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),

Battle Road Farm Condominium Trust
c/o First Realty Management Corporation
151 Tremont Street
Boston, MA 02111

is authorized to discharge from the facility located at

Battle Road Farm Wastewater Treatment Facility
39 Indian Camp Lane
Lincoln, MA 01773

to receiving water named

Headwaters Wetland to the Shawsheen River
Shawsheen River Basin (MA83-08)

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

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 August 11, 2003.

This permit consists of **Part I (**18 pages including effluent limitations and monitoring requirements); **Attachment A** (USEPA Region 1 Freshwater Chronic Toxicity Test Procedure and Protocol, March 2013, 7 pages); **Attachment B** (USEPA Region I Freshwater Acute Toxicity Test Procedure and Protocol, February 2011, 8 pages): and **Part II** (25 pages including NPDES Part II Standard Conditions).

Signed this 2nd day of June, 2015

/S/SIGNATURE ON FILE
Ken Moraff, Director
Office of Ecosystem Protection
Environmental Protection Agency
Boston, MA

/S/SIGNATURE ON FILE_____
David Ferris, Director
Massachusetts Wastewater Management Program
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 headwaters of the Shawsheen River. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC	**EFFLUENT LIMITS**					**MONITORING REQUIREMENTS [3]**	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
FLOW[2]	*********	*********	0.033 mgd	*********	Report mgd	CONTINUOUS	RECORDER
FLOW[2]	*********	*********	Report mgd	*********	*********	CONTINUOUS	RECORDER
BOD_5 [4]	1.4 lb/day	2.8 lb/day	5 mg/l	*********	10 mg/l	2/MONTH	24-HOUR COMPOSITE[5]
TSS [4]	1.4 lb/day	2.8 lb/day	5 mg/l	*********	10 mg/l	2/MONTH	24-HOUR COMPOSITE[5]
pH RANGE[1]	6.5 - 8.3 S.U. (SEE PERMIT PARAGRAPH I.A.1.b.)					1/DAY	GRAB
FECAL COLIFORM[1,6]	*********	**********	200 cfu/100 ml		400 cfu/100 ml	1/WEEK	GRAB
ESCHERICHIA COLI (E. coli) [1,7]	*********	**********	126 cfu/100 ml	*********	409 cfu/100 ml	1/WEEK	GRAB
TOTAL PHOSPHORUS (April 1 – October 31) (See Schedule in Section D)	*********	*********	0.1 mg/l	*********	Report	1/WEEK	24-HOUR COMPOSITE[5]
TOTAL PHOSPHORUS (November 1 – March 31) (See Schedule in Section D)	*********	*********	1.0 mg/l	*********	2.0 mg/l	1/WEEK	24-HOUR COMPOSITE[5]
TOTAL NITROGEN	*********	*********	5 mg/l	*********	10 mg/l	1/WEEK	24-HOUR COMPOSITE[5]

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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 headwaters of the Shawsheen River. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITS					MONITORING REQUIREMENTS [3]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
TOTAL ALUMINUM	********* *********	********* *********	87 ug/l	********* *********	750 ug/l	4/YEAR[8]	24-HOUR COMPOSITE[5]
TOTAL CADMIUM[9]	********* *********	********* *********	0.13 ug/l	********* *********	Report ug/l	4/YEAR[8]	24-HOUR COMPOSITE[5]
TOTAL LEAD[10]	********* *********	********* *********	0.86 ug/l	********* *********	Report ug/l	4/YEAR[8]	24-HOUR COMPOSITE[5]
TOTAL ZINC[11]	********* *********	********* *********	Report ug/l	********* *********	Report ug/l	4/YEAR[8]	24-HOUR COMPOSITE[5]
TOTAL COPPER[12] (***Interim Limits in effect for first 12 months from issuance date)	********* *********	********* *********	4.3 ug/l	********* *********	5.9 ug/l	4/YEAR[8]	24-HOUR COMPOSITE[5]
TOTAL COPPER[12] (In effect 12 months after issuance)	********* *********	********* *********	3.87 ug/l	********* *********	5.3 ug/l	4/YEAR[8]	24-HOUR COMPOSITE[5]

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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 headwaters of the Shawsheen River. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITS					MONITORING REQUIREMENTS [3]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE TYPE**
WHOLE EFFLUENT TOXICITY[13,14,15,16,17]	Acute $LC_{50} \geq 100\%$ Chronic C-NOEC $\geq 100\%$					2/YEAR	24-HOUR COMPOSITE[5]
Hardness[17]	*********	*********	*********	*********	Report mg/l	2/YEAR	24-HOUR COMPOSITE[5]
Ammonia Nitrogen as N[17]	*********	*********	*********	*********	Report mg/l	2/YEAR	24-HOUR COMPOSITE[5]
Total Recoverable Aluminum[17]	*********	*********	*********	*********	Report mg/l	2/YEAR	24-HOUR COMPOSITE[5]
Total Recoverable Cadmium[17]	*********	*********	*********	*********	Report mg/l	2/YEAR	24-HOUR COMPOSITE[5]
Total Recoverable Copper[17]	*********	*********	*********	*********	Report mg/l	2/YEAR	24-HOUR COMPOSITE[5]
Total Recoverable Nickel[17]	*********	*********	*********	*********	Report mg/l	2/YEAR	24-HOUR COMPOSITE[5]
Total Recoverable Lead[17]	*********	*********	*********	*********	Report mg/l	2/YEAR	24-HOUR COMPOSITE[5]
Total Recoverable Zinc[17]	*********	*********	*********	*********	Report mg/l	2/YEAR	24-HOUR COMPOSITE[5]

Sampling Location: All effluent samples shall be collected after the UV disinfection.

Footnotes:

1. Required for State Certification.

2. Report annual average, monthly average, and the maximum daily flow. The limit is an annual average, which shall be reported as a 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. Effluent sampling shall be of the discharge and shall be collected at the point specified on page 4. 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.

4. Sampling required for influent and effluent.

5. 24-hour composite samples 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.

6. The fecal coliform limit is only in effect until the E. coli limit becomes effective **1 year** from the effective date of the permit.

7. The monthly average limit for E. coli is expressed as a geometric mean. E. coli monitoring shall be conducted concurrently with a total residual chlorine sample.

   The E. coli limit becomes effective **1 year** from the effective date of the permit.

8. Results from the 2/year sampling conducted as part of the whole effluent toxicity testing requirement can be used to partially satisfy this 4/year monitoring requirement.

9. The minimum level for cadmium is defined as 0.5 ug/l. This value is the minimum level for cadmium using Graphite Furnace Atomic Absorption method (EPA Method 200.9) This method or other EPA-approved method with an equivalent or lower ML shall be used for effluent limitations less than 0.5 ug/l. Compliance/non-compliance will be determined based on the ML. Sampling results of 0.5 ug/l or less shall be reported as zero on the Discharge Monitoring Report (DMR).

10. The minimum level for lead is defined as 3 ug/l. This value is the minimum level for lead using Graphite Furnace Atomic Absorption method (EPA Method 200.9) This method or other EPA-approved method with an equivalent or lower ML shall be used for effluent limitations less than 3 ug/l. Compliance/non-compliance will be determined based on the ML. Sampling results of 3 ug/l or less shall be reported as zero on the Discharge Monitoring Report (DMR).

11. The minimum level for zinc is defined as 10 ug/l. This value is the minimum level for lead using Inductively Coupled Plasma method (EPA Method 200.8) This method or other EPA-approved method with an equivalent or lower ML shall be used for effluent limitations less than 10 ug/l. Compliance/non-compliance will be determined based on the ML. Sampling results of 10 ug/l or less shall be reported as zero on the Discharge Monitoring Report (DMR).

12. As the copper limitations are more stringent than the copper limitations in the 2003 permit, the permittee has 12 months from the effective date of this permit to achieve the new limits. In the interim period, the permit limits from the 2003 permit remain in place.

    The minimum level (ML) for copper is defined as 3 ug/l. This value is the minimum level for copper using the Graphite Furnace Atomic Absorption analytical method (EPA Method 220.2). This method or other EPA-approved method with an equivalent or lower ML shall be used for effluent limitations less than 3 ug/l. Compliance/non-compliance will be determined based on the ML. Sampling results of 3 ug/l or less shall be reported as zero on the Discharge Monitoring Report.

13. The permittee shall conduct acute and chronic toxicity tests *two* times per year. The permittee shall test the daphnid, Ceriodaphnia dubia, only. Toxicity test samples shall be collected during of the months of July and October. The test results shall be submitted by the last day of the month following the completion of the test. The results are due August 31st and November 30th, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachment A & B** of this permit.

Test Dates	**Submit Results By:**	**Test Species**	**Acute Limit LC_{50}**	**Chronic Limit C-NOEC**
July October	August 31 November 30	Ceriodaphnia dubia (daphnid)	≥ 100%	≥ 100%

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 **100%** or greater" limit is defined as a sample which is composed of **100%** (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 **Attachments A & B**.

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 **Attachments A & B**. 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. Prohibitions Concerning Interference and Pass Through:

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

3. 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.

4. 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-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.

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.

3. Infiltration/Inflow Control:

   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 system and high flow related violations of the wastewater treatment plant's effluent limitations.

4. Annual Reporting Requirements:

   The permittee shall submit a summary of activities related to its Preventative Maintenance Program 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 description of inspection and maintenance activities conducted and corrective actions taken during the previous year;
   c. Expenditures for any maintenance activities and corrective actions taken during the previous year;
   d. A description of investigation/action in the coming year;
   e. If treatment plant flow has reached 80% of its design flow [specify 80 percent of design flow value] 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.

5. 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 treatment works it owns and operates.

D. SCHEDULE OF COMPLIANCE FOR TOTAL PHOSPHORUS

In order to comply with the permit limits, the Permittee shall take the actions below with regard to total phosphorus. The permittee shall comply with an interim limit of 1.0 mg/l.

1. Within twelve (12) months of the effective date of the permit, the Permittee shall submit to EPA and MassDEP a status report relative to the planning of the facilities, including alternative groundwater and surface water discharge locations, if such alternative locations are necessary or planned by the permittee to address the limits.

2. Within twelve (12) months of the effective date of the permit, if the Permittee chooses to pursue the potential for establishing a site specific water quality criteria for total phosphorus, the Permittee shall hire a wetlands ecologist to determine an alternative total phosphorus criteria level that would not result in adverse impacts to the wetland vegetation or the channelized portion of the receiving stream and submit a report to EPA and MassDEP for consideration.

3. Within twenty-four (24) months of the effective date of the permit, the Permittee shall complete facilities planning and initiate design of any facilities necessary to address compliance with the phosphorus limits.

4. Within thirty (30) months of the effective date of the permit, the Permittee shall initiate construction of any facility improvements required to comply with the total phosphorus limits.

5. Within forty-two (42) months 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 comply with the total phosphorus limits.

6. Within forty-eight (48) months of the effective date of the permit, the Permittee shall complete construction of any facility improvements required to comply with the phosphorus limits and achieve compliance with the total phosphorus limits.

