RTC as well as in the 2015 Fact Sheet (page 6), 18 mgd was the facility's historic design flow based on its upgrade in the 1970's. Since that time, 18 mgd has been used to develop permit limits in each permit reissuance.

Although the AWRF was upgraded with an increased capacity of 20.5 mgd in 2010, EPA maintains that the AWRF's requested wastewater effluent flow increase is subject to antidegradation regulations and was therefore not approved in this permit reissuance. See more thorough discussion of this decision in Section VI.B.1. of the 2015 Fact Sheet. As stated on page 8 of the Fact Sheet, "An increase in design flow is itself an increase in pollutants to the receiving water,[18] as well as having potential for increasing loading of individual pollutants, some of which (pharmaceuticals, endocrine disrupters, etc.) have not been monitored. Therefore, any increase in flow requires antidegradation review to ensure that all increases are within the assimilative capacity of the river or otherwise authorized pursuant to the antidegradation regulations, both at the point of discharge and further downstream. In addition, EPA's regulations require that no permit be issued unless conditions can be imposed that ensure compliance with water quality standards." This is especially important in this case based on the fact that the receiving water is "extremely effluent dominated even under the historic [18 mgd] design flow conditions" as described on page 9 of the Fact Sheet.

Furthermore, EPA notes that is it not clear what is meant in the comment's footnote by "non-regulated pollutants," but presumably it means pollutants with no numeric criteria. EPA clearly has the authority to regulate pollutants that may cause or contribute to water quality impairments associated with numeric or narrative criteria. To the extent that emerging contaminants can have a toxic effect on aquatic life, they can constitute a violation of the narrative criteria protecting against toxicity. See Response C.3 below for more details regarding EPA's decision to require monitoring and reporting for emerging contaminants.

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[18] Effluent flows are treated sewage and are expressly included in the definition of "pollutant" under the Clean Water Act and EPA's regulations. 33 U.S.C. 1362(6) ("The term 'pollutant' means . . . sewage . . . discharged into water.").

Comment A.61.

c) Requirements for reporting if plant flow exceeds 80% of design flow

Part I.A.1.g (Draft Permit at 8) is typical language, that would require that the City submit a report (essentially initiate a facilities planning process) if the plant flow exceeds 80% of the facility's design flow in any calendar year. First, as clarification: the Draft Permit indicates that 18 mgd is the permitted annual average flow, but as has been well documented, 20.5 mgd is the facility's design flow. The intent of this requirement should be clarified.

Second, if EPA clarifies that the intent of this requirement is to use 18 mgd, then it must be noted that given the status of the City's planning documentation, this paragraph should not apply to Brockton. 80% of 18 mgd is 14.4 mgd, and the plant flow already exceeds 80% of 18 mgd. The City requests that EPA delete or at least modify this paragraph to recognize the current situation with regard to Brockton specifically.

Response A.61.

As discussed in Response A.60 above, the permitted flow used in this permit reissuance is 18 mgd, the same as the 2005 permit. Additionally, the requirement regarding 80% of design flow of page 8 of the draft permit states the following:

> If the average annual flow in any calendar year exceeds 80 percent of the facility's design flow, the permittee shall submit a report to MassDEP by March 31 of the following calendar year describing its plans for further flow increases and describing how it will maintain compliance with the flow limit and all other effluent limitations and conditions.

To clarify, this requirement is intended to apply to the 18 mgd permitted flow. Given the current status of annual average flow (greater than 14.4 mgd) and plant capacity, EPA still maintains that this requirement applies to the Brockton AWRF as it is written. The intent of this requirement is to proactively ensure that planning is in place when actual flow is approaching permitted flow. This planning is required to ensure the prevention of permit violations. Therefore, it is consistent that this requirement is triggered based on the permitted flow rather than some authorized higher flow value. At the required time, the City must submit a report to MassDEP describing, primarily, how it plans to maintain compliance with the limits set in the final permit given its current flow and flow limit as well as potential sources of flow increases in the future.

Comment A.62.

7. CMOM

a) Collection System Studies and Performance Requirement (Section C)

The Draft Permit (at 7-12) includes many new requirements regarding the operations and maintenance of the collection system. The City has been under state and federal order to address CSO requirements and collection system evaluations, and received EPA Administrative Order by Consent Docket NO. 14-014, effective on September 1, 2014. The City has been accomplishing those goals as part of its ongoing maintenance program; the CMOM checklist and assessment report were submitted on March 18, 2015 to both MassDEP and EPA. While the City will continue to implement its CMOM program, there is no basis to impose further requirements at this time and the City requests that these entire provisions be withdrawn in consideration of the following points:

- Any facility planning provisions of the permit are state-level provisions beyond the federal program and must be so identified so federal enforcement is not triggered over these provisions;
- The new permit provisions were not part of adopted NPDES rules, and they never have been presented for public notice and comment in a rulemaking setting prior to the attempted imposition in this permit, in violation of federal APA requirements;
- EPA has provided no data demonstrating that the current City O&M program is insufficient to justify such requirements on a site-specific basis;
- EPA has provided no basis for the individual program requirements that are being imposed as necessary to achieve technology or water quality-based requirements; the development of such technology-based provisions is governed by 40 CFR 125.3 and no such analysis has been presented with this permit;
- The CWA does not authorize EPA to develop a separate set of technology-based provisions for collection systems; the only applicable technology-based provision is secondary treatment;
- Federal law does not authorize EPA regional offices to create new regulatory requirements (*see, PMAA v. Whittman*);
- The provisions represent an unlawful amendment of the O&M rule which only sets forth general requirements to ensure effluent quality is met – EPA has changed the existing general O&M requirement to mandate that the collection system, regardless of plant performance must be operated and managed in a highly specific fashion and that certain documents must be developed to comply with the O&M provision. These actions are beyond EPA's authority under the CWA (*See, e.g., Iowa League of Cities v. EPA*, 8th Cir. 2013);
- The NPDES program has never established sewer system operational requirements, nor demonstrated that such provisions are necessary to meet technology or water quality-based limitations. Therefore, inclusion of these requirements is *ultra vires;*
- The new EPA requirements are not case specific provisions but new boilerplate "CMOM" provisions that EPA is attempting to put in all reissued permits.

> Establishing new NPDES provisions that have reporting and report generating requirements without OMB review violates the federal Paperwork Reduction Act.

In summary, to the degree EPA is claiming that the adopted NPDES rules mandate these requirements; EPA has unlawfully modified the adopted rules. To the degree EPA is claiming that the plain language of the rule allows EPA to impose such requirements, EPA's reading of the rule in unsupported. Finally, to the degree EPA is attempting to dictate the management of the facility or its collection system, EPA is operating beyond statutory authority (See, *Iowa League of Cities v. EPA* (8th Cir. 2013)).

Response A.62.

EPA disagrees with the comment that EPA is not authorized to impose requirements regarding the operation and maintenance (O&M) of the collection system as set forth in the Brockton draft permit. The O&M requirements included in the draft permit are intended to minimize the occurrence of permit violations that have a reasonable likelihood of adversely affecting human health or the environment. Contrary to the commenters claim, the imposition of the provisions by the Region is indeed case specific. The fact that similar language appears in other municipal discharge permits is immaterial; the Region has exercised its permit writing expertise and experience to tailor many specific permit provisions that it has employed across many permits, and it is an efficient practice to utilize provisions that it has found to be effective and clear across many permits, as necessary. The elements of the O&M plan in the draft permit have been fashioned by the Region to carry out the objective of protecting human health and the environment; these provisions are being placed into individual permits where, based on the administrative record of a particular permitting action, the Region has ascertained the need for more information about the operation and maintenance of a particular treatment works and, until that information is provided, to assure the permit contains conditions sufficient to assure compliance with the Act. EPA notes that the Region is not making any judgment on the merits of Brockton's existing O&M program regarding whether it is sufficient to comply with these requirements. Rather, the Region is exercising its discretion to apply these preventative requirements to all newly issued municipal permits. If the City's current program is sufficient to comply with these requirements, the City must simply document and report this compliance according to the reporting requirements in the permit. The permit conditions represent a starting point, and the Region expects to further tailor their terms in future permit cycles as more information and operational data become available. In the Region's view, these conditions are not highly prescriptive but provide the permittee with continued flexibility and discretion in determining how to operate and maintain their treatment works.

The Brockton AWRF is a Publicly Owned Treatment Works (POTW) as defined at 40 C.F.R. § 403.3. This definition also includes sewers, pipes, and other conveyances that convey wastewater to a POTW treatment plant. Conditions applicable to all permits include the regulation of proper operation and maintenance (see 40 C.F.R. § 122.41(e)). This regulation requires that "the permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit." The treatment plant and collection system are included in the definition "facilities and systems of treatment and control" and are therefore subject to proper operation and maintenance requirements. The general requirements for proper operation and maintenance, and mitigation are typically found in Part II, Standard Conditions. Recently, EPA has included the specific permit conditions found in Parts I.B and I.C in all reissued municipal permits in order to clearly identify practices that will ensure "proper operation and maintenance."

Clearly, Brockton has had issues with high flow and SSOs that the provisions at issue are designed to ameliorate. See Response A.59 above for a detailed description of Brockton's recent SSOs. Although some of these SSOs may have been due to blockages or other factors, EPA notes that the frequency and volume of these SSOs can be exacerbated by high flows. Furthermore, high flows lead to more frequent permit limit violations. For example, as noted in the Fact Sheet (at 54) the facility's only two whole effluent toxicity (WET) violations during the review period were from two samples required to be taken at flows over 30 MGD.

Contrary to the comment, EPA does have authority to include these O&M requirements in the Brockton permit. Regulations found at 40 C.F.R. § 122.44(i), and CWA §§ 308(a)(A) and 402(a)(2) provide broad authority to require owners and operators of point sources to establish monitoring methods and to prescribe permit conditions for data collection and reporting. As the Environmental Appeals Board has described:

"It is well established that permit writers enjoy broad authority under the CWA and regulations to prescribe municipal data collection and reporting requirements." *Town of Concord*, slip op. at 39. See CWA § 308(a)(A), 33 U.S.C. § 1318(a)(A) (specifying that permittees must provide records, reports, and other information EPA reasonably requires); CWA § 402(a)(2), 33 U.S.C. § 1342(a)(2) (requiring permittees to provide data and other information EPA deems appropriate); 40 C.F.R. § 122.41(h) (permittees shall furnish "any information" needed to determine permit compliance); 40 C.F.R. § 122.44(i) (permittees must supply monitoring data and other measurements as appropriate); *see also*, *e.g.*, *In re City of Moscow*, 10 E.A.D. 135, 170-71 (EAB 2001) (holding that EPA has "broad authority" to impose information-gathering requirements on permittees); *In re Town of Ashland Wastewater Treatment Facility*, 9 E.A.D. 661, 671-72 (EAB 2001) (holding that CWA confers "broad authority" on permit issuers to require monitoring and information from permittees).

In *In re Town of Concord*, NPDES Appeal No. 13-08, slip op. at 39 (EAB Aug. 28, 2014), EPA's decision to include the O&M requirements in the permit was reasonable and consistent with its responsibilities under the Clean Water Act, particularly given the environmental imperatives identified by the Region as driving the collection system requirements (e.g., SSO prevention) and receiving water conditions. As EPA outlined in the Fact Sheet, at 56:

> Proper operation of collection systems is critical to prevent blockages and equipment failures that would cause overflows of the collection system (sanitary sewer overflows, or SSOs), and to limit the amount of non-wastewater flow entering the collection system (inflow and infiltration or I/I[19]). I/I in a collection system can pose a significant environmental problem because it may displace wastewater flow and thereby cause, or contribute to causing, SSOs. Moreover, I/I could reduce the capacity and efficiency of the treatment plant and cause bypasses of secondary treatment. Therefore, reducing I/I will help to minimize any SSOs and maximize the flow receiving proper treatment at the treatment plant.

Contrary to the City of Brockton's view that the Region is prohibited from imposing monitoring and reporting conditions on internal treatment processes of the POTW, CWA §§ 308(a)(A), 402(a)(2) and implementing regulations provide broad legal authority to require owners and operators of point sources to establish monitoring methods and to prescribe permit conditions for data collection and reporting, and are not expressly or impliedly delimited to the end of the pipe. CWA § 308(a)(A), 33 U.S.C. § 1318(a)(A) (specifying that permittees must provide records, reports, and other information EPA reasonably requires); CWA § 402(a)(2), 33 U.S.C. § 1342(a)(2) (requiring permittees to provide data and other information EPA deems appropriate); 40 C.F.R. § 122.41(h) (permittees shall furnish "any information" needed to determine permit compliance); 40 C.F.R. § 122.44(i) (permittees must supply monitoring data and other measurements as appropriate). The O&M requirements are not technology-based effluent requirements but are preventative O&M requirements based on the regulations cited above.

The City appears to argue that the Act does not authorize EPA to impose either monitoring requirements or effluent limitations on internal treatment processes of a point source subject to an NPDES permit. For this proposition, the City leans heavily on the Eighth Circuit decision in *Iowa League of Cities*, 711 F.3d 844, 877 (8th Cir. 2013), and that case's citation to *Am. Iron and Steel v. EPA*, 115 F.3d 979, 996 (D.C. Cir. 1997). Not only are these cases irrelevant to the monitoring and reporting requirements at issue, as described below, but the City's legal theory directly conflicts with a long line of Board precedent on the breadth of authority conferred on the Region by the Act to impose reasonable reporting and monitoring requirements on owners and operators of "point sources," without

[19] "Infiltration" is groundwater that enters the collection system through physical defects such as cracked pipes, or deteriorated joints. "Inflow" is extraneous flow entering the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems.

reference to whether that person even has a permit. That authority, found in Section 308 of the Act, is supplemented in this case by Section 402, as the discharges from the City are governed by the NPDES program. Under Section 402(a)(2), an NPDES permit may include "conditions on data and information collection, reporting, and such other requirements as [the Administrator] deems appropriate." The provisions at issue here are appropriate, designed as they are to assess consistency with Section 301 of the Act, including water quality standards. Against this backdrop, the City of Brockton's primary claim of error underlying its challenge to the monitoring and reporting conditions—that EPA is barred under Section 308 and 402 from prescribing such conditions on internal treatment process flow on facilities even though their discharges are from point sources—is unpersuasive.

There is, furthermore, no basis to conclude under the Board's precedent construing Sections 308(a) and 402(a)(2) of the Act, and implementing regulations, that the monitoring conditions at issue here are unwarranted simply because they pertain to processes that occur at a remove from the outfall. *In re Westborough*, 10 E.A.D. 297, 316-17 (EAB 2002) (requiring monitoring of the actual influent of phosphorus coming into the headworks of the Westborough POTW from industrial and other sources discharging waste into the sewer system prior to treatment by the POTW, and noting "The regulatory scheme clearly anticipates that both discharges *from* and discharges *into* POTWs are subject to regulation by means of NPDES permits."). *See, e.g.*, *Town of Concord*, slip op. at 38-40; *In re Charles River Pollution Control Dist.*, NPDES Appeal No. 14-01 (EAB Feb. 2, 2015) (holding that the Region has authority under the Clean Water Act and EPA's regulations to include municipal satellite collection systems as co-permittees and subject them to monitoring and reporting requirements). Indeed, the authority to impose effluent limitations on internal waste streams, and associated monitoring requirements, is expressly recognized in EPA's regulations. 40 C.F.R. § 122.45(h).

Finally, the provisions at issue do not violate the Paperwork Reduction Act. The conditions have been imposed on the City based on a site-specific assessment of circumstances pertaining to these particular treatment works. The permit requirements allow a permittee to select the information to be provided in response to the request based on its interpretation and experience of the facts and circumstances applicable to each facility; the Region disagrees therefore with the contention that the permit conditions are identical purposes of the PRA or that the Region's action meets the numerical threshold of the PRA. Even if the PRA were applicable to the circumstances here, the permit conditions would fall within information collection requests that have already been approved by the Office of Management and Budget (OMB) in previous submissions made for the NPDES permit program under the provisions of the Clean Water Act.

The broad objective of the Clean Water Act ("CWA"), 33 U.S.C. § 1251 *et seq.*, is to restore and maintain the chemical, physical, and biological integrity of the nation's waters.[20] CWA section 402, 33 U.S.C. § 1342, established the NPDES program as the primary mechanism for controlling discharges of pollutants to navigable waters of the United States, and, subject to certain conditions, authorizes the Administrator of the EPA to issue permits for the discharge of pollutants, and to "prescribe conditions for such permits … including conditions on data and information collection, reporting, and such other requirements as [the Administrator] deems appropriate."[21]

To this end, EPA passed regulations further defining the procedures and requirements of the NPDES program, codified in Title 40 of the Code of Federal Regulations (CFR) Parts 122-125. Regulations governing permit requirements for NPDES discharges are contained in 40 CFR Part 122, and the regulations specifically authorizing CMOM collection requirements in NPDES permits include 40 CFR § 122.48(a) and § 122.44(i)(1)(iii). Section 122.48(a) provides that all permits shall specify, "[r]equirements concerning the proper use, maintenance, and installation, when appropriate, of monitoring equipment or methods (including biological monitoring methods when appropriate)." Section 122.44(i)(1)(iii) provides for monitoring requirements in addition to those in § 122.48, specifically:

> Other measurements as appropriate including pollutants in internal waste streams under § 122.45(i); pollutants in intake water for net limitations under § 122.45(f); frequency, rate of discharge, etc., for noncontinuous discharges under § 122.45(e); pollutants subject to notification requirements under § 122.42(a); and pollutants in sewage sludge or other monitoring as specified in 40 CFR part 503; or as determined to be necessary on a case-by-case basis pursuant to section 405(d)(4) of the CWA.

Additional broad authority for CMOM requirements has also been derived from 40 CFR § 122.41(d) and (e).[22] Section 122.41 provides, "[c]onditions applicable to all permits," with subsection (d) providing for a duty to mitigate "discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment." Subsection (e) requires, "[p]roper operation and maintenance … [of] all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee."

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[20] CWA Section 101, 33 U.S.C. § 1251(a).

[21] Id. § 1342(a)(1)-(2).

[22] *See e.g.*, 2010 NPDES Permit Writers' Manual ("2010 Manual"), pp. 9-21 (asserting that "[p]ermits should clarify requirements for proper operation and maintenance of the collection system," which, "may include requiring the development and implementation of capacity, management, operation and maintenance (CMOM) programs"). *See also* Brockton Draft NPDES Permit Fact Sheet, pp. 55-56 (citing to 40 CFR § 122.41(d) and (e) in its justification for permit requirements pertaining to Operation and Maintenance of the Sewer System).

Any information collection ("IC") by an agency that requests identical or substantively similar information from ten or more people, including municipalities, must be approved by the Office of Management and Budget ("OMB").[23] Information collection activities under 40 CFR §§ 122.44(i)(1)(iii) and 122.48(a) is specifically identified and approved under the currently approved NPDES Information Collection Request ("ICR"), OMB Control No. 2040-0004 (2012) (the "2012 ICR"). The relevant subsections have both been approved under the current ICR and will also be covered under the pending ICR, OMB Control No. 2040-0004(2015) (the "2015 ICR"). This approval has been sufficiently displayed and covered parties notified via publication in the Code of Federal Regulation, at 40 CFR § 9.1.

The 2012 ICR approval covers the CMOM authorizing regulations. First, within Section 4(b) of the 2012 ICR Supporting Statement, which outlines the "Information Requested" of the public,[24] the supporting statement repeatedly cites monitoring-based IC requirements under § 122.44(i) as a whole, including in the context of municipal "stormwater" and "non-stormwater."[25] Both of these sections in the supporting statement note that, "[f]ederal regulations at 40 CFR 122.44(i) outline the monitoring requirements for NPDES permittees."[26] OMB approval for an ICR constitutes approval for the ICs outlined and justified in the agency's supporting statement. Here, approval for the 2012 ICR constitutes approval for ICs pursuant to § 122.44(i) monitoring requirements, including CMOM authorizing IC-requirements pursuant to § 122.44(i)(1)(iii). Relatedly, although the supporting statement does not specifically cite ICs pursuant to § 122.48(a),[27] approval of ICs under 122.44(i) also constitute approval for ICs under § 122.48 because that section of the regulation is incorporated by reference in § 122.44(i). Namely, § 122.44(i) authorizes "monitoring requirements," that are specifically, "[i]n addition to [those required by] § 122.48."

Additional evidence that CMOM-authorizing regulations have been approved by OMB is available in EPA's 40 CFR § 9.1. First and foremost, this table meets

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23 See 44 U.S.C. §§ 3507(a), 3502(3)(A)(i), 3502(10).

24 2012 ICR Supporting Statement, 4(b) "Information Requested," p. 18.

25 Id., 4(b)(iii)(1)(A)(2) and 4(b)(iii)(1)(B)(2), pp. 37-38.

26 Id.

27 EPA's supporting statement for the 2012 ICR does expressly cite to 122.48(c), however. While 122.48(a) is the substantive, CMOM-authorizing requirement "concerning proper use, maintenance, and installation, when appropriate, of monitoring equipment or methods," 122.48(c) is the related reporting requirement. Thus, while the reporting requirements pertaining to CMOM activities are expressly cited and approved, the CMOM proper use and maintenance requirements themselves are not expressly cited. There is therefore an additional argument for implied approval based on standard statutory interpretation—namely that without implied approval for the substantive information collection activity, there would be nothing to report under the associated, expressly approved, reporting requirement. Thus the substantive information gathering requirement should be understood to be impliedly approved.

EPA's notice and display responsibilities pursuant to 5 CFR § 1320.5(b) and 44 USC § 3512(a) because it "displays" IC-requiring regulations with corresponding OMB control numbers in the Code of Federal Regulations, which constitutes acceptable notice to "potential persons who are to respond to the collection of information." The table also constitutes EPA's understanding of which regulations have been expressly approved by OMB, however. To that end, 40 CFR § 9.1 cites express OMB approval for ICs pursuant to both 40 CFR §§ 122.44(i) and 122.48 in the 2012 ICR.[28] This publication demonstrates EPA's understanding and belief that these regulations were sufficiently well outlined and justified in the 2012 ICR supporting statement that OMB approval for the 2012 ICR constitutes approval for these broad sections under the PRA.

Comment A.63.

b) No Violation of WQS in Receiving Waters

The permit contains one provision specifying that it is illegal for the City's WWTP discharge to cause a violation of any applicable water quality standard (Part I.A.1.a, Draft Permit at 8). The imposition of these provision is not authorized by either NPDES permit rules or the Act. EPA is supposed to calculate effluent limits (numeric values) so that the community may be on notice and understand what pollutants need to be regulated. EPA uses WET testing to address otherwise unregulated pollutant or those without specific numeric criteria. This additional vague provision provides no such notice of the pollutants intended to be regulated under the permit and provides no guidance on how one would determine such violation exists, such that corrective measures could be undertaken. Thus, the provision violated the "fair notice" principle that underlies the CWA and its enforcement ("Traditional concepts of due process incorporated into administrative law preclude an agency from penalizing a private party for violating a rule without first providing adequate notice of the substance of the rule." Satellite Broad. Co., Inc. v. Fed. Commc'n Comm'n, 824 F.2d 1, 3 (D.C. Cir. 1987); *see e.g.*, Gen. Elec. Co. v. U.S. Envtl. Prot. Agency, 53 F.3d 1324, 1328 (D.C. Cir. 1995)).

Moreover, the provision negates schedule of compliance authority adopted by MassDEP by making all water quality standards compliance immediate. Where new information indicates that a standard violation is occurring, the proper procedure is to reopen the permit, set a limit and provide a schedule of compliance. This provision, however, places the City in immediate noncompliance and that is not permissible.

Response A.63.

EPA disagrees with the comment that EPA is not authorized to impose a permit requirement that prevents the discharge from causing a violation of the water quality standards of the receiving waters. Rather, EPA asserts that this is the

[28] 40 CFR § 9.1 also cites authority for these regulations under older ICRs, including OMB Control No. 2040-0170, which was merged in 2040-0004 (i.e., the 2012 ICR). The Table also cites approval for 122.44(i) under OMB Control No. 2040-0110, which was discontinued at EPA's request in 2009.

primary intent of the development and application of water quality standards in NPDES permits. Accordingly, the Massachusetts Surface Water Quality Standards (MA SWQS) at 314 CMR 4.03(1)(a) state "Where the Department has not established water quality based effluent limitations in a permit and a violation of water quality standards attributable to a discharge occurs, the Department may modify, suspend or revoke the permit, in whole or in part, for cause in accordance with 314 CMR 3.00." The draft permit provision referenced in the comment (Part I.A.1.a) provides "fair notice" that, according to MA SWQS the permittee must meet all water quality standards, even if EPA or MassDEP "has not established water quality based effluent limitations" based on any applicable water quality standard.

While it is true that the permit is written to include limitations and conditions to assure compliance with water quality standards, EPA cannot reasonably be expected to anticipate all the water quality issues arising from the discharge. The CWA does not proscribe permit conditions stated in terms of water quality standards. EPA sees merit in including a more general, narrative, preventative permit provision that restates the commands of Section 301 and the implementing regulations at 40 CFR §§ 122.4 and .44 to "ensure" compliance with quality standards. Doing so allows EPA to address, as necessary, ongoing water quality impairments caused or contributed to by such circumstances as changes in effluent quality that might otherwise meet permit conditions or the discharge of pollutants not identified in the City's permit application. The Permit's effluent limitations and conditions are written to ensure the discharge complied with WQS, but EPA disagrees that it lacked authority under the Act to impose a narrative permit condition stated in terms of WQS. *Northwest Envtl. Advocates v. City of Portland*, 56 F.3d 979, 990 (9th Cir. 1995). While compliance with an NPDES permit is, as a general matter, deemed compliance with, *inter alia*, Section 301, the permit shield provisions of the Act and implementing regulations do not uniformly immunize the City from all conceivable impacts of its discharge on water quality. 33 U.S.C. § 1342(k); CWA § 402(k). "Congress has vested in the Administrator [of EPA] broad discretion to establish conditions for NPDES permits" in order to achieve the statutory mandate of establishing effluent limitations to attain and maintain WQS. *Arkansas v. Oklahoma*, 503 U.S. 91, 105 (1992). The narrative condition at issue here was fashioned to ensure full implementation of Sections 301(b)(1)(C) and 402.

Neither can EPA be expected to anticipate a reasonable compliance schedule for complying with all possible violations of this water quality-based permit provision. EPA notes that while the current MA SWQS provide for the option of establishing a compliance schedule in a permit for water quality-based effluent limitations when certain conditions are satisfied, the MA SWQS do not make a compliance schedule a mandatory permit provision. In this case, given the number of scenarios for non-compliance that would have bearing on a reasonable schedule, EPA has exercised its discretion not to include a compliance schedule.

Comment A.64.

8. Copper limits not necessary/miscalculated

EPA indicates that the Salisbury Plain River no longer has the assimilative capacity with respect to copper (Fact Sheet at 11) and that the existing effluent limitation for copper can only be increased slightly, despite the fact that MassDEP has adopted less restrictive copper criteria for the receiving water. The condition of assimilative capacity is plainly incorrect as given the new site-specific copper limits adopted for the Salisbury Plain River (acute = 25.7 μg/l and chronic = 18.1 μg/l which apply to the confluence with the Taunton River [Table 28 of 314 CMR 4.06]; this fact needs to be acknowledged. On a potential increase in copper limits, EPA indicates that MassDEP procedures require an antidegradation/antibacksliding analysis in light of the fact that the City's pollution reduction efforts have resulted in effluent quality largely meeting the existing, now unnecessarily restrictive effluent limits (Fact Sheet at 51-53). **Table 8** [54] provides the last 5 years of monthly copper sampling results, which show that 20 of the 60 samples have met the current average monthly limit of 5.3 μg/l while 55 of 60 samples have met the maximum day limit of 7.4 μg/l. These very low effluent levels of copper are likely unprecedented among Massachusetts POTWs and reflect favorable on the ability of Brockton to remove copper.

54 Upon checking the effluent copper data in the Fact Sheet, Brockton noticed a few values that differed from its own records, which are likely the result of typographical errors. The data in **Table 8** reflect the actual data. Brockton will file an amended DMR to provide the correct data.

The Draft Permit proposes an average monthly limit of 8.5 μg/l and a maximum day limit of 10 μg/l. Even with the revised limits, it is apparent from the 5-year data record that effluent concentrations could be exceeded less than 5% of the time, which is not considered compliance under the CWA (*See* 95-99 percentile performance estimates in Brockton Fact Sheet at 53). Using the full 5-year dataset to reflect recent performance, a greater percentage of exceedance is projected – all while meeting the applicable water quality standards. Thus, Brockton meets antibacksliding exemption 5 (proper operation and maintenance of facilities yet compliance is not achieved).

Table 8: Corrected Brockton AWRF Effluent Copper Concentrations, 2010-2014

Month	Effluent Copper (μg/l)				
	2010	2011	2012	2013	2014
January	7.25	3.8	6.5	5.6	5
February	5	5.8	6.8	5	4.19
March	3	4	5.8	5	4.2
April	4	6.3	5	6.2	3.6
May	7.25	6.2	8.2	6.3	6.4
June	6.4	5.8	5.8	6.3	5.25
July	7.75	5.8	6	6.6	5.6
August	8	6.2	6	5.8	4.6
September	5.6	7.5	6.3	6.8	6
October	2.33	6.8	6.2	5.8	5.25
November	9.25	4.6	5.8	5	5.4
December	6.4	5.3	5.8	5	5

Therefore, the City disagrees with the limits set in the permit. The City has undertaken extreme and costly efforts to reduce copper and those efforts need not be maintained under the current situation. Therefore, the City requests that EPA establish permit limits equal to the site-specific criteria for the Salisbury Plain River cited above. Failing that, the following action should be undertaken:

1. EPA should set the monthly average limit based on the 95th percentile performance and a maximum monthly limit based on the 99th percentile performance of the last 5 years of data
2. Allow an additional 10% increase in the limit based on the principle that such increases are *de minimis* and do not require a further antidegradation response (*See*, MassDEP antidegradation policy).
3. Thus, the final antibacksliding limit should be set at 9.0 μg/l monthly average; 10.7 μg/l daily maximum.

Response A.64.

As stated in the Fact Sheet at 51, in determining the appropriate effluent limitation in response to the revised copper standard, EPA must apply the requirements of the revised state standard, as set forth in the MassDEP *Protocol for and Determination of Site-Specific Copper Criteria for Ambient Waters in Massachusetts*, January 2007 (the "site-specific protocol"), and the requirements of the anti-backsliding provisions of the Clean Water Act §§ 402(o) and 303(d)(4). The site-specific protocol allows for relaxation of permit limits to reflect the higher criteria only to the extent required to reflect the *actual performance* that the facility has been able to achieve. It states:

> [A]s part of the site-specific criteria, all reasonable efforts to minimize the loads of metals, and copper in this case, are part of the criteria revision protocol. So, the Department on a case-by-case basis will develop permit copper limits. Each determination will be based not only on the adjusted concentration resulting from the appropriate multiplier but will reflect the demonstrated level of copper reduction routinely achievable at the facility in order to minimize copper loads and thereby reduce its accumulation in the sediment.

Thus, determination of the appropriate effluent limits under the site-specific protocol requires calculating both (i) the required effluent limits that would meet the numeric criteria (criteria-based limits) and (ii) the actual effluent concentrations achieved by the facility (performance-based limits), and selecting the more stringent of the two. As demonstrated in the subsequent analysis of the Fact Sheet, the calculated acute and chronic limits based on demonstrated performance were more stringent than the limits based upon the revised criteria. Hence, limits in the draft permit were based upon past performance. It should also be noted that these limits are indeed less stringent than the limits in the previous 2005 permit. This was allowable under antibacksliding exception found at CWA Section 402(o)(2)(E) (*i.e.*, proper operation and maintenance of facilities yet compliance is not achieved), correctly referred to by the commenter above.

Additionally, while EPA maintains that the 95th and 99th percentile values are appropriate indicators of demonstrated performance, the Agency is amenable to consider the new and corrected copper data which were submitted with this comment. However, EPA does not agree with applying a 10% increase, which is considered *de minimis* under MassDEP antidegradation policy, for purposes of establishing limits using demonstrated performance. This is especially true since compliance with these revised limits is by definition achievable.

In reevaluating the copper data, EPA believes a more appropriate calculation of the 95th and 99th percentile values for demonstrated performance should be based on the raw (unaveraged) copper data, rather than the monthly averages of the data as done in the Fact Sheet and in the comment above. Hence, EPA obtained from the facility all raw daily effluent copper results taken from 2010 through 2015. The 95th and 99th percentile values for demonstrated performance were then calculated from these 298 newly submitted measurements.

The 95th and 99th percentile values for the performance data submitted (from January 2010 through December 2015) result in 10.3 ug/l and 13.7 ug/l applied as monthly average and daily maximum limits, respectively. The limits set forth in the draft permit (based on monthly average data from January 2011 through December 2013) resulted in limits of 8.5 ug/l and 10 ug/l, respectively. Hence, EPA has chosen to apply the full range of daily data. The copper limits in the final permit have been modified to reflect this change.

Comment A.65.

9. Co-permittee restriction

Brockton does not object, in principle to the co-permittee designation for communities that utilize its system for treatment. That will ensure that the collection systems of these communities are properly maintained. However, the permit provisions must clearly state that Brockton is not jointly/severally liable for any actions or inactions of any co-permittee, or it objects to this provision as contrary to existing rules and beyond EPA's authority to impose under the Act for the reasons previously expressed by Upper Blackstone (Attachment II).

Response A.65.

EPA's inclusion of the satellite communities as co-permittees is consistent with existing NPDES regulations and does not involve adding to or amending NPDES rules. EPA has discretion under the regulations with respect to treatment of multiple entities responsible for a POTW or other discharge and its determination to adopt a co-permitting framework is a valid exercise of that discretion. *In re Charles River Pollution Control Dist.*, NPDES Appeal No. 14-01 (EAB Feb. 2, 2015) (holding that the Region has authority under the Clean Water Act and EPA's regulations to include municipal satellite collection systems as co-permittees).

The importance of the collection system component of treatment works has been the subject of increasing attention for a number of years, and EPA's approach would apply the same requirements to satellite systems as are being routinely applied to collection systems that are owned by POTW owners. The need for such an approach is particularly important where, as here, the treatment plant owner and operator has denied any responsibility for those portions of the treatment works on the grounds that they are owned and operated by the contributing communities.

EPA agrees that under the Permit language it is the satellite collection system operator that it responsible for reporting of SSOs from the satellite collection system operated by co-permittees and Brockton is not liable for any related inactions in satellite collection systems Brockton does not own or operate. Regarding the SSO reporting requirements in Part B, the City of Brockton is responsible only for reporting SSOs that are from those portions of the collection system that are owned or operated by the City. This would include interceptors owned by the City that extend into other communities, if any.

Comment A.66.

10. Total Residual Chlorine

Table A.1 (Draft Permit at 3) and Footnote 7 (Draft Permit at 5) include and provide clarification of total residual chlorine (TRC) limits. Inclusion of TRC limits for Brockton is unnecessary because 1) the plant uses UV for effluent disinfection; and 2) on those intermittent occasions when the plant uses sodium hypochlorite mainly for cleaning (presumably an "other purpose" as noted in the footnote), there will be no TRC in the plant effluent. The maintenance procedure that the plant employs periodically to avoid fouling of the effluent filters is the "closest" proximity and process-wise to the plant effluent, but this cleaning process is a batch process completed when that particular filter bay is off-line. The standard operating procedure for a filter "soak" is 1) that particular filter is removed from service and isolated from plant flow; 2) sodium hypochlorite is added to the filter bed and recirculated such that it comes into contact with the filter media several times to clean it from any accumulated biological growth; 3) once the soak period is done (and the TRC is consumed), and filter bed is drained to the influent pump station, from which it proceeds through the entire treatment process; and 4) the filter bed is returned to service. So, no sodium hypochlorite is added to the flow stream. This being the case, we request that the TRC limits be removed from the permit, and if that is not acceptable to EPA, then the language in Footnote 7 be modified from "TRC sampling is not required if chlorine is not added for disinfection or other purpose" to "TRC sampling is not required if chlorine is not added for disinfection or other purpose that causes chlorine to be present in the plant effluent".

Response A.66.

EPA agrees with the commenter that TRC monitoring (and a TRC limit) should only be required if chlorine is present in the effluent. Hence, the footnote in question has been modified in the final permit. Note that during times when monitoring for TRC is not required, no discharge of TRC is permitted.

Comment A.67.

11. Load limits for CBOD, TSS, phosphorus, ammonia-nitrogen, and total nitrogen

There is a significant, and important, inconsistency with the load limits contained in the permit for CBOD, TSS, phosphorus, ammonia-nitrogen and total nitrogen. The permit includes a flow limit of 18 mgd, which by Footnote 2 is clarified to be "annual average, which shall be reported as 12-month rolling average." However, the permit uses this average-annual flow limit together with concentration limits, to calculate average monthly, average weekly and maximum daily load limits. This approach inherently results in tighter mass limits than justified. For example, the permit calculates the average monthly CBOD load limit as 18 mgd x 5 mg/l x 8.34 = 750 lb/day. To be consistent, this calculation is actually be the average annual CBOD load limit. The average monthly load limit should be based on the maximum-month average flow, not the average annual flow. Please modify the load limits in the permit to correctly account for maximum-month average flow.

Response A.67.

This issue was previously raised in the Response to Comments for the 2005 Brockton permit reissuance. In that response EPA stated "Mass limits for BOD_5 and TSS are now added to all POTW permits in Massachusetts as is part of a flow policy change that allows the flow limit in a permit to be calculated as an annual rather than a monthly average. This change was made in an effort to allow a facility to operate at the maximum monthly hydraulic capacity. To prevent degradation of the receiving water, DEP and EPA agreed that mass limitations for BOD_5 and TSS should be included as permit conditions to ensure that existing controls on mass discharges of BOD_5 and TSS are maintained."

In general, when flow limits in permits were revised from monthly average limit to annual average limits, EPA and DEP agreed that the addition of mass-limits was necessary to ensure that this flow change did not result in increased loadings to the receiving water, which would be inconsistent with antidegradation requirements found at 40 C.F.R. § 131.12 and in the Massachusetts Surface Water Quality Standards at 314 CMR 4.04.

Additionally, EPA notes that identical mass-based limits for $CBOD_5$, TSS, and ammonia-nitrogen were carried forward in multiple permit reissuances for more than 20 years and are now carried forward in the 2015 draft permit. These limits are based on water quality concerns given the low dilution of the receiving water and are calculated using the permitted flow of 18 mgd. Based on antibacksliding requirements found at Section 402(o) of the Clean Water Act (CWA), these limits must be at least as stringent in this permit reissuance.

Comment A.68.

12. Whole effluent toxicity

The Draft Permit includes whole effluent toxicity (WET) testing requirements including total recoverable aluminum. Brockton does not use alum in its treatment process; the City's phosphorus reduction process uses ferric chloride. Therefore, there is no need for an aluminum testing requirement and the City requests that this provision be deleted from the final permit.

Furthermore, the City notes that the AWRF has passed all of its quarterly WET tests since 2011[55] (*see* Fact Sheet Table 1), and the last 8 WET tests have all met the permit requirements (**Table 6**).

55 Note that Brockton did not pass the chronic toxicity test in February, 2014, but did pass the subsequent retest.

Table 6: Brockton AWRF WET Test Results, March 2014-February 2015

Date	Type	Acute (%)	Chronic (%)
March-14	30+ mgd	100	100
May-14	2nd Q	100	100
August-14	3rd Q	100	100
November-14	4th Q	100	100
December-14	30+ mgd	100	100
February-15	1st Q	100	100
March-15	30+ mgd	100	100
March-15	30+ mgd	100	100

Given these results, the City requests that the required quarterly WET testing be reduced to a biannual frequency, with toxicity test samples collected during the second week of the months of April and October. The test results shall be submitted by the last day of the month following the completion of the text. This request is consistent with the language in the City's current (2005) permit, which states "After submitting **one year** and a **minimum** of six consecutive sets of WET test results, all of which demonstrate compliance with the WET permit limits, the permittee may request a reduction in the WET testing requirements" (2005 Brockton NPDES Permit at 7, emphasis in original).

Response A.68.

Based upon the provision in the 2005 permit and the City's demonstrated compliance with the WET permit limits, EPA is granting the permittee's request of a reduction in frequency. The draft permit required 6 WET tests per year and the final permit will require WET tests to be conducted only four times per year with two of the four being done during periods of high flow. The permittee must continue to perform these two WET tests each year during days when treatment plant total daily flow exceeds 30 mgd. The details of this requirement are set forth in the final permit.

With regard to aluminum, the WET testing protocol requires certain metals, including aluminum, to be measured with each WET test. Therefore, EPA does not view the reporting of these test results as an unnecessary requirement, but rather as monitoring and reporting that is consistent with standard WET protocols. Furthermore, results from these WET tests can be used to inform future permitting decisions with respect to each metal, including aluminum. Hence, aluminum monitoring and reporting will remain in the final permit.

Comment A.69.

13. Compliance schedule

Given the potential costs of upgrading the plant to comply with the new TN limit and the tighter TP limit contained in the draft NPDES permit, and the dubious need for these limits as described in our earlier comments, the City is requesting an alternative scheduling approach with regards to compliance with the TN and TP limits. Our proposal recognizes that the need for these tight limits may be demonstrated in the future, and also asks EPA to acknowledge that the City is currently undergoing relatively low-cost process optimization measures at the plant (independent of the proposed limits) that are expected to further improve the plant's current nutrient discharges. The City proposes the following alternative approach for a schedule.

1. A seasonal rolling average total nitrogen load limit of 826 lb/day shall become effective five (5) years from the effective date of the permit. This is based on our reasonable expectation that within 5 years the plant should be able to reliably achieve an average seasonal effluent TN concentration of 5.5 mg/l.
2. A 450 lb/day seasonal rolling average total nitrogen shall become effective ten (10) years from the effective date of the permit, should the need for such be scientifically justified.
3. In the event that updated monitoring data and information describing the Taunton River and Mount Hope Bay indicate that the 450 lb/day total nitrogen limit is not necessary with regard to protecting water quality in the receiving water, the more stringent nitrogen limitation shall be postponed in perpetuity until such time that data and information require a more stringent total nitrogen limit to be sufficiently protective of the receiving water.

The total nitrogen limit shall not be subject to anti-backsliding requirements until ten years after the effective date of the permit. However, in the event that EPA does not agree to the City's request to use an alternate approach, we note that the compliance schedule included in Section F (Draft Permit at 18) does not recognize both the complexity and scope of upgrades that may be necessary to comply with the nitrogen and phosphorus limits, nor the fact that the City is proactively initiating a pilot program to determine the best path forward – and that the pilot program will take more than 1 year to operate and evaluate. Given this, we propose the following changes to the compliance schedule contained in the draft permit:

1. Item 1: increase "one year" to "two years"
2. Item 2: Increase "two years" to "four years"
3. Item 3: Increase "three years" to "five years"
4. Item 4: Increase "four years" to "six years"
5. Item 5: Increase "54 months" to "eight years"
6. Item 6, Line 1: Increase "five years" to "eight years" and modify the requirement to submit a progress report within 1 year of the effective date of the permit to submit progress reports at the 1 year and the 2 year marks.

Response A.69.

EPA agrees with the commenter that the complexity and scope of upgrades may be significant in order to comply with the nitrogen and phosphorus limits. However, EPA believes the compliance schedule set forth in the draft permit is reasonable. For example, the comment (submitted May 4, 2015) mentions that the City is proactively initiating a pilot program which will take more than 1 year to operate and evaluate. The compliance schedule allots 1 year from the effective date of the permit, to complete such an evaluation. The comment then requests item 2 (complete design submitted for approval) be extended by two years. Presumably one year due to extending the pilot study, but without any justification for the additional year. Furthermore, items 5 and 6 request extensions of 3.5 years and 3 years, respectively, without any justification. EPA believes the compliance schedule set forth in the draft permit is reasonable and is not inclined to make adjustments without clear, compelling evidence of the inability of the permittee to comply with specific milestones. EPA's position is based on the understanding that the City's intent is to retrofit all of the existing aeration basins, based on pilot testing, in order to operate in a Bardenpho treatment mode. While it is EPA's position that five years is sufficient time to complete all retrofits and startup optimization and that such retrofits will allow for consistent and cost effective compliance with the permit limits, we also recognize that that there is the potential that an additional treatment technology may be necessary. In the event that this is demonstrated, EPA will work with the City of Brockton to establish a reasonable schedule for the additional time necessary to plan, design, and construct such additional treatment step(s). While the length of the compliance schedule remains unchanged in the final permit, the required submittals have been modified to reflect the specific milestones necessary to achieve conversion of the existing aeration tanks to a Bardenpho treatment process.

Furthermore, EPA will continue to consider all new information regarding nutrient and eutrophication conditions in this system and take any appropriate action based on such information in accordance with applicable regulations. Accordingly, a provision has been added to the final permit stating that if at any time the permittee believes it has sufficient new information to justify a revision of the total nitrogen limit, it may submit the information to EPA and MassDEP and the agencies will review the information and, if appropriate, act on a request for a permit modification if there exists "cause" under 40 CFR § 124.62 or incorporate the information in a new water quality-based permit limit analysis as part of permit reissuance.

B. U.S. Senators Markey and Warren and U.S. Congressman Lynch submitted comments by a joint letter dated May 4, 2015.

Introduction

We are writing in support of the City of Brockton's ongoing efforts related to the management of its wastewater collection and treatment systems. It is our understanding that Brockton has received a draft National Pollutants Discharge Elimination system (NPDES) permit for its Advanced Water Reclamation Facility (AWRF) from the Environmental Protection Agency (EPA) and is preparing to submit a detailed response. The City has communicated to our offices that it has reservations with a number of aspects of the draft permit and we ask that the EPA give full consideration to Brockton's concerns.

Comment B.1.

The City has expressed interest in increasing the permitted flow limit of its AWRF. While the draft NPDES permit allows for a flow limit of 18 million gallons per day (MGD), Brockton is hoping to utilize the design capacity of the plant of 20.5 MGD. However, the City has questions about the testing requirements to pursue the increased flow limit included in the draft permit. City officials feel that the milestones that must be met for the requested flow increase to be granted are unclear in the draft permit and have requested more specific conditions before Brockton commits to any studies or investments related to increasing the plant's flow.

Response B.1.

EPA understands that the City wishes to pursue authorization of a flow increase. EPA therefore provides the following as guidance to the process by which a flow increase can be evaluated for purposes of further review and potential authorization. To receive a flow increase, the City must demonstrate both meeting water quality standards and satisfying anti-degradation requirements, as follows:

1. Process to demonstrate meeting water quality standards
    a. Institute plant improvements to achieve new permit limits; plant improvements should be in place at least one year and preferably two to allow assimilation of receiving water to new conditions; and
    b. Perform receiving stream evaluation similar to that performed in 2010 Receiving Water Assessment, but extending to sites in the Taunton River mainstem; and either
    c. If results confirm the discharge is no longer contributing to water quality impairments, can request increase if consistent with anti-degradation requirements (below); or
    d. If results indicate discharge is contributing to water quality impairments, can
        i. Propose plan with permit limits that will ensure discharge will not contribute to impairments at current and increased effluent flow; or
        ii. Initiate water quality standards proceeding for variance or downgrade of receiving water classification, including Use Attainability Analysis and public process

2. Process to demonstrate satisfying antidegradation requirements
    a. Perform monitoring and evaluation of emerging contaminants, particularly endocrine disrupters, in effluent and in receiving water to determine concentration, loads and assimilative capacity (EPA is available to assist in defining scope of monitoring and evaluation); and
    b. Evaluate benthic macroinvertebrate and taste/odor conditions in impaired reaches and in Taunton River mainstem to determine extent of impairment and contributing pollutants and evaluate assimilative capacity in unimpaired reaches (may be best to wait until after plant improvements as in 1.b. above); and
    c. Determine whether flow increase will result in loss of more than 10% assimilative capacity in any downstream reach. If it can be demonstrated that it does not, proceed to request flow increase; or
    d. If increase cannot be demonstrated to be insignificant, proceed to antidegradation authorization proceeding under 314 CMR 4.04(5). Upon authorization pursuant to 314 CMR 4.04(5) (including "No less environmentally damaging alternative . . . is reasonably available or feasible" showing), can proceed to request flow increase.

EPA presumes that the City, MassDEP, and perhaps other regional entities will coordinate the work required to meet these requirements. EPA is available to provide technical assistance as necessary during this process. EPA notes that protection and improvement of baseflow conditions in the watershed is an important component of the assimilative capacity of the receiving water and downstream segments. EPA therefore encourages exploration of groundwater recharge opportunities in this process.

The commenters should feel free to contact EPA for further clarification regarding any of these milestones.

Comment B.2.

Another aspect of the draft NPDES permit that City officials are concerned about is the nitrogen removal standard. The City expects that the requirements outlined by its draft permit will necessitate a significant financial commitment from the community, including additional staff, capital expenditures, and operations costs. Because of the anticipated costs and Brockton's demonstrated commitment to nitrogen removal, the City requests a longer timeframe to demonstrate compliance. This would give the City more time to properly evaluate its ability to operate within the new nutrient removal standards.

Response B.2.

As described in Response A.69 above, in EPA's assessment, the compliance schedule set forth in the draft permit is reasonable. Comment A.69 mentions that the City is proactively initiating a pilot program to determine the best path forward and EPA is confident that the path chosen can be achievable within the prescribed compliance schedule, and the City has not offered any specific information that would call that assessment into question. If at any time the permittee can demonstrate that despite its efforts, complying with the schedule is not feasible or affordable, the permittee may request a schedule change.

C. Massachusetts State Representative Michelle DuBois submitted comments by email dated May 4, 2015.

Introduction: I submit this comment letter in the matter of a draft NPDES permit to the Brockton Advanced Water Reclamation Facility ("AWRF"). I submit these comments as the elected state representative for 29,934 residents of Brockton; 6,916 residents of West Bridgewater; and 3,450 residents of East Bridgewater.

Prior to being sworn into office as the state representative for the 10th Plymouth district in January 2015, I held the position of Brockton city councilor from 2006 to present. Brockton's elected officials have been deep in the weeds with regards to Brockton's AWRF for decades. The issues around this facility have been some of most costly (financially and environmentally) for city residents. In addition to the verbal comments I made during a public meeting, I now submit these written comments concerning: 1. expanding the processing capacity at Brockton's AWRF; 2. incineration of human waste;

and 3. environmental testing. I would like to note that I agree with the comments submitted by Alternative for Community and Environment as well.

Comment C.1.

Expanded capacity at Brockton's AWRF:

Until the incinerator is decommissioned there should be no expansion of processing capacity at Brockton's AWRF. As the draft permit stands now it will require a higher degree of solids (waste) removal during processing. This positive improvement in processing will benefit the river, streams and water aquifer but as a result will increase the tons of human waste (known as "cake" or "sludge") that is burnt in the incinerator.

Prior to expanding processing capacity at the Brockton AWRF, the effects of processing "blow-down" (non-evaporated effluent water) used in the cooling tower of a natural gas power plant should be better understood and analyzed. As EPA and DEP know, there is a natural gas power plant being proposed by Brockton Power that would use Brockton's AWRF effluent in the cooling tower process. If operational, the power plant will be permitted to discharge up to 350,000 gallons per day of wastewater from sanitary and industrial facilities, which will contain, among other pollutants, mercury. The power plant would evaporate approximately 1,600,000 of water into the air daily and discharge an average of approximately 300,000 gallons per day from its cooling towers to the AWRF, which is already over capacity during significant rain storms. Consequently, the Brockton Power discharge could potentially cause or increase the AWRF’s discharge of untreated or partially treated wastewater to the Salisbury Plain River.

Brockton Power’s proposed discharge will contain priority pollutants. Relatively low concentrations of trace metals in receiving waters can be toxic to resident aquatic life species. The commenters are concerned that sewer permits issued to the industrial users that require pre-treatment may be insufficient. The only way to determine if industrial chemicals are passing from the industrial users to the AWRF and being released into the Salisbury Plain River is if EPA requires those chemicals to be monitored by the AWRF. The draft permit requires whole effluent toxicity testing (“WET”). However, if the AWRF monitors the discharge and finds an exceedance of the WET test, it is difficult to determine the source or industrial pollutant that is causing or contributing to the failure. The final permit should require monitoring for additional industrial chemicals that are used by the industrial users. The commenters request that EPA and MassDEP create a list of the industrial and pharmaceutical chemicals that are discharged to the AWRF and require the applicant to monitor for such chemicals. We urge the final permit to require biannual submission of the pretreatment report detailing the activities of the pretreatment program instead of annual submissions.

Additionally, the facility should be required to demonstrate permit compliance for a period of at least two years prior to the EPA and MassDEP deciding whether to increase the facility flow rate.

Response C.1.

Regarding the wastewater effluent flow portion of this comment, EPA agrees with the commenter that no wastewater effluent flow increase is allowable at this time. The potential impacts from Brockton Power are also noted and included here as part of the administrative record for future reference.

Regarding the sludge incinerator, refer to Response C.2 below for a more detailed response.

Regarding Brockton Power's proposed discharge, pretreatment industrial user permits are developed by the Brockton POTW in order to protect pass through and/or interference. These permits include the more stringent of local limitations and federal categorical standards. It appears the Brockton Power plant would be subject to 40 CFR 423 categorical standards. Given that, in accordance with 40 CFR 423, there should be no detectable amount of effluent from any of the 126 priority pollutants contained in chemicals added for cooling tower maintenance. Hence, EPA does not believe more frequent pretreatment reports are necessary.

EPA also notes that these priority pollutants will be monitored as a requirement of the permit reapplication process. If any pollutants are detected in quantities that pose a concern, additional monitoring and/or limitations for those pollutants will be established at that time.

Comment C.2.

Sludge incinerator:

The final permit must establish a process and timeline for retiring the sewage sludge incinerator function. Brockton is one of only five municipalities in Massachusetts with an operating sludge incinerator. This heavy air polluting process is conducted in a poor, urban city with residents that are already overburdened by pollution. Further these residents already experience a high percentage of negative health outcomes as compared to other municipalities. High air pollution has been shown to be one of the known causes of the types of negative health outcomes seen in Brockton. Brockton has one of the highest premature mortality rates in the state, and the fifth highest premature mortality rate of the thirty largest communities in Massachusetts: 413.7 premature deaths per 100,000 people, compared to the statewide average of 317 premature deaths per 100,000 people. Brockton's children have a statistically significantly higher prevalence of pediatric asthma as compared to the overall state prevalence, a rate of 13.85% compared to the state rate of 10.6%. Brockton's age-adjusted cardiovascular hospital admission rate of 2,302 per 100,000 well exceeds the state average of 1686.1 per 100,000.

While other water reclamation facilities have moved to processing sludge into fertilizer pellets for gardening, Brockton's system has refused to change. Rather the Brockton

AWRF continues to use the antiquated method of incineration without even a plan to update. The EPA and DEP should note that almost all improvements undertaken at the Brockton AWRF have come as a result of either EPA or DEP pressure. The NPDES permit should require the City of Brockton to close the sludge incinerator within five years. Additionally, the facility should be required to demonstrate permit compliance for a period of at least two years prior to the EPA and MassDEP deciding whether to increase the facility flow rate.

The facility is located in an environmental justice community, which requires an analysis of the sludge incinerator and additional conditions.

Response C.2.

The proposed NPDES permit for the Brockton AWRF contains all applicable NPDES requirements related to the facility's multiple hearth incinerator as required by Clean Water Act regulations at 40 C.F.R. Part 503, Subpart E, and Clean Air Act regulations at 40 C.F.R. Part 61. These regulations resulted in permit limits for the emissions of arsenic, cadmium, chromium, lead, and nickel in section I.D.2 of the draft permit. For comparison, the table below presents these limits and the maximum monitoring data submitted by the facility in their 2011 permit reapplication (out of 7 rounds of sampling).

Pollutant	**Limit (mg/kg)**	**Actual Max (mg/kg)**
Arsenic	732	6.8
Cadmium	1,601	1.70
Chromium	310,396	115
Lead	71,630	45.3
Nickel	136,438	13.8

As noted in the Fact Sheet, EPA's evaluation of this monitoring data indicated that the facility is complying with the applicable requirements found in 40 C.F.R. Part 503, Subpart E – regulations that are designed to be adequate to protect public health and the environment, *see* CWA § 405(d), 33 U.S.C. § 1345(d) – and in Part 61 and is actually discharging several orders of magnitude below them. EPA recognizes that the facility may incorporate process changes in order to comply with nutrient limitations in the proposed permit or receive increased loadings in the future that may increase sludge production. However, even if the facility were to increase sludge production significantly, their margin of compliance is such that we would not anticipate issues regarding compliance with applicable requirements found in 40 C.F.R. Part 503, Subpart E and Part 61 during the life of the permit. In any case, the permittee must submit an annual report documenting compliance with these requirements and limitations or be subject to enforcement action.

In addition to the limits contained in the proposed NPDES permit, the multiple hearth incinerator at Brockton AWFR is subject to a Non-Major Comprehensive Plan Approval (Plan Approval) issued by the Massachusetts Department of Environmental Protection (MassDEP). The Plan Approval, most recently amended on April 22, 2013, also contains emissions limits for arsenic, cadmium, chromium, lead, and nickel, as well as limits on the emissions of mercury, beryllium, carbon monoxide, sulfur dioxide, volatile organic compounds, oxides of nitrogen, particulate matter, and opacity. EPA notes that these emission requirements are outside the scope of this NPDES permit reissuance but are included in this response to give the commenter a broader understanding of the various regulations and non-NPDES permit conditions the permittee must comply with in order to operate the incinerator.

As part of the issuance of the MassDEP Plan Approval, Brockton AWRF conducted air quality modeling and submitted the results to MassDEP for review. The air dispersion modeling was conducted to demonstrate that no areas surrounding the multiple hearth incinerator would be in violation of National Ambient Air Quality Standards (NAAQS), which are set at a level requisite to protect the public health and welfare, *see* CAA § 109(b), 42 U.S.C. § 7409(b), and state-based guidelines for ambient air toxics concentrations, specifically metals, which are set at concentrations intended to protect the general population, including sensitive populations such as children, from adverse health effects over a lifetime of continuous exposure. A supplemental analysis, dated June 20, 2011, contains the results of the dispersion modeling and finds that all NAAQS are protected and downwind impacts of metal pollutants are less than the state-based guidelines for ambient air toxics concentrations.

Based upon this analysis, EPA has determined that reissuance of the NPDES permit for the Brockton AWRF, including the incineration of sewage sludge, will not result in an adverse impact to human health or the environment. Since reissuance of the permit will not result in an *adverse* impact, there will not be a *disproportionate* adverse impact on the surrounding community. Hence, the Brockton community is protected, and a further environmental justice analysis is not warranted. Although EPA does not expect future changes to the treatment process and/or industrial users to result in disproportionately high and adverse human health or environmental impacts from the use of the sludge incinerator, it should also be noted that if the facility is not able to consistently maintain compliance with all applicable limits, some or all of the sewage sludge may be disposed of using an alternate disposal method (e.g., land application or surface disposal in a landfill). Hence, even if these future changes are more significant than EPA expects, the Brockton community would still be protected from any disproportionately high and adverse impacts through the issuance of this permit and the other relevant air quality regulations mentioned above.

Furthermore, EPA has established emission limits for multiple hearth incinerators in the Federal Plan Requirements for Sewage Sludge Incineration Units

Constructed on or before October 14, 2010 (Federal Plan). *See* 81 FR 26039, April 29, 2016. The Federal Plan is being implemented by EPA. It is expected MassDEP will request delegation of the Federal Plan in the near future.

The Federal Plan establishes federal emission limits for particulate matter, hydrogen chloride, carbon monoxide, dioxins/furans, mercury, oxides of nitrogen, sulfur dioxide, cadmium, lead, and fugitive emissions from ash handling. These emission limits were developed by averaging the best-performing 12 percent of multiple hearth incinerators nationwide. Many of the emission limits in the MassDEP Plan Approval are equally as stringent as those in the Federal Plan and more stringent for particulate matter, carbon monoxide, cadmium, and lead. Under the Federal Plan, the Brockton AWRF is additionally subject to limits on hydrogen chloride, dioxins/furans, and fugitive emissions from ash handling, all of which are not currently covered by the MassDEP Plan Approval. These limits will be applied to the facility independently of this NPDES permit reissuance.

Comment C.3.

Environmental Testing:

The existing permit does not require monitoring for the industrial and pharmaceutical chemicals that will be discharged to the AWRF. EPA and MassDEP need to ensure those chemicals are not discharged into the Salisbury Plain River. An industrial pretreatment report should be submitted biannually instead of annually. Further, monitoring should be required to ensure that industrial and pharmaceutical chemicals do not pass through the AWRF into the Salisbury Plain River. Additionally, the permittee should be required to report immediately to the EPA and MassDEP when the facility exceeds the total flow rate.

Testing for environmental pollutants coming out of the incinerator and water discharge should be as stringent as currently contemplated in the draft permit and not relaxed in any way. The more than 100,000 people who live and work around this facility deserve every assurance that their health and well-being will not be further impacted by the new NPDES permit.

The EPA and MassDEP should conduct more frequent unannounced inspections of the AWRF and pursue enforcement when the facility is out of compliance. More frequent inspections and enforcement actions would provide a greater incentive for the facility operators to contribute to improving the Salisbury Plain River water quality. If the EPA and/or MassDEP take enforcement action against the AWRF, any funds recovered or supplemental environmental projects should benefit the Brockton residents and ecology. If the AWRF reports a permit exceedance to the EPA and MassDEP, it should be required to increase the frequency of sampling to prove it is meeting permit requirements for six consecutive months before reverting back to less frequent sampling. Any permit violation should be reported in the monthly discharge monitoring report and uploaded to the EPA Enforcement and Compliance History Online ("ECHO") website.

Response C.3.

EPA appreciates the comments and concern expressed regarding emerging contaminants found here as well as in Comments G.1, J.1 and K.10 below. EPA agrees that with the Brockton AWRF, which serves industrial facilities including multiple hospitals and discharges to an effluent dominated stream, emerging contaminants poses a particular concern to aquatic life. As noted on page 9 of the Fact Sheet, the receiving water is extremely effluent dominated at low flow conditions. The receiving water is composed of more than 95% effluent under 7Q10 and permitted effluent flow conditions, making the assimilative capacity of the receiving water extremely limited. Adverse effects in wildlife from exposure to significant concentrations of endocrine disrupting compounds that may be present in the AWRF's effluent may include developmental malformations, interference with reproduction, increased cancer risk, and disturbances in the immune and nervous system function. See EPA's website on endocrine disruption (found at https://www.epa.gov/endocrine-disruption/what-endocrine-disruption) for more information. Therefore, to the extent that emerging contaminants can have a toxic effect on aquatic life, they can constitute a violation of the narrative criteria prohibiting toxicity.

In response to the comments raised by multiple commenters, EPA has decided to require the permittee to conduct annual emerging contaminant monitoring for a period of three years to better determine what level of emerging contaminants are present in the discharge. This requirement will not be included in the final permit, but will rather be made through an information request pursuant to Section 308(a) of the CWA, 33 U.S.C. §1318(a), which authorizes EPA to require the owner or operator of any point source to provide information, including effluent samples, to carry out the objectives of the statute. Specifically, the information request will require the permittee to conduct annual monitoring using EPA Method 1694, EPA Method 1698, EPA Method 606, and ASTM Method D7065-11 during the third calendar quarter (i.e., July through September) for the next three years (i.e., 2017, 2018 and 2019). Method 1694 detects pharmaceuticals and personal care products, Method 1698 detects steroids and hormones, Method 606 detects phthalate compounds, and ASTM Method D7065-11 detects phenolic compounds. All results shall be submitted to EPA no later than the 15th of the month following the calendar quarter (i.e., October 15th). These data will help inform future permitting decisions as well as alert the permittee, EPA and MassDEP of potentially toxic impacts of emerging contaminants downstream.

Concerns regarding the potential for emerging contaminants to be discharged from this facility, along with the need for a better understanding of their presence and potentially toxic effects, was included in the Fact Sheet. (See Fact Sheet pp 14-18.) In reaching this decision to require annual effluent monitoring for emerging contaminants at the Brockton POTW, EPA has considered several factors. These include the costs of the requirement; the high degree to which the receiving water is dominated by effluent during low flow periods; the nature and variety of industrial and medical discharges received at this POTW; public comments received reporting downstream flooding of sewage (Comment H.1) and habitat effects (Comment J.1); and the multiple public comments raising concerns regarding the potential for emerging contaminants to be discharged from the Brockton POTW and requesting monitoring of emerging contaminants (Comments C.3, G.1, J.1 and K.10).

Regarding other industrial pollutants, pretreatment industrial user permits are developed by the Brockton POTW in order to protect pass through and/or interference, as described in Response C.1 above. Hence, EPA believes annual pretreatment reports are sufficient.

EPA understands that a comprehensive and robust compliance and enforcement program is a critical component of an effective NPDES program. EPA uses a number of mechanisms, including inspections to ensure compliance with the permits. Inspections of facilities with NPDES permits are performed by EPA Region 1's Office of Environmental Stewardship. EPA's inspection frequency depends on such factors as the regulatory requirements of the program, the compliance history of the facility, the EPA resources available to perform inspections and the extent of competing environmental priorities. Monitoring results, are reviewed with the goal of prioritizing inspections as well as for resolving any violations identified in a timely manner. EPA attempts to take all of the above factors into account when developing an appropriate inspection frequency. The inspections conducted by EPA include both announced and unannounced inspections. Depending upon the specific circumstances of an inspection, the permittee may or may not be notified prior to the inspection. Each region and program uses different criteria to determine the most appropriate type of inspection.

EPA also notes that discharges of pollutants above permit limits do not always signal a recurring deficiency in treatment. Therefore, mandatory increases in monitoring frequency in reaction to increased pollutants would not be necessary to ensure permit compliance in all cases. The EPA retains the authority to require increased monitoring and exercises that authority when it deems additional information is necessary to perform its statutory functions. Any permit violations that are reported will be uploaded to the ECHO website, as mentioned in the comment.

D. Taunton River Watershed Alliance, Inc. submitted comments dated April 30, 2015.

Introduction: The Taunton River Watershed Alliance, Inc. (TRWA) submits the following comments on the Draft National Pollutant Discharge Elimination System (NPDES) Permit #MA 0101010 for the Brockton Advanced Water Reclamation Facility (AWRF). TRWA is an environmental organization whose mission is the protection and restoration of the water quality and aquatic ecosystems of the Taunton River and its tributaries and other habitats and ecosystems of the watershed. Our members use the Taunton River and its tributaries for recreation and our volunteer water quality monitoring teams have conducted monthly testing at locations on the River and several tributaries since 1991. TRWA has over 400 members and the environmental organizations copied on this letter have thousands of members.

Comment D.1.

TRWA is deeply concerned about the well documented water quality impairment for aquatic macroinvertebrate assessments, excess algal growth, dissolved oxygen, total phosphorus, turbidity, taste and odor and fecal coliform in the effluent dominated Salisbury Plain and Matfield Rivers in the headwaters of the watershed downstream of the Brockton AWRF discharge. The Salisbury Plain, Matfield River and Taunton River system until well below the City of Taunton is effluent dominated. The Massachusetts water quality standards require that numeric and narrative water quality standards be met for all flows above the seven day ten year low flow (7Q10). The 7Q10 at Taunton is 20.42 million gallons per day (MGD). The sum of the proposed permitted discharges Brockton (18 MGD) + Bridgewater (1.44 MGD) + Taunton (8.4 MGD) = 27.84. Clearly a river which is more than 50% effluent can't assimilate any more effluent and meet water quality standards. In the Salisbury Plain River just below the Brockton discharge the degree of effluent domination is more severe, 7Q10 flow only 0.39 MGD and permitted wastewater treatment plant flow is 18 MGD. **The path to achievement of water quality standards in the upper watershed is a long term program of flow reduction by water conservation and infiltration inflow reduction coupled with wastewater treatment improvement.**

TRWA is also concerned about documented conditions of eutrophication, including low dissolved oxygen levels, algae growth and growth of nuisance aquatic plants in the lower estuarine reaches of the Taunton River and in Mount Hope Bay. There is broad consensus that excessive loads of total phosphorus and total nitrogen are the primary cause of eutrophication of waterways, and that discharges from wastewater treatment facilities are a major source of these pollutants.

Concerning the proposed permit flow limitation - From Figure 3 page 7 of 64 of the draft permit Fact Sheet the twelve month rolling average flow from December 2010 to December 2013 was consistently below 17 MGD. The plant was formerly permitted for 18 MGD (same as the proposed draft permit) and Brockton has requested approval for an increased flow to 20.49 MGD based on construction completed in 2010. During the City's own 2011 water quality study which demonstrated serious instream water quality violations the AWTF was discharging at less than 17 MGD. EPA should review the Brockton ARWF twelve month rolling average flows for 2014 to see if the flow was also below 17 MGD. TRWA believes EPA may be being too generous in continuing to permit an 18 MGD flow in light of the severe water quality problems documented in the effluent dominated Salisbury Plain and Matfield Rivers. TRWA is strongly against any increase in flow above the

current permitted 18 MGD until the plant has achieved the more stringent limitations of the proposed draft permit and the evaluation outlined on pages 17 and 18 of the Fact Sheet <u>demonstrates</u> that downstream water quality standards are being attained and sufficient assimilative capacity for the increased flow is available. If this permit is appealed, TRWA reserves the right to join any appeal of the final permit and argue for an immediate flow limit of less than 17 MGD based on recent past demonstrated summer flow performance, desirability of an additional safety factor and limited receiving water dilution. We also request EPA consider and would seek if we joined any appeal a provision requiring measurable flow reduction each year through a well-defined program of aggressive water conservation and infiltration and inflow (I/I) reduction.