E. SLUDGE CONDITIONS

1. The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices, including EPA regulations promulgated at 40 CFR Part 503, which prescribe "Standards for the Use or Disposal of Sewage Sludge" pursuant to Section 405(d) of the CWA, 33 U.S.C. § 1345(d).

2. If both state and federal requirements apply to the permittee's sludge use and/or disposal practices, the permittee shall comply with the more stringent of the applicable requirements.

3. The requirements and technical standards of 40 CFR Part 503 apply to the following sludge use or disposal practices.

   a. Land application - the use of sewage sludge to condition or fertilize the soil

   b. Surface disposal - the placement of sewage sludge in a sludge only landfill

   c. Sewage sludge incineration in a sludge only incinerator

4. The requirements of 40 CFR Part 503 do not apply to facilities which dispose of sludge in a municipal solid waste landfill. 40 CFR § 503.4. These requirements also do not apply to facilities which do not use or dispose of sewage sludge during the life of the permit but rather treat the sludge (e.g. lagoons, reed beds), or are otherwise excluded under 40 CFR § 503.6.

5. The 40 CFR. Part 503 requirements including the following elements:

   - General requirements
   - Pollutant limitations
   - Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
   - Management practices
   - Record keeping
   - Monitoring
   - Reporting

   Which of the 40 C.F.R. Part 503 requirements apply to the permittee will depend upon the use or disposal practice followed and upon the quality of material produced by a facility. The EPA Region 1 Guidance document, "EPA Region 1 - NPDES Permit Sludge Compliance Guidance" (November 4, 1999), may be used by the permittee to

assist it in determining the applicable requirements.[1]

6. The sludge shall be monitored for pollutant concentrations (all Part 503 methods) and pathogen reduction and vector attraction reduction (land application and surface disposal) at the following frequency. This frequency is based upon the volume of sewage sludge generated at the facility in dry metric tons per year

less than 290	1/ year
290 to less than 1,500	1 /quarter
1,500 to less than 15,000	6 /year
15,000 +	1 /month

Sampling of the sewage sludge shall use the procedures detailed in 40 CFR 503.8.

7. Under 40 CFR § 503.9(r), the permittee is a "person who prepares sewage sludge" because it "is … the person who generates sewage sludge during the treatment of domestic sewage in a treatment works …." If the permittee contracts with *another* "person who prepares sewage sludge" under 40 CFR § 503.9(r) – i.e., with "a person who derives a material from sewage sludge" – for use or disposal of the sludge, then compliance with Part 503 requirements is the responsibility of the contractor engaged for that purpose. If the permittee does not engage a "person who prepares sewage sludge," as defined in 40 CFR § 503.9(r), for use or disposal, then the permittee remains responsible to ensure that the applicable requirements in Part 503 are met. 40 CFR § 503.7. If the ultimate use or disposal method is land application, the permittee is responsible for providing the person receiving the sludge with notice and necessary information to comply with the requirements of 40 CFR Part 503 Subpart B.

8. The permittee shall submit an annual report containing the information specified in the 40 CFR Part 503 requirements (§ 503.18 (land application), § 503.28 (surface disposal), or § 503.48 (incineration)) by **February 19** (*see also* "EPA Region 1 - NPDES Permit Sludge Compliance Guidance"). Reports shall be submitted to the address contained in the reporting section of the permit. If the permittee engages a contractor or contractors for sludge preparation and ultimate use or disposal, the annual report need contain only the following information:

   a. Name and address of contractor(s) responsible for sludge preparation, use or disposal
   b. Quantity of sludge (in dry metric tons) from the POTW that is transferred to the sludge contractor(s), and the method(s) by which the contractor will prepare and use or dispose of the sewage sludge.

1 This guidance document is available upon request from EPA Region 1 and may also be found at: http://www.epa.gov/region1/npdes/permits/generic/sludgeguidance.pdf

F. 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 and the Use of NetDMR

   Beginning the effective date of the permit the permittee must submit its monthly monitoring data in discharge monitoring reports (DMRs) to EPA and MassDEP no later than the 15th day of the month following the completed reporting period. **For a period of six months from the effective date of the permit**, the permittee may submit its monthly monitoring data in DMRs to EPA and MassDEP either in hard copy form, as described in Part I.F.4, or in DMRs electronically submitted using NetDMR. NetDMR is a web-based tool that allows permittees to electronically submit DMRs and other required reports via a secure internet connection. NetDMR is accessed from: http://www.epa.gov/netdmr. **Beginning no later than six months after the effective date of the permit**, the permittee shall begin reporting monthly monitoring data using NetDMR, unless, in accordance with Part I.F.6, the facility is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs. The permittee must continue to use the NetDMR after the permittee begins to do so. When a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs to EPA or MassDEP.

2. Submittal of Reports as NetDMR Attachments

   After the permittee begins submitting DMR reports to EPA electronically using NetDMR, the permittee shall electronically submit all reports to EPA as NetDMR attachments rather than as hard copies, unless otherwise specified in this permit. Permittees shall continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP. (See Part I.F.5. 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 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. 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

4. 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. Reports and DMRs submitted prior to the use of NetDMR

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 and submitted prior to the use of NetDMR shall be submitted to:

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

5. 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.F.2, I.F.3, and I.F.4 also shall be submitted to the State at the following addresses:

MassDEP – Northeast Region
Bureau of Water Resources
205B Lowell Street
Wilmington, MA 01887

Copies of toxicity tests only shall be submitted to:

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

6. Submittal of NetDMR Opt-Out Requests

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

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

And

Massachusetts Department of Environmental Protection
Surface Water Discharge Permit Program
1 Winter Street, 5th Floor
Boston, Massachusetts 02108

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

G. 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. In addition, as a state permit condition, the permittee shall establish and maintain a financial assurance mechanism in the form of an escrow agreement subject to approval by the Department that provides for an immediate repair and replacement account. The immediate repair and replacement account shall be fully capitalized in the amount of ten thousand dollars ($10,000) within one year of the effective date of the permit, so that funds are available immediately to correct any unanticipated problem so that any disruption of operation is minimized, and a violation of the terms and conditions contained in the permit does not occur, or is otherwise mitigated. Permittee shall replenish the account within one (1) year of any disbursement, subject to the terms of the agreement.

3. 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.

4. 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. ≥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 (^{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.

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. 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.

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

FACT SHEET

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

NPDES PERMIT NUMBER: **MA0031658**

PUBLIC NOTICE START AND END DATES: November 24, 2014 – December 23, 2014

NAME AND ADDRESS OF APPLICANT:

Battle Road Farm Condominium Trust
c/o First Realty Management Corporation
151 Tremont Street
Boston, MA 02111

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Battle Road Farm Wastewater Treatment Facility
39 Indian Camp Lane
Lincoln, MA 01773

RECEIVING WATER: **Shawsheen River headwaters wetland**
Shawsheen River Watershed (Segment MA 83-08)

RECEIVING WATER CLASSIFICATION: **Class B – Treated Water Supply, Warm Water Fishery**

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ATTACHMENTS

1. PROPOSED ACTION

The above named applicant has applied to the U.S. Environmental Protection Agency (EPA) for the re-issuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving water, a headwater wetlands of the Shawsheen River. The current permit was issued on August 11, 2003, became effective on October 11, 2003 and expired on September 30, 2007. In accordance with the regulations at 40 CFR 122.6, the current permit will be in effect until the permit is re-issued. The draft permit is conditioned to expire five (5) years from its effective date.

2. TYPE OF FACILITY AND DISCHARGE LOCATION

The Battle Road Farm Condominium Trust (the "Trust") owns the Battle Road Farm Wastewater Treatment Facility (WWTF), a 33,000 gallon per day (gpd) advanced wastewater treatment plant with year-round ultraviolet disinfection, which discharges to a wetland at the headwaters of the Shawsheen River in Lincoln, MA (See Figure 1). First Realty Management Corporation ("First Realty") is the managing agent for the Trust and has retained a contract operator to operate the WWTF.

The Battle Road Farm WWTF serves approximately 250 residents in 120 two and three bedroom units. The Battle Road Farm development has a gravity sewer system including two lift stations, which convey wastewater to the treatment facility through force mains.

The facility's discharge outfall is listed below:

Outfall	Description of Discharge	Receiving Water	Outfall Location
001	Treated Effluent	Shawsheen River (headwater wetlands)	42° 27.359' N; 71° 17.476' W

3. DESCRIPTION OF DISCHARGE

Quantitative descriptions of the discharge in terms of significant effluent parameters, based on discharge monitoring reports (DMRs) submitted from January 2008 through January 2014 (a longer review period was used due to changes in the operation of the facility since the 2008 Administrative Consent Order with Penalty and Notice of Noncompliance (the "ACOP"), and the March 2008 application, are shown in Attachments A and B of this fact sheet, respectively.

4. LIMITATIONS AND CONDITIONS

The effluent limitations and monitoring requirements may be found in the draft NPDES permit.

5. PERMIT BASIS AND EXPLANATION OF EFFLUENT LIMITATIONS

5.1 Process Description

Wastewater enters the Battle Farm Road WWTF (Figure 2) through a pretreatment settlement tank with solids pumped out 2 or 3 times per year. Wastewater then flows to two (2) equilization tanks and is pumped to the two (2) aerobic rotating biological contactors (RBCs). Wastewater then flows to an anoxic RBC for denitrification. Sodium bicarbonate is added for alkalinity and pH adjustment. Polyaluminum chloride is added for phosphorus removal. Wastewater then passes through a sand filter. Backwash water is returned to the equalization tank. Wastewater is disinfected using UV before discharge. Collected sludge is reduced in an aerobic digestor, with periodic pumping and then hauled to the Fitchburg WWTF for disposal.

In March 2012, EPA visited the facility in order to locate the outfall and collect GPS data. The discharge pipe is located in a rock retaining wall and discharges to a wetland drainage system. Photographs of the discharge point and receiving waters can be found in Figures 3 & 4.

5.1.1 Facility Compliance, Evaluation Report and Upgrade Plan

In January 2008, the MassDEP issued an Administrative Consent Order with Penalty and Notice of Noncompliance (ACOP)[1] to the Battle Road Farm Condominium Trust. The ACOP identified numerous effluent limitation exceedances between 2006 and 2007 and a significant failure to submit timely DMRs. The ACOP detailed a plan for returning to compliance including an updated staffing plan, and the preparation of a facility evaluation report (Report) and upgrade plan (Plan).

The Report[2] was received by MassDEP on April 1, 2008. MassDEP conducted an inspection at the facility on April 2, 2008. As a result of the review of the report and the inspection, MassDEP made observations and recommendations in its letter[3] of April 28, 2008. The Plan includes five recommendations to make the phosphorus removal processes more efficient; on-site phosphorus testing for process control; new liquid alum storage facilities; weekly bench-scale testing of alum coagulation; increased monitoring of pH, temperature, dissolved oxygen (DO), alkalinity, nitrate, phosphorus and biochemical oxygen demand (BOD_5) at each key step in the treatment process; and further evaluation of the sand filter media and structural elements. In addition, MassDEP recommended the installation of a continuous feed alkalinity system and a continuous pH monitor.