TRWA is strongly <u>against any increase</u> in the proposed total nitrogen (TN) limitation until the new TN limits are attained and monitoring in the upper estuary <u>demonstrates</u> that water quality is being attained and assimilative capacity is available. If the permit is appealed TRWA reserves the right to join in any appeal and argue for TN effluent limitations based on a flow limitation of 17 MGD (or less) at summer flow (0.9 times twelve month rolling average flow) based on past performance and the 3.0 mg/l treatment level cited in the fact sheet (i.e. 17 MGD * 3 mg/l * 8.34*0.9 = 383 lbs/day). EPA has used an aggressive target of 20% for stormwater and nonpoint source reduction in calculating allowable TN loads for each discharger. TRWA believes this may be overly optimistic given that the Massachusetts MS4 stormwater permit is seven years overdue for reissuance and the most recent draft permit only requires each permittee to install one nitrogen removal <u>demonstration</u> best management practice (BMP) on public property during the entire five year life of the new permit.

TRWA supports the effluent limitations for phosphorus 101 ug/l based on dilution and EPA's Gold Book target of 100 ug/l.

Response D.1.

First, EPA shares the deep concern of the commenter regarding the impairments of the effluent-dominated Salisbury Plain River, Matfield River, and Taunton River. EPA also agrees that the path to achieve water quality standards in the upper watershed and the lower estuarine reaches must include wastewater treatment improvements, including increased nutrient removal and may also require reductions in the current discharge flow.

Furthermore, EPA notes the commenter's support of the decision to deny the flow increase in this permit reissuance and the necessary demonstrations required before any flow increase would be granted. Although 12-month rolling average flows have been below 17 mgd, EPA has chosen to maintain the 18 mgd flow limit at this time. If, in the future it is demonstrated that flow reductions are necessary to ensure attainment of water quality standards downstream, the authorized discharge volume will be reconsidered.

EPA also notes the commenter's support of the nutrient limitations set forth in the draft permit.

Comment D.2.

Background

The Taunton River is the largest freshwater source to Mount Hope Bay. It supports habitat for 45 species of fish, globally rare freshwater and brackish tidal marshes and, together with its tributary the Nemasket River, the largest alewife run in Massachusetts. It was added to the National Wild and Scenic Rivers System in 2009. The headwater tributaries of the watershed such as the Matfield and Salisbury Plain Rivers are ecologically important resources needed for spawning/reproduction and juvenile food supply during critical life stages of virtually all recreational and commercial freshwater and marine fish species (or their primary food sources). A fundamental fact of estuarine science is that healthy estuaries require healthy watershed tributary streams.

The Brockton AWRF discharges effluent to the Salisbury Plain River in Brockton 2.3 miles upstream of Beaver Brook in East Bridgewater. Below Beavor Brook the main stem of the river becomes the Matfield River until it joins the Town River 6.6 miles further downstream in Bridgewater to become the Taunton River. The permit fact sheet describes how at low river flow the effluent from the Brockton plant is 98% of the Salisbury Plain and 92% or the Matfield River flow. Even as far downstream as the City of Taunton Brockton's effluent is almost 50% of river flow at 7Q10 low flow conditions. Brockton's own 2011 Receiving Water Assessment Study (conducted after the 2010 plant upgrade) cataloged a near absence of pollution intolerant species and a nutrient rich algae-dominated river downstream of the AWRF discharge in both the Salisbury Plain and Matfield Rivers.

40 CFR 122.44 (d)(1)(i) of the federal Clean Water Act regulations requires EPA to establish limitations to control all pollutants which "are or may be discharged to waters of the United States at a level which will cause, have the reasonable potential to cause, <u>or contribute to</u> an excursion above any State water quality standard, including State narrative criteria for water quality" (underline added). Based on the overwhelming evidence described in great detail in the draft permit Fact Sheet of water quality violations downstream caused or <u>at least contributed to</u> by excessive wastewater nutrient loading and effluent, **it is EPA's responsibility and nondiscretionary duty to establish water quality based effluent limits for total phosphorus, total nitrogen and flow for the Brockton AWRF.**

Phosphorus

In a no dilution situation such as Brockton AWRF's discharge to the Salisbury Plain River, EPA's only option for achieving water quality standards is to limit the discharge to essentially the water quality criterion. TRWA agrees that a reasonable starting point for a phosphorus limitation is to use the 100 ug/l Gold Book criterion corrected for the minor dilution available resulting in an effluent limitation of 101 ug/l.

Response D.2.

EPA agrees with the commenter's concern regarding nutrient pollution of the receiving waters and notes the support of the phosphorus limitations set forth in the draft permit.

Comment D.3. Total Nitrogen

The importance of the total nitrogen limitation to the health of the Taunton River Estuary and the current nitrogen loading caused water quality violations are well described in the permit Fact Sheet. Even accounting for the 2010 Brockton AWRF improvements and attenuation the Brockton plant is 13% of the total nitrogen load to the lower estuarine reaches of the Taunton River and Mount Hope Bay. This contribution is similar to the Taunton WWTF at 14% which discharges directly to the estuary. TRWA believes the wasteload allocation scheme proposed in Table 10 on page 49 of 64 of the permit Fact Sheet is reasonable and necessary to achieve water quality standards. As discussed above the estimate of 20% future reduction in stormwater/nonpoint source nitrogen results in very generous TN allocations to the watershed wastewater point source dischargers. As a consequence the TN limitations should be considered an upper boundary subject to further review and potential reduction.

Response D.3.

EPA notes the commenter's support of the total nitrogen wasteload allocation presented in the Fact Sheet. Regarding the concern (mentioned in Comment D.1 and D.3) that 20% stormwater/nonpoint source reductions are "overly optimistic," EPA believes that estimate is a reasonable initial working assumption in the absence of any more specific modeling or studies and is not aware of any specific information that would call that estimate into question, but reserves the right to further reduce nitrogen limits in future permitting actions as necessary to achieve water quality standards.

Comment D.4. Flow Limit

The flow limitation is discussed in the first bolded paragraph above. If the final permit is appealed, TRWA reserves the right to join in any appeal and argue for an immediate flow limit of less than 17 MGD based on recent past demonstrated summer flow performance, desirability of an additional safety factor and limited receiving water dilution. We also request EPA consider and would request in any appeal we participate in a provision requiring measurable flow reduction each year through a well-defined program of aggressive water conservation and infiltration and inflow (I/I) reduction as an additional safety measure to reduce effluent domination in the Taunton River watershed.

Response D.4.

See Response D.1 above for relevant response to this comment.

Comment D.5. Timeliness of Permit Re-issuance

TRWA notes that the current permit expired on May 20, 2010 but is only being proposed for reissuance in March of 2015 nearly 5 years after permit expiration. The next increment of watershed water quality improvement will not occur until this and the remaining larger permits in the Taunton River watershed are issued and compliance with updated effluent limitations achieved (generally 5 years from reissuance). EPA needs to speed up the issuance process for this and the remaining Taunton River Watershed NPDES permits: Taunton (recently issued after being off public notice 1 year, 9 months), Bridgewater (6 years - 3 months overdue, off public notice 6 months), Somerset (6 years - 6 months overdue, not yet on public notice) and Fall River (9 years - 3 months overdue, not yet on public notice).

TRWA understands that EPA Region 1 has a heavy workload and that it takes time to develop comprehensive water quality based permits and fact sheets however this permit fact sheet demonstrates that most of the work for this watershed is complete. We are sympathetic to allowing a reasonable time for discussion of draft permit conditions with permittees to save agency resources and municipalities millions of dollars in consultant and legal fees for fruitless appeals. We would like to point out that no Region 1 municipal discharger has ever successfully appealed a water quality based nutrient effluent limitation or flow limitation to either the EPA Environmental Appeals Board or the First Circuit Court of Appeals despite very expensive multi-million dollar attempts at both. Anyone who believes appeal of a nutrient and flow limited permit to an effluent dominated nutrient impaired riverine and estuarine system like the Taunton might be anything more than a waste of money should read the following Final Orders Denying Review (or at least the quotes from them contained on Attachments A through C of this letter).

http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/30b93f139d3788908525706c005185b4/97ccd304c9b7e58585257c3500799108!OpenDocument
http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/85d3c616287d52d885257088004e5834/2d0d249e441a18f185257b6600725f04!OpenDocument
http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/30b93f139d3788908525706c005185b4/34e841c87f346d948525773600689 76f!OpenDocument
http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/30b93f139d3788908525706c005185b4/d506ebee22a1035e8525763300499a78!OpenDocument

The arguments that might be used to appeal water quality based nutrient and flow limitations have been made and lost. It is impossible for a wastewater discharger to overcome the “cause or contribute to” standard of 40 CFR 122.44 (d)(1)(i), in watersheds with ambient monitoring documenting severe adverse water quality impacts like the Taunton. For the Brockton permit, a better case may be made for more stringent nutrient and flow limitations than less stringent limitations for this large discharge to a small river tributary to a nitrogen overloaded estuary. If an agreement that preserves the integrity of the Clean Water Act cannot be quickly reached on these crucial permits we urge EPA to issue the final permits and expedite any ensuing appeal(s) that might result.

The Taunton River watershed communities of Middleborough, Mansfield, Norton and Foxboro have accepted new water quality based permits. In fairness to the communities that have stepped up to take responsibility for proper management of their wastewater, EPA needs to expedite the remaining Taunton watershed permits.

Response D.5.

EPA appreciates the commenter's concern for timely action to be taken within the watershed to improve the quality of the receiving water through permit reissuance. EPA also appreciates the communities that are taking responsibility for proper management of their wastewater. EPA is working as expeditiously as possible to reissue the Brockton permit, as well as remaining NPDES permits within the Taunton River watershed. To effectively implement the NPDES program, EPA prioritizes the reissuing of permits based on many factors and the resources available. Hence, EPA cannot guarantee a specific timeframe for the public notice or reissuance of these permits.

Comment D.6. Economic Importance of Permit Reissuance

The legal requirements of the Clean Water Act and moral imperative of dischargers taking responsibility for their wastewater discharges so as to do no harm to others downstream and future generations not-with-standing, the experience of the successful Boston Harbor Estuary clean-up demonstrates that a clean Taunton River Estuary/Mount Hope Bay/Greater Narragansett Bay is worth several million dollars a year in improved commercial and recreational fishing. In addition improved property value and smart development along a clean river/estuary system will add 100s of millions of dollars in recreational and commercial benefits.

Response D.6.

EPA agrees that there are both environmental and economic incentives to managing this watershed responsibly and appreciates the support of the commenter.

Comment D.7. Conclusion

TRWA supports the draft permit and urges that the total phosphorus, total nitrogen and flow limitations not be changed in any way that would reduce the level of stringency or reduce their effectiveness from those proposed in the draft permit. TRWA encourages expeditious reissuance of this permit because it is 5 years past its expiration, there is severe well-documented adverse watershed impact (water quality standards violation) from the current inadequately controlled discharge, and there is substantial economic benefit from a clean river/estuary.

[Attachments A, B and C of the Taunton River Watershed Alliance's comments are not included in this document but were considered in the relevant responses herein.]

Response D.7.

These comments have been addressed in the relevant responses above (D.1 through D.6).

E. Save the Bay submitted comments dated May 4, 2015.

Comment E.1.

Save The Bay represents thousands of members and supporters committed to preserving, restoring, and protecting the ecological integrity and value of Narragansett Bay, its watershed and nearby and coastal waters. Our mission is to protect and improve Narragansett Bay and to create a swimmable, fishable, healthy Narragansett Bay accessible to everyone.

The Taunton River, discharging to Mount Hope Bay north of Fall River, is the largest source of freshwater to Mount Hope Bay, part of the Narragansett Bay Estuary system. In establishing water quality based effluent limitations it is incumbent on EPA to ensure that the discharge does not interfere with the attainment of designated uses in downstream and adjacent segments. EPA must apply both Rhode Island and Massachusetts Water Quality Standards to Mount Hope Bay and provide a sufficient margin of safety to account for unknown information about the impact on water quality from the pollutants being discharged. Mount Hope Bay, both the Rhode Island and Massachusetts areas, are not meeting water quality standards and are listed on the Clean Water Act Section 303(d) List as suffering from impacts from excessive nutrients, including cultural eutrophication. Total Nitrogen has been specifically identified as a cause of impairment to the Bay.

Save The Bay supports the draft discharge permit limits for the City of Brockton's Advanced Water Reclamation Facility of a monthly average total nitrogen limit of 450 lb/day total nitrogen, for May through October, to address cultural eutrophication in the Taunton River and Mount Hope Bay, and the use of all available equipment and optimization of the facility operations for total nitrogen removal from November through April. By decreasing nitrogen inputs to the Mount Hope Bay estuary and phosphorus inputs to the Salisbury Plain and Matfield Rivers, this permit will reduce ongoing impacts to the Taunton River and Narragansett Bay. It also maintains current effluent limits consistent with anti-degradation rules.

Save The Bay also strongly supports the findings that show a needed nitrogen load reduction of 51% from the watershed. The rationale for this limit was well articulated in the draft permit fact sheet through the discussion of existing water quality data. Low dissolved oxygen and high chlorophyll readings continue to impair the Mount Hope Bay estuary. In the absence of a TMDL and numeric criteria for total nitrogen, these data represent important indicators of estuary health.

The Salisbury Plain River is an important tributary and a headwater stream that joins with the Matfield River and Town Rivers to form the main stem of the Taunton River. The Taunton River estuary and main stem were designated as Wild & Scenic in 2009 because of their high quality habitat. This habitat is being directly impaired by wastewater effluent. As the largest source of fresh water to Narragansett Bay, the Taunton River is an important regional ecosystem supporting rare habitats and aquatic species. Habitat quality has increased significantly in Mount Hope Bay and Upper Narragansett Bay since the elimination of once-through cooling at Brayton Point Power. We are now seeing shellfish beds reopened in Swansea, the returning of bay scallops, and an increase in fish habitat. If eelgrass and other native species are to be restored in the Mount Hope Bay, algae blooms need to be reduced (as evidenced by high chlorophyll readings), and dissolved oxygen needs to maintain higher levels. Reduction in nitrogen from the Taunton River will allow this to happen.

The requested increase in flow to the facility of 20.5 mgd is unacceptable. The Brockton facility essentially has no dilution by the receiving water for extended periods of time. Because the receiving water's flow is about 2% of the facility's design flow at 7Q10, permit limits must be set to ensure that the discharge itself meets water quality standards and the facility can't process additional flow. The Taunton River is so effluent-dominated that as far downstream as the City of Taunton, effluent flow represents more than 50% of the river at 7Q10 flows. The long term solution to supporting healthy water quality in the river must include efforts to reduce flow to the treatment plant through efforts at water conservation. It is also critical that the work by watershed municipalities to fix and maintain existing infrastructure and to add additional infiltration capacity to reduce non-point source pollution continue.

Save The Bay applauds the EPA for drafting a new discharge permit for the City of Brockton that gives the Taunton River watershed, and Narragansett Bay, a chance to recover and thrive.

Response E.1.

EPA notes the commenter's support of both the nutrient limitations as well as the decision to deny the flow increase in this permit reissuance. These comments are included here as part of the administrative record.

F. The Nature Conservancy submitted comments dated April 17, 2015.

Comment F.1.

The Nature Conservancy is an international, nonprofit conservation organization. Our mission is to conserve the lands and waters on which all life depends. Our work is carried out in all 50 states and over 30 countries, and is supported by over 36,000 members in Massachusetts and Rhode Island and over one million members worldwide. The Conservancy works globally on freshwater and coastal science and management to help government agencies, water management agencies, industry, scientists, and other non-governmental organizations around the world to improve ecosystem health and implement sustainable solutions.

The Nature Conservancy supports the draft NPDES permit for the Brockton facility, and we agree with EPA that these limits are necessary to achieve water quality standards in the Salisbury Plain River and downstream waterways, and that the limits are justified by the best available science. Requiring the Brockton facility and other dischargers to meet these new limits will help to protect and improve water quality in the Taunton River watershed and associated estuary. We view this permit as a key piece of a comprehensive and watershed-wide approach to restoring the environmental conditions of the Taunton River estuary.

The Taunton River is the longest free flowing coastal river in New England, with tidal influence reaching nearly 20 miles inland from Narragansett Bay. This extent of tidal influence maintains large, high quality, and globally rare brackish and freshwater tidal marshes. The river supports populations of environmentally-sensitive species such as river otters and freshwater mussels; three globally rare species of plants and two globally rare fish, bridle shiner and Atlantic sturgeon, inhabit the watershed. The Taunton River provides important habitat for one of the largest spawning populations of river herring in New England and populations of other fish that play a critical role in supporting marine food webs. The River was designated Wild and Scenic in 2009, to protect six outstanding resource values: agriculture, ecology and biodiversity, estuary, fisheries, history and archaeology, and recreation. However, the segment of the Salisbury Plain River to which the Brockton AWRF discharges has impairments to aquatic macroinvertebrate bioassessments, excess algal growth, fecal coliform (TDML completed), dissolved oxygen, total phosphorus, taste and odor, turbidity and debris/floatables/trash, and many of these impairments continue in reaches downstream. The Brockton facility must limit its flow, nitrogen, and phosphorus effluent to support water quality improvements, as described in the draft permit. While the data show that the limits on flow and nitrogen should be stricter, we believe the proposed limits are a good start, and that these numerical limits should go forward in the interest of issuing this permit as soon as possible.

Nutrient pollution (nitrogen and phosphorus) from wastewater is widely recognized as a major source of impairment for aquatic systems throughout the region, including areas of the Taunton River Watershed, Mt Hope Bay, and Narragansett Bay. The Conservancy is committed to efforts to reduce excess nutrient levels in this region because of persistent related problems including increased algal dominance and widespread algal blooms leading to low dissolved oxygen levels, and causing shellfish harvest closures, loss of eelgrass, and changes in native species diversity. From Nantucket Sound to Block Island Sound to Great South Bay, NY, The Nature Conservancy is investing in estuarine restoration focused on salt marsh, seagrass, oysters, bay scallops, hard clams, and diadromous fish habitat. Throughout the Taunton Watershed, The Conservancy is advancing the restoration and protection of our freshwater systems by removing dams that block the passage of migratory fish, conserving critical lands that buffer streams, and enabling green infrastructure projects that improve stormwater management. However, monitoring and research have shown that to be truly effective at scale, restoration success requires additional improvement of water quality to support a diversity and abundance of native species and habitats. Limiting nitrogen and phosphorus from wastewater treatment facilities is a high priority for the Conservancy in our efforts to improve water quality and thus ecosystem health in the region’s rivers and estuaries.

The Conservancy strongly supports the scientifically-derived seasonal load limit and optimization for total nitrogen described in the draft permit. As the draft permit describes, monitoring by the University of Massachusetts School for Marine Science and Technology (SMAST) has shown elevated total nitrogen concentrations in the Taunton River Estuary and Mount Hope Bay. SMAST and Narragansett Bay Water Quality Network monitoring data have also shown other indicators of eutrophic condition, including low dissolved oxygen and elevated chlorophyll-a concentrations. Based on these data, EPA has concluded that excess nitrogen in the Taunton River Estuary and Mount Hope Bay has reached the level of a violation of state water quality standards for nutrients and aesthetics, and has subsequently determined a nitrogen limit is necessary to meet water quality requirements. While we commend the upgrades made to the Brockton facility, the facility discharge still constitutes 13% of the total watershed nitrogen load to the Taunton River Estuary; a 51% reduction in nitrogen from the watershed, allocated among several sources, is needed. We agree that a numerical limit on total nitrogen should be included in the permit, and commend the use of local data to determine the limit. The Nature Conservancy is also supportive of other source reductions and limits needed to reach the overall required load reduction, including reductions in nonpoint source pollution.

The Conservancy is supportive of the reduced seasonal concentration and load limits for total phosphorus stated in the draft permit. Along with minor dilution in the river, limiting effluent to 101 ug/L phosphorus will result in meeting the 100 ug/L Gold Book criterion. The current phosphorus concentration limit of 0.2 mg/L results in receiving waters with projected phosphorus concentration higher than guidance recommendations. As the draft permit describes, assessments show that impaired benthic macroinvertebrate conditions continue even after past phosphorus reductions, and that the river is algal dominated, indicating that lower limits are necessary.

Response F.1.

EPA notes the commenter's support of the nutrient limitations in this permit reissuance. These comments are included here as part of the administrative record.

Comment F.2.

The Salisbury Plain River is an effluent dominated stream. The Brockton AWRF makes up over 95% of the flow in the Salisbury Plain River under 7Q10 conditions, and effluent-dominated conditions extend downstream through the Matfield and into the Taunton River in dry weather. Therefore, we support the flow limit for the Brockton facility described in the draft permit, as well as the process specified to request any flow increase (demonstrate meeting of water quality standards and Antidegradation requirements). The Conservancy is supportive of measures to protect and restore the water balance in the Taunton River watershed, consistent with goals of the 2008/2011 Taunton River Watershed Study and the 2004 Massachusetts Water Policy. We encourage careful consideration of flow limits for wastewater treatment plants in the watershed, to restore water balance and promote groundwater recharge, as well as to maintain consistency with anti-degradation regulations to prevent increased discharge of pollutants to already impaired waters. We support limiting the flow from the Brockton facility as proposed in the draft permit, as well as additional flow reduction by water conservation and continued decrease in infiltration and inflow.

In coalition with associations representing municipalities and water suppliers, The Nature Conservancy has supported public policy and funding for municipal infrastructure and assistance related to water quality including leading the legislative advocacy efforts to create a $20 million loan fund for dam removal and repair, pushing for funding for technical assistance and grants for green infrastructure, and advocating for capital funding legislation to implement the recommendations of the Water Infrastructure Financing Commission. The Conservancy will continue to help ensure public funding and incentives are available to help communities protect clean water to benefit people and the environment.

Response F.2.

EPA notes the commenter's support of the decision to deny the flow increase in this permit reissuance. These comments are included here as part of the administrative record.

G. Alternatives for Community and Environment (ACE) submitted comments dated May 4, 2015.

Introduction

This comment letter is filed on behalf of residents of Brockton, West Bridgewater, and East Bridgewater[1] whom Alternatives for Community & Environment ("ACE") is assisting in the matter of a draft permit to the Brockton Advanced Water Reclamation Facility ("AWRF"). ACE is an environmental justice organization that is partnering with local residents to review the draft permit issued jointly by the United States Environmental Protection Agency ("EPA") and Massachusetts Department of Environmental Protection ("MassDEP") under 33 U.S.C. §§1251 *et seq.* and M.G.L. c. 21 §§26-53.

1 Maria Alamo, Brockton 02301; Kate Archard, Brockton 02301; Jim Bosco, Brockton, 02302; Barbara Carchidi, West Bridgewater 02379; J. Edward Carchidi, West Bridgewater 02379; Michelle DuBois, Brockton 02302; Dan Gibbons, Brockton 02301; Virginia Jeppson, Brockton 02302; Laurie Matthews, East Bridgewater 02333; James McCarthy, Brockton 02301; Albert Murray, Brockton 02302; Loretta Murray, Brockton 02302.

As explained in these comments, the EPA should amend the draft permit to respond to the concerns noted below. These comments focus on five issues:

1. The existing permit does not require monitoring for the industrial and pharmaceutical chemicals that will be discharged to the AWRF. EPA and MassDEP must ensure those chemicals are not discharged into the Salisbury Plain River;
2. The facility flow rate should be kept at 18 MGD and not increased;
3. The final permit should create a plan for retiring the sewage sludge incinerator and better account for the public health impacts prior to its retirement;
4. The thermal temperature of the discharge requires further analysis in the context of climate change; and
5. The facility is located in an environmental justice community, which requires an analysis of the sludge incinerator and additional conditions.

Comment G.1.

I. <u>The draft permit should be more stringent to ensure there is not pass through of industrial and pharmaceutical products into the Salisbury Plain River.</u>

The Salisbury Plain River is classified as a Class B warm water fishery in the Massachusetts Surface Water Quality Standards, 314 CMR 4.05(4)(a). Class B waters are designated as habitat for fish, other aquatic life, and wildlife, including for their reproduction. Because the segment of the Salisbury Plain River (Segment 62-06) is an impaired water body,[2] permits must not allow the wastewater discharge of additional pollutants that will contribute to further water quality impairment. The AWRF discharges its effluent into the Salisbury Plain River. Upstream of the AWRF, the Salisbury Plain River flows through an artificially created channel but downstream of the AWRF the Salisbury Plain River adopts a meandering character reflective of the more natural and undisturbed setting in that less developed area. At certain times of year, the AWRF discharge represents a large percentage of the flow of the Salisbury Plain River and during extended dry periods the AWRF discharge represents almost the entire flow of the river. Consequently, the quality of water in the Salisbury Plain River is largely affected by the quality and quantity of the AWRF discharge.

2 Final Pathogen TMDL for the Taunton River Watershed, June 2011, available at: http://www.mass.gov/eea/docs/dep/water/resources/n-thru-y/taunton1.pdf (last visited May 1, 2015).

Because the Salisbury Plain River is an effluent-dominated stream, the quality of the treated water from the AWRF discharged into the Salisbury Plain River is nearly equal to the overall stream quality. It is critical that the AWRF is discharging water that does not contain industrial or pharmaceutical chemicals. The Brockton AWRF collects and treats wastewater from nine non-categorical significant users and six categories industrial users, including sheet metal manufacturers and finishers and medical and pharmaceutical users.[3] If permitted and financed, the Brockton Power LLC fossil fuel power plant will also discharge to the AWRF and increase the number of significant industrial users. The draft NPDES permit does not require monitoring for all the industrial and pharmaceutical products that are treated by the AWRF and have the potential to pass through the AWRF into the Salisbury Plain River. Because of ACE's long history of involvement in the opposition to the Brockton Power plant, these comments address the potential future operation of the power plant.

3 NPDES No. MA0101010 Fact Sheet, page 5.

Brockton Power, if operational, will be permitted to discharge up to 350,000 gallons per day of wastewater from sanitary and industrial facilities, which will contain, among other pollutants, mercury. The power plant would evaporate approximately 1,600,000 of water into the air daily and discharge an average of approximately 300,000 gallons per day from its cooling towers to the AWRF, which is already over capacity during significant rain storms. Consequently, the Brockton Power discharge could potentially cause or increase the AWRF's discharge of untreated or partially treated wastewater to the Salisbury Plain River.

Brockton Power's proposed discharge will contain priority pollutants.[4] Relatively low concentrations of trace metals in receiving waters can be toxic to resident aquatic life species. The above-named commenters are concerned that sewer permits issued to the industrial users, which require pre-treatment, may be insufficient. The only way to determine if industrial chemicals are passing from the industrial users to the AWRF and being released into the Salisbury Plain River is if EPA requires those chemicals to be monitored by the AWRF. The draft permit requires whole effluent toxicity testing ("WET"). However, if the AWRF monitors the discharge and finds an exceedance of the WET test, it is difficult to determine the source or industrial pollutant that is causing or contributing to the failure. The final permit should require monitoring for additional industrial chemicals that are used by the industrial users, including anticipated industrial chemicals from Brockton Power. The commenters request that EPA and MassDEP create a list of the industrial and pharmaceutical chemicals that are discharged to the AWRF and require the applicant to monitor for such chemicals. We urge the final permit to require biannual submission of the pretreatment report detailing the activities of the pretreatment program instead of annual submissions.

The pharmaceutical and medical users discharge endocrine disrupting compounds to the AWRF. These pollutants are known to negative impact aquatic life and public health.[5] Residents seek information about how the AWRF treats endocrine disrupting compounds. The final NDPES permit must require removal of endocrine disrupting compounds and monitoring for such compounds. If monitoring for such compounds is not feasible, ACE requests an explanation as to how the pre-treatment process guarantees that endocrine disrupting compounds will be treated and removed prior to receipt at the AWRF.

4 United States Environmental Protection Agency regulations Appendix A to 40 CFR Part 423.
5 Iwanowicz, et. al., "Reproductive Health of Bass in the Potomac, USA Drainage: Part 1: Exploring the Effects of Proximity to Wastewater Treatment Plant Discharge," 28 *Env. Toxicology and Chemistry* 1072-1083 (2009); American Public Health Association, "A Precautionary Approach to Reducing American Exposure to Endocrine Disrupting Chemicals," Policy Number 20104, available at: http://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/09/09/03/a-precautionary-approach-to-reducing-american-exposure-to-endocrine-disrupting-chemicals (last visited May 1, 2015); Drewes et. al., "Removal of Endocrine Disrupting Compounds in Water Reclamation Processes," available at: https://www.watereuse.org/files/images/01HHE20T_web.pdf (last visited May 1, 2015).

Response G.1.

Regarding Brockton Power's proposed discharge, pretreatment industrial user permits are developed by the Brockton POTW in order to protect pass through and/or interference. These permits include the more stringent of local limitations and federal categorical standards. It appears the Brockton Power plant would be subject to 40 CFR 423 categorical standards. Given that, in accordance with 40 CFR 423, there should be no detectable amount of effluent from any of the 126 priority pollutants contained in chemicals added for cooling tower maintenance.

EPA also notes that these priority pollutants will be monitored as a requirement of the permit reapplication process. If any pollutants are detected in quantities that pose a concern, additional monitoring and/or limitations for those pollutants will be established at that time.

Given these facts, EPA believes the draft permit is protective of water quality standards and annual pretreatment reports are sufficient.

Regarding pharmaceuticals and endocrine disrupting compounds, EPA agrees that, in this effluent dominated stream and with a variety of chemical sources in the sewage collection system, emerging contaminants pose a particular concern to aquatic life. In response, EPA has decided to require monitoring and reporting in a separate information request to better determine what level of emerging contaminants are present in the discharge. See Response C.3 for more details of these requirements.

Comment G.2.

II. <u>The facility flow rate should remain fixed at 18.0 million gallons per day.</u>

The commenters support the EPA determination to include a twelve month rolling average flow limit of 18.0 million gallon per day limit. Receiving water assessments performed by the City of Brockton's consultants revealed continued impairments consistent with nutrient overenrichment downstream of the AWRF.[6] Increasing the flow rate to 20.5 million gallons per day (MGD) has the potential to further negatively impact the quality of the receiving water and violate the anti-degradation provisions of the Clean Water Act. The commenters agree with the agencies' determination that increasing the design flow is not consistent with federal and state law. An increased flow rate will further increase the duration of conditions under which the AWRF represents the vast majority of receiving water flow, and increase the extent of the entire Taunton River system under which the AWRF is the majority of flow.7

6 NPDES No. MA 0101010 Fact Sheet, page 16.
7 NPDES No. MA 0101010 Fact Sheet, page 17.

As the EPA and MassDEP are well aware, there is an anti-backsliding requirement for NPDES permits which means that the requirements of a subsequent permit may not be less stringent than previous permits. The final permit must ensure that discharges contribute to improving the quality of the receiving waters. Under the federal and state Clean Water Act, the EPA and MassDEP are required to protect the water resources of the Commonwealth and may grant permits to industrial dischargers only if the discharges will conform to regulations. At present, the draft NPDES permit does not conform to regulations. MassDEP has a broad statutory mandate to protect the waters of the Commonwealth. M.G.L. c. 21, §§26-53. MassDEP is also responsible for enhancing the quality and value of water resources, M.G.L. c. 21, §27, and enforcing the antidegradation provisions of the surface water quality standards. 314 CMR 4.00.

The Salisbury Plain River has historically flooded during significant rain storms and floods the mobile home community just south of the facility site. The EPA cannot demonstrate that an increased flow rate will not result in backsliding or other negative environmental and human health impacts. The process proposed by the EPA and MassDEP in the fact sheet on pages 17-18 to determine whether a future flow increase would be permissible is not stringent enough. We recommend that the AWRF demonstrate permit compliance for a continuous period of at least two years. Moreover, if the Brockton power plant is constructed, the facility will withdraw a significant amount of AWRF effluent, which will increase flow variability in the Salisbury Plain River. If Brockton Power is operational, the AWRF should be required to demonstrate NPDES permit compliance for a period of at least one additional year. The commenters suggest that an increased flow rate is likely to result in a larger volume of sewage sludge that is burned. As discussed below, the commenters are concerned about the public health impacts of sewage sludge and do not support an increase in the amount of sewage sludge burned.

Response G.2.

EPA acknowledges the commenter's support of the decision to deny the flow increase in this permit reissuance. These comments are included here as part of the administrative record.

Additionally, EPA has recommended that in order for a future flow increase to be permissible, compliance with the limits set forth in this permit reissuance must be demonstrated for "at least one year and preferably two to allow assimilation of receiving water to new conditions." EPA believes this is an appropriate length of demonstrated compliance in order to properly evaluate improvements to the receiving water quality, and is in accordance with the nature of this request. If Brockton Power is operational, demonstrated compliance with AWRF's effluent limits for one to two years as well as instream water quality improvements such that the discharge does not contribute to water quality impairments and is consistent with antidegradation requirements should still be sufficient to determine if a flow increase is permissible. However, EPA may exercise its discretion to require additional time if data indicate that the receiving water has not yet assimilated to the new discharge conditions.

For a further discussion of the impacts of the incinerator, see Response C.2 above.

Comment G.3.

III. <u>The final permit should create a plan for retiring the sludge incinerator and better account for the public health impacts prior to its retirement.</u>

Brockton residents have one of the highest premature mortality rates in the state, and the fifth highest premature mortality rate of the thirty largest communities in Massachusetts: 413.7 premature deaths per 100,000 people, compared to the statewide average of 317 premature deaths per 100,000 people. Brockton's children have a statistically significantly higher prevalence of pediatric asthma as compared to the overall state prevalence, a rate of 13.85% compared to the state rate of 10.6%. Brockton's age-adjusted cardiovascular hospital admission rate of 2,302 per 100,000 well exceeds the state average of 1686.1 per 100,000.8

8 Massachusetts Department of Public Health.

The commenters are concerned about a history of odors and substandard operation of the sewage sludge incinerator. The incinerator stack performance test should be required at least monthly. Commenters urge the City, EPA, and MassDEP to consider alternative methods for processing sludge and phasing out the incinerator operation at the AWRF.

Response G.3.

For a detailed discussion of the incinerator issue, refer to Response C.2 above. Nothing in the permit precludes the City of Brockton from pursuing alternate means of sludge disposal consistent with applicable laws.

The commenter also requests that an incinerator stack performance test be required monthly. Note that the permit requires exit gas to be continuously monitored for total hydrocarbons, which are not to exceed 100 ppm. (See Part I.D.3.) Average monthly results from this measurement are to be reported in the annual report. EPA believes these requirements are sufficient to monitor and enforce the applicable regulations.

Comment G.4.

IV. <u>The thermal temperature of the water is not adequately controlled, which has the potential to negatively impact the ecology.</u>

In addition to the reasons discussed above, the draft NPDES permit is inadequate because of its failure to consider climate change impacts. Section 316(a) of the Clean Water Act requires the EPA to consider the change to the ambient water temperature in the Salisbury Plain River because of an effluent discharge. The EPA must revise the draft NPDES permit to consider that the effects of global climate change could alter the thermal profile of the Salisbury Plain River. Historical conditions of the thermal profile of the Salisbury Plain River do not necessarily predict future conditions. Since some of the wastewater discharged to the AWRF will originate as boiler blowdown from one or more boilers, the NPDES permit should include stringent conditions regarding the temperature of the effluent. As water temperature increases, water pollution problems will increase. As the temperature of water increases, dissolved oxygen levels will decrease. These more complex environmental conditions should be further evaluated by the EPA. The NPDES permit limits should reflect these foreseeable climate changes and increases in temperature of the Salisbury Plain River.

Further, the NPDES permit is jointly issued by the EPA and MassDEP. Under state law, MassDEP is required to consider reasonably foreseeable climate change impacts before issuing the permits under M.G.L. c. 30, §61, ¶ 2.[9] MEPA Section 61, as amended by the Global Warming Solutions Act, states in paragraph one that "[a]ny determination made by an agency of the commonwealth shall include a finding describing the environmental impact, if any, of the project and a finding that all feasible measures have been taken to avoid or minimize said impact." M.G.L. c. 30, §61, ¶ 1. The second paragraph goes on to say "[i]n considering and issuing permits . . . the respective agency, department . . . shall also consider reasonable foreseeable climate change impacts" (emphasis added). M.G.L. c. 30, §61, ¶ 2. The use of the term "also," by its plain meaning, indicates the legislators' intent for the agency to make findings and also consider reasonably foreseeable climate change impacts. The draft permit fails to analyze reasonably foreseeable climate change impacts.

9 MEPA Section 61, as amended by the Global Warming Solutions Act.

Response G.4.

The basis of this comment is an assertion that the AWRF currently receives thermal loads from boiler blowdown which may impact the temperature of the receiving water. EPA notes that, at present, the AWRF does not receive such thermal loads and EPA has developed the draft permit based on existing conditions. Although there is a potential for future discharges to contain boiler blowdown, these discharges would not be regarded as climate change impacts. Rather, such discharges would be addressed under the pretreatment program and/or under Massachusetts water quality temperature standards.

Pretreatment regulations found at 40 CFR §403.5(b)(5) state that an industrial user shall not introduce into a POTW "Heat in amount which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW Treatment Plant exceeds 40 degrees C (104 degrees F) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits." Part I.E.2 of the draft and final permit require the permittee to implement its industrial pretreatment program in accordance with the procedures and provisions described in the 40 CFR § 403 pretreatment regulations.

The Massachusetts Surface Water Quality Standards found at 314 CMR 4.05(3)(b)(2) would apply to the discharge into the receiving water. This regulation states that class B waters “shall not exceed 68°F (20°C) based on the mean of the daily maximum temperature over a seven-day period in cold water fisheries, unless naturally occurring. Where a reproducing cold water aquatic community exists at a naturally occurring higher temperature, the temperature necessary to protect the community shall not be exceeded and the natural daily and seasonal temperature fluctuations necessary to protect the community shall be maintained. Temperature shall not exceed 83°F (28.3°C) in warm water fisheries. The rise in temperature due to a discharge shall not exceed 3°F (1.7°0C) in rivers and streams designated as cold water fisheries nor 5°F (2.8°C) in rivers and streams designated as warm water fisheries (based on the minimum expected flow for the month); in lakes and ponds the rise shall not exceed 3°F (1.7°0C) in the epilimnion (based on the monthly average of maximum daily temperature)”

Since there are no known significant thermal loads presently contained in this discharge, and considering the time of treatment and dilution within the treatment plant, EPA deems there is not a reasonable potential for the discharge to cause or contribute to an exceedance of the temperature water quality standards described above. Additionally, MassDEP has reviewed M.G.L. c. 30, §61 and determined that a finding under this statute is not required for the renewal of this NPDES permit. If Brockton Power (or any other industrial user with a thermal load) were to come on line, EPA and MassDEP may reopen the permit to determine whether the discharge has the reasonable potential to cause or contribute to a violation of these temperature water quality standards and, if so, to establish thermal limits in the permit.

Comment G.5.

V. <u>The facility is located in an environmental justice community, which requires an analysis of the sludge incinerator and requires additional conditions.</u>

Environmental justice communities encompass only a small portion of the land area of the Commonwealth but they host or are in close proximity to many of the state's contaminated and abandoned sites and large sources of air emissions. Dr. Daniel Faber has determined that Brockton is the ninth most extensively overburdened community in Massachusetts in total environmental hazard points and the thirty-second most extensively overburdened community in Massachusetts in total hazard points per square mile.[10]

10 Daniel Faber, "The Proposed Brockton Power Plant: Environmental Disparities in Brockton MA," March 2008.

The EPA defines environmental justice as the "fair treatment and meaningful involvement of all people" with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.[11] "Fair treatment" means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental impacts resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal environmental programs and policies. "Meaningful involvement" means that (a) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (b) the public's contribution can influence the regulatory agency's decision; (c) the concerns of all participants involved will be considered in the decision-making process; and (d) the decision makers seek out and facilitate the involvement of those potentially affected. That language along with Executive Order 12,898 provides both procedural and substantive obligations for the EPA.

11 EPA Environmental Justice website, available at: http://www.epa.gov/environmentaljustice/basics/index.html (last accessed May 1, 2015).

We thank the EPA and MassDEP for holding a public hearing at a convenient location in the evening. The Brockton AWRF is located in an area with identified environmental justice populations, according to the Massachusetts Executive Office of Energy and Environmental Affairs.[12] The wastewater treatment plant incinerates sewage sludge on site, yet the agencies chose to forego an environmental justice analysis. An environmental justice analysis is necessary to adequately examine the sewage sludge incineration function and to determine whether future AWRF operations should allow for on-site sewage sludge incineration. The environmental justice analysis should use the EJ Screen tool to collect demographic and health data.

12 Mass GIS, EJ Viewer available at: http://maps.massgis.state.ma.us/map_ol/ej.php (last accessed May 1, 2015).

The EPA must determine whether the permitting action, including sewage sludge incineration, will have a disproportionately high and adverse human health and/or environmental effect. The concept of environmental justice requires substantive improvements in overburdened communities, such as Brockton.

Response G.5.

The commenter has raised concerns regarding potential site impacts from the permitting action, including sewage sludge incineration that could have a disproportionately high and adverse human health and/or environmental effect on environmental justice communities and whether EPA is fulfilling its procedural and substantive responsibilities under Executive Order 12898.

At the outset, when fulfilling its responsibilities and exercising its authorities under the Clean Water Act (CWA), EPA is guided by Presidential Executive Order 12898 ("the Executive Order"). Under the Executive Order, "[t]o the greatest extent practicable and permitted by law . . . each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States." *See* Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Executive Order 12898, 59 Fed. Reg. 7629 (Feb. 16, 1994), § 1-101. Furthermore, "[e]ach Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of . . . subjecting persons (including populations) to discrimination under, such, programs, policies, and activities, because of their race, color, or national origin." *Id.* § 2-2.

EPA is also guided by its own definition of environmental justice:
Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

Based on the Executive Order, EPA's Environmental Appeals Board (EAB) has held that environmental justice issues must be considered in connection with the issuance of federal permits issued by EPA regional offices and states acting under delegations of Federal authority. *In re Prairie State Gen. Co.*, 13 E.A.D. 1, 123 (EAB 2006) (citing *In re Knauf Fiber Glass, GmbH*, 8 E.A.D. 121, 174-75 (EAB

1999). *See also In re AES Puerto Rico, L.P.*, 8 E.A.D. 324, 351 (EAB 1999) (order denying review based in part on the thorough environmental justice analysis), *aff'd sub nom Sur Contra La Contaminacion v. EPA*, 202 F.3d 443 (1st Cir. 2000); *In re EcoEléctrica, L.P.*, 7 E.A.D. 56, 67-69 (EAB 1997); *In re Puerto Rico Elec. Power Auth.*, 6 E.A.D. 253, 254-58 (EAB 1995) (citing *In re Chem. Waste Mgmt. of Indiana*, 6 E.A.D. 66 (EAB 1995) (examining for the first time the general policy directive set out in Executive Order 12898 and the EAB's role in implementing it in the context of a RCRA permit).

The Executive Order states in relevant part that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States." *See* Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Executive Order 12898, 59 Fed. Reg. 7629 (Feb. 16, 1994), § 1-101. The Executive Order does not, however, "amend EPA's statutory or regulatory requirements and obligations," *In re Sierra Pacific Indus.*, PSD Appeal Nos. 13-01 through 13-04, slip op. at 31-32 (EAB July 18, 2013), but rather, by its own terms, directs that it is to be implemented "consistent with, and to the extent permitted by, existing law," Exec. Order 12898 § 6-608. The Clean Water Act and its implementing regulations generally govern the development of NPDES Permits.

EPA expects that the permitting action at issue – the renewal of the NPDES permit for the Brockton AWRF – will not have a disproportionately high and adverse human health or environmental effect on minority or low-income populations near the permitted facilities. As explained below, the NPDES permit renewal will not cause "adverse" effects within the meaning of Executive Order 12898.

In the development of the draft permit, EPA conducted "reasonable potential" analyses, where appropriate, to determine whether a particular pollutant is or may be discharged at a level that "will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard." 40 CFR § 122.44(d)(1). An excursion occurs if the projected or actual in-stream concentration exceeds an applicable water quality criterion. In some cases, the analyses indicated that discharge under the existing permit does not have a reasonable potential to cause violations of water quality standards established for the protection of public health, aquatic organisms and other uses. Where the analyses indicated, however, a reasonable potential for the discharge of a particular pollutant to cause or contribute to a violation of water quality standards, the draft permit proposes limits to ensure that the discharges will not cause or contribute to water quality standards violations. Such limits are generally referred to as water quality-based effluent limitations (WQBELs). Where there is insufficient information to determine whether a discharge will contribute to a violation of water quality standards, the draft permit can impose conditions on the permittee to undertake additional monitoring, or testing to inform future permitting or permit modifications or both. NPDES permits such as the one for this facility are issued for a maximum period of five years.

Because EPA is proposing effluent limits in this draft permit that will ensure discharges from the Brockton AWRF do not cause or contribute to violations of water quality standards, EPA has determined that this permitting action will not have disproportionately high and adverse human health or environmental effects. This is so because a state's water quality standards are designed "to protect the public health or welfare, enhance the quality of water and serve the purposes of th[e Clean Water Act]." 33 U.S.C. § 1313(c)(2)(A); *accord In re HECLA Mining Co.*, 13 E.A.D. 216, 220 n.7 (EAB 2006).

Based on EPA's analysis and the permit conditions described in more detail in the fact sheet and this Response to Comments, EPA has determined that the discharge, as permitted, will not cause or contribute to violations of water quality standards in the receiving waters. Accordingly, EPA also concludes that the permit reissuance for this facility will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations within the meaning of Executive Order 12898.

Regarding the potential impacts of sewage sludge incineration, EPA has determined that this permit reissuance does not impose an *adverse* impact on the community based upon compliance with both the Clean Water Act and National Ambient Air Quality Standards. Hence, there cannot be a *disproportionate* adverse impact which an environmental justice analysis would evaluate. The permittee is therefore authorized to continue use of the sludge incinerator as long as it maintains consistent compliance with all relevant regulations and limitations. For a more detailed discussion of this issue, refer to Response C.2 above.

Comment G.6.

VI. <u>The final permit should include additional conditions.</u>

The commenters respectfully request several additional permit conditions as detailed below.

- The industrial pretreatment report should be submitted biannually instead of annually.
- Additional monitoring should be required to ensure that industrial and pharmaceutical chemicals do not pass through the AWRF into the Salisbury Plain River.
- The permittee should be required to report immediately to the EPA and MassDEP when the facility exceeds the total flow rate.

- The facility must demonstrate permit compliance for a period of at least two years prior to the EPA and MassDEP deciding whether to increase the facility flow rate.
- The final permit must establish a process and timeline for retiring the sewage sludge incinerator function.
- If the AWRF reports a permit exceedance to the EPA and MassDEP, it should be required to increase the frequency of sampling to prove it is in compliance with permit requirements for six consecutive months before reverting back to less frequent sampling.
- Any permit violation should be reported in the monthly discharge monitoring report and uploaded to the EPA Enforcement and Compliance History Online ("ECHO") website.[13]

13 The ECHO website is available at http://echo.epa.gov/?redirect=echo and data are available at http://www.epa.gov/envirofw/ (last accessed May 1, 2015).

In addition to the above recommended special conditions, the EPA and MassDEP should conduct more frequent unannounced inspections of the AWRF and pursue enforcement when the facility is out of compliance. More frequent inspections and enforcement actions would provide a greater incentive for the facility operators to contribute to improving the Salisbury Plain River water quality. If the EPA and/or MassDEP take enforcement action against the AWRF, any funds recovered or supplemental environmental projects should benefit the Brockton residents and ecology and involve such residents in the project design.

Response G.6.

See Reponses G.1 through G.5 for detailed responses to the bulleted items in this comment. With regard to the final bulleted item, it is EPA's intent that any permit violations that are reported will be uploaded to the ECHO website.

In regard to the inspection and enforcement issue raised, see Response C.3 above.

H. Krause & Hummel LLP, on behalf of Edward Medairos and Beacon Park Realty Trust, submitted comments dated April 14, 2015.

Comment H.1.

Please be advised that this office represents the interests of Edward Medairos and Beacon Park Realty Trust, which owns and operates a manufactured housing community located in West Bridgewater, immediately adjacent to the waste treatment facility in Brockton, to which the above-referenced permit relates (the "Facility").

We understand that the comment period for this matter is April 15, 2015 and we are responding by way of providing a comment. At the outset, it is imperative that you and the Environmental Protection Agency ("EPA") understand that there are significant, excessive flows of potentially untreated materials going to the Salisbury Plain River.

Litigation is on-going with respect to flows that have adversely affected my client (see Medairos v. City of Brockton, et al, Plymouth Superior Court, Civil Action No. PLCV2010-00505-A); my client's allegations that the City of Brockton has been exceeding its eighteen million gallons per day (“18 mgd”) for years despite being under an ACO, which by its own terms expired in January of 2013.

Attached hereto and made a part hereof is a graph and data that we synopsized from the Massachusetts Department of Environmental Protection’s (“MA DEP”) records with respect to the flows associated with the Facility. My client undertook an investigation to determine flows given that he was required to build a nearly 2,000-foot berm on his property to keep the flows from reaching his manufactured housing residents' homes. The synopsis and attached graph clearly indicate that the excess flows were in the hundreds of millions of gallons, which was we believe polluted effluent, marginally, barely and sometimes as we have alleged, hardly treated and which went directly into the Salisbury Plain River. It is important to understand that the Salisbury Plain River is contiguous with my client's property and maybe twenty (20) feet wide, at its widest point. The outflow from the Facility is not a pipe, but a one hundred foot-sluice swale that is constantly generating flows into the river and consequently into and onto my client's property.

Our understanding is that the revision to the permit would allow the Facility to increase its flows by 2.5 million gallons per day. That scares my client and should be of great concern to not only the MA DEP but the EPA and the residents of my client's manufactured housing community and everyone adjacent to the Salisbury Plain River for the potential of increased pollution, odors and health and safety issues from expanded flows. It is our impression that the Facility cannot handle the flows appropriately that it is currently permitted to do, let alone an increased flow that would come from a revision to the NPDES permit.

All of this amounts to a grave concern on my client's part that the health, welfare and safety of his residents is presently being adversely affected and could be further jeopardized by increased flows emanating from the Facility per the request for the permit.

We strongly urge you to visit the site and communicate with the abutters, including but not limited to, my client. Mr. Medairos has been involved in matters associated with the Facility for years and he is a wealth of information relating to the concerns and the flows that have emanated from the Facility. We understand that it is a public facility, but we also understand that public facilities, notwithstanding that their governmental agencies, cannot and should not, be allowed to pollute the community and adversely affect residents living adjacent to it.

Response H.1.

EPA notes the commenter’s position opposing an effluent flow increase in this permit reissuance. The facts and circumstances outlined above heighten EPA’s concern over the effluent flow issues associated with the facility and the need to consider all applicable regulations and procedures in assessing requests for effluent flow increases and in the further collection of relevant information. These comments are included here as part of the administrative record. Additionally, EPA notes that any future permitting action related to the volume of effluent flow from Brockton AWRF should be done with consideration for the downstream abutters and potentially affected residents.

I. William Carpenter (Brockton), Frank A. Hegarty (Avon), David Sheedy (East Bridgewater), Daniel Murphy (Easton), Nancy J. Maloney (West Bridgewater), Christopher Cooney (Metro-South Chamber of Commerce), and Pasquale Ciaramella (Old Colony Planning Council) submitted a joint comment letter dated April 14, 2015.

Comment I.1.

After reviewing the very thorough draft NPDES Permit No. MA0101010, we, the undersigned, recommend that the permit be modified to allow treatment and disposal of wastewater at the Advanced Water Reclamation Facility's (AWRF) upgraded design capacity of 20.5 MGD rather than at the present limit of 18 MGD.

The increased sewer capacity will allow the affected communities to develop at higher densities than would be possible with on-site disposal. In particular, firms in existing unserved industrial areas in Brockton and other communities would be able to develop tax-paying businesses on accessible, buildable land which is unsuitable for septic systems. The existing and new firms would also be able to use more of their land, since space would not be needed to be reserved for leaching fields.

Such increased discharge limits mean that with effective, supportive, planning and zoning, a given amount of development could use less land and there would be less pressure to do large lot development in outlying areas. In addition to allowing new industrial and commercial growth, this would save land, protect wildlife habitat and allow more compact walkable communities in the spirit of Smart Growth. Similarly, it would encourage growth near existing infrastructure, since most newly sewered areas would already have water and electric service.

The Permit's attached fact sheet notes Brockton's great progress in reducing Infiltration-Inflow (I/I) so that normal flows are well below the allowed of 18 MGD. It therefore "deletes the specific limitation on additional flow from Abington [since increased to 1.5 MGD by agreement with Brockton], Whitman [now allowed one MGD], and other communities." It also recognizes the City's "discretion to allocate its available capacity as it deems appropriate," presumably up to the allowed 18 MGD total.

The effluent from the upgraded AWRF is of high quality with no violations of present standards for Carbonaceous Biochemical Oxygen Demand (CBOD), Total Suspended Solids (TSS), pH, bacteria, Dissolved Oxygen (DO), Residual Chlorine (not used), Total

Phosphorous, and Ammonia Nitrogen in the period 1/2011 to 12/2013. In addition the greatly reduced nitrogen discharge (from 1303 lbs./day to 527 lbs./day) is close to the draft permit's May to October target of 450 lbs. day.

Recognizing the high quality of the present effluent, we suggest allowing a relatively modest 13.7 % increase in allowed flows from 18 MGD to the design volume of 20.5 MGD.

Such increased flows may require authorization under the Commonwealth's Antidegradation Implementation Procedures. The first criterion for such an authorization is that the project is necessary to "accommodate important economic or social development in the area in which the waters are located." This is clearly the case as the expanded capacity will allow more intensive development in otherwise accessible, suitable areas, especially town centers and existing industrial/commercial areas where septic systems are infeasible or consume much land in leaching fields. These are areas where needed population and employment/tax base growth is constrained by septic disposal limitations and sensitive water resources.

The added 2.5 MGD in permitted discharges would allow vacant accessible, suitably-zoned land in the City and in towns such as Avon, East Bridgewater, Easton and West Bridgewater, to be productively developed, creating jobs, and adding to the local commercial/industrial tax base. Our communities need the increased flow limit to develop rationally and responsibly.

The second requirement is that "no less environmentally damaging alternative site for the activity, receptor for disposal, or method of elimination of the discharge is reasonably available or feasible." This is confirmed by the recent (2012) "Upper Taunton River Regional Wastewater Evaluation Report" which sought to return treated effluent from several regional AWRFs to its point of origin for reuse, recharge or treatment in augmented wetlands, and found few suitable locations in the served or potentially-served communities.

It is important to allow the communities to make the best use of the upgraded treatment and the resulting added capacity at this regional facility, thereby making efficient use of existing infrastructure and allowing needed economic growth.

For these reasons we seek your support in raising the Permit's limit from 18.0 MGD to 20.5 MGD. Attached please find supporting documentation. Thank you for your consideration of this request.

Response I.1.

As referenced by the commenter, Brockton’s 2005 permit contained a limitation on the amount of flow that could be received by the AWRF from the Towns of Abington and Whitman. Since that time, significant I/I has been removed from the system, dramatically reducing peak and average flows from the Brockton

AWRF below its 18 mgd flow limit and giving Brockton an available flow capacity. Accordingly, the limitation on flow from these Towns has been removed in the draft permit. At the same time, EPA is not authorizing the flow increase given the significant environmental damage that would be associated (See Fact Sheet pages 6-18 and Response A.59 above). In EPA's assessment, a flow limit of 18 mgd while removing the limitation on flow received from neighboring towns is appropriate and is in accordance the Commonwealth's Antidegradation Implementation Procedures.

EPA encourages the Towns of Abington and Whitman to pursue all alternatives for local management of wastewater other than sending more flow to Brockton. Directing flow to Brockton further exacerbates groundwater and stream flow depletion and is inconsistent with the State Water Policy. Furthermore, the economics of this practice may shift in the future given the potential for increasing effluent dominance of the Salisbury Plain River, which will likely necessitate more stringent permit limits (and increased costs of compliance) going forward.

J. Tim Watts submitted comments (undated).

Comment J.1.

We submit these comments for NPDES Permit MA0101010 City of Brockton Sewer Plant. While our comments will be in support of this permit we recognize that the limits and demands of this permit though much improved over the last will not alone or immediately cure the ills inflicted on a significant portion of the Taunton River Watershed by the Brockton Sewer Plant discharge. The receiving waters will fail to meet assigned water quality standards directly because of the discharge of Brockton Sewer Plant. EPA does a good job in this permit of finally acknowledging this fact that the Brockton discharge is in fact doing what is obvious to both the eye and nose. Aldo Leopold's words of wisdom in Thinking Like a Mountain "Only the ineducable tyro can fail to sense the presence or absence of wolves" applies well here on the banks of our river, for even an ineducable tyro strolling haplessly along the river bank would not fail to sense the grayish green, stinking of sewer.

The very word sewer is perhaps the most relevant of all the many words written by all parties in regard to this permit. The CDM Brockton Receiving Waters Assessment 2011 sampled several sites from upstream of the plant on downs tream. The field data sheets prepared and filled out by the survey staff of CDM begin at the sample site Salisbury Plain River Sergeants Way Bridge in Brockton upstream of WWTP. At this site no odor of sewage was noted in the corresponding box for sewage odor. At each and every sample site on the mainstem Salisbury Plain and Matfield Rivers downstream of the plant the surveyors noted in the appropriate box of the field data sheet that the river did indeed smell like sewage. This leads to the simple question? Can a river which smells like sewage because of a permitted discharge meet the demands set forth in the Clean Water Act? Is a permit which allows a receiving water to continue stinking like sewage a legal permit in the eyes EPA? When both professionally gathered data and all anecdotal observations clearly demonstrate that the receiving water is in violation of its Water Quality Standard due to a permitted discharge should the permitted party be permitted to increase the volume of flow? We think not.

We are also pleased to see and support the flow limit established in this permit. We fought hard throughout the previous permit process to prevent surrounding communities from pig piling onto the "upgraded" Brockton Sewer Plant. Knowing that once allowed in it would be very difficult to remove them even when the river declined further. This flow limit is a good start and future permits will likely require further flow reductions to reach the goals set forth in the CWA.

At the public hearing regarding this permit Brockton and surrounding communities continued their infantile blubbering about a "regional solution" for their alleged sewer woes. A cadre of Brooks Brothers clad clowns for hire sallied forth to the microphone bemoaning the proposed flow limit which they claimed would surely prevent their respective communities from growing and prospering. Meanwhile several miles away in the Town of Easton two significant development projects are prospering. One completed, Shovel Shop Village in downtown Easton which has its own treatment plant discharging to the ground. This was a collaborative project which not only services the development project but a section of downtown Easton which was in need of sewer service. Currently, another project at Quesett Village in Easton is underway with a similar plant being constructed.

The point being there are alternatives and real regional solutions which can and will serve both our economic needs without destroying our precious environments. EPA needs to hold down the fort regarding this flow issue. Additional flow to the receiving waters from this plant is not permittable for these reasons and the many established by EPA in the fact sheet of this permit.

We also support the phosphorus and nitrogen limits in this permit. Will they be stringent enough? In the case of nitrogen the discharge in Brockton as EPA demonstrates must be addressed as a significant contributor to the ills of Mount Hope Bay even though its distance by land makes it appear far removed. Any arguments to the contrary simply do not stand the test of scientifically gathered data or common sense.

We also are encouraged to find language in this permit regarding "emerging contaminants" endocrine disrupters, pharmaceuticals and so on. Having spent many days fishing the rivers downstream of the Brockton Sewer Plant, specifically the area of the confluence of the Matfield and Town Rivers and the Taunton River at the outflow of Nemasket River something appears to be at work in the water beyond sampled and regulated contaminants. The Matfield River and upper Taunton River despite good habitat simply do not support the numbers and diversity of aquatic species that both the Town and Nemasket Rivers which are not overwhelmed by effluent do. Even generalist fish species like largemouth bass and panfish which can survive and even thrive in eutrophic waters are few in the Matfield and Taunton. Many times I have paddled and fished down the Taunton through its dingy sewer smelling waters with little luck only to arrive at the mouth of the Nemasket with its clear tea stained water to find fish by the many. Something is wrong with the water here beyond conventional pollutants perhaps?

While we recognize that these are anecdotal observations the CDM Brockton Receiving Waters Assessment 2011 docs support these observations in the Matfield and Salisbury Plain. As EPA establishes in the fact sheet the upper Taunton is also dominated by the same wastewater which limits the receiving waters.

We recommend that Brockton at the very least begin in this permit cycle data collection at the plant to determine what type and what levels of these emerging contaminants are in the effluent pre discharge. As EPA points out "There is no data available for such contaminants for either the Brockton AWRF or the receiving water". We believe it's reasonable to assume Brockton AWRF is not going to step forward and voluntarily begin data collection for emerging contaminants. Therefore if in fact emerging contaminants are a "further concern" of EPA should EPA incorporate language in this permit to induce Brockton AWRF to collect and make that data available? We think the answer is yes!

In closing we do not intend to sound flip in our comments about those that support more flow to the Salisbury Plain River. This is no joke. I have poured countless hours of my life into this process over the years without receiving a single penny and will gladly do it again and again till the job is done. However, when I sit in the front row of a public hearing listening to a for profit mouth piece disrespect a man that I have great respect for, Dave Pincumbe. When that man wearing an arrogant smirk suggests for profit that Dave and his coworkers may not know a swamp from a river, it's then high time for true words to be spoken, exposing the Brooks Brothers clad clowns for what they are. The simple fact is that the river and folks like me are put at great disadvantage because this process about the river takes place far away from the river.

Back in 2005 my brother and I appealed the predecessor of this draft permit. We apparently did something right because I received a call from Dave Pincumbe about negotiating a settlement of our appeal. We met by the river, Dave, Samir Bukhari, Doug Watts and me. By the riverside there could be no debate about the state of the stream, the color and smell said it all. The stream is no different today. If these folks from the Mayor’s office, from Old Colony Planning Council, from the Easton Council of Greedy Dirtbags had to sally forth to the river bank during August low flows to plead their collective cases they would be exposed for what they are, for how I have characterized them. It's really that simple. It needs to be said. They need to be exposed. They need to have their words reflected back at them by the waters which they greedily foul, otherwise they warp the reality, change the baseline, alter how future generations will know and relate to our ever dwindling precious wild places and creatures.

I am submitting as part of these comments some photos of the river during low August flows 2014 along with the copies of the data sheets from the CDM 2011 assessment just to keep it real.

[Note: these attached documents were reviewed by EPA but not reproduced herein]

Response J.1.

EPA acknowledges the commenter's support of both the nutrient limitations as well as the decision to deny the flow increase in this permit reissuance. These comments are included here as part of the administrative record. Regarding the concern that the 18 MGD wastewater effluent flow limit is already too high given conditions in the receiving water, EPA has noted that future flow reductions may be necessary if water quality remains impaired. See Response D.1. EPA also concurs with the comment that the odor of sewage is not consistent with Massachusetts Surface Water Quality Standards applicable to the receiving waters. If this condition persists, further treatment and/or flow reductions may be necessary.

The Town of Easton is a good example of addressing wastewater needs in a more sustainable and cost effective manner over the long term. See Response I.1.

Regarding emerging contaminants, EPA agrees that, in this effluent dominated stream, emerging contaminants pose a particular concern to aquatic life. EPA has decided to require monitoring and reporting to better determine what level of emerging contaminants are present in the discharge. See Response C.3 for more details of these requirements.

K. Transcription of Oral Comments from the Public Hearing on March 24, 2015.

Comment K.1.

MR. GIAQUINTO: Good evening, everyone. My name's Nick Giaquinto.

I'm here on behalf of Brockton Mayor, Bill Carpenter, tonight, who unfortunately couldn't make it. He's feeling a little bit under the weather. Sends his regrets. So, I'd like to just take this opportunity to read a statement into the record on his behalf.

The City of Brockton is preparing detailed comments on the subject Draft Permit and will be submitting them separately in accordance with the requirements of the public notice. In conjunction with this public hearing, the City has developed these preliminary comments for the record.

In conjunction with the City's prior NPDES permit renewal, a consent agreement was negotiated with DEP and EPA under which the City committed to extensive collection and treatment system upgrades. The City has committed over $100,000,000 for the completion of this program and a consent agreement was terminated in 2013.

The City has gone above and beyond the requirements for this program in making continued improvements. The completed program has provided substantial one to one reduction, decrease flows and significant improvements in operational efficiency, flexibility, capacity and effluent quality at the City's Advanced Water Reclamation Facility.

In completing this work, the City worked closely with the EPA and DEP, especially during the development of a regional wastewater needs study performed in conjunction with the regional planning authority. In partnership with DEP, the regional wastewater study for the Upper Taunton River Watershed identified needs for wastewater collection and treatment for neighboring communities. The Executive Office of Energy and Environmental Affairs documented that the acknowledged 20.5 million gallon per day capacity of the plant would not increase potential pollutant leading to the Taunton River and would not increase environmental impacts.

The City has been proactive in demonstrating a commitment to compliance with the current permit, including ammonia limits and significant improvements in nitrogen removal that meet the anticipated limits in the City of Taunton's permit.

Brockton has been following the Taunton process closely as this permit establishes the basis for purported impacts of Brockton's Advanced Water Reclamation Facility. The Draft Permit requires more extensive commitments from the City of Brockton to address further reduction of phosphorous and nitrogen. And the scientific basis for these requirements is concerning.

The City also has concerns over onerous testing requirements that are included in the Draft Permit, included as a possible avenue for the City to pursue in conjunction with our standard request that the permitted flow reflect the design capacity of the Advanced Water Reclamation Facility.

We are not aware of any other community that is faced with such extensive testing requirements. The City appreciates the opportunity today to provide these preliminary comments and a more detailed submission with further questions will be forthcoming under the public comment period.

Thank you.

Response K.1.

The issues raised in this oral comment have been addressed in the written comments submitted by the City of Brockton (see Section A above) and William Carpenter (see Section I above) and EPA's responses to those comments.

Comment K.2.

REPRESENTATIVE DUBOIS: Good evening. And thank you so much for having this information session and public comment period.

My name is Michelle DuBois. I'm a State Representative, the 10th Plymouth District. I represent right around 30,000 residents of Brockton, the whole town of West Bridgewater which is -- well, close to 7000 people, and a little over 3000 people in the town of East Bridgewater.

So, I'm a lifelong Brockton resident. I have been a City Councilor in Brockton for five terms. I'm currently finishing up my fifth term, 10 years. So, I'm familiar with the system. I'm familiar with many of the issues that have been raised over these last nine years with some problems with Brockton actually reporting the amount of pollution coming out of the incinerator to the DEP. I believe, that happened a couple of years ago. I'll be happy to follow up with written documentation of that.

I definitely would not want you to decrease testing for pollution in this permit. I'm really happy that I heard in the information session that you are requiring additional stipulations and requirements to make sure that the water coming out of the treatment plant is cleaner. I think that's great.

There are people that depend on the water down the river and for many other environmental reasons, it's good that you're making the water clearer.

My concern here today is with the incinerator, and by making the water cleaner, the amount of incineration that is going to happen at the site. And the amount of pollution that is then going to be borne by the people that live in the community.

Brockton, for more than 10 years, has been in the 10 top communities for asthma hospitalization of children. Our ozone level is high. The PM2.5 pollution level in the air is high.

So, I am extremely concerned about any expansion of incineration at this location. It would be my opinion that we should get rid of the incinerator, period.

I don't know. That seems like it's going to be a long term solution, long term coming to actually getting rid of the incinerator and finding a different way to deal with the cake. Be it making it a commodity and selling it and actually making money for it.

But, Brockton is an Environmental Justice community. And that means that not only is it a large community that has a big population of people of color and low income people and people with low education attainment levels, it means that we have many pollutants.

I think, that we have -- the average community has 80. And we have more than 300 something Brownfields sites. And so, it's a very polluted community.

So, I'm happy that you're making the water cleaner that's leaving the city and going into different parts of my district and further down the river to different communities in Massachusetts. But, by making the water cleaner, if you're making the air, that my constituents who already deal with disproportional air pollution burdens, worse, that is a huge concern for me.

And I know that it's hard for you to balance them both. And you're trying your best. But, I just want you to be cognizant that Brockton has huge air problems, air quality problems.

So, I'm very nervous about expanding this permit if it's going to increase the amount of air pollution that my constituents have to breathe every day.

So, I will follow up with written comments on this. I appreciate your time and your attention to this.

Thank you.

Response K.2.

The issues raised in this oral comment have been addressed in EPA's response to the written comments submitted by Michelle DuBois (see Section C above).

Comment K.3.

MR. WATTS: My name is Tim Watts. I actually live in Wareham, Mass. But, I grew up in Easton. And I've been pretty active in the river for the past 15 years or so as I grew up hunting and fishing in this area, you know, and in the rivers.

And I think, if this meeting were to take place in August of this year, down by the riverbank, we would all see how effective the treatment plant is, because the river was a disgusting mess. It stunk. It was gray green and gunky and disgusting.

And things would be a lot clearer if we stood by the river and had this talk. But, we can't do that. So, I kind of tried to bring the river here so that we can be factual about what's actually going on here.

I support the permit as it is. It's not perfect. But, it begins the process of fixing what's been wrong for quite a few years here. There are alternatives to put water in other places. Over in Easton, they've built two small treatment plants now. Development is taking place. They build these little package plants. They discharge it to the ground. It works. It's a way to take water and put it into the river. You put it back in the ground where it belongs.