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[1]Chaplin, Richard J., Regional Director, MassDEP - NERO, 2008, Administrative Consent Order with Penalty and Notice of Noncompliance to Battle Road Farm Condominium Trust, File No. ACOP-NE-07-1N018

[2] Mount Hope Engineering, Inc. for Battle Road Farm Homeowner's Association, 2008, "Inventory & Evaluation for Battle Road Farm Homeowner's Association Wastewater Treatment Facility", 17pp.

[3] Letter from Worrall, Eric, Deputy Regional Director, MassDEP – NERO, to Todd Chaplin, P.E., Mount Hope Engineering, dated April 28, 2008, RE: Battle Road Farm WWTP Evaluation Report, ACOP-NE-07-1N018.

The permittee's consultant responded to MassDEP's comments by letter[4] on June 25, 2008. The permittee agreed to address concerns about backups of flow within the RBC unit; repair areas of corrosion on the clarifier unit; move the alum storage to the garage area; rebuild the sand filter and install a 1000 gallon alum feed system.

In August 2008, the property management company, First Realty, confirmed in a letter[5] to MassDEP that they had relocated the alum storage to the garage area and the sand filter repair was completed. It was also stated that since the conversion to liquid alum there had been a decrease in phosphorus levels. Also mentioned in the letter was a mechanical failure of rotating biological filter (RBC)#2, which was repaired; however, there was a spike in BOD and nitrogen effluent levels as a result. As of February 2014, the ACOP remains in full force and effect.

The permittee was issued a new notice of noncompliance (NON) on January 28, 2013 for exceedances of its effluent limits for BOD_5 for the months of August, October and December 2012[6]. Two of the three exceedances were caused by singular operational events, i.e. routine backwashing of the system, or the overdosing of methanol within the system[7,8]. Battle Road Farm was required to submit a written report providing 1) an evaluation of the cause of the reported discharge violations and 2) a schedule of recommended action to bring the discharge into compliance. According to MassDEP, the plant was able to return to compliance by putting both aerobic RBC's into simultaneous service (previously had only used one at a time).

Also in 2013, there was a mechanical failure of the anoxic RBC that caused a shutdown for several months resulting in total nitrogen exceedances. MassDEP reports that repairs to the anoxic RBC have been completed and the unit is back in service.

According to MassDEP, the ACO issues appear to be separate from the recent NON and anoxic RBC shutdown. MassDEP believes that the facility now functions well; however, there are several operation and maintenance preventative issues that could be addressed to reduce the possibility of future unit failures[9].

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[4] Letter from Chaplin, Todd, P.E., Mount Hope Engineering, to George Kretas, MassDEP – NERO, Wastewater Permitting, dated June 25, 2008, RE: Lincoln - Sewage Treatment – Battle Road Farm, NPDES Permit MA 0031658, ACOP-NE-07-1N018.

[5] Letter from McGrath, William, First Realty Trust on behalf of Battle Road Farm Condominium Trust, to George Kretas, MassDEP – NERO, Wastewater Permitting, dated August 22, 2008, Re: Lincoln – Sewerage Treatment Plant – Battle Road Farm, NPDES Permit MA0031658, ACOP – NE-0701N018.

[6] Letter from Worrell, Eric, Acting Regional Director, MassDEP – NERO, dated January 28, 2013, RE: Battle Road Farm Wastewater Treatment Facility, NPDES Permit No. MA0031658, Violation of Effluent Limitations, Notice of Noncompliance – NON-NE-13-1N001.

7 Email from Jennifer Wood, MassDEP to Claire Golden, MassDEP and forwarded to Michele Barden, USEPA, Region 1, dated January 28, 2014.

[8] Letter from Nugent, Kenneth, Compliance Coordinator, Weston & Sampson to Kevin Brander, MassDEP – NERO, Wastewater Management Section Chief, dated March 12, 2013, RE: Battle Road Farm WWTF – NPDES Permit No. MA0031658, Response to Enforcement Notice: NON-NE-13-1N001.

[9] Jennifer Wood, MassDEP. "Battle Road Farm" Email to Claire Golden, MassDEP, January 28, 2014

As part of EPA's development of the draft permit, a review of DMRs and Whole Effluent Toxicity (WET) Test Reports was done. Specifics regarding compliance with the individual limits are included in Section 6.2.

6. Statutory and Regulatory Authority

6.1 General Requirements

The Clean Water Act (CWA) prohibits the discharge of pollutants to waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit unless such a discharge is otherwise authorized by the CWA. An NPDES permit is the mechanism used to implement technology and water quality-based effluent limitations and other requirements, including monitoring and reporting requirements. This draft NPDES permit was developed in accordance with the various statutory and regulatory requirements established pursuant to the CWA and any applicable State regulations. The regulations governing the EPA NPDES permit program are generally found at 40 CFR Parts 122, 124, and 125.

When developing permit limits, EPA is required to consider (a) technology-based requirements, (b) water quality-based requirements, and (c) all limitations and requirements in the current/existing permit. These requirements are described in the following paragraphs.

6.1.1 Technology-based Requirements

Under Section 301(b)(1)(B) of the Clean Water Act (CWA), publicly owned treatment works (POTWs) must have achieved effluent limitations based upon secondary treatment by July 1, 1977. The secondary treatment requirements are set forth at 40 CFR Part 133.102. In addition, Section 301(b)(1)(C) of the CWA requires that effluent limitations based on water quality considerations be established for point source discharges when such limitations are necessary to meet state or federal water quality standards that are applicable to the designated receiving water.

Pursuant to CFR § 122.44 (d), permittees must achieve water quality standards established under Section 303 of the CWA, including state narrative criteria for water quality. Additionally, under 40 CFR § 122.44 (d)(1)(i), "Limitations 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." When determining whether a discharge causes, or has the reasonable potential to cause or contribute to an in-stream excursion above a narrative or numeric criterion, the permitting authority shall use procedures which account for existing controls on point and non-point sources of pollution, and where appropriate, consider the dilution of the effluent in the receiving water.

EPA has not promulgated effluent guidelines for privately owned treatment facilities

treating domestic wastewater. In accordance with Section 401(a) of the CWA and regulations at 40 CFR 125.3 (c), EPA has made a best professional judgment (BPJ) determination to use the secondary treatment requirements for publicly owned treatment works (POTWs) set forth at 40 CFR Part 133 as the appropriate technology- based effluent limits.

6.1.2 Water Quality Standards; Designated Use; Outfall 001

The Shawsheen River, in the vicinity of the discharge, is classified in the Massachusetts Surface Water Quality Standards (MASWQS) at 314 CMR 4.00 as a Class B water with treated water supply and warm water qualifiers.

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.

A treated water supply is defined in 314 CMR 4.06 as "... those Class B waters that are used as a source of public water supply after appropriate treatment. These waters may be subject to more stringent site specific criteria as established by the Department as appropriate to protect and maintain the use."

A warm water fishery is defined in the Massachusetts Surface Water Quality Standards (314 CMR 4.02) as "waters in which the maximum mean monthly temperature generally exceeds 68° F (20° C) during the summer months and are not capable of sustaining a year-round population of cold water stenothermal aquatic life."

Section 303(d) of the CWA requires states to identify those waterbodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such, require the development of total maximum daily loads (TMDL).

The Battle Road Farm WWTF discharges to a headwaters wetland at the upstream end of segment MA83-08 of the Shawsheen River. The segment begins at the headwaters, north of Folly Pond and North Great Road, Lincoln and continues approximately two (2) miles downstream to Summer Street in Bedford. The segment is classified as impaired and requiring the development of a TMDL. The listed impairments in the Massachusetts Year 2012 Integrated List of Waters[10] for this segment are: fecal coliform and physical substrate habitat alterations.

[10]Division of Watershed Management, MassDEP, 2012, Massachusetts Year 2012 Integrated List of Waters, Final Listing of Condition of Massachusetts' Waters Pursuant to Sections 303(d) and 305(b) of the Clean Water Act, p. 175.

The Shawsheen River Watershed 2000 Water Quality Assessment Report[11] notes that this segment was on the 1998 Integrated List of Waters for habitat alterations and pathogens. The drainage area for the segment is primarily comprised of Hanscom Field. The Hanscom property is owned and operated as a civilian airfield with tenant areas and then the remainder of the property is operated by the US Air Force. There are direct and indirect discharges of stormwater to this segment of the Shawsheen River from Hanscom Field. The Battle Road Farm WWTF discharge is located at the headwaters of the Shawsheen River and upstream of Hanscom Field and these discharges.

A bacterial TMDL was completed for the Shawsheen River Watershed in 2002.[12] It established a wasteload allocation (WLA) for point sources as a fecal coliform geometric mean of less than or equal to 200 organisms per 100 ml and that less than 10% of fecal coliform measurements exceed 400 organisms per 100 ml. These values are equivalent to the bacterial water quality standards for Class B waters that were in effect at the time the TMDL was published.

MassDEP conducted a water quality monitoring survey of the Shawsheen River Watershed in the summer of 2005. A technical memorandum summarizing the monitoring approach and the resulting data was prepared in 2012.[13] The closest station to the Battle Road Farm discharge was located approximately 2 miles downstream at Summer Street in Bedford, which is the end of the stream segment as designated by MassDEP. The data does indicate that there continues to be bacterial contamination. As previously stated, there is approximately 2 miles between the Battle Road Farm discharge and the sampling station and there are numerous direct and indirect stormwater discharges from the Hanscom Airfield. Discharge monitoring data submitted by Battle Road Farm shows that the facility consistently complies with its bacteria limits, so EPA does not believe that the discharge causes or contributes to this impairment.

6.1.3 Available Dilution

Massachusetts regulations at 314CMR 4.03(3) define the most severe hydrologic conditions at which water quality standards must be applied. For rivers and streams, this flow condition is the lowest mean flow for seven consecutive days to be expected once in 10 years (7Q10).

This discharge is to a wetland, and during the dry months the channelized section receiving the wastewater discharge includes no natural flow, therefore, EPA believes there is no dilution flow under 7Q10 conditions and has used a dilution factor of one in its calculations of water quality-based limits.

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[11] Kiras, Stella D., MassDEP, 2003, Shawsheen River Watershed, 2000 Water Quality Assessment Report, Report Number 83-AC-2, p. 160.
[12] LimnoTech, 2002, Total Maximum Daily Loads of Bacteria for the Shawsheen River Basin, DEP, DWM TMDL Report MA 83-01-2002-24 CN 122.0
[13] Reardon, Matthew, MassDEP, 2012, "Technical Memorandum: Shawsheen River Watershed, 2005 DWM Water Quality Monitoring Data", DWM Control Number 220.3, 44 pp.

6.2 Permit Basis and Explanation of Effluent Limitations

6.2.1 Flow

The proposed flow limit is based on the average daily design flow of the treatment plant, which is 0.033 mgd. Flow is to be measured continuously. The permittee shall report the annual average flow each month using the annual rolling average method (See Permit Footnote 2). The average monthly and maximum daily flow for each month shall also be reported.

A review of DMR data submitted from January 2008 to January 2014 shows that the reported annual average flows have ranged between 0.015 – 0.024 MGD with a median of 0.017 MGD. There have been no exceedances of the annual average flow limit during the review period.

6.3 Conventional Pollutants

6.3.1 Biochemical Oxygen Demand (BOD_5)/Total Suspended Solids (TSS)

As described in Section 6.1, EPA has made a BPJ determination to use the POTW technology-based limits found at 40 CFR Part 133 in establishing appropriate technology-based limits for this facility.

However, the current permit includes water quality based effluent concentration limits for both BOD_5 and TSS that are stricter than secondary treatment requirements. These limits were necessary to ensure that the receiving water meets state water quality criteria, given the lack of dilution. Both pollutants have limits of 5 mg/l as a monthly average and 10 mg/l as a maximum daily. Since there has been no change in the character of neither the discharge nor the receiving water, EPA continues to believe that these limits are appropriate.

The sampling frequency for BOD_5 and TSS remains twice per month.

The mass-based limits for both BOD_5 and TSS are based on the 33,000 GPD design flow.

The calculation of the allowable mass loads for average monthly and maximum daily BOD_5 and TSS is based on the following equation:

$$L = C * DF * 8.34$$

C = Maximum allowable effluent concentration for reporting period in mg/l. (Reporting periods are average monthly and weekly and daily maximum)
L = Maximum allowable load in lbs/day.
DF = Annual average design flow of facility (33,000 gpd or 0.033 mgd).
8.34 = Factor to convert effluent concentration in mg/l and design flow in MGD to lbs/day.

Concentration limit [5] * Design Flow [0.033] * Constant [8.34] = 1.4 lbs/day

Concentration limit [10] * Design Flow [0.033] * Constant [8.34] = 2.8 lbs/day

A review of DMR data for BOD_5 submitted from January 2008 to January 2014 shows that there have been ten (10) months with permit violations of BOD_5 concentration limits. Based on the DMR data, the average values for BOD_5 monthly average and maximum daily concentrations were 4.04 mg/l (range 2.00-22.00 mg/l; n=71) and 6.19 mg/l (2.00-28.00 mg/l; n=71), respectively.

Based on the DMR data, the average mass discharge values, in pounds per day (lbs/day), reported for BOD_5 monthly average and maximum daily were 0.54 lbs/day (range 0.15-2.75) lbs/day; n=71) and 0.49 lbs/day (0.25-5.16 lbs/day; n=71), respectively. There were four (4) months with exceedances of the average monthly mass-based limits for BOD_5 and five (5) months with exceedances of the maximum daily mass-based limit for BOD_5.

A review of DMR data for TSS submitted from January 2008 to January 2014 shows that there have been eight months with permit violations of TSS concentration or mass-based limits. Based on the DMR data, the average values for TSS monthly average and maximum daily were 2.74 mg/l (range 2-10.8 mg/l; n=71), and 3.42 (2-17 mg/l; n=71), respectively. The average mass-based values for TSS monthly average and maximum daily were 0.37 lbs/day (range 0.04-1.62 lbs/day; n=71), and 0.54 lbs/day (0.04-3.3 lbs/day; n=71), respectively.

The provisions of 40 CFR §133.102(a)(3), (4) and (b)(3) requires that the 30-day average percent removal for BOD_5 and TSS be not less than 85%. This requirement was included in the current permit and is maintained in the proposed permit.

A review of DMR data shows that the median BOD_5 and TSS removal percentages are 99% and 98%, respectively. There have been two (2) months with violations of the BOD_5 removal limit and no violations of the TSS removal limit during the review period.

6.3.2 pH

The draft permit includes pH limitations that are more stringent than the technology-based pH limitations set forth at 40 CFR §133.102(c). The pH of the effluent shall not be less than 6.5 or greater than 8.3 standard units at any time. These limits are the same as the water quality criteria for the receiving water. The monitoring frequency is daily.

A review of DMR data submitted between January 2008 and January 2014 shows that there have been seven (7) months with violations of the minimum pH limit and three (3) months with violations of the maximum pH limit. Based on the DMR data, the pH values have ranged from 4.7-8.51 standard units.

6.3.3 Bacteria

Revisions to the MA SWQS were approved by EPA in 2007. These revisions included a change to the Class B bacteria water quality criteria from fecal coliform to Escherichia coli (E. coli). The current permit includes fecal coliform bacteria effluent limitations that were established using the criteria in the MA SWQS at 314 CMR 4.05(3)(b) that were in effect at the time the current permit was issued in 2003.

6.3.3.1 E. coli

The draft permit includes year-round E. coli limitations that are based on the E. coli criteria in the revisions to the MA SWQS (314 CMR 4.05(3)(b). The monthly average limitation proposed in the draft permit is 126 colony forming units (cfu) per 100 ml, and is expressed as a monthly geometric mean. The daily maximum limitation proposed in the draft permit is 409 cfu/100 ml. The E. coli monitoring frequency proposed in the draft permit is once per week. The limits are in effect year-round due to downstream water supply withdrawals. As this is a new requirement, the limits will become effective one (1) year following the effective date of this permit.

6.3.3.2 Fecal Coliform

As previously mentioned, the current permit includes fecal coliform bacteria limitations that are in accordance with the water quality standards in effect at the time of the permit issuance. These limits are an average monthly geometric mean of 200 cfu per 100 ml and a maximum daily limit of 400 cfu/100 ml. These limits will be in effect for the first year of this permit until the E. coli limit become effective. The bacterial TMDL for the Shawsheen River Basin[14] established bacterial limits using fecal coliform as the indicator bacteria since that was the water quality standard in effect at the time the TMDL was published. Since the standards have been changed and now use E. coli as the indicator bacteria, EPA and MassDEP[15] have concluded that establishing the effluent limits at the E. coli bacterial standard will be protective of the WLA. The sampling frequency remains once per week and the limits are in effect year round due to downstream water supply withdrawals.

A review of DMR data from January 2008 through January 2014 shows that the monthly geometric mean fecal coliform bacteria discharge range from 1 to 234 cfu/100 ml. The maximum daily value reported between January 2008 and January 2014 was 223 cfu/100 ml. There has been one (1) violation of the fecal coliform requirements during the review period.

6.4 Non-conventional pollutants

6.4.1 Total Phosphorus

The MA SWQS do not contain numerical criteria for total phosphorus. The narrative criteria for nutrients is found at 314 CMR 4.05(5)(c), which states that nutrients "shall not exceed the site specific limits necessary to control accelerated or cultural eutrophication". The standards also require that "any existing point source discharges containing nutrients in concentrations which encourage eutrophication or the growth of weeds or algae shall be provided with the highest and best practicable treatment to remove such nutrients (314 CMR 4.04(5)(c)). MassDEP has established that a monthly average total phosphorus limit of 0.2 mg/l represents the highest and best practical treatment for POTWs.

[14] MassDEP, 2002, "Bacterial TMDL for the Shawsheen River Basin", Report MA83-01-2002-24.
[15] Kevin Brander, MassDEP, "Battle Road Farm Discharge Permit" Email to Michele Barden, EPA. February 4, 2013.

EPA has produced several guidance documents that contain recommended total phosphorus criteria for receiving waters. The 1986 Quality Criteria of Water ("the Gold Book") recommends in-stream phosphorus concentrations of 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 impounds, and 0.025 mg/l within a lake or reservoir.

More recently, EPA has released "Ecoregional Nutrient Criteria", established as part of an effort to reduce problems associated with excess nutrient in water bodies in specific areas of the country. The published criteria represent conditions in waters in each specific ecoregion which are minimally impacted by human activities and thus representative of waters without cultural eutrophication. The Battle Road Farm WWTF is within Ecoregion XIV, Eastern Coastal Plain. The recommended total phosphorus criteria for this ecoregion is 24 ug/l (0.024 mg/l) and can be found in Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV[16], published in December 2000.

In developing NPDES permit limits, EPA prefers to use the Gold Book criteria because these are effects-based criteria (i.e. a concentration at which one would expect eutrophication to occur) rather than the Ecoregion criteria, which are reference-based (i.e. a concentration typically found in unimpacted waters). Use of the reference-based criteria could result in a limit more stringent than necessary to achieve water quality standards.

Elevated concentrations of chlorophyll a, excessive algal and macrophyte growth, and low levels of dissolved oxygen are all effects of nutrient enrichment. The relationship between these factors and high in-stream total phosphorus concentrations is well documented in scientific literature, including guidance developed by EPA to address nutrient over-enrichment (Nutrient Criteria Technical Guidance Manual – Rivers and Streams, EPA July 2000 [EPA-822-B-00-002]).

MassDEP has listed several segments, 83-01, 83-17, and 83-18, of the Shawsheen River, downstream of the Battle Road Farm discharge, on the 2010 Integrated Waters as impaired for dissolved oxygen. Furthermore, the State has documented aquatic plants (macrophytes) in Ballardvale Impoundment (also known as Lowell Junction Pond (MA830115)) located approximately 20 miles downstream. The outlet of Ballardvale Impoundment, segment MA83-19, is also listed as impaired for dissolved oxygen.

The current permit includes a monthly average total phosphorus limit of 1 mg/l and a maximum daily limit of 2 mg/l. These limits are effective year-round. Given that there is no available dilution these limits will not achieve the Gold Book-recommended criteria of 0.1 mg/l.

Accordingly, the proposed permit includes the growing season limit of 0.1 mg/l for the period April 1 through October 31 and a winter limit of 1.0 mg/l for the period November

[16] EPA, 2000, "Ambient Water Quality Criteria Recommendations, information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV",

1 through March 31. EPA has established the sampling frequency as once per week for total phosphorus. If future water quality information shows that more stringent limits are necessary to achieve water quality standards, the permit may be re-opened and a more stringent limit proposed in a permit modification.

The permit also contains a compliance schedule for meeting the summer total phosphorus limit (see Section D of the permit.) The schedule contains several interim milestones and reporting requirements relative to the steps necessary to complete the design and construction of facilities necessary to meet the final limits. The compliance schedule also contains an interim milestone should the permittee wish to pursue the potential for establishing a site specific water quality criteria for total phosphorus. Final compliance with the total phosphorus limits must be achieved by within 48 months of the effective date of the permit. The permit establishes interim total phosphorus limit of 1.0 mg/l that is in effect until the final compliance date noted above.

A review of DMR data from January 2008 to January 2014 shows that there have been seven (7) months with violations of the current total phosphorus limits. These data show that there is reasonable potential for the discharge of total phosphorus from this facility to cause or contribute to an exceedance of water quality criteria. DMR data submitted by the permittee show monthly average total phosphorus concentration ranged from 0.12 – 2.50 mg/l with a median of 0.45 mg/l. The maximum daily discharge ranged from 0.15 – 2.94 mg/l with a median of 0.7 mg/l.