The technology is there to do these things. We do not and cannot, under the law, as it's written in the Clean Water Act, continue to sluice water down a river that's already not meeting its water quality standard.

I mean, to increase the flow from 2.5 million gallons to 20.5 million gallons is just absurd when you stand next to the river and see what it looks like. And the pollution, it's just -- it's over the top.

And my brother and I appealed this permit last time it came out way back in 2005. And we were successful in our appeal. And our success was a product of us making that simple point of saying, look at the river. You tell me. That's what we said to Dave Pincumbe in his office. We said look at the river. You tell me.

And so, I'm sitting here tonight. I'm going to file written comments obviously saying that this is a good permit. It's a good start. It gets things moving in the right direction. And we need to start looking for ways to put this waste water in other places other than the river, because it doesn't work. And it's not going to work.

And people are watching now. 10 years ago, when I first got -- 15 years ago, when I first got involved in this, people weren't watching. People are watching now.

The Taunton River is a Wild and Scenic River federally recognized. People are paying attention to it. And people aren't going to pay less attention. They're going to pay more attention.

And as they pay more attention, it's going to put more demands on the City of Brockton to fix what's broken. And they can do it cooperatively, or they can not cooperate. They can spend money to fight it or they can spend money to fix it.

There's a whole boatload of people that are willing to cooperate, willing to help out, willing to make it work. And that's all.

Thank you.

Response K.3.

The issues raised in this oral comment have been addressed in the written comments submitted by Tim Watts and EPA's responses (See Section J above).

Comment K.4.

MS. RUBIN: Good evening. My name is Staci Rubin. And I am the Senior Attorney and Director of the Environmental Justice Legal Services Program at Alternatives for Community and Environment located in Roxbury, Massachusetts.

ACE is providing legal services to residents in Brockton, West Bridgewater and East Bridgewater regarding Environmental Justice matters in Brockton.

I intend to submit written comments by April 20th on behalf of a group of residents. However, my comments tonight are strictly on behalf of ACE.

Thank you, EPA and DEP, for holding tonight's public hearing at a convenient location and during the evening. And I appreciate that EPA also granted and held an information meeting prior to the public hearing tonight.

There are four main points that I'd like to cover today. First, I am concerned that there's going to be a possible pass through of industrial chemicals to the Advanced Water Reclamation Facility and discharged into the Salisbury Plain River. And those chemicals are not being adequately monitored based on the Draft Permit.

Two, I am concerned about an increased flow rate and support keeping the lower number which is in the current Draft Permit.

Third, I am concerned about the poor performance of the sludge incinerator and the associated negative public health impacts, and think that the Draft Permit does not address those concerns.

And fourth, I'm concerned that there is going to be a potential increase in the temperature, the thermal temperature, which could negatively impact the receiving water and the ecology.

As the federal government and state government is aware, there are multiple industrial dischargers to the AWRF. Those present multiple Environmental Justice concerns.

ACE has gone on record opposing Brockton Power, the proposed power plant that may be cited. The power plant, if operational, will be permitted to discharge approximately 350,000 gallons per day of waste water from sanitary and industrial facilities that will contain many pollutants, including mercury. And these pollutants will be discharged to the Advanced Water Reclamation Facility.

The power plant's proposed use will have many significant impacts. The addition of hundreds of gallons of waste water daily to the AWRF, which is already at over capacity during significant rain storms, could potentially increase the AWRF's discharge of untreated or only partially treated waste water to the Salisbury Plain River.

And second, it would add flow to an already flood prone small river. The Salisbury Plain River has historically flooded during significant rain storms and has flooded mobile home communities just south of the facility site.

On an average annual basis, Brockton Power, the proposed power plant's use of the AWRF effluent would reduce the discharge to the Salisbury Plain River. And we have concerns about that.

There could be many cumulative impacts. And we'd like to see a Response to Comments that addresses this issue.

Secondly, the flow rate, we support adding the limit to the flow rate and do not want to see a higher flow rate in the Final Permit. We have significant concern that, if there is a higher flow rate, there is likely to be an increase in the amount of sewage sludge that will be burned on site.

Regarding the sludge incineration, we think that the existing incineration process produces multiple environmental injustices. And we would like to see an Environmental Justice analysis specific to the sludge incineration issue. Odor issues have occurred in the past related to the incineration. And we think the existing incineration standards in the Draft Permit are not stringent enough.

We would like to see at least required monthly monitoring from the stack performance test. And we want to make sure that the amount of sludge that is produced is reduced over time.

The Environmental Justice analysis should address the fact that there could be alternatives to sludge incineration, and to consider phasing out the use of the incinerator.

Finally, in addition to the issues I've just discussed, I am concerned that the Draft Permit is inadequate because of the failure to consider climate change impacts. Section 316A of the Clean Water Act requires EPA to consider the change to the ambient water temperature in the receiving water because of effluent discharge.

With the addition of the power plant and other industrial dischargers, the thermal temperature of the discharge is likely to increase. And we'd like to see an analysis of how that will be addressed in the Final Permit.

And we request that the Final Permit include a commitment to at least a biannual inspection by EPA and DEP to look at the facility and ensure that it is complying with both federal and state law.

In conclusion, I hope that the EPA and DEP recognize the Environmental Justice consideration proposed by the AWRF Final Permit.

And I thank you for the opportunity to comment.

Response K.4.

The issues raised in this oral comment have been addressed in EPA's response to the written comments submitted by ACE (See Section G above).

Comment K.5.

MR. CIARAMELLA: Good evening. My name is Pat Ciaramella. I'm the Executive Director of the Old Colony Planning Council. And I'd like to welcome you to Brockton.

This is something that we've been working on for many, many years with our constituents. We are a regional planning agency. And we have 16 communities, including the city of Brockton and all the communities around Brockton.

And about a dozen years ago, the communities came to us asking for help. They had all done waste management studies in their region. And some of them didn't even have any solution on how to deal with them.

And that's one of the reasons we were able to get some money through DEP and the City of Brockton to do a feasibility study about three years ago, which we will be -- we're in the process right now of reviewing your report. We'll have written comments and we'll have all the supporting documentation that we'll submit to you.

But, the communities that I'm talking about that we've been working with is the city of Brockton, the town of Avon, Easton, East Bridgewater, West Bridgewater, of course the town of Abington, Whitman and also the town of Stoughton. The last three towns are part of the system now.

But, the town of Avon, Easton, West Bridgewater and East Bridgewater, they came to us asking for help on how to deal with the economic development. Because, ultimately, a lot of their industrial commercial areas were built out. It was mostly warehouses. They'd like to build more like office buildings and that kind of stuff in their community just to sustain themselves economically.

As part of that study, it came out that it was feasible to increase the capacity to 20 million gallons, 20.5 million gallons. What we did is, through the MEPA process, filed a notice of project change which we submitted to the state. And the state did approve the 20.5 million.

And just for your information, we'll be requesting that you reconsider increasing the capacity to 20.5 million. And as I said, we'll send written comments and all the supporting documentation.

Thank you.

Response K.5.

The issues raised in this oral comment have been addressed in the written comments submitted by Mr. Ciaramella (among others) and EPA’s responses (See Section I above), as well as Comment A.60 (submitted by the City of Brockton) and EPA’s response.

Comment K.6.

MR. BOSCO: Hi. My name is Jim Bosco. I'm a resident of Brockton.

I had mentioned before that the Mayor had signed an agreement to sell 2 million gallons of the effluent from the sewer treatment plant under its current permit. And the net would mean that the actual increase to the current permit would be about 1.5 million gallons a day.

So, my question was, I don't understand the need for an additional 2 million gallons a day until the growth in that existing 1.5 million gallons a day is used up.

Having said that, for economic development, I think we should look towards the state leader, the MWRA, which finds ways to reduce the flow of water to its sewer treatment plant because water is a precious commodity. And we should look at ways of conservation first and quality of water before we look at just quantity of water.

MWRA has proven that, through partnership with businesses that they've found ways of reusing this in such large developments and commercial users of water to conserve both the drinking water consumption and the water that has to be treated and discharged to Boston Harbor.

So, I think, that's an idea that not only Brockton, but all communities should try to look towards that leadership in the state to find ways. It was mentioned that, you know, that you're taking water from one community and discharging it to another, whether that's a, you know, interbased transfer.

I think that Brockton can improve its collection system in ways that will reduce the flow even further. I mean, that's the first thing we should be looking to, to not only, you know, -- gives us the economic development right there. There's a finite number of water per day that's being leaked into the system that's not from the users.

So, Brockton has proven in the past, a decade ago, that it had the ability to reduce that infiltration by millions of gallons a day. And I think, through that continued effort, they can partnership with economic development, and through conservation, find ways of dealing with water, which is a precious commodity. It's not something that we can redevelop. It's a finite effort.

And as mentioned, if you look to the western part of the United States, where they've suffered severe droughts, I think that, you know, you have to look to the future of how you deal with the commodity that we have. And through large developments, such as power plants that want to use water and claim it might be a green effort, by actually evaporating millions of gallons a day in their process, I think that technology today, through that, whether it be other large economic developments, if you look to the models that the MWRA has developed, you know, collecting rainwater systems in today's designs for use on their properties, whether it be for irrigation, toilet use, you know, toilet use for flushing, there are ways that we can improve our infrastructure and our mind set on how we consume that commodity and how we deal with it, before we just say let's just increase a permit because of the sake of, you know, economic or profit.

I think, there's a balance that was mentioned. And I think, partnership would go a long way. But, I think that, when it comes to the Department of Environmental Protection and the EPA, there's a responsibility that they're required to follow to basically develop those guidelines. Because, when left for economic development or business, profit will drive certain economic developments.

And that's why it falls on the shoulders of departments to steer policies to guide business. Where the free market would freewheel. And if it was left up to the market, would be discharging 30, 40 million gallons a day.

So, there is a partnership. And it comes down to looking at ways that business may not look at today.

But, if you look at the state models, they're already existing not only in Massachusetts, but across the country. And I think that that has to be pushed forward through policy.

Thank you.

Response K.6.

EPA acknowledges the support from this commenter regarding EPA's position on the flow limit and agrees that EPA must continue to be involved in partnership and coordination with state regulatory agencies, municipalities and businesses.

Comment K.7.

MR.KOURUFUS - Hi. My name is Charles Kourufus. I'm here with my cousin tonight. We're some property owners over in the town of Abington.

Back in the late '90s, my uncle purchased about 40 acres and started a subdivision. He went through the process of getting a set of plans and starting the road, only to have the rug pulled out from underneath him and have the permits taken away from, you know, being able to hook up to the sewage. We've had this property in limbo for years now.

And there's nothing we can do with it. It's been a great financial hardship on our family. And I'm sure there's hundreds, if not thousands, of people throughout Abington and Brockton that they're in the same boat as us. They've got a piece of property over there that they just can't do anything with. And it's sitting idle and it's just costing money and taxes on these people.

Thank you.

Response K.7.

As mentioned in Response I.1 above, Brockton's 2005 permit contained a limitation on the amount of flow that could be received by the AWRF from the Towns of Abington and Whitman. Since that time, significant I/I has been removed from the system, substantially reducing peak and average flows from the Brockton AWRF below its 18 mgd flow limit and giving Brockton an available flow capacity. Accordingly, the limitation on flow from these Towns has been removed in the draft permit.

EPA encourages the Towns of Abington and Whitman to pursue all alternatives for local management of wastewater other than sending more flow to Brockton. Directing flow to Brockton further exacerbates groundwater and stream flow depletion and is inconsistent with the State Water Policy. Furthermore, the economics of this practice may shift in the future given the potential for increasing effluent dominance of the Salisbury Plain River, which will likely necessitate more stringent permit limits (and increased costs of compliance) going forward.

Comment K.8.

MR. COONEY: Thank you. I'm Chris Cooney, President of the Metro South Chamber of Commerce.

We are comprised of about 1,000 companies within communities. The vast majority of the companies are located in Brockton. But, we have business representation from all of the surrounding communities.

We recently hired the U Mass Donahue Institute which is an economic development institute to do a study of working smarter and in terms of a region as it relates to water and sewage. And that study is 95 percent complete. And I have a draft here. I will be submitting that for your consideration.

But, some of the interesting notes that they pursued in the study are around working collaboratively and gaining economies of scale.

They specifically looked at models within New England, like New Haven, Hartford, even locally here in Mansfield, where they have created systems that service the local community, that do it in an efficient way and better than could be done otherwise as individual communities and individual property owners and ultimately, create a more sustainable system of dealing with water and sewage.

We're talking about sewage here, I realize. But, this study will have both pieces, because they're obviously interrelated.

I'm here to speak in favor of the Mayor's perspective on this and local governance, both our local, and you've heard from our regional, Pat Ciaramella, and our state DEP have recommended a 20.5 gallons per day flow rate. And as a business community, we support that.

One, in recognition of the repairs that have been made to the facility and the reinvestment that's been done.

Secondly, in the spirit of what has been going on in the city of Brockton which is a rising star, which has a high quality of life, which is geographically located in a superior region of the state, with very high education levels, very high incomes, and really, within a direct link to the capital of New England, Boston, within 18 miles. We have the most affordable housing and commercial property within 18 miles of Boston.

And that's positioned us very well to grow in a dramatic and impressive way. Especially, given the public investment which is the irony here. The public investment that's been made in terms of transportation, in terms of infrastructure improvements. And all of that followed the initial investment made in conjunction with the Army Corps of Engineers and the EPA and our grandfathers and mothers, who put this plant in place so that we wouldn't have to deal with this issue.

I recognize things change. Technologies change. But, this system was really a bold move to handle these needs of our region, and their sons and daughters and grandkids, which we all have procreated and added to the pressure on these systems.

However, it's the best viable option at this point. The Chamber's all in favor of identifying ways through the EPA to make this system work to the best of its ability. But, we also recognize that it's an essential human need to dispose of waste and also to grow economically.

So, we endorse the 20.5 million gallons based on those reasons. I look forward to presenting you the study with best practices highlighted and contained in the report. And we hope for a permit that will allow both high quality of water, but most importantly, the capacity to have us grow and be able to economically support the debt that's been taken on to repair the facility which is $100,000,000 and have enough money to maintain the ever increasing standards that EPA and DEP are placing, probably rightfully so, so that we have a sustainable water supply.

But, the money's got to come from somewhere. And in order to create the economies of scale, in order to create the critical numbers that are required to maintain a first rate system in this city that will service the region, we are supportive of this permit being moved to 20.5 million gallons.

Thank you.

Response K.8.

The flow issue raised in this oral comment has been addressed in the written comments and EPA's responses above (See Comments and Responses A.60, A.61 and B.1).

Comment K.9.

MR. HANSON: Good evening. My name is Jeff Hanson. I live in North Easton.

I just wanted to make a couple of points here. I came in at the late part of the informational session there, but I heard the word decentralization, that that's really kind of what the focus is.

I've lived in the town of Easton for over 30 years. I'm a Brockton resident before that. So, I've had public sewer system. And then, I had to go to a septic system.

We have a problem in Easton with septic systems. No matter what we'd like to think, the bottom line is that they do pollute the aquifers. And we've had a problem with that.

And that's why we're going to smaller plants in Easton now. Doug King is building one. The town has built a couple of them. We're kind of trying to get it all into one place rather than going into groundwater discharge. It just doesn't work on the average home.

So, we need to get away from that.

The second point I'd like to make is that there's this misconception. I'm also the developer of the Aquaria Water Plant, the desalination plant. I spent a good part of my working life permitting that thing.

It's up and running right now. It's not running at capacity for many reasons. But, I've studied this issue quite a bit as far as water supply.

Groundwater is not stagnant. If you don't pump it out of the ground, it goes to the ocean. No matter what anybody thinks, it's all going to the ocean.

The city of Brockton, for example, is 200 feet higher than the ocean. Anything that's in the ground is flowing downhill. It makes its way to the Taunton River and it goes out into the ocean.

So, this notion that water is kind of hanging around here and we've got to conserve it and save it is a misconception. Because it doesn't stay. It moves out.

The Aquaria plant on the other hand, does grab it, just as it's moving out and ships back and forth, back to Brockton, for example. And back in, I don't know, about two years ago, we had a meeting talking about regional water supply and regional waste water supply.

And one of the concepts that we talked about and I raised was the concept that, what if we increased the discharge from the Brockton plant, but at the same time, replaced every gallon from the desalination plant which is taking water out of the Taunton River. We put a million gallons in in Brockton. We take a million gallons out in the Taunton desal plant and we ship it back to Brockton. We've got a nice closed loop here.

So, we have a great opportunity to do that. And towns like Easton are suffering and need help. We're about to have a meeting over there in the comprehensive waste water management plant. And part of their plan is to send water to Mansfield and hopefully send water to Brockton.

But, if it gets turned off and we can't do that, we have a serious problem there.

The town is growing. All towns around here are growing. And that produces more sewage. Whether you like it or not, it's got to go someplace.

So, I hope that you look favorably upon this, because the towns need it. Now, if there's a problem with the sludge disposal, there's solutions to that. We can keep the sludge out of it.

Many towns, and I happen to have another house in Vermont, and we have basically a leachate only system up there. The way -- the solid waste goes one place and the water goes to the treatment plant. And that's all that goes to the treatment plant is the water, the leachate.

We could do something like that. We could think about that. But, I wouldn't -- I hate to use this term, throw the baby out with the wash water here, let the incineration be the big problem.

We can deal with those kind of issues, I think, with a little bit more money, of course. But, I hope that you give strong consideration to allowing Brockton to increase this supply, this capacity, because, not only Easton, but the other towns around here are suffering because they are growing and they need some place to put the sewage, because we're polluting the aquifers.

And that's going to happen. You can't stop it. There's no law to stop that. And I think there's ways to deal with this.

But the step one is, we've got to send the water someplace. And Brockton is the ideal place to send it.

So, I thank you for your consideration. I hope that you'll take that to heart.

And I'd be more than happy to talk to anybody if they want to talk about it further. I think, my contact information is there. And I appreciate it.

Thank you.

Response K.9.

EPA agrees that there are complex interactions between surface water, ground water, drinking water, and sewage. Although EPA has not granted the flow increase for the Brockton AWRF, EPA notes that significant I/I has been removed from the system, substantially reducing peak and average flows from the Brockton AWRF below its 18 mgd flow limit and giving Brockton an available flow capacity. EPA commends the City for its efforts in this regard.

Comment K.10.

MS. ARCHARD: Good evening. My name is Kate Archard. I'm a resident in the city of Brockton. I'm also on the Brockton Water Commission.

I'd like to talk about two issues that are of concern to me. In terms of the water that's coming through the system, Brockton has three very large hospitals. And I didn't see anything in the Draft Permit, and I didn't go over it with a fine toothed comb, but about endocrine disruptors and any other kind of pharmaceuticals that are coming through the system there.

That also gets into the biosolids. Incinerating the biosolids I think is unfair to the folks, the thousands of people in that area. You're talking about increasing capacity that means increasing the incineration. And without oversight.

There won't be an alternative as much as Brockton says that they'd like to do something else without the EPA and the DEP's guidance. I'd like to see that incinerator decommissioned. It's old. It's grandfathered in.

But, it's not going to be gotten rid of unless there's a great incentive there.

I also wanted to talk about the issue of the effluent being turned into cooling tower vapor and make up.

There doesn't seem to be any information on aspirating effluent. What kind of an impact, cumulative health impact, does aspirating effluent have on the people in that area? Again, this is a densely populated Environmental Justice area with people outside and pets outside. What happens when they breathe in mist that's made of effluent?

I think, the EPA and the DEP have to look at that. I couldn't find any studies on what the impact of that is. It's as if nobody even cares about that. They look at what corrodes the machinery, but they don't look at human beings.

And again, the quality of the water that's going into the Salisbury -- I'm very happy that the fathead minnows are taken care of. But, I would like a little bit more oversight on the impact to human beings, especially in regards to the pharmaceuticals and some other types of materials that's coming through.

Thank you.

Response K.10.

Regarding pharmaceuticals and endocrine disrupting compounds, EPA agrees that, in this effluent dominated stream, emerging contaminants pose a particular concern to aquatic life as discussed in Response C.3. EPA has decided to require monitoring and reporting to better determine what level of emerging contaminants are present in the discharge. Also see Response C.3 for more details of these requirements.

Regarding air quality from the incinerator and the potential Brockton Power plant, both will be required to operate in accordance with all applicable regulations, and not "without oversight." If the permittee is not able to comply with these applicable regulations, they will be required to seek alternative sludge disposal options. For more details regarding the incinerator, refer to Response C.2 above.

L. The City of Brockton submitted supplemental comments dated June 17, 2015.

Since these comments were submitted after the close of the comment period, they have not been reproduced in this response to comments document. However, EPA did review the supplemental comments and determined that they do not impact any conclusions made by the Agency. The supplemental comments include a May 1, 2015 letter from Brian L. Howes addressing the use of the "sentinel site approach" and MHB16 for predicting nutrient effects in the Taunton estuary, both of which have been addressed in Responses A.4, A.5, A.16, A.23 A.36 and A.39 above.

ATTACHMENT A – SALISBURY PLAIN RIVER SITE VISIT MEMO

To: File, Brockton WWTP, NPDES No. MA0101010

From: David Pincumbe, Team Leader Massachusetts Municipal Permits

Date: July 11, 2016

Re: Salisbury Plain River Site Visit

Michael Cobb and I did a site visit to the Salisbury Plain River on 7/7/16 to make visual observations upstream and downstream of the Brockton discharge. We accessed the river in the vicinity of the discharge through the trailer park located on the opposite side of the river as the discharge.

The owner of the trailer park (Ed Medeiros) discussed in detail with us the flooding issues he has had on his property over many years and his belief that the treatment facility bypasses treatment during some high flow events and forces so much flow through the outfall that it floods his property. He further indicated that when this happens there is evidence of untreated sewage in the flood waters, including fecal material and toilet paper. At significant expense, he has had to construct a berm around his property to prevent flooding.

I indicated that we would pursue the potential that the facility could be bypassing but that what he is seeing (high water levels and untreated sewage) could also be from the municipal storm water system servicing the center of Brockton that is immediately upstream of the WWTP outfall. I will follow up with Todd Borci to see if he has any information on illicit connections to the separate sewer system.

At the point of discharge, the flow significantly overwhelms the small receiving water and causes an obvious eddy flow of wastewater moving upstream. The receiving water has a distinctive gray color immediately downstream of the discharge that persists for several hundred feet. Extensive macrophyte, filamentous algae, and Duck Weed is readily apparent downstream of the discharge, with significant macrophyte growth extending all the way to the beginning of the Taunton River. Upstream of the discharge (Sargent's Way Road), the river is not gray colored and there is minimal macrophyte growth.

The following are pictures taken during this site visit with brief descriptions of the location and observed characteristics of the receiving water:

ATTACHMENT A – SALISBURY PLAIN RIVER SITE VISIT MEMO

#19 – approximately 100 feet downstream of the discharge - gray color and extensive macrophyte growth.

#24 – approximately 250 feet downstream of the discharge - gray color and extensive macrophyte growth.

ATTACHMENT A – SALISBURY PLAIN RIVER SITE VISIT MEMO

#30 – approximately 300 feet downstream of the discharge - gray color and macrophyte growth on every available surface.

ATTACHMENT A – SALISBURY PLAIN RIVER SITE VISIT MEMO

#35 – approximately 500 feet downstream of the discharge - gray color, extensive macrophyte growth, Duck Weed and trash.

ATTACHMENT A – SALISBURY PLAIN RIVER SITE VISIT MEMO

#37 – upstream of the discharge (Sargent's Way Road) – normal color, minimal macrophyte growth and no Duck Weed.

#42 – approximately 2.5 miles downstream of the discharge (North Central Street) - extensive macrophyte growth.

ATTACHMENT A – SALISBURY PLAIN RIVER SITE VISIT MEMO

#48 – just below where the Town River and the Matfield River form the Taunton River (Rte. 104 bridge) - gray color no longer apparent but macrophyte growth still significant, although less than at sites further upstream.

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),

City of Brockton

is authorized to discharge from the facility located at

Brockton Advanced Water Reclamation Facility
303 Oak Hill Way
Brockton, Massachusetts 02301

to receiving water named **Salisbury Plain River**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein. The Towns of Abington and Whitman are co-permittees for Parts 1.B. Unauthorized Discharges and 1.C. Operation and Maintenance of the Sewer System, which include conditions regarding the operation and maintenance of the collection systems owned and operated by the Towns. The responsible Town authorities are:

Town of Abington	**Town of Whitman**
Sewer Department	**Department of Public Works**
350 Summer Street	**100 Essex Street, P.O. Box 454**
Abington, MA 02351	**Whitman, MA 02382**

This permit will become effective on the first day of the calendar month immediately following sixty days after signature.* This permit expires at midnight, five (5) years from the last day of the month preceding the effective date. This permit supersedes the permit issued on May 11, 2005.

This permit consists of **Part I (**23 pages including effluent limitations and monitoring requirements); **Attachment A** (USEPA Region 1 Freshwater Chronic Toxicity Test Procedure and Protocol, March 2013); **Attachment B** (USEPA Region 1 Freshwater Acute Toxicity Test Procedure and Protocol, February 2011); **Attachment C** (USEPA Region 1 Reassessment of Technically Based Industrial Discharge Limits); **Attachment D** (USEPA Region 1 NPDES Permit Requirement for Industrial Pretreatment Annual Report) and **Part II (**25 pages including NPDES Part II Standard Conditions).

Signed this day of

__________________________	__________________________
Ken Moraff, Director	David Ferris, Director
Office of Ecosystem Protection	Massachusetts Wastewater Management Program
Environmental Protection Agency	Department of Environmental Protection
Boston, MA	Commonwealth of Massachusetts
	Boston, MA

* Pursuant to 40 CFR 124.15(b)(3), if no comments requesting a change to the draft permit are received, the permit will become effective upon the date of signature.

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PART I

A.1. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall serial number **001** to the Salisbury Plain River. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC			**EFFLUENT LIMITS**				**MONITORING REQUIREMENTS** [1]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
FLOW[2]	*********	*********	*********	18.0 mgd	*********	Report mgd	CONTINUOUS	RECORDER
FLOW[2]	*********	*********	*********	Report mgd	*********	*********	CONTINUOUS	RECORDER
$CBOD_5$ [3] (May 1-October 31)	750 lb/day	1200 lb/day	2250 lb/day	5 mg/l	8 mg/l	15 mg/l	1/DAY	24-HR COMP[4]
$CBOD_5$ [3] (November 1–April 30)	2250 lb/day	3750 lb/day	4500 lb/day	15 mg/l	25 mg/l	30 mg/l	1/DAY	24-HR COMP[4]
TSS [3] (May 1-October 31)	750 lb/day	1200 lb/day	2250 lb/day	5 mg/l	8 mg/l	15 mg/l	1/DAY	24-HR COMP[4]
TSS [3] (November 1–April 30)	2250 lb/day	3750 lb/day	4500 lb/day	15 mg/l	25 mg/l	30 mg/l	1/DAY	24-HR COMP[4]
pH RANGE[5]	6.5 - 8.3 S.U. (SEE PERMIT PARAGRAPH I.A.1.b.)						1/DAY	GRAB
ESCHERICHIA COLI [5,6] (April 1 to October 1)	*********	*********	**********	126 cfu/100 ml	*********	409 cfu/100 ml	3/WEEK	GRAB
TOTAL RESIDUAL CHLORINE[7]	*********	*********	**********	11 ug/l	*********	19 ug/l	1/DAY	GRAB
TOTAL PHOSPHORUS[9] (April 1 to October 31)	15.2 lb/day	*********	*********	101 ug/l	*********	Report mg/l	2/WEEK	24-HR COMP[4]
TOTAL PHOSPHORUS (November1 to March 31)	150 lb/day	*********	*********	1.0 mg/l	*********	Report mg/l	1/WEEK	24-HR COMP[4]
ORTHOPHOSPHORUS[8] (November1 to March 31)	*********	*********	*********	Report mg/l	*********	**********	1/WEEK	24-HR COMP[4]
DISSOLVED OXYGEN[5] (April 1-October 31)	NOT LESS THAN 6.0 mg/l						1/DAY	GRAB

Sampling location: 24-hour composites after disinfection; grab samples at foot of aeration cascade.

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A.1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall serial number **001** to the Salisbury Plain River. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC			EFFLUENT LIMITS				MONITORING REQUIREMENTS[1]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
AMMONIA-NITROGEN (June 1 – October 31)	150 lb/day	150 lb/day	225 lb/day	1 mg/l	1 mg/l	1.5 mg/l	2/WEEK	24-HR COMP[4]
AMMONIA-NITROGEN (November 1 – November 30)	946 lb/day	*********	*********	6.3 mg/l	*********	Report mg/l	2/WEEK	24-HR COMP[4]
AMMONIA-NITROGEN (December 1 - April 30)	1,426 lb/day	*********	*********	9.5 mg/l	*********	Report mg/l	2/WEEK	24-HR COMP[4]
AMMONIA-NITROGEN (May 1 – May 31)	450 lb/day	*********	*********	3.2 mg/l	*********	Report mg/l	2/WEEK	24-HR COMP[4]
TOTAL NITROGEN[9,10] (May 1 – October 31) TOTAL NITRATE NITROGEN TOTAL NITRITE NITROGEN TOTAL KJELDAHL NITROGEN	450 lb/day Report lb/day Report lb/day Report lb/day	*********	*********	Report mg/l Report lb/day Report lb/day Report lb/day	*********	Report mg/l Report lb/day Report lb/day Report lb/day	2/WEEK	24-HR COMP[4]
TOTAL NITROGEN[11] (November 1 – April 30) TOTAL NITRATE NITROGEN TOTAL NITRITE NITROGEN TOTAL KJELDAHL NITROGEN	Report lb/day Report lb/day Report lb/day Report lb/day	*********	*********	Report mg/l Report lb/day Report lb/day Report lb/day	*********	Report mg/l Report lb/day Report lb/day Report lb/day	1/MONTH	24-HR COMP[4]
TOTAL COPPER[12]	*********	*********	*********	8.5 ug/l	*********	10 ug/l	1/MONTH	24-HR COMP[4]

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EFFLUENT CHARACTERISTIC	**EFFLUENT LIMITS**						**MONITORING REQUIREMENTS[1]**	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
WHOLE EFFLUENT TOXICITY [13,14,15,16]	Acute $LC_{50} \geq 100\%$ Chronic C-NOEC $\geq 98\%$						6/YEAR	24-HR COMP[4]
Hardness[17]	*********	*********		*********	*********	Report mg/l	6/YEAR	24-HR COMP[4]
Ammonia Nitrogen as N[17]	*********	*********		*********	*********	Report mg/l	6/YEAR	24-HR COMP[4]
Total Recoverable Aluminum[17]	*********	*********		*********	*********	Report mg/l	6/YEAR	24-HR COMP[4]
Total Recoverable Cadmium[17]	*********	*********		*********	*********	Report mg/l	6/YEAR	24-HR COMP[4]
Total Recoverable Copper[17]	*********	*********		*********	*********	Report mg/l	6/YEAR	24-HR COMP[4]
Total Recoverable Nickel[17]	*********	*********		*********	*********	Report mg/l	6/YEAR	24-HR COMP[4]
Total Recoverable Lead[17]	*********	*********		*********	*********	Report mg/l	6/YEAR	24-HR COMP[4]
Total Recoverable Zinc[17]	*********	*********		*********	*********	Report mg/l	6/YEAR	24-HR COMP[4]

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Footnotes:

1. Effluent sampling shall be of the discharge and shall be collected at the point specified on page 2. Any change in sampling location must be reviewed and approved in writing by EPA and MassDEP.

   A routine sampling program shall be developed in which samples are taken at the same location, same time and same days of the week each month. Occasional deviations from the routine sampling program are allowed, but the reason for the deviation shall be documented in correspondence appended to the applicable discharge monitoring report.

   All samples shall be tested using the analytical methods found in 40 CFR § 136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR § 136.

2. Report annual average, monthly average, and the maximum daily flow. The 18.0 mgd limit is an annual average, which shall be reported as a 12-month rolling average. The value will be calculated as the arithmetic mean of the monthly average flow for the reporting month and the monthly average flows of the previous eleven months.

3. Sampling required for influent and effluent.

4. 24-hour composite samples ("24-hr Comp") will consist of at least twenty four (24) grab samples taken during one consecutive 24 hour period, either collected at equal intervals and combined proportional to flow or continuously collected proportionally to flow.

5. Required for State Certification.

6. The monthly average limit for E. coli is expressed as a geometric mean.

7. Total residual chlorine monitoring is required whenever chlorine is added to the treatment process and such sampling shall be representative of the effluent under conditions of chlorine addition. TRC sampling is not required if chlorine is not added for disinfection or other purpose. The limitations are in effect year-round.

   The minimum level (ML) for total residual chlorine is defined as 20 ug/l. This value is the minimum level for chlorine using EPA approved methods found in the most currently approved version of Standard Methods for the Examination of Water and Wastewater, Method 4500 CL-E and G. One of these methods must be used to determine total residual chlorine. For effluent limitations less than 20 ug/l, compliance/non-compliance will be determined based on the ML.

8. The maximum daily concentration values for dissolved orthophosphorus shall be derived from sampling done concurrently with the sampling for total phosphorus.

9. The permittee shall comply with the new 101 ug/l and 15.2 lb/day total phosphorus limits and the 450 lb/day total nitrogen limit in accordance with the schedule contained in

Section F below. The prior permit total phosphorus limit of 0.2 mg/l (April 1 to October 31) shall remain in effect as an interim limit until the date specified in Section F for compliance with the new 101 ug/l total phosphorus limit. Upon the effective date of the permit, and until the date specified in Section F below for compliance with the total nitrogen final limit of 450 lb/day, the permittee shall optimize the operation of its existing treatment facility for nitrogen removal.

10. The total nitrogen values will be calculated by adding the results of the nitrite and nitrate nitrogen and the total Kjeldahl nitrogen sampling.

11. The permittee shall optimize the operation of the treatment facility for the removal of total nitrogen during the period November 1 through April 30. All available treatment equipment in place at the facility shall be operated unless equal or better performance can be achieved in a reduced operational mode. The addition of a carbon source that may be necessary in order to meet the total nitrogen limit from May 1 through October 31 is not required during the period November 1 through April 30.

12. The minimum level (ML) for copper is defined as 3 ug/l. This value is the minimum level for copper using the Furnace Atomic Absorption analytical method (EPA Method 220.2).

    Sampling results in connection with Whole Effluent Toxicity (WET) testing may be used to satisfy this monitoring requirement in those months in which WET testing is performed.

13. The permittee shall conduct acute and chronic toxicity tests four times per year. The permittee shall test the daphnid, <u>Ceriodaphnia dubia</u>, only. Toxicity test samples shall be collected during the second week of the months of February, May, August and November. The test results shall be submitted by the last day of the month following the completion of the test. The results are due March 31, June 30, September 30 and December 31, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachments A and B** of this permit.

    An additional two samples shall be collected and tests completed during days when treatment plant total daily flow exceeds 30 mgd. These two test may be conducted during any month of the year. The results for these tests shall be submitted by the last day of the month following the test in which they are taken. See Permit Attachments A and B, Toxicity Test Procedure and Protocols.

Test Dates Second Week in	**Submit Results By:**	**Test Species**	**Acute Limit LC_{50}**	**Chronic Limit C-NOEC**
February May August November	March 31 June 30 September 30 December 31	Ceriodaphnia dubia (daphnid)	≥ 100%	≥ 98%

After submitting **one year** and a **minimum** of four consecutive sets of WET test results, all of which demonstrate compliance with the WET permit limits, the permittee may request a reduction in the WET testing requirements. The permittee is required to continue testing at the frequency specified in the permit until notice is received by certified mail from the EPA that the WET testing requirement has been changed.

14. The LC_{50} is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 100% limit means that a sample of 100% effluent (no dilution) shall cause no more than a 50% mortality rate.

15. C-NOEC (chronic-no observed effect concentration) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life cycle or partial life cycle test which causes no adverse effect on growth, survival, or reproduction, based on a statistically significant difference from dilution control, at a specific time of observation as determined from hypothesis testing. As described in the EPA WET Method Manual EPA 821-R-02-013, Section 10.2.6.2, all test results are to be reviewed and reported in accordance with EPA guidance on the evaluation of the concentration-response relationship. The **98**% or greater" limit is defined as a sample which is composed of **98**% (or greater) effluent, the remainder being dilution water.

16. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall either follow procedures outlined in **Attachment A (Toxicity Test Procedure and Protocol**) **Section IV., DILUTION WATER** in order to obtain an individual approval for use of an alternate dilution water, or the permittee shall follow the Self-Implementing Alternative Dilution Water Guidance, which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. This guidance is found in Attachment G of *NPDES Program Instructions for the Discharge Monitoring Report Forms (DMRs)*, which may be found on the EPA Region I web site at http://www.epa.gov/Region1/enforcementandassistance/dmr.html. If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachment A**. Any modification or revocation to this guidance will be transmitted to the permittees. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment A**.

17. For each whole effluent toxicity test, the permittee shall report on the appropriate discharge monitoring report (DMR) the concentrations of the hardness, ammonia nitrogen as nitrogen, total recoverable aluminum, cadmium, copper, lead, nickel, and zinc found in the 100 percent effluent sample. All these aforementioned chemical parameters shall be determined to at least the minimum quantification level shown in **Attachment A**. Also the permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report.

Part I.A.1. (Continued)

a. The discharge shall not cause a violation of the water quality standards of the receiving waters.

b. The pH of the effluent shall not be less than 6.5 or greater than 8.3 at any time.

c. The discharge shall not cause objectionable discoloration of the receiving waters.

d. The effluent shall not contain a visible oil sheen, foam, or floating solids at any time.

e. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand. The percent removal shall be based on monthly average values.

f. The results of sampling for any parameter done in accordance with EPA approved methods above its required frequency must also be reported.

g. If the average annual flow in any calendar year exceeds 80 percent of the facility’s design flow, the permittee shall submit a report to MassDEP by March 31 of the following calendar year describing its plans for further flow increases and describing how it will maintain compliance with the flow limit and all other effluent limitations and conditions.

2. All POTWs must provide adequate notice to the Director of the following:

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants; and

b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

c. For purposes of this paragraph, adequate notice shall include information on:

(1) The quantity and quality of effluent introduced into the POTW; and

(2) Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

3. Prohibitions Concerning Interference and Pass Through:

   a. Pollutants introduced into POTW's by a non-domestic source (user) shall not pass through the POTW or interfere with the operation or performance of the works.

4. 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.

5. Numerical Effluent Limitations for Toxicants

   EPA or MassDEP may use the results of the toxicity tests and chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to Section 304(a)(1) of the Clean Water Act (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.

B. UNAUTHORIZED DISCHARGES

This permit authorizes discharges only from the outfall(s) listed in Part I.A.1, in accordance with the terms and conditions of this permit. Discharges of wastewater from any other point sources, including sanitary sewer overflows (SSOs), are not authorized by this permit and shall be reported to EPA and MassDEP in accordance with Section D.1.e.(1) of the General Requirements of this permit (Twenty-four hour reporting).

Notification of SSOs to MassDEP shall be made on its SSO Reporting Form (which includes DEP Regional Office telephone numbers). The reporting form and instruction for its completion may be found on-line at http://www.mass.gov/eea/agencies/massdep/service/approvals/sanitary-sewer-overflow-bypass-backup-notification.html.

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance of the sewer system shall be in compliance with the General Requirements of Part II and the following terms and conditions. The permittee is required to complete the following activities for the collection system which it owns:

1. Maintenance Staff

The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit. Provisions to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

2. Preventive Maintenance Program

The permittee shall maintain an ongoing preventive maintenance program to prevent overflows and bypasses caused by malfunctions or failures of the sewer system infrastructure. The program shall include an inspection program designed to identify all potential and actual unauthorized discharges. Plans and programs to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

3. Infiltration/Inflow

The permittee shall control infiltration and inflow (I/I) into the sewer system as necessary to prevent high flow related unauthorized discharges from their collection systems and high flow related violations of the wastewater treatment plant's effluent limitations. Plans and programs to control I/I shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

4. Collection System Mapping

Within 30 months of the effective date of this permit, the permittee shall prepare a map of the sewer collection system it owns (see page 1 of this permit for the effective date). The map shall be on a street map of the community, with sufficient detail and at a scale to allow easy interpretation. The collection system information shown on the map shall be based on current conditions and shall be kept up to date and available for review by federal, state, or local agencies. Such map(s) shall include, but not be limited to the following:

a. All sanitary sewer lines and related manholes;
b. All combined sewer lines, related manholes, and catch basins;
c. All combined sewer regulators and any known or suspected connections between the sanitary sewer and storm drain systems (e.g. combination manholes);
d. All outfalls, including the treatment plant outfall(s), CSOs, and any known or suspected SSOs, including stormwater outfalls that are connected to combination manholes;
e. All pump stations and force mains;
f. The wastewater treatment facility(ies);
g. All surface waters (labeled);
h. Other major appurtenances such as inverted siphons and air release valves;
i. A numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;
j. The scale and a north arrow; and

k. The pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow.

5. Collection System Operation and Maintenance Plan

The permittee shall develop and implement a Collection System Operation and Maintenance Plan.

a. Within six (6) months of the effective date of the permit, the permittee shall submit to EPA and MassDEP

(1) A description of the collection system management goals, staffing, information management, and legal authorities;
(2) A description of the collection system and the overall condition of the collection system including a list of all pump stations and a description of recent studies and construction activities; and
(3) A schedule for the development and implementation of the full Collection System O & M Plan including the elements in paragraphs b.1. through b.8. below.

b. The full Collection System O & M Plan shall be completed, implemented and submitted to EPA and MassDEP within twenty four (24) months from the effective date of this permit. The Plan shall include:

(1) The required submittal from paragraph 5.a. above, updated to reflect current information;
(2) A preventive maintenance and monitoring program for the collection system;
(3) Description of sufficient staffing necessary to properly operate and maintain the sanitary sewer collection system and how the operation and maintenance program is staffed;
(4) Description of funding, the source(s) of funding and provisions for funding sufficient for implementing the plan;
(5) Identification of known and suspected overflows and back-ups, including manholes. A description of the cause of the identified overflows and back-ups, corrective actions taken, and a plan for addressing the overflows and back-ups consistent with the requirements of this permit;
(6) A description of the permittee's programs for preventing I/I related effluent violations and all unauthorized discharges of wastewater, including overflows and by-passes and the ongoing program to identify and remove sources of I/I. The program shall include an inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts; and
(7) An educational public outreach program for all aspects of I/I control, particularly private inflow.

(8) An Overflow Emergency Response Plan to protect public health from overflows and unanticipated bypasses or upsets that exceed any effluent limitation in the permit.

6. Annual Reporting Requirement

The permittee shall submit a summary report of activities related to the implementation of its Collection System O & M Plan during the previous calendar year. The report shall be submitted to EPA and MassDEP annually by March 31. The summary report shall, at a minimum, include:

a. A description of the staffing levels maintained during the year;
b. A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year;
c. Expenditures for any collection system maintenance activities and corrective actions taken during the previous year;
d. A map with areas identified for investigation/action in the coming year;
e. If treatment plant flow has reached 80% of its design flow (14.4 mgd) based on the annual average flow during the reporting year, or there have been capacity related overflows, submit a calculation of the maximum daily, weekly, and monthly infiltration and the maximum daily, weekly, and monthly inflow for the reporting year; and
f. A summary of unauthorized discharges during the past year and their causes and a report of any corrective actions taken as a result of the unauthorized discharges reported pursuant to the Unauthorized Discharges section of this permit.

7. Alternate Power Source

In order to maintain compliance with the terms and conditions of this permit, the permittee shall provide an alternative power source(s) sufficient to operate the portion of the publicly owned treatment works[1] it owns and operates.

D. SLUDGE CONDITIONS

1. Standard Conditions

a. The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices and the Clean Water Act section 405(d) technical standards.

b. The permittee shall comply with the more stringent of either the state or federal requirements.

c. No person shall fire sewage sludge in a sewage sludge incinerator except in compliance with the requirements of 40 CFR part 503 subpart E.

[1] As defined at 40 CFR §122.2, which references the definition at 40 CFR §403.3

2. Pollutant Limitations

   a. Firing of sewage sludge shall not violate the requirements of the National Emission Standard for beryllium in 40 CFR part 61, subpart C - 10 grams per 24-hour period.

   b. Firing of sewage sludge shall not violate the requirements in the National Emission Standard for mercury in 40 CFR part 61, subpart E - 3200 grams per 24-hour period.

   c. The daily concentration of the metals in the sewage sludge fed to the incinerator shall not exceed the limits specified below (dry weight basis):

	Maximum Daily
Arsenic	732 mg/kg
Cadmium	1,601 mg/kg
Chromium	310,396 mg/kg
Lead	71,630 mg/kg
Nickel	136,438 mg/kg

3. Operational Standards

   a. The exit gas from the sewage sludge incinerator stack shall be monitored continuously for Total Hydrocarbons (THC).

   b. The monthly average concentration for Total Hydrocarbons (THC), corrected to zero percent moisture and to seven percent oxygen, in the exit gas from the sewage sludge incinerator stack shall not exceed 100 PPM on a volumetric basis.

   c. The measured THC concentration shall be corrected to zero percent moisture using the correction factor below:

   Correction factor (percent moisture) = $\frac{1}{(1-X)}$

   Where:
   X = the decimal fraction of the percent moisture in the sewage sludge incinerator exit gas in hundredths.

   d. The measured THC concentration shall be corrected to seven percent oxygen using the correction factor below:

   Correction factor (oxygen) = $\frac{14}{(21-Y)}$

   Where:

Y = the percent oxygen concentration in the sewage sludge incinerator stack exit dry gas (dry volume/dry volume)

e. The measured THC value shall be multiplied by the correction factors in items b and c. The corrected THC value shall be used to determine compliance with Paragraph D.3.a.

4. Management Practices

a. An instrument that continuously measures and records the THC concentration in the sewage sludge incinerator stack exit gas shall be installed, calibrated, operated and maintained for each incinerator in accordance with the manufacturer's written instructions.

b. The total hydrocarbons instrument shall employ a flame ionization detector; shall have a heated sampling line maintained at a temperature of 150 degrees Celsius or higher at all times; and shall be calibrated at least once every 24-hour operating period using propane.

c. An instrument that continuously measures and records the oxygen concentration in the sewage sludge incinerator stack exit gas shall be installed, calibrated, operated and maintained for each incinerator in accordance with the manufacture's written instructions.

d. An instrument that continuously measures and records information used to determine the moisture content in the sewage sludge incinerator stack exit gas shall be installed, calibrated, operated and maintained for each incinerator in accordance with the manufacture's written instructions.

e. An instrument that continuously measures and records combustion temperatures shall be installed, calibrated, operated and maintained for each incinerator in accordance with the manufacture's written instructions.

f. Upon completion of the testing to demonstrate compliance with the performance specifications, but not later than 90 days from the effective date of this permit, the operator of the incinerators shall submit to EPA Region 1 a certification stating that the continuous emissions monitoring system meets the performance specifications detailed in the above referenced guidance.

g. Operation of the incinerator shall not cause the operating combustion temperature for the incinerator to exceed the performance test combustion temperature by more than 20 percent.

h. Any air pollution control devices shall be appropriate for the type of incinerator and operating parameters for the air pollution control device shall be adequate to indicate proper performance of the air pollution control device. For incinerators subject to the requirements of 40 CFR subpart O, operation of the air pollution control device shall not violate the air pollution control device requirements of that part.

i. Sewage sludge shall not be fired in an incinerator if it is likely to adversely affect a threatened or endangered species listed under Section 4 of the Endangered Species Act or its designated critical habitat.

j. The permittee shall notify the EPA and MassDEP if any continuous emission monitoring equipment is shut down or broken down for more than 72 hours while the incinerator continues to operate.

k. Notification shall include the following:

(1) The reason for the shut down or break down;
(2) Steps taken to restore the system;
(3) Expected length of the down time; and
(4) The expected length of the incinerator operation during the down time of the monitoring system.

l. Break downs or shut downs of less than 72 hours shall be recorded in the operations log along with an explanation of the event.

m. Copies of all manufacturer's instructions shall be kept on file and be available during inspections.

5. Monitoring Frequency

a. The frequency of monitoring beryllium shall be as required in 40 CFR part 61, subpart C.

b. The frequency of monitoring mercury shall be as required in 40 CFR part 61, subpart E.

c. The pollutants in paragraph 2c shall be monitored at the following frequency **- <u>bimonthly (6 times per year)</u>**.

d. After the sewage sludge has been monitored for the pollutants in paragraph 2c for two years at the frequency specified above, the permittee may request a reduction in the monitoring frequency.

e. The operating parameters for the air pollution control devices shall be monitored at the following frequency - **<u>1/day</u>**.

f. The THC concentration in the exit gas, the oxygen concentration in the exit gas, information from the instrument used to determine moisture content, and combustion temperatures shall be **<u>continuously</u>** monitored.

6. Sampling and Analysis

   a. The sewage shall be sampled at a location which is prior to entering the incinerator and provides a representative sample of the sewage sludge being incinerated.

   b. The sewage sludge shall be analyzed using “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods”, EPA publication SW-846, Second Edition (1982) with Updates I (April 1984) and II (April 1985) and Third Edition (November 1986) with Revision I (December 1987).

   c. If emission testing is done for demonstration of NESHAPS, testing shall be in accordance with Method 101A in 40 CFR part 60, Appendix B, “Determination of Particulate and Gaseous Mercury Emissions from Sewage Sludge Incinerators”.

   d. Sewage sludge samples for mercury shall be sampled and analyzed using Method 105 in 40 CFR part 61, Appendix B, “Determination of Mercury in Wastewater Treatment Plant Sewage Sludge”.

7. Record Keeping Requirements

   The permittee is required to keep records for the following:

   a. Report the maximum concentration of each pollutant listed in paragraph D.2.c above;

   b. Report the average monthly THC concentration in the exit gas from the incinerator stack;

   c. Information that demonstrates compliance with the National Emission Standard for beryllium;

   d. Information that demonstrates compliance with the National Emission Standard for mercury. If sludge sampling is used, include calculation for compliance demonstration;

   e. The operating combustion temperature for the sewage sludge incinerator;

   f. Report the average monthly operating values for the air pollution control devices operating parameters;

   g. The oxygen concentration and the information used to measure moisture content in the exit gas from the sewage sludge incinerator. Report the oxygen concentration and percent moisture results which were used to determine the THC values reported in paragraph D.3.b;

   h. Record the average daily and average monthly sewage sludge feed rate to the incinerator;

i. The stack height of the incinerator;

j. The dispersion factor for the site where the incinerator is located;

k. The control efficiency for arsenic, lead, chromium, cadmium and nickel;

l. A calibration and maintenance log for the instruments used to measure the THC concentration and the oxygen concentration in the exit gas; the information need to determine moisture content in the exit gas, and the combustion temperatures.

8. Reporting

The permittee shall report the information in paragraphs 7 (a) through (l) annually by February 19 to EPA and MassDEP.

E. INDUSTRIAL USERS AND PRETREATMENT PROGRAM

1. The permittee shall develop and enforce specific effluent limits (local limits) for Industrial User(s), and all other users, as appropriate, which together with appropriate changes in the POTW Treatment Plant's Facilities or operation, are necessary to ensure continued compliance with the POTW's NPDES permit or sludge use or disposal practices. Specific local limits shall not be developed and enforced without individual notice to persons or groups who have requested such notice and an opportunity to respond. Within (120 days of the effective date of this permit), the permittee shall prepare and submit a written technical evaluation to the EPA analyzing the need to revise local limits. As part of this evaluation, the permittee shall assess how the POTW performs with respect to influent and effluent of pollutants, water quality concerns, sludge quality, sludge processing concerns/inhibition, biomonitoring results, activated sludge inhibition, worker health and safety and collection system concerns. In preparing this evaluation, the permittee shall complete and submit the attached form (see **Attachment C –** Reassessment of Technically Based Industrial Discharge Limits) with the technical evaluation to assist in determining whether existing local limits need to be revised. Justifications and conclusions should be based on actual plant data if available and should be included in the report. Should the evaluation reveal the need to revise local limits, the permittee shall complete the revisions within 120 days of notification by EPA and submit the revisions to EPA for approval. The permittee shall carry out the local limits revisions in accordance with EPA's Local Limit Development Guidance (July 2004).

2. The permittee shall implement the Industrial Pretreatment Program in accordance with the legal authorities, policies, procedures, and financial provisions described in the permittee's approved Pretreatment Program, and the General Pretreatment Regulations, 40 CFR 403. At a minimum, the permittee must perform the following duties to properly implement the Industrial Pretreatment Program (IPP):

a. Carry out inspection, surveillance, and monitoring procedures which will determine independent of information supplied by the industrial user, whether the industrial user is in compliance with the Pretreatment Standards. At a minimum, all significant industrial users shall be sampled and inspected at the frequency established in the approved IPP but in no case less than once per year and maintain adequate records.

b. Issue or renew all necessary industrial user control mechanisms within 90 days of their expiration date or within 180 days after the industry has been determined to be a significant industrial user.

c. Obtain appropriate remedies for noncompliance by any industrial user with any pretreatment standard and/or requirement.

d. Maintain an adequate revenue structure for continued implementation of the Pretreatment Program.

3. The permittee shall provide the EPA and MassDEP with an annual report describing the permittee's pretreatment program activities for the twelve (12) month period ending 60 days prior to the due date in accordance with 403.12(i). The annual report shall be consistent with the format described in **Attachment D** (NPDES Permit Requirement for Industrial Pretreatment Annual Report) of this permit and shall be submitted no later than **March 1** of each year.

4. The permittee must obtain approval from EPA prior to making any significant changes to the industrial pretreatment program in accordance with 40 CFR 403.18(c).

5. The permittee must assure that applicable National Categorical Pretreatment Standards are met by all categorical industrial users of the POTW. These standards are published in the Federal Regulations at 40 CFR 405 et. seq.

6. The permittee must modify its pretreatment program, if necessary, to conform to all changes in the Federal Regulations that pertain to the implementation and enforcement of the industrial pretreatment program. The permittee must provide EPA, in writing, within 180 days of this permit's effective date proposed changes, if applicable, to the permittee's pretreatment program deemed necessary to assure conformity with current Federal Regulations. At a minimum, the permittee must address in its written submission the following areas: (1) Enforcement response plan; (2) revised sewer use ordinances; and (3) slug control evaluations. The permittee will implement these proposed changes pending EPA Region I's approval under 40 CFR 403.18. This submission is separate and distinct from any local limits analysis submission described in Part I.E.1.

F. COMPLIANCE SCHEDULE

In order to comply with the new permit limits for total phosphorus (101 ug/l and 15.2 lb/day monthly average) and total nitrogen (450 lb/day monthly average), the permittee shall take the following actions:

1. Within one year of the effective date of the permit, the permittee shall complete an evaluation of the ability of the current facility to meet the permit limits and identify alternatives to upgrade the facility to meet the permit limits.

2. Within two years of the effective date of the permit, the permittee shall complete design of the facility improvements required to achieve the new total phosphorus and total nitrogen permit limits and shall submit the design to MassDEP for approval.

3. Within three years of the effective date of the permit, the permittee shall initiate construction of the facility improvements required to achieve the new total phosphorus and total nitrogen permit limits.

4. Within four years of the effective date of the permit, the permittee shall submit to EPA and MassDEP a status report relative to construction of the facility improvements required to achieve the new total phosphorus and total nitrogen permit limits.

5. Within fifty-four (54 months) of the effective date of the permit, the permittee shall substantially complete construction of the facility improvements required to achieve the new total phosphorus and total nitrogen permit limits.

6. The new permit limits for total phosphorus and total nitrogen shall go into effect five years from the effective date of the permit. Until such time the permittee shall meet an interim phosphorus limit of 0.2 mg/l (60 day rolling average, April to October). The permittee shall also, as an interim measure, investigate alternative operational approaches to reduce nitrogen discharges using its existing equipment and implement operational changes as appropriate to optimize nitrogen removal at the existing facility. A report describing the optimization investigation and including a schedule for implementing any recommended actions shall be submitted within one year of the effective date of the permit, and a report on the results of the implementation shall be submitted within three years of the effective date of the permit.

7. The permittee shall notify EPA and MassDEP of its compliance or noncompliance with the requirements of this part in writing and provide a summary report on its activities under this schedule no later than 14 days after each interim or final date of compliance..

G. MONITORING AND REPORTING

The monitoring program in the permit specifies sampling and analysis, which will provide continuous information on compliance and the reliability and effectiveness of the installed pollution abatement equipment. The approved analytical procedures found in 40 CFR Part 136 are required unless other procedures are explicitly required in the permit. The Permittee is obligated to monitor and report sampling results to EPA and the MassDEP within the time specified within the permit.

Unless otherwise specified in this permit, the permittee shall submit reports, requests, and information and provide notices in the manner described in this section.

1. Submittal of DMRs Using NetDMR

The permittee shall continue to submit its monthly monitoring data in discharge monitoring reports (DMRs) to EPA and MassDEP no later than the 15th day of the month electronically using NetDMR. When the permittee submits DMRs using NetDMR, it is not required to submit hard copies of DMRs to EPA or MassDEP.

2. Submittal of Reports as NetDMR Attachments

Unless otherwise specified in this permit, the permittee shall electronically submit all reports to EPA as NetDMR attachments rather than as hard copies. Permittees shall continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP. (See Part I.G.6. for more information on state reporting.) Because the due dates for reports described in this permit may not coincide with the due date for submitting DMRs (which is no later than the 15th day of the month), a report submitted electronically as a NetDMR attachment shall be considered timely if it is electronically submitted to EPA using NetDMR with the next DMR due following the particular report due date specified in this permit.

3. Submittal of Pre-treatment Related Reports

All reports and information required of the permittee in the Industrial Users and Pretreatment Program section of this permit shall be submitted to the Office of Ecosystem Protection's Pretreatment Coordinator in Region 1 EPA's Office of Ecosystem Protection (OEP). These requests, reports and notices include:

A. Annual Pretreatment Reports,
B. Pretreatment Reports Reassessment of Technically Based Industrial Discharge Limits Form,
C. Revisions to Industrial Discharge Limits,
D. Report describing Pretreatment Program activities, and
E. Proposed changes to a Pretreatment Program

This information shall be submitted to EPA/OEP as a hard copy at the following address:

U.S. Environmental Protection Agency
Office of Ecosystem Protection
Regional Pretreatment Coordinator
5 Post Office Square - Suite 100 (OEP06-03)
Boston, MA 02109-3912

4. Submittal of Requests and Reports to EPA/OEP

The following requests, reports, and information described in this permit shall be submitted to the EPA/OEP NPDES Applications Coordinator in the EPA Office Ecosystem Protection (OEP).

A. Transfer of Permit notice

B. Request for changes in sampling location
C. Request for reduction in testing frequency
D. Request for Reduction in WET Testing Requirement
E. Report on unacceptable dilution water / request for alternative dilution water for WET testing

These reports, information, and requests shall be submitted to EPA/OEP electronically at R1NPDES.Notices.OEP@epa.gov or by hard copy mail to the following address:

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP NPDES Applications Coordinator
5 Post Office Square - Suite 100 (OEP06-03)
Boston, MA 02109-3912

5. Submittal of Reports in Hard Copy Form

The following notifications and reports shall be submitted as hard copy with a cover letter describing the submission. These reports shall be signed and dated originals submitted to EPA.

A. Written notifications required under Part II
B. Notice of unauthorized discharges, including Sanitary Sewer Overflow (SSO) reporting
C. Collection System Operation and Maintenance Plan (from co-permittees)
D. Report on annual activities related to O&M Plan (from co-permittees)
E. Sludge monitoring reports

This information shall be submitted to EPA/OES at the following address:

U.S. Environmental Protection Agency
Office or Environmental Stewardship (OES)
Water Technical Unit
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912

All sludge monitoring reports required herein shall be submitted only to:

U.S. Environmental Protection Agency, Region 7
Biosolids Center
Water Enforcement Branch
11201 Renner Boulevard
Lenexa, Kansas 66219

6. State Reporting

Unless otherwise specified in this permit, duplicate signed copies of all reports, information, requests or notifications described in this permit, including the reports, information, requests or notifications described in Parts I.G.3, I.G.4, and I.G.5 also shall be submitted to the State at the following addresses:

MassDEP – Southeast Region
Bureau of Resource Protection (Municipal)
20 Riverside Drive
Lakeville, MA 02347

Copies of toxicity tests and nitrogen optimization reports only shall be submitted to:

Massachusetts Department of Environmental Protection
Watershed Planning Program
8 New Bond Street
Worcester, Massachusetts 01606

7. Verbal Reports and Verbal Notifications

Any verbal reports or verbal notifications, if required in Parts I and/or II of this permit, shall be made to both EPA and to MassDEP. This includes verbal reports and notifications which require reporting within 24 hours. (As examples, see Part II.B.4.c.(2), Part II.B.5.c. (3), and Part II.D.1.e.) Verbal reports and verbal notifications shall be made to EPA's Office of Environmental Stewardship at:

U.S. Environmental Protection Agency
Office of Environmental Stewardship
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912
617-918-1510

H. 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.

FRESHWATER CHRONIC
TOXICITY TEST PROCEDURE AND PROTOCOL
USEPA Region 1

I. GENERAL REQUIREMENTS

The permittee shall be responsible for the conduct of acceptable chronic toxicity tests using three fresh samples collected during each test period. The following tests shall be performed as prescribed in Part 1 of the NPDES discharge permit in accordance with the appropriate test protocols described below. (Note: the permittee and testing laboratory should review the applicable permit to determine whether testing of one or both species is required).

- **Daphnid (<u>Ceriodaphnia</u> <u>dubia</u>) Survival and Reproduction Test.**
- **Fathead Minnow (<u>Pimephales</u> <u>promelas</u>) Larval Growth and Survival Test.**

Chronic toxicity data shall be reported as outlined in Section VIII.

II. METHODS

Methods to follow are those recommended by EPA in: <u>Short Term Methods For Estimating The Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition. October 2002</u>. United States Environmental Protection Agency. Office of Water, Washington, D.C., EPA 821-R-02-013. The methods are available on-line at http://www.epa.gov/waterscience/WET/ . Exceptions and clarification are stated herein.

III. SAMPLE COLLECTION AND USE

A total of three fresh samples of effluent and receiving water are required for initiation and subsequent renewals of a freshwater, chronic, toxicity test. The receiving water control sample must be collected immediately upstream of the permitted discharge's zone of influence. Fresh samples are recommended for use on test days 1, 3, and 5. However, provided a total of three samples are used for testing over the test period, an alternate sampling schedule is acceptable. The acceptable holding times until initial use of a sample are 24 and 36 hours for on-site and off-site testing, respectively. A written waiver is required from the regulating authority for any hold time extension. All test samples collected may be used for 24, 48 and 72 hour renewals after initial use. All samples held for use beyond the day of sampling shall be refrigerated and maintained at a temperature range of 0-6^{o} C.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol.

Sampling guidance dictates that, where appropriate, aliquots for the analysis required in this protocol shall be split from the samples, containerized and immediately preserved, or analyzed as per 40 CFR Part 136. EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection. Testing for the presence of total residual chlorine (TRC) must be analyzed immediately or as soon as possible, for all effluent samples, prior to WET testing. TRC analysis may be performed on-site or by the toxicity testing laboratory and the samples must be dechlorinated, as necessary, using sodium thiosulfate prior to sample use for toxicity testing.

If any of the renewal samples are of sufficient potency to cause lethality to 50 percent or more of the test organisms in any of the test treatments for either species or, if the test fails to meet its permit limits, then chemical analysis for total metals (originally required for the initial sample only in Section VI) will be required on the renewal sample(s) as well.

IV. DILUTION WATER

Samples of receiving water must be collected from a location in the receiving water body immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. EPA strongly urges that screening for toxicity be performed prior to the set up of a full, definitive toxicity test any time there is a question about the test dilution water's ability to achieve test acceptability criteria (TAC) as indicated in Section V of this protocol. The test dilution water control response will be used in the statistical analysis of the toxicity test data. All other control(s) required to be run in the test will be reported as specified in the Discharge Monitoring Report (DMR) Instructions, Attachment F, page 2,Test Results & Permit Limits.

The test dilution water must be used to determine whether the test met the applicable TAC. When receiving water is used for test dilution, an additional control made up of standard laboratory water (0% effluent) is required. This control will be used to verify the health of the test organisms and evaluate to what extent, if any, the receiving water itself is responsible for any toxic response observed.

If dechlorination of a sample by the toxicity testing laboratory is necessary a "sodium thiosulfate" control, representing the concentration of sodium thiosulfate used to adequately dechlorinate the sample prior to toxicity testing, must be included in the test.

If the use of an alternate dilution water (ADW) is authorized, in addition to the ADW test control, the testing laboratory must, for the purpose of monitoring the receiving water, also run a receiving water control.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable an ADW of known quality with hardness similar to that of the receiving water may be substituted. Substitution is species specific meaning that the decision to use ADW is made for each species and is based on the toxic response of that particular species. Substitution to an ADW is authorized in two cases. The first is the case where repeating a test due to toxicity in the site dilution water requires an **immediate decision** for ADW use be made by the permittee and toxicity testing laboratory. The second is in the case where two of the most recent documented incidents of unacceptable site dilution water toxicity requires ADW use in future WET testing.

For the second case, written notification from the permittee requesting ADW use **and** written authorization from the permit issuing agency(s) is required **prior to** switching to a long-term use of ADW for the duration of the permit.

Written requests for use of ADW must be mailed with supporting documentation to the following addresses:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency, Region 1
Five Post Office Square, Suite 100
Mail Code OEP06-5
Boston, MA 02109-3912

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
Five Post Office Square, Suite 100
Mail Code OES04-4
Boston, MA 02109-3912

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the most current annual DMR instructions which can be found on the EPA Region 1 website at http://www.epa.gov/region1/enforcementandassistance/dmr.html for further important details on alternate dilution water substitution requests.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

Method specific test conditions and TAC are to be followed and adhered to as specified in the method guidance document, EPA 821-R-02-013. If a test does not meet TAC the test must be repeated with fresh samples within 30 days of the initial test completion date.

V.1. Use of Reference Toxicity Testing

Reference toxicity test results and applicable control charts must be included in the toxicity testing report.

If reference toxicity test results fall outside the control limits established by the laboratory for a specific test endpoint, a reason or reasons for this excursion must be evaluated, correction made and reference toxicity tests rerun as necessary.

If a test endpoint value exceeds the control limits at a frequency of more than one out of twenty then causes for the reference toxicity test failure must be examined and if problems are identified corrective action taken. The reference toxicity test must be repeated during the same month in which the exceedance occurred.

If two consecutive reference toxicity tests fall outside control limits, the possible cause(s) for the exceedance must be examined, corrective actions taken and a repeat of the reference toxicity test must take place immediately. Actions taken to resolve the problem must be reported.

V.1.a. Use of Concurrent Reference Toxicity Testing

In the case where concurrent reference toxicity testing is required due to a low frequency of testing with a particular method, if the reference toxicity test results fall slightly outside of laboratory established control limits, but the primary test met the TAC, the results of the primary test will be considered acceptable. However, if the results of the concurrent test fall well outside the established **upper** control limits i.e. ≥3 standard deviations for IC25 values and ≥ two concentration intervals for NOECs, and even though the primary test meets TAC, the primary test will be considered unacceptable and must be repeated.

V.2. For the *C. dubia* test, the determination of TAC and formal statistical analyses must be performed using only the first three broods produced.

V.3. Test treatments must include 5 effluent concentrations and a dilution water control. An additional test treatment, at the permitted effluent concentration (% effluent), is required if it is not included in the dilution series.

VI. CHEMICAL ANALYSIS

As part of each toxicity test's daily renewal procedure, pH, specific conductance, dissolved oxygen (DO) and temperature must be measured at the beginning and end of each 24-hour period in each test treatment and the control(s).

The additional analysis that must be performed under this protocol is as specified and noted in the table below.

Parameter	Effluent	Receiving Water	ML (mg/l)
Hardness[1, 4]	x	x	0.5
Total Residual Chlorine (TRC)[2, 3, 4]	x		0.02
Alkalinity[4]	x	x	2.0
pH[4]	x	x	--
Specific Conductance[4]	x	x	--
Total Solids [6]	x		--
Total Dissolved Solids [6]	x		--
Ammonia[4]	x	x	0.1
Total Organic Carbon [6]	x	x	0.5
Total Metals [5]			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02
Other as permit requires			

Notes:

1. Hardness may be determined by:

- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
  - -Method 2340B (hardness by calculation)
  - -Method 2340C (titration)

2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.

- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
  - -Method 4500-CL E Low Level Amperometric Titration
  - -Method 4500-CL G DPD Colorimetric Method
- USEPA 1983. Manual of Methods Analysis of Water and Wastes
  - -Method 330.5

3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing
4. Analysis is to be performed on samples and/or receiving water, as designated in the table above, from all three sampling events.
5. Analysis is to be performed on the initial sample(s) only unless the situation arises as stated in Section III, paragraph 4
6. Analysis to be performed on initial samples only

VII. TOXICITY TEST DATA ANALYSIS AND REVIEW

A. Test Review

1. Concentration / Response Relationship

A concentration/response relationship evaluation is required for test endpoint determinations from both Hypothesis Testing and Point Estimate techniques. The test report is to include documentation of this evaluation in support of the endpoint values reported. The dose-response review must be performed as required in Section 10.2.6 of EPA-821-R-02-013. Guidance for this review can be found at http://water.epa.gov/scitech/methods/cwa/ . In most cases, the review will result in one of the following three conclusions: (1) Results are reliable and reportable; (2) Results are anomalous and require explanation; or (3) Results are inconclusive and a retest with fresh samples is required.