6.4.2 Total Nitrogen

The current permit includes an average monthly effluent limit of 5.0 mg/l for total nitrogen and a maximum daily limit of 10 mg/l. This limit has been retained in the permit consistent with antidegradation and anti-backsliding requirements.

A review of DMR data submitted between January 2008 and January 2014 shows that there has been eleven (11) months with permit violations of the nitrogen limits. DMR data submitted by the permittee ranges from 0.98-25.45 mg/l (median = 2.47) as an average monthly and 1.22-29.15 mg/l (median = 3.67 mg/l) as a maximum daily.

6.4.3 Metals

Certain metals in water can be toxic to aquatic life. There is a need to limit toxic metal concentrations in the effluent where aquatic life may be impacted. An evaluation of the concentration of metals in the facility's effluent (from Whole Effluent Toxicity reports submitted between October 2008 and October 2013; prior to October 2008 the permittee did not submit effluent data for metals, and additional effluent data submitted in DMRs for aluminum, copper and lead) was used to determine reasonable potential for the effluent discharge to cause exceedances of the water quality criteria for aluminum, cadmium, copper, lead, nickel and zinc (See Attachment C).

Metals may be present in both dissolved and particulate forms in the water column. Extensive studies suggest that it is the dissolved fraction that is biologically available, and therefore, presents the greatest risk of toxicity to aquatic life inhibiting the water column (Water Quality Standards Handbook: Second Edition, Chapter 3.6 and Appendix

J, EPA 1994 [EPA 823-B-94-05a], http://www.epa.gov/waterscience/standards/handbook/chapter03.html#section6). As a result, water quality criteria are established in terms of dissolved metals. However, regulations at 40 CFR 122.45(c) require, with limited exceptions, that metals limits in NPDES permits be expressed as total recoverable metals. This accounts for the potential for a transition from the particulate to dissolved form as the effluent mixes with the receiving water (*The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA 1996 [EPA-823-B96-007])).

For metals with hardness-based water quality criteria, the criteria were determined using the equations in EPA's *National Recommended Water Quality Criteria: 2002,* using the appropriate factors for the individual metals (see table below). Since there is no dilution, the median effluent hardness of 35.7 mg/l as CaCO3 was used to determine the total recoverable metals criteria, including the factors and equations used for each metal. The previous permit used a default hardness of 40 mg/l as $CaCO_3$. The following table presents the factors used to determine the acute and chronic total recoverable criteria for each metal:

Table 1: EPA's *National Recommended Water Quality Criteria: 2002*

Metal	Parameters				Total Recoverable Criteria	
	ma	ba	mc	bc	Acute Criteria (CMC) (ug/L)	Chronic Criteria (CCC) (ug/L)
Aluminum	—	—	—	—	750	87
Cadmium	1.0166	-3.9240	0.7409	-4.7190	0.75	0.13
Copper	0.9442	-1.7000	0.8545	-1.702	5.3	3.87
Lead	1.273	-1.46	1.273	-4.705	22.00	0.86
Nickel	0.846	2.255	0.846	0.0584	196.29	21.82
Zinc	0.8473	0.884	0.8473	0.884	50.06	50.06

*Acute Criteria (CMC) = $\exp(m_a*\ln(\text{hardness})+b_a)$
**Chronic Criteria (CCC) = $\exp(m_c*\ln(\text{hardness})+b_c)$
Hardness = 35.7 mg/l as $CaCO_3$

In order to determine whether the effluent has the reasonable potential to cause or contribute to an exceedance above the in-stream water quality criteria for each metal, the following mass balance is used to project in-stream metal concentrations downstream from the discharge.

$$Q_dC_d+Q_sC_s=Q_rC_r$$

rewritten as:

where:

Q_d = effluent flow (design flow = 0.033 mgd = 0.051 cfs)
C_d = effluent metals concentration in ug/l (number of samples < 10 so, Cd = max reported or number samples >10 so, Cd = 95th percentile)
Q_s = stream flow upstream (7Q10 upstream = 0 cfs)
C_s = background in-stream metals concentration in ug/l (median = 0 ug/l)
Q_r = resultant in-stream flow, after discharge (Qs+Qd= 0.051 cfs)
C_r = resultant in-stream concentration in ug/l

Reasonable potential is then determined by comparing this resultant in-stream concentration (for both acute and chronic conditions) with the criteria for each metal. If there is reasonable potential (for either acute or chronic conditions), the appropriate limit is then calculated by rearranging the above mass balance to solve for the effluent concentration (C_d) using criterion as the resultant in-stream concentration (C_r). See the table below for the results of this analysis with respect to aluminum, cadmium, copper, lead, nickel and zinc.

Table 2: Analysis of Reasonable Potential and Calculation of Reasonable Potential

Metal	Qd	Cd[1] (95th percentile)	Cd[2] (Maximum)	Qs[3]	Cs[4]	Qr = Qs + Qd	Cr = (QdCd+QsCs)/Qr	Criteria		Reasonable Potential	Limit = (Qr*Criteria-Qs*Cs)/Qd	
	cfs	ug/l	ug/l	cfs	ug/l	cfs	ug/l	Acute (ug/l)	Chronic (ug/l)	Cr > Criteria	Acute (ug/l)	Chronic (ug/l)
Aluminum	0.033	4603.65	-	0	0	0.033	4603.65	750	87	Y	750.00	87.00
Cadmium		-	0.39		0		0.39	0.75	0.13	Y (chronic)	N/A	0.13
Copper		8.2			0		8.2	5.30	3.87	Y	5.30	3.87
Lead		8.5	-		0		8.5	22.00	0.86	Y (chronic)	N/A	0.86
Nickel		-	5.00		0		5.00	196.29	21.82	N	N/A	N/A
Zinc		-	45.00		0		45.00	50.06	50.06	N	N/A	N/A

[1]Values represent the 95th percentile calculated from DMR data and WET testing conducted between 2008-2013 (See Attachment C).
[2] Values represent the maximum measured concentration from the six rounds of WET testing conducted between 2008-2013 (See Attachment C).
[3]Qs = 0 because the discharge is to the headwaters of the Shawsheen River.
[4] Cs = 0 because the discharge is to the headwaters of the Shawsheen River.

The current permit includes effluent limits for aluminum, copper and lead. EPA combined the DMR and WET data sets to determine the reasonable potential for these metals to cause or contribute to an exceedance of water quality criteria. Since the number of samples is greater than 10, EPA calculated the 95th percentile to determine reasonable potential. There is reasonable potential for aluminum and copper concentrations to exceed the acute and chronic water quality criteria, and there is also reasonable potential for lead to exceed the chronic criteria.

Effluent data for the metals: cadmium, nickel and zinc, were taken from WET test reports. There were only six (6) rounds of sampling reported. Given the small sample size, EPA used the maximum reported effluent concentration to determine reasonable potential. As indicated in the table above, there is no reasonable potential that the discharge of nickel and zinc will cause or contribute to an exceedance of the applicable water quality criteria. However, there is potential for cadmium (chronic only) to cause and/or contribute to an exceedance. Hence, the draft permit includes an average monthly limit for cadmium. The applicable limits are set at criteria since there is no dilution. Additionally, monitoring and reporting for all metals will continue to be required as part of the WET tests.

Because of the small sample size for cadmium, nickel and zinc, EPA performed additional statistical analyses of the effluent data for these metals to determine whether increased sampling should be included for any metal to ensure a more robust data set for the next permit issuance. Using a methodology from the *Technical Support Document for Water Quality-Based Toxics Control* ("the TSD"), EPA calculated a projected upper bound of effluent concentrations based on a statistical analysis of the facility's effluent data from its whole effluent toxicity tests and used this value to estimate a downstream concentration for each metal analyzed. The statistical analysis used on the effluent data accounts for the fact that maximum measured concentration may not correspond to the true upper bound of effluent concentrations, particularly for small samples sizes (n<10) as are available here. This analysis accounts for the uncertainty that arises from small sample sizes by characterizing the maximum measured concentration as a percentile of the underlying distribution at a particular confidence level, then scaling that number upward by a "multiplying factor" in order to project an upper bound (95th percentile) concentration at that confidence level. EPA uses a 95 percent confidence level for this characterization. See Attachment D for the details of this statistical derivation. The resulting effluent concentration for each metal was put into the same mass balance described above and compared to the respective criteria. This is summarized in the table below.

Table 3: Analysis to evaluate need for increased sampling

Metal	Qd	Cd[1] (Upper Bound = 95th percentile *multiplying factor (2.1)	Qs	Cs2	Qr	Cr= (QdCd+QsCs)/Qr	Criteria		Criteria Exceeded ?
	cfs	ug/l	cfs	ug/l	cfs	ug/l	Acute (ug/l)	Chronic (ug/l)	Cr>Criteria
Cadmium	0.033	1.72	0	0	0.033	1.72	0.75	0.13	Acute and Chronic
Nickel		22.05		0		22.05	196.29	21.82	Chronic
Zinc		198.45		0		198.45	50.06	50.06	Acute and Chronic

[1] Values calculated using procedures in Attachment D, using the metals data submitted with WET tests between October 2008 and October 2013.
[2] Since the discharge is to a wetland that is the headwaters of the Shawsheen River there is no upstream data.

As shown, the upper bound of the effluent data (as opposed to the maximum measured concentration) indicates there is uncertainty regarding whether the discharge of cadmium, nickel and zinc from this facility may pose a concern. Hence, in an effort to better characterize the discharge and provide a more robust data set for future permitting decisions, quarterly monitoring is being required for total recoverable cadmium, nickel and zinc as indicated in the draft permit. If future monitoring of Cd, Ni and/or Zn indicates that the discharge has reasonable potential to cause or contribute to an exceedance of the Cd, Ni and/or Zn criterion, future permitting actions may require

effluent limits for cadmium, nickel and zinc. Additionally, monitoring and reporting for all metals will continue to be required as part of the WET tests.

6.4.3.1 Copper

The current permit includes monthly average and daily maximum copper limits of 4.3 ug/l and 5.9 ug/l, respectively. These limits were established using the 1998 National Recommended Water Quality criteria for copper calculated at a hardness of 40 mg/l as CaCO3 and a dilution factor of 0.

MassDEP recently revised the MA SWQS to include a site specific criteria for copper in the Shawsheen River in Table 28 (314 CMR 4.05(5)(e);however, these criteria have yet to be approved by EPA and cannot be used due to the *Alaska* Rule[17]. When the revisions are approved by EPA, the permittee may submit a written request for a modification for the permit under 40 CFR 122.62(a)(3).

As such, EPA has established effluent limits for copper based on the 2002 EPA recommended criteria with an average monthly limit of 5.30 ug/l and a maximum daily limit of 3.87 ug/l (See calculations in section 6.4.4. above).

Analytical data submitted with toxicity test results and past DMRs (See Attachment A) indicates that the facility has not consistently achieved the limitations in the previous permit. The effluent concentrations of copper from January 2008 through January 2014 ranged from 0.8 - 10 ug/l with an average of 2.69 ug/l.

6.4.4 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 [314 CMR 4.05(5)(e)].

National studies conducted by the EPA have demonstrated that domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and others. Based on the potential for toxicity from domestic and industrial sources, the state narrative water quality criterion, the limited dilution at the discharge location, and in accordance with EPA national and regional policy and 40 CFR §122.44(d), the draft permit includes a whole effluent chronic and acute toxicity limitations (C-NOEC = 100% and LC_{50} =100%). (See also "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 49 Fed. Reg. 9016 March 9, 1984, and EPA's "Technical Support Document for Water Quality-

[17] Under EPA's regulation at 40 CFR 131.21(c)(2) (also known as the *Alaska* rule), new and revised standards submitted to EPA after May 30, 2000, must be approved before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to EPA by May 30, 2000 may be used for CWA purposes, whether or not approved by EPA. (See http://water.epa.gov/lawsregs/rulesregs/ak/questions.cfm)

Based Toxics Control", September, 1991.)

EPA recognizes that toxicity testing is required to assure that the synergetic effect of the pollutants in the discharge do not cause toxicity, even though the pollutants may be at low concentration in the effluent. Thus, the draft permit includes a whole effluent toxicity limitation requirement for the 001 outfall, to assure that the facility does not discharge combinations of toxic compounds into the Shawsheen River in amounts which would affect aquatic or human life.

The draft permit carries forward a requirement for semi-annual chronic and acute toxicity tests using the species Ceriodaphnia dubia. The tests must be performed in accordance with the test procedures and protocols specified in **Permit Attachments A & B**. The tests will be conducted two (2) times per year during the months of May and August.

A review of WET results shows consistent compliance until the most recent test. There was a violation of the acute and chronic limits in October 2013 with NOEC of 50% and LC50 of 70.7%.

The LC50 limit of 100% is established by EPA/MassDEP policy for facilities with less than 10:1 dilution (See MassDEP's "Implementation Policy for the Control of Toxic Pollutants in Surface Waters, February 23, 1990.) The C-NOEC is established at the receiving water concentration (1/Dilution Factor = 1/1), which is 100%.

The permit shall be modified or alternatively revoked and reissued, to incorporate additional toxicity testing requirements, including chemical specific limits, if the results of the toxicity tests indicate the discharge causes an exceedance of any state water quality criterion. Results from these toxicity tests are considered "New Information" and the permit may be modified pursuant to 40 CFR 122.62(a)(2).

7. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

The permit standard conditions for 'Proper Operation and Maintenance' are found at 40 CFR § 122.41(e). These require proper operation and maintenance of permitted wastewater systems and related facilities to achieve permit conditions. Similarly, the permittee has a "duty to mitigate" as stated in 40 CFR § 122.41(d). This requires the permittee to take all reasonable steps to minimize or prevent any discharge in violation of the permit which has the reasonable likelihood of adversely affecting human health or the environment. EPA and MassDEP have included specific operation and maintenance requirements for the wastewater treatment plant and include requirements for adequate staffing, preventative maintenance, infiltration and inflow (I/I) control, and alternate power needed at pump stations.

As the permittee is not a POTW and has a less extensive collection system than a typical POTW, EPA has not included in the draft permit all of the standard collection system operation and maintenance requirements that are currently included in POTW permits. However, the facility does experience high flows during wet weather indicative of infiltration and inflow (I/I) in the

system. I/I is extraneous water entering the wastewater collection system through a variety of sources. 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 roofleaders, 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 and the efficiency of the treatment works and may cause bypasses of secondary treatment. It greatly increases the potential for sanitary sewer overflows in separate systems and combined sewer overflows in combined systems.

8. SLUDGE INFORMATION AND REQUIREMENTS

The draft permit requires that the permittee comply with all existing federal and state laws that apply to sewage sludge use and disposal practices and with the CWA Section 405(d) technical standards (see 40 CFR Section 503) and that it submit an annual reports describing its sludge disposal practices. Sludge from the Battle Road Farm WWTF is sent to the Fitchburg Wastewater Treatment Facility for disposal. Because the final disposal of the permittee's sludge is done by others, the permittee is not currently subject to the requirements of 40 CFR Section 503. However, if the ultimate sludge disposal method changes, the permittee is responsible for complying with the applicable state and federal requirements. Under its current disposal method, the permittee is only required submit an annual report by February 19th.

9. ANTI-BACKSLIDING

Anti-backsliding as described in Section 402 (o) of the CWA and 40 CFR §122.44(l)(1), requires reissued permits to contain limitations as stringent than those of the previous permit. There are limited exceptions to this requirement.

The draft permit does not include any less stringent effluent limitations with the exception of the copper limit which has been recalculated in accordance with the updated Massachusetts site specific criteria and so it is consistent with antibacksliding.

10. ANTIDEGRADATION

MassDEP's Antidegradation Policy is found at 314 CMR 4.04. MassDEP has also developed implementation procedures[18]. All existing uses of the Shawsheen River must be protected. EPA believes that the antidegradation policy has been met because the draft permit is being reissued with allowable discharge limits as or more stringent than the current permit with the same parameter coverage.

[18] Haas, Glenn, MassDEP, 2009, "Implementation Procedures for the Antidegradation Provisions of the Massachusetts Surface Water Quality Standards, 314 CMR 4.00".

11. ESSENTIAL FISH HABITAT

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.(1998)), EPA is required to consult with the National Marine Fisheries Service (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, "may adversely impact any essential fish habitat," 16 U.S.C. § 1855(b). The Amendments broadly define "essential fish habitat" (EFH) as: "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity," 16 U.S.C. § 1802(10). "Adverse impact" means any impact which reduces the quality and/or quantity of EFH, 50 CFR § 600.910(a). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. Id.

Essential fish habitat is only designated for fish 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 Shawsheen River is a tributary of the Merrimack River. According to the National Oceanic and Atmospheric Administration Habitat Division (NOAA-HD), the Merrimack River is designated as EFH for various life stages of 15 different species. However, only Atlantic salmon *(Salmo salar)* juvenile and adult life stages are expected to inhabit freshwater areas of the river. In further defining Atlantic salmon EFH in the Merrimack River watershed, NOAA-HD included all aquatic habitats in the watersheds of the Merrimack River, including all tributaries to the extent that they are currently or were historically accessible for salmon migration. This description likely includes the Shawsheen River.

Although EFH has been designated for this general location, EPA has concluded that this activity is not likely to affect EFH or its associated species for the following reasons:

- This is a reissuance of an existing permit with the same or stricter effluent limits.
- The quantity of the discharge from the WPCF is 0.033 MGD monthly average and receives advanced tertiary treatment.
- Limits specifically protective of aquatic organisms have been established for aluminum and cadmium based on EPA water quality criteria and copper based on MassDEP site specific criteria.
- Acute and chronic toxicity testing on *Ceriodaphnia dubia* is required two (2) times per year and the recent toxicity results are in compliance with permit limits.
- The permit prohibits any violation of state water quality standards.

Accordingly, EPA has determined that a formal consultation with NMFS is not required.

12. UNAUTHORIZED DISCHARGES

The permit authorizes discharges only from the outfall 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 MassDEP Regional Office telephone numbers). The reporting form and instruction for its completion may be found online at http://www.mass.gov/eea/agencies/massdep/service/approvals/sanitary-overflow-bypass-backup-notification.html.

13. MONITORING AND REPORTING

The effluent monitoring requirements have been established to yield data representative of the discharge under the 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 that precludes the use of NetDMR from 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 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 s 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 ability 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 Net DMR, no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees must continue to

send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

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

14. 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.

15. GENERAL CONDITIONS

The standard conditions of the permit are based on 40 CFR Parts 122, Subparts A and D and 40 CFR 124, Subparts A, D, E, and F and are consistent with management requirements common to other permits.

16. STATE CERTIFICATION REQUIREMENTS

The staff of MassDEP has reviewed the draft permit. EPA has requested permit certification by the State pursuant to 40 CFR § 124.53 and expects that the draft permit will be certified.

17. PUBLIC COMMENT PERIOD AND PROCEDURES FOR FINAL DECISION

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Office of

Ecosystem Protection, Attn: Michele Cobban Barden, 5 Post Office Square, Suite-100, (OEP06-1), Boston, Massachusetts 02109-3912 or via email to barden.michele@epa.gov. The comments should reference the name and permit number of the facility for which they are being provided.

Any person, prior to such date, may submit a request in writing to EPA and the State's Agency for a public hearing to consider the draft permit. Such requests shall state the nature of the issues proposed 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 a 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 a public hearing, if such a hearing is held, 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. Within thirty (30) days following the notice of final permit decision, permit may be appealed to the Environmental Appeals Board in the manner described at 40 CFR § 124.19.

18. EPA AND MassDEP CONTACTS

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays from:

Michele Cobban Barden
EPA New England, Region1
5 Post Office Square, Suite-100 (OEP06-1)
Boston, MA 02109-3912
Telephone: (617) 918-1539, FAX: (617) 918-0539
Email: barden.michele@epa.gov

Claire Golden
Massachusetts Department of Environmental Protection
Surface Water Discharge Permit Program
205B Lowell Street
Wilmington, Massachusetts 01887
Telephone: (978) 694-3244, FAX: (978) 694-3499
Email: claire.golden@state.ma.us