2. Test Variability (Test Sensitivity)

This review step is separate from the determination of whether a test meets or does not meet TAC. Within test variability is to be examined for the purpose of evaluating test sensitivity. This evaluation is to be performed for the sub-lethal hypothesis testing endpoints reproduction and growth as required by the permit. The test report is to include documentation of this evaluation to support that the endpoint values reported resulted from a toxicity test of adequate sensitivity. This evaluation must be performed as required in Section 10.2.8 of EPA-821-R-02-013.

To determine the adequacy of test sensitivity, USEPA requires the calculation of test percent minimum significant difference (PMSD) values. In cases where NOEC determinations are made based on a non-parametric technique, calculation of a test PMSD value**,** for the sole purpose of assessing test sensitivity, shall be calculated using a comparable parametric statistical analysis technique. The calculated test PMSD is then compared to the upper and lower PMSD bounds shown for freshwater tests in Section 10.2.8.3, p. 52, Table 6 of EPA-821-R-02-013. The comparison will yield one of the following determinations.

- The test PMSD exceeds the PMSD upper bound test variability criterion in Table 6, the test results are considered highly variable and the test may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC). If the test results indicate that the discharge is not toxic at the PLC, then the test is considered insufficiently sensitive and must be repeated within 30 days of the initial test completion using fresh samples. If the test results indicate that the discharge is toxic at the PLC, the test is considered acceptable and does not have to be repeated.

- The test PMSD falls below the PMSD lower bound test variability criterion in Table 6, the test is determined to be very sensitive. In order to determine which treatment(s) are statistically significant and which are not, for the purpose of reporting a NOEC, the relative percent difference (RPD) between the control and each treatment must be calculated and compared to the lower PMSD boundary. See *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program,* EPA 833-R-00-003, June 2002, Section 6.4.2. The following link: Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program can be used to locate the USEPA website containing this document. If the RPD for a treatment falls below the PMSD lower bound, the difference is considered statistically insignificant. If the RPD for a treatment is greater that the PMSD lower bound, then the treatment is considered statistically significant.

- The test PMSD falls within the PMSD upper and lower bounds in Table 6, the sub-lethal test endpoint values shall be reported as is.

B. Statistical Analysis

1. General - Recommended Statistical Analysis Method

Refer to general data analysis flowchart, EPA 821-R-02-013, page 43

For discussion on Hypothesis Testing, refer to EPA 821-R-02-013, Section 9.6

For discussion on Point Estimation Techniques, refer to EPA 821-R-02-013, Section 9.7

2. *Pimephales promelas*

Refer to survival hypothesis testing analysis flowchart, EPA 821-R-02-013, page 79

Refer to survival point estimate techniques flowchart, EPA 821-R-02-013, page 80

Refer to growth data statistical analysis flowchart, EPA 821-R-02-013, page 92

3. *Ceriodaphnia dubia*

Refer to survival data testing flowchart, EPA 821-R-02-013, page 168

Refer to reproduction data testing flowchart, EPA 821-R-02-013, page 173

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Test summary sheets (2007 DMR Attachment F) which includes:
    - Facility name
    - NPDES permit number
    - Outfall number
    - Sample type
    - Sampling method
    - Effluent TRC concentration
    - Dilution water used
    - Receiving water name and sampling location
    - Test type and species
    - Test start date
    - Effluent concentrations tested (%) and permit limit concentration
    - Applicable reference toxicity test date and whether acceptable or not
    - Age, age range and source of test organisms used for testing
    - Results of TAC review for all applicable controls
    - Test sensitivity evaluation results (test PMSD for growth and reproduction)
    - Permit limit and toxicity test results
    - Summary of test sensitivity and concentration response evaluation

In addition to the summary sheets the report must include:

- A brief description of sample collection procedures
- Chain of custody documentation including names of individuals collecting samples, times and dates of sample collection, sample locations, requested analysis and lab receipt with time and date received, lab receipt personnel and condition of samples upon receipt at the lab(s)
- Reference toxicity test control charts
- All sample chemical/physical data generated, including minimum limits (MLs) and analytical methods used
- All toxicity test raw data including daily ambient test conditions, toxicity test chemistry, sample dechlorination details as necessary, bench sheets and statistical analysis
- A discussion of any deviations from test conditions
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review per species per endpoint

USEPA REGION 1 FRESHWATER ACUTE
TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable acute toxicity tests in accordance with the appropriate test protocols described below:

- **Daphnid (Ceriodaphnia dubia) definitive 48 hour test.**
- **Fathead Minnow (Pimephales promelas) definitive 48 hour test.**

Acute toxicity test data shall be reported as outlined in Section VIII.

II. METHODS

The permittee shall use 40 CFR Part 136 methods. Methods and guidance may be found at:

http://water.epa.gov/scitech/methods/cwa/wet/disk2_index.cfm

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. This protocol defines more specific requirements while still being consistent with the Part 136 methods. If, due to modifications of Part 136, there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

III. SAMPLE COLLECTION

A discharge sample shall be collected. Aliquots shall be split from the sample, containerized and preserved (as per 40 CFR Part 136) for chemical and physical analyses required. The remaining sample shall be measured for total residual chlorine and dechlorinated (if detected) in the laboratory using sodium thiosulfate for subsequent toxicity testing. (Note that EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection.) Grab samples must be used for pH, temperature, and total residual chlorine (as per 40 CFR Part 122.21).

Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1.0 mg/L chlorine. If dechlorination is necessary, a thiosulfate control (maximum amount of thiosulfate in lab control or receiving water) must also be run in the WET test.

All samples held overnight shall be refrigerated at 1- 6^{o}C.

IV. DILUTION WATER

A grab sample of dilution water used for acute toxicity testing shall be collected from the receiving water at a point immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. In the case where an alternate dilution water has been agreed upon an additional receiving water control (0% effluent) must also be tested.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable, an alternate standard dilution water of known quality with a hardness, pH, conductivity, alkalinity, organic carbon, and total suspended solids similar to that of the receiving water may be substituted **AFTER RECEIVING WRITTEN APPROVAL FROM THE PERMIT ISSUING AGENCY(S)**. Written requests for use of an alternate dilution water should be mailed with supporting documentation to the following address:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency-New England
5 Post Office Sq., Suite 100 (OEP06-5)
Boston, MA 02109-3912

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
5 Post Office Sq., Suite 100 (OES04-4)
Boston, MA 02109-3912

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the most current annual DMR instructions which can be found on the EPA Region 1 website at http://www.epa.gov/region1/enforcement/water/dmr.html *for further important details on alternate dilution water substitution requests.*

It may prove beneficial to have the proposed dilution water source screened for suitability prior to toxicity testing. EPA strongly urges that screening be done prior to set up of a full definitive toxicity test any time there is question about the dilution water's ability to support acceptable performance as outlined in the 'test acceptability' section of the protocol.

V. TEST CONDITIONS

The following tables summarize the accepted daphnid and fathead minnow toxicity test conditions and test acceptability criteria:

EPA NEW ENGLAND EFFLUENT TOXICITY TEST CONDITIONS FOR THE DAPHNID, CERIODAPHNIA DUBIA 48 HOUR ACUTE TESTS[1]

1.	Test type	Static, non-renewal
2.	Temperature (^{o}C)	20 $\pm$ 1^{o}C or 25 $\pm$ 1^{o}C
3.	Light quality	Ambient laboratory illumination
4.	Photoperiod	16 hour light, 8 hour dark
5.	Test chamber size	Minimum 30 ml
6.	Test solution volume	Minimum 15 ml
7.	Age of test organisms	1-24 hours (neonates)
8.	No. of daphnids per test chamber	5
9.	No. of replicate test chambers per treatment	4
10.	Total no. daphnids per test concentration	20
11.	Feeding regime	As per manual, lightly feed YCT and Selenastrum to newly released organisms while holding prior to initiating test
12.	Aeration	None
13.	Dilution water[2]	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q^{R} or equivalent deionized water and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	$\geq$ 0.5, must bracket the permitted RWC
15.	Number of dilutions	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution

		series.
16.	Effect measured	Mortality-no movement of body or appendages on gentle prodding
17.	Test acceptability	90% or greater survival of test organisms in dilution water control solution
18.	Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples must first be used within 36 hours of collection.
19.	Sample volume required	Minimum 1 liter

Footnotes:

1. Adapted from EPA-821-R-02-012.
2. Standard prepared dilution water must have hardness requirements to generally reflect the characteristics of the receiving water.

EPA NEW ENGLAND TEST CONDITIONS FOR THE FATHEAD MINNOW (PIMEPHALES PROMELAS) 48 HOUR ACUTE TEST[1]

1.	Test Type	Static, non-renewal
2.	Temperature (^oC)	$20 \pm 1\ ^o$ C or 25 ± 1^oC
3.	Light quality	Ambient laboratory illumination
4.	Photoperiod	16 hr light, 8 hr dark
5.	Size of test vessels	250 mL minimum
6.	Volume of test solution	Minimum 200 mL/replicate
7.	Age of fish	1-14 days old and age within 24 hrs of each other
8.	No. of fish per chamber	10
9.	No. of replicate test vessels per treatment	4
10.	Total no. organisms per concentration	40
11.	Feeding regime	As per manual, lightly feed test age larvae using concentrated brine shrimp nauplii while holding prior to initiating test
12.	Aeration	None, unless dissolved oxygen (D.O.) concentration falls below 4.0 mg/L, at which time gentle single bubble aeration should be started at a rate of less than 100 bubbles/min. (Routine D.O. check is recommended.)
13.	dilution water[2]	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q[R] or equivalent deionized and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	$\geq$ 0.5, must bracket the permitted RWC

15.	Number of dilutions	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution series.
16.	Effect measured	Mortality-no movement on gentle prodding
17.	Test acceptability	90% or greater survival of test organisms in dilution water control solution
18.	Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples are used within 36 hours of collection.
19.	Sample volume required	Minimum 2 liters

Footnotes:

1. Adapted from EPA-821-R-02-012
2. Standard dilution water must have hardness requirements to generally reflect characteristics of the receiving water.

VI. CHEMICAL ANALYSIS

At the beginning of a static acute toxicity test, pH, conductivity, total residual chlorine, oxygen, hardness, alkalinity and temperature must be measured in the highest effluent concentration and the dilution water. Dissolved oxygen, pH and temperature are also measured at 24 and 48 hour intervals in all dilutions. The following chemical analyses shall be performed on the 100 percent effluent sample and the upstream water sample for each sampling event.

Parameter	Effluent	Receiving Water	ML (mg/l)
Hardness[1]	x	x	0.5
Total Residual Chlorine (TRC)[2, 3]	x		0.02
Alkalinity	x	x	2.0
pH	x	x	--
Specific Conductance	x	x	--
Total Solids	x		--
Total Dissolved Solids	x		--
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
Total Metals			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02
Other as permit requires			

Notes:

1. Hardness may be determined by:
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     - Method 2340B (hardness by calculation)
     - Method 2340C (titration)
2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     - Method 4500-CL E Low Level Amperometric Titration
     - Method 4500-CL G DPD Colorimetric Method
3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing.

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration (Determined at 48 Hours)

Methods of Estimation:

- Probit Method
- Spearman-Karber
- Trimmed Spearman-Karber
- Graphical

See the flow chart in Figure 6 on p. 73 of EPA-821-R-02-012 for appropriate method to use on a given data set.

No Observed Acute Effect Level (NOAEL)

See the flow chart in Figure 13 on p. 87 of EPA-821-R-02-012.

VIII. TOXICITY TEST REPORTING

A report of the results will include the following:

- Description of sample collection procedures, site description
- Names of individuals collecting and transporting samples, times and dates of sample collection and analysis on chain-of-custody
- General description of tests: age of test organisms, origin, dates and results of standard toxicant tests; light and temperature regime; other information on test conditions if different than procedures recommended. Reference toxicant test data should be included.
- All chemical/physical data generated. (Include minimum detection levels and minimum quantification levels.)
- Raw data and bench sheets.
- Provide a description of dechlorination procedures (as applicable).
- Any other observations or test conditions affecting test outcome.

EPA - New England

Reassessment of Technically Based Industrial Discharge Limits

Under 40 CFR §122.21(j)(4), all Publicly Owned Treatment Works (POTWs) with approved Industrial Pretreatment Programs (IPPs) shall provide the following information to the Director: a written evaluation of the need to revise local industrial discharge limits under 40 CFR §403.5(c)(1).

Below is a form designed by the U.S. Environmental Protection Agency (EPA - New England) to assist POTWs with approved IPPs in evaluating whether their existing Technically Based Local Limits (TBLLs) need to be recalculated. The form allows the permittee and EPA to evaluate and compare pertinent information used in previous TBLLs calculations against present conditions at the POTW.

Please read direction below before filling out form.

ITEM I.

* In Column (1), list what your POTW's influent flow rate was when your existing TBLLs were calculated. In Column (2), list your POTW's present influent flow rate. Your current flow rate should be calculated using the POTW's average daily flow rate from the previous 12 months.

* In Column (1) list what your POTW's SIU flow rate was when your existing TBLLs were calculated. In Column (2), list your POTW's present SIU flow rate.

* In Column (1), list what dilution ratio and/or 7Q10 value was used in your old/expired NPDES permit. In Column (2), list what dilution ration and/or 7Q10 value is presently being used in your new/reissued NPDES permit.

The 7Q10 value is the lowest seven day average flow rate, in the river, over a ten year period. The 7Q10 value and/or dilution ratio used by EPA in your new NPDES permit can be found in your NPDES permit "Fact Sheet."

* In Column (1), list the safety factor, if any, that was used when your existing TBLLs were calculated.

* In Column (1), note how your bio-solids were managed when your existing TBLLs were calculated. In Column (2), note how your POTW is presently disposing of its biosolids and how your POTW will be disposing of its biosolids in the future.

ITEM II.

* List what your existing TBLLs are - as they appear in your current Sewer Use Ordinance (SUO).

ITEM III.

* Identify how your existing TBLLs are allocated out to your industrial community. Some pollutants may be allocated differently than others, if so please explain.

ITEM IV.

* Since your existing TBLLs were calculated, identify the following in detail:

  (1) if your POTW has experienced any upsets, inhibition, interference or pass-through as a result of an industrial discharge.

  (2) if your POTW is presently violating any of its current NPDES permit limitations - include toxicity.

ITEM V.

* Using current sampling data, list in Column (1) the average and maximum amount of pollutants (in pounds per day) received in the POTW's influent. Current sampling data is defined as data obtained over the last 24 month period.

  All influent data collected and analyzed must be in accordance with 40 CFR §136. Sampling data collected should be analyzed using the lowest possible detection method(s), e.g. graphite furnace.

* Based on your existing TBLLs, as presented in Item II., list in Column (2), for each pollutant the Maximum Allowable Headwork Loading (MAHL) values derived from an applicable environmental criteria or standard, e.g. water quality, sludge, NPDES, inhibition, etc. For more information, please see EPA's <u>Local Limit Guidance Document</u> (July 2004).

Item VI.

* Using current sampling data, list in Column (1) the average and maximum amount of pollutants (in micrograms per liter) present your POTW's effluent. Current sampling data is defined as data obtained during the last 24 month period.

(Item VI. continued)

All effluent data collected and analyzed must be in accordance with 40 CFR §136. Sampling data collected should be analyzed using the lowest possible detection method(s), e.g. graphite furnace.

* List in Column (2A) what the Water Quality Standards (WQS) were (in micrograms per liter) when your TBLLs were calculated, please note what hardness value was used at that time. Hardness should be expressed in milligram per liter of Calcium Carbonate.

List in Column (2B) the current WQSs or "Chronic Gold Book" values for each pollutant multiplied by the dilution ratio used in your new/reissued NPDES permit. For example, with a dilution ratio of 25:1 at a hardness of 25 mg/l - Calcium Carbonate (copper's chronic WQS equals 6.54 ug/l) the chronic NPDES permit limit for copper would equal 156.25 ug/l.

ITEM VII.

* In Column (1), list all pollutants (in micrograms per liter) limited in your new/reissued NPDES permit. In Column (2), list all pollutants limited in your old/expired NPDES permit.

ITEM VIII.

* Using current sampling data, list in Column (1) the average and maximum amount of pollutants in your POTW's biosolids. Current data is defined as data obtained during the last 24 month period. Results are to be expressed as total dry weight.

All biosolids data collected and analyzed must be in accordance with 40 CFR §136.

In Column (2A), list current State and/or Federal sludge standards that your facility's biosolids must comply with. Also note how your POTW currently manages the disposal of its biosolids. If your POTW is planing on managing its biosolids differently, list in Column (2B) what your new biosolids criteria will be and method of disposal.

In general, please be sure the units reported are correct and all pertinent information is included in your evaluation. If you have any questions, please contact your pretreatment representative at EPA - New England.

REASSESSMENT OF TECHNICALLY BASED LOCAL LIMITS (TBLLs)

POTW Name & Address : ______________________________

NPDES PERMIT # : ______________________________

Date EPA approved current TBLLs : ______________________________

Date EPA approved current Sewer Use Ordinance : ______________________________

ITEM I.

In Column (1) list the conditions that existed when your current TBLLs were calculated. In Column (2), list current conditions or expected conditions at your POTW.		
	Column (1) EXISTING TBLLs	Column (2) PRESENT CONDITIONS
POTW Flow (MGD)		
Dilution Ratio or 7Q10 (from NPDES Permit)		
SIU Flow (MGD)		
Safety Factor		N/A
Biosolids Disposal Method(s)		

ITEM II.

EXISTING TBLLs			
POLLUTANT	NUMERICAL LIMIT (mg/l) or (lb/day)	POLLUTANT	NUMERICAL LIMIT (mg/l) or (lb/day)

ITEM III.

Note how your existing TBLLs, listed in Item II., are allocated to your Significant Industrial Users (SIUs), i.e. uniform concentration, contributory flow, mass proportioning, other. Please specify by circling.

ITEM IV.

Has your POTW experienced any upsets, inhibition, interference or pass-through from industrial sources since your existing TBLLs were calculated?
If yes, explain.

____

____

Has your POTW violated any of its NPDES permit limits and/or toxicity test requirements?

If yes, explain.

____

____

ITEM V.

Using current POTW influent sampling data fill in Column (1). In Column (2), list your Maximum Allowable Headwork Loading (MAHL) values used to derive your TBLLs listed in Item II. In addition, please note the Environmental Criteria for which each MAHL value was established, i.e. water quality, sludge, NPDES etc.				
Pollutant	Column (1) Influent Data Analyses Maximum (lb/day)	Average (lb/day)	Column (2) MAHL Values (lb/day)	Criteria
Arsenic				
Cadmium				
Chromium				
Copper				
Cyanide				
Lead				
Mercury				
Nickel				
Silver				
Zinc				
Other (List)				

ITEM VI.

Using current POTW effluent sampling data, fill in Column (1). In Column (2A) list what the Water Quality Standards (Gold Book Criteria) were at the time your existing TBLLs were developed. List in Column (2B) current Gold Book values multiplied by the dilution ratio used in your new/reissued NPDES permit.

Pollutant	Column (1) Effluent Data Analyses		Columns (2A) (2B) Water Quality Criteria (Gold Book)	
	Maximum (ug/l)	Average (ug/l)	From TBLLs (ug/l)	Today (ug/l)
Arsenic				
*Cadmium				
*Chromium				
*Copper				
Cyanide				
*Lead				
Mercury				
*Nickel				
Silver				
*Zinc				
Other (List)				

*Hardness Dependent (mg/l - $CaCO_3$)

ITEM VII.

In Column (1), identify all pollutants limited in your new/reissued NPDES permit. In Column (2), identify all pollutants that were limited in your old/expired NPDES permit.			
Column (1) NEW PERMIT Pollutants Limitations (ug/l)		Column (2) OLD PERMIT Pollutants	(ug/l) Limitations

ITEM VIII.

Using current POTW biosolids data, fill in Column (1). In Column (2A), list the biosolids criteria that was used at the time your existing TBLLs were calculated. If your POTW is planing on managing its biosolids differently, list in Column (2B) what your new biosolids criteria would be and method of disposal.

Pollutant	Column (1) Biosolids Data Analyses Average (mg/kg)	Columns (2A) Biosolids Criteria From TBLLs (mg/kg)	(2B) New (mg/kg)
Arsenic			
Cadmium			
Chromium			
Copper			
Cyanide			
Lead			
Mercury			
Nickel			
Silver			
Zinc			
Molybdenum			
Selenium			
Other (List)			

NPDES PERMIT REQUIREMENT
FOR
INDUSTRIAL PRETREATMENT ANNUAL REPORT

The information described below shall be included in the pretreatment program annual reports:

1. An updated list of all industrial users by category, as set forth in 40 C.F.R. 403.8(f)(2)(i), indicating compliance or noncompliance with the following:
   - baseline monitoring reporting requirements for newly promulgated industries
   - compliance status reporting requirements for newly promulgated industries
   - periodic (semi-annual) monitoring reporting requirements,
   - categorical standards, and
   - local limits;

2. A summary of compliance and enforcement activities during the preceding year, including the number of:
   - significant industrial users inspected by POTW (include inspection dates for each industrial user),
   - significant industrial users sampled by POTW (include sampling dates for each industrial user),
   - compliance schedules issued (include list of subject users),
   - written notices of violations issued (include list of subject users),
   - administrative orders issued (include list of subject users),
   - criminal or civil suits filed (include list of subject users) and,
   - penalties obtained (include list of subject users and penalty amounts);

3. A list of significantly violating industries required to be published in a local newspaper in accordance with 40 C.F.R. 403.8(f)(2)(vii);

4. A narrative description of program effectiveness including present and proposed changes to the program, such as funding, staffing, ordinances, regulations, rules and/or statutory authority;

5. A summary of all pollutant analytical results for influent, effluent, sludge and any toxicity or bioassay data from the wastewater treatment facility. The summary shall include a comparison of influent sampling results versus threshold inhibitory concentrations for the Wastewater Treatment System and effluent sampling results versus water quality standards. Such a comparison shall be based on the sampling program described in the paragraph below or any similar sampling program described in this Permit.

At a minimum, annual sampling and analysis of the influent and effluent of the Wastewater Treatment Plant shall be conducted for the following pollutants:

a.) Total Cadmium	f.) Total Nickel
b.) Total Chromium	g.) Total Silver
c.) Total Copper	h.) Total Zinc
d.) Total Lead	i.) Total Cyanide
e.) Total Mercury	j.) Total Arsenic

The sampling program shall consist of one 24-hour flow-proportioned composite and at least one grab sample that is representative of the flows received by the POTW. The composite shall consist of hourly flow-proportioned grab samples taken over a 24-hour period if the sample is collected manually or shall consist of a minimum of 48 samples collected at 30 minute intervals if an automated sampler is used. Cyanide shall be taken as a grab sample during the same period as the composite sample. Sampling and preservation shall be consistent with 40 CFR Part 136.

6. A detailed description of all interference and pass-through that occurred during the past year;

7. A thorough description of all investigations into interference and pass-through during the past year;

8. A description of monitoring, sewer inspections and evaluations which were done during the past year to detect interference and pass-through, specifying parameters and frequencies;

9. A description of actions being taken to reduce the incidence of significant violations by significant industrial users; and,

10. The date of the latest adoption of local limits and an indication as to whether or not the permittee is under a State or Federal compliance schedule that includes steps to be taken to revise local limits.

NPDES PART II STANDARD CONDITIONS
(January, 2007)

TABLE OF CONTENTS

PART II. A. GENERAL REQUIREMENTS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

a. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirements.

b. The CWA provides that any person who violates Section 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any of such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Section 402 (a)(3) or 402 (b)(8) of the CWA is subject to a civil penalty not to exceed $25,000 per day for each violation. Any person who negligently violates such requirements is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both. Any person who knowingly violates such requirements is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

c. Any person may be assessed an administrative penalty by the Administrator for violating Section 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

Note: See 40 CFR §122.41(a)(2) for complete "Duty to Comply" regulations.

2. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or notifications of planned changes or anticipated noncompliance does not stay any permit condition.

3. Duty to Provide Information

The permittee shall furnish to the Regional Administrator, within a reasonable time, any information which the Regional Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Regional Administrator, upon request, copies of records required to be kept by this permit.

4. Reopener Clause

The Regional Administrator reserves the right to make appropriate revisions to this permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the CWA in order to bring all discharges into compliance with the CWA.

For any permit issued to a treatment works treating domestic sewage (including "sludge-only facilities"), the Regional Administrator or Director shall include a reopener clause to incorporate any applicable standard for sewage sludge use or disposal promulgated under Section 405 (d) of the CWA. The Regional Administrator or Director may promptly modify or revoke and reissue any permit containing the reopener clause required by this paragraph if the standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or contains a pollutant or practice not limited in the permit.

Federal regulations pertaining to permit modification, revocation and reissuance, and termination are found at 40 CFR §122.62, 122.63, 122.64, and 124.5.

5. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the CWA, or Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

6. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges.

7. Confidentiality of Information

   a. In accordance with 40 CFR Part 2, any information submitted to EPA pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR Part 2 (Public Information).

   b. Claims of confidentiality for the following information will be denied:

      (1) The name and address of any permit applicant or permittee;
      (2) Permit applications, permits, and effluent data as defined in 40 CFR §2.302(a)(2).

   c. Information required by NPDES application forms provided by the Regional Administrator under 40 CFR §122.21 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

8. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Regional Administrator. (The Regional Administrator shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

9. State Authorities

Nothing in Part 122, 123, or 124 precludes more stringent State regulation of any activity covered by these regulations, whether or not under an approved State program.

10. Other Laws

The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, or local laws and regulations.

PART II. B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

4. Bypass

a. Definitions

(1) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.

(2) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can be reasonably expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of Paragraphs B.4.c. and 4.d. of this section.

c. Notice

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in paragraph D.1.e. of this part (Twenty-four hour reporting).

d. Prohibition of bypass

Bypass is prohibited, and the Regional Administrator may take enforcement action against a permittee for bypass, unless:

(1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and

(3) i) The permittee submitted notices as required under Paragraph 4.c. of this section.
ii) The Regional Administrator may approve an anticipated bypass, after considering its adverse effects, if the Regional Administrator determines that it will meet the three conditions listed above in paragraph 4.d. of this section.

5. Upset

a. Definition. *Upset* means an exceptional incident in which there is an unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph B.5.c. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;
(2) The permitted facility was at the time being properly operated;
(3) The permittee submitted notice of the upset as required in paragraphs D.1.a. and 1.e. (Twenty-four hour notice); and
(4) The permittee complied with any remedial measures required under B.3. above.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

PART II. C. MONITORING REQUIREMENTS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Except for records for monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application except for the information concerning storm water discharges which must be retained for a total of 6 years. This retention period may be extended by request of the Regional Administrator at any time.

c. Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;
(2) The individual(s) who performed the sampling or measurements;
(3) The date(s) analyses were performed;
(4) The individual(s) who performed the analyses;
(5) The analytical techniques or methods used; and
(6) The results of such analyses.

d. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.

e. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

2. Inspection and Entry

The permittee shall allow the Regional Administrator or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

PART II. D. REPORTING REQUIREMENTS

1. Reporting Requirements

a. Planned Changes. The permittee shall give notice to the Regional Administrator as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is only required when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR§122.29(b); or
(2) The alteration or addition could significantly change the nature or increase the quantities of the pollutants discharged. This notification applies to pollutants which are subject neither to the effluent limitations in the permit, nor to the notification requirements at 40 CFR§122.42(a)(1).
(3) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition or change may justify the application of permit conditions different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

b. Anticipated noncompliance. The permittee shall give advance notice to the Regional Administrator of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. Transfers. This permit is not transferable to any person except after notice to the Regional Administrator. The Regional Administrator may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the CWA. (See 40 CFR Part 122.61; in some cases, modification or revocation and reissuance is mandatory.)

d. Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(1) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Director for reporting results of monitoring of sludge use or disposal practices.

(2) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of the monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.

(3) Calculations for all limitations which require averaging or measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

e. Twenty-four hour reporting.

(1) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances.

A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(2) The following shall be included as information which must be reported within 24 hours under this paragraph.

(a) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR §122.41(g).)
(b) Any upset which exceeds any effluent limitation in the permit.
(c) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Regional Administrator in the permit to be reported within 24 hours. (See 40 CFR §122.44(g).)

(3) The Regional Administrator may waive the written report on a case-by-case basis for reports under Paragraph D.1.e. if the oral report has been received within 24 hours.

f. Compliance Schedules. Reports of compliance or noncompliance with, any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

g. Other noncompliance. The permittee shall report all instances of noncompliance not reported under Paragraphs D.1.d., D.1.e., and D.1.f. of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in Paragraph D.1.e. of this section.

h. Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Administrator, it shall promptly submit such facts or information.

2. Signatory Requirement

a. All applications, reports, or information submitted to the Regional Administrator shall be signed and certified. (See 40 CFR §122.22)

b. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 2 years per violation, or by both.

3. Availability of Reports.

Except for data determined to be confidential under Paragraph A.8. above, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statements on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA.

PART II. E. DEFINITIONS AND ABBREVIATIONS

1. Definitions for Individual NPDES Permits including Storm Water Requirements

Administrator means the Administrator of the United States Environmental Protection Agency, or an authorized representative.

Applicable standards and limitations means all, State, interstate, and Federal standards and limitations to which a “discharge”, a “sewage sludge use or disposal practice”, or a related activity is subject to, including “effluent limitations”, water quality standards, standards of performance, toxic effluent standards or prohibitions, “best management practices”, pretreatment standards, and “standards for sewage sludge use and disposal” under Sections 301, 302, 303, 304, 306, 307, 308, 403, and 405 of the CWA.

Application means the EPA standard national forms for applying for a permit, including any additions, revisions, or modifications to the forms; or forms approved by EPA for use in "approved States", including any approved modifications or revisions.

Average means the arithmetic mean of values taken at the frequency required for each parameter over the specified period. For total and/or fecal coliforms and Escherichia coli, the average shall be the geometric mean.

Average monthly discharge limitation means the highest allowable average of "daily discharges" over a calendar month calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

Average weekly discharge limitation means the highest allowable average of "daily discharges" measured during the calendar week divided by the number of "daily discharges" measured during the week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Best Professional Judgment (BPJ) means a case-by-case determination of Best Practicable Treatment (BPT), Best Available Treatment (BAT), or other appropriate technology-based standard based on an evaluation of the available technology to achieve a particular pollutant reduction and other factors set forth in 40 CFR §125.3 (d).

Coal Pile Runoff means the rainfall runoff from or through any coal storage pile.

Composite Sample means a sample consisting of a minimum of eight grab samples of equal volume collected at equal intervals during a 24-hour period (or lesser period as specified in the section on Monitoring and Reporting) and combined proportional to flow, or a sample consisting of the same number of grab samples, or greater, collected proportionally to flow over that same time period.

Construction Activities - The following definitions apply to construction activities:

(a) Commencement of Construction is the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

(b) Dedicated portable asphalt plant is a portable asphalt plant located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to. The term dedicated portable asphalt plant does not include facilities that are subject to the asphalt emulsion effluent limitation guideline at 40 CFR Part 443.

(c) Dedicated portable concrete plant is a portable concrete plant located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to.

(d) Final Stabilization means that all soil disturbing activities at the site have been complete, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

(e) Runoff coefficient means the fraction of total rainfall that will appear at the conveyance as runoff.

Contiguous zone means the entire zone established by the United States under Article 24 of the Convention on the Territorial Sea and the Contiguous Zone.

Continuous discharge means a "discharge" which occurs without interruption throughout the operating hours of the facility except for infrequent shutdowns for maintenance, process changes, or similar activities.

CWA means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, and Pub. L. 97-117; 33 USC §§1251 et seq.

Daily Discharge means the discharge of a pollutant measured during the calendar day or any other 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Director normally means the person authorized to sign NPDES permits by EPA or the State or an authorized representative. Conversely, it also could mean the Regional Administrator or the State Director as the context requires.

Discharge Monitoring Report Form (DMR) means the EPA standard national form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by permittees. DMRs must be used by "approved States" as well as by EPA. EPA will supply DMRs to any approved State upon request. The EPA national forms may be modified to substitute the State Agency name, address, logo, and other similar information, as appropriate, in place of EPA's.

Discharge of a pollutant means:

(a) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source", or

(b) Any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation (See "Point Source" definition).

This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works.

This term does not include an addition of pollutants by any "indirect discharger."

Effluent limitation means any restriction imposed by the Regional Administrator on quantities, discharge rates, and concentrations of "pollutants" which are "discharged" from "point sources" into "waters of the United States", the waters of the "contiguous zone", or the ocean.

Effluent limitation guidelines means a regulation published by the Administrator under Section 304(b) of CWA to adopt or revise "effluent limitations".

EPA means the United States "Environmental Protection Agency".

Flow-weighted composite sample means a composite sample consisting of a mixture of aliquots where the volume of each aliquot is proportional to the flow rate of the discharge.

Grab Sample – An individual sample collected in a period of less than 15 minutes.

Hazardous Substance means any substance designated under 40 CFR Part 116 pursuant to Section 311 of the CWA.

Indirect Discharger means a non-domestic discharger introducing pollutants to a publicly owned treatment works.

Interference means a discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

(a) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

(b) Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act (CWA), the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resources Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SDWA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection Research and Sanctuaries Act.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and which is not a land application unit, surface impoundment, injection well, or waste pile.

Land application unit means an area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for treatment or disposal.

Large and Medium municipal separate storm sewer system means all municipal separate storm sewers that are either: (i) located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and 40 CFR Part 122); or (ii) located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships, or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or (iii) owned or operated by a municipality other than those described in Paragraph (i) or (ii) and that are designated by the Regional Administrator as part of the large or medium municipal separate storm sewer system.

Maximum daily discharge limitation means the highest allowable “daily discharge” concentration that occurs only during a normal day (24-hour duration).

Maximum daily discharge limitation (as defined for the Steam Electric Power Plants only) when applied to Total Residual Chlorine (TRC) or Total Residual Oxidant (TRO) is defined as “maximum concentration” or “Instantaneous Maximum Concentration” during the two hours of a chlorination cycle (or fraction thereof) prescribed in the Steam Electric Guidelines, 40 CFR Part 423. These three synonymous terms all mean “a value that shall not be exceeded” during the two-hour chlorination cycle. This interpretation differs from the specified NPDES Permit requirement, 40 CFR § 122.2, where the two terms of “Maximum Daily Discharge” and “Average Daily Discharge” concentrations are specifically limited to the daily (24-hour duration) values.

Municipality means a city, town, borough, county, parish, district, association, or other public body created by or under State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribe organization, or a designated and approved management agency under Section 208 of the CWA.

National Pollutant Discharge Elimination System means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of the CWA. The term includes an “approved program”.

New Discharger means any building, structure, facility, or installation:

(a) From which there is or may be a “discharge of pollutants”;

(b) That did not commence the “discharge of pollutants” at a particular “site” prior to August 13, 1979;

(c) Which is not a “new source”; and

(d) Which has never received a finally effective NPDES permit for discharges at that “site”.

This definition includes an “indirect discharger” which commences discharging into “waters of the United States” after August 13, 1979. It also includes any existing mobile point source (other than an offshore or coastal oil and gas exploratory drilling rig or a coastal oil and gas exploratory drilling rig or a coastal oil and gas developmental drilling rig) such as a seafood processing rig, seafood processing vessel, or aggregate plant, that begins discharging at a “site” for which it does not have a permit; and any offshore rig or coastal mobile oil and gas exploratory drilling rig or coastal mobile oil and gas developmental drilling rig that commences the discharge of pollutants after August 13, 1979, at a ”site” under EPA’s permitting jurisdiction for which it is not covered by an individual or general permit and which is located in an area determined by the Regional Administrator in the issuance of a final permit to be in an area of biological concern. In determining whether an area is an area of biological concern, the Regional Administrator shall consider the factors specified in 40 CFR §§125.122 (a) (1) through (10).

An offshore or coastal mobile exploratory drilling rig or coastal mobile developmental drilling rig will be considered a "new discharger" only for the duration of its discharge in an area of biological concern.

New source means any building, structure, facility, or installation from which there is or may be a "discharge of pollutants", the construction of which commenced:

(a) After promulgation of standards of performance under Section 306 of CWA which are applicable to such source, or

(b) After proposal of standards of performance in accordance with Section 306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with Section 306 within 120 days of their proposal.

NPDES means "National Pollutant Discharge Elimination System".

Owner or operator means the owner or operator of any "facility or activity" subject to regulation under the NPDES programs.

Pass through means a Discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

Permit means an authorization, license, or equivalent control document issued by EPA or an "approved" State.

Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to any pipe ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff (see 40 CFR §122.2).

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

(a) Sewage from vessels; or

(b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well is used either to facilitate production or for disposal purposes is approved by the authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Primary industry category means any industry category listed in the NRDC settlement agreement (Natural Resources Defense Council et al. v. Train, 8 E.R.C. 2120 (D.D.C. 1976), modified 12 E.R.C. 1833 (D. D.C. 1979)); also listed in Appendix A of 40 CFR Part 122.

Privately owned treatment works means any device or system which is (a) used to treat wastes from any facility whose operation is not the operator of the treatment works or (b) not a "POTW".

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Publicly Owned Treatment Works (POTW) means any facility or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by a "State" or "municipality".

This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

Regional Administrator means the Regional Administrator, EPA, Region I, Boston, Massachusetts.

Secondary Industry Category means any industry which is not a "primary industry category".

Section 313 water priority chemical means a chemical or chemical category which:

(1) is listed at 40 CFR §372.65 pursuant to Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986);

(2) is present at or above threshold levels at a facility subject to EPCRA Section 313 reporting requirements; and

(3) satisfies at least one of the following criteria:

(i) are listed in Appendix D of 40 CFR Part 122 on either Table II (organic priority pollutants), Table III (certain metals, cyanides, and phenols), or Table V (certain toxic pollutants and hazardous substances);
(ii) are listed as a hazardous substance pursuant to Section 311(b)(2)(A) of the CWA at 40 CFR §116.4; or
(iii) are pollutants for which EPA has published acute or chronic water quality criteria.

Septage means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Sewage Sludge means any solid, semisolid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater treatment, scum, septage, portable toilet pumpings, Type III Marine Sanitation Device pumpings (33 CFR Part 159), and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge.

Sewage sludge use or disposal practice means the collection, storage, treatment, transportation, processing, monitoring, use, or disposal of sewage sludge.

Significant materials includes, but is not limited to: raw materials, fuels, materials such as solvents, detergents, and plastic pellets, raw materials used in food processing or production, hazardous substance designated under section 101(14) of CERCLA, any chemical the facility is required to report pursuant to EPCRA Section 313, fertilizers, pesticides, and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills includes, but is not limited to, releases of oil or hazardous substances in excess of reportable quantities under Section 311 of the CWA (see 40 CFR §110.10 and §117.21) or Section 102 of CERCLA (see 40 CFR § 302.4).

Sludge-only facility means any "treatment works treating domestic sewage" whose methods of sewage sludge use or disposal are subject to regulations promulgated pursuant to Section 405(d) of the CWA, and is required to obtain a permit under 40 CFR §122.1(b)(3).

State means any of the 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Trust Territory of the Pacific Islands.

Storm Water means storm water runoff, snow melt runoff, and surface runoff and drainage.

Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. (See 40 CFR §122.26 (b)(14) for specifics of this definition.

Time-weighted composite means a composite sample consisting of a mixture of equal volume aliquots collected at a constant time interval.

Toxic pollutants means any pollutant listed as toxic under Section 307 (a)(1) or, in the case of "sludge use or disposal practices" any pollutant identified in regulations implementing Section 405(d) of the CWA.

Treatment works treating domestic sewage means a POTW or any other sewage sludge or wastewater treatment devices or systems, regardless of ownership (including federal facilities), used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated for the disposal of sewage sludge. This definition does not include septic tanks or similar devices.

For purposes of this definition, "domestic sewage" includes waste and wastewater from humans or household operations that are discharged to or otherwise enter a treatment works. In States where there is no approved State sludge management program under Section 405(f) of the CWA, the Regional Administrator may designate any person subject to the standards for sewage sludge use and disposal in 40 CFR Part 503 as a "treatment works treating domestic sewage", where he or she finds that there is a potential for adverse effects on public health and the environment from poor sludge quality or poor sludge handling, use or disposal practices, or where he or she finds that such designation is necessary to ensure that such person is in compliance with 40 CFR Part 503.

Waste Pile means any non-containerized accumulation of solid, non-flowing waste that is used for treatment or storage.

Waters of the United States means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide;

(b) All interstate waters, including interstate "wetlands";

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands", sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purpose;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in Paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in Paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds as defined in 40 CFR §423.11(m) which also meet the criteria of this definition) are not waters of the United States.

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Whole Effluent Toxicity (WET) means the aggregate toxic effect of an effluent measured directly by a toxicity test. (See Abbreviations Section, following, for additional information.)

2. <u>Definitions for NPDES Permit Sludge Use and Disposal Requirements</u>.

Active sewage sludge unit is a sewage sludge unit that has not closed.

Aerobic Digestion is the biochemical decomposition of organic matter in sewage sludge into carbon dioxide and water by microorganisms in the presence of air.

Agricultural Land is land on which a food crop, a feed crop, or a fiber crop is grown. This includes range land and land used as pasture.

Agronomic rate is the whole sludge application rate (dry weight basis) designed:

(1) To provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or vegetation grown on the land; and

(2) To minimize the amount of nitrogen in the sewage sludge that passes below the root zone of the crop or vegetation grown on the land to the ground water.

Air pollution control device is one or more processes used to treat the exit gas from a sewage sludge incinerator stack.

Anaerobic digestion is the biochemical decomposition of organic matter in sewage sludge into methane gas and carbon dioxide by microorganisms in the absence of air.

Annual pollutant loading rate is the maximum amount of a pollutant that can be applied to a unit area of land during a 365 day period.

Annual whole sludge application rate is the maximum amount of sewage sludge (dry weight basis) that can be applied to a unit area of land during a 365 day period.

Apply sewage sludge or sewage sludge applied to the land means land application of sewage sludge.

Aquifer is a geologic formation, group of geologic formations, or a portion of a geologic formation capable of yielding ground water to wells or springs.

Auxiliary fuel is fuel used to augment the fuel value of sewage sludge. This includes, but is not limited to, natural gas, fuel oil, coal, gas generated during anaerobic digestion of sewage sludge, and municipal solid waste (not to exceed 30 percent of the dry weight of the sewage sludge and auxiliary fuel together). Hazardous wastes are not auxiliary fuel.

Base flood is a flood that has a one percent chance of occurring in any given year (i.e. a flood with a magnitude equaled once in 100 years).

Bulk sewage sludge is sewage sludge that is not sold or given away in a bag or other container for application to the land.

Contaminate an aquifer means to introduce a substance that causes the maximum contaminant level for nitrate in 40 CFR §141.11 to be exceeded in ground water or that causes the existing concentration of nitrate in the ground water to increase when the existing concentration of nitrate in the ground water exceeds the maximum contaminant level for nitrate in 40 CFR §141.11.

Class I sludge management facility is any publicly owned treatment works (POTW), as defined in 40 CFR §501.2, required to have an approved pretreatment program under 40 CFR §403.8 (a) (including any POTW located in a state that has elected to assume local program responsibilities pursuant to 40 CFR §403.10 (e) and any treatment works treating domestic sewage, as defined in 40 CFR § 122.2, classified as a Class I sludge management facility by the EPA Regional Administrator, or, in the case of approved state programs, the Regional Administrator in conjunction with the State Director, because of the potential for sewage sludge use or disposal practice to affect public health and the environment adversely.

Control efficiency is the mass of a pollutant in the sewage sludge fed to an incinerator minus the mass of that pollutant in the exit gas from the incinerator stack divided by the mass of the pollutant in the sewage sludge fed to the incinerator.

Cover is soil or other material used to cover sewage sludge placed on an active sewage sludge unit.

Cover crop is a small grain crop, such as oats, wheat, or barley, not grown for harvest.

Cumulative pollutant loading rate is the maximum amount of inorganic pollutant that can be applied to an area of land.

Density of microorganisms is the number of microorganisms per unit mass of total solids (dry weight) in the sewage sludge.

Dispersion factor is the ratio of the increase in the ground level ambient air concentration for a pollutant at or beyond the property line of the site where the sewage sludge incinerator is located to the mass emission rate for the pollutant from the incinerator stack.

Displacement is the relative movement of any two sides of a fault measured in any direction.

Domestic septage is either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from a grease trap at a restaurant.

Domestic sewage is waste and wastewater from humans or household operations that is discharged to or otherwise enters a treatment works.

Dry weight basis means calculated on the basis of having been dried at 105 degrees Celsius (°C) until reaching a constant mass (i.e. essentially 100 percent solids content).

Fault is a fracture or zone of fractures in any materials along which strata on one side are displaced with respect to the strata on the other side.

Feed crops are crops produced primarily for consumption by animals.

Fiber crops are crops such as flax and cotton.

Final cover is the last layer of soil or other material placed on a sewage sludge unit at closure.

Fluidized bed incinerator is an enclosed device in which organic matter and inorganic matter in sewage sludge are combusted in a bed of particles suspended in the combustion chamber gas.

Food crops are crops consumed by humans. These include, but are not limited to, fruits, vegetables, and tobacco.

Forest is a tract of land thick with trees and underbrush.

Ground water is water below the land surface in the saturated zone.

Holocene time is the most recent epoch of the Quaternary period, extending from the end of the Pleistocene epoch to the present.

Hourly average is the arithmetic mean of all the measurements taken during an hour. At least two measurements must be taken during the hour.

Incineration is the combustion of organic matter and inorganic matter in sewage sludge by high temperatures in an enclosed device.

Industrial wastewater is wastewater generated in a commercial or industrial process.

Land application is the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of sewage sludge into the soil so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil.

Land with a high potential for public exposure is land that the public uses frequently. This includes, but is not limited to, a public contact site and reclamation site located in a populated area (e.g., a construction site located in a city).

Land with low potential for public exposure is land that the public uses infrequently. This includes, but is not limited to, agricultural land, forest and a reclamation site located in an unpopulated area (e.g., a strip mine located in a rural area).

Leachate collection system is a system or device installed immediately above a liner that is designed, constructed, maintained, and operated to collect and remove leachate from a sewage sludge unit.

Liner is soil or synthetic material that has a hydraulic conductivity of 1×10^{-7} centimeters per second or less.

Lower explosive limit for methane gas is the lowest percentage of methane gas in air, by volume, that propagates a flame at 25 degrees Celsius and atmospheric pressure.

Monthly average (Incineration) is the arithmetic mean of the hourly averages for the hours a sewage sludge incinerator operates during the month.

Monthly average (Land Application) is the arithmetic mean of all measurements taken during the month.

Municipality means a city, town, borough, county, parish, district, association, or other public body (including an intermunicipal agency of two or more of the foregoing entities) created by or under State law; an Indian tribe or an authorized Indian tribal organization having jurisdiction over sewage sludge management; or a designated and approved management agency under section 208 of the CWA, as amended. The definition includes a special district created under state law, such as a water district, sewer district, sanitary district, utility district, drainage district, or similar entity, or an integrated waste management facility as defined in section 201 (e) of the CWA, as amended, that has as one of its principal responsibilities the treatment, transport, use or disposal of sewage sludge.

Other container is either an open or closed receptacle. This includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer with a load capacity of one metric ton or less.

Pasture is land on which animals feed directly on feed crops such as legumes, grasses, grain stubble, or stover.

Pathogenic organisms are disease-causing organisms. These include, but are not limited to, certain bacteria, protozoa, viruses, and viable helminth ova.

Permitting authority is either EPA or a State with an EPA-approved sludge management program.

Person is an individual, association, partnership, corporation, municipality, State or Federal Agency, or an agent or employee thereof.

Person who prepares sewage sludge is either the person who generates sewage sludge during the treatment of domestic sewage in a treatment works or the person who derives a material from sewage sludge.

pH means the logarithm of the reciprocal of the hydrogen ion concentration; a measure of the acidity or alkalinity of a liquid or solid material.

Place sewage sludge or sewage sludge placed means disposal of sewage sludge on a surface disposal site.

Pollutant (as defined in sludge disposal requirements) is an organic substance, an inorganic substance, a combination or organic and inorganic substances, or pathogenic organism that, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food chain, could on the basis on information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction) or physical deformations in either organisms or offspring of the organisms.

Pollutant limit (for sludge disposal requirements) is a numerical value that describes the amount of a pollutant allowed per unit amount of sewage sludge (e.g., milligrams per kilogram of total solids); the amount of pollutant that can be applied to a unit of land (e.g., kilograms per hectare); or the volume of the material that can be applied to the land (e.g., gallons per acre).

Public contact site is a land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

Qualified ground water scientist is an individual with a baccalaureate or post-graduate degree in the natural sciences or engineering who has sufficient training and experience in ground water hydrology and related fields, as may be demonstrated by State registration, professional certification, or completion of accredited university programs, to make sound professional judgments regarding ground water monitoring, pollutant fate and transport, and corrective action.

Range land is open land with indigenous vegetation.

Reclamation site is drastically disturbed land that is reclaimed using sewage sludge. This includes, but is not limited to, strip mines and construction sites.

Risk specific concentration is the allowable increase in the average daily ground level ambient air concentration for a pollutant from the incineration of sewage sludge at or beyond the property line of a site where the sewage sludge incinerator is located.

Runoff is rainwater, leachate, or other liquid that drains overland on any part of a land surface and runs off the land surface.

Seismic impact zone is an area that has 10 percent or greater probability that the horizontal ground level acceleration to the rock in the area exceeds 0.10 gravity once in 250 years.

Sewage sludge is a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to:, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in treatment works.

Sewage sludge feed rate is either the average daily amount of sewage sludge fired in all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located for the number of days in a 365 day period that each sewage sludge incinerator operates, or the average daily design capacity for all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located.

Sewage sludge incinerator is an enclosed device in which only sewage sludge and auxiliary fuel are fired.

Sewage sludge unit is land on which only sewage sludge is placed for final disposal. This does not include land on which sewage sludge is either stored or treated. Land does not include waters of the United States, as defined in 40 CFR §122.2.

Sewage sludge unit boundary is the outermost perimeter of an active sewage sludge unit.

Specific oxygen uptake rate (SOUR) is the mass of oxygen consumed per unit time per unit mass of total solids (dry weight basis) in sewage sludge.

Stack height is the difference between the elevation of the top of a sewage sludge incinerator stack and the elevation of the ground at the base of the stack when the difference is equal to or less than 65 meters. When the difference is greater than 65 meters, stack height is the creditable stack height determined in accordance with 40 CFR §51.100 (ii).

State is one of the United States of America, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Trust Territory of the Pacific Islands, the Commonwealth of the Northern Mariana Islands, and an Indian tribe eligible for treatment as a State pursuant to regulations promulgated under the authority of section 518(e) of the CWA.

Store or storage of sewage sludge is the placement of sewage sludge on land on which the sewage sludge remains for two years or less. This does not include the placement of sewage sludge on land for treatment.

Surface disposal site is an area of land that contains one or more active sewage sludge units.

Total hydrocarbons means the organic compounds in the exit gas from a sewage sludge incinerator stack measured using a flame ionization detection instrument referenced to propane.

Total solids are the materials in sewage sludge that remain as residue when the sewage sludge is dried at 103 to 105 degrees Celsius.

Treat or treatment of sewage sludge is the preparation of sewage sludge for final use or disposal. This includes, but is not limited to, thickening, stabilization, and dewatering of sewage sludge. This does not include storage of sewage sludge.

Treatment works is either a federally owned, publicly owned, or privately owned device or system used to treat (including recycle and reclaim) either domestic sewage or a combination of domestic sewage and industrial waste of a liquid nature.

Unstable area is land subject to natural or human-induced forces that may damage the structural components of an active sewage sludge unit. This includes, but is not limited to, land on which the soils are subject to mass movement.

Unstabilized solids are organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Vector attraction is the characteristic of sewage sludge that attracts rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents.

Volatile solids is the amount of the total solids in sewage sludge lost when the sewage sludge is combusted at 550 degrees Celsius in the presence of excess air.

Wet electrostatic precipitator is an air pollution control device that uses both electrical forces and water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

Wet scrubber is an air pollution control device that uses water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

3. Commonly Used Abbreviations

BOD	Five-day biochemical oxygen demand unless otherwise specified
CBOD	Carbonaceous BOD
CFS	Cubic feet per second
COD	Chemical oxygen demand
Chlorine	
Cl_2	Total residual chlorine
TRC	Total residual chlorine which is a combination of free available chlorine (FAC, see below) and combined chlorine (chloramines, etc.)

TRO	Total residual chlorine in marine waters where halogen compounds are present
FAC	Free available chlorine (aqueous molecular chlorine, hypochlorous acid, and hypochlorite ion)
Coliform	
Coliform, Fecal	Total fecal coliform bacteria
Coliform, Total	Total coliform bacteria
Cont. (Continuous)	Continuous recording of the parameter being monitored, i.e. flow, temperature, pH, etc.
Cu. M/day or M^3/day	Cubic meters per day
DO	Dissolved oxygen
kg/day	Kilograms per day
lbs/day	Pounds per day
mg/l	Milligram(s) per liter
ml/l	Milliliters per liter
MGD	Million gallons per day
Nitrogen	
Total N	Total nitrogen
NH_3-N	Ammonia nitrogen as nitrogen
NO_3-N	Nitrate as nitrogen
NO_2-N	Nitrite as nitrogen
NO_3-NO_2	Combined nitrate and nitrite nitrogen as nitrogen
TKN	Total Kjeldahl nitrogen as nitrogen
Oil & Grease	Freon extractable material
PCB	Polychlorinated biphenyl
pH	A measure of the hydrogen ion concentration. A measure of the acidity or alkalinity of a liquid or material
Surfactant	Surface-active agent

Temp. °C	Temperature in degrees Centigrade
Temp. °F	Temperature in degrees Fahrenheit
TOC	Total organic carbon
Total P	Total phosphorus
TSS or NFR	Total suspended solids or total nonfilterable residue
Turb. or Turbidity	Turbidity measured by the Nephelometric Method (NTU)
ug/l	Microgram(s) per liter
WET	"Whole effluent toxicity" is the total effect of an effluent measured directly with a toxicity test.
C-NOEC	"Chronic (Long-term Exposure Test) – No Observed Effect Concentration". The highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specified time of observation.
A-NOEC	"Acute (Short-term Exposure Test) – No Observed Effect Concentration" (see C-NOEC definition).
LC_{50}	LC_{50} is the concentration of a sample that causes mortality of 50% of the test population at a specific time of observation. The LC_{50} = 100% is defined as a sample of undiluted effluent.
ZID	Zone of Initial Dilution means the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports.

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

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES

NPDES PERMIT NO: **MA0101010**

PUBLIC NOTICE START AND END DATES: February 20, 2015 – April 20, 2015

NAME AND ADDRESS OF APPLICANT:

City of Brockton
City Hall, 45 School Street
Brockton, Massachusetts 02401

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Brockton Advanced Water Reclamation Facility
303 Oak Hill Way
Brockton, Massachusetts 02301

The municipalities of Abington and Whitman are co-permittees for specific activities required by the permit, as set forth in Section VIII of this Fact Sheet and Sections 1.B and 1.C. of the Draft Permit. The responsible municipal departments are:

Town of Abington	**Town of Whitman**
Sewer Department	**Department of Public Works**
350 Summer Street	**100 Essex Street, P.O. Box 454**
Abington, MA 02351	**Whitman, MA 02382**

RECEIVING WATER: **Salisbury Plain River** (Taunton River Basin - MA62)

CLASSIFICATION: **Class B**

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Fact Sheet Attachments:

I. PROPOSED ACTION, TYPE OF FACILITY AND DISCHARGE LOCATION

The above named applicant has applied to the U.S. Environmental Protection Agency for the re-issuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving water. The current permit was issued on May 11, 2005. The permit expired in 2010 and has been administratively continued pursuant to 40 C.F.R. 122.6.

The Brockton Advanced Water Reclamation Facility is an advanced secondary treatment plant that was originally constructed in 1963 with a design flow of 18 mgd. The facility has received a major upgrade since the issuance of the current permit to provide for improved nutrient removal, maintain permit compliance and extend facility life. According to the City this upgrade has increased the capacity of the facility to 20.49 mgd (See Application form 2A, Section A.6.), although the City has not received authorization for increased flow pursuant to the state antidegradation policy (see discussion in Section VI.B.1 below). The treatment plant discharges to the Salisbury Plain River (Outfall 001). See Figure 1 (attached).

The treatment plant and the Brockton collection system are owned by the City of Brockton and are currently operated under contract by Veolia Water. Veolia submitted the application for renewal of the NPDES permit as required by 40 CFR §122.22(b). The City shall be the sole permittee for the treatment plant consistent with other contract operated publicly owned treatment works (POTWs). The Towns of Abington and Whitman shall be co-permittees for their collection systems that discharge to the Brockton AWRF.

II. DESCRIPTION OF DISCHARGE

Quantitative descriptions of the discharge in terms of significant effluent parameters based on recent discharge monitoring reports (DMRs) for January 2011 through December 2013 may be found in Fact Sheet Table 1 (attached).

III. RECEIVING WATER DESCRIPTION

The receiving water, Salisbury Plain River, is classified as a Class B warm water fishery in the Massachusetts Surface Water Quality Standards, 314 CMR 4.05(4)(a). Class B waters are designated as a 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. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. The waters should have consistently good aesthetic value.

A warm water fishery is defined in the Massachusetts Surface Water Quality Standards (314 CMR 4.02) as water in which the maximum mean monthly temperature generally exceeds 20° Celsius during the summer months and are not capable of supporting a year-round population of cold water stenothermal aquatic life.

The Salisbury Plain River is an effluent dominated stream. The Brockton AWRF makes up over 95% of the flow in the Salisbury Plain River under 7Q10 conditions, and effluent-dominated conditions extend downstream through the Matfield (the Brockton AWRF flow is 50-90% of mean August flows at the former USGS streamgage site on the Matfield River in Bridgewater) and into the Taunton River in dry weather.

The segment of the Salisbury Plain River to which the Brockton AWRF discharges (segment 62-06) is listed in the Massachusetts 303(d) list for impairments to aquatic macroinvertebrate bioassessments, excess algal growth, fecal coliform (TDML completed), dissolved oxygen, total phosphorus, taste and odor, turbidity and debris/floatables/trash (denoted 'not a pollutant'; no TMDL required). The Salisbury Plain River joins Beaver Brook in East Bridgewater to form the Matfield River (segment 62-32), which is also listed in the 303(d) list (impairments due to aquatic macroinvertebrate bioassessments, excess algal growth, fecal coliform (TDML completed), dissolved oxygen, total phosphorus, taste and odor). The Matfield River joins with the Town River in Bridgewater to become the Taunton River. The Taunton River from Bridgewater to the Route 24 bridge in Taunton is listed as attaining the Aquatic Life use, with other uses not assessed. The Taunton River is a designated Wild and Scenic River under 16 U.S.C. 1271-1287, and is the longest undammed river in Massachusetts. The Taunton River flows into Mount Hope Bay at Fall River; estuarine conditions extend upstream as far as the City of Taunton.

IV. LIMITATIONS AND CONDITIONS

The effluent limitations and monitoring requirements may be found in the draft NPDES permit.

V. PERMIT BASIS: STATUTORY AND REGULATORY AUTHORITY

The Clean Water Act (the "CWA") prohibits the discharge of pollutants to waters of the United States without an NPDES permit unless such a discharge is otherwise authorized by the Act. A NPDES permit is used to implement technology-based and water quality-based effluent limitations as well as other requirements including monitoring and reporting. This draft NPDES permit was developed in accordance with statutory and regulatory authorities established pursuant to the Act. The regulations governing the NPDES program are found in 40 CFR Parts 122, 124 and 125.

Under Section 301(b)(1)(B) of the CWA, POTWs are required to achieve technology-based effluent limitations based upon secondary treatment. The secondary treatment requirements are set forth in 40 CFR Part 133 and define secondary treatment as an effluent achieving specific limitations for biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH.

Under Section 301(b)(1)(C) of the CWA, discharges are also subject to effluent limitations based on water quality standards. The MA SWQS, 314 CMR 4.00, include requirements for the regulation and control of toxic constituents and also require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site specific criteria is established. Massachusetts regulations similarly require that its permits contain limitations which are adequate to assure the attainment and maintenance of the water quality standards of the receiving waters as assigned in the MA SWQS, 314 CMR 4.00. See 314 CMR 3.11(3). Additionally, under 40 CFR §122.44 (d)(1)(i), "[l]imitations must control all pollutants or pollutant parameters which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard."

VI. EXPLANATION OF THE PERMIT'S EFFLUENT LIMITATIONS

A. TREATMENT PROCESS AND COLLECTION SYSTEM DESCRIPTION

The Brockton AWRF is engaged in the collection and treatment of municipal wastewater, including industrial wastewater from nine non-categorical significant industrial users and six categorical industrial users (including sheet metal manufacturers and finishers and medical and pharmaceutical users). The facility provides advanced treatment, filtration and UV disinfection. Figure 2. The wastewater treatment processes are as follows:

At the headworks wastewater is screened and passes through grit removal, then flows to the influent pump station and a distribution structure to one of four primary clarification tanks. After settling in the primary clarifiers, the flow continues on through one of two parallel treatment trains. The North train consists of four aeration basins and three secondary clarifiers. The South treatment train consists of three aeration basins and three secondary clarifiers. Both sets of aeration basins were upgraded as of 2010 to a biological nitrogen removal system with chemical phosphorus removal. Flows to the south treatment train pass through the primary effluent lift station; in extremely high flow conditions primary effluent is also on occasion diverted directly from the primary effluent lift station to UV disinfection (secondary bypass; see restrictions on such practices at Draft Permit Part II.B.4). After settling in the secondary clarifiers, the flow is recombined at the Filter Building, containing four AquaDiamond cloth media filters and two sand filters. The effluent then flows to UV disinfection, and passes over a reaeration cascade to the Salisbury Plain River. Sludge is dewatered by centrifuge and incinerated on site.

The treatment process described reflects a treatment plant upgrade project completed in 2010. The upgrade included conversion of the existing aeration basins into a biological nitrogen removal system; replacement of sludge collection equipment in the primary clarifiers; expansion of the existing effluent filter capacity; installation of chemical systems to achieve chemical phosphorus removal; replacement of the sodium hypochlorite disinfection system with a new ultraviolet (UV) disinfection system; new electrical feed/distribution systems; and odor control systems.

The sewage collection system is entirely separate sanitary sewer. Table 2 below shows the number of households served in each municipality.

Table 2. Communities served

Town	Population served by AWRF
Brockton	90,000
Abington	10,000 (est)
Whitman	10,000 (est)

The collection system has historically been subject to extremely high wet weather flows due to infiltration and inflow (I/I) to the system. The City of Brockton has engaged in an extensive program to remove I/I from its system, and has been successful in reducing both peak flows and average annual flows to the AWRF.

The collection system and facility upgrade were performed pursuant to a judicial consent decree issued in September 2006; the work required under that decree has been completed and the judicial decree was terminated in March 2013. EPA also issued an administrative order in April 2006 relating to violations of the copper limit and establishing an interim limit of 20 ug/l. That order remains in effect but will be superseded by the new copper limits in the reissued permit (see Copper section below).

B. DERIVATION OF EFFLUENT LIMITATIONS

1. Effluent Flow

The draft permit contains a new 12 month rolling average effluent flow limit of 18.0 MGD. Sewage treatment plant discharge is encompassed within the definition of “pollutant” and is subject to regulation under the CWA. The CWA defines “pollutant” to mean, *inter alia*, “municipal . . . waste” and “sewage…discharged into water.” 33 U.S.C. § 1362(6). The limitation on sewage effluent flow is within EPA’s authority to condition a permit in order to carry out the objectives of the Act. *See* CWA §§ Sections 402(a)(2) and 301(b)(1)(C); 40 C.F.R. §§ 122.4(a) and (d); 122.43 and 122.44(d). Regulating the quantity of pollutants in the discharge through a restriction on the quantity of wastewater effluent is consistent with the overall structure and purposes of the CWA.

The draft permit does not include any changes from the current permit that reflect the increased capacity of the upgraded facility (20.5 mgd) requested by the City of Brockton and others, as EPA has determined that such an increase cannot be authorized at this time consistent with the Massachusetts Antidegradation regulations (314 CMR 4.04) and procedures. The basis for this determination is set forth below.

a. Background

As discussed above, the Brockton AWRF was designed to treat an average effluent flow of 18 MGD.[1] This design flow is reflected in the current permit in the calculation of mass load limits for $CBOD_5$, TSS and ammonia. The Brockton AWRF has not had a numeric flow limit in its current or previous permits; EPA notes that this is different from standard practice in Massachusetts NPDES permits, which generally contain an effluent flow limit based on a facility’s design flow, implemented as a 12 month rolling average limit. While not containing a numeric flow limit, the current permit did contain restrictions on increased wastewater flow to the facility, with a condition stating that:

> Flows originating from the Towns of Abington and Whitman are limited each to an annual average of 1 MGD. The Co-permittees shall not accept flow from any new sewer connections in other communities although, EPA and MA DEP may allow such a tie-in through a permit modification, if an abutting Town with a completed Comprehensive

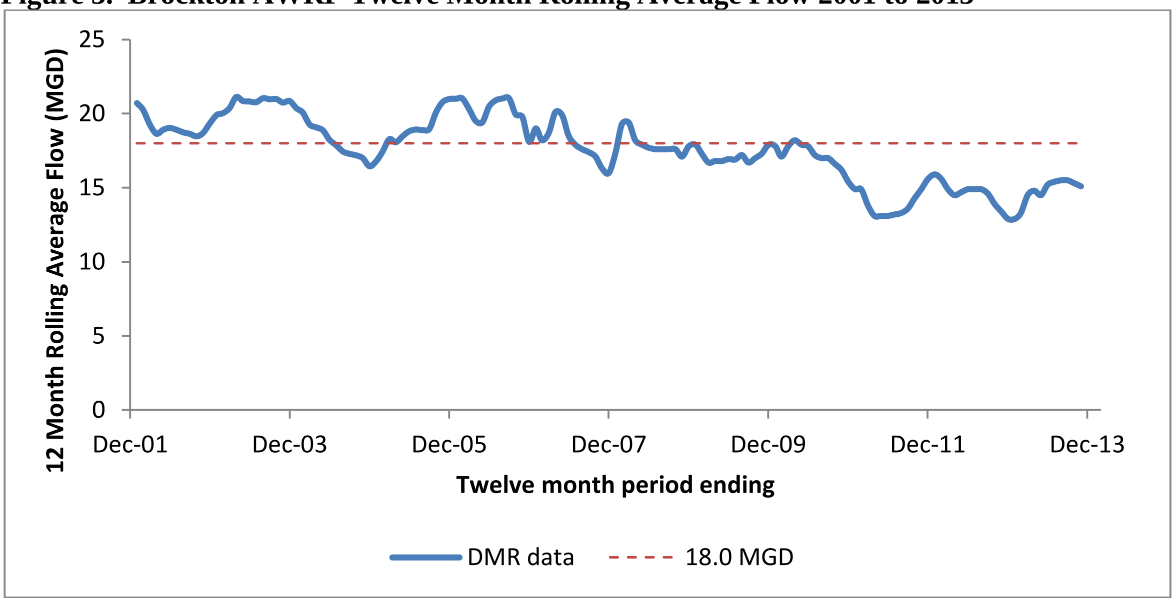
[1] This is the facility’s design flow in its upgrade in the 1970s. See Response to Comments, MA0101010 (2005), City of Brockton comment #1.

> Wastewater Management Plan (CWMP) demonstrates that a tie-in to Abington or Whitman is an appropriate option.
>
> Increased flows from facilities currently connected directly to the Brockton sewer system shall be offset, to the extent feasible, in order to minimize any net increase in flow to the WWTP.

Final Permit MA0101010, Part I.A.1 n.3 (2005). Historically (until 2007) the Brockton AWRF has operated for lengthy periods above the 18.0 MGD design flow. See Figure 3.

The upgraded AWRF was designed with an increased capacity of 20.49 MGD and construction was completed in 2010. In the meantime the City was engaged in an intensive effort to reduce infiltration and inflow (I/I) in its system pursuant to a judicial consent order with EPA. This effort has dramatically reduced peak and average flows from the Brockton AWRF. Figure 3.

Figure 3. Brockton AWRF Twelve Month Rolling Average Flow 2001 to 2013



In conjunction with the reissuance of its NPDES permit the City of Brockton has requested that the new permit reflect the upgraded capacity of the facility of 20.49 MGD, most recently by letter of June 7, 2014. EPA has also received requests for increases to Brockton's permitted flows from other entities, including elected officials, and seeking consideration of the expansion of Brockton's role as a regional facility for wastewater disposal for surrounding communities. EPA has also received correspondence opposing such an increase. This Fact Sheet represents EPA's formal consideration of the proposed flow increase and EPA invites comment from all interested entities on its determination here.

The City's plan to upgrade with an increased capacity was raised in connection with the issuance of the current permit in 2005, and EPA's response at that time was as follows:

> We understand that the City's current plans are to construct upgraded facilities with a

design flow of 20.48 MGD. However, the facilities plan which proposes this design flow increase has not yet been approved by MADEP, it has not been shown that Class B water quality standards can be attained at the increased flow, nor has the state conducted a review which demonstrates that this increase can be authorized under its antidegradation policy.