November 17, 2014
Date

Ken Moraff, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

Figure 1: Location of the Battle Road Farm WWTF

Figure 2: Flow Diagram of Battle Road Farm Wastewater Treatment Facility

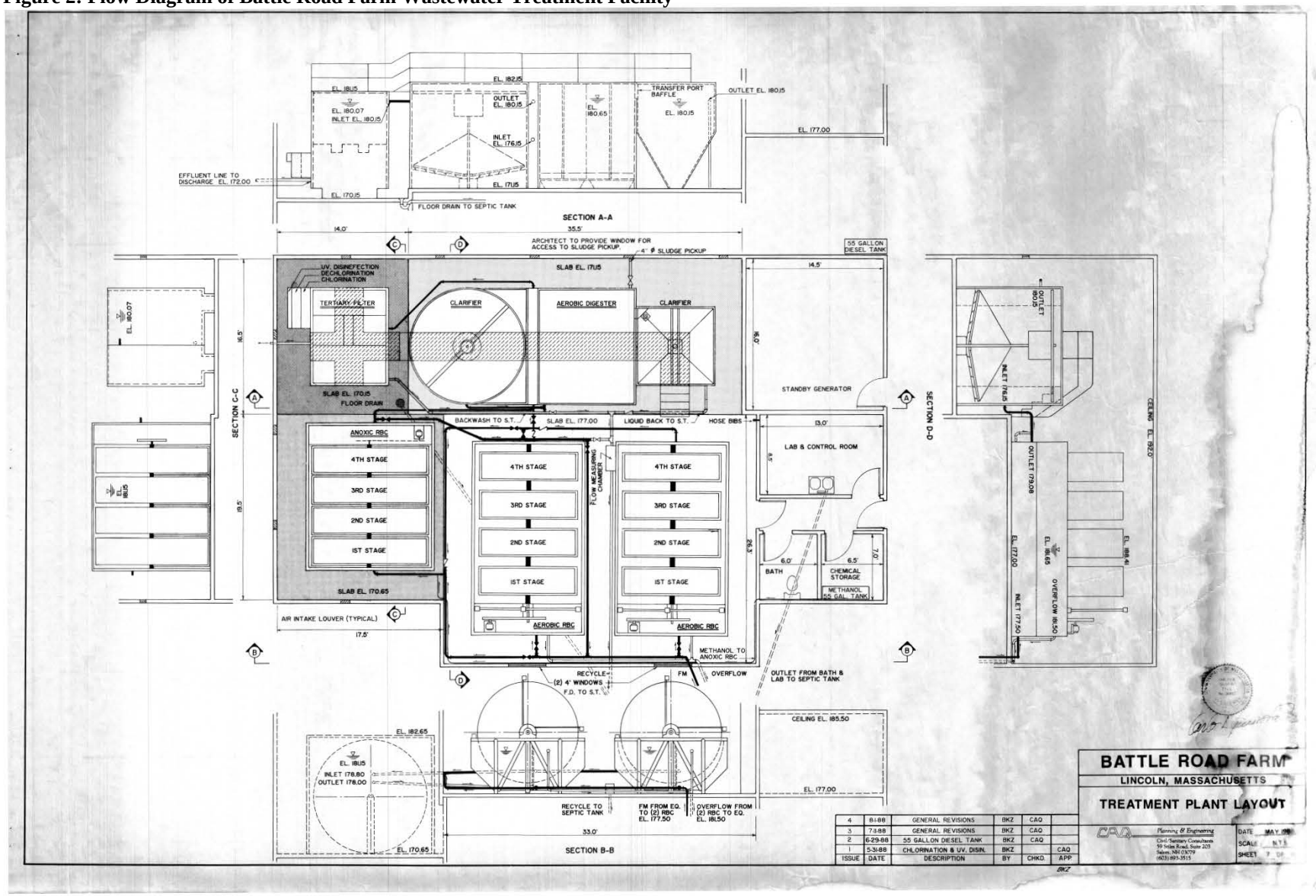

Figure 3: Discharge location below the rock retaining wall.

Figure 4: Confluence with other wetlands.

Battle Road Farm discharges to canal on the right side of the picture. The viewpoint is looking upstream.

	Flow		BOD_5				BOD_5 (Influent)	BOD_5
	(MGD)		(mg/l)		lbs/day	lbs/day	mg/l	%
	Average Monthly (Rolling Average*)	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Minimum
Effluent Limit	**0.033**	**Report**	**5**	**10**	**1.4**	**2.8**	**Report**	**85%**
Jan-14	0.015	0.018	**22**	**41**	**2.75**	**5.16**	72	**69%**
Dec-13	0.015	0.015	2.5	3	0.25	0.32	70.5	96%
Nov-13	0.015	0.015	3	3	0.32	0.33	60	95%
Oct-13	0.015	0.018	2.5	3	0.32	0.37	73.5	97%
Sep-13	0.016	0.016	3	3	0.33	0.39	86	97%
Aug-13	0.016	0.016	3	3	0.36	0.39	83.5	96%
Jul-13	0.016	0.015	3.3	3.6	0.38	0.43	79	96%
Jun-13	0.016	0.021	4.4	5.8	0.60	0.79	79.5	94%
May-13	0.016	0.022	**7.2**	10	0.98	1.47	110	93%
Apr-13	0.016	0.024	3.5	3.9	0.45	0.52	85	96%
Mar-13	0.016	0.024	**15**	**16**	**2.68**	**3.24**	103	85%
Feb-13	0.016	0.021	4.2	5.4	0.47	0.63	170	98%
Jan-13	0.016	0.019	4.1	6.2	0.48	0.72	175	98%
Dec-12	0.016	0.019	9	16	0.91	1.70	205	96%
Nov-12	0.016	0.018	2.5	3	0.26	0.28	215	99%
Oct-12	0.016	0.018	**6**	**23**	0.80	**3.02**	260	98%
Sep-12	0.016	0.018	3	3.9	0.36	0.47	240	99%
Aug-12	0.016	0.022	5	19	0.70	2.48	410	99%
Jul-12	0.016	0.022	2	2	0.26	0.27	200	99%
Jun-12	0.016	0.021	2	2	0.29	0.32	205	99%
May-12	0.016	0.02	2	2	0.29	0.29	245	99%
Apr-12	0.02	0.022	**9**	**16**	0.87	1.48	170	95%
Mar-12	0.02	0.16	2	2	0.29	0.33	425	100%
Feb-12	0.017	0.022	**19**	**28**	2.58	4.00	450	96%
Jan-12	0.017	0.021	2	2	0.29	0.33	250	99%
Dec-11	0.017	0.031	2	2	0.25	0.32	214	99%
Nov-11	0.017	0.016	2	2	0.15	0.25	150	99%
Oct-11	0.016	0.017	3	3.7	0.37	0.42	440	99%
Sep-11	0.017	0.023	2	2	0.24	0.27	270	99%
Aug-11	0.015	0.025	2.7	3.4	0.36	0.49	356	99%
Jul-11	0.017	0.015	2.9	3.7	0.35	0.44	250	99%
Jun-11	0.017	0.024	**7.5**	**12**	0.82	1.21	470	98%
May-11	0.017	0.023	2.5	3	0.27	0.30	345	99%
Apr-11	0.016	0.024	2	2	0.26	0.29	230	99%
Mar-11	0.017	0.037	3.5	4	0.75	0.78	190	98%
Feb-11	0.017	0.022	2	2	0.22	0.25	1285	100%
Jan-11	0.017	0.023	3.8	5.4	0.53	0.78	253	98%
Dec-10	0.017	0.022	**8.5**	**14**	1.26	2.17	275	97%
Nov-10	0.017	0.018	4.2	6.2	0.55	0.86	265	98%

	Flow		BOD5				BOD5 (Influent)	BOD5
	(MGD)	(MGD)	(mg/l)	(mg/l)	lbs/day	lbs/day	mg/l	%
	Average Monthly (Rolling Average*)	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Minimum
Effluent Limit	**0.033**	**Report**	**5**	**10**	**1.4**	**2.8**	**Report**	**85%**
Oct-10	0.017	0.018	2.7	3.4	0.26	0.30	185	99%
Sep-10	0.017	0.018	2.5	3	0.30	0.37	430	99%
Aug-10	0.017	0.022	2	2	0.28	0.30	275	99%
Jul-10	0.017	0.017	2.65	3.3	0.34	0.42	7450	100%
Jun-10	0.017	0.02	2	2	0.24	0.27	360	99%
May-10	0.016	0.022	3.4	4.8	0.41	0.54	365	99%
Apr-10	0.017	0.029	4.65	5.4	0.76	0.83	185	97%
Mar-10	0.0173	0.0596	2	2	0.20	0.30	325	99%
Feb-10	0.017	0.026	3.1	4.2	0.40	0.60	305	99%
Jan-10	0.017	0.029	2	2	0.30	0.30	210	99%
Dec-09	0.017	0.02	2	2	0.20	0.30	395	99%
Nov-09	0.018	0.021	2.9	5.7	0.40	0.80	283	99%
Oct-09	0.018	0.02	2	2	0.30	0.30	225	99%
Sep-09	0.018	0.019	2.5	3	0.30	0.50	215	99%
Aug-09	0.018	0.027	2.3	3	0.30	0.70	220	99%
Jul-09	0.018	0.024	2	2	0.30	0.40	350	99%
Jun-09	0.0181	0.0282	2.5	3.9	0.30	0.40	150	98%
May-09	0.018	0.024	**9.3**	**24**	**1.50**	**3.90**	140	93%
Apr-09	0.018	0.024	2	2	0.40	0.40	124	98%
Mar-09	0.018	0.035	2.5	3.9	0.40	0.60	94	97%
Feb-09	0.0178	0.0278	2.5	3.8	0.40	0.60	218	99%
Jan-09								
Dec-08	0.0179	0.0362	2.4	3	0.38	0.58	101	98%
Nov-08								
Oct-08	0.015	0.022	3.9	7.7	0.49	1.12	192	98%
Sep-08	0.0177	0.0263	3.2	6.6	0.22	0.33	212	98%
Aug-08	0.018		2.25	3	0.22	0.35	152	99%
Jul-08	0.018	0.028	2.4	3.8	0.40	0.54	293	99%
Jun-08	0.0188	0.0312	4	7.8	0.58	1.26	217	98%
May-08	0.019	0.023	4.02	6.8	0.62	1.23	26.50	85%
Apr-08	0.021	0.024	2.7	3.4	0.48	0.60	320	99%
Mar-08	0.024	0.032	4.6	6.9	0.91	1.36	131.3	96%
Feb-08	0.022	0.032	3.3	6.6	0.61	1.76	126	97%
Jan-08	0.018	0.029	4.84	5.68	0.73	1.37	102	95%
Min	0.015	0.015	2.00	2.00	0.15	0.25	26.5	69%
Max	0.024	0.160	22.00	28.00	2.75	5.16	7450	100%
Median	0.017	0.022	2.9	3.7	0.370	0.49	216.5	99%
Number of sample	71	70	71	71	71	71	71	71
Number of exceedances	0	***	10	10	4	5	***	2

	TSS				TSS (Influent)	TSS % Removal
	(mg/l)		lbs/day	lbs/day	mg/l	%
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Minimum
Effluent Limit	**5**	**10**	**1.4**	**2.8**	**Report**	**85%**
Jan-14	2.2	2.3	0.29	0.29	94.0	98%
Dec-13	2	2	0.20	0.21	104.0	98%
Nov-13	**6.2**	8	0.66	0.88	92.0	93%
Oct-13	2.9	3	0.36	0.39	130.0	98%
Sep-13	2	2	0.22	0.26	115.0	98%
Aug-13	2	2	0.24	0.26	125.0	98%
Jul-13	2	2	0.23	0.24	175.0	99%
Jun-13	2	2	0.28	0.28	135.5	99%
May-13	3.2	4	0.43	0.59	104.5	97%
Apr-13	2.85	3.7	0.37	0.49	63.0	95%
Mar-13	2	2	0.42	0.51	72.0	97%
Feb-13	2	2	0.22	0.23	86.00	98%
Jan-13	2	2	0.24	0.25	92.00	98%
Dec-12	2	2	0.23	0.24	180.00	99%
Nov-12	2	2	0.22	0.25	91.00	98%
Oct-12	2	2	0.24	0.26	104.00	98%
Sep-12	3	3.3	0.33	0.41	91.00	97%
Aug-12	2	2	0.26	0.26	485.00	100%
Jul-12	2	2	0.26	0.27	255.00	99%
Jun-12	2	2	0.29	0.32	110.00	98%
May-12	2	2	0.29	0.29	150.00	99%
Apr-12	2	2	0.22	0.26	210.00	99%
Mar-12	2	2	0.29	0.33	1140.00	100%
Feb-12	2.4	2.7	0.20	0.38	595.00	100%
Jan-12	2	2	0.29	0.33	225.00	99%
Dec-11	2	2	0.23	0.32	110.00	98%
Nov-11	2	2	0.15	0.25	90.00	98%
Oct-11	2	2	0.27	0.32	3710.00	100%
Sep-11	2	2	0.24	0.27	155.00	99%
Aug-11	2	2	0.26	0.29	126.00	98%
Jul-11	2	2	0.25	0.27	115.00	98%
Jun-11	3	3	0.29	0.30	481.00	99%
May-11	2	2	0.22	0.25	330.00	99%
Apr-11	2	2	0.26	0.29	180.00	99%
Mar-11	2	2	0.44	0.52	119.00	98%
Feb-11	2	2	0.22	0.25	1775.00	100%
Jan-11	2.2	2.5	0.30	0.36	119.00	98%
Dec-10	2	2	0.27	0.31	205.00	99%
Nov-10	2	2	0.26	0.28	161.00	99%