An increase in design flow at the facility may be reflected in the City's permit after their facility's plan has been approved, it has been shown that the Class B water quality standards can be achieved at the increased flow and that the increased discharge can be authorized under the MADEP antidegradation policy. Limitations in the permit based upon a dilution factor [metals] would need to be adjusted to reflect the change in dilution at the low flow conditions.

Response to Comments, MA0101010 (2005), Response #1. As the state has approved the facility plan and the upgrade construction is complete, EPA proceeds to assess antidegradation and the meeting of water quality standards below.

In making this assessment, EPA acknowledges the extensive effort that has gone into evaluating wastewater treatment alternatives in this region, including the *Upper Taunton River Regional Wastewater Evaluation* (CDM Smith/Weston & Sampson, 2012) and the MEPA process for construction of the upgraded Brockton AWRF (EEA #13109). EPA also recognizes the needs expressed by a number of surrounding communities. Indeed in moving forward on permit issuance EPA intends to provide some relief to communities who now or in the future have agreements with the City of Brockton by removing the strict limitation on additional connections that is included in the current permit, so that some of the capacity that has opened up through removal of I/I, even within the original 18 mgd, can be allocated.

However, as indicated in the Response to Comments to the previous, jointly-issued EPA and MassDEP permit for this facility, an antidegradation review and assessment of the meeting of water quality standards under an increased flow is needed before the permit can reflect any increase in design flow from 18 to 20.5 mgd, and the regional studies and MEPA processes do not themselves satisfy these requirements. An increase in design flow is itself an increase in pollutants to the receiving water,[2] as well as having potential for increasing loading of individual pollutants, some of which (pharmaceuticals, endocrine disrupters, etc.) have not been monitored. Therefore any increase in flow requires antidegradation review to ensure that all increases are within the assimilative capacity of the river or otherwise authorized pursuant to the antidegradation regulations, both at the point of discharge and further downstream. In addition, EPA's regulations require that no permit be issued unless conditions can be imposed that ensure compliance with water quality standards. These requirements are addressed in turn below.

b. Antidegradation Review

In accordance with 40 CFR 131.12, the State Water Quality Standards at 314 CMR 4.04 include

[2] Effluent flows are treated sewage and are expressly included in the definition of "pollutant" under the Clean Water Act and EPA's regulations. 33 U.S.C. 1362(6) ("The term 'pollutant' means . . . sewage . . . discharged into water.").

an antidegradation provision that apply to all new or increased point source discharges to waters of the Commonwealth requiring a permit under 314 CMR 3.00. The Implementation Procedures ensures that existing instream water uses are protected and maintained, and water quality levels in high quality waters are protected and maintained. MassDEP published a policy document, titled *Implementation Procedures for the Antidegradation Provisions of the Massachusetts Surface Water Quality Standards (Implementation Procedures)* on October 21, 2009 that explains how the antidegradation provisions of the State standards are implemented. The Implementation Procedures establish a technology-based review for all discharges, and four tiers of additional review dependent on the quality of the receiving water.

i. Background

As context for the antidegradation analysis, it should be noted that the receiving water, and the overall Taunton River watershed, are extremely effluent dominated even under the historic design flow conditions. Under 7Q10 conditions (the specified conditions for antidegradation analysis, *see Implementation Procedures* at 2), the natural baseflow in the Salisbury Plain River is only 2% of the 18.0 mgd historic design flow. Even under less severe conditions the plant effluent flows dwarf the natural flows in the Salisbury Plain River; a USGS Streamstats estimate of median August flows just upstream of the discharge is 3.35 cfs (2.2 mgd), only 12% of the 18 mgd design flow.

These effluent dominated conditions persist well downstream of the point of discharge. The Salisbury Plain River flows 2.3 miles into the Matfield River, then 6.7 miles to the confluence with the Town River to form the Taunton River. The natural 7Q10 flow in the lowermost Matfield River is calculated as 2.27 cfs (1.5 mgd), only 8% of Brockton's 18 mgd historic design flow. Even in the Taunton River, a designated Wild and Scenic River and the longest undammed river in the northeast, the majority of flow in low flow conditions is Brockton effluent. The Town River 7Q10 is about 2.7 cfs (1.7 mgd), so that the uppermost Taunton River is only 3.2 MGD at 7Q10 flows. Even as far downstream as the City of Taunton the river is more than 50% effluent under 7Q10 conditions (at that point including other effluent sources in addition to Brockton). See Taunton WWTP Fact Sheet, MA0100897.

The 2.5 mgd additional flow sought by the City of Brockton is by itself larger than the 7Q10 or median August flows at the point of discharge, and larger than the 7Q10 flows in either the Matfield or the Town Rivers at the point where they join to form the Taunton River. A 2.5 mgd discharge would itself constitute a "Major" NPDES discharge if it were a separate facility; indeed it would be the third largest POTW discharging to the freshwater Taunton River or its tributaries (behind Brockton and Mansfield (3.14 mgd) and larger than Middleborough (2.16 mgd) and Bridgewater (1.44 mgd)).

i. Technology-based review

As stated in the <u>Implementation Procedures, the</u> "minimum technology based treatment requirements for publicly owned treatment works (POTWs) consist of secondary treatment and applicable limitations and standards promulgated by EPA" and "[t]he technology based review for POTWs subject to the SRF process generally is satisfied upon completion of the Comprehensive Wastewater Management Plan or Project Evaluation Report, public participation and Department approval." Section II. While the City of Brockton has not completed a CWMP, in this case the treatment provided for the increased flow is far better than required to achieve secondary treatment requirements and construction proceeded through the SRF process, so the technology-based requirements of the Implementation Procedures have been satisfied.

ii. Tier Review

The primary focus of each Tier review is listed below:

Tier 1	review to protect existing uses in all waters
Tier 2	review to protect and maintain existing water quality in high quality waters
Tier 2 1/2	review to protect outstanding resource waters
Tier 3	review to protect special resource waters

As can be seen, each tier is associated with a specific receiving water designation. The Implementation Procedures require greater protection for higher value waters.

New or increased discharges to special resource waters (Tier 3) are essentially prohibited.

New or increased discharges to outstanding resource waters (Tier 2 ½) are allowed only where the discharge is determined, among other things, to be for the express purpose and intent of maintaining or enhancing the resource for its designated use.

New or increased discharges to high quality waters (Tier 2) are limited to increases that are insignificant, or are authorized pursuant to 314 CMR 4.04(5). These waters must be protected and maintained for their existing water quality. Authorization of a significant increase requires a demonstration that:

1. The discharge is necessary to accommodate important economic or social development in the area in which the waters are located[3];
2. No less environmentally damaging alternative site for the activity, receptor for the disposal, or method of elimination of the discharge is reasonably available or feasible;
3. To the maximum extent feasible, the discharge and activity are designed and conducted to minimize adverse impacts on water quality, including implementation of source reduction practices; and
4. The discharge will not impair existing water uses and will not result in a level of water quality less than that specified for the Class.

314 CMR 4.04(5)(a).

New or increased discharges to all other waters (Tier 1) may be allowed, providing that existing uses, and water quality to protect those uses, is maintained and protected.

[3] For POTWs, if the proposed discharge is subject to the Clean Water State Revolving Fund (SRF) process, is in accordance with a Comprehensive Wastewater Management Plan (CWMP) or Project Evaluation Report, has been subject to public participation, and is approved by the State, then it is presumed that the requirement of economic or social importance has been met.

The first step then, is to determine the receiving water(s) classification and condition in order to determine the applicable tier(s). As noted above, the receiving water, Salisbury Plain River, is classified as a Class B warm water surface water and is an effluent dominated stream (the Brockton AWRF makes up over 95% of the flow in the Salisbury Plain River under 7Q10 conditions).

The segment of the Salisbury Plain River to which the Brockton AWRF discharges (segment 62-06) is listed in the Massachusetts 303(d) list for impairments to aquatic macroinvertebrate bioassessments, excess algal growth, fecal coliform (TDML completed), dissolved oxygen, total phosphorus, taste and odor, turbidity and debris/floatables/trash (denoted ‘not a pollutant’; no TMDL required). The Salisbury Plain River joins Beaver Brook in East Bridgewater to form the Matfield River (segment 62-32), which is also listed in the 303(d) list (impairments due to aquatic macroinvertebrate bioassessments, excess algal growth, fecal coliform (TDML completed), dissolved oxygen, total phosphorus, taste and odor). The Matfield River joins with the Town River in Bridgewater to become the Taunton River.

Given the extensive and comprehensive impairments, in general the Salisbury Plain and Matfield Rivers would not be considered “high quality” waters, although there may be individual pollutants for which high quality status could be demonstrated in these segments on a case by case basis (antidegradation analysis is performed on a criteria by criteria basis). These segments would therefore be subject to Tier 1 review. The Taunton River segments downstream of the Matfield (confluence with the Town River) have been assessed as achieving aquatic life uses, are not listed on the Massachusetts 303(d) list, and are likely to be high quality for many pollutants (Tier 2 review). There are no Outstanding or Special Resource Waters downstream of the discharge, so Tiers 2½ and 3 do not apply.

To determine which criteria and pollutants are subject to Tier 1 review, EPA reviewed the available water quality data for the receiving water as well as the water quality based limits in the current permit, which are based on previous analyses indicating that such limits are necessary to meet water quality standards in the receiving water (no additional assimilative capacity is available). A listing of identified Tier 1 pollutants is shown in Table 3.

Table 3. Tier 1 Pollutants in Salisbury Plain River

Tier 1 Pollutant	Basis for Tier 1 Determination
BOD	Permit limit, Wasteload Allocation, 303(d) listed DO impairment
TSS	Permit limit, Wasteload Allocation
DO	Permit limit, 303(d) listed DO impairment
Bacteria	Permit limit, 303(d) listed impairment
Ammonia	Permit limit, Wasteload Allocation, 303(d) listed DO impairment
Phosphorus	Permit limit, 303(d) listed impairment
Copper	Permit limit

For these criteria the receiving water no longer has any assimilative capacity for an increase in pollutant loads. In order to protect existing uses with respect to these pollutants, no increase in pollutant loads to the receiving water is permitted. This means that for pollutants with existing numeric permit limits, the existing load limit is maintained even if an increase in flow is authorized. The City of Brockton's request for an increase in load limits to reflect the increase in facility capacity is therefore denied.

The Salisbury Plain and Matfield Rivers have also been determined to have impairments that are not specifically linked to an individual pollutant. Both waters are listed on the 303(d) list with impairments to "taste and odor" and to "aquatic macroinvertebrate bioassessments." Both of these impairments are in connection with narrative criteria within the Massachusetts narrative water quality standards. [taste and odor] 314 CMR 4.05(5)(b) provides:

> Bottom Pollutants or Alterations. All surface waters shall be free from pollutants in concentrations or combinations or from alterations that adversely affect the physical or chemical nature of the bottom, interfere with the propagation of fish or shellfish, or adversely affect populations of non-mobile or sessile benthic organisms.

While these impairments are based on data prior to the facility upgrade, receiving water monitoring performed by the City's consultants as part of a Supplemental Environmental Project in 2010 indicated that impaired benthic macroinvertebrate conditions continue subsequent to the improvements in the facility (and are present both upstream and downstream of the facility).

> One of the most striking aspects of the biological samples from the Salisbury Plain River and Matfield River is the near absence of pollution intolerant macroinvertebrate taxa, especially the EPT taxa.
> • The caddisflies Cheumatopsyche sp. and Hydropsyche betteni were the only EPT taxa consistently found, yet these are among the most tolerant stream caddisflies and are often used as indicators of organic pollution rather than indicators of clean water.
> • No stoneflies and only two individual mayflies were detected, despite the presence of suitable habitat in four of the survey sites.
> Macroinvertebrate samples were comprised of a low diversity of habitat generalists that are tolerant of a range of conditions in warmwater streams.

CDM, *Brockton Receiving Water Assessment SEP* (2011). The impairment downstream of the facility appears to be directly related to the discharge; while impaired conditions exist both upstream and downstream of the facility, the nature of the macroinvertebrate population changes in a manner consistent with the nutrient-enriched discharge of the Brockton AWRF.[4]

The same study included a Habitat Assessment, Macrophyte Assessment and Fish Population Survey, concluding that "[t]he biological communities in the Salisbury Plain River and Matfield River are mostly comprised of habitat generalists"; that ""[o]nly seven fish species were detected; tessellated darters comprised 86 percent (184 of 214) of all fish captured" and that "[h]abitat conditions are suboptimal or poor throughout these rivers". *Id.* at 12.

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[4] As summarized in the *Brockton Receiving Water Assessment SEP* at 12-13: "There seems to be a general trend from a highly polluted, fungal/bacterial-dominated river upstream of Brockton's AWRF to a more typical nutrient-rich, algal-dominated river downstream. It is difficult to quantify the effects of Brockton's AWRF on biological communities because of the highly degraded state of the Salisbury Plain River upstream of the facility. A suitable upstream control does not exist."

While EPA hopes to address these downstream conditions at least in part with the imposition of more stringent limits on Total Phosphorus in this Draft Permit (see Section VI.B.5 of this Fact Sheet), it remains unclear whether healthy macroinvertebrate conditions can be achieved with this high (let alone a higher) a proportion of effluent in the receiving water. Therefore EPA cannot conclude on current information that increasing the volume of flow to this system can be assimilated consistent with antidegradation requirements.

Tier 2

EPA must also consider whether the proposed increase is consistent with Tier 2 review, both for the immediate receiving water (for any parameters for which the stream is high quality) and downstream waters. The Taunton River downstream of the confluence of the Matfield and Town Rivers is listed as attaining the Aquatic Life use, with other uses not assessed. The Taunton River is the longest undammed river in Massachusetts. It is a designated Wild and Scenic River under 16 U.S.C. §§ 1271-1287, which was enacted to preserve outstanding rivers (although the Act does not prescribe specific regulatory implications under the Clean Water Act):

> It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.

Wild & Scenic Rivers Act (October 2, 1968).

As discussed above, the first question with respect to Tier 2 review is whether the increased discharge is "insignificant." As set forth in the Massachusetts Antidegradation Implementation Procedures:

> <u>Insignificant discharges</u> - Except where the Department determines that in order to adequately protect water quality a particular discharge of the type described below requires an antidegradation authorization under 314 CMR 4.04(5), the Department has determined that the following discharges are insignificant:
>
> a) <u>Temporary discharges</u> – [not applicable] . . .; and
> b) <u>New or increased loadings of a pollutant that use < 10% of the unused loading capacity of a receiving water</u> - a new or increased discharge of a pollutant that would use less than 10% of the available assimilative capacity of the receiving water for that pollutant.

In general monitoring data for the Taunton mainstem has indicated Tier 2 status for the commonly monitored parameters (phosphorus, ammonia, TSS, DO, copper) but there is a limited amount of recent data available to perform a current assessment of the assimilative capacity of the receiving water. However, as the City's request for an increase in load limits is not being granted, no increase in loads will occur for such pollutants.

EPA also notes that the Salisbury Plain and Matfield Rivers suffer from impaired benthic macroinvertebrate communities, and taste and odor impairments, that have not been linked to specific pollutants but appear to be related to the Brockton AWRF. The Taunton mainstem is currently high quality for these water quality standards, and it is difficult to assess the amount of assimilative capacity available given lack of clear evidence of the specific effluent components that are causing these impairments. However, in order to satisfy antidegradation requirements it must be demonstrated that the increased discharge of effluent uses less than 10% of the Taunton River's assimilative capacity, or this increase must be treated as a significant increase requiring a full authorization process.

A further concern is the range of emerging contaminants, including endocrine disrupters, pharmaceuticals, personal care products and other substances, known to be present in POTW effluent and receiving waters downstream of wastewater treatment facilities. See, e.g., EPA, *Occurrence of Contaminants of Emerging Concern in Wastewater from Nine Publicly Owned Treatment Works* (2009); USGS, *A Reconnaissance for Emerging Contaminants in the South Branch Potomac River, Cacapon River, and Williams River Basins, West Virginia, April-October*, USGS OFR 2006-1393 (2006). While there are no numeric water quality criteria for such pollutants to date, these pollutants are known to impact aquatic life[5] and are subject to state narrative water quality standards.[6] There is no data available for such contaminants for either the Brockton AWRF or the receiving water on which to base an analysis of assimilative capacity. In order for EPA to properly assess whether the proposed increase is "insignificant" EPA would require a detailed study of a range of emerging contaminants. *See, e.g.,* Kipp, K. *An Investigation into the Extent and Biological Impacts of Endocrine Disrupting Chemical (EDCs) in a Highly Effluent-Dominated River in New England: Preliminary Results* (2011) https://www.neiwpcc.org/ppcpconference/ppcp-docs/2011presentations/Session%204/4.2%20Kipp.pdf

Even in the absence of more comprehensive data, EPA notes that on a qualitative level it is difficult to characterize the proposed increase in discharge as "insignificant". As noted above under 7Q10 conditions flow in the uppermost reach of the Taunton River is only 3.2 mgd,

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[5] Iwanowicz, et al., "Reproductive Health of Bass in the Potomac, USA Drainage: Part 1. Exploring the Effects of Proximity to Wastewater Treatment Plant Discharge," 28 *Env. Toxicology and Chemistry* 1072-1083 (2009); Kidd, et al., "Collapse of a fish population after exposure to synthetic estrogen," 104 *Proc. Nat'l Acad. Of Sciences* 8897-8901 (2007); Gagne, et al., "Effects of pharmaceutical products and municipal wastewaters on temperature-dependent mitochondrial electron transport activity in *Elliptio complanata* mussels," 143 *Comp. Biochem. And Physiol., Part C*, 388-393 (2006); Pait, A.S. and J.O. Nelson, *Endocrine Disruption in Fish: An Assessment of Recent Research and Results*. NOAA Tech Memo. NOS NCCOS CCMA 149 (2002).

[6] The MA SWQS require that "Discharges shall be limited or prohibited to protect existing uses and not interfere with the attainment of designated uses in downstream and adjacent segments. The Department will provide a reasonable margin of safety to account for any lack of knowledge concerning the relationship between the pollutants being discharged and their impact on water quality." 314 CMR 403(1)(a). Designated uses for these water are "Class B. These waters are designated as a 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. Where designated in 314 CMR 4.06, they shall be suitable as a source of public water supply with appropriate treatment ("Treated Water Supply"). Class B waters shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value." 314 C.M.R. 403(3)(b). The MA SWQS also state that "all surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife." 314 CMR 405(5)(e).

dwarfed by the current 18 mgd design flow of the Brockton AWRF and only slightly more than the proposed increase; if the proposed increase were a new facility it would be the third largest POTW discharge to the freshwater portion of the Taunton River. In this context EPA would encourage MassDEP to use its authority under the Antidegradation Implementation Procedures to require an authorization under 314 CMR 4.04(5) even if specific pollutant loads are not shown to use more than 10% of assimilative capacity.

Authorization under 314 CMR 4.04(5) requires a demonstration that:

> 1. The discharge is necessary to accommodate important economic or social development in the area in which the waters are located;
> 2. No less environmentally damaging alternative site for the activity, receptor for the disposal, or method of elimination of the discharge is reasonably available or feasible;
> 3. To the maximum extent feasible, the discharge and activity are designed and conducted to minimize adverse impacts on water quality, including implementation of source reduction practices; and
> 4. The discharge will not impair existing water uses and will not result in a level of water quality less than that specified for the Class.

314 CMR 4.04(5)(a). Normally the requirement of "important economic or social development" is met through approval of a CWMP; as no CWMP has been completed or approved for the City of Brockton or its copermittees Abington or Whitman, this requirement would have to be met prior to authorization. Further, the City would have to show that there is no feasible alternative to the flow increase, not only for its own wastewater disposal but for any other community seeking to connect to the Brockton AWRF. No such showing has been made here.

EPA acknowledges that, as pointed out by the City, the upgraded capacity was subject to a certificate from the Massachusetts Executive Office of Environmental Affairs pursuant to the MEPA process in 2003. However, the MEPA process itself does not establish consistency with antidegradation requirements pursuant to the Massachusetts Antidegradation Implementation Procedures. Indeed, even if the full CWMP/SRF approval process were followed (not the case here as neither Brockton nor its current copermittees has a CWMP), that process is relevant to only one of the four requirements for antidegradation authorization, that of economic and social importance.[7] In addition the EOEA certificate was issued based on design documents indicating that the facility's existing flow had averaged 19.79 mgd from 1998 to 2002, *Design Memorandum W1-A* (July 2003), so that the upgraded facility was sized essentially to treat existing flows; a revised assessment of economic and social importance would be justified in light of the substantial reduction in flow achieved through the I/I mitigation work performed under the City's consent decree which has reduced current flows well below the 18.0 mgd permitted flow.

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[7] The CWMP process does not, and is not designed to, establish the other three factors for authorization. For example, an antidegradation authorization for a significant lowering of water quality requires that "no less environmentally damaging alternative . . . is reasonably available and feasible"; this is a far different standard from the CWMP direction to select the alternative with "the greatest environmental and cost benefit." See MassDEP, *Guide to Comprehensive Wastewater Management Planning* (1996) at 26. http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/wwtrfpg.pdf.

c. Water Quality Standards

As discussed in section V of this Fact Sheet, NPDES permits are required to include limitations that ensure the meeting of water quality standards in the receiving water. Specifically, 40 C.F.R. 122.4 provides that "No permit may be issued . . . [w]hen the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected States."

In general these requirement are implemented through numeric permit limits calculated using a dilution factor for the receiving water under 7Q10 flow conditions. This approach is generally considered to address the critical conditions of maximum pollutant impact, where dilution of the discharge is at a minimum. Since at most times receiving water flow is well above the 7Q10, use of the 7Q10 as an assumed flow ensures that exceedances of the water quality criteria will be limited in duration and frequency as assumed in the calculation of the criteria (for example, chronic criteria reflect concentrations to be exceeded less than once every three years for a four day period), so that the limit is protective.

Facilities such as the Brockton AWRF, which have essentially no dilution by the receiving water for extended periods of time, represent a challenge in the context of setting water quality based limits. In essence, with a receiving water flow that is about 2% of the facility's design flow at 7Q10, permit limits must be set that ensure that the discharge itself meets water quality standards. However, where the varying flow of the receiving water is not sufficient to ensure that critical pollutant concentrations are limited in duration and frequency, it is not always clear that average monthly and maximum daily permit limits will be sufficiently protective to meet water quality standards. For example, as discussed below the draft permit contains a permit limit of 100 ug/l total phosphorus to address eutrophication in the Salisbury Plain and Matfield Rivers, based on the Gold Book target that streams should not exceed 100 ug/l TP. For most facilities a permit limit based on that target will ensure that concentrations are well below 100 ug/l for most of the year, which should be sufficient to protect against eutrophication impacts. However for Brockton a 100 ug/l permit limit may result in stream concentrations of approximately the target concentration for long periods of the summer; it is unclear whether eutrophication impairments will be prevented under those circumstances of consistent and relatively high TP concentrations.

Therefore, EPA's approach to permitting of the Brockton AWRF discharge includes reassessment of instream conditions as treatment has improved to determine the effectiveness of the permit limits and conditions. For example, in Brockton's previous permit a TP limit of 0.2 mg/l was set; receiving water assessments performed by the City of Brockton's consultants revealed continued impairments consistent with nutrient overenrichment downstream of the AWRF. Under the new permit Brockton will need to improve its nutrient reduction to achieve at most 100 ug/l TP; EPA expects to review receiving water conditions downstream of the AWRF to determine if that limit is sufficient to protect against eutrophication impacts from the discharge or if a more stringent limit is necessary; EPA will also consider any calibrated and verified water quality modeling of the system that may be completed for this system.[8] This assessment will not

[8] EPA notes that USGS and MassDEP have performed some preliminary work on modelling loads in the upper Taunton River Basin, including calibrating a precipitation-runoff HSPF model, although it is not clear whether a calibrated and verified water quality model will be forthcoming as the project continues. See USGS, *Nutrient and Sediment Concentrations, Yields, and Loads in Impaired Streams and Rivers in the Taunton River Basin, Massachusetts, 1997–2008*, SIR 2012-5277 (2012).

be limited to nutrients; under such extreme effluent-dominated conditions there is potential for other pollutants, or the combined effects of multiple pollutants, to impact receiving water habitat and aquatic life that may not be captured by individual pollutant criteria.

In this context, when considering a flow increase EPA must also carefully consider the ability to issue a permit that ensures the meeting of water quality standards at an increased effluent flow up to 20.49 mgd. EPA notes that this is a significant increase in total flow; the increase alone is more than six times the 7Q10 flow in the Salisbury Plain River, and would itself be a major discharge and the third largest discharge on the Taunton River. Increasing the design flow will further increase the duration of conditions under which the Brockton AWRF represents the vast majority of receiving water flow, and increase the extent of the entire Taunton River system under which the AWRF is the majority of flow. Thus, until the evidence indicates that water quality standards can be met in the Salisbury Plain River under existing flows (which to date has not been the case), EPA will not authorize an even larger discharge to this receiving water.

d. Conclusion

For the reasons given above, the City of Brockton's request for an increase in permitted flow and load limits to reflect a 20.5 mgd flow is denied. A twelve month rolling average flow limit of 18.0 mgd is included in the Draft Permit.

EPA understands that the City wishes to pursue authorization of a flow increase. EPA therefore provides the following as guidance to the process by which a flow increase can be evaluated for purposes of further review and potential authorization.

1. Process to demonstrate meeting of water quality standards
    a. Institute plant improvements to achieve new permit limits; plant improvements should be in place at least one year and preferably two to allow assimilation of receiving water to new conditions; and
    b. Perform receiving stream evaluation similar to that performed in 2010 Receiving Water Assessment, but extending to sites in the Taunton River mainstem; and either
    c. If results confirm the discharge is no longer contributing to water quality impairments, can request increase if consistent with antidegradation requirements (below); or
    d. If results indicate discharge is contributing to water quality impairments, can
        i. Propose plan with permit limits that will ensure discharge will not contribute to impairments at current and increased effluent flow; or
        ii. Initiate water quality standards proceeding for variance or downgrade of receiving water classification, including Use Attainability Analysis and public process

2. Process to demonstrate meeting of Antidegradation requirements
    a. Perform monitoring and evaluation of emerging contaminants, particularly endocrine disrupters, in effluent and in receiving water to

determine concentration, loads and assimilative capacity (EPA is available to assist in defining scope of monitoring and evaluation); and

b. Evaluate benthic macroinvertebrate and taste/odor conditions in impaired reaches and in Taunton River mainstem to determine extent of impairment and contributing pollutants and evaluate assimilative capacity in unimpaired reaches (may be best to wait until after plant improvements as in 1.b. above); and
c. Determine whether flow increase will result in loss of more than 10% assimilative capacity in any downstream reach. If it can be demonstrated that it does not, proceed to request flow increase; or
d. If increase cannot be demonstrated to be insignificant, proceed to antidegradation authorization proceeding under 314 CMR 4.04(5). Upon authorization pursuant to 314 CMR 4.04(5) (including "No less environmentally damaging alternative . . . is reasonably available or feasible" showing), can proceed to request flow increase.

EPA presumes that the City, MassDEP, and perhaps other regional entities will coordinate the work required to meet these requirements. EPA is available to provide technical assistance as necessary during this process. EPA notes that protection and improvement of baseflow conditions in the watershed is an important component of the assimilative capacity of the receiving water and downstream segments. EPA therefore encourages exploration of groundwater recharge opportunities in this process.

Finally, as the City has made substantial progress in addressing I/I issues and is operating below the 18.0 mgd flow limit, the specific limitation on additional flow from Abington, Whitman or other communities has been deleted from the permit. While the City of Brockton has discretion to allocate its available capacity as it deems appropriate, EPA encourages the City to ensure that it reserves capacity for its future needs, and encourages surrounding communities to utilize local recharge solutions to wastewater management needs where feasible, consistent with the *Massachusetts Water Policy* (2004) (http://www.mass.gov/eea/waste-mgnt-recycling/water-resources/preserving-water-resources/massachusetts-water-policy-2004.html)

2. Dilution

Water quality based limitations are established with the use of a calculated available dilution. Title 314 CMR 4.03(3)(a) requires that effluent dilution be calculated based on the receiving water 7Q10. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, recorded over a 10 year recurrence interval. Additionally, the plant design flow is used to calculate available effluent dilution; permit limits are expressed in terms of mass as well as concentration to ensure that the assumptions of the dilution calculation are met.

The plant design flow used to calculate the dilution factor for the current permit was 18.0 mgd. The City in its application stated that the current design flow rate of the (upgraded) facility was 20.49 mgd, and requested by letter that the increased flow capacity be used in calculation of permit limits. Because such an increase would not be consistent with MassDEP's antidegradation regulations (see discussion above), EPA has used 18.0 MGD in these calculations.

There is no stream gaging information available on the Salisbury Plain River. The prior permit calculated a 7Q10 based on the Wading River, stating that the Wading River is a near-by river with similar hydrologic characteristics. This produced an in-stream 7Q10 flow of 0.39 MGD that was used to determine the dilution factor. EPA has reviewed the available data for 7Q10 flows in this watershed and determined that this continues to be a reasonable value for 7Q10 flows.[9]

Qs = In stream 7 day 10 year low flow (7Q10) = 0.39 MGD
Dilution Factor = (Qs + Qd) / Qd = (0.39 + 18) / 18 = 1.02

3. Conventional Pollutants

Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) – Limits for $CBOD_5$ and TSS are the same as in the current permit. These are water quality based limits that are more stringent than the secondary treatment requirements set forth at 40 CFR Part § 137.102(a)(4).

For May through October, the limits are an average monthly concentration of 5 mg/l, a weekly average concentration of 8 mg/l, and a maximum daily concentration of 15 mg/l. For November through April the limits are 15 mg/l average monthly, 25 mg/l average weekly, and 30 mg/l daily maximum. These were established by the MassDEP as a wasteload allocation. There were no violations of the $CBOD_5$ or TSS limits in the period January 2010 through December 2013. The average summer CBOD and TSS were 1.3 mg/l and 1.2 mg/l respectively. The monitoring frequency remains the same at 1/day.

The permit utilizes $CBOD_5$ as the measure of oxygen demand due to high nitrogenous oxygen demand in the effluent, as allowed under 40 CFR § 133.102(a)(4). The $CBOD_5$ test reduces the interference from nitrogenous compounds that would otherwise make accurate assessment of the organic (carbonaceous) oxygen demand impossible.

The permit also contains accompanying mass limitations that are based on the facility's approved design flow of 18.0 mgd. Average monthly and average weekly $CBOD_5$ and TSS mass limits (lbs per day) are consistent with 40 CFR §122.45(f).

$CBOD_5$ and TSS Mass Loading Calculations:

Calculations of maximum allowable loads for average monthly BOD_5 and TSS are based on the following equation:

L = C x 18.0 x 8.34

L = Maximum allowable load in lbs/day.
C = Maximum allowable effluent concentration for reporting period in mg/l.
Reporting periods are average monthly and weekly and daily maximum.

[9] For comparison, an estimate of 7Q10 flow from the USGS StreamStats model, based on regression equations, yields a 7Q10 flow at the Brockton AWRF of 0.47 cfs or 0.3 mgd. This would result in a dilution factor of 1.02, the same as used in the current permit.

18.0 = Approved design flow of facility
8.34 = Factor to convert effluent concentration in mg/l and design flow in mgd to lbs/day.

(Concentration limit) [30] x 8.34 (Constant) x 18.0 (design flow) = 4,500 lb/day
(Concentration limit) [25] x 8.34 (Constant) x 18.0 (design flow) = 3,750 lb/day
(Concentration limit) [15] x 8.34 (Constant) x 18.0 (design flow) = 2,250 lb/day
(Concentration limit) [8] x 8.34 (Constant) x 18.0 (design flow) = 1,200 lb/day
(Concentration limit) [5] x 8.34 (Constant) x 18.0 (design flow) = 750 lb/day

Eighty-Five Percent (85%) BOD_5 and TSS Removal - the provisions of 40 CFR §133.102(a)(3) and (4), require that the 30 day average percent removal for $CBOD_5$ and TSS be not less than 85%. There were no violations of the $CBOD_5$ or TSS percent removal limits in the period January 2010 through December 2013. The average summer CBOD and TSS percent removal were 99% for both parameters.

pH - The draft permit includes pH limitations of a minimum of 6.5 standard units (s.u.) and maximum of 8.3 s.u. These pH limits are required as a condition of state certification and are protective of pH standards set forth at 314 CMR 4.05(4)(b)(3) for Class B waters, requiring that pH "[s]hall be in the range of 6.5 through 8.3 standard units and not more than 0.5 units outside of the natural background range." There were no violations of the pH limits in the period January 2010 through December 2013. The range of pH measured was 6.5 to 7.5 s.u., which is within the range of upstream Salisbury Plain River pH values (6.5 to 7.6 s.u.) as reported in the 2001 Taunton River Water Quality Assessment Report. The monitoring frequency remains the same at 1/day.

Bacteria
Limitations for bacteria in the existing permit are based upon state water quality standards for Massachusetts. There were no violations of the fecal coliform limit in the period January 2010 through December 2013.

The limits are modified in the Draft Permit to reflect the *E. coli* criteria in the revisions to the MA SWQS, 314 CMR § 4.05(3)(b), approved by EPA in 2007. The monthly average limitation in the draft permit is 126 colony forming units (cfu) per 100 ml, and shall be expressed as a monthly geometric mean. The daily maximum limitation in the draft permit is 409 cfu/100 ml, which represents the 90^{th} percentile of a lognormal distribution with a geometric mean equal to 126 cfu/100 ml. EPA, *1986 Ambient Water Quality for Bacteria.* These limitations are a State certification requirement and are consistent with EPA guidance recommending that no dilution be considered in establishing permit limits for discharges to rivers designated for primary contact recreation. *EPA Memorandum re: Initial Zones of Dilution for Bacteria in Rivers and Streams Designated for Primary Contact Recreation*, November 12, 2008. The monitoring frequency is maintained at five times per week.

4. Dissolved Oxygen (DO) and Total Residual Chlorine

Dissolved Oxygen - The instantaneous minimum effluent DO limit of 6.0 mg/l or greater is carried forward from the current permit. The limit ensures that DO levels depleted during wastewater treatment process are restored prior to discharge to the Salisbury Plain River. The limit is established to protect the DO minimum Water Quality Criteria of 5.0 mg/l for waters designated by the State as Class SB. There were no violations of the DO limit in the period January 2011 to December 2013.

Total Residual Chlorine (TRC) – The Brockton AWRF uses ultraviolet (UV) disinfection. TRC limit are included in the permit in the event that chlorine compounds are used in the treatment process. No monitoring is required in periods when no chlorine compounds are used, and no monitoring was reported in the January 2011 to December 2013 period.

For any period in which chlorine compounds are used, permit limits are in effect based on the instream chlorine criteria defined in *National Recommended Water Quality Criteria: 2002*, EPA 822R-02-047 (November 2002), as adopted by the MassDEP into the state water quality standards at 314 CMR 4.05(5)(e). The criteria establish that the total residual chlorine in the receiving water should not exceed 11 ug/l (chronic) and 19 ug/l (acute). The following is a water quality based calculation of chlorine limits:

Acute Chlorine Fresh Water Criteria = 19 ug/l

Chronic Chlorine Fresh Water Criteria = 11 ug/l

(acute criteria * dilution factor) = Acute (Maximum Daily)
19 ug/l x 1.02 = 19.4 ug/l = **19 ug/l Maximum Daily**.

(chronic criteria * dilution factor) = Chronic (Average Monthly)
11 ug/l x 1.02 = 11.2 ug/l = **11 ug/l mg/l Average Monthly**

5. Phosphorus

The existing total phosphorus permit limit of 0.2 mg/l average monthly is reduced in the draft permit to 100 ug/l in order to meet the Gold Book target of 100 ug/l to prevent eutrophication in the receiving water. The facility averaged 0.16 mg/l total phosphorus in the January 2011 to December 2013 period.

Eutrophication is an aspect of nutrient overenrichment and is defined as an increase in the rate of supply of organic matter to a waterbody (EPA, 2001). The primary symptoms of nutrient overenrichment include an increase in the rate of organic matter supply, changes in algal dominance, and loss of water clarity and are followed by one or more secondary symptoms such as nuisance/toxic algal blooms and low dissolved oxygen. (EPA, 2001). In freshwater systems such as the Salisbury Plain River, phosphorus is the primary nutrient of concern.

The MA SWQS at 314 CMR 4.00 do not contain numerical criteria for total phosphorus. They include a narrative criterion for nutrients at 314 CMR 4.05(5)(c), which provides that "all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses." They also include a requirement that "[a]ny existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment as determined by the Department, including, where necessary, highest and best practical treatment (HBPT) for POTWs" Id. MassDEP has interpreted the "highest and best practicable treatment" (HBPT) requirement in its standards as requiring an effluent limit of 0.2 mg/l (200 ug/l) for phosphorus.

The City's current permit limit of 0.2 mg/l is based on HBPT. In determining whether the 0.2 mg/l limit is sufficient to ensure that water quality standards are met, EPA has assessed information concerning downstream conditions after the facility achieved the permit limit, and predicted instream concentrations as compared to threshold levels identified in the scientific literature for eutrophication impacts.

First, downstream assessments conducted by the City's consultants as part of a Supplemental Environmental Project (SEP) indicate that impaired benthic macroinvertebrate conditions continue subsequent to the improvements in the facility to achieve the 0.2 mg/l limit. As set forth in the SEP Report:

> **Benthic Macroinvertebrates**
> One of the most striking aspects of the biological samples from the Salisbury Plain River and Matfield River is the near absence of pollution intolerant macroinvertebrate taxa, especially the EPT taxa.
> • The caddisflies Cheumatopsyche sp. and Hydropsyche betteni were the only EPT taxa consistently found, yet these are among the most tolerant stream caddisflies and are often used as indicators of organic pollution rather than indicators of clean water.
> • No stoneflies and only two individual mayflies were detected, despite the presence of suitable habitat in four of the survey sites.
> Macroinvertebrate samples were comprised of a low diversity of habitat generalists that are tolerant of a range of conditions in warmwater streams.

CDM, *Brockton Receiving Water Assessment SEP* (2011). The impairment is thought to be related to nutrient discharges from the AWRF; conditions were described in the report as a "typical nutrient-rich, algal-dominated river downstream". Thus the available evidence from downstream monitoring indicates continued nutrient-related impairment with a 0.2 mg/l permit limit.

Second, EPA considers whether the predicted instream concentration at the permit limit is such that water quality standards will be met. In the absence of a numeric criterion for phosphorus, EPA looks to nationally recommended criteria and other technical guidance documents. *See* 40 CFR 122.44(d)(1)(vi)(B). EPA has produced several guidance documents which contain recommended total phosphorus thresholds for receiving waters. The *1986 Quality Criteria for Water* ("Gold Book") recommends in-stream phosphorus concentrations of no greater than 50 ug/l in any stream entering a lake or reservoir, 100 ug/l for any stream not discharging directly to lakes or impoundments, and 25 ug/l within a lake or reservoir. EPA has also released "Ecoregional Nutrient Criteria," established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. *Ambient Water Quality*

Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams, December 2000 (EPA- 822-B-00-022). The published criteria represent conditions in waters in that ecoregion that are minimally impacted by human activities, and thus representative of water without cultural eutrophication. The Brockton AWRF is within Ecoregion XIV, Eastern Coastal Plains. The recommended total phosphorus criterion for this ecoregion is 24 ug/l.

EPA has decided to rely on the Gold Book threshold of 100 ug/l rather than the more stringent ecoregion criteria of 24 ug/l, given that it was developed from an effects-based approach, versus the ecoregion criteria that were developed on the basis of reference conditions. The effects-based approach is taken because it is often more directly associated with an impairment to a designated use (i.e. fishing, swimming). The effects-based approach provides a threshold value above which adverse effects (i.e., water quality impairments) are likely to occur. It applies empirical observations of a causal variable (i.e., phosphorus) and a response variable (i.e., chlorophyll *a*) associated with designated use impairments. In contrast, the ecoregion reference-based values are statistically derived from a comparison within a population of rivers in the same ecoregion class. They are a quantitative set of river characteristics (physical, chemical and biological) that represent minimally impacted conditions.

The effects-based Gold Book threshold is a general target applicable in free-flowing streams. As the Gold Book notes, there are natural conditions of a water body that can result in either increased or reduced eutrophication response to phosphorus inputs; in some waters more stringent phosphorus reductions may be needed, while in some others a higher total phosphorus threshold could be assimilated without inducing a eutrophic response. In this case EPA is not aware of any evidence that the Salisbury Plain River is unusually susceptible to eutrophication impacts, so that the 100 ug/l threshold appears sufficient in this receiving water. With respect to factors that can reduce susceptibility, the Gold Book identifies morphometric features (steep banks, great depths and substantial flows), limitation by nutrients other than phosphorus, reduced light penetration where waters are highly laden with natural silts or color, or other naturally occurring phenomena that limit plant growth.[10] EPA is not aware of evidence that any of these factors are reducing eutrophic response in the Salisbury Plain River downstream of the discharge.

Therefore EPA has evaluated the projected instream concentration under current permit limits, and calculated a revised total phosphorus limit based on meeting the Gold Book target of 100 ug/l for preventing eutrophication, applied under 7Q10 conditions. In performing this calculation EPA assumes an upstream receiving water concentration of 48 ug/l, as reported from the upstream site in the *Brockton Receiving Water Assessment SEP*. The mass balance calculation is as follows:

[10] The Gold Book also includes waters where "technological or cost-effective limitations may help control induced pollutants"; "waters managed primarily for waterfowl or other wildlife" and waters where "phosphorus control cannot be sufficiently effective under present technology to make phosphorus the limiting nutrient". As these factors do not address water body response but instead alternative technological solutions or changes in management goals, EPA does not consider them as altering the threshold necessary to meet the narrative water quality standard.

$(C_d * Q_d + C_s * Q_s) = C_r * Q_r$; where

C_d = Effluent concentration
Q_d = Design flow of facility = 18 mgd
C_s = Median concentration in the Salisbury Plain River upstream of discharge = 48 ug/l
Q_s = 7Q10 streamflow in the Salisbury Plain River upstream of discharge = 0.39 mgd
C_r = Receiving water concentration downstream
Q_r = Flow in receiving water downstream = $Q_s + Q_d$

At the current permit limit of 0.2 mg/l (200 ug/l), the projected receiving water concentration would be:

$$C_r = \underline{(C_d * Q_d + C_s * Q_s)} = \frac{[(18*200 \text{ ug/l} + 0.39 \text{ mgd} * 48 \text{ ug/l}]}{(18.39 \text{ mgd})} = 197 \text{ ug/l}$$

This is well over the Gold Book target and indicates that current discharges have the reasonable potential to cause exceedances of water quality standards. A revised permit limit based on meeting the Gold Book standard is calculated as follows:

$$\text{Permit limit } (C_d) = \frac{(C_r * Q_r - C_s * Q_s)}{(Q_d)}$$

$$\text{Limit} = \frac{[(18 + 0.39 \text{ mgd})*100 \text{ ug/l} - 0.39 \text{ mgd} * 48 \text{ ug/l}]}{18 \text{ mgd}} = 101 \text{ ug/l}$$

The draft permit also includes a load limit of 15.2 lb/day, calculated using the effluent concentration limit and the facility design flow.

The draft permit provides a compliance schedule for meeting the new total phosphorus limit at the earliest practicable time, pursuant to 314 CMR 4.03(1)(b) and 40 CFR 122.47(a)(1).

6. Total Nitrogen

The draft permit includes a monthly average total nitrogen limit of 450 lb/day total nitrogen, in effect for the months of May through October, in order to address cultural eutrophication in the Taunton River Estuary and Mount Hope Bay. In addition to this May to October numeric limit, the permit requires the permittee to optimize the treatment facility operations for the removal of total nitrogen during the months of November through April using all available treatment equipment at the facility. The basis for this determination is set forth below.

a. Ecological Setting: the Taunton River Estuary, Mount Hope Bay, Narragansett Bay and Estuarine Systems Generally

The saltwater portions of the Taunton River (the “Taunton River Estuary”) and Mount Hope Bay are part of the greater Narragansett Bay Estuary system, which covers approximately 147 square miles within Massachusetts and Rhode Island. The Narragansett Bay Estuary is one of only 28 “estuaries of national significance” under the National Estuary Program (NEP), which was established in 1987 by amendments to the CWA to identify, restore and protect estuaries along the coasts of the United States.

Mt. Hope Bay (the Bay) is situated in the northeast corner of Narragansett Bay, lying within both Rhode Island to the south and west and Massachusetts to the north and east. The Bay connects to the East Passage of Narragansett Bay proper to the southwest, via a deep, narrow channel where the Mt. Hope Bridge crosses over from Aquidneck Island to Bristol Point, and to Rhode Island Sound to the South via the Sakonnet River (actually an embayment) between Tiverton, RI and Aquidneck Island. The Bay covers an area of 13.6 square miles, and has a volume of 53.3 billion gallons at mean low water (MLW). http://www.smast.umassd.edu/MHBNL/report2003.php. The Bay has a tidal range averaging approximately 4.5 feet.

The Taunton River is the largest freshwater source to Mount Hope Bay. It discharges into the Bay from the north at Fall River. The Taunton River Estuary consists of the saltwater portions of the Taunton River, extending from the Braga Bridge at the confluence with Mount Hope Bay upstream to the Route 24 bridge (Taunton/Raynham), approximately four miles upstream of the Taunton WWTP discharge. (MassDEP, 2001). It is the longest river unobstructed by dams in New England, with tidal influence extending upriver approximately 20 miles. (Horsley Witten, 2007). The Salisbury Plain River, to which the Brockton AWRF discharges, flows into the Matfield River which combines with the Town River in Bridgewater to form the Taunton River.

Estuaries are extremely significant aquatic resources. An estuary is a partially enclosed coastal body of water located between freshwater ecosystems (lakes, rivers, and streams; freshwater and coastal wetlands; and groundwater systems) and coastal shelf systems where freshwater from the land measurably dilutes saltwater from the ocean. This mixture of water types creates a unique transitional environment that is critical for the survival of many species of fish, birds, and other wildlife. Estuarine environments are among the most productive on earth, creating more organic matter each year than comparably sized areas of forest, grassland, or agricultural land (EPA, 2001).

Maintaining water quality within an estuary is important for many reasons. Estuaries provide a variety of habitats such as shallow open waters, freshwater and saltwater marshes, sandy beaches, mud and sand flats, rocky shores, oyster reefs, tidal pools, and seagrass beds. Tens of thousands of birds, mammals, fish, and other wildlife depend on estuarine habitats as places to live, feed, and reproduce. Many species of fish and shellfish rely on the sheltered waters of estuaries as protected places to spawn.

Moreover, estuaries also provide a number of recreational values such as swimming, boating, fishing, and bird watching. In addition, estuaries have an important commercial value since they serve as nursery grounds for two-thirds of the nation's commercial fish and shellfish, and support tourism drawing on the natural resources that estuaries supply. (EPA, 1998). Consequently, EPA believes sound environmental policy reasons favor a pollution control approach that is both protective and undertaken expeditiously to prevent degradation of these critical natural resources.

Because estuaries are the intermediary between oceans and land, both of these geographic features influence their physical, chemical, and biological properties. In the course of flowing downstream through a watershed to an estuary, tributaries pick up materials that wash off the land or are discharged directly into the water by land-based activities. Eventually, the materials that accumulate in the tributaries are delivered to estuaries. The types of materials that eventually enter an estuary largely depend on how the land is used. Undisturbed land, for example, will discharge considerably fewer pollutants than an urban center or areas with large amounts of impervious cover. Accordingly, an estuary's overall health can be heavily impacted by surrounding land uses.

Unlike free-flowing rivers, which tend to flush out sediments and pollutants relatively quickly, an estuary will often have a lengthy retention period as up-estuary saltwater movement interacts with down-estuary freshwater flow (EPA, 2001). Estuaries are particle-rich relative to coastal systems and have physical mechanisms that tend to retain particles. These suspended particles mediate a number of activities (e.g., absorbing and scattering light, or absorbing hydroscopic materials such as phosphate and toxic contaminants). New particles enter with river flow and may be resuspended from the bottom by tidal currents and wind-wave activity. Many estuaries are naturally nutrient-rich because of inputs from the land surface and geochemical and biological processes that act as "filters" to retain nutrients within estuaries (EPA, 2001). Consequently, waterborne pollutants, along with contaminated sediment, may remain in the estuary for a long time, magnifying their potential to adversely affect the estuary's plants and animals.

b. Effects of Nutrients on Estuarine Water Quality

The basic cause of nutrient problems in estuaries and nearshore coastal waters is the enrichment of freshwater with nitrogen (N) and phosphorus (P) (EPA, 2001). EPA defines nutrient overenrichment as the anthropogenic addition of nutrients, in addition to any natural processes, causing adverse effects or impairments to beneficial uses of a waterbody. (EPA, 2001).

Eutrophication is an aspect of nutrient overenrichment and is defined as an increase in the rate of supply of organic matter to a waterbody (EPA, 2001). Increased nutrient inputs promote a progression of symptoms beginning with excessive growth of phytoplankton and macroalgae to the point where grazers cannot control growth (NOAA, 2007). Phytoplankton is microscopic algae growing in the water column and is measured by chlorophyll-a. Macroalgae are large algae, commonly referred to as "seaweed." The primary symptoms of nutrient overenrichment include an increase in the rate of organic matter supply, changes in algal dominance, and loss of water clarity and are followed by one or more secondary symptoms such as loss of submerged aquatic vegetation, nuisance/toxic algal blooms and low dissolved oxygen. (EPA, 2001). In U.S. coastal waters, nutrient overenrichment is a common thread that ties together a diverse suite of coastal problems such as red tides, fish kills, some marine mammal deaths, outbreaks of shellfish poisonings, loss of seagrass and bottom shellfish habitats, coral reef destruction, and hypoxia and anoxia now experienced as the Gulf of Mexico's "dead zone." (EPA, 2001). Figure 4 shows the progression of nutrient impacts on a waterbody.

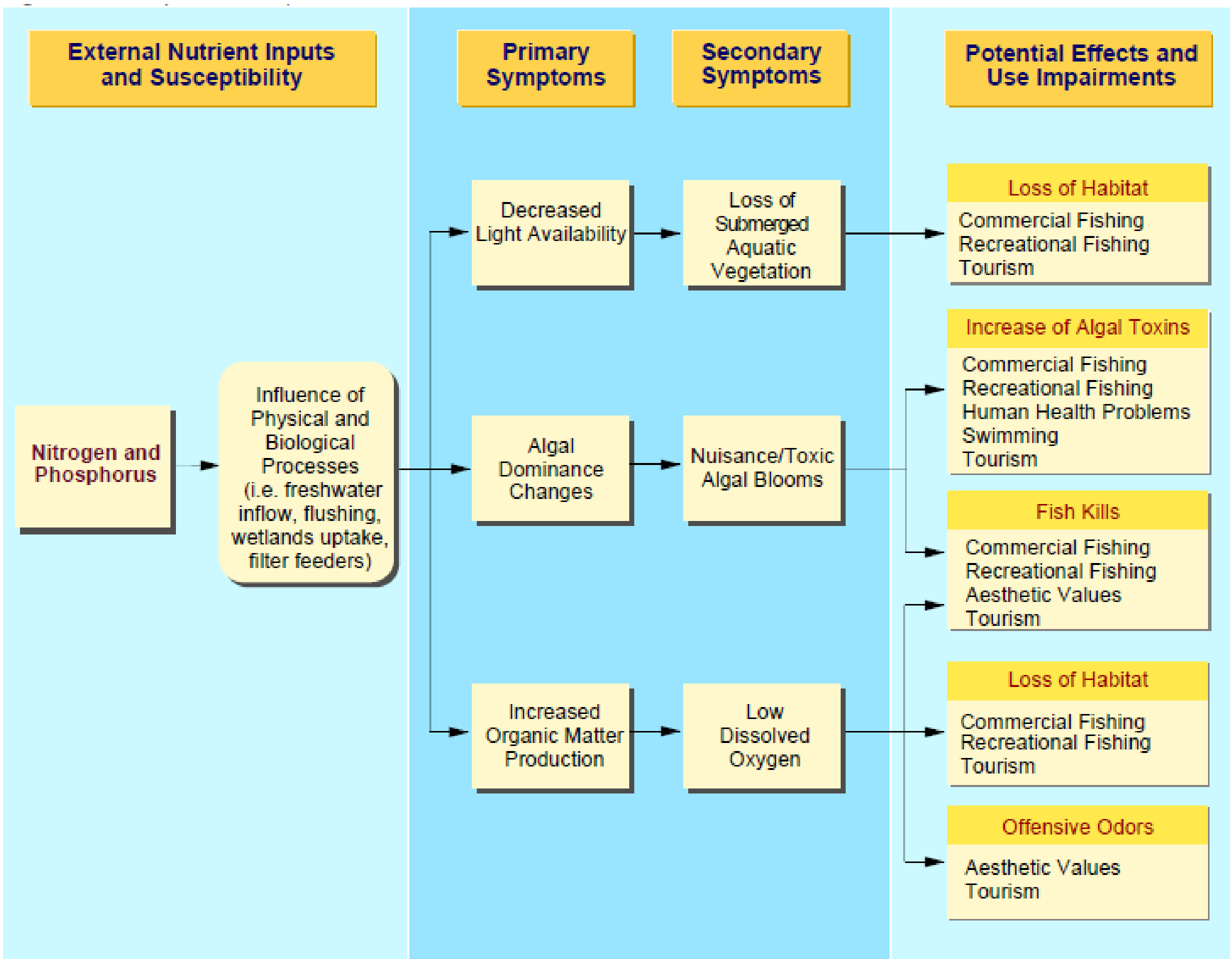

Figure 4. Nutrient enrichment model. Source: Bricker, 1999 as cited in EPA, 2001.

Estuarine nutrient dynamics are complex and are influenced by flushing time, freshwater inflow and stratification, among other factors. The deleterious physical, chemical, and biological responses in surface water resulting from excessive plant growth impair designated uses in both receiving and downstream waterbodies. Excessive plant growth can result in a loss of diversity and other changes in the aquatic plant, invertebrate, and fish community structure and habitat.

Nutrient-driven impacts on aquatic life and habitat are felt throughout the eutrophic cycle of plant growth and decomposition. Nutrient-laden plant detritus can settle to the bottom of a water body. In addition to physically altering the benthic environment and aquatic habitat, organic materials (*i.e.*, nutrients) in the sediments can become available for future uptake by aquatic plant growth, further perpetuating and potentially intensifying the eutrophic cycle.

Excessive aquatic plant growth, in addition, degrades aesthetic and recreational uses. Unsightly algal growth is unappealing to swimmers and other stream users and reduces water clarity. Decomposing plant matter also produces unpleasant sights and strong odors. Heavy growths of algae on rocks can make streambeds slippery and difficult or dangerous to walk on. Algae and macrophytes can interfere with angling by fouling fishing lures and equipment. Boat propellers and oars may also get tangled by aquatic vegetation.

When nutrients exceed the assimilative capacity of a water body, the ensuing eutrophic cycle can negatively impact in-stream dissolved oxygen (DO) levels. Through respiration, and the decomposition of dead plant matter, excessive algae and plant growth can reduce instream DO concentrations to levels that could negatively impact aquatic life. During the day, primary producers (*e.g.*, algae, plants) provide oxygen to the water as a by-product of photosynthesis. At night, however, when photosynthesis ceases but respiration continues, DO concentrations decline. Furthermore, as primary producers die, they are decomposed by bacteria that consume oxygen, and large populations of decomposers can consume large amounts of DO. Many aquatic insects, fish, and other organisms become stressed and may even die when DO levels drop below a particular threshold level.

Nutrient overenrichment of estuaries and nearshore coastal waters from human-based causes is now recognized as a national problem on the basis of Clean Water Act Section 305(b) reports from coastal States (EPA, 2001). Most of the nation's estuarine and coastal waters are moderately to severely polluted by excessive nutrients, especially nitrogen and phosphorus (NOAA, 2007; NOAA, 1999, EPA, 2006; EPA, 2004, EPA; and EPA, 2001). The State of Rhode Island has undertaken extensive efforts to reduce nitrogen discharges to Narragansett Bay proper to address eutrophic conditions there, with wastewater treatment facilities investing upward of $250 million on nitrogen removal upgrades. Letter from RI Governor Lincoln Chafee, December 22, 2014; see also Fact Sheet, Upper Blackstone Water Pollution Abatement District, NPDES No. MA0102369 (2008).

c. Water Quality Standards Applicable to the Taunton River Estuary and Mount Hope Bay

Under the MA SWQS, 314 CMR 4.00, surface waters are divided into water "use" classifications, including Class SA and SB for marine and coastal waters. The Taunton River Estuary and the eastern portion of Mount Hope Bay are classified as SB waters, with designations for Shellfishing (Restricted and Conditionally Restricted Shellfish Areas) and CSO. Class SB waters are designated as a "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. In certain waters, habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting with depuration (Restricted and Conditionally Restricted Shellfish Areas)." 314 CMR 4.05(4)(b). Waters in this classification "shall have consistently good aesthetic value." *Id.*

Class SB waters are subject to class-specific narrative and/or numeric water quality criteria. 314 CMR 4.05(4)(b)1 to 8. DO concentrations in Class SB waters "[s]hall not be less than 5.0 mg/l. Seasonal and daily variations that are necessary to protect existing and designated uses shall be maintained. Where natural background conditions are lower, DO shall not be less than natural background."

The western portion of Mount Hope Bay is designated as a Class SA – Shellfishing water. These waters are designated as an excellent habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation. In approved areas, they shall be suitable for shellfish harvesting without depuration (Open Shellfish Areas). These waters shall have excellent aesthetic value. With respect to DO, the criteria for class SA waters is "not less than 6.0 mg/. Where natural background conditions are lower, DO shall not be less than the natural background. Natural seasonal and daily variations that are necessary to protect existing and designated uses shall be maintained."

Both Class SA and Class SB waters are also subject to additional minimum standards applicable to all surface waters, as set forth at 314 CMR 4.05(5). With respect to nutrients, the MA SWQS provide:

> Unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses and shall not exceed the site specific criteria developed in a TMDL or as otherwise established by the Department pursuant to 314 CMR 4.00. Any existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment as determined by the Department, including, where necessary, highest and best practical treatment (HBPT) for POTWs and BAT for non POTWs, to remove such nutrients to ensure protection of existing and designated uses.

314 CMR 4.05(5)(c). In addition, the MA SWQS require:

> Aesthetics – All surface waters shall be free from pollutants in concentrations or combinations that settle to form objectionable deposits; float as debris, scum, or other matter to form nuisances; produce objectionable odor, color, taste, or turbidity; or produce undesirable or nuisance species of aquatic life. 314 CMR 4.05(5)(a)

Massachusetts has not adopted numeric criteria for total nitrogen or other nutrients. MassDEP has, however, used a number of indicators in interpreting its narrative nutrient standard. The DEP/SMAST Massachusetts Estuaries Project report, *Site-Specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical Indicators - Interim Report* (Howes et al., 2003) (Critical Indicators Report), was developed to provide "a translator between the current narrative standard and nitrogen thresholds (as they relate to the ecological health of each embayment) which can be further refined based on the specific physical, chemical and biological characteristics of each embayment. This report is intended to provide a detailed discussion of the issue and types of indicators that can be used, as well as propose an acceptable range of nitrogen thresholds that will be used to interpret the current narrative standard." http://www.oceanscience.net/estuaries/pdf/nitroest.pdf. This interpretive guidance has been used in a number of TMDLs for estuarine waters in southeastern Massachusetts.

The Critical Indicators Report finds that the indicators of primary concern to be:

- plant presence and diversity (eelgrass, macroalgae, etc.)
- animal species presence and diversity (finfish, shellfish, infauna)
- nutrient concentrations (nitrogen species)

- chlorophyll-a concentration
- dissolved oxygen levels in the embayment water column

(Howes et al., 2003 at 11). With respect to total nitrogen, it concluded:

> It is not possible at this time to put quantitative nitrogen levels on each Water Quality Class. In fact, initial results of the Massachusetts Estuaries Project (Chatham Embayment Report 2003) indicate that the total nitrogen level associated with a particular ecological response can vary by over 1.4 fold (e.g. Stage Harbor versus Bassing Harbor in Chatham MA). Although between embayments nitrogen criteria may be different, it does appear that within a single embayment a consistent quantitative nitrogen criterion can be developed.

However, the Critical Indicators Report provides guidance for indicators, including total nitrogen, for various water quality classes. The nitrogen indicator ranges are based on long-term (>3 yr) average mid-ebb tide concentrations of total nitrogen (mg/L) in the water column. For "Excellent to Good" nitrogen related water quality conditions, equivalent to SA classification, the Report guidance is as follows: "Eelgrass beds are present, macroalgae is generally non-existent but in some cases may be present, benthic animal diversity and shellfish productivity are high, oxygen levels are generally not less than 6.0 mg/l with occasional depletions being rare (if at all), chlorophyll-a levels are in the 3 to 5 μg/L range. . . . For the case study, total nitrogen levels of 0.30-0.39 mg N/L were used to designate "excellent to good" quality areas." Id at 21-22.

For SB waters, the Critical Indicators Report provides the following guidance for indicators of unimpaired conditions, to be refined based on data from the specific embayments: "benthic animal diversity and shellfish productivity are high, oxygen levels are generally not less than 5.0 mg/l with depletions to <4 mg/L being infrequent, chlorophyll-a levels are in the 3 to 5 μg/L range and nitrogen levels are in the 0.39 - 0.50 range. . . . eelgrass is not present . . . and macroalgae is not present or present in limited amounts even though a good healthy aquatic community still exists." Id. at 22.

"Moderate Impairment" is indicated by "Shellfisheries may shift to more resistant species. Oxygen levels generally do not fall below 4 mg/L, although phytoplankton blooms raise chlorophyll a levels to around 10 μg/L. Eelgrass is not sustainable and macro-algae accumulations occur in some regions of the embayment. In the Case Study, embayment regions supporting total nitrogen levels >0.5 mg N/L were clearly impaired." Significant Impairment is indicated by total nitrogen concentrations of 0.6/0.7 mg/l and above. In "severely degraded" conditions, "algal blooms are typical with chlorophyll-a levels generally >20 μg/L, oxygen depletions to hypoxic levels are common, there are periodic fish kills, and macro-algal accumulations occur with both ecological and aesthetic impacts."

In addition to the Massachusetts water quality standards, water quality standards applicable to the Rhode Island portion of Mount Hope Bay must also be satisfied. As in Massachusetts, the Rhode Island portions of Mount Hope Bay are designated SB waters in the eastern portion and SA waters in the western portion of the Bay. Rhode Island, like Massachusetts, has specific numeric criteria for DO in SA and SB waters[11], and narrative criteria for nutrients[12] and aesthetics.[13] The Rhode Island portions of Mount Hope Bay, like the Massachusetts portions are listed for impairments due to total nitrogen, dissolved oxygen (as well as fishes bioassessments and temperature impairments linked to the Brayton Point power plant). As discussed below, permit limits designed to meet water quality standards in the Taunton River Estuary and the Massachusetts portions of Mount Hope Bay are expected to achieve water quality standards in Rhode Island.

d. Receiving Water Quality Violations

The Taunton River Estuary and Mount Hope Bay have reached their assimilative capacity for nitrogen and are suffering from the adverse water quality impacts of nutrient overenrichment, including cultural eutrophication. They are, consequently, failing to attain the water quality standards described above. The impacts of excessive nutrients are evident throughout the Taunton River Estuary and Mount Hope Bay as indicated by historic studies, a comprehensive monitoring study of the Taunton River Estuary/Mount Hope Bay in 2004-06, and ongoing (to the present) monitoring conducted as part of the larger Narragansett Bay monitoring program.

Both Massachusetts and Rhode Island have documented these impairments in their reporting on impaired waters. Section 303(d) of the CWA requires states to identify those waterbodies that are not expected to meet surface water quality standards after implementation of technology-based controls. The State of Massachusetts has identified Mount Hope Bay and the lower

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[11] Rule 8.D.3. Table 3. For waters with a seasonal pynocline, no less than 4.8 mg/l above the seasonal pynocline; below the seasonal pynocline DO concentrations above 4.8 mg/l shall be considered protective of Aquatic Life Uses. When instantaneous DO values fall below 4.8 mg/l, the waters shall not be (1) Less than 2.9 mg/l for more than 24 consecutive hours during the recruitment season; nor (2) Less than 1.4 mg/l for more than 1 hour more than twice during the recruitment season; nor (3) Shall they exceed the allowable cumulative DO exposure (Table 3.A).

For waters without a seasonal pycnocline, DO concentrations above 4.8 mg/l shall be considered protective of Aquatic Life Uses. When instantaneous DO values fall below 4.8 mg/l, the waters shall not be: (1) Less than 3.0 mg/l for more than 24 consecutive hours during the recruitment season; nor (2) Less than 1.4 mg/l for more than 1 hour more than twice during the recruitment season; nor (3) Shall they exceed the allowable cumulative DO exposure presented (Table 3.A. and Table 3.B).

[12] Rule 8.D.1(d). Nutrients - Nutrients shall not exceed the limitations specified in rule 8.D.(2) (freshwaters) and 8.D.(3) (seawaters) and/or more stringent site-specific limits necessary to prevent or minimize accelerated or cultural eutrophication.

Rule 8.D.3. None in such concentration that would impair any usages specifically assigned to said Class, or cause undesirable or nuisance aquatic species associated with cultural eutrophication. Shall not exceed site-specific limits if deemed necessary by the Director to prevent or minimize accelerated or cultural eutrophication. Total phosphorus, nitrates and ammonia may be assigned site-specific permit limits based on reasonable Best Available Technologies. Where waters have low tidal flushing rates, applicable treatment to prevent or minimize accelerated or cultural eutrophication may be required for regulated nonpoint source activities.

[13] Rule 8.D.1(b)(iv). Aesthetics - all waters shall be free from pollutants in concentrations or combinations that: iv. Result in the dominance of species of fish and wildlife to such a degree as to create a nuisance or interfere with the existing or designated uses.

reaches of the Taunton River Estuary for impairments due to low dissolved oxygen, with Total Nitrogen specifically identified as a cause of impairments in Mount Hope Bay.

Early studies focused predominantly on Narragansett Bay proper, rather than Mount Hope Bay, and established the need for significant nitrogen reductions in order to address eutrophication in the system, as evidenced by high chlorophyll-a concentrations and pervasive DO depletions. The state of Rhode Island established a legislative goal of a 50% reduction in nitrogen discharges to Narragansett Bay, which has been implemented through permit limits on total nitrogen. Early studies also indicated the need for nitrogen reductions in Mount Hope Bay, although additional study was needed for setting reduction targets. See e.g. Isaac, R.A., Estimation of Nutrient Loadings and Their Impacts on Dissolved Oxygen Demonstrated at Mount Hope Bay, 23 *Environment International* 151 (1997).

To remedy the paucity of data in Mount Hope Bay and the Taunton River Estuary, a three-year water quality monitoring study was conducted by the School for Marine Science and Technology at UMass-Dartmouth (SMAST) with funding and oversight from MassDEP. The study involved monthly sampling at 22 sites across Mount Hope Bay and the Taunton River Estuary from 2004 to 2006 (see Figure 5).[14] This study showed that average chlorophyll-a over the three year period was above 10 ug/l at all monitoring stations across the Taunton River Estuary and Mount Hope Bay. The 20th percentile DO concentrations for the three year period were below the 5.0 mg/l water quality standard at four of the six sites in the Taunton River Estuary.[15] Table 4, reproduced from SMAST, *Summary of Water Quality Monitoring Program for the Mount Hope Bay Embayment System (2004 – 2006)* at 24 (August 16, 2007).

[14] This monitoring program forms the baseline of EPA's load analysis due to the comprehensive nature of the available data and the quality assurance provided by MassDEP oversight, including data collection and analysis under an approved QAPP.
[15] The six Taunton River stations are MHB 1, 2 and 18-21; MHB 2, 18, 19 and 21 had 20% low DO below 5.0 mg/l for the three year period.

Figure 5. Mount Hope Bay Monitoring Program estuarine stations.

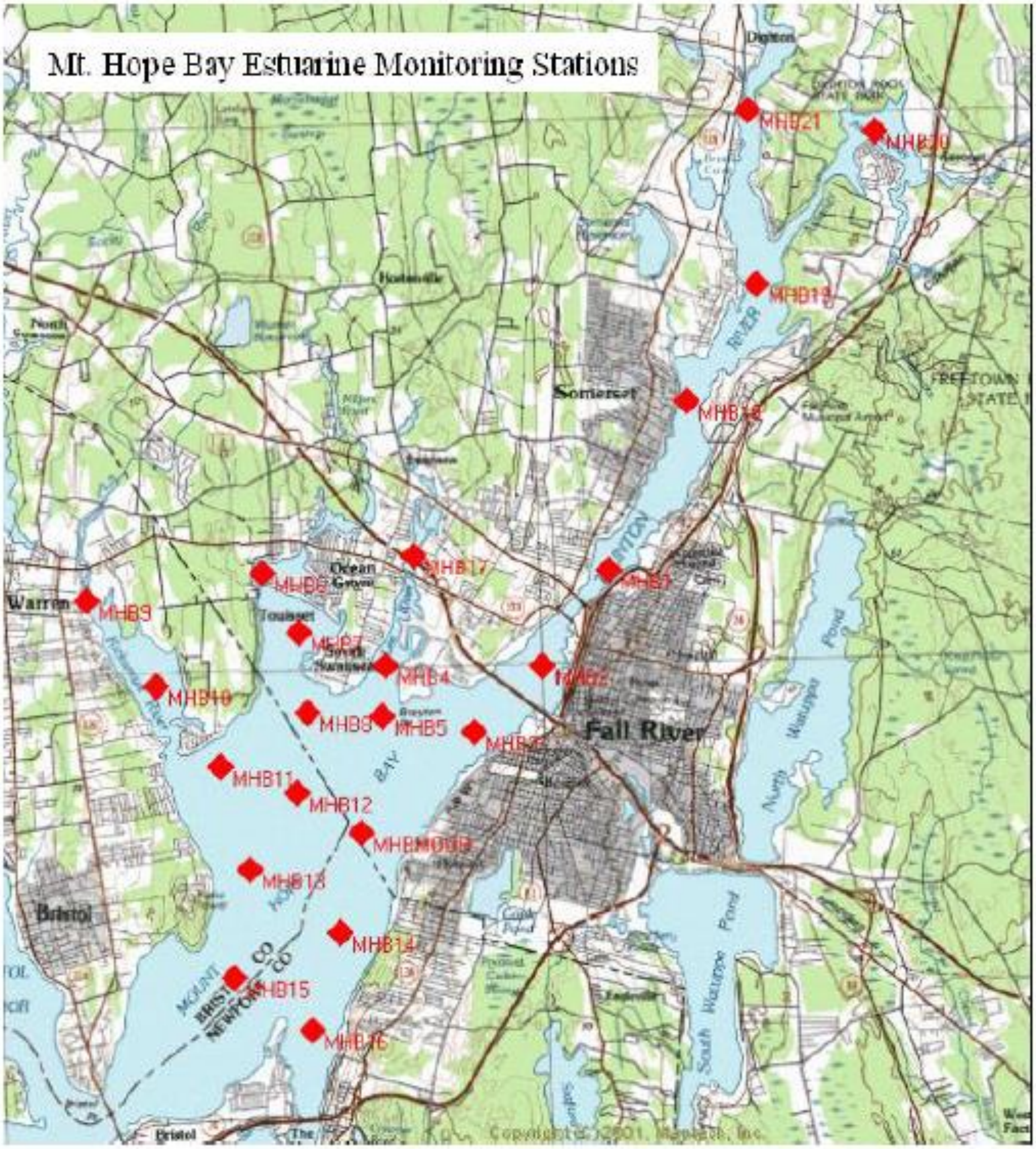


Table 4. Mount Hope Bay Monitoring Program results as reported in SMAST, 2007.

Table 5. Summary of average levels of primary nutrient related water quality parameters measured in the summers of 2004, 2005 and 2006 in Mount Hope Bay by SMAST Coastal Systems staff.

Station	Total Depth (m)	20% Low* D.O. (mg/L)	Sal (ppt)	PO4 (mg/L)	NH4 (mg/L)	NOX (mg/L)	DIN (mg/L)	DON (mg/L)	PON (mg/L)	TN (mg/L)	DIN/DIP Molar Ratio	Total Chl a (ug/L)
MHB1	10.0	5.02	23.3	0.054	0.052	0.095	0.147	0.299	0.155	0.601	6	11.75
MHB2	8.9	4.94	26.1	0.052	0.047	0.043	0.090	0.312	0.170	0.572	4	13.50
MHB3	5.2	5.49	26.0	0.051	0.037	0.035	0.072	0.282	0.163	0.517	3	14.32
MHB4	3.5	5.61	25.7	0.052	0.026	0.017	0.043	0.308	0.173	0.525	3	14.71
MHB5	5.6	5.20	26.2	0.050	0.029	0.020	0.050	0.294	0.169	0.512	2	14.53
MHB6	3.9	5.09	24.1	0.061	0.049	0.030	0.079	0.359	0.168	0.606	3	12.87
MHB7	4.5	5.94	25.5	0.049	0.023	0.016	0.039	0.308	0.189	0.536	2	17.46
MHB8	5.1	4.93	25.8	0.046	0.022	0.019	0.041	0.280	0.165	0.486	2	15.84
MHB9	ND	ND	19.7	0.062	0.049	0.040	0.089	0.453	0.263	0.805	3	14.02
MHB10	3.2	5.86	25.7	0.048	0.017	0.012	0.027	0.314	0.167	0.508	1	14.11
MHB11	4.9	5.02	26.2	0.043	0.017	0.012	0.029	0.268	0.175	0.472	1	16.23
MHB12	5.0	5.36	26.4	0.049	0.020	0.021	0.040	0.284	0.168	0.493	2	16.12
MHB13	5.9	6.00	26.8	0.045	0.020	0.013	0.033	0.282	0.158	0.473	2	15.40
MHB14	6.5	5.34	27.0	0.044	0.024	0.009	0.033	0.289	0.197	0.519	2	16.78
MHB15	12.9	6.46	27.9	0.035	0.021	0.009	0.029	0.273	0.143	0.445	2	12.68
MHB16	11.2	6.33	27.7	0.043	0.028	0.012	0.039	0.265	0.157	0.461	2	13.02
MHB17	ND	ND	24.6	0.064	0.057	0.026	0.083	0.404	0.181	0.669	3	11.81
MHB18	6.7	4.96	22.3	0.062	0.061	0.136	0.197	0.300	0.156	0.652	7	11.44
MHB19	4.0	4.93	18.7	0.058	0.074	0.201	0.275	0.342	0.178	0.799	10	12.27
MHB20	1.8	5.09	17.5	0.054	0.063	0.144	0.207	0.372	0.192	0.771	8	13.59
MHB21	2.6	4.60	14.2	0.061	0.066	0.350	0.415	0.420	0.219	1.058	15	13.34
MHBMOOR	6.3	5.85	26.8	0.045	0.025	0.013	0.038	0.284	0.181	0.503	2	15.57

* Average of the lowest 20% of recorded values

Table 5 below shows the results of the SMAST monitoring for each of the three years of the monitoring program, with the Taunton River stations highlighted. Minimum measured DO concentrations in each year were below 5.0 mg/l at all the Taunton River stations in 2004 and 2006, and a majority of those stations in 2005. In Mount Hope Bay proper, minimum DO concentrations below 5.0 mg/l were encountered at all but one of the Mount Hope Bay stations at least once during the three year period, and at five of the ten stations in both 2004 and 2005. This is compelling evidence of pervasive low DO conditions throughout the Taunton River Estuary and Mount Hope Bay, given that the sampling was intermittent (and therefore unlikely to capture isolated low DO events) and was not timed to reflect the lowest DO conditions in the waterbody (just before dawn, when oxygen depletion due to respiration is greatest).

Elevated chlorophyll-a concentrations are similarly pervasive based on the SMAST monitoring data. Mean chlorophyll-a concentrations are above the Critical Indicators Report guidelines for unimpaired waters (3-5 ug/l) at every station monitored, in all three of the monitoring seasons. See Table 5. Maximum chlorophyll-a concentrations are routinely above 20 ug/l, far exceeding the chlorophyll concentrations found in unimpaired waters. Again, given the likelihood of intermittent sampling missing the worst conditions in terms of algal blooms, this is compelling evidence of pervasive eutrophic conditions throughout the Taunton River Estuary and Mount Hope Bay.

The study showed total nitrogen concentrations are elevated throughout the system, with a three year average TN concentration above 0.5 mg/l at sixteen of the 22 sites and above 0.45 mg/l at 21 of 22 sites. SMAST, 2007. Total Nitrogen concentrations are generally highest in the tidal rivers, including the Taunton River (e.g. Station 19, TN range 0.66 to 0.99 mg/l). Molar N/P ratios are consistent with nitrogen limitation (≤ 10 at all stations other than MHB21, the uppermost Taunton River station).

Table 5. SMAST Monitoring Data Summarized by Year. Taunton River stations highlighted.

			2004				2005				2006			
Station	**Location**	**State**	**DO min (mg/l)**	**Chl-a max (ug/l)**	**Chl-a mean (ug/l)**	**TN mean (mg/l)**	**DO min (mg/l)**	**Chl-a max (ug/l)**	**Chl-a mean (ug/l)**	**TN mean (mg/l)**	**DO min (mg/l)**	**Chl-a max (ug/l)**	**Chl-a mean (ug/l)**	**TN mean (mg/l)**
1	Taunton River	MA	4.8	24.2	7.8	0.53	5.1	49.2	10.9	0.56	4.1	26.6	10.3	0.74
2	Taunton River	MA	4.7	33.2	9.6	0.53	5.0	16.6	8.2	0.51	3.0	48.6	14.2	0.68
3	MHB proper (61-06)	MA	5.1	65.1	11.9	0.51	5.2	20.0	10.2	0.45	4.8	41.5	16.8	0.60
4	Lee River	MA	4.7	19.5	10.5	0.51	5.1	16.0	10.8	0.48	6.1	28.6	16.3	0.59
5	MHB proper (61-07)	MA	4.7	22.4	10.5	0.48	4.6	22.6	11.7	0.49	5.1	29.7	14.3	0.57
6	Cole River	MA	4.9	26.4	11.1	0.52	4.7	16.0	11.0	0.56	5.3	18.6	8.5	0.74
7	MHB proper (61-07)	MA	3.4	37.2	14.2	0.47	5.3	22.3	13.3	0.54	7.1	24.9	16.2	0.60
8	MHB proper (61-07)	MA	3.8	38.8	12.7	0.46	2.6	27.5	11.8	0.45	5.6	32.7	14.1	0.55
9	Kickamut River	RI	No data	19.1	11.9	0.70	No Data	17.7	9.7	0.73	No data	33.1	13.1	1.03
10	Kickamut River	RI	6.0	12.5	8.5	0.48	5.4	29.9	13.6	0.49	5.4	28.9	14.6	0.57
11	MHB-proper	RI	3.2	26.3	10.4	0.44	4.5	33.2	14.3	0.45	5.5	35.6	17.1	0.53
12	MHB-proper	RI	4.0	29.2	10.8	0.45	4.0	29.6	14.4	0.50	5.4	36.4	14.1	0.52
13	MHB-proper	RI	6.5	25.8	11.2	0.42	4.1	27.9	13.4	0.46	6.2	26.5	13.7	0.53
14	MHB-proper	RI	6.0	36.8	14.2	0.58	6.1	32.4	12.1	0.41	2.1	80.6	19.4	0.57
15	MHB-proper	RI	6.9	23.1	9.8	0.45	6.3	23.6	8.8	0.42	4.3	42.4	14.5	0.46
16	MHB-proper	RI	6.2	25.5	10.5	0.45	6.0	33.3	10.3	0.44	5.3	30.4	14.1	0.50
17	Lee River	MA	No data	9.2	4.7	0.65	No Data	17.3	7.9	0.61	No data	27.2	13.8	0.76
18	Taunton River	MA	4.7	16.1	7.5	0.61	4.4	38.0	9.0	0.60	4.3	12.9	7.2	0.80
19	Taunton River	MA	4.4	27.0	10.8	0.72	4.7	33.2	10.5	0.73	4.6	15.0	5.5	0.99
20	Assonet River	MA	5.1	15.7	9.1	0.72	5.6	27.1	12.2	0.63	4.8	16.9	7.6	0.94
21	Taunton River	MA	3.8	23.1	10.5	0.98	4.1	19.8	10.5	1.04	4.8	14.3	5.9	1.24
MOOR	MHB proper (61-06)	MA	6.3	21.4	11.4	0.51	5.4	19.9	11.5	0.45	2.7	35.4	16.5	0.55

Based on these data, the SMAST report concluded that a Massachusetts Estuaries Project ("MEP") analysis of nitrogen loading was warranted for restoration of the Mount Hope Bay/Taunton River complex, stating:

> Given the high population within the watershed and resultant N loading to this down gradient estuary and the observed high chlorophyll levels and oxygen depletions, it is not surprising that nitrogen levels are moderately to highly enriched over offshore waters. The Taunton River estuarine reach, as the focus of upper watershed N loading, showed very high total nitrogen levels (TN) in its upper reach (1.058 mg N L^{-1}) and maintained high levels throughout most of its reach (>0.6 mg N L^{-1}). The main basin of Mt. Hope Bay supported lower TN levels primarily as a result of mixing with incoming waters (generally 0.5-0.6 mg N L^{-1}). This is consistent with the observed oxygen depletions and infauna animal communities. The highest (Moderate) water quality was found at the stations in the main basin and lower reaches of Mt Hope Bay out to the channels to lower Narragansett Bay and the Sakonet River.
> . . .
> In general, the Taunton River Estuary, with its large watershed N load and high TN levels, is showing poor water quality due to its high chlorophyll and oxygen depletions. The main basin of Mt. Hope Bay, with its greater flushing and access to higher quality waters of the lower Bay, is showing less impairment with moderate water quality. Finally, the lower basin of Mt. Hope Bay, nearest the tidal "inlet", is generally showing moderate water quality. . . . [T]hese data indicate that the MEP analysis of this system should focus on restoration of the main basin of Mt. Hope Bay and the Taunton River estuarine reach, and that it is likely that restoration of the Taunton River Estuary will have a significant positive effect on the habitat quality of the main basin of Mt. Hope Bay.

To date, the MEP analysis, along with the TMDL that would result from the analysis, has not been completed.[16]

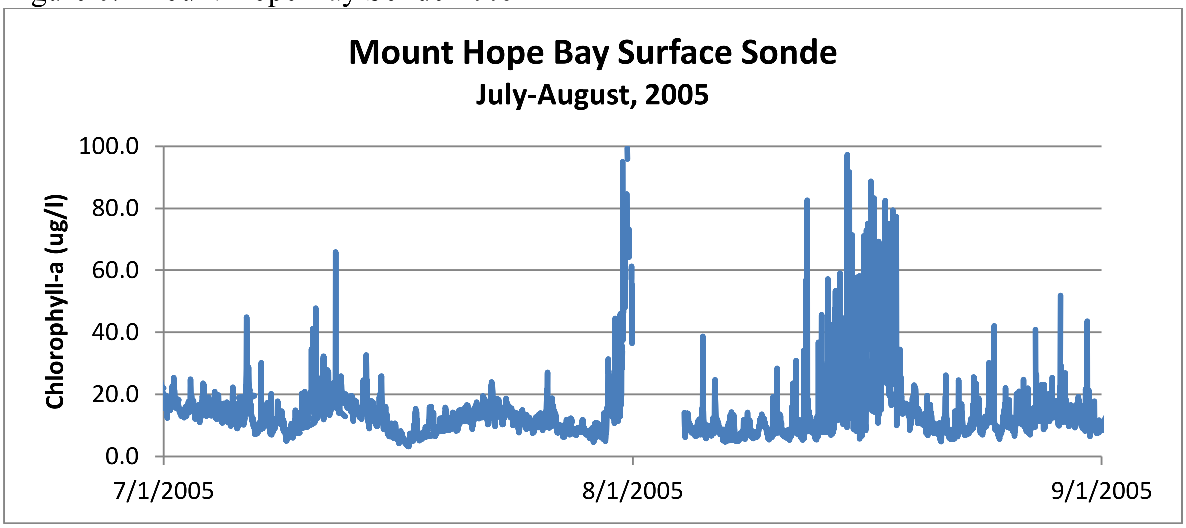
Additional evidence of conditions in Mount Hope Bay is provided from the Narragansett Bay Water Quality Network fixed monitoring station in the Bay, equipped with two datasondes that measured temperature, salinity, dissolved oxygen and depth at approximately 1 meter from the bottom and 0.5 meters below the surface, and chlorophyll fluorescence at the near surface sonde. (http://www.narrbay.org/d_projects/buoy/buoydata.htm). The datasondes were deployed in the Rhode Island portion of Mount Hope Bay near SMAST site MHB13, from May or June through October, from 2005 through 2014. Analysis of the DO data from the deep sonde at this site in 2005 and 2006 showed multiple events (three in 2005; seven in 2006) of DO depletion below the 4.8 mg/l RI water quality threshold, with individual events lasting between two and twelve days.

[16] EPA is required to issue the permit with limits and conditions necessary to ensure compliance with State water quality standards at the time of permit reissuance. Neither the CWA nor EPA regulations require that a TMDL be completed before a water quality-based limit may be included in a permit. Rather, water quality-based effluent limitations in NPDES permits must be "consistent with the assumptions and requirements of any *available* [emphasis added] wasteload allocation." 40 C.F.R. § 122.44(d)(1)(vii)(B). Thus, an approved TMDL is not a precondition to the issuance of an NPDES permit for discharges to an impaired waterway; nor does EPA have discretion to wait for the issuance of a TMDL to include effluent limitation on discharges of pollutants that contribute to impairments.

Codiga et al, "Narragansett Bay Hypoxic Even Characteristics Based on Fixed-Site Monitoring Network Time Series: Intermittency, Geographic Distribution, Spatial Synchronicity, and Interannual Variability," *Estuaries and Coasts* 32:621-641 (2009). Two of the 2006 events were characterized as "hypoxic", with DO concentrations less than 2.9 mg/l persisting for over two days. Id.

The sonde data also confirms the occurrence of algal blooms and generally elevated chlorophyll-a concentrations in Mount Hope Bay. The 2005 sonde data, Figure 6, shows multiple events with chlorophyll-a concentrations well above 20 ug/l, and above the maximum concentrations captured with the intermittent SMAST sampling.

Figure 6. Mount Hope Bay Sonde 2005



Charts by EPA. Source data: Narragansett Bay Fixed-Site Monitoring Network (NBFSMN), 2005. 2005 Datasets. Rhode Island Department of Environmental Management, Office of Water Resources. Data available at www.dem.ri.gov/bart

The sonde monitoring also confirms that these water quality violations continue to the present. The most recent published continuous data (for 2011) show elevated chlorophyll-a concentrations, corresponding periods of supersaturated DO at the surface, persistent bottom DO concentrations below 5 mg/l and frequent excursions below 3 mg/l. *See* Figure 7.

Figure 7a. Surface Chlorophyll and DO percent saturation, 2011

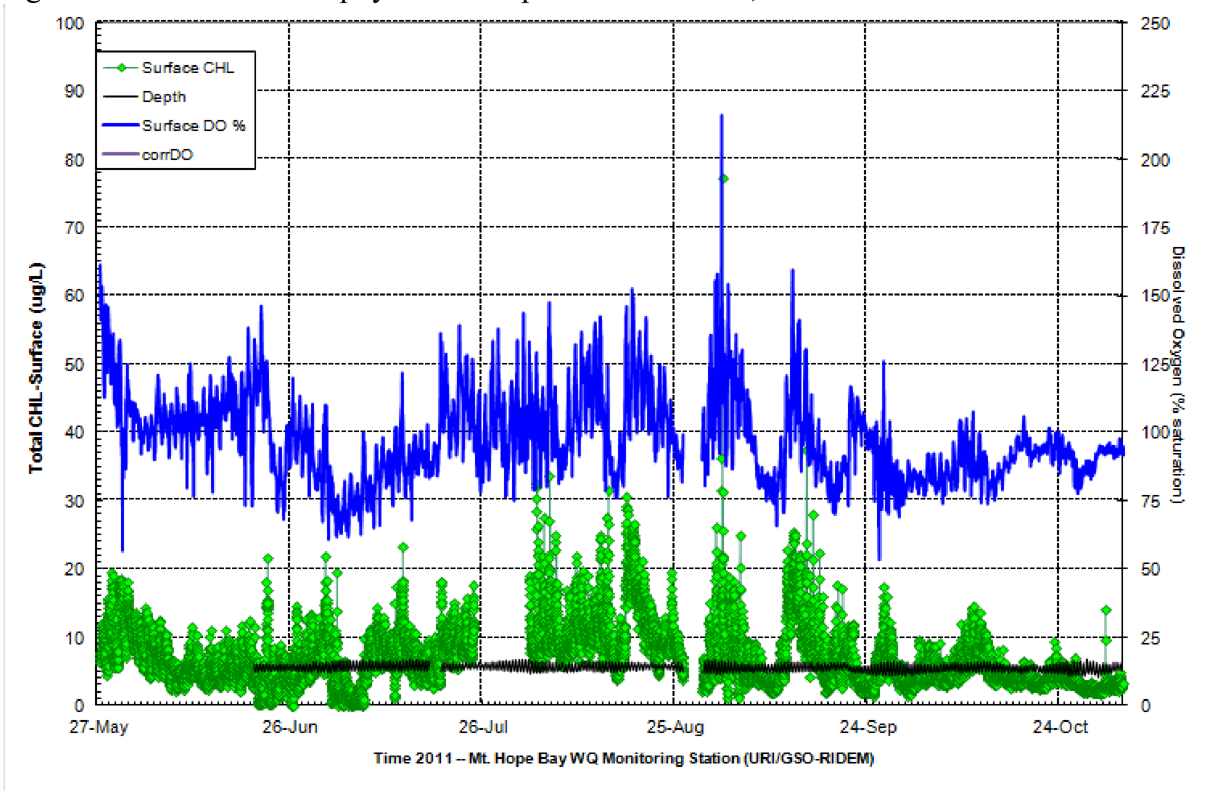
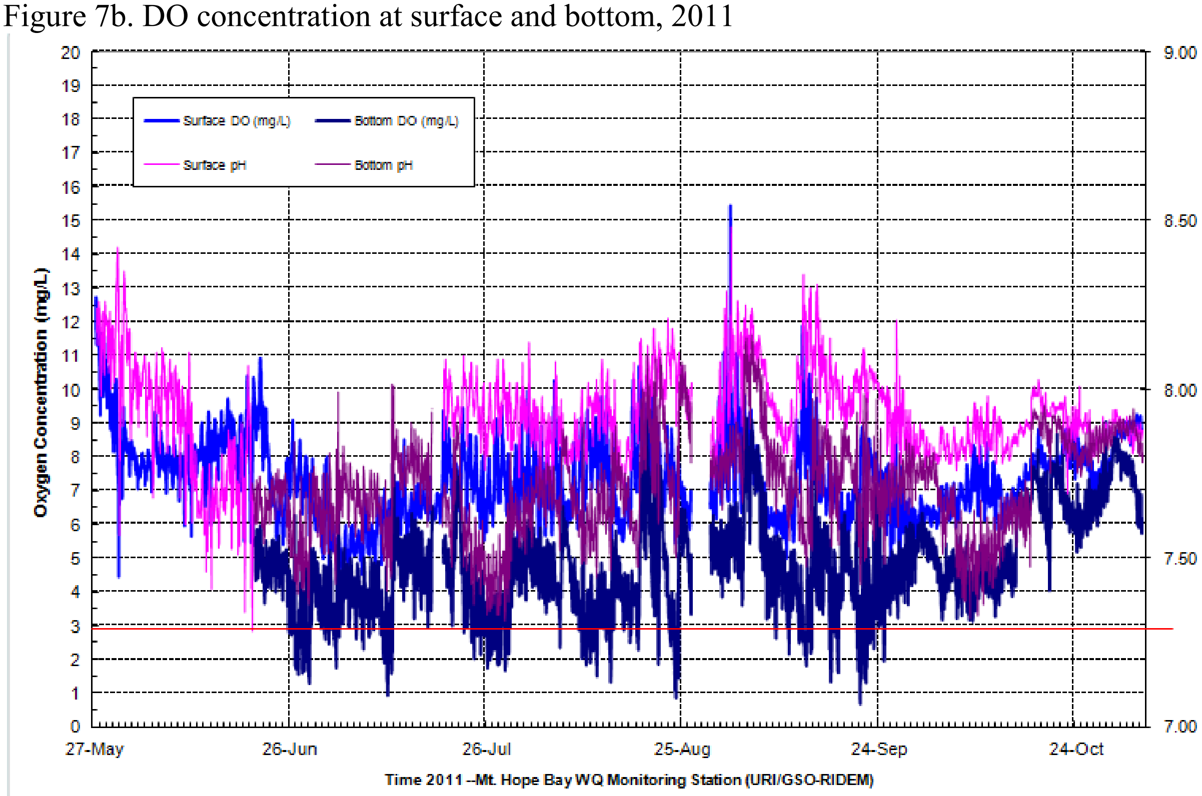


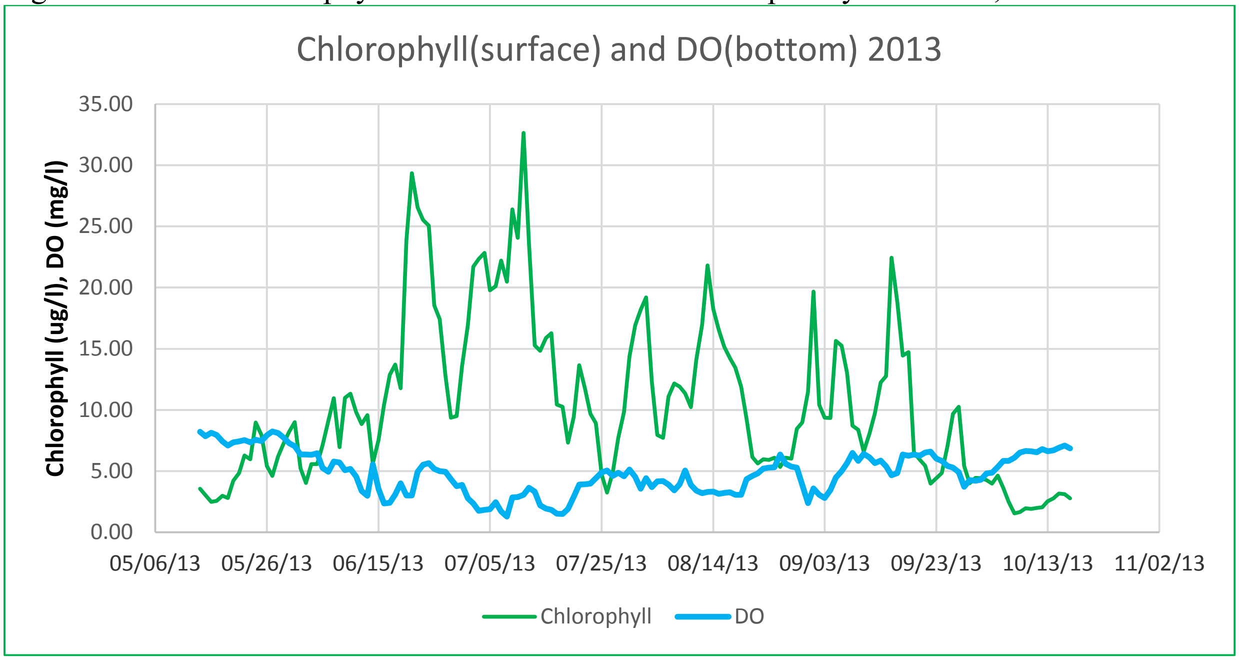
Figure 7b. DO concentration at surface and bottom, 2011



Charts by URI/GSO-RIDEM. Chart and data available at www.dem.ri.gov/bart

In addition daily average data has been published through 2013, and confirms continued elevated algae with accompanying extended periods of low DO, consistent with continuing nutrient impacts. In 2013 most of the summer had daily average DO below the 5.0 mg/l Massachusetts DO standard, and extensive periods below the 2.8 mg/l threshold in Rhode Island water quality standards.

Figure 8. Surface chlorophyll and bottom DO at Mount Hope Bay datasonde, 2013.



Based on these data, EPA has concluded that cultural eutrophication due to nitrogen overenrichment in the Taunton River Estuary and Mount Hope Bay has reached and continues to exhibit the level of a violation of both Massachusetts and Rhode Island water quality standards for nutrients and aesthetics, and has also resulted in violations of the numeric DO standards in these waters.

e. Reasonable Potential Analysis

Pursuant to 40 C.F.R. § 122.44(d)(1), NPDES permits must contain any requirements in addition to technology-based limits necessary to achieve water quality standards established under Section 303 of the CWA, including state narrative criteria for water quality. In addition, limitations "must control any pollutant or pollutant parameter (conventional, non-conventional, or toxic) that the Director has determined are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any water quality standard, including State narrative criteria for water quality" (40 C.F.R. § 122.44(d)(1)(i)). An excursion occurs if the actual or projected instream data exceeds any numeric or narrative water quality criterion.

To determine the extent of the facility's contribution to the violation of the MA SWQS, EPA performed an analysis of nitrogen loading to the Taunton River Estuary using as a baseline data from the SMAST monitoring program, which included monitoring on the Taunton River and major tributaries to the Taunton River Estuary, in additional to the estuarine stations. These data represent the most comprehensive dataset available for the Mount Hope Bay and Taunton River Estuary system. The analysis focuses on the Taunton River Estuary because that area shows the greatest eutrophication impacts and greatest nitrogen concentrations. Using the 2004-2005 to representative a "typical year" based on precipitation data,[17] EPA used the USGS LOADEST program to calculate a calculate a seasonal average (June to September) nitrogen load for the Taunton River and each tributary using measured nitrogen concentrations and flow for several discrete events. A description of the LOADEST analysis is provided in Attachment A.

EPA also calculated the point source loads to the Taunton River Estuary derived from wastewater treatment plants based on DMR data from each facility from June through September 2004-05. These include direct discharges to the Taunton River Estuary (Taunton and Somerset WWTPs), and discharges to the tributaries from other POTWs, which are a component of the tributary loads calculated above. For POTWs discharging to tributaries to the Taunton River, an attenuation factor was applied to account for instream uptake of nitrogen. A description of the attenuation calculation is provided in Attachment B. Attenuation was determined to range from four to eighteen percent for the major (> 1 mgd) facilities located on tributaries (eleven percent for Brockton, the largest discharger), with higher attenuation for some of the smaller facilities on smaller tributaries. Table 6 shows the point sources, the receiving stream, their nitrogen discharges and the delivered load to the estuary.

[17] Rainfall during the summers of 2004 and 2005 totalled 17.82 and 11.03 inches respectively (http://weather-warehouse.com/WeatherHistory/PastWeatherData_TauntonMuniArpt_EastTaunton_MA_September.html), compared to a long term average of 15.24 inches (http://www.weather.com/weather/wxclimatology/monthly/graph/02780). The third monitoring year, 2006, was excluded because extremely high rainfall in May and June (over 9 inches per month, or more than twice the long term average) has potential to disturb the "steady-state" assumption that underlies EPA's load analysis.

Table 6. Point Source Discharges and Delivered Loads

WWTF	Design Flow (MGD)	Receiving stream	Average 2004-05 Summer TN discharged (lb/d)	Average 2004-05 Summer TN delivered to Estuary (lb/d)
Direct discharges to Estuary				
Taunton	8.4	Taunton River Estuary	610	610
Somerset	4.2	Taunton River Estuary	349.5	349.5
			Total direct point source load:	959
Upstream discharges				
MCI Bridgewater	0.55	Taunton River	37	33
Brockton	18	Salisbury Plain River	1303	1160
Bridgewater	1.44	Town River	137.5	132
Dighton-Rehoboth Schools	0.01	Segregansett River	1	1
Mansfield	3.14	Three Mile River	375.5	312
Middleboro	2.16	Nemasket River	207.5	191
Wheaton College	0.12	Three Mile River	6	3
Oak Point	0.18	Bartlett Brook	9	8
East Bridgewater High School	0.01	Matfield River	1.5	1
			Total upstream point source load:	1841

Finally, EPA calculated total loads to the estuary and allocated those loads between point sources and nonpoint sources. For upstream loads, nonpoint sources were calculated by subtracting the delivered point source loads from the LOADEST total load. Nonpoint source loads from the watershed area downstream of the SMAST monitoring sites, not accounted for in the LOADEST analysis, were calculated using an areal loading factor derived from the LOADEST loading figures. Direct atmospheric deposition to the Taunton River Estuary was not included in the model as it is a relatively small contribution given the relatively small area of the estuary.[18] The average summer load to the estuary in 2004 to 2005 is 4,228 lbs/day.

Table 7 and Figure 9 show the total watershed nitrogen loads to the Taunton River Estuary in the baseline analysis. Wastewater treatment plant loads make up 66% of the total nitrogen load. Nonpoint sources make up the remaining 34%. The Brockton AWRF load, at 1,303 lbs/day, was approximately 31% of the total nitrogen load.

EPA also considered the impacts of changes since the 2004-05 baseline. Specifically, (the Brockton AWRF was upgraded as of 2010, reducing its total nitrogen load discharges from 1303 lbs/day to an average of 527 lbs/day in 2012-13. This is reduction reduces delivered loads from the baseline of 4,228 lbs/day to 3537 lbs/day. The load from Brockton is a smaller percentage of that total, but would still make up approximately 13% of total loads. Monitoring done by the Narragansett Bay Commission on the Taunton River also indicate continuing high total nitrogen

[18] Atmospheric deposition to the watershed is included in the nonpoint source loading figures.

concentrations, consistent with EPA's analysis, with TN concentrations at the Berkley Bridge in Dighton ranging between 0.6 to 2.7 mg/l (median 1.06 mg/l) in 2014. NBC River and Bay Nutrients Data, http://snapshot.narrabay.com/app/MonitoringInitiatives/NutrientMonitoring. (Unfortunately the NBC data includes total nitrogen only since mid-2013, and the monitoring data is from an estuarine portion of the river so is influenced by dilution by marine waters, so that trends over time and direct comparison to SMAST baseline data are not possible.)

Figure 9. Taunton River Estuary Loads by Category

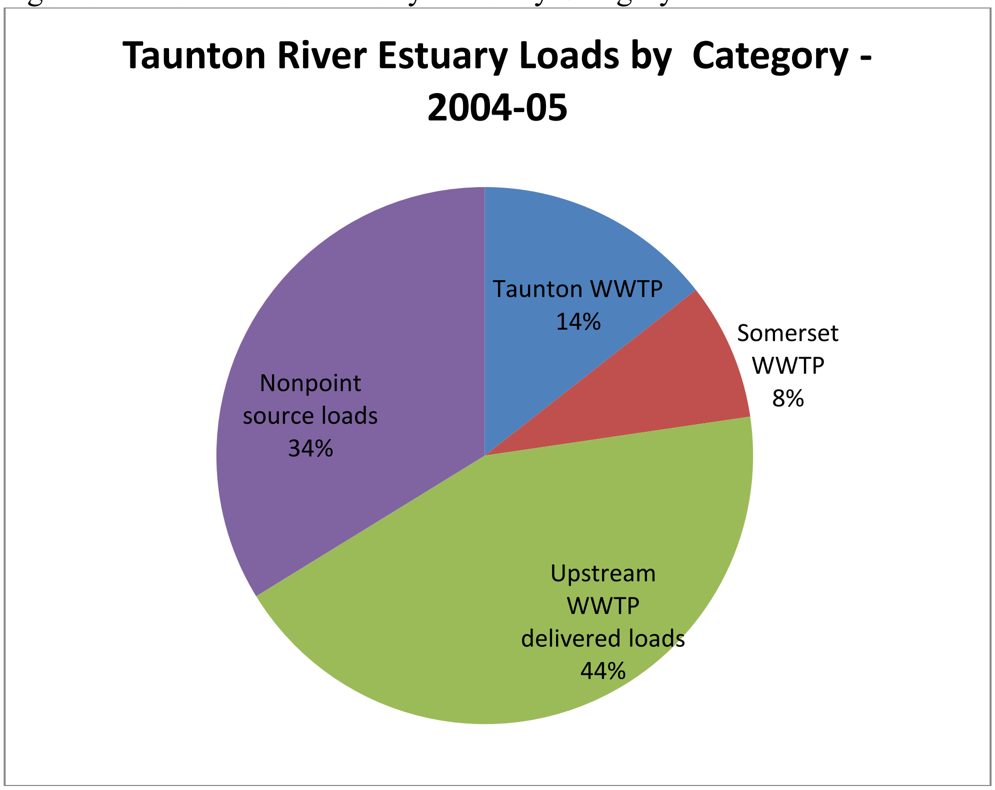


Table 7. Taunton River Estuary Loads by Category

Total loads	Avg 2004-05 Summer Load (lb/d)
Taunton WWTP	610
Somerset WWTP	350
Upstream WWTP delivered loads	1841
Nonpoint source loads	1428
Total	4228

On this basis, EPA concludes that the Brockton AWRF's nitrogen discharges "cause, have a reasonable potential to cause, or contribute" to nitrogen-related water quality violations in the Taunton River Estuary. Therefore, an effluent limit must be included in the permit.

EPA notes that the reduction in loads associated with the Brockton AWRF upgrade has resulted in about a 17% reduction in the total load to the Taunton River estuary. EPA commends this voluntary reduction, which is a significant step (although not sufficient in itself, see section f.ii below) towards achieving the necessary load reductions in this watershed.

f. Effluent limitation calculation

EPA's calculation of an effluent limitation for nitrogen consists of two parts. First, EPA determines a threshold nitrogen concentration in the water body that is consistent with unimpaired conditions. Second, EPA determines the allowable load from watershed sources generally, and this facility specifically, that will result in receiving water concentrations at or below the allowable threshold.

i. Threshold nitrogen concentration

To determine an appropriate threshold concentration, EPA applies the procedure developed by the Massachusetts Estuaries Project ("MEP") of identifying a target nitrogen concentration threshold based on a location within the estuary where water quality standards are not violated, in order to identify a nitrogen concentration consistent with unimpaired conditions. See, e.g., SMAST/MassDEP, Massachusetts Estuaries Project Linked Watershed-Embayment Modeling to Determine Critical Nitrogen Loading Thresholds for Stage Harbor, Sulphur Springs, Taylors Pond, Bassing Harbor and Muddy Creek, Chatham, MA (2003) at 227 ("the nitrogen level associated with high and stable habitat quality typically derived from a lower reach of the same system or an adjacent embayment is used as the nitrogen concentration target").[19] This approach is consistent with EPA guidance regarding the use of reference conditions for the purposes of developing nutrient water quality criteria. The MEP process also distinguishes areas where eelgrass restoration is targeted, which generally require much lower TN concentrations. The Taunton River Estuary is classified as an SB water and is not a location where eelgrass has historically been found.[20] Therefore the primary water quality parameter considered in determining a reference location is protection of DO conditions, with algae growth (chlorophyll) and water clarity also considered. EPA notes that concentrations previously found to be protective of DO in other southeastern Massachusetts estuaries have ranged between 0.35 and 0.55 mg/l.[21]

[19] The Massachusetts Estuaries Project use the term "sentinel" location to describe the critical location(s) that are targeted for nitrogen reductions, such that "restoration or protection of the sentinel sub-embayment will necessarily create high quality habitat throughout the estuary."

[20] Known historic eelgrass locations within Mount Hope Bay are located on the western portion of the Bay, including the mouths of the Kickamuit, Cole and Lee Rivers, and in the Sakkonet River. See Restoration Sites and Historical Eelgrass Distribution in Narragansett Bay, Rhode Island (2001), http://www.edc.uri.edu/restoration/images/maps/historiceelgrass.pdf . Water quality based TN thresholds would be lower in those areas to protect eelgrass habitat. The DO-based thresholds used for development of permit limits will also protect eelgrass in those locations due to much greater dilution of the Taunton River discharges in those areas of the Bay.

[21] See, e.g. MassDEP, *FINAL West Falmouth Harbor Embayment System Total Maximum Daily Loads For Total Nitrogen* (2007) (Harbor Head threshold 0.35 – SA water); MassDEP, *Oyster Pond Embayment System Total Maximum Daily Loads For Total Nitrogen* (2008) (threshold 0.55).

Data from the SMAST monitoring program indicates widespread DO violations at a range of TN concentrations. Table 5 of the SMAST report (Table 4 of this Fact Sheet above) provides the three year period 20% low DO concentration, which was below the 5 mg/l water quality standard at four stations, with long term average TN concentrations ranging from 0.486 to 1.058 mg/l. However, EPA does not consider a three year, 20% low DO to be a sufficiently sensitive indicator of water quality violations because the water quality criteria are based on a minimum DO concentration of 5 mg/l.

Closer examination of the SMAST monitoring data indicates multiple stations with minimum DO violations during the year with corresponding TN mean concentrations below 0.48 mg/l. Indeed minimum DO concentrations of less than 5.0 mg/l were encountered at all but one site (MHB16) during the three year monitoring program. See Table 5.

In addition, DO concentrations from the fixed site monitoring station indicate extensive periods with DO below 5.0 mg/l in 2005 and 2006 (the datasonde was not operating in 2004). EPA considers fixed site monitoring to be superior to intermittent sampling data with respect to DO concentrations because the continuous monitoring includes critical conditions and time periods (e.g. early morning DO minimums) that are generally missed in intermittent sampling. The SMAST monitoring station that is closest to the fixed site station is MHB13. The average TN concentration at MHB13 between 2004 and 2006 was 0.473 mg/l, indicating that the threshold concentration must be lower than that value.

This is consistent with SMAST findings based on the entire tropic health index, which includes indices for water clarity (secchi depth) and algae. SMAST determined that stations MHB15 and MHB16 had the highest eutrophication index values, consistent with moderate water quality. See Table 7 of the SMAST report which is shown as Figure 10 of this Fact Sheet..

Figure 10. SMAST Trophic health index scores for Mount Hope Bay

Table 7 Trophic health index scores and status for water quality monitoring stations, Mt. Hope Bay, 2004-2006 (described in Howes et al. 1999 and also at www.savebuzzardsbay.org.)

Station	Secchi SCORE	Low20% Oxsat SCORE	DIN SCORE	TON SCORE	T-Pig SCORE	EUTRO Index	Health Status
MHB1	52.2	57.8	0.0	36.5	0.0	29	Fair/Poor
MHB2	67.7	58.5	19.3	28.7	0.0	35	Mod/Fair
MHB3	62.1	79.4	29.0	39.1	0.0	42	Mod
MHB4	62.0	79.0	51.5	28.7	0.0	44	Mod
MHB5	61.2	71.8	44.9	34.2	0.0	42	Mod
MHB6	65.7	73.5	24.9	17.0	0.0	36	Mod/Fair
MHB7	61.5	87.9	55.4	24.8	0.0	46	Mod
MHB8	61.7	65.3	53.5	39.1	0.0	44	Mod
MHB9	ND	ND	19.6	0.0	0.0	ND	ND
MHB10	60.4	89.4	70.7	29.1	0.0	50	Mod
MHB11	61.6	66.2	68.5	39.8	0.0	47	Mod
MHB12	58.5	78.2	54.1	37.1	0.0	46	Mod
MHB13	57.4	89.9	63.4	40.6	0.0	50	Mod
MHB14	58.8	73.0	63.3	27.5	0.0	45	Mod
MHB15	68.6	92.8	68.3	48.1	0.0	56	Mod
MHB16	65.6	95.5	55.8	45.9	0.0	53	Mod
MHB17	ND	ND	22.5	3.3	0.0	ND	ND
MHB18	47.1	58.0	0.0	36.1	0.0	28	Fair/Poor
MHB19	36.9	54.6	0.0	19.1	0.0	22	Fair/Poor
MHB20	30.5	60.7	0.0	8.1	0.0	20	Fair/Poor
MHB21	24.1	43.5	0.0	0.0	0.0	14	Fair/Poor
MHBMOOR	57.4	84.0	57.1	33.3	0.0	46	Mod

High Quality = >69; High/Moderate = 61-69; Moderate = 39-61; Moderate/Fair = 31-39; Fair/Poor = <31

On the basis of these data, EPA determined that station MHB16 was appropriate as a reference site where dissolved oxygen standards were met, and that a total nitrogen concentration of **0.45** mg/l (the average of 2004-05 concentrations) represents the threshold protective of the dissolved oxygen water quality standard of 5.0 mg/l. Higher TN concentrations are associated with multiple DO violations, based on the available monitoring data. EPA notes that this value is within the range of target nitrogen thresholds previously determined in southeastern Massachusetts embayments, and is also consistent with TN concentration thresholds to protect dissolved oxygen standards identified in other estuaries.[22]

ii. Allowable TN load

EPA next determined an allowable total nitrogen load from the watershed that would result in TN concentrations at or below the 0.45 mg/l TN threshold. To do so, EPA applied a steady state

[22] EPA notes that a probable range of criteria for total nitrogen "in the vicinity of 0.35 to 0.40 mg/l" is suggested in Deacutis & Pryor, *Nutrient Conditions in Narragansett Bay & Numeric Nutrient Criteria Development Strategies for Rhode Island Estuarine Waters* (2011). While this range is lower than the endpoint identified by EPA for this analysis EPA believes the site specific information supports the 0.45 mg/l target. NHDES identified a target of 0.45 mg/l TN to protect DO conditions in the Great Bay estuary, NHDES, *Draft Numeric Nutrient Criteria for the Great Bay Estuary* (2009), although that draft numeric nutrient criterion is no longer used in 305(b) and 303(d) water quality assessments in the Great Bay estuary, see Settlement Agreement and Release, NH Supreme Ct No. 2013-0119 (2014).

ocean water dilution model based on salinity, from Fischer et al. (1979). A similar approach was used by the New Hampshire Department of Environmental Services to develop loading scenarios for the Great Bay Estuary (NHDES, 2009). The basic premise is that steady state concentrations of nitrogen in an estuary will be equal to the nitrogen load divided by the total water flushing rate from freshwater and ocean water. Estuaries are complicated systems with variability due to tides, weather, and stream flows. However, by making the steady state assumption, it is not necessary to model all of these factors. The steady state assumption can be valid for calculations based on long term average conditions, which approximate steady state conditions.

Salinity data is used to determine the proportion of fresh and ocean water in the estuary. Freshwater input is calculated from streamflow measurements at USGS gages in the watershed. Then, ocean water inputs are estimated using salinity measurements and the freshwater inputs. The total flushing rate is then used with the target nitrogen threshold to determine the total allowable load to the estuary. For this calculation, salinity at Station MHB19 during 2004-05[23] was used to represent the reference location for meeting the target threshold, because it is the uppermost station that appears clearly nitrogen limited based on the Mount Hope Bay Monitoring Program data.

Freshwater Flow: Average freshwater flow input to the estuary in the summers of 2004 and 2005 is shown in Table 8. Freshwater flows at the mouths of the river is determined based on the USGS streamgage data using a drainage area ratio calculation as follows:

Flow at mouth = Flow at USGS gage * Drainage area at mouth/Drainage area at gage

Table 8. Average Freshwater Flow 2004-05

	1 Taunton River (Bridge-water) *USGS Gage*	2 Taunton River (area to mouth of estuary minus tributaries) *Drainage Area calculation*	3 Three Mile River (North Dighton) *USGS Gage*	4 Three Mile River (mouth) *Drainage Area calculation*	5 Segre-ganset River (Dighton) *USGS Gage*	6 Segre ganset River (mouth) *Drainage Area calculation*	7 Assonet River (dam) *based on Segregansett*	8 Quequechan River (mouth) *based on Segregansett*	Total Fresh-water Flow (Sum of Columns 2 4+6+ 7+8
Drainage Area	261 sq. miles	410 sq. miles	84 sq. miles	85 sq. miles	10.6 sq. miles	14.9 sq. miles	21.9 sq. miles	30.5 sq. miles	
2004	195 cfs	306 cfs	54 cfs	55 cfs	4.4 cfs	6.1 cfs	9.0 cfs	12.6 cfs	**389 cfs**
2005	217 cfs	341 cfs	55 cfs	56 cfs	4.6 cfs	6.4 cfs	9.4 cfs	13.1 cfs	**427 cfs**

Average: **408 cfs**

Salinity: A mass balance equation is applied as follows:

Average salinity at ocean boundary (Rhode Island Sound) = 30 ppt (Kincaid and Pockalny, 2003)

[23] As discussed above, 2004-05 represent a typical year.

Average salinity at MHB19 in Taunton River Estuary for 2004-05 = 22.35 ppt

Average freshwater flow 2004-05 (Table 8) = 408 cfs

(30 ppt * X cfs + 0 ppt * 408 cfs)/(408 cfs + X) = 22.35 ppt

X = 1,192 cfs ocean water

Nitrogen Target: The nitrogen target load in lbs per day is calculated by combining all water inputs and multiplying by the threshold concentration and the appropriate conversion factors.

(408 cfs + 1,192 cfs)*(0.646)*(8.34)*(0.45 mg/l) = 3,879 lbs/day

The nitrogen concentration at the seaward boundary is 0.28 mg/l (from Oviatt, et al., *Annual Primary Production in Narragansett Bay with no Bay-Wide Winter-Spring Phytoplankton Bloom* (2001). The ocean load can then be calculated:

Ocean load = 1,192 cfs * (0.646)*(8.34)*(0.28 mg/l) = 1,798 lbs/day

Based on the overall flow of the estuary (average of summers 2004 and 2005), the allowable TN load to the Taunton River Estuary, including both ocean and watershed loads, is 3,879 lbs/day.[24] The load from the ocean is 1,798 lbs/day, leaving an allowable load of **2,081** lbs/day from watershed sources. As noted above, actual loads in 2004-05 averaged 4,228 lbs/day. This means a reduction in watershed loads of 2,147, or approximately 51% from the 2004-05 baseline, is required in order to meet water quality standards in the Taunton River Estuary.[25] The Brockton AWRF upgrade already completed has reduced loads by approximately 17%, which while a significant step forward is not expected to be sufficient to achieve water quality standards in the estuary without substantial additional reductions. The ongoing monitoring in Mount Hope Bay indicates that this prediction is correct; the continuous DO and chlorophyll monitoring at the Mount Hope Bay NBFSMN station indicates that high chlorophyll concentrations and accompanying DO depletions in bottom waters have continued subsequent to completion of the upgrade in 2010. See part d above for charts of datasonde data.

The required load reduction is greater than the load discharged from any single facility and can be achieved only through permit limits on multiple facilities. Furthermore, the reduction should be fairly allocated among all discharges to the estuary. EPA notes that all the wastewater treatment plants contributing to the Taunton River are due for permit reissuance, and it is EPA's intent to include nitrogen limits in those permits as appropriate, consistent with this analysis. In doing so, EPA considers not only the facility's current discharges, but their potential discharges under their approved design flows. As this analysis considers summer flows only, an estimated summer flow is calculated at 90% of design flow, consistent with the analysis done by the Rhode

[24] To provide a check on this calculation, EPA calculated the predicted TN concentration in the estuary using calculated loads from 2004-05 using the same mass balance equation. Using the calculated watershed load of 4,228 lbs/day and an ocean load of 1,803 lbs/day as calculated above, the predicted concentration in the estuary is 0.70 mg/l. The monitoring data indicates that the average TN concentration was 0.73 mg/l, within 5% of the predicted value.

[25] Ocean loads are not considered controllable.

Island Department of Environmental Management (RIDEM) for Narragansett Bay facilities. (RIDEM, 2004) See Table 9. This accounts for the fact that a facility discharging at an annual average flow equal to its design flow will average less than design flow during the drier summer months.

For purposes of allocating the required load reduction, EPA first notes that nonpoint sources are unlikely to be reduced by 51% (the overall reduction required in the estuary), and that therefore a higher proportion of the reduction will be allocated to wastewater point sources in the estuary. This is consistent with approaches in approved TMDLs in Massachusetts and elsewhere. EPA considers a 20% nonpoint source reduction to be a reasonably aggressive target for nonpoint source reduction in this watershed based on the prevalence of regulated MS4 stormwater discharges, trends in agricultural uses and population, and potential reductions in atmospheric deposition through air quality programs. EPA notes that should nonpoint source reductions fail to be achieved, permit limits for WWTPs in the watershed shall be revisited to ensure that water quality standards are met.

Using the baseline NPS load of 1,428 lbs/day from 2004-05, a 20% reduction would result in a NPS load of 1,142 lbs/day. This leaves an available load for wastewater discharges of 939 lbs/day. Of the eleven facilities discharging to the watershed, five are minor discharges (< 1 MGD) with a combined load of less than 50 lbs/day. These facilities are considered de minimis contributors for the purposes of this analysis and are not analyzed further here.

To determine an equitable load allocation, EPA first determined the permit limit that would be required to meet the allowable load if a uniform limit were applied to all facilities. While permit limits are generally set to be more stringent on larger dischargers/direct discharges to impaired waters, calculating a uniform limit allows EPA to determine the range of options for permit limits. As shown in Table 9 below, a uniform permit limit on all discharges > 1 MGD in the Taunton would have to be between 3.4 and 3.5 mg/l for the allowable loading threshold to be met. For the largest discharges such as Taunton and Brockton, therefore, a 3.4 mg/l limit represents the upper bound of possible discharge concentrations to meet the water quality requirement. For a lower bound on potential permit limits, EPA notes that the currently accepted limit of technology (LOT) for nitrogen removal is 3.0 mg/l.

Table 9. Delivery Factors and Loads under Permit Limits

WWTF	Design Flow (MGD)	Percent delivered to estuary	Limit assumption: 3.3	Limit assumption: 3.4	Limit assumption: 3.5
Taunton	8.4	100%	208	214	221
Somerset	4.2	100%	104	107	110
Brockton	18	89%	397	409	421
Bridgewater	1.44	96%	34	35	36
Mansfield	3.14	83%	65	67	69
Middleboro	2.16	92%	49	51	52
		Smaller facilities (at 04-05 loads)	46	46	46
		Total	903	929	955

Given the determination that the maximum possible limit for larger facilities is less than 4 mg/l, and that upgrades to meet the most stringent permit limits are more cost-effective at facilities with the highest flows and highest proportion of the load delivered to the estuary, EPA has concluded that a permit limit based on the LOT of 3.0 mg/l is required for the larger dischargers of nitrogen to the estuary. (Effluent limits for the smaller dischargers are calculated based on an assumption of the Taunton and Brockton facilities achieving 3.0 mg/l.)

To put this limit in context, Table 10 shows an example permitting scenario that would meet the allowable loading threshold.

Table 10. Load Allocation Scenario to Meet Load Target

WWTF	Design Flow (MGD)	Percent delivered to estuary	Potential permit limit	Load discharged (lbs/day) at 90%	Load delivered to Estuary
Brockton	18	89%	3.0	405	361
Taunton	8.4	100%	3.0	189	189
Somerset	4.2	100%	3.7	117	117
Mansfield	3.14	83%	5.0	118	98
Middleboro	2.16	92%	5.0	81	74
Bridgewater	1.44	96%	5.0	54	52
Smaller facilities (at current loads)					46
Total					937

In this particular example permit limits for the Brockton AWRF (the largest discharger), and Taunton WWTP (the second largest discharge and a direct discharger to the estuary) are based on an effluent concentration of 3.0 mg/l. Somerset WWTP (the third largest discharge and a direct discharger to the estuary) is set at 3.7 mg/l; and the remaining three facilities (Bridgewater, Mansfield and Middleborough) are set at 5.0 mg/l. Final determinations as to the permit limits on facilities other than the Brockton AWRF will be made in each individual permit issuance.

For these reasons, EPA has included a monthly average total nitrogen limit of 450 lb/day (May to October[26]) in the draft permit, which is a mass load calculated on the basis of a 3 mg/l concentration in the effluent, considered the current limit of technology, at the design flow of 18 mgd. As the water quality analysis is based on total loads to the estuary and is not affected by

[26] The May to October seasonal period is consistent with other Narragansett Bay-related nitrogen limits. See Upper Blackstone Water Pollution Abatement District, MA01002369. The Mount Hope Bay Monitoring Program did not include May and October sampling, so those months were not explicitly included in the loading analysis. However, the Narragansett Bay Fixed Site Monitoring Program extends through October and includes limited data at the end of May and supports the need for permit limits in those months. For example, in 2006 chlorophyll-a concentrations in the last week of May averaged 13 ug/l with a maximum of 25 ug/l, with an average DO at the surface sonde of less than 5.0 mg/l. In 2005, chlorophyll-a concentrations from October 1 through 5 averaged 15 ug/l, with a maximum of 45 ug/l; DO concentrations measured at the near-bottom datasonde were less than 5.0 mg/l for approximately 5% of that time. The monthly average load limit is designed to ensure that the seasonal target is met.

variations in the amount of flow from the point sources,[27] a mass load-only limit is therefore protective of water quality, and is consistent with 40 CFR 122.45(f). The permittee must also report total nitrogen concentration as well as concentration and load for the nitrogen parameters nitrate, nitrite and TKN. The sampling frequency is two times per week. The permit contains a compliance schedule for meeting the nitrogen limit (See Permit Section 1.F).

Consistent with the seasonal analysis, EPA has not included nitrogen limits for the timeframe of November through April because these months are not the most critical period for phytoplankton growth. As noted earlier, EPA is imposing a condition requiring the permittee to optimize nitrogen removal during the wintertime. The summer limits and the winter optimization requirements will serve to keep the annual discharge load low. In combination, the numeric limitations and the optimization requirements are designed to ensure that the discharge does not cause or contribute to violations of applicable water quality standards, including narrative water quality criterion for nutrients, in accordance with Section 301(b)(1)(C) of the CWA.

EPA also notes that while the permit limit was set based on standards in the Taunton River Estuary, the limit is also protective of water quality standards in Mount Hope Bay under Massachusetts and Rhode Island water quality standards. Mount Hope Bay receives much greater dilution by ocean water, so that the nitrogen concentrations resulting from Taunton River loadings will be lower in the Bay than the 0.45 mg/l being met in the Taunton River Estuary. While other loads to Mount Hope Bay (particularly the Fall River WWTP) will need to be addressed as well, the reduction in nitrogen loadings from the Taunton River will ensure that those discharges do not cause or contribute to nitrogen-related impairments in Mount Hope Bay.

7. Ammonia-Nitrogen

The draft permit also carries over the ammonia-nitrogen limits of the current permit of 1 mg/l average monthly and average weekly, and 2 mg/l maximum daily (and corresponding load limits), in the June to September period, as well as average monthly limits of 3.2 mg/l in May, 6.3 mg/l in November, and 9.5 mg/l in December to April. EPA notes that the new 3 mg/l total nitrogen limits and optimization requirements, once in effect, should be sufficient to ensure that ammonia-nitrogen concentrations are below these limits. The facility had no violations of the permit limits in the period January 2011 to December 2013. See Table 1.

8. Metals

a. Copper

The limits for copper in the existing permit were calculated based on the chronic and acute criteria set forth in the 1998 *National Recommended Water Quality Criteria*, pursuant to the MA SWQS in effect when the existing permit was issued in 2004. Since that time the Commonwealth of Massachusetts has issued, and EPA has approved, site-specific water quality criteria for copper for the Salisbury Plain River that are less stringent than the prior criteria. The new site

[27] For example, the lowest recorded from the Brockton AWRF is approximately 12 mgd, a difference of 6 mgd from design flow conditions; this is less than one-half of one percent of the 1600 cfs in freshwater and ocean water dilution at the location of the load analysis and would not significantly change the resulting TN concentration.

specific criteria for copper establish a chronic criterion of 18.1 ug/l(dissolved, "d"),[28] and an acute criterion of 25.7 ug/l(d). The draft permit contains effluent limits of 8.5 ug/l(total recoverable "tr")(monthly average) and 10 ug/l(tr)(maximum daily). The derivation of these limits is set forth below.

In determining the appropriate effluent limitation in response to this revised standard, EPA must apply the requirements of the revised state standard, as set forth in the Mass DEP *Protocol for and Determination of Site-Specific Copper Criteria for Ambient Waters in Massachusetts,* January 2007 (the "site-specific protocol"), and the requirements of the anti-backsliding provisions of the Clean Water Act §§ 402(o) and 303(d)(4).

Site-Specific Protocol: In determining effluent limitations under the revised standard, the site-specific protocol allows for relaxation of permit limits to reflect the higher criteria only to the extent required to reflect the actual performance that the facility has been able to achieve. It states:

> [A]s part of the site-specific criteria, all reasonable efforts to minimize the loads of metals, and copper in this case, are part of the criteria revision protocol. So, the Department on a case-by-case basis will develop permit copper limits. Each determination will be based not only on the adjusted concentration resulting from the appropriate multiplier but will reflect the demonstrated level of copper reduction routinely achievable at the facility in order to minimize copper loads and thereby reduce its accumulation in the sediment.

Thus, determination of the appropriate effluent limits under the site-specific protocol requires calculating both (i) the required effluent limits that would meet the numeric criteria (criteria-based limits) and (ii) the actual effluent concentrations achieved by the facility (performance-based limits), and selecting the more stringent of the two.

Anti-backsliding: The reissuance of a permit with less stringent effluent limits must meet the requirements of the Clean Water Act's anti-backsliding provision, § 402(o), which allows relaxation of water quality based standards only if they comply with CWA § 303(d)(4), and only if the revised limit meets current effluent guidelines and will not cause a violation of water quality standards.[29] The Massachusetts antidegradation policy is set forth in 314 CMR § 4.04, providing, *inter alia*, "[i]n all cases existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected."

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[28] Water quality criteria for copper are expressed in terms of dissolved metals. However, permit limitations for copper are expressed in terms of total recoverable metals in accordance with the requirements of 40 CFR § 122.45(c). As such, conversion factors are used to develop total recoverable limits from dissolved criteria. The conversion factor reflects how the discharge of a particular metal partitions between the particulate and dissolved form after mixing with the receiving water. In the absence of site-specific data describing how a particular discharge partitions in the receiving water, a default assumption equivalent to the criteria conversion factor is used in accordance with the *Metal Translator Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA 1996 [EPA-823-B96-007]). Therefore, a conversion factor of 0.960 was used to convert between total recoverable and dissolved copper concentrations. Dissolved concentrations are denoted ug/l(d), while total recoverable concentrations are denoted ug/l(tr)

[29] The anti-backsliding rule also contains a number of exceptions that are not applicable here. *See* CWA § 402(o)(2); 40 CFR § 122.44(l).

The analysis under the site-specific protocol addresses the anti-backsliding and antidegradation requirements by relaxing the copper limits to the more stringent of the limits necessary to achieve the revised criteria, or to the limits that have historically been achieved by the facility (unless the facility has historically discharged an effluent concentration lower than the current permit limits, in which those limits are retained). Because any relaxed limits will result in attainment of the site-specific criteria and not be less stringent than the facility's current performance, the facility will not be able to scale back its efforts to reduce copper concentrations in the effluent. Therefore, the less stringent limits will not have the result of exceeding the revised criteria or worsening water quality in the receiving water, and the antidegradation requirement will be met.

As set forth above, the effluent limitations are determined by calculating both (i) the required effluent limits that would meet the numeric criteria (criteria-based limits) and (ii) the actual effluent concentrations achieved by the facility (performance-based limits), and selecting the more stringent of the two. The only exception to this procedure is if the actual effluent concentration is lower than the current (non site-specific) limits, then the current limits are retained in the permit

Criteria-based calculation. The criteria-based limits are calculated based on dilution under 7Q10 conditions, assuming a receiving water concentration of 8 ug/l based on the median receiving water result reported in the WET test reports:

Calculation of acute limit for copper:
Acute criteria (dissolved) = 25.7 ug/l(d)
7Q10 flow = 0.39 mgd
Design flow = 18.0 mgd
Criteria for total recoverable copper = 25.7 ug/l(d)/0.960 = 26.8 ug/l (tr)
Effluent limit = [(18 + 0.39 mgd)*26.8 ug/l – 0.39 mgd * 8 ug/l]/18 = 27.2 ug/l

Calculation of chronic limit for copper:
Chronic criteria (dissolved) = 18.1 ug/l(d)
7Q10 flow = 0.39 mgd
Design flow = 18.0 mgd
Criteria for total recoverable copper = 18.1 ug/l(d)/0.960 = 18.85 ug/l (tr)
Effluent limit = [(18 + 0.39 mgd)*18.85 ug/l – 0.39 mgd * 8 ug/l]/18 = 19.1 ug/l

Performance-based calculation. The level of copper removal routinely achieved by the facility (i.e., the past demonstrated performance of the facility) is determined by a statistical analysis of discharge data submitted by the facility over the three-year period from January 2011 through December 2013, using the methodology set forth in the *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001 (March 1991) (Appendix E). The average monthly and maximum daily limits are based on the 95th and 99th percentile of a lognormal distribution, based on the facility's monthly average effluent data as shown in Table 11. These calculations indicate that limits based solely on past performance would result in a monthly average limit of 8.5 μg/l(tr) and a maximum daily limit of 10 μg/l(tr).

Table 11. Copper Performance Data and Statistical Analysis

Month end	mg/l	ln(mg/l)
01/31/2011	4.	1.3862944
02/28/2011	5.8	1.7578579
03/31/2011	4.	1.3862944
04/30/2011	6.3	1.8405496
05/31/2011	8.	2.0794415
06/30/2011	5.8	1.7578579
07/31/2011	5.8	1.7578579
08/31/2011	6.2	1.8245493
09/30/2011	7.5	2.014903
10/31/2011	6.8	1.9169226
11/30/2011	4.6	1.5260563
12/31/2011	2.	0.6931472
01/31/2012	6.5	1.8718022
02/29/2012	6.8	1.9169226
03/31/2012	5.8	1.7578579
04/30/2012	5.	1.6094379
05/31/2012	8.2	2.1041342
06/30/2012	5.8	1.7578579
07/31/2012	6.	1.7917595
08/31/2012	6.	1.7917595
09/30/2012	6.3	1.8405496
10/31/2012	6.2	1.8245493
11/30/2012	5.8	1.7578579
12/31/2012	5.8	1.7578579
01/31/2013	5.6	1.7227666
02/28/2013	5.	1.6094379
03/31/2013	5.	1.6094379
04/30/2013	6.2	1.8245493
05/31/2013	6.2	1.8245493
06/30/2013	6.3	1.8405496
07/31/2013	6.6	1.8870696
08/31/2013	6.	1.7917595
09/30/2013	6.8	1.9169226
10/31/2013	5.8	1.7578579
11/30/2013	5.	1.6094379
12/31/2013	5.	1.6094379
Mean of ln(data)		1.74244
Std deviation		0.239225
95th percentile	**8.465222**	2.135966
99th percentile	**9.963005**	2.298879

Resulting Effluent Limitation. As noted above, pursuant to the site-specific protocol, effluent limits will be relaxed only to the more stringent of the criteria-based or performance-based limits. In this case the performance-based limits are more stringent with respect to both the chronic and acute criteria. The draft permit therefore includes performance-based monthly average and maximum daily permit limits, as follows:

Monthly average: 8.5 µg/l(tr)
Maximum daily: 10 µg/l(tr)

b. Other Metals

EPA also reviewed analytical data submitted in connection with the Brockton WET Reports to determine whether the facility discharges other toxic metals. Data from samples of the effluent and receiving water for the period February 2011 through November 2013 are set forth in Table 12 (attachment), along with the relevant water quality criteria for each parameter. The facility discharges none of these metals at concentrations above the water quality criteria, so no limits are required.

Whole Effluent Toxicity (WET) - Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The MA SWQS include the following narrative statement and requires that EPA criteria established pursuant to Section 304(a)(1) of the CWA be used as guidance for interpretation of the following narrative criteria: "All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife."

National studies conducted by the Environmental Protection Agency have demonstrated that domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents and aromatic hydrocarbons among others. The Region's current policy is to include toxicity testing requirements in all municipal permits, while Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts.

Based on the potential for toxicity resulting from domestic sewage, in accordance with EPA national and regional policy, and in accordance with MassDEP policy, the draft permit includes acute toxicity limitations and monitoring requirements. (See *Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants*, 50 Fed. Reg. 30,784 (July 24, 1985); EPA, *Technical Support Document for Water Quality-Based Toxics Control* (September, 1991); and MassDEP, *Implementation Policy for the Control of Toxic Pollutants in Surface Waters* (February 23, 1990)). EPA Region 1 has developed a toxicity control policy which requires wastewater treatment facilities to perform toxicity bioassays on their effluents. The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measure only by biological analyses; (2) bioavailability of pollutants after discharge is best measured by toxicity testing including any synergistic effects of pollutants; and (3) pollutants for which there are inadequate chemical analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic pollutants.

Pursuant to EPA, Region I and MassDEP policy, discharges having a dilution factor less than 100:1 (1.02 for this discharge) require acute and chronic toxicity testing and an acute LC_{50} limit of ≥ 100%. The draft permit requires the permittee to conduct four chronic and acute WET tests per year. The tests use the species, Ceriodaphnia dubia, in accordance with existing permit conditions, and are to be conducted in accordance with the EPA Region 1 Toxicity protocol found in the draft permit Attachment A for the chronic test and Attachment B for the acute test. The prior permit's use of the single "chronic (and modified acute)" test has been revised to two separate tests, consistent with the requirement to use approved test methods.

The permit also requires toxicity of an additional two samples per year, to be taken during a period when the plant's daily flow exceeds 30 mgd. These samples may be taken in any month when such flows occur. The facility had no violations of the WET permit limits in the period January 2011 to December 2013 for regularly scheduled sampling, but had two violations of the chronic limit in the two samples taken at flows over 30 mgd. See Table 1.

The chronic no observable effects concentration (C-NOEC) limit is calculated to be greater than or equal to the effluent concentration in the receiving water. The inverse of the receiving water concentration (chronic dilution factor) multiplied by one hundred is used to calculate the chronic C-NOEC as a percent limit. $(1/1.02)(100) \geq 98\%$

VII. INDUSTRIAL PRETREATMENT PROGRAM

The permittee is required to administer a pretreatment program based on the authority granted under 40 CFR 122.44(j), 40 CFR Part 403 and Section 307 of the Act. The permittee's pretreatment program received EPA approval on July 31, 1982 and, as a result, appropriate pretreatment program requirements were incorporated into the previous permit, which were consistent with that approval and federal pretreatment regulations in effect when the permit was issued.

The Federal Pretreatment Regulations in 40 CFR Part 403 were amended in October 1988, in July 1990, and again in October 2005. Those amendments established new requirements for implementation of pretreatment programs. Upon reissuance of this NPDES permit, the permittee is obligated to modify its pretreatment program to be consistent with current Federal Regulations. Those activities that the permittee must address include, but are not limited to, the following: (1) develop and enforce EPA approved specific effluent limits (technically based local limits); (2) revise the local sewer-use ordinance or regulation, as appropriate, to be consistent with Federal Regulations; (3) develop an enforcement response plan; (4) implement a slug control evaluation program; (5) track significant noncompliance for industrial users; and (6) establish a definition of and track significant industrial users.

These requirements are necessary to ensure continued compliance with the POTW's NPDES permit and its sludge use or disposal practices.

In addition to the requirements described above, the draft permit requires the permittee to submit to EPA in writing, within 180 days of the permit's effective date, a description of proposed changes to permittee's pretreatment program deemed necessary to assure conformity with current federal pretreatment regulations. These requirements are included in the draft permit to ensure that the pretreatment program is consistent and up-to-date with all pretreatment requirements in effect. Lastly, the permittee must continue to submit, annually by March 1, a pretreatment report detailing the activities of the program for the twelve month period ending 60 days prior to the due date.

VIII. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

EPA regulations set forth a standard condition for "Proper Operation and Maintenance" that is included in all NPDES permits. *See* 40 CFR §122.41(e). This condition is specified in Part II.B.1 (General Conditions) of the draft permit and it requires the proper operation and maintenance of all wastewater treatment systems and related facilities installed or used to achieve permit conditions.

EPA regulations also specify a standard condition to be included in all NPDES permits that specifically imposes on permittees a "duty to mitigate." *See* 40 CFR § 122.41(d). This condition is specified in Part II.B.3 of the draft permit and it requires permittees to take all reasonable steps

– which in some cases may include operations and maintenance work - to minimize or prevent any discharge in violation of the permit which has the reasonable likelihood of adversely affecting human health or the environment.

Proper operation of collection systems is critical to prevent blockages and equipment failures that would cause overflows of the collection system (sanitary sewer overflows, or SSOs), and to limit the amount of non-wastewater flow entering the collection system (inflow and infiltration or I/I[30]). I/I in a collection system can pose a significant environmental problem because it may displace wastewater flow and thereby cause, or contribute to causing, SSOs. Moreover, I/I could reduce the capacity and efficiency of the treatment plant and cause bypasses of secondary treatment. Therefore, reducing I/I will help to minimize any SSOs and maximize the flow receiving proper treatment at the treatment plant. MassDEP has stated that the inclusion in NPDES permits of I/I control conditions is a standard State Certification requirement under Section 401 of the CWA and 40 CFR § 124.55(b).

Therefore, specific permit conditions have been included in Part I.B. and I.C. of the draft permit. These requirements include mapping of the wastewater collection system, preparing and implementing a collection system operation and maintenance plan, reporting unauthorized discharges including SSOs, maintaining an adequate maintenance staff, performing preventative maintenance, controlling infiltration and inflow to the extent necessary to prevent SSOs and I/I related-effluent violations at the wastewater treatment plant, and maintaining alternate power where necessary. These requirements are intended to minimize the occurrence of permit violations that have a reasonable likelihood of adversely affecting human health or the environment.

Several of the requirements in the new draft permit were not included in the current permit, including collection system mapping, and preparation of a collection system operation and maintenance plan. EPA has determined that these additional requirements are necessary to ensure the proper operation and maintenance of the collection system and has included schedules for completing these requirements in the draft permit.

Because Abington and Whitman each own and operate collection systems that discharge to the Brockton AWRF, these municipalities have been included as co-permittees for the specific permit requirements discussed in the paragraph above. The historical background and legal framework underlying this co-permittee approach is set forth in Attachment C to this Fact Sheet, EPA Region 1 NPDES Permitting Approach for Publicly Owned Treatment Works that Include Municipal Satellite Sewage Collection Systems.

IX. SLUDGE INFORMATION AND REQUIREMENTS

Section 405(d) of the CWA requires that EPA develop technical standards regulating the use and disposal of sewage sludge. These regulations were signed on November 25, 1992, published in the Federal Register on February 19, 1993, and became effective on March 22, 1993. Domestic

[30] "Infiltration" is groundwater that enters the collection system through physical defects such as cracked pipes, or deteriorated joints. "Inflow" is extraneous flow entering the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems.

sludge, which is land applied, disposed of in a surface disposal unit or fired in a sewage sludge incinerator, is subject to Part 503 technical standards. Part 503 regulations have a self-implementing provision; however Section 405(d) of the CWA requires that sludge conditions be included in all POTW permits. Domestic sludge, which is disposed of in a municipal solid waste landfill, is in compliance with Part 503 regulations, provided that the sludge meets the quality criteria of the landfill and the landfill meets the requirements of 40 C.F.R. Part 258.

The draft permit has been conditioned to ensure that sewage sludge use and disposal practices meet the CWA Section 405(d) Technical Standards. In addition, EPA-New England has prepared a 72-page document entitled "EPA Region I NPDES Permit Sludge Compliance Guidance" for use by the permittee in determining their appropriate sludge conditions for their chosen method of sewage sludge use or disposal practices. This guidance document is available upon request from EPA Region 1 and may be found at:
http://www.epa.gov/region1/npdes/permits/generic/sludgeguidance.pdf. The permittee is required to submit an annual report to EPA Region 1 and MassDEP, by February 19th each year, containing the information specified in the Sludge Compliance Guidance document for their chosen method of sewage sludge use or disposal practices.

The City of Brockton owns and operates a multiple hearth incinerator. The incinerator has the following air pollution control devices: a flue gas recirculation system, a VenturiPak wet scrubbing system and an enclosed feed screw conveyor. The City generates approximately 3,830 dry metric tons of sewage sludge annually. The resulting ash (approximately 240 dry metric tons annually) is disposed of at the Brockton AWRF Ash Landfill. Disposal of ash is not regulated by Part 503.

Subpart E of the Part 503 regulations outlines the standards for the incineration of sewage sludge. The permit contains general requirements, management practices, pollutant limitations, an operational standard, monitoring frequency, record keeping and reporting requirements implementing the provisions of the regulations. The basis of each provision is detailed below.

Pollutant Limitations:

The sludge standards regulate seven metals. The pollutant limits in the permit are based on the requirements in §503.43.

Mercury and beryllium are regulated by the National Emission Standard for Hazardous Air Pollutants (NESHAPs) found in 40 CFR Part 61. The permit requires that the firing of sewage sludge in the facility's incinerators does not cause the violation of the NESHAPs for mercury and beryllium. The NESHAP for beryllium applies to each incinerator. The NESHAP for mercury applies to the facility.

The allowable sludge concentrations for arsenic, cadmium, chromium, and nickel are calculated from Equation (5) in §503.43(d):

$$C = \frac{RSC \;\; X \;\; 86{,}400}{DF \times (1 - CE) \times SF} \qquad \text{Eq. (5)}$$

Where:

C = Daily concentration of pollutant in sewage sludge in mg/kg of total solids (dry weight basis)
CE = control efficiency for the incinerator - based on performance tests
DF = dispersion factor in micrograms per cubic meter per gram per second
RSC = risk specific concentration in micrograms per cubic meter
SF = sewage sludge feed rate in metric tons per day (dry weight basis)

The parameters, with the exception of RSC, are site specific to the Brockton's incinerator. The RSC is derived for each pollutant based on a risk assessment.

The RSC is the allowable increase in the average daily ground level ambient air concentration for a pollutant above background levels that result from the firing of sewage sludge in an incinerator. It is equivalent to the amount of a pollutant that a person living near the incinerator can inhale with a probability of 1 in 10,000 that the person will contract cancer as a result of inhaling the pollutant. The RSC was calculated from the equation below, which is found in the *Technical Support Document for Sewage Sludge Incineration* (EPA 822/R-93-003, November 1992):

$$RSC = \frac{RL \ X \ BW}{Q^* \ X \ I_a} \ x \ 10^3$$

Where:

RL = Risk Level, 10^{-4}
BW = body weight, 70 kg (154 lbs), this is the average weight of an adult male
Q^* = allowable dose of a pollutant from EPA's Integrated Risk Information System database
I_a = inhalation rate, 20 m/day, normal inhalation rate for an adult male.

The RSC calculated from this equation is intended to protect the "Highly Exposed Individual" (HEI). The HEI is a person who remains for an extended period of time, 70 years, at the point of maximum ground level pollutant concentration. The RSC values for the regulated metals are found in Tables 1 and 2 of § 503.43 and are presented below.

Pollutant	RSC (ug/m^3)
Arsenic	0.023
Cadmium	0.057
Chromium	0.65*
Nickel	2.0

*Chromium RSC based on fluidized bed with wet scrubber

The sludge feed rate, dispersion factor and control efficiency (based on performance stack test) are:

Sludge Feed Rate: 189 dry g/sec = 16.3 metric tons/day
Dispersion factor: 11.1 ug/m^3/g/sec

Pollutant	Control Efficiency (%)
Arsenic	98.5
Cadmium	98.3
Chromium	99.9
Lead	99.9
Nickel	99.3

Based on the above parameters, the concentration limits for each pollutant are calculated below using Equation (5) in §503.43(d):

Pollutant	Limit (mg/kg)
Arsenic	732
Cadmium	1,601
Chromium	310,396
Nickel	136,438

The pollutant limit for lead is calculated using equation (4) of §503.43:

$$C = \frac{0.1 \text{ x } NAAQS \text{ x } 86{,}400}{DF \text{ x } (1 - CE) \text{ x } SF} \qquad \text{Eq. (4)}$$

Instead of using an RSC, a percentage of the National Ambient Air Quality Standard (NAAQS) for lead was used. The NAAQS for lead (1.5 ug/m^3) is found in 40 CFR § 50.12. Although lead is classified as a probable human carcinogen, the Clean Air Science Advisor Committee of the Science Advisory Board recommended that the NAAQS for lead be based on the noncarcinogenic effects. Developmental neurotoxicity is considered to be the most sensitive end point for lead exposure. The calculated concentration from equation (4) shown below also protects the HEI described above.

Pollutant	Limit (mg/kg)
Lead	71,630

The limits for arsenic, cadmium, chromium, and lead are less stringent than in the 2005 permit and the limit for nickel is more stringent. EPA has determined that these newly-developed limits are in accordance with antibacksliding exceptions found at 40 CFR § 122.44(l)(i)(A) & (B)[Material and Substantial Alterations & New Information]. After the 2005 permit was issued, the incinerator underwent a significant upgrade (including the construction of a new VenturiPak wet scrubbing system, a flue gas recirculation system, and an enclosed sludge feed screw conveyor. Subsequent to that upgrade, modeling and stack testing has provided new information used herein. For both of these reasons, the limits developed above are applied in the draft permit. Monitoring data submitted by the facility in the 2011 permit reapplication indicates that the facility should not have any problem complying with these limits.

Operational Standard:

The Part 503 regulations have an operational standard for total hydrocarbons (THC). Hydrocarbons are simple organic compounds containing carbon and hydrogen. The standard is designed to regulate organic emissions from sewage sludge incinerators. Total hydrocarbons represent a subset of organic compounds and is used in the regulation since it is impractical to attempt to monitor sludges or stack emissions for all organic compounds which may be present.

The THC value must be corrected to seven percent oxygen and zero percent moisture. The correction to seven percent oxygen is used because seven percent is the standard amount of oxygen used to reference measurements of pollutant limits expressed as concentration; it is also equivalent to 50 percent excess air (excess air is air added to a system above the amount of air needed for complete combustion to occur); and without the correction, inaccurate readings may occur because the presence of the additional oxygen may dilute the THC reading. Similarly, the correction for moisture is needed since the presence of moisture can also dilute the actual THC reading. THC is conventionally expressed in terms of a dry volumetric basis, hence the need to set the standard based on zero moisture.

On February 25, 1994, §503.40 was amended. The amendment allows facilities to monitor carbon monoxide (CO) instead of THC. A facility can monitor for CO if the facility can meet a monthly average concentration CO limit of 100 parts per million on a volumetric basis. This limit, like the THC limit, is corrected to seven percent oxygen and zero percent moisture. The City of Brockton monitors THC**.**

Management Practices:

The permit contains management practices based on §503.45. They pertain to the operation of the incinerator. The management practices include maintaining the instruments which monitor CO, oxygen and temperature; proper operation of all air pollution control devices; and notification to EPA when the continuous monitoring equipment is not operational for a period of 72 hours or more.

The permit requires notification to EPA and the state if any monitoring equipment is broken or shut down for longer than 72 hours. It also prohibits adversely affecting a threatened or endangered species or their critical habitat. There are no known threatened or endangered species within the vicinity of the incinerator. Therefore, EPA has determined that the activity will not affect a threatened or endangered species.

The monitoring frequency is based on §503.46. The permittee is required to monitor heavy metals 6 times per year. The monitoring for mercury and beryllium is at the frequency required by 40 CFR Part 61. The record keeping requirements are based on §503.47.

X. UNAUTHORIZED DISCHARGES

The draft permit authorizes discharges only from the outfalls listed in Part I.A.1 of the permit, in accordance with the terms and conditions therein. Discharges of wastewater from any other point sources are not authorized by the permit and shall be reported as set forth in Part I.B. in accordance with Section D.1.e. (1) of the General Requirements (Part II) of the permit (Twenty-four hour reporting).

XI. ENDANGERED SPECIES ACT

Section 7(a) of the Endangered Species Act of 1973, as amended (ESA) grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical (a "critical habitat"). The ESA requires every Federal agency, in consultation with and with the assistance of the Secretary of Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat.

EPA has reviewed the federal endangered or threatened species of fish, wildlife, or plants to determine if any listed species might potentially be impacted by the re-issuance of this NPDES permit. EPA has determined that no federally-listed or proposed, threatened or endangered species or critical habitat are known to occur in the Salisbury Plain River. Furthermore, the effluent limitations and other permit requirements identified in this Fact Sheet are designed to be protective of all aquatic species, and permit limits on total nitrogen have been included to protect the downstream waters of Mount Hope Bay and the Taunton River Estuary. Therefore EPA has determined that a consultation with USFWS and NMFS is not required.

XII. 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 Services (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, may adversely impact any essential fish habitat 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 C.F.R. § 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. The Salisbury Plain River is not covered by the EFH designation for riverine systems, and permit limits on total nitrogen have been included to protect the downstream waters of Mount Hope Bay and the Taunton River Estuary. Therefore EPA has determined that a formal EFH consultation with NMFS is not required.

XIII. MONITORING AND REPORTING

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 six months 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 six months 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.

NetDMR is a national web-based tool for regulated CWA permittees to submit discharge monitoring reports (DMRs) electronically via a secure Internet application to U.S. 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. NetDMR is accessed from the following url: http://www.epa.gov/netdmr. Further information about NetDMR, including contacts for EPA Region 1, is provided on this website.

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. To participate in upcoming trainings, visit http://www.epa.gov/netdmr for contact information for Massachusetts.

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.

EPA has become aware that the requirement to submit reports as electronic attachments to DMRs using NetDMR has created confusion as to report due dates, as the report due dates generally differ from the DMR due date (the 15th of each month) and NetDMR does not allow submission of a report without a concurrently submitted DMR. Therefore, to assist in electronic reporting, EPA has added language to the Final Permit (Section I.G.1.a) stating that any report required under the permit shall be considered timely so long as it is electronically submitted with the next DMR submitted by the permittee following the permit report deadline.

The Draft Permit also includes an "opt-out" request process. Permittees who believe they can not 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. Hard copies of DMRs must be postmarked no later than the 15th day of the month following the completed reporting period.

XIV. STATE PERMIT CONDITIONS

The NPDES Permit is issued jointly by the U. S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection under federal and state law, respectively. As such, all the terms and conditions of the permit are, therefore, incorporated into and constitute a discharge permit issued by the MassDEP Commissioner.

XV. GENERAL CONDITIONS

The general conditions of the permit are based primarily on the NPDES regulations 40 CFR §§122 through 125 and consist primarily of management requirements common to all permits.

XVI. STATE CERTIFICATION REQUIREMENTS

EPA may not issue a permit unless MassDEP 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, or waives certification. EPA has requested permit certification by the State pursuant to 40 CFR §124.53 and expects the draft permit will be certified.

XVII. COMMENT PERIOD, HEARING REQUESTS, AND PROCEDURES FOR FINAL DECISIONS

All persons, including applicants, who believe any condition of the 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 Susan Murphy, U.S. Environmental Protection Agency, 5 Post Office Square, Suite 100 (OEP06-1), Boston, MA 02109. 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 to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator 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 the public hearing, if held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and to each person who has submitted written comments or requested notice.

XVIII. EPA CONTACT

Requests for additional information or questions concerning the draft permit may be addressed Monday through Friday, between the hours of 9:00 a.m. and 5:00 p.m., to:

Susan Murphy
U.S. Environmental Protection Agency
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109
Telephone: (617) 918-1534 Fax: (617) 918-0534
Email: murphy.susan@epa.gov

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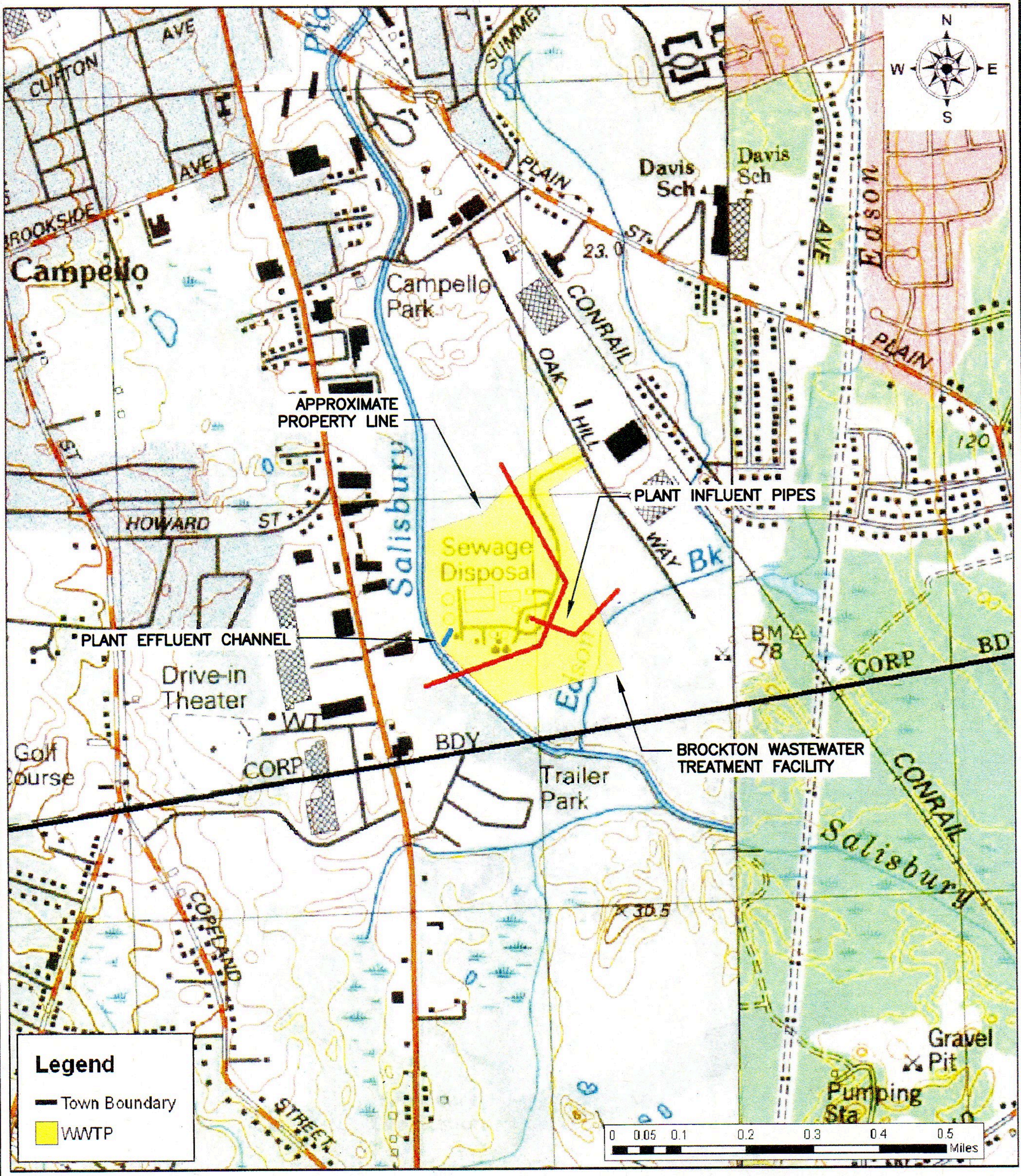
Ken Moraff, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

February 2015



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ORIGINAL SHEET – ANSI A

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Client/Project
CITY OF BROCKTON, MA
WWTF NPDES PERMIT RENEWAL

Figure No.
2.0

Title
SITE DETAILS

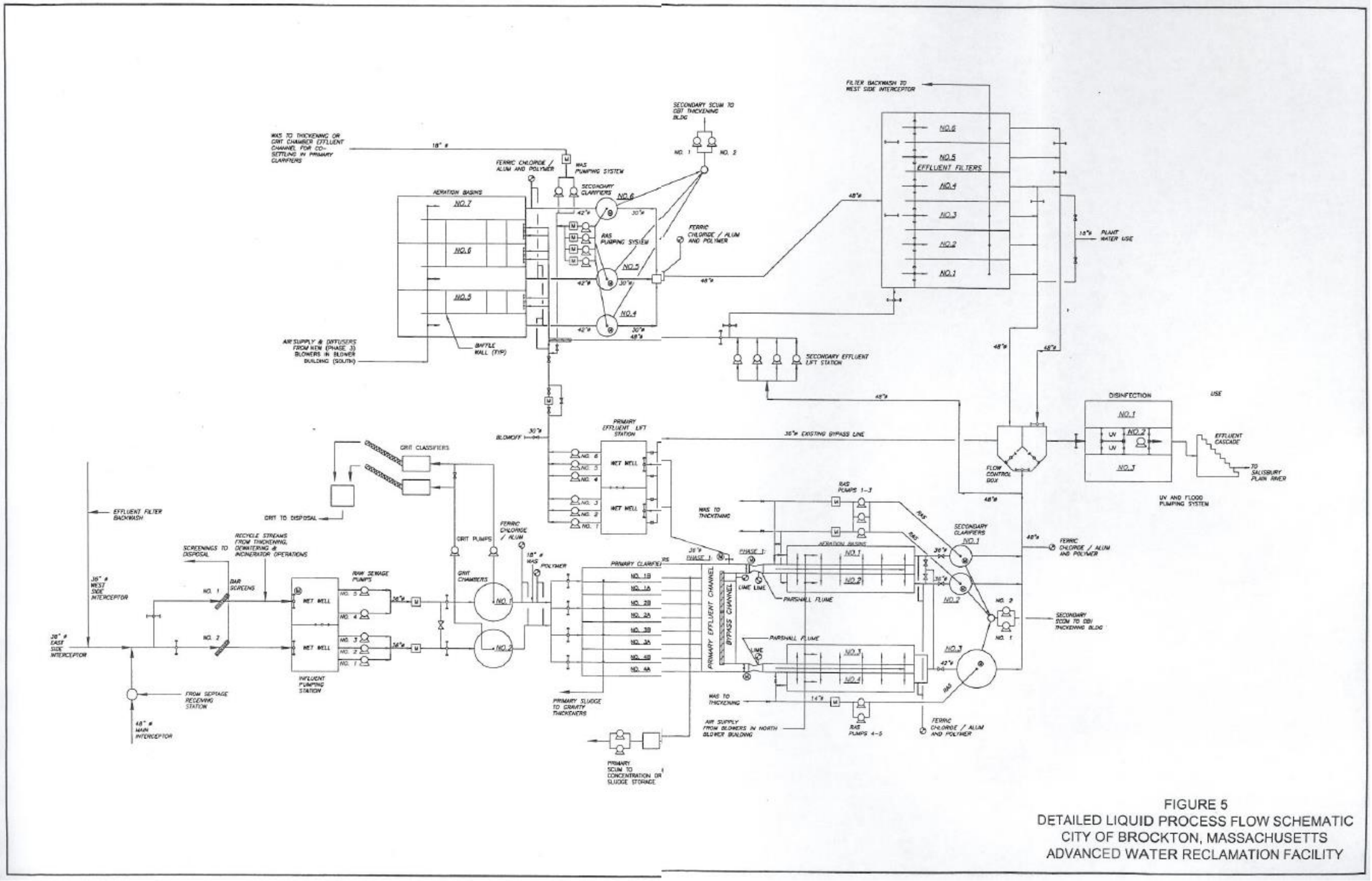

FIGURE 5
DETAILED LIQUID PROCESS FLOW SCHEMATIC
CITY OF BROCKTON, MASSACHUSETTS
ADVANCED WATER RECLAMATION FACILITY

NPDES Permit No. MA0101010
Fact Sheet Table 1

Month	Flow			CBOD5 (May 1 - October 31)					CBOD5 (November 1 - April 30)					CBOD	TSS (May 1 - October 31)				
	12 Month Rolling Avg	Monthly Average	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Average Monthly	Max Daily	Average Monthly	Average Weekly	Maximum Daily	Percent Removal	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily
	MGD			lb/day		mg/L			lb/day		mg/L			%	lb/day		mg/L		
Jan-11	14.9	12.9	14.6	Winter limits apply					211	355	2	2	3	99	Winter limits apply				
Feb-11	14.9	18.1	29.9	Winter limits apply					370	1213	2	2	5	98	Winter limits apply				
Mar-11	13.8	22.5	37.6	Winter limits apply					449	1570	2	4	5	98	Winter limits apply				
Apr-11	13.1	16.5	23.6	Winter limits apply					151	290	1	1	2	99	Winter limits apply				
May-11	13.1	12.9	14.1	119	451	1	1	4	Summer limits apply					99	122	229	1	1	2
Jun-11	13.1	11.8	15.1	112	252	1	1	2	Summer limits apply					99	106	219	1	1	2
Jul-11	13.2	10.9	12.8	90	107	1	1	1	Summer limits apply					99.6	105	277	1	1	3
Aug-11	13.3	11.3	14.6	98	244	1	1	2	Summer limits apply					100	99	176	1	1	2
Sep-11	13.6	13.7	17	114	142	1	1	1	Summer limits apply					99	159	407	1	2	3
Oct-11	14.3	18.8	26.8	157	223	1	1	1	Summer limits apply					99	244	892	2	2	4
Nov-11	14.9	18.7	23.9	Winter limits apply					178	368	1	1	2	99	Winter limits apply				
Dec-11	15.6	20	28.7	Winter limits apply					182	422	1	1	3	99	Winter limits apply				
Jan-12	15.9	15.8	19.6	Winter limits apply					152	499	1	1	4	99	Winter limits apply				
Feb-12	15.6	14.2	18	Winter limits apply					118	150	1	1	1	100	Winter limits apply				
Mar-12	14.9	14.3	17.7	Winter limits apply					140	428	1	2	4	99	Winter limits apply				
Apr-12	14.5	12	16.8	Winter limits apply					100	140	1	1	1	100	Winter limits apply				
May-12	14.7	15.1	19	130	242	1	1	2	Summer limits apply					99	134	276	1	1	2
Jun-12	14.9	14.1	16.7	118	140	1	1	1	Summer limits apply					100	132	239	1	1	2
Jul-12	14.9	10.5	11.9	96	190	1	1	2	Summer limits apply					99	98	171	1	1	2
Aug-12	14.9	11.3	22.2	95	185	1	1	1	Summer limits apply					100	166	1112	2	2	6
Sep-12	14.6	10.2	11.2	122	342	1	2	4	Summer limits apply					99	140	281	2	2	3
Oct-12	13.9	10.4	12.8	113	213	1	1	2	Summer limits apply					100	136	213	2	2	2
Nov-12	13.4	12.8	18.5	Winter limits apply					208	370	2	2	3	99	Winter limits apply				
Dec-12	12.9	14.1	20	Winter limits apply					235	333	2	2	2	99	Winter limits apply				
Jan-13	12.9	15.4	18.3	Winter limits apply					257	305	2	2	2	99	Winter limits apply				
Feb-13	13.3	19.4	45.4	Winter limits apply					723	0	3	2	28	98	Winter limits apply				
Mar-13	14.5	29.1	54.5	Winter limits apply					631	2556	2	7	8	98	Winter limits apply				
Apr-13	14.8	15	19	Winter limits apply					270	634	2	3	4	99	Winter limits apply				
May-13	14.5	12.2	14	219	467	2	2	4	Summer limits apply					99	131	214	1	2	3
Jun-13	15.2	22.4	48.5	353	701	2	2	2	Summer limits apply					99	287	1401	1	2	4
Jul-13	15.4	12.4	15.4	207	256	2	2	2	Summer limits apply					99	121	256	1	1	2
Aug-13	15.5	12.1	27.4	205	458	2	2	3	Summer limits apply					99	147	261	1	2	2
Sep-13	15.5	10.1	12.2	168	204	2	2	2	Summer limits apply					99	120	332	1	2	4
Oct-13	15.3	9.1	10.1	152	168	2	2	2	Summer limits apply					99	86	168	1	1	2
Nov-13	15.1	9.8	15.2	Winter limits apply					167	254	2	2	3	99	Winter limits apply				
Dec-13	15	13.4	18	Winter limits apply					227	309	2	2	2	99	Winter limits apply				
Existing Permit Limit	Report	Report	Report	1200	2250	5	8	15	2250	4500	15	25	30	>85	1200	2250	5	8	15
Minimum	12.9	9.1	10.1	90	107	1	1	1	100	0	1	1	1	98	86	168	1	1	2
Maximum	15.9	29.1	54.5	353	701	2	2	4	723	2556	3	7	28	100	287	1401	2	2	6
Average	14.442	14.536	21.142	148.2	276.9	1.3	1.4	2.1	264.9	566.4	1.7	2.1	4.6	99.1	140.7	395.8	1.2	1.5	2.8
Standard Deviation	0.903	4.292	10.518	65.1	152	0.5	0.5	1	173.5	622.8	0.6	1.5	6.1	0.5	50.6	356	0.4	0.5	1.1
Number of Measurements	36	36	36	18	18	18	18	18	18	18	18	18	18	36	18	18	18	18	18
Number of Exceedences	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Month	TSS (November 1 - April 30)					TSS	DO	pH		Fecal Coliform		TRC (only when used in treatment process)		Ammonia Nitrogen (June 1 to October 31)				
	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Percent Removal	Daily Min	Daily Min	Daily Max	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Max Daily
	lb/day		mg/L			%	mg/L	SU		cfu/100mL		ug/L		lb/day		mg/L		
Jan-11	308	366	3	3	3	98	Test NR	6.7	7.1	Test not required		Test not required		Winter limit applies				
Feb-11	534	3140	3	4	13	97	Test NR	6.7	7.1	Test not required		Test not required		Winter limit applies				
Mar-11	451	2183	2	4	8	98	Test NR	6.6	7.2	Test not required		Test not required		Winter limit applies				
Apr-11	303	786	2	3	4	98	8.3	6.6	7.2	4	28	Test not required		Winter limit applies				
May-11	Summer limits apply					99	7.4	6.6	7.1	3	80	Test not required		May limit applies				
Jun-11	Summer limits apply					99	7	6.6	7.2	3	86	Test not required		4	6	0.04	0.05	0.06
Jul-11	Summer limits apply					99	6.3	6.6	7	4	36	Test not required		22	86	0.24	0.69	0.99
Aug-11	Summer limits apply					99	6.6	6.7	7.2	6	42	Test not required		5	10	0.05	0.08	0.11
Sep-11	Summer limits apply					99	6.5	6.7	7.3	6	35	Test not required		5	9	0.05	0.07	0.09
Oct-11	Summer limits apply					99	6.8	6.5	7.1	3	48	Test not required		15	33	0.11	0.17	0.25
Nov-11	233	502	1	2	3	99	Test NR	6.6	7.2	Test not required		Test not required		November limit applies				
Dec-11	234	654	1	2	4	99	Test NR	6.5	7.3	Test not required		Test not required		Winter limit applies				
Jan-12	238	2121	2	3	17	99	Test NR	6.5	7.2	Test not required		Test not required		Winter limit applies				
Feb-12	138	240	1	1	2	99	Test NR	6.7	7.3	Test not required		Test not required		Winter limit applies				
Mar-12	135	294	1	1	2	99	Test NR	6.6	7.2	Test not required		Test not required		Winter limit applies				
Apr-12	119	311	1	1	3	99	Test NR	6.7	7.3	1	4	Test not required		Winter limit applies				
May-12	Summer limits apply					99	8	6.6	7.2	2	9	Test not required		May limit applies				
Jun-12	Summer limits apply					99	7.1	6.5	7.2	2	8	Test not required		7	17	0.06	0.07	0.14
Jul-12	Summer limits apply					99	6.9	6.7	7.5	2	7	Test not required		7	9	0.07	0.1	0.1
Aug-12	Summer limits apply					99	6.7	6.6	7.3	4	22	Test not required		8	18	0.09	0.1	0.21
Sep-12	Summer limits apply					99	6.7	6.6	7.2	12	65	Test not required		28	67	0.33	0.47	0.8
Oct-12	Summer limits apply					99	6.8	6.6	7.1	5	27	Test not required		17	63	0.19	0.37	0.69
Nov-12	145	308	1	2	3	99	Test NR	6.6	7.1	Test not required		Test not required		November limit applies				
Dec-12	195	1300	2	2	8	99	Test NR	6.6	7	Test not required		Test not required		Winter limit applies				
Jan-13	204	681	2	4	5	99	Test NR	6.5	7	Test not required		Test not required		Winter limit applies				
Feb-13	564	0	2	1	18	98	Test NR	6.5	7.1	Test not required		Test not required		Winter limit applies				
Mar-13	910	0	3	9	16	97	Test NR	6.5	7.4	Test not required		Test not required		Winter limit applies				
Apr-13	188	314	2	2	3	99	Test NR	6.6	7	2	33	Test not required		Winter limit applies				
May-13	Summer limits apply					99	7.1	6.6	7.1	2	7	Test not required		May limit applies				
Jun-13	Summer limits apply					99	8.8	6.6	7.1	2	11	Test not required		9	33	0.06	0.1	0.15
Jul-13	Summer limits apply					99	6.7	6.5	7.1	1	6	Test not required		13	58	0.13	0.24	0.59
Aug-13	Summer limits apply					99	6.8	6.5	7.1	6	61	Test not required		33	113	0.32	1	1.2
Sep-13	Summer limits apply					99	6.3	6.6	7.2	5	27	Test not required		14	32	0.16	0.25	0.36
Oct-13	Summer limits apply					100	6.5	6.5	7	4	17	Test not required		14	54	0.19	0.09	0.74
Nov-13	147	508	2	3	5	99	Test NR	6.5	6.9	Test not required		Test not required		November limit applies				
Dec-13	204	426	2	2	3	99	Test NR	6.5	7	Test not required		Test not required		Winter limit applies				
Existing Permit Limit	2250	4500	15	25	30	>85%	>6.0	6.5	8.3	200	400	0.011	0.019	150	225	1.0	1.0	1.5
Minimum	119	0	1	1	2	97	6.3	6.5	6.9	1	4	N/A	N/A	4	6	0.04	0.05	0.06
Maximum	910	3140	3	9	18	100	8.8	6.7	7.5	12	86	N/A	N/A	33	113	0.33	1.0	1.2
Average	291.7	785.2	1.8	2.7	6.7	98.8	7	6.6	7.2	3.8	31.4	N/A	N/A	13.4	40.5	0.1	0.257	0.4
Standard Deviation	203.9	857	0.7	1.9	5.5	0.6	0.7	0.1	0.1	2.5	24.7	N/A	N/A	8.7	32	0.1	0.274	0.4
Number of Measurements	18	18	18	18	18	36	19	36	36	21	21	N/A	N/A	15	15	15	15	15
Number of Exceedences	0	0	0	0	0	0	0	0	0	0	0	N/A	N/A	0	0	0	0	0

Month	Ammonia Nitrogen (May)		Ammonia Nitrogen (November)		Ammonia Nitrogen (Dec 1 to April 30)		Total Kjeldahl Nitrogen				Total NO2/NO3				Total Phosphorus				Copper	Ceriodaphnia dubia		Ceriodaphnia dubia (During bypass)	
	Average Weekly	Max Daily	Average Weekly	Max Daily	Average Weekly	Max Daily	Average Monthly	Maximum Daily	Average Monthly	Max Daily	Average Monthly	Maximum Daily	Average Monthly	Max Daily	Monthly Average	Maximum Daily	60 Day Rolling Avg	Maximum Daily	Maximum Daily	Acute	Chronic	Acute	Chronic
	mg/L		mg/L		mg/L		lb/day		mg/l		lb/day		mg/l		lb/day		mg/L			%		%	
Jan-11	Winter limit applies				1.69	4.2	220	381	2.2	3.9	316	357	3.1	3.7	9	29	0.15	0.28	4	Test Not Required		Test Not Required	
Feb-11	Winter limit applies				0.81	5.9	1095	2355	2.7	7.2	610	882	4	5.7	22	137	0.1	0.5	5.8	100	100	Test Not Required	
Mar-11	Winter limit applies				2.55	7	861	2135	3.3	6.8	298	455	1.8	3.1	22	107	0.13	0.6	4	Test Not Required		100	25
Apr-11	Winter limit applies				0.22	0.52	161	185	1.4	1.7	523	707	4.2	5.2	14.12	22.03	0.12	0.15	6.3	Test Not Required		Test Not Required	
May-11	0.12	0.18	May limit applies				168	218	1.6	2.1	373	400	3.6	4.1	20.63	34.06	0.15	0.34	8	100	100	Test Not Required	
Jun-11	Summer limit applies						81	83	0.9	0.9	381	409	4.2	4.4	11.62	24.54	0.16	0.25	5.8	Test Not Required		Test Not Required	
Jul-11	Summer limit applies						93	95	1.2	1.2	358	372	4.5	4.9	17.1	39.97	0.17	0.41	5.8	Test Not Required		Test Not Required	
Aug-11	Summer limit applies						108	117	1.2	1.3	348	370	3.9	4.1	13.28	37.83	0.17	0.42	6.2	100	100	Test Not Required	
Sep-11	Summer limit applies						216	301	2.1	2.9	453	458	4.3	4.4	13.36	24.44	0.17	0.18	7.5	Test Not Required		Test Not Required	
Oct-11	Summer limit applies						169	192	1.2	1.3	484	493	3.5	3.6	23.14	46.85	0.13	0.24	6.8	Test Not Required		Test Not Required	
Nov-11	Nov limit applies		0.05	0.34	Nov limit applies		135	184	0.9	1	625	636	4.3	5.2	22	31	0.15	0.19	4.6	100	100	Test Not Required	
Dec-11	Winter limit applies				0.04	0.12	203	309	1.3	2	862	904	5.5	5.6	25	43	0.15	0.21	2	Test Not Required		Test Not Required	
Jan-12	Winter limit applies				0.1	0.23	154	156	1.3	1.3	587	668	4.7	5.3	25	45	0.17	0.36	6.5	Test Not Required		Test Not Required	
Feb-12	Winter limit applies				0.11	0.23	140	154	1.2	1.2	459	486	3.8	4.3	13	17	0.17	0.14	6.8	100	100	Test Not Required	
Mar-12	Winter limit applies				0.12	0.18	164	208	1.3	1.7	528	633	4.1	4.7	18	27	0.15	0.24	5.8	Test Not Required		Test Not Required	
Apr-12	Winter limit applies				0.1	0.27	162	202	1.7	2.1	281	287	2.9	2.9	16.92	32.72	0.16	0.33	5	Test Not Required		Test Not Required	
May-12	0.13	0.38	May limit applies				123	125	1.2	1.2	353	401	3.3	3.5	16.28	23.44	0.16	0.19	8.2	100	100	Test Not Required	
Jun-12	Summer limit applies						179	218	1.4	1.8	429	434	3.3	3.5	21.53	34.75	0.16	0.31	5.8	Test Not Required		Test Not Required	
Jul-12	Summer limit applies						101	116	1.1	1.2	278	346	3.1	4.1	11.28	29.76	0.16	0.32	6	Test Not Required		Test Not Required	
Aug-12	Summer limit applies						108	111	1.3	1.4	313	324	3.6	4.1	13.04	63.01	0.16	0.34	6	100	100	Test Not Required	
Sep-12	Summer limit applies						89	161	1	1.8	403	405	4.7	4.9	14.36	20.68	0.15	0.24	6.3	Test Not Required		Test Not Required	
Oct-12	Summer limit applies						130	137	1.5	1.6	501	538	5.8	6.3	11.62	17.19	0.15	0.19	6.2	Test Not Required		Test Not Required	
Nov-12	Nov limit applies		0.13	0.7	Nov limit applies		141	167	1.3	1.3	570	755	5.1	5.9	17	35	0.16	0.28	5.8	100	100	Test Not Required	
Dec-12	Winter limit applies				0.16	0.68	135	141	1.4	1.5	385	443	3.8	4.2	20	43	0.16	0.34	5.8	Test Not Required		Test Not Required	
Jan-13	Winter limit applies				0.4	1.4	169	229	1.4	1.5	334	417	2.8	2.8	16	24	0.16	0.19	5.6	Test Not Required		Test Not Required	
Feb-13	Winter limit applies				1.14	4.7	275	358	2.1	2.6	331	349	2.6	2.9	46	432	0.17	1.14	5	100	100	Test Not Required	
Mar-13	Winter limit applies				1.59	2.8	660	877	2.4	2.7	746	975	2.7	3	42	243	0.19	0.76	5	Test Not Required		100	6.25
Apr-13	Winter limit applies				0.51	2	351	439	2.5	2.9	354	368	2.5	2.8	16.44	24.68	0.18	0.23	6.2	Test Not Required		Test Not Required	
May-13	0.08	0.4	May limit applies				130	137	1.3	1.3	361	416	3.6	3.9	16.71	29.75	0.15	0.28	6.2	100	100	Test Not Required	
Jun-13	Summer limit applies						141	163	1	3.7	566	761	3.7	3.7	37.93	420.34	0.19	1.2	6.3	Test Not Required		Test Not Required	
Jul-13	Summer limit applies						131	137	1.2	1.3	389	412	3.4	3.5	18.76	47.63	0.19	0.44	6.6	Test Not Required		Test Not Required	
Aug-13	Summer limit applies						161	192	1.6	1.7	363	397	3.7	3.8	13.29	38.89	0.18	0.22	6	100	98	Test Not Required	
Sep-13	Summer limit applies						173	234	1.9	2.6	271	332	2.9	3.5	7.82	21.72	0.15	0.29	6.8	Test Not Required		Test Not Required	
Oct-13	Summer limit applies						89	94	1.2	1.3	271	279	3.7	3.7	17.66	46.69	0.17	0.6	5.8	Test Not Required		Test Not Required	
Nov-13	Nov limit applies		0.36	0.61	Nov limit applies		111	130	1.5	1.7	230	233	3	3.1	8	17	0.17	0.17	5	100	100	Test Not Required	
Dec-13	Winter limit applies				0.27	0.82	207	271	2.1	2.7	2.53	283	2.6	2.8	13	26	0.15	0.2	5	Test Not Required		Test Not Required	
Existing Permit Limit	3.2	Report	6.3	Report	9.5	Report	Report	Report	Report	Report	Report	Report	Report	Report	Report	Report	0.2	Report	20*	100	>98	100	>98
Minimum	0.08	0.18	0.05	0.34	0.04	0.12	81	83	0.9	0.9	2.53	233	1.8	2.8	7.82	17	0.1	0.14	2	100	98	100	6.25
Maximum	0.13	0.4	0.36	0.7	2.55	7	1095	2355	3.3	7.2	862	975	5.8	6.3	46	432	0.19	1.2	8.2	100	100	100	25
Average	0.1	0.3	0.2	0.6	0.7	2.1	214.8	325.3	1.6	2.1	414.9	482.9	3.7	4.1	18.5	64.9	0.16	0.35	5.8	100	99.8	100	15.6
Standard Deviation	0	0.1	0.2	0.2	0.8	2.3	214.3	493.3	0.5	1.4	157.1	188	0.9	1	8.5	98.1	0.02	0.24	1.1	0	0.6	0	13.3
Number of Measurements	3	3	3	3	15	15	36	36	36	36	36	36	36	36	36	36	36	36	36	12	12	2	2
Number of Exceedences	0	N/A	0	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0	0	0	0	2

*Limit is changed due to an administrative order, original permit limits are 5.3 ug/L monthly average and 7.4 ug/L daily max.

Brockton AWRF
NPDES Permit No. MA 0101010

Fact Sheet Table 12
Metals Effluent Data and Criteria Calculations

	Effluent Analytical Data (ug/l)							Receiving Water Analytical Data (ug/l)						
	Hardness	**Al**	**Cd[1]**	**Cu**	**Ni**	**Pb[1]**	**Zn**	**Hardness**	**Al**	**Cd[1]**	**Cu**	**Ni**	**Pb[1]**	**Zn**
2/15/2011	150	ND-20	ND-0.5	4	ND-2	ND-0.5	23							
3/1/2011	170	50	ND-0.5	8	2	0.7	17							
5/10/2011	150	ND-20	ND-0.5	4	ND-2	ND-0.5	21	71	53	ND-0.5	9	2	2	16
8/9/2011	170	ND-20	ND-0.5	4	2	ND-0.5	19	53	84	ND-0.5	12	2	4	21
11/15/2011	140	ND-20	ND-0.5	9	2	ND-0.5	13	58	40	ND-0.5	7	2	2	16
2/12/2012	140	ND-20	ND-0.5	4	ND-2	ND-0.5	19	66	47	ND-0.5	3	ND-2	2	20
5/13/2012	140	ND-20	ND-0.5	6	2	ND-0.5	18	58	50	ND-0.5	8	ND-2	2	14
8/12/2012	110	ND-20	ND-0.5	6	2	ND-0.5	22	53	62	ND-0.5	9	3	4	23
11/11/2012	110	44	ND-0.5	10	4	ND-0.5	37	58	41	ND-0.5	7	2	2	17
2/10/2013	170	ND-20	ND-0.5	4	ND-2	ND-0.5	18	75	25	ND-0.5	7	ND-2	2	29
5/11/2013	150	ND-20	ND-0.5	19	2	ND-0.5	25	69	53	ND-0.5	16	ND-2	ND-0.5	25
8/11/2013	140	ND-20	ND-0.5	5	ND-2	ND-0.5	17	49	140	ND-0.5	6	ND-2	7	18
11/9/2013	140	ND-20	ND-0.5	5	2	ND-0.5	25	71	39	ND-0.5	11	ND-2	3	30
Median	140	47	ND-0.5	5	2	0.7	19	58	50	ND-0.5	8.0	2.0	2.0	20.0
Maximum		50	ND-0.5	19	4	0.7	37							
95th percentile[2]		39	ND-0.5	17	3	0.6	31							
Chronic Criterion[3]		87	0.34	18.1	69	4.81	158							
Acute Criterion[3]		750	2.97	25.7	617	123.3	158							

[1] Non-detects noted as " ND- [minimum detection level]"

[2] Percentiles calculated from a lognormal distribution with mean and standard deviation derived from monitoring data

[3] Expressed in Total Recoverable Metals for consistency with monitoring data. Criteria for Cd, Ni, Pb and Zn are hardness dependent and calculated using the formulas set forth in the National Recommended Water Quality Criteria 2002 (EPA 2002) at a hardness of 138, based on the median hardness of effluent and receiving water combined proportional to design flow and 7Q10 flow.

To estimate the TN load to the Taunton River Estuary, the USGS LOADEST computer modeling program was used. This program develops a number of regression equations correlating constituent concentration and streamflow based on an input calibration file listing corresponding data points of these two variables. For each regression equation, three different models are used to estimate the average summer load based on the summer flow record. The first, Adjusted Maximum Likelihood Estimation (AMLE), and the second, Maximum Likelihood Estimation (MLE) are applicable when the calibration model errors, or “residuals,” are normally distributed. Normality is determined by the Turnbull-Weiss test. These two estimations will be the same unless there are any censored data points, in which case the AMLE estimate is more accurate. The third model, Least Absolute Deviation (LAD), is used for non-normally distributed data.

The average summer TN load to the Taunton River at Weir Village, as well as to the four tributaries downstream from this point, were modeled by LOADEST using nitrogen concentration data from the Mount Hope Bay Monitoring Program and 2004 and 2005 daily streamflow data either measured by USGS gages, or adjusted proportionally based on drainage area. For days on which more than one concentration was measured, the average concentration was used in the LOADEST calibration file. Days on which the streamflow was 0 cfs were excluded from the dataset.

For all load estimations the best regression equation was automatically selected by the program based on the Akaike Information Criteria (AIC) value. In calculating the summer loads, the regression equation was selected based on the full year of monitoring data (i.e., the equation used to calculate the summer 2004 loads was selected based on a calibration dataset of the entire year 2004 monitoring data).

As described earlier, LOADEST gives load estimations based on three different models. If the calibration residuals were distributed normally, the Maximum Likelihood Estimation (MLE) was chosen. Otherwise, the Least Absolute Deviation (LAD) estimation was chosen. The calibration residuals were considered normal if the p-value of the Turnbull Weiss test was greater than 0.05.

Taunton River at Weir Village	
Year	Load Est. (lb/d)
2004	2659
2005	2289

Three Mile River	
Year	Load Est. (lb/d)
2004	547
2005	403

Segreganset River	
Year	Load Est. (lb/d)
2004	35
2005	34

Assonet River	
Year	Load Est. (lb/d)
2004	49
2005	51

Quequechan River	
Year	Load Est. (lb/d)
2004	85
2005	112

Sum of Loads (lb/d)	
2004	3375
2005	2889

Nitrogen Attenuation

As a result of chemical and biological processes, not all of the nitrogen discharged from each point source reaches the estuary. To determine the delivered nitrogen load, attenuation from each point source was calculated. The governing equation is:

$$L_f = L_i * e^{-kt} \text{ ; where}$$

L_f = the delivered load;
L_i = discharged load;
k = attenuation coefficient; and
t = travel time in days.

Attenuation calculations have been estimated in a number of studies for smaller order streams but generally do not reflect the effluent-dominated stream conditions encountered downstream of the Brockton AWRF (DF (dilution factor) = 1.02) and, to a lesser extent, the Bridgewater (DF 2.2), Mansfield (DF 2.2) and Middleboro (DF 1.9) WWTPs. For example, attenuation coefficients for small streams are given by the NE SPARROW models. Moore et al., *Estimation of Total Nitrogen and Phosphorus in New England Streams Using Statistically Referenced Regression Models*, USGS SIR-2004-5012. The NE SPARROW model indicates that no attenuation would be expected in the Taunton River mainstem, but that the tributaries (with flows ≤ 100cfs) are given an attenuation coefficient of 0.77 day^{-1}.

For the Brockton AWRF, attenuation calculations based on regional regression equations were determined to be insufficient. Using the above analysis with SPARROW regression coefficients, the calculated attenuation of the Brockton AWRF discharge under summer flow conditions is predicted to be approximately 30%. EPA determined that this figure was unreliable for the following reasons:

(1) Use of a 30% attenuation factor for Brockton's load to allocate the total loads at Weir Village from the LOADEST analysis resulted in an implausibly large nonpoint source load per square mile compared to the other tributaries. This would indicate that the point source component of the load is being understated; the likeliest explanation for that is that attenuation of Brockton's load is overstated.[1]

[1] To explain further, monitoring of the Taunton River at Weir Village indicates an average summer load for 2004-05 of 2,474 lbs/day. If the Brockton discharge of 1,303 lbs/day is assumed to be reduced by 30% through attenuation, then 912 lbs/day of the load at Weir Village is due to Brockton. Other WWTPs contribute 330 lbs/day, leaving 1,232 lbs/day attributable to nonpoint sources. Given the drainage area above Weir Village of 358 square miles, this gives an estimated summer nonpoint source loading of 3.4 lbs/day/sq.mi. This is significantly greater than the areal nonpoint source loading found at any other monitoring site in the Mount Hope Bay Monitoring Program, including the Quequechan River (which drains the City of Fall River) as well as the Ten Mile, Assonet and Segreganset Rivers.

(2) Nitrogen data collected by CDM for the Brockton AWRF receiving water study, although not collected for the purposes of attenuation calculations, do not appear to be consistent with significant in-stream attenuation.[2]

(3) The extremely effluent-dominated conditions downstream of the Brockton AWRF discharge are likely outside of the range of conditions used in developing the SPARROW regional regression equations.[3,4]

Because of the large impact of Brockton's discharge on the loading analysis, EPA determined that an improved attenuation estimate was necessary for this analysis, and therefore conducted a monitoring study including sampling and streamflow measurements in the summer of 2012, in order to determine an attenuation rate for Brockton's discharge.

The Matfield River Monitoring Study utilized a Lagrangian sampling program modelled on USGS, *Lagrangian Sampling of Wastewater Treatment Plant Effluent in Boulder Creek, Colorado, and Fourmile Creek, Iowa*, Open File Report 2011-1054 (2011), based on following the same "packet" of water downstream from the AWRF and sampling downstream based on calculated time of travel from the AWRF. Samples were taken at one upstream and four downstream locations on the Salisbury Plain and Matfield Rivers, as well as the two major tributaries (Beaver Brook and Meadow Brook) and the AWRF discharge, and streamflow was measured at three downstream locations. Sampling locations are shown on Figure B-1.

The furthest downstream station (MATF08) was located at the former USGS streamgage site on the Matfield River at Elmwood (USGS 01106500). Time of travel to this site was based on 15-minute streamflow data provided by USGS for summer months prior to discontinuance of data collection at the streamgage in October 2009. These show a clear pattern of influence from the Brocton AWRF's diurnal discharge variation. Figure B-2 shows two 24-hour streamflow records from September 2009 at relatively low (chart A)

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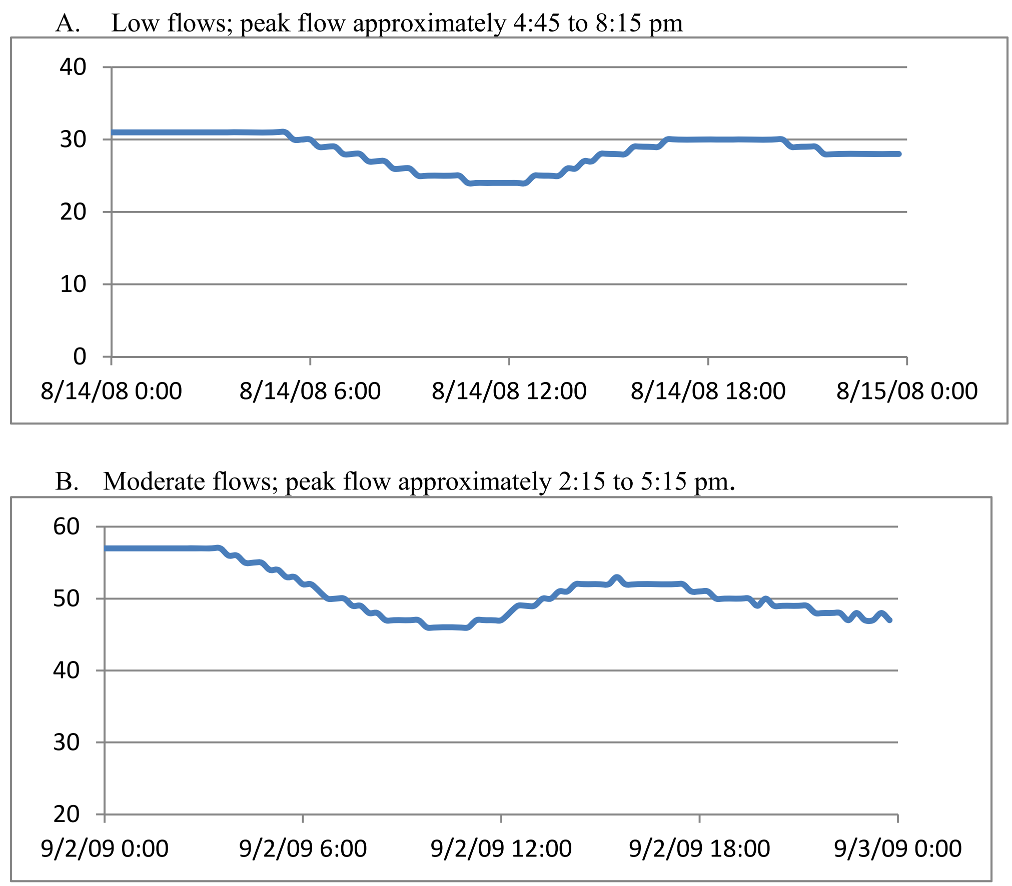
[2] For example, total nitrogen concentrations at the site of the discontinued USGS gage on the Matfield (CDM's station BR1-08) were within 5% of the concentrations found over 4 miles upstream on the Salisbury Plain River (CDM Station BR1-03), indicating on a qualitative level that little attuenuation is occurring once the additional dilution resulting from the confluence of Beaver Brook, Meadow Brook and other minor tributaries and baseflow is accounted for.

[3] Furthermore, the SPARROW regression equations themselves indicate that more wastewater load is passing thought the system than would be indicated by the discharge loads and attenuation coefficient. For the predictor variable 'municipal wastewater facilities' the regression coefficient is 1.11, so that the regression model predicts 11% more in-stream load from WWTPs than is actually discharged. That is, direct application of the SPARROW model would require that Brockton's load be inflated by 11% before applying the attenuation factor in order to calculate Brockton's contribution to the delivered flow.

[4] Available literature also indicates the potential for significant reduction in attenuation rates under high nitrogen concentrations. See Alexander et al, Dynamic modeling of nitrogen losses in river networks unravels the coupled effects of hydrological and biogeochemical processes, *Biogeochemistry* 93:91–116 (2009).

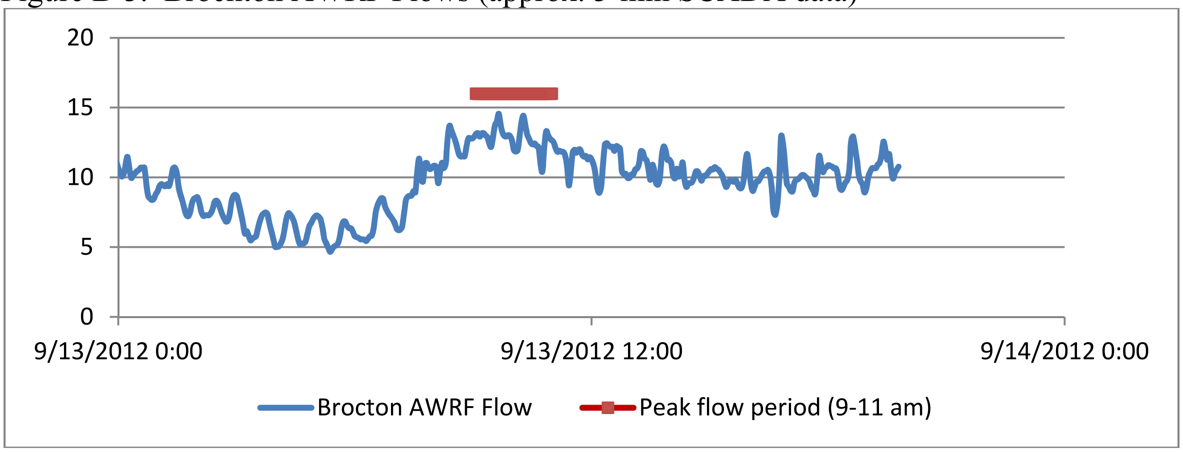
and moderate (chart B) flows. These show a distinct diurnal flow pattern, consistent with wastewater discharges, and a delayed and more spread out pattern under lower flow conditions, consistent with lower stream velocities under those conditions. The time of travel for individual days was determined by comparison of the daily streamflow pattern with the Brocton AWRF discharge data from the facility's SCADA system (measurements approximately every 3 minutes; an example is shown at Figure B-3). Time of travel to the intermediate sites was assumed to be proportional to time of travel to MATF08, based on the distance in river miles to each site.

Figure B-2. USGS 01106500, Matfield River at Elmwood, 15-minute flow data



As can be seen from the Brockton AWRF SCADA data, there is considerable short term variability in the AWRF discharge rate. As explained by the facility, this is due to the interaction of the various pump operations related to facility discharge and is inherent in the operation of the facility. While this variability will tend to dissipate as the plume moves downstream (see smoother pattern in 15-min data from the USGS gage downstream), there is potential for initial load calculations, and thus the attenuation factor, to vary on the order of 5-8% in the short term (on the order of 3 minutes). A time of travel analysis is not expected to be sufficiently precise to capture the exact packet of discharge within the sub-3 minute variability of the discharge. Therefore the analysis focused of following the peak period of Brockton's flows, approximately 9 to 11 a.m. While this provides a lower level of precision than would be ideal, it is sufficient that attenuation on the order of 30% (as predicted using regional regression models) would be apparent.

Figure B-3. Brockton AWRF Flows (approx. 3-min SCADA data)



Monitoring data from sampling stations on the Salisbury Plain and Matfield River are shown in Table B-1. On two of the sampling dates, instream total nitrogen concentrations increase slightly as sampling moves downstream, inconsistent with significant attenuation of nitrogen under those flow conditions (these are the two lowest flow dates). These increases could indicate instream release of nitrogen under low flow conditions. In contrast, in the August sampling a significant reduction in total nitrogen concentration occurred between sites 5 and 8. In general, the reach between sites 5 and 8 saw the most variability, with both load increases and one day of significant load decrease recorded between the two sites. This is likely due to the extensive wetland system the river passes through between these two stations, which appear to provide potential for sizeable release as well as uptake of nitrogen discharges. EPA notes that results showing widely variation attenuation rates under different stream conditions are consistent with the available literature (see, e.g. Smith et al., Nitrogen attenuation in the Connecticut River, northeastern USA; a comparison of mass balance and N2 production modeling approaches, *Biogeochemistry* 87, 311-323 (2008) (differing attenuation in April (zero in both reaches) from August (zero in southern reach, 18% in northern reach)); Vanderburg et al., Field Evaluation of Mixing Length and Attenuation of Nutrients and Fecal Coliform in a Wastewater Effluent Plume, Environmental Monitoring and Assessment (2005) 107: 45–57 (2005) ("Nitrate attenuation is markedly different between the two sampling events.").

Table B-1

Station	Distance Downstream from AWRF (ft)	6/18/2012		7/9/2012		8/13/2012		9/13/2012	
		Flow (cfs)	TN (mg/l)	Flow (cfs)	TN (mg/l)	Flow (cfs)	TN (mg/l)	Flow (cfs)	TN (mg/l)
SALP01	-200	--	1.67	--	2.13	--	1.67	--	1.53
AWRF	0	25.2	4.22	18.3	4.32	22.1	4.82	19.9	4.00
SALP03	6644	37.4	3.26	26.0	3.21	42.2	3.32	25.2	3.43
MATF05	17288	42.1	2.79	26.8	3.22	55.3	2.82	25.8	3.51
MATF08[1]	28742	46.0	3.09	27.7	3.40	63.0	1.64	26.7	3.82

[1] Flow at MATF08 determined from USGS staff gage and most recent shifted rating curve for June, August and September sampling dates. Direct streamflow measurements on 7/9/12 and early morning on 9/13/12 used to confirm shifted rating curve, which is considered highly provisional by USGS since discontinuance of site as active USGS streamgage.

Load reduction percentages were calculated for each sampling station on the Salisbury Plain/Matfield Rivers for each monitoring data and are shown in Table B-2. In general load reductions are on the order of a few percent and, given the uncertainty in the analysis, are consistent with either zero attenuation or a low level of attenuation in the system on all sampling dates but August 13 (when significant attenuation is shown). These calculations indicate that, averaged over the summer, there is attenuation of nitrogen taking place downstream of the AWRF discharge. Average attenuation over the summer for the three reaches were combined to determine a cumulative attenuation percentage from the AWRF to Station MATF08 of 7%. This corresponds to an attenuation coefficient k of 0.28 day^{-1}.

An alternative approach to estimating attenuation from these data was also applied as a qualitative check on this analysis, using chloride concentrations to assess relative changes in TN concentrations using the approach of Vanderburg et al. (2005). This approach uses chloride concentration to determine dilution of the nitrogen discharge, then compares TN predicted based purely on dilution to the measured concentration to determine whether attenuation of nitrogen has occurred. Results using the approach are generally consistent with the above analysis, with no attenuation shown on sampling dates other than August 13.[5]

[5] The chlorides analysis was not used to assess attenuation upstream of site 3 due to the nearly identical chloride concentration of the discharge and upstream flow, which prevents dilution analysis based on chloride concentration.

Table B-2

	6/18/2012			7/9/2012			8/13/2012			9/13/2012		
	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load
Input Loads												
Brockton AWRF	25.2	4.2	572	18.3	4.3	425	22.1	4.8	572	19.9	4.0	428
Upstream of SALP03[1]	12.2	1.7	110	7.8	2.1	89	20.1	1.7	181	5.3	1.5	44
			682			**514**			**753**			**472**
Output Load												
Total load at SALP03	37.4	3.26	**656**	26.0	3.21	**450**	42.2	3.32	**754**	25.2	3.43	**465**
Attenuation percent			**4%**			**12%**			**0%**			**1%**

[1] Flow upstream calculated from flow at SALP03 minus Brockton AWRF flow; concentration upstream from Salisbury Plain River at SALP01, representing 82% of watershed at SALP03.

	6/18/2012			7/9/2012			8/13/2012			9/13/2012		
	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load
Input Loads												
Load at SALP03	37.4	3.3	656.1	26.0	3.2	449.6	42.2	3.3	754.1	25.2	3.4	465.1
Load added between SALP03 and MATF05	4.7	1.0	25	0.7	1.4	5	13.1	1.5	106	0.7	1.0	3
			681			**455**			**860**			**468**
Output Load												
Total load at SALP05	42.1	2.785	**632**	26.8	3.22	**464**	55.3	2.82	**839**	25.8	3.51	**488**
Attenuation percent			**7%**			**-2%**			**2%**			**-4%**

[2] Flow input between SALP03 and SALP05 calculated from flow at SALP05 minus flow at SALP03; concentration of input flow based on concentration of Beaver Brook at BEAB04, representing 91% of additional watershed betwee SALP03 and SALP05.

	6/18/2012			7/9/2012			8/13/2012			9/13/2012		
	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load	Flow (cfs)	TN (mg/l)	Load
Input Loads												
Load at SALP03	42.1	2.8	632.0	26.8	3.2	464.0	55.3	2.8	839.1	25.8	3.5	488.4
Load added between MATF05 and MATF08	3.9	1.6	34	1.0	1.7	9	7.7	2.8	117	0.9	1.5	7
			666			**473**			**956**			**495**
Output Load												
Total load at SALP08[3]	46	3.085	**765**	27.7	3.40	**508**	63	1.64	**555**	26.7	3.82	**549**
Attenuation percent			**-15%**			**-7%**			**42%**			**-11%**

[3] Flow input between SALP08 and SALP05 calculated from flow at SALP08 minus flow at SALP05; concentration of input flow based on concentration of Meadow Brook at MEBR06, representing 77% of additional watershed betwee SALP05 and SALP08

Reach	**Average attenuation in reach**	**Cumulative attenuation**	**Cumulative delivery factor**	**k (1/day)**
Upstream of SAPB03	4%	4%	96%	
Between SALP03 and MATF05	1%	5%	95%	
Between MATF05 and MATF08	2%	7%	93%	0.28

The calculated value of k (0.28 day^{-1}) was used to determine the delivery factor for the Brockton AWRF and for the Bridgewater, Mansfield and Middleborough WWTPs that also discharge to effluent-dominated streams. For the small facilities discharging to tributaries the New England SPARROW attenuation coefficient was applied. Travel time from each point source to the Taunton River, was calculated using river distance and a calculated average summer velocity,[6] Table B-3 shows the river distance, average velocity, travel time and percent load delivered for each facility.

Table B-3

Facility	River distance on tributary (ft)	Average velocity (fps)	Travel Time (days)	Percent of load delivered
Oak Point	9,613	0.67	0.17	88
MCI Bridgewater	7,665	0.67	0.13	90
Brockton	44,135	1.23	0.42	89
Bridgewater	13,015	1.04	0.14	96
Dighton-Rehoboth Schools	53,385	0.79	0.78	55
Mansfield	62,503	1.1	0.66	83
Middleboro	27,608	1.05	0.30	92
Wheaton College	81,449	1.1	0.86	52
East Bridgewater H.S.	22,976	0.99	0.27	81

EPA notes that the results of this field work confirm the complex nature of nitrogen cycling in the Salisbury Plain and Matfield River, and that continued work developing a water quality model of the Salisbury Plain and Matfield Rivers as contemplated by MassDEP and USGS would assist in informing this analysis and any future TMDL

[6] Annual average velocities by reach were obtained from the National Hydrography Dataset (NHDPlus), and were used to calculate the average summer velocity based on the following relationship from Jobson, H.E., 1996, *Prediction of traveltime and longitudinal dispersion in rivers and streams*: U.S. Geological Survey Water-Resources Investigations Report 96-4013 (equation 12).

$$V_p = 0.094 + 0.0143 \times (D'_a)^{0.919} \times (Q'_a)^{-0.469} \times S^{0.159} \times \frac{Q}{D_a}.$$

Where $Q'_a = Q/Qa$
Q = summer average flow
Qa = annual average flow
Da = Drainage area

$$D'_a = \frac{D_a^{1.25} \times \sqrt{g}}{Q_a}$$

The NHDPlus average annual velocities were calculated using the Jobson equation where Q=Qa. The Jobson equation can be used to derive a relationship between summer average and annual average velocity:

$$V_{summer} = 0.094 + (V_{annual} - 0.094) * (Q/Qa)^{0.531}$$

This equation was used to calculate average summer flows for each reach in NHDPlus.

analysis, particularly with respect to attenuation under differing loads as upgrades are implemented. However, at this time no modeling effort is ongoing, and the attenuation analysis performed by EPA is the best available information upon which to develop this permit limit. EPA also notes that the permit limit for the Taunton facility of 3.0 mg/l would remain the same under a wide range of assumptions regarding attenuation of the Brockton discharge. For example, the Fact Sheet notes that, using the 7% attenuation figure, if a uniform permit limit were applied to all facilities in the watershed it would have to be less than 3.5 mg/l. For comparison, if it were assumed that there is zero attenuation of Brockton's discharge, the resulting uniform permit limit would be only slightly higher (approximately 3.7). On the other hand, if the attenuation factor was doubled (approximately 21% attenuation), a permit limit between 3.1 and 3.2 mg/l would need to be applied. (Required permit limits are more stringent if greater attenuation is assumed. This is because the attenuation factor is used in calculating how much of the measured load is from nonpoint sources; a higher attenuation rate means more load is attributed to the (more difficult to control) nonpoint sources, so that greater reduction from point sources is needed to meet the same total load target). As discussed in the Fact Sheet, since the highest possible permit limit is less than 4, and the Taunton WWTP is the second largest discharge and is a direct discharger to the estuary, a permit limit of 3.0 mg/l would still be applied.

EPA REGION 1 NPDES PERMITTING APPROACH FOR PUBLICLY OWNED TREATMENT WORKS THAT INCLUDE MUNICIPAL SATELLITE SEWAGE COLLECTION SYSTEMS

This interpretative statement provides an explanation to the public of EPA Region 1's interpretation of the Clean Water Act ("CWA" or "Act") and implementing regulations, and advises the public of relevant policy considerations, regarding the applicability of the National Pollutant Discharge Elimination System ("NPDES") program to publicly owned treatment works ("POTWs") that are composed of municipal satellite sewage collection systems owned by one entity and treatment plants owned by another ("regionally integrated POTWs"). When issuing NPDES permits to these types of sanitary sewer systems, it is EPA Region 1's practice to directly regulate, as necessary, the owners/operators of the municipal satellite collection systems through a co-permitting structure. This interpretative statement is intended to explain, generally, the basis for this practice. In determining whether to include municipal satellite collection systems as co-permittees in any particular circumstances, Region 1's decision will be made by applying the law and regulations to the specific facts of the case before the Region.

EPA has set out a national policy goal for the nation's sanitary sewer systems to adhere to strict design and operational standards:

> "Proper [operation and maintenance] of the nation's sewers is integral to ensuring that wastewater is collected, transported, and treated at POTWs; and to reducing the volume and frequency of …[sanitary sewer overflow] discharges. Municipal owners and operators of sewer systems and wastewater treatment facilities need to manage their assets effectively and implement new controls, where necessary, as this infrastructure continues to age. Innovative responses from all levels of government and consumers are needed to close the gap."[1]

Because ownership/operation of a regionally integrated POTW is sometimes divided among multiple parties, the owner/operator of the treatment plant many times lacks the means to implement comprehensive, system-wide operation and maintenance ("O & M") procedures. Failure to properly implement O & M measures in a POTW can cause, among other things, excessive extraneous flow (*i.e.*, inflow and infiltration) to enter, strain and occasionally overload treatment system capacity. This failure not only impedes EPA's national policy goal concerning preservation of the nation's wastewater infrastructure assets, but also frustrates achievement of the water quality- and technology-based requirements of CWA § 301 to the extent it results in sanitary sewer overflows and degraded treatment plant performance, with adverse impacts on human health and the environment.

In light of these policy objectives and legal requirements, it is Region 1's permitting practice to subject all portions of the POTW to NPDES requirements in order to ensure that the treatment system as a whole is properly operated and maintained and that human health and water quality impacts resulting from excessive extraneous flow are minimized. The approach of addressing O&M concerns in a regionally integrated treatment works by adding municipal satellite

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[1] *See Report to Congress: Impacts and Control of CSOs and SSOs* (EPA 833-R-04-001) (2004), at p. 10-2. *See also* "1989 National CSO Control Strategy," 54 Fed. Reg. 37371 (September 8, 1989).

collection systems as co-permittees is consistent with the definition of "publicly owned treatment works," which by definition includes sewage collection systems. Under this approach, the POTW in its entirety will be subject to NPDES regulation as a point source discharger under the Act. Region 1's general practice will be to impose permitting requirements applicable to the POTW treatment plant along with a more limited set of conditions applicable to the connected municipal satellite collection systems.

The factual and legal basis for the Region's position is set forth in greater detail in *Attachment A*.

Attachment A

ANALYSIS SUPPORTING EPA REGION 1
NPDES PERMITTING APPROACH FOR PUBLICLY OWNED TREATMENT WORKS THAT INCLUDE MUNICIPAL SATELLITE SEWAGE COLLECTION SYSTEMS

Exhibit A List of POTW permits that include municipal satellite collection systems as co-permittees

Exhibit B Analysis of extraneous flow trends and SSO reporting for representative systems

Exhibit C Form of Regional Administrator's waiver of permit application requirements for municipal satellite collection systems

Introduction

On May 28, 2010, the U.S. EPA Environmental Appeals Board ("Board") issued a decision remanding to the Region certain NPDES permit provisions that included and regulated satellite collection systems as co-permittees. *See In re Upper Blackstone Water Pollution Abatement District*, NPDES Appeal Nos. 08-11 to 08-18 & 09-06, 14 E.A.D. __ (*Order Denying Review in Part and Remanding in Part*, EAB, May 28, 2010).[2] While the Board "did not pass judgment" on the Region's position that its NPDES jurisdiction encompassed the entire POTW and not only the treatment plant, it held that "where the Region has abandoned its historical practice of limiting the permit only to the legal entity owning and operating the wastewater treatment plant, the Region had not sufficiently articulated in the record of this proceeding the statutory, regulatory, and factual bases for expanding the scope of NPDES authority beyond the treatment plant owner/operator to separately owned/operated collection systems that do not discharge directly to waters of the United States, but instead that discharge to the treatment plant." *Id., slip op.* at 2, 18. In the event the Region decided to include and regulate municipal satellite collection systems as co-permittees in a future permit, the Board posed several questions for the Region to address in the analysis supporting its decision:

> (1) In the case of a regionally integrated POTW composed of municipal satellite collection systems owned by different entities and a treatment plant owned by another, is the scope of NPDES authority limited to owners/operators of the POTW treatment plant, or does the authority extend to owners/operators of the municipal satellite collection systems that convey wastewater to the POTW treatment plant?
>
> (2) If the latter, how far up the collection system does NPDES jurisdiction reach, *i.e.*, where does the "collection system" end and the "user" begin?

[2] The decision is available on the Board's website via the following link: http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/30b93f139d3788908525706c005185b4/34e841c87f346d94852577360068976f!OpenDocument.

(3) Do municipal satellite collection systems "discharge [ ] a pollutant" within the meaning of the statute and regulations?

(4) Are municipal satellite collection systems "indirect dischargers" and thus excluded from NPDES permitting requirements?

(5) Is the Region's rationale for regulating municipal satellite collection systems as co-permittees consistent with the references to "municipality" in the regulatory definition of POTW, and the definition's statement that "[t]he term also means the municipality…which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works"?

(6) Is the Region's rationale consistent with the permit application and signatory requirements under NPDES regulations?

See *Blackstone, slip op.* at 18, 20, n. 17.

This regional interpretative statement is, in part, a response to the Board's decision. It details the legal and policy bases for regulating publicly owned treatment works ("POTWs") that include municipal satellite collection systems through a co-permittee structure. Region 1's analysis is divided into five sections. First, the Region provides context for the co-permitting approach by briefly describing the health and environmental impacts associated with poorly maintained sanitary sewer systems. Second, the Region outlines its evolving permitting practice regarding regionally integrated POTWs, particularly its attempts to ensure that such entity's municipal satellite collection systems are properly maintained and operated. Third, the Region explains the legal authority to include municipal satellite collection systems as co-permittees when permitting regionally integrated POTWs. In this section, the Region answers the questions posed by the Board in the order presented above. Fourth, the Region sets forth the basis for the specific conditions to which the municipal satellite collection systems will be subject as co-permittees. Finally, the Region discusses other considerations informing its decision to employ a co-permittee structure when permitting regionally integrated POTWs.

I. Background

A sanitary sewer system (SSS) is a wastewater collection system owned by a state or municipality that conveys domestic, industrial and commercial wastewater (and limited amounts of infiltrated groundwater and some storm water runoff) to a POTW.[3] *See* 40 C.F.R. § 35.2005(b)(37) (defining "sanitary sewer"). The purpose of these systems is to transport wastewater uninterrupted from its source to a treatment facility. Developed areas that are served by sanitary sewers often also have a separate storm sewer system (*e.g.*, storm drains) that collects and conveys runoff, street wash waters and drainage and discharges them directly to a receiving

[3] *See generally* Report to Congress: Impacts and Control of CSOs and SSOs (EPA 833-R-04-001) (2004), from which EPA Region 1 has drawn this background material.

water (*i.e.*, without treatment at a POTW). While sanitary sewers are not designed to collect large amounts of runoff from precipitation events or provide widespread drainage, they typically are built with some allowance for higher flows that occur during periods of high groundwater and storm events. They are thus able to handle minor and controllable amounts of extraneous flow (*i.e.*, inflow and infiltration, or I/I) that enter the system. Inflow generally refers to water other than wastewater—typically precipitation like rain or snowmelt—that enters a sewer system through a direct connection to the sewer. Infiltration generally refers to other water that enters a sewer system from the ground, for example through defects in the sewer.

Municipal sanitary sewer collection systems can consist of a widespread network of pipes and associated components (*e.g.*, pump stations). These systems provide wastewater collection service to the community in which they are located. In some situations, the municipality that owns the collector sewers may not provide treatment of wastewater, but only conveys its wastewater to a collection system that is owned and operated by a different municipal entity (such as a regional sewer district). This is known as a satellite community. A "satellite" community is a sewage collection system owner/operator that does not have ownership of the treatment facility and the wastewater outfall but rather the responsibility to collect and convey the community's wastewater to a POTW treatment plant for treatment. *See* 75 Fed. Reg. 30395, 30400 (June 1, 2010).

Municipal sanitary sewer collection systems play a critical role in protecting human health and the environment. Proper operation and maintenance of sanitary sewer collection systems is integral to ensuring that wastewater is collected, transported, and treated at POTW treatment plants. Through effective operation and maintenance, collection system operators can maintain the capacity of the collection system; reduce the occurrence of temporary problem situations such as blockages; protect the structural integrity and capacity of the system; anticipate potential problems and take preventive measures; and indirectly improve treatment plant performance by minimizing I/I-related hydraulic overloading.

Despite their critical role in the nation's infrastructure, many collection systems exhibit poor performance and are subjected to flows that exceed system capacity. Untreated or partially treated overflows from a sanitary sewer system are termed "sanitary sewer overflows" (SSOs). SSOs include releases from sanitary sewers that reach waters of the United States as well as those that back up into buildings and flow out of manholes into city streets.

There are many underlying reasons for the poor performance of collection systems. Much of the nation's sanitary sewer infrastructure is old, and aging infrastructure has deteriorated with time. Communities also sometimes fail to provide capacity to accommodate increased sewage delivery and treatment demand from increasing populations. Furthermore, institutional arrangements relating to the operation of sewers can pose barriers to coordinated action, because many municipal sanitary sewer collection systems are not entirely owned or operated by a single municipal entity.

The performance and efficiency of municipal sanitary sewer collection systems influence the performance of sewage treatment plants. When the structural integrity of a municipal sanitary sewer collection system deteriorates, large quantities of infiltration (including rainfall-induced infiltration) and inflow can enter the collection system, causing it to overflow. These extraneous flows are among the most serious and widespread operational challenges confronting treatment works.[4]

Infiltration can be long-term seepage of water into a sewer system from the water table. In some systems, however, the flow characteristics of infiltration can resemble those of inflow, *i.e.*, there is a rapid increase in flow during and immediately after a rainfall event, due, for example, to rapidly rising groundwater. This phenomenon is sometimes referred to as rainfall-induced infiltration.

Sanitary sewer systems can also overflow during periods of normal dry weather flows. Many sewer system failures are attributable to natural aging processes or poor operation and maintenance. Examples include years of wear and tear on system equipment such as pumps, lift stations, check valves, and other moveable parts that can lead to mechanical or electrical failure; freeze/thaw cycles, groundwater flow, and subsurface seismic activity that can result in pipe movement, warping, brittleness, misalignment, and breakage; and deterioration of pipes and joints due to root intrusion or other blockages.

Inflow and infiltration impacts are often regional in nature. Satellite collection systems in the communities farthest from the POTW treatment plant can cause sanitary sewer overflows ("SSOs") in communities between them and the treatment plant by using up capacity in the interceptors. This can cause SSOs in the interceptors themselves or in the municipal sanitary sewers that lead to them. The implication of this is that corrective solutions often must also be regional in scope to be effective.

The health and environmental risks attributed to SSOs vary depending on a number of factors including location and season (potential for public exposure), frequency, volume, the amount and type of pollutants present in the discharge, and the uses, conditions, and characteristics of the receiving waters. The most immediate health risks associated with SSOs to waters and other areas with a potential for human contact are associated with exposure to bacteria, viruses, and other pathogens.

Human health impacts occur when people become ill due to contact with water or ingestion of water or shellfish that have been contaminated by SSO discharges. In addition, sanitary sewer systems can back up into buildings, including private residences. These discharges provide a direct pathway for human contact with untreated wastewater. Exposure to land-based SSOs typically occurs through the skin via direct contact. The resulting diseases are often similar to those associated with exposure through drinking water and swimming (*e.g.*, gastroenteritis), but may also include illness caused by inhaling microbial pathogens. In addition to pathogens, raw sewage may contain metals, synthetic chemicals, nutrients, pesticides, and oils, which also can be detrimental to the health of humans and wildlife.

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[4] In a 1989 Water Pollution Control Federation survey, 1,003 POTWs identified facility performance problems. Infiltration and inflow was the most frequently cited problem, with 85 percent of the facilities reporting I/I as a problem. I/I was cited as a major problem by 41 percent of the facilities (32 percent as a periodic problem).

II. Region 1 Past Practice of Permitting POTWs that Include Municipal Satellite Collection Systems

Region 1's practice in permitting regionally integrated POTWs has developed in tandem with its increasing focus on addressing I/I in sewer collection systems, in response to the concerns outlined above. Up to the early 1990s, POTW permits issued by Region 1 generally did not include specific requirements for collection systems. When I/I and the related issue of SSOs became a focus of concern both nationally and within the region in the mid-1990s, Region 1 began adding general requirements to POTW permits that required the permittees to "eliminate excessive infiltration and inflow" and provide an annual "summary report" of activities to reduce I/I. As the Region gathered more information and gained more experience in assessing these reports and activities, it began to include more detailed requirements and reporting provisions in these permits.

MassDEP also engaged in a parallel effort to address I/I, culminating in 2001 with the issuance of MassDEP Policy No. BRP01-1, "Interim Infiltration and Inflow Policy." Among other provisions, this policy established a set of standard NPDES permit conditions for POTWs that included development of an I/I control plan (including funding sources, identification and prioritization of problem areas, and public education programs) and detailed annual reporting requirements (including mapping, reporting of expenditures and I/I flow calculations). Since September 2001, these requirements have been the basis for the standard operation and maintenance conditions related to I/I.

Regional treatment plants presented special issues as I/I requirements became more specific, as it is generally the member communities, rather than the regional sewer district, that own the collection systems that are the primary source of I/I. Before the focus on I/I, POTW permits did not contain specific requirements related to the collection system component of POTWs. Therefore, when issuing NPDES permits to authorize discharges from regionally integrated treatment POTWs, Region 1 had generally only included the legal entity owning and/or operating the regionally centralized wastewater treatment plant as the permittee. As the permit conditions were focused on the treatment plant and its effluent discharge, a permit issued only to the owner or operator of the treatment plant was sufficient to ensure that permit conditions could be fully implemented and that EPA had authority to enforce the permit requirements.

In implementing the I/I conditions, Region 1 initially sought to maintain the same structure, placing the responsibility on the regional sewer district to require I/I activities by the contributing systems and to collect the necessary information from those systems for submittal to EPA. MassDEP's 2001 Interim I/I Policy reflected this approach, containing a condition for regional systems:

> ((FOR REGIONAL FACILITIES ONLY)) The permittee shall require, through appropriate agreements, that all member communities develop and implement infiltration and inflow control plans sufficient to ensure that high flows do not cause or contribute to a violation of the permittee's effluent limitations, or cause overflows from the permittee's collection system.

As existing NPDES permittees, the POTW treatment plants were an obvious locus of regulation. The Region assumed the plants would be in a position to leverage preexisting legal and/or contractual relationships with the satellite collection systems they serve to perform a coordinating function, and that utilizing this existing structure would be more efficient than establishing a new system of direct reporting to EPA by the collection system owners. The Region also believed that the owner/operator of the POTW treatment plant would have an incentive to reduce flow from contributing satellite systems because doing so would improve treatment plant performance and reduce operation costs. While relying on this cooperative approach, however, Region 1 also asserted that it had the authority to require that POTW collection systems be included as NPDES permittees and that it would do so if it proved necessary. Indeed, in 2001 Region 1 acceded to Massachusetts Water Resources Authority's ("MWRA") request to include as co-permittees the contributing systems to the MWRA Clinton wastewater treatment plant ("WWTP") based on evidence provided by MWRA that its relationship with those communities would not permit it to run an effective I/I reduction program for these collection systems. Region 1 also put municipal satellite collection systems on notice that they would be directly regulated through legally enforceable permit requirements if I/I reductions were not pursued or achieved.

In time, the Region realized that its failure to assert direct jurisdiction over municipal satellite dischargers was becoming untenable in the face of mounting evidence that cooperative (or in some cases non-existent) efforts on the part of the POTW treatment plant and associated satellites were failing to comprehensively address the problem of extraneous flow entering the POTW. The ability and/or willingness of regional sewer districts to attain meaningful I/I efforts in their member communities varied widely. The indirect structure of the requirements also tended to make it difficult for EPA to enforce the implementation of meaningful I/I reduction programs.

It became evident to Region 1 that a POTW's ability to comply with CWA requirements depended on successful operation and maintenance of not only the treatment plant but also the collection system. For example, the absence of effective I/I reduction and operation/maintenance programs was impeding the Region's ability to prevent or mitigate the human health and water quality impacts associated with SSOs. Additionally, these excess flows stressed POTW treatment plants from a hydraulic capacity and performance standpoint, adversely impacting effluent quality. *See Exhibit B* (Analysis of extraneous flow trends and SSO reporting for representative systems). Addressing these issues in regional systems was essential, as these include most of the largest systems in terms of flow, population served and area covered.

The Region's practice of imposing NPDES permit conditions on the municipal collection systems in addition to the treatment plant owner/operator represents a necessary and logical progression in its continuing effort to effectively address the serious problem of I/I in sewer collection systems.[5] In light of its past permitting experience and the need to effectively address

[5] Although the Region has in the past issued NPDES permits only to the legal entities owning and operating the wastewater treatment plant (*i.e.*, only a portion of the "treatment works"), the Region's reframing of permits to include municipal satellite collection systems does not represent a break or reversal from its historical legal position. Region 1 has never taken the legal position that the satellite collection systems are beyond the reach of the CWA and the NPDES permitting program. Rather, the Region as a matter of discretion had merely never determined it

the problem of extraneous flow on a system-wide basis, Region 1 decided that it was necessary to refashion permits issued to regionally integrated POTWs to include all owners/operators of the treatment works (*i.e.*, the regional centralized POTW treatment plant and the municipal satellite collection systems).[6] Specifically, Region 1 determined that the satellite systems should be subject as co-permittees to a limited set of O&M-related conditions on permits issued for discharges from regionally integrated treatment works. These conditions pertain only to the portions of the POTW collection system that the satellites own. This ensures maintenance and pollution control programs are implemented with respect to all portions of the POTW. Accordingly, since 2005, Region 1 has generally included municipal satellite collection systems as co-permittees for limited purposes while it required the owner/operator of the treatment plant, as the primary permittee, to comply with the full array of NPDES requirements, including secondary treatment and water-quality based effluent limitations. The Region has identified 25 permits issued by the Region to POTWs in New Hampshire and Massachusetts that include municipal satellite collection systems as co-permittees. *See Exhibit A.* The 25 permits include a total of 55 satellite collection systems as co-permittees.

III. Legal Authority

The Region's prior and now superseded practice of limiting the permit only to the legal entity owning and/or operating the wastewater treatment plant had never been announced as a regional policy or interpretation. Similarly, the Region's practice of imposing NPDES permit conditions on the municipal collection systems in addition to the treatment plant owner/operator has also never been expressly announced as a uniform, region-wide policy or interpretation. Upon consideration of the Board's decision, described above, Region 1 has decided to supply a clearer, more detailed explanation regarding its use of a co-permittee structure when issuing NPDES permits to regionally integrated POTWs. In this section, the Region addresses the questions posed by the Board in the *Upper Blackstone* decision referenced above.

(1) In the case of a regionally integrated POTW composed of municipal satellite collection systems owned by different entities and a treatment plant owned by another, is the scope of

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necessary to exercise its statutory authority to directly reach these facilities in order to carry out its NPDES permitting obligations under the Act.

Although the Region adopted a co-permittee structure to deal I/I problems in the municipal satellite collection systems, that decision does nothing to foreclose a permitting authority from opting for alternative permitting approaches that are consistent with applicable law. Each permitting authority has the discretion to determine which permitting approach best achieves the requirements of the Act based on the facts and circumstances before it. Upon determining that direct regulation of a satellite collection system via an NPDES permit is warranted, a permitting authority has the discretion to make the owner or operator of the collection system a co-permittee, or to cover it through an individual or general permit. Nothing in EPA regulations precludes the issuance of a separate permit to an entity that is part of the larger system being regulated. As in the pretreatment program, there are many ways to ensure that upstream collection systems are adequately contributing to the successful implementation of a POTW's permit requirements.

[6] EPA has "considerable flexibility in framing the permit to achieve a desired reduction in pollutant discharges." *Natural Resources Defense Council, Inc. v. Costle*, 568 F.2d 1369, 1380 (D.C.Cir.1977). ("[T]his ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all.").

NPDES authority limited to owners/operators of the POTW treatment plant, or does the authority extend to owners/operators of the municipal satellite collection systems that convey wastewater to the POTW treatment plant?

The scope of NPDES authority extends beyond the owners/operators of the POTW treatment plant to include the owners/operators of the municipal satellite collection systems conveying wastewater to the treatment plant for the reasons discussed below.

The CWA prohibits the "discharge of any pollutant by any person" from any point source to waters of the United States, except, *inter alia*, in compliance with an NPDES permit issued by EPA or an authorized state pursuant to Section 402 of the CWA. CWA § 301, 402(a)(1); 40 C.F.R. § 122.1(b).

"Publicly owned treatment works" are facilities that, when they discharge, are subject to the NPDES program. Statutorily, POTWs as a class must meet performance-based effluent limitations based on available wastewater treatment technology. *See* CWA § 402(a)(1) ("[t]he Administrator may…issue a permit for the discharge of any pollutant….upon condition that such discharge will meet (A) all applicable requirements under [section 301]…"); § 301(b)(1)(B) ("In order to carry out the objective of this chapter there shall be achieved…for publicly owned treatment works in existence on July 1, 1977...effluent limitations based upon secondary treatment[.]"); *see also* 40 C.F.R. pt 133. In addition to secondary treatment requirements, POTWs are also subject to water quality-based effluent limits if necessary to achieve applicable state water quality standards. *See* CWA § 301(b)(1)(C). *See also* 40 C.F.R. § 122.44(a)(1) ("…each NPDES permit shall include…[t]echnology-based effluent limitations based on: effluent limitations and standards published under section 301 of the Act") and (d)(1) (same for water quality standards and state requirements). NPDES regulations similarly identify the "POTW" as the entity subject to regulation. *See* 40 C.F.R. § 122.21(a) (requiring "new and existing POTWs" to submit information required in 122.21(j)," which in turn requires "all POTWs," among others, to provide permit application information).

The CWA and its implementing regulations broadly define "POTW" to include not only wastewater treatment plants but also the sewer systems and associated equipment that collect wastewater and convey it to the treatment plants. When a municipal satellite collection system conveys wastewater to the POTW treatment plant, the scope of NPDES authority extends to both the owner/operators of the treatment facility and the municipal satellite collection system, because the POTW is discharging pollutants.

Under section 212 of the Act,

> "(2)(A) The term 'treatment works' means any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature to implement section 1281 of this title, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, outfall sewers, *sewage collection systems* [emphasis added], pumping, power, and other equipment, and their appurtenances; extensions, improvements, remodeling, additions, and alterations thereof; elements essential to provide a reliable recycled supply such as

standby treatment units and clear well facilities; and any works, including site acquisition of the land that will be an integral part of the treatment process (including land used for the storage of treated wastewater in land treatment systems prior to land application) or is used for ultimate disposal of residues resulting from such treatment.

(B) In addition to the definition contained in subparagraph (A) of this paragraph, 'treatment works' means any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water runoff, or industrial waste, including waste in combined storm water and *sanitary sewer systems* [emphasis added]. Any application for construction grants which includes wholly or in part such methods or systems shall, in accordance with guidelines published by the Administrator pursuant to subparagraph (C) of this paragraph, contain adequate data and analysis demonstrating such proposal to be, over the life of such works, the most cost efficient alternative to comply with sections 1311 or 1312 of this title, or the requirements of section 1281 of this title."

EPA has defined POTW as follows:

"The term *Publicly Owned Treatment Works* or *POTW* [emphasis in original]…includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW Treatment Plant. The term also means the municipality as defined in section 502(4) of the Act, which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works."

See 40 C.F.R. §§ 403.3(q) and 122.2.

Thus, under the CWA and its implementing regulations, wastewater treatment plants and the sewer systems and associated equipment that collect wastewater and convey it to the treatment plants fall within the broad definition of "POTW."

The statutory and regulatory definitions plainly encompass both the POTW treatment plant and municipal satellite collection systems conveying wastewater to the POTW treatment plant even if the treatment plant and the satellite collection system have different owners. Municipal satellite collection systems indisputably fall within the definition of a POTW. First, they are "sewage collection systems" under section 212(A) and "sanitary sewer systems" under section 212(B). Second, they convey wastewater to a POTW treatment plant for treatment under 40 C.F.R. § 403.3(q)). The preamble to the rule establishing the regulatory definition of POTW supports the reading that the treatment plant comprises only one portion of the POTW. *See* 44 Fed. Reg. 62260, 62261 (Oct. 29, 1979).[7] Consistent with Region 1's interpretation, courts have similarly

[7] "A new provision…defining the term 'POTW Treatment Plant' has been added to avoid an ambiguity that now exists whenever a reference is made to a POTW (publicly owned treatment works). …[T]he existing regulation defines a POTW to include both the treatment plant and the sewer pipes and other conveyances leading to it. As a result, it is unclear whether a particular reference is to the pipes, the treatment plant, or both. The term "POTW

taken a broad reading of the terms treatment works and POTW.[8] Finally, EPA has long recognized that a POTW can be composed of different parts, and that sometimes direct control is required under a permit for all parts of the POTW system, not just the POTW treatment plant segment. *See Multijurisdictional Pretreatment Programs Guidance Manual,* Office off Water (4203) EPA 833-B-94-005 (June 1994) at 19. ("If the contributing jurisdiction owns or operates the collection system within its boundaries, then it is a co-owner or operator of the POTW. As such, it can be included on the POTW's NPDES permit and be required to develop a pretreatment program. Contributing jurisdictions should be made co-permittees where circumstances or experience indicate that it is necessary to ensure adequate pretreatment program implementation."). The Region's interpretation articulated here is consistent with the precepts of the pretreatment program, which pertains to the same regulated entity, i.e., the POTW.[9]

Thus, under the statutory and regulatory definitions, a satellite collection system owned by one municipality that transports municipal sewage to another portion of the POTW owned by another municipality can be classified as part of a single integrated POTW system discharging to waters of the U.S.

(2) If the latter, how far up the collection system does NPDES jurisdiction reach, i.e., where does the "collection system" end and the "user" begin?

NPDES jurisdiction extends beyond the treatment plant to the outer boundary of the municipally-owned sewage collection systems, that is, to the outer bound of those sewers whose purpose is to transport wastewater for others to a POTW treatment plant for treatment, as explained below.

As discussed in response to Question 1 above, the term "treatment works" is defined to include "sewage collection systems." CWA § 212. In order to identify the extent of the sewage collection system for purposes of co-permittee regulation—*i.e.*, to identify the boundary between the portions of the collection system that are subject to NPDES requirements and those that are not—Region 1 is relying on EPA's regulatory interpretation of the term "sewage collection system." In relevant part, EPA regulations define "sewage collection system" at 40 C.F.R. § 35.905 as:

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treatment plant" will be used to designate that portion of the municipal system which is actually designed to provide treatment to the wastes received by the municipal system."

[8] *See, e.g., United States v. Borowski, 977 F.2d 27, 30 n.5* (1st Cir. 1992) ("We read this language [POTW definition] to refer to such sewers, pipes and other conveyances that are publicly owned. Here, for example, the City of Burlington's sewer is included in the definition because it conveys waste water to the Massachusetts Water Resource Authority's treatment works."); *Shanty Town Assoc. v. Envtl. Prot. Agency, 843 F.2d 782, 785* (4th Cir. 1988) ("As defined in the statute, a 'treatment work' need not be a building or facility, but can be any device, system, or other method for treating, recycling, reclaiming, preventing, or reducing liquid municipal sewage and industrial waste, including storm water runoff.") (citation omitted); *Comm. for Consideration Jones Fall Sewage System v. Train,* 375 F. Supp. 1148, 1150-51 (D. Md. 1974) (holding that NPDES wastewater discharge permit coverage for a wastewater treatment plant also encompasses the associated sanitary sewer system and pump stations under § 1292 definition of "treatment work").

[9] The fact that EPA has endorsed a co-permittee approach in addressing pretreatment issues in situations where the downstream treatment plant was unable to adequately regulate industrial users to the collection system in another jurisdiction reinforces the approach taken here.

> ".... each, and all, of the common lateral sewers, within a publicly owned treatment system, which are primarily installed to receive waste waters directly from facilities which convey waste water from individual structures or from private property and which include service connection "Y" fittings designed for connection with those facilities. The facilities which convey waste water from individual structures, from private property to the public lateral sewer, or its equivalent, are specifically excluded from the definition…."

Put otherwise, a municipal satellite collection system is subject to NPDES jurisdiction under the Region's approach insofar as it transports wastewater for others to a POTW treatment plant for treatment. This test (i.e., common sewer installed to receive and carry waste water from others) allows Region 1 to draw a principled, predictable and readily ascertainable boundary between the POTW's collection system and the users. This test would exclude, for example, single user branch drainpipes that collect and transport wastewater from plumbing fixtures in a commercial building or public school to the common lateral sewer, just as service connections from private residential structures to lateral sewers are excluded. This type of infrastructure would not be considered part of the collection system, because it is not designed to receive and carry wastewaters from other users. Rather, it is designed to transport its users' wastewater to such a common collection system at a point further down the sanitary sewer system.

EPA's reliance on the definition of "sewage collection system" from the construction grants regulations for interpretative guidance is reasonable because these regulations at 40 C.F.R. Part 35, subpart E pertain to grants specifically for POTWs, the entity that is the subject of this NPDES policy. Additionally, the term "sewage collection systems" expressly appears in the definition of treatment works under section 212 of the Act as noted above.

(3) Do municipal satellite collection systems "discharge [] a pollutant" within the meaning of the statute and regulations?

Yes, the collection system "discharges a pollutant" because it adds pollutants to waters of the U.S. from a point source. This position is consistent with the definition of "discharge of a pollutant" at 40 C.F.R. § 122.[10] The fact that a collection system may be located in the upper reaches of the POTW and not necessarily near the ultimate discharge point at the treatment plant, or that its contribution may be commingled with other wastewater flows prior to the discharge point, is not material to the question of whether it "discharges" a pollutant and consequently may be subject to conditions of an NPDES permit issued for discharges from the POTW.[11]
40 C.F.R. § 122.2 defines "discharge of a pollutant" as follows:

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[10] This position differs from that taken by the Region in the *Upper Blackstone* litigation. There, the Region stated that the treatment plant was the discharging entity for regulatory purposes. The Region has clarified this view upon further consideration of the statute, EPA's own regulations and case law and determined that a municipal satellite collection system in a POTW is a discharging entity for regulatory purposes.

[11] As explained more fully below, non-domestic contributors of pollutants to the collection system and treatment plant do not require NPDES permits because they are regulated through the pretreatment program under Section 307 of the CWA and are specifically excluded from needing an NPDES permit. 40 C.F.R. § 122.3(c).

"Discharge of a pollutant means:

> (a) Any addition of any 'pollutant'' or combination of pollutants to 'waters of the United States'' from any 'point source,' or
> (b) Any addition of any pollutant or combination of pollutants to the waters of the 'contiguous zone' or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation.
>
> This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. This term does not include an addition of pollutants by any 'indirect discharger.'"

POTW treatment plants as well as the municipal satellite collection systems that comprise portions of the larger POTW and that transport flow to the POTW treatment plant clearly add pollutants or combinations of pollutants to waters of the U.S. and to waters of the "contiguous zone" and are thus captured under sections (a) and (b) of this definition.[12]

(4) Are municipal satellite collection systems "indirect dischargers" and thus excluded from NPDES permitting requirements?

No, municipal satellite collection systems that convey wastewater from domestic sources to another portion of the POTW for treatment are not "indirect dischargers" to the POTW.

Section 307(b) of the Act requires EPA to establish regulatory pretreatment requirements to prevent the "introduction of pollutants into treatment works" that interfere, pass through or are otherwise incompatible with such works. Section 307 is implemented through the General Pretreatment Regulations for Existing and New Sources of Pollution (40 C.F.R. Part 403) and categorical pretreatment standards (40 C.F.R. Parts 405-471). Section 403.3(i) defines "indirect discharger" as "any non-domestic" source that introduces pollutants into a POTW and is regulated under pretreatment standards pursuant to CWA § 307(b)-(d). The source of an indirect discharge is termed an "industrial user." *Id*. at § 403.3(j). Under regulations governing the

[12] Some municipal satellite collection systems have argued that the addition of pollutants to waters of the United States from pipes, sewers or other conveyances that go to a *treatment plant* are not a "discharge of a pollutant" under 40 C.F.R. § 122.2. This is erroneous. Only one category of such discharges is excluded: indirect discharges. For the reasons explained below in section 4, the satellite system discharges at issue here are not indirect discharges. It is correct that the discharge of wastewater that does not go to the treatment works is included as a discharge under the definition. However, interpreting the *inclusion* of such discharges under the definition as categorically *excluding* the conveyance of other discharges that do go to the treatment works is not a reasonable reading of the regulation. This argument is also flawed in that it incorrectly equates "treatment works," the term used in the definition above, with "treatment plant." To interpret "treatment works" as it appears in the regulatory definition of "discharge of a pollutant" as consisting of only the POTW treatment plant would be inconsistent with the definition of "treatment works" at 40 C.F.R. § 403.3(q), which expressly includes the collection system. *See also* § 403.3(r) (defining "POTW Treatment Plant" as "*that portion* [emphasis added] of the POTW which is designed to provide treatment (including recycling and reclamation) of municipal sewage and industrial waste.")

NPDES permitting program, the term "indirect discharger" is defined as "a non-domestic discharger introducing 'pollutants' to a 'publicly owned treatment works.'" 40 C.F.R. § 122.2. Indirect dischargers are excluded from NPDES permit requirements at 40 C.F.R. § 122.3(c), which provides, "The following discharges do not require an NPDES permit: . . . The introduction of sewage, industrial wastes or other pollutants into publicly owned treatment works by indirect dischargers."

Municipal satellite collection satellite systems are not indirect dischargers as that term is defined under part 122 or 403 regulations. Unlike indirect dischargers, municipal satellite collection systems are not a non-domestic discharger "introducing pollutants" to POTWs as defined in 40 C.F.R. § 122.2. Instead, they themselves fall within the definition of POTW, whose components consist of the municipal satellite collection system owned and operated by one POTW and a treatment system owned and operated by another POTW. Additionally, they are not a non-domestic *source* regulated under section 307(b) that introduces pollutants into a POTW within the meaning of § 403.3(i). Rather, they are part of the POTW and collect and convey municipal sewage from industrial, commercial and domestic users of the POTW.

The Region's determination that municipal satellite collection systems are not indirect dischargers is, additionally, consistent with the regulatory history of the term indirect discharger. The 1979 revision of the part 122 regulations defined "indirect discharger" as "a non-municipal, non-domestic discharger introducing pollutants to a publicly owned treatment works, which introduction does not constitute a 'discharge of pollutants'…" *See* National Pollutant Discharge Elimination System, 44 Fed. Reg. 32854, 32901 (June 7, 1979). The term "non-municipal" was removed in the Consolidated Permit Regulations, 45 Fed. Reg. 33290, 33421 (May 19, 1980) (defining "indirect discharger" as "a nondomestic discharger…"). Although the change was not explained in detail, the substantive intent behind this provision remained the same. EPA characterized the revision as "minor wording changes." 45 Fed. Reg. at 33346 (Table VII: "Relationship of June 7[, 1979] Part 122 to Today's Regulations"). The central point again is that under any past or present regulatory incarnation, municipal satellite collection systems, as POTWs, are not within the definition of "indirect discharger," which is limited to non-domestic sources subject to section 307(b) that introduce pollutants to POTWs.

(5) How is the Region's rationale consistent with the references to "municipality" in the regulatory definition of POTW found at 40 C.F.R. § 403.3(q), and the definition's statement that "[t]he term also means the municipality….which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works?"

There is no inconsistency between the Region's view that municipally-owned satellite collection systems fall within the definition of POTW, and the references to municipality in 40 C.F.R. § 403.3(q), including the final sentence of the regulatory definition of POTW in the pretreatment regulations.

The Region's co-permitting rationale is consistent with the first part of the pretreatment program's regulatory definition of POTW, because the Region is only asserting NPDES jurisdiction over satellite collection systems that are owned by a "State or municipality (as defined by section 502(4) of the Act)." The term "municipality" as defined in CWA § 502(4) "means a city, town, borough, county, parish, district, association, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes…" Thus, in order to qualify under this definition, a wastewater collection system need only be "owned by a State or municipality." There is no requirement that the constituent components of a regionally integrated POTW, *i.e.*, the collection system and regional centralized POTW treatment plant, be owned by the same State or municipal entity.

Furthermore, there is no inconsistency between the Region's view that a satellite collection system is part of a POTW, and the final sentence of the regulatory definition of POTW in the pretreatment regulations. As noted above, the sentence provides that "POTW" may "also" mean a municipality which has jurisdiction over indirect discharges to and discharges from the treatment works. This is not a limitation because of the use of the word "also" (contrast this with the "only if" language in the preceding sentence of the regulatory definition).

(6) How does the Region's rationale comport with the permit application and signatory requirements under NPDES regulations?

"Any person who discharges or proposes to discharge pollutants"… must comply with permit application requirements set forth in 40 C.F.R. § 122.21 ("Application for a Permit"), including the duty to apply in subsection 122.21(a). It is the operator's duty to obtain a permit. *See* 40 C.F.R. § 122.21(b). An operator of a sewage collection system in a regionally integrated treatment works is operating a portion of the POTW and thus can be asked to submit a separate permit application pursuant to § 122.21(a) (requiring applicants for "new and existing POTWs" to submit information required in 122.21(j)," which in turn requires "all POTWs," among others, to provide permit application information). In the Region's experience, however, sufficient information about the collection system can be obtained from the treatment plant operator's permit application. The NPDES permit application for POTWs solicits information concerning portions of the POTW beyond the treatment plant itself, including the collection system used by the treatment works. *See* 40 C.F.R. § 122.21(j)(1). Where this information is not sufficient for writing permit conditions that apply to a separately owned municipal satellite system, EPA can request that the satellite system to submit an application with the information required in 122.21(j), or alternatively use its authority under CWA section 308 to solicit the necessary information. Because Region 1 believes that it will typically receive information sufficient for NPDES permitting purposes from the POTW treatment plant operator's application, the Region will formalize its historical practice by issuing written waivers to exempt municipal satellite collection systems from permit application and signatory requirements in accordance with 40 C.F.R. § 122.21(j).[13] To the extent the Region requires additional information, it intends to use its information collection authority under CWA § 308.

<u>IV. Basis for the Specific Conditions to which the Municipal Satellite Collection Systems are Subject as Co-permittees</u>

[13] EPA may waive applications for municipal satellite collection systems, when requiring such applications may result in duplicative or immaterial information. The Regional Administrator ("RA") may waive any requirement of this paragraph if he or she has access to substantially identical information. 40 C.F.R. § 122.21(j). *See generally*, 64 Fed. Reg. 42440 (August 4, 1999). The RA may also waive any application requirement that is not of material concern for a specific permit. *Id.*

Section 402(a) of the CWA is the legal authority for extending NPDES conditions to all portions of the municipally-owned treatment works to ensure proper operation and maintenance and to reduce the quantity of extraneous flow into the POTW. This section of the Act authorizes EPA to issue a permit for the "discharge of pollutants" and to prescribe permit conditions as necessary to carry out the provisions of the CWA, including Section 301 of the Act. Among other things, Section 301 requires POTWs to meet performance-based requirements based on secondary treatment technology, as well as any more stringent requirements of State law or regulation, including water quality standards. *See* CWA § 301(b)(1)(B),(C).

The Region imposes requirements on co-permittees when it determines that they are necessary to assure continued achievement of effluent limits based on secondary treatment requirements and state water quality standards in accordance with sections 301 and 402 of the Act, and to prevent unauthorized discharges of sewage from downstream collection systems. With respect to achieving effluent limits, the inclusion of the satellite systems as co-permittees may be necessary when high levels of I/I dilute the strength of influent wastewater and increase the hydraulic load on treatment plants, which can reduce treatment efficiency (*e.g.*, result in violations of technology-based percent removal limitations for BOD and TSS due to less concentrated influent, or violation of other technology-based or water quality-based effluent limitations due to reduction in treatment efficiency). Excess flows from an upstream collection system can also lead to bypassing a portion of the treatment process, or in extreme situations make biological treatment facilities inoperable (*e.g.*, wash out the biological organisms that treat the waste).

By preventing excess flows, the co-permittee requirements will also reduce water quality standards violations that result from SSOs by lessening their frequency and extent. *See Exhibit B* (Analysis of extraneous flow trends and SSO reporting for representative systems). SSOs that reach waters of the U.S. are discharges in violation of section 301(a) of the CWA to the extent not authorized by an NPDES permit.

Imposing standard permit conditions on the satellite communities may be necessary to give full effect to some of the standard permit conditions applicable to all NPDES permits at 40 C.F.R. § 122.41 . To illustrate, NPDES permitting regulations require standard conditions that "apply to all NPDES permits," pursuant to 40 C.F.R. § 122.41, including a duty to mitigate and to properly operate and maintain "all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit." *Id.* at § 122.41(d), (e). If the owner or operator of a downstream POTW treatment plant is unable, due to legal constraints for example, or unwilling to ensure that upstream collection systems are implementing requirements concerning the collection system, such as I/I requirements, making the upstream POTW collection system subject to its own permit requirements may be the only or best available option to give full effect to these permit obligations.

V. Conclusion

For all the reasons above, Region 1 has determined that it is reasonable to, as necessary, directly regulate municipal satellite collection systems as co-permittees when issuing NPDES permits for discharges from regionally integrated treatment works.

Exhibit A

Name	Issue Date
Massachusetts Water Resources Authority – Clinton (NPDES Permit No. MA0100404)	September 27, 2000
City of Brockton (NPDES Permit No. MA0101010)	May 11, 2005
City of Marlborough (NPDES Permit No. MA0100480)	May 26, 2005
Westborough Wastewater Treatment Plant (NPDES Permit No. MA0100412)	May 20, 2005
Lowell Regional Wastewater Utilities (NPDES Permit No. MA0100633)	September 1, 2005
Town of Webster Sewer Department (NPDES Permit No. MA0100439)	March 24, 2006
Town of South Hadley, Board of Selectmen (NPDES Permit No. MA0100455)	June 12, 2006
City of Leominster (NPDES Permit No. MA0100617)	September 28, 2006
Hoosac Water Quality District (NPDES Permit No. MA0100510)	September 28, 2006
Board of Public Works, North Attleborough (NPDES Permit No. MA0101036)	January 4, 2007
Town of Sunapee (NPDES Permit No. 0100544)	February 21, 2007
Lynn Water and Sewer Commission (NPDES Permit No. MA0100552)	March 3, 2007
City of Concord (NPDES Permit No. NH0100331)	June 29, 2007
City of Keene (NPDES Permit No. NH0100790)	August 24, 2007
Town of Hampton (NPDES No. NH0100625)	August 28, 2007
Town of Merrimack, NH (NPDES No. NH0100161)	September 25, 2007
City of Haverhill (NPDES Permit No. MA0101621)	December 5, 2007
Greater Lawrence Sanitary District (NPDES Permit No. MA0100447)	August 11, 2005
City of Pittsfield, Department of Public Works (NPDES No. MA0101681)	August 22, 2008

City of Manchester (NPDES No. NH0100447)	September 25, 2008
City of New Bedford (NPDES Permit No. MA0100781)	September 28, 2008
Winnipesaukee River Basin Program Wastewater Treatment Plant (NPDES Permit No. NH0100960)	June 19, 2009
City of Westfield (NPDES Permit No. MA0101800)	September 30, 2009
Hull Permanent Sewer Commission (NPDES Permit No. MA0101231)	September 1, 2009
Gardner Department of Public Works (NPDES Permit No. MA0100994)	September 30, 2009

<u>Exhibit B</u>

Analysis of extraneous flow trends and SSO reporting for representative systems

I. <u>Representative POTWS</u>

The **South Essex Sewer District (SESD)** is a regional POTW with a treatment plant in Salem, Massachusetts. The SESD serves a total population of 174,931 in six communities: Beverly, Danvers, Marblehead, Middleton, Peabody and Salem. The **Charles River Pollution Control District (CRPCD)** is a regional POTW with a treatment plant in Medway, Massachusetts. The CRPCD serves a total population of approximately 28,000 in four communities: Bellingham, Franklin, Medway and Millis. The CRPCD has been operating since 2001 under a permit that places requirements on the treatment plant to implement I/I reduction programs with the satellite collection systems, while SESD's existing permit does not include specific I/I requirements related to the satellite collection systems, in contrast to Region 1's current practice of including the satellite collection systems as co-permittees.

II. <u>Comparison of flows to standards for nonexcessive infiltration and I/I</u>

Flow data from the facilities' discharge monitoring reports (DMRs) are shown in comparison to the EPA standard for nonexcessive infiltration/inflow (I/I) of 275 gpcd wet weather flow and the EPA standard for nonexcessive infiltration of 120 gallons per capita per day (gpcd) dry weather flow; the standards are multiplied by population served for comparison with total flow from the facility. See *I/I Analysis and Project Certification*, EPA Ecol. Pub. 97-03 (1985); 40 CFR 35.2005(b)(28) and (29).

Figures 1 and 2 show the daily maximum flows (the highest flow recorded in a particular month) for the CRPCD and SESD, respectively, along with monthly precipitation data from nearby weather stations. Both facilities experience wet weather flows far exceeding the standard for nonexcessive I/I, particularly in wet months, indicating that these facilities are receiving high levels of inflow and wet weather infiltration.

Figure 1. CRPCD Daily Maximum Flow Compared to Nonexcessive I/I Standard

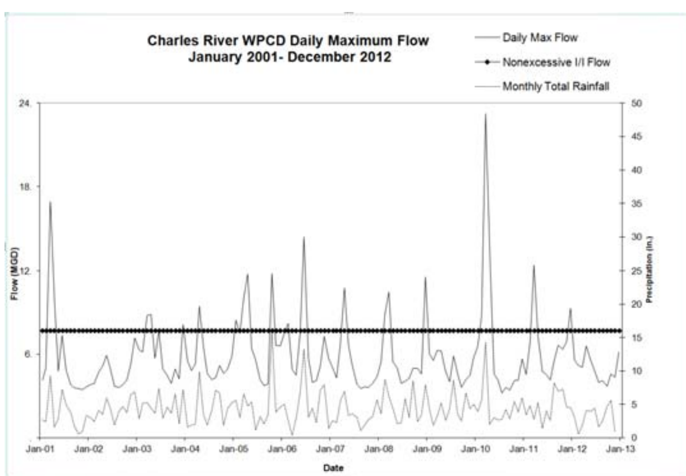
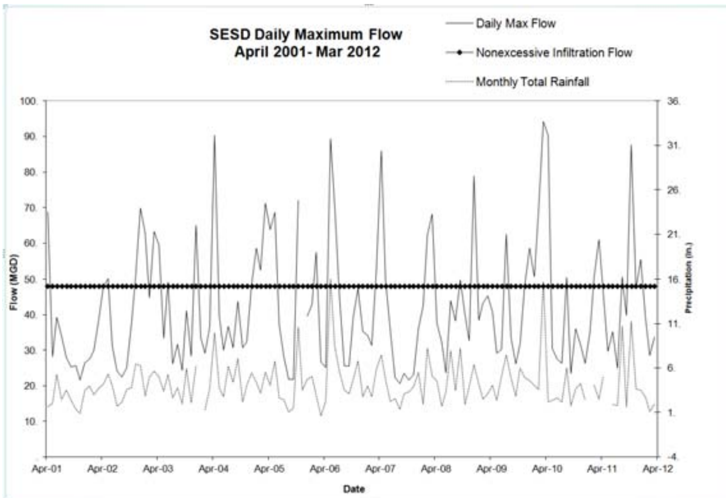


Figure 2. SESD Daily Maximum Flow Compared to Nonexcessive I/I Standard



Figures 3 and 4 shows the average flows for the CRPCD and SESD, which exceed the nonexcessive infiltration standard for all but the driest months. This indicates that these systems experience high levels of groundwater infiltration into the system even during dry weather.

Figure 3. CRPCD 12 Month Average Flow Compared to Nonexcessive Infiltration Standard

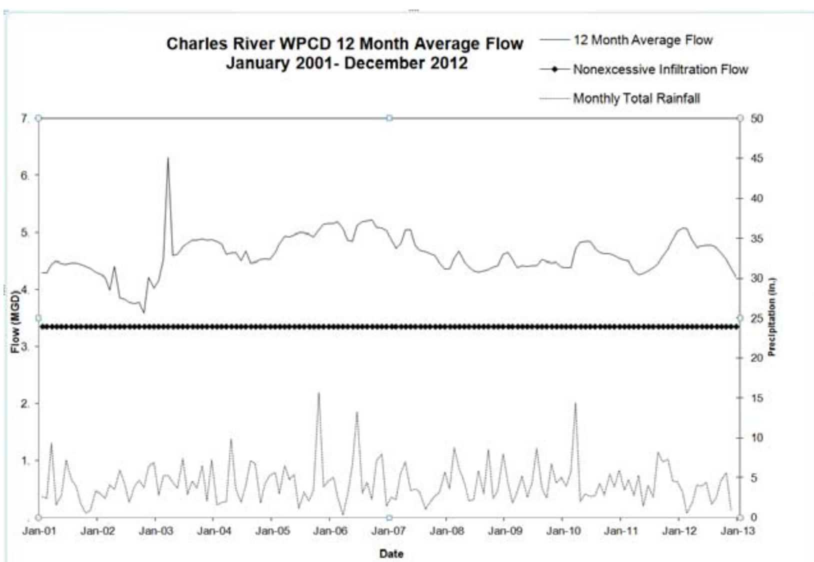
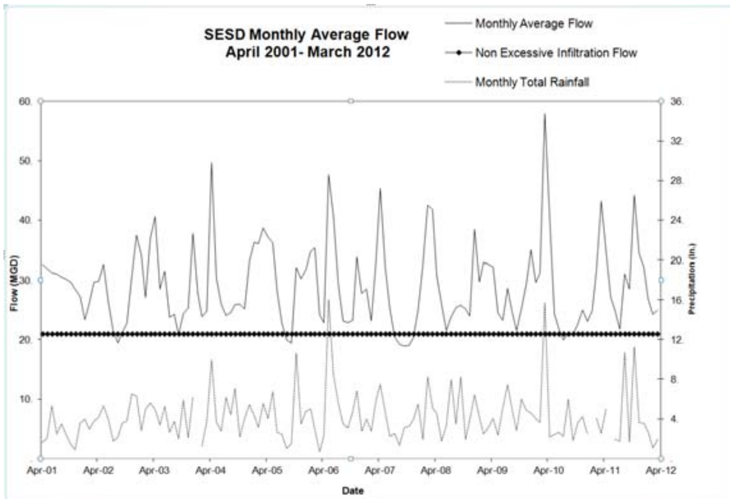


Figure 4. SESD Monthly Average Flow Compared to Nonexcessive Infiltration Standard

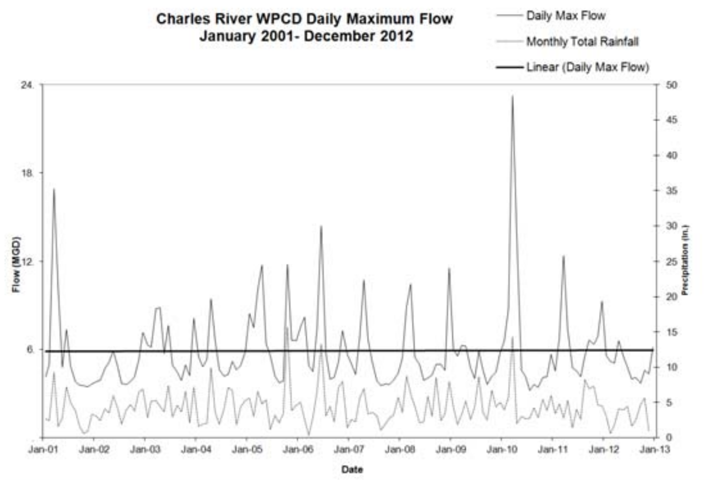


II. Flow Trends

Successful I/I reduction programs should result in decreases in wet weather flows to the treatment plant over the long term. Figures 5 and 6 show the trend in maximum daily flows since 2001. The maximum daily flow reflects the highest wet weather flow for each month. Charts are shown for both the reported maximum daily flow and for a one year rolling average of the maximum daily flow (provided to reduce the impact of seasonality on the regression results). The linear regressions indicates a weak trend over this time period of increasing maximum daily flow; while most of the variability from year to year is due to changes in precipitation, the trends are generally inconsistent with reduction in maximum daily flow over this time period. This indicates that I/I has not been reduced in either system.

Figure 5. CRPCD Daily Maximum Flow Trends

a. Reported Daily Maximum Flows



b. One Year Rolling Average of Daily Maximum Flows

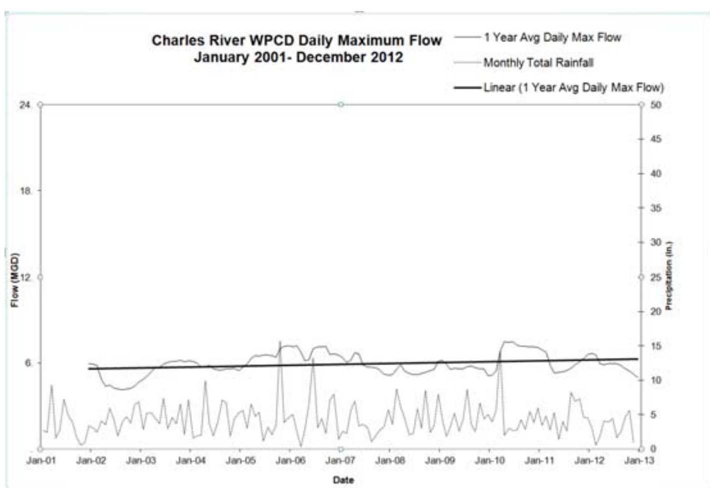
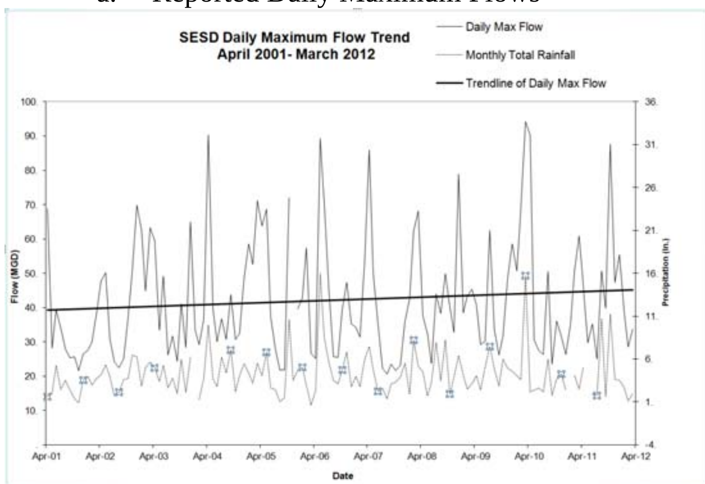
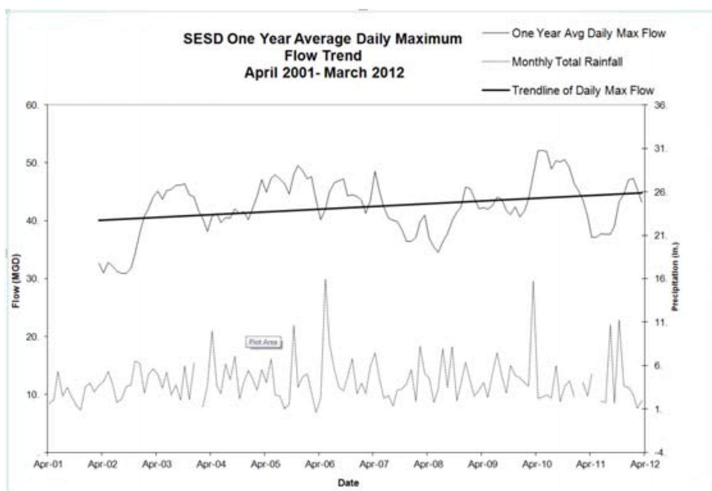


Figure 6. SESD Daily Maximum Flow Trend

a. Reported Daily Maximum Flows



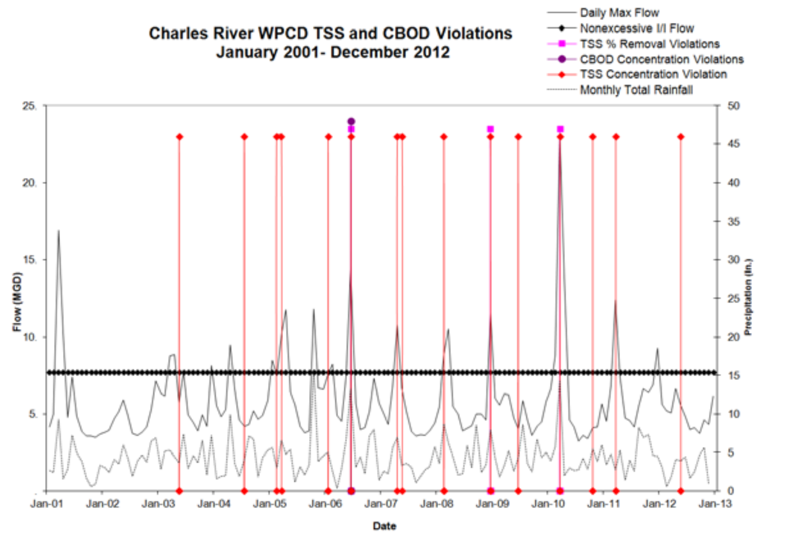
b. One Year Rolling Average of Daily Maximum Flows



III. Violations Associated with Wet Weather Flows

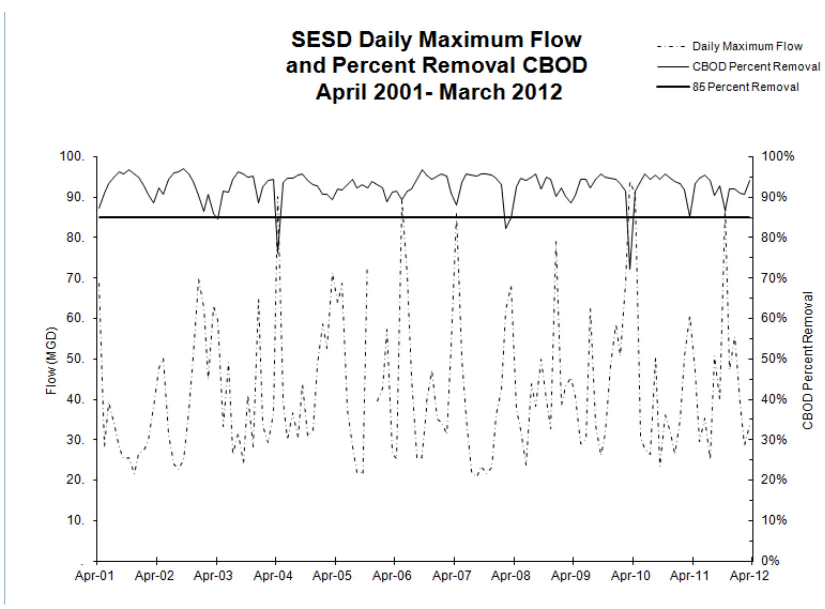
The CRPCD has experienced permit violations that appear to be related to I/I, based on their occurrence during wet weather months when excessive I/I standards are exceeded. Figure 7 shows violations of CRPCD's effluent limits for CBOD (concentration) and TSS (concentration and percent removal). Thirteen of the nineteen violations occurred during months when daily maximum flows exceeded the EPA standard.

Figure 7. CRPCD CBOD and TSS Effluent Limit Violations



In addition, SESD has been unable to achieve the secondary treatment requirement of 85% CBOD removal, also related to I/I. Figure 8 shows SESD's results for removal of CBOD, in percentage, as compared to maximum daily flow. SESD had three months where CBOD removal fell below 85%, all during months with high maximum daily flows. While SESD's current permit requires 85% removal in dry weather, so that these excursions did not constitute permit violations, SESD's proposed draft permit does not limit this requirement to dry weather. Relief from the 85% removal requirement is allowed only when the treatment plant receives flows from CSOs or if it receives less concentrated influent wastewater from separate sewers that is not the result of excessive I/I (including not exceeding the 275 gpcpd nonexcessive I/I standard). 40 CFR § 133.103(a) and (d).

Figure 8. SESD CBOD Percent Removal



IV. SSO Reporting

In addition, both of these regional POTWs have experienced SSOs within the municipal satellite collection systems. In the SESD system, Beverly, Danvers, Marblehead and Peabody have reported SSOs between 2006 and 2008, based on data provided by MassDEP. In the CRPCD system, Bellingham reported SSOs in its system between 2006 and 2009.

Exhibit C

Form of Regional Administrator's or Authorized Delegate's Waiver of Permit Application Requirements for Municipal Satellite Collection Systems

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

Re: Waiver of Permit Application and Signatory Requirements for [Municipal Satellite Sewage Collection System]

Dear ______:

Under NPDES regulations, all POTWs must submit permit application information set forth in 40 C.F.R. § 122.21(j) unless otherwise directed. Where the Region has "access to substantially identical information," the Regional Administrator [or Authorized Delegate] may waive permit application requirements for new and existing POTWs. *Id.* Pursuant to my authority under this regulation, I am waiving NPDES permit application and signatory requirements applicable to the above-named municipal satellite collection systems.

Although EPA has the authority to require municipal satellite collection systems to submit individual permit applications, in this case I find that requiring a single permit application executed by the regional POTW treatment plant owner/operator will deliver "substantially identical information," and will be more efficient, than requiring separate applications from each municipal satellite collection system owner/operator. Municipal satellite collection system owners/operators are expected to consult and coordinate with the regional POTW treatment plant operators to ensure that any information provided to EPA about their respective entities is accurate and complete. In the event that EPA requires additional information, it may use its information collection authority under CWA § 308. 33 U.S.C. § 1318.

This notice reflects my determination based on the specific facts and circumstances in this case. It is not intended to bind the agency in future determinations where a separate permit for municipal satellites would not be duplicative or immaterial.

If you have any questions or would like to discuss this decision, please contact [EPA Contact] at [Contact Info].

Sincerely,

Regional Administrator

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMONWEALTH OF MASSACHUSETTS 1 WINTER STREET BOSTON, MASSACHUSETTS 02108	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY – REGION 1 OFFICE OF ECOSYSTEM PROTECTION 5 POST OFFICE SQUARE BOSTON, MASSACHUSETTS 02109

JOINT **PUBLIC COMMENT PERIOD** AND PUBLIC NOTICE OF A **PUBLIC HEARING** PERTAINING TO THE ISSUANCE OF **DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT** TO DISCHARGE INTO WATERS OF THE UNITED STATES UNDER SECTIONS 301 AND 402 OF THE CLEAN WATER ACT, AS AMENDED, AND SECTIONS 27 AND 43 OF THE MASSACHUSETTS CLEAN WATERS ACT, AS AMENDED, AND REQUEST FOR STATE CERTIFICATION UNDER SECTION 401 OF THE CLEAN WATER ACT.

DATE OF NOTICE: February 20, 2015

PERMIT NUMBER: **MA0101010**

PUBLIC NOTICE NUMBER: MA-008-15

NAME AND MAILING ADDRESS OF APPLICANT:

City of Brockton
City Hall, 45 School Street
Brockton, Massachusetts 02401

NAME AND ADDRESS OF THE FACILITY WHERE DISCHARGE OCCURS:

Brockton Advanced Water Reclamation Facility
303 Oak Hill Way
Brockton, Massachusetts 02401

NAMES AND ADDRESSES OF COPERMITTEES:

Town of Abington Sewer Department 350 Summer Street Abington, MA 02351	Town of Whitman Department of Public Works 100 Essex Street, P.O. Box 454 Whitman, MA 02382

RECEIVING WATER: Salisbury Plain River (Class B)

The U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) have cooperated in the development of a draft permit for the Brockton AWRF, which discharges treated domestic and industrial wastewater. Sludge from this facility is incinerated on-site. The effluent limits and permit conditions imposed have been drafted to assure compliance with the Clean Water Act, 33 U.S.C. sections 1251 et seq., the

Massachusetts Clean Waters Act, G.L. c. 21, §§ 26-53, 314 CMR 3.00, and State Surface Water Quality Standards at 314 CMR 4.00. EPA has requested that the State certify this draft permit pursuant to Section 401 of the Clean Water Act and expects that the draft permit will be certified.

INFORMATION ABOUT THE DRAFT PERMIT:

The draft permit and explanatory fact sheet may be obtained at no cost at http://www.epa.gov/region1/npdes/draft_permits_listing_ma.html or by contacting:

Susan Murphy
U.S. Environmental Protection Agency – Region 1
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109-3912
Telephone: (617) 918-1534

The administrative record containing all documents relating to this draft permit including all data submitted by the applicant may be inspected at the EPA Boston office mentioned above between 9:00 a.m. and 5:00 p.m., Monday through Friday, except holidays.

PUBLIC HEARING:

The Regional Administrator has determined, pursuant to 40 C.F.R. Section 124.12, upon request by the applicant, that a significant degree of public interest exists in this proposed permit that a public hearing should be held to consider this draft permit.

A public hearing and meeting (information session) will be held on the following date and time.

DATE: Tuesday, March 24, 2015

Or, SNOW DATE: Tuesday, March 31, 2015

MEETING TIME: 6:30pm – 7:15pm

HEARING TIME: 7:30 pm

LOCATION: West Middle School
Auditorium
271 West Street
Brockton, MA 02301

In accordance with 40 CFR Section124.12, the following is a summary of the procedures that shall be followed at the public hearing:

a. The Presiding Officer shall have the authority to open and conclude hearing and to maintain order; and

b. Any person appearing at such hearing may submit oral or written statements and data concerning the draft permit.

All persons, including applicants, who believe any condition of this draft permit is inappropriate, must raise all issues and submit all available arguments and all supporting material for their arguments in full by April 20, 2015, to the address listed above. In reaching a final decision on this draft permit, the Regional Administrator will respond to all significant comments and make the responses available to the public at EPA's Boston office.

FINAL PERMIT DECISION:

Following the close of the comment period and after a public hearing, the Regional Administrator 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.

DAVID FERRIS, DIRECTOR
MASSACHUSETTS WASTEWATER MANAGEMENT PROGRAM
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

KEN MORAFF, DIRECTOR
OFFICE OF ECOSYSTEM PROTECTION
EPA-REGION 1

MASSACHUSETTS DEPARTMENT OF
ENVIRONMENTAL PROTECTION
COMMONWEALTH OF MASSACHUSETTS
1 WINTER STREET
BOSTON, MASSACHUSETTS 02108

UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY – REGION 1
OFFICE OF ECOSYSTEM PROTECTION
5 POST OFFICE SQUARE
BOSTON, MASSACHUSETTS 02109

JOINT EXTENSION OF PUBLIC COMMENT PERIOD FOR A DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

On February 20, 2015, the U.S. EPA and MassDEP published a notice of a draft NPDES permit for the Brockton Advanced Water Reclamation Facility, NPDES No. MA0101010. The public notice was published in the *Brockton Enterprise* on February 20, 2015 and is also available on EPA's website at http://www.epa.gov/region1/npdes/draft_permits_listing_ma.html. A copy of the draft permit and fact sheet may be obtained at the above website or by contacting EPA at the address below.

This Notice serves to inform the public that the comment period has been extended to May 4, 2015. Public comments should be submitted to

Susan Murphy
U.S. Environmental Protection Agency – Region 1
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109-3912
Telephone: (617) 918-1534

Former Closing Date: April 20, 2015
New Closing Date: May 4, 2015