	TSS				TSS (Influent)	TSS % Removal
	(mg/l)	lbs/day	lbs/day		mg/l	%
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Minimum
Effluent Limit	**5**	**10**	**1.4**	**2.8**	**Report**	**85%**
Oct-10	2	2	0.20	0.23	215.00	99%
Sep-10	2	2	0.24	0.29	1135.00	100%
Aug-10	2	2	0.28	0.33	315.00	99%
Jul-10	2	2	0.26	0.27	12500.00	100%
Jun-10	2	2	0.24	0.27	285.00	99%
May-10	2	2	0.25	0.28	185.00	99%
Apr-10	2	2	0.30	0.40	105.00	98%
Mar-10	**5.9**	9.7	0.60	1.00	390.00	98%
Feb-10	2	2	0.20	0.30	365.00	99%
Jan-10	2	2	0.30	0.30	290.00	99%
Dec-09	2	2	0.20	0.30	1235.00	100%
Nov-09	2	2	0.30	0.40	700.00	100%
Oct-09	2	2	0.30	0.30	190.00	99%
Sep-09	2	2	0.20	0.30	370.00	99%
Aug-09	2	2	0.30	0.40	190.00	99%
Jul-09	2	2	0.30	0.40	2100.00	100%
Jun-09	2	2	0.30	0.30	155.00	99%
May-09	2	2	0.30	0.30	106.00	98%
Apr-09	2	2	0.04	0.04	86.00	98%
Mar-09	2	2	0.40	0.40	48.00	96%
Feb-09	2	2	0.40	0.50	58.00	97%
Jan-09						
Dec-08	**6**	**17**	1.04	**3.30**	66.00	91%
Nov-08						
Oct-08	4.4	7.82	0.52	0.77	67.00	93%
Sep-08	3.7	6.3	0.40	0.87	74.00	95%
Aug-08	2	2	0.19	0.28	108.00	98%
Jul-08	**5.6**	10	0.88	1.60	104.00	95%
Jun-08	**7.4**	8.7	1.01	1.29	73.00	90%
May-08	**10.8**	**14**	1.62	2.07	97.00	89%
Apr-08	**7**	8.7	1.26	1.58	78.00	91%
Mar-08	3.3	6	0.67	1.28	131.00	97%
Feb-08	3	9	0.55	2.40	100.00	97%
Jan-08	**7.67**	**11**	1.15	2.66	95.50	92%
Min	2.00	2.00	0.04	0.04	48	89%
Max	10.80	17.00	1.62	3.30	12500	100%
Median	2.00	2.00	0.28	0.30	130	98%
Number of sample	71	71	71	71	71	71
Number of exceedances	8	3	1	1	***	0

	pH (S.U)		Fecal Coliform Bacteria cfu/100 ml		Total Residual Chlorine ug/l		Total Nitrogen mg/l		Total Phosphorus mg/l	
	Minimum	Maximum	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Effluent Limit	**6.5**	**8.3**	**200**	**400**	**11**	**19**	**5**	**10**	**1**	**2**
Jan-14	6.5	7.47	1	1	NODI	NODI	**22.27**	**29.15**	0.38	1.4
Dec-13	6.5	**8.5**	1	1	NODI	NODI	**25.4**	**28.6**	0.51	1
Nov-13	6.5	**8.5**	1	1	NODI	NODI	**25.45**	**26.05**	0.61	0.76
Oct-13	**6.48**	**8.51**	1	3	NODI	NODI	**24.22**	**26.45**	0.45	0.68
Sep-13	6.5	7.96	1	1	NODI	NODI	**21.98**	**23.15**	**2.5**	**2.94**
Aug-13	6.53	7.17	2	5	NODI	NODI	**6.46**	**23.15**	0.76	2.8
Jul-13	6.51	7.36	1	1	NODI	NODI	1.99	3.45	0.23	0.38
Jun-13	**6.44**	7.75	1	1	NODI	NODI	2.77	5.13	0.36	0.65
May-13	6.52	7.23	1	5	NODI	NODI	2.27	2.69	0.29	0.38
Apr-13	6.68	7.41	1	1	NODI	NODI	2.17	2.71	0.28	0.33
Mar-13	6.52	7.41	1	2	NODI	NODI	1.91	2.61	0.27	0.34
Feb-13	6.85	7.75	2	4	NODI	NODI	**7.14**	**10.34**	0.65	0.92
Jan-13	6.6	7.52	1	3	NODI	NODI	4.49	7.71	0.82	1.3
Dec-12	6.64	7.26	2	5	NODI	NODI	3.62	4.11	0.63	0.82
Nov-12	6.56	7.13	2	7	NODI	NODI	2.67	3.37	0.63	0.96
Oct-12	6.6	7.04	1	3	NODI	NODI	2.5	3.67	0.58	0.89
Sep-12	6.7	7.45	2	3	NODI	NODI	2.77	4.81	0.89	1.3
Aug-12	6.59	7.17	3	7	NODI	NODI	1.81	2.71	0.46	0.75
Jul-12	6.81	7.09	1	1	NODI	NODI	3.3	5.9	0.24	0.4
Jun-12	6.74	7.02	1	3	NODI	NODI	1.82	2.96	0.56	0.9
May-12	6.51	7.88	4	59	NODI	NODI	4.5	**16.2**	0.45	0.73
Apr-12	6.52	7.13	2	3	NODI	NODI	3.06	4.21	0.43	0.86
Mar-12	6.54	7.17	1	4	NODI	NODI	2.7	5.41	0.15	0.33
Feb-12	6.61	7.61	5	40	NODI	NODI	1.06	2.23	0.27	0.64
Jan-12	6.85	7.28	8	20	NODI	NODI	1.16	1.57	0.7	1.3
Dec-11	6.54	7.22	3	10	NODI	NODI	1.06	1.57	0.24	0.35
Nov-11	6.57	7.35	1	2	NODI	NODI	1.3	2.7	0.22	0.34
Oct-11	6.72	7.19	1	1	NODI	NODI	3.9	7.16	0.12	0.15
Sep-11	6.67	7.23	2	16	NODI	NODI	2.47	4.22	0.28	0.49
Aug-11	6.74	7.28	1	1	NODI	NODI	2.5	4.22	0.29	0.45
Jul-11	6.83	7.29	1	1	NODI	NODI	1.5	1.8	0.36	0.43
Jun-11	6.75	7.54	3	10	NODI	NODI	2.24	3.31	0.5	0.64
May-11	7.01	7.32	3	75	NODI	NODI	**15.8**	3.21	0.75	1.2
Apr-11	6.68	7.38	12	36	NODI	NODI	1.01	1.31	0.55	0.88
Mar-11	6.83	7.43	4	22	NODI	NODI	1.21	2.21	0.36	0.72
Feb-11	6.95	7.37	3	10	NODI	NODI	1.58	2.14	0.53	0.82
Jan-11	6.91	7.13	28	125	NODI	NODI	1.3	1.42	0.4	0.75
Dec-10	6.89	7.34	3	6	NODI	NODI	1.81	3.8	0.58	0.88
Nov-10	6.68	7.24	2	5	NODI	NODI	2.23	6.31	0.58	0.7

	pH (S.U)		Fecal Coliform Bacteria cfu/100 ml		Total Residual Chlorine ug/l		Total Nitrogen mg/l		Total Phosphorus mg/l	
	Minimum	Maximum	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Effluent Limit	**6.5**	**8.3**	**200**	**400**	**11**	**19**	**5**	**10**	**1.0**	**2.0**
Oct-10	6.82	7.13	1	4	NODI	NODI	2.56	3.73	0.47	0.86
Sep-10	6.68	7.61	1	1	NODI	NODI	0.98	1.22	0.61	0.71
Aug-10	6.51	7.74	2	38	NODI	NODI	2.89	4.61	0.43	0.59
Jul-10	**6.29**	7.31	2	8	NODI	NODI	3.15	4.12	0.65	0.74
Jun-10	6.88	7.54	1	2			1.94	2.86	0.53	0.84
May-10	6.75	7.16	1	2	NODI	NODI	1.6	3.4	0.32	0.63
Apr-10	6.63	7.12	14	223	NODI	NODI	2	4.7	0.64	0.86
Mar-10	6.57	7.16	15	218	NODI	NODI	1.4	2.3	0.28	0.5
Feb-10	6.7	7.93	8	57	NODI	NODI	1.7	2.3	0.57	0.85
Jan-10	6.85	7.59	31	101	NODI	NODI	1.3	2.3	0.39	0.75
Dec-09	6.94	7.65	2	10	NODI	NODI	1.8	4.9	0.18	0.28
Nov-09	6.92	7.87	1	1	NODI	NODI	2.4	3.3	0.24	0.31
Oct-09	6.78	7.92	1	1	NODI	NODI	4.8	9.6	0.33	0.48
Sep-09	6.92	7.58	1	1	NODI	NODI	4.1	9.8	0.25	0.5
Aug-09	6.83	**3.26**	1	1	NODI	NODI	2.2	3.8	0.37	0.46
Jul-09	6.68	7.98	1	4	NODI	NODI	2	3.2	0.24	0.39
Jun-09	6.6	7.6	1	1	NODI	NODI	3.8	9.4	0.24	0.42
May-09	6.84	7.86	1	1	NODI	NODI	2	2.5	0.31	0.46
Apr-09	6.93	7.72	1	1	NODI	NODI	2.1	2.9	0.37	0.48
Mar-09	6.74	7.63	1	1	NODI	NODI	2.6	4.6	0.4	0.5
Feb-09	6.51	7.58	1	2	NODI	NODI	1.4	1.6	0.2	0.29
Jan-09										
Dec-08	6.5	7.82	7	48	NODI	NODI	2.7	3.4	0.7	**2.3**
Nov-08										
Oct-08	6.78	7.82	1	1	NODI	NODI	2.9	3.5	0.51	0.82
Sep-08	**6.31**	8	1	1	NODI	NODI	2.76	3.4	0.58	0.68
Aug-08	6.82	8.18	1	1	NODI	NODI	2.25	2.68	0.25	0.4
Jul-08	6.5	7.9	1	1	NODI	NODI	**6.1**	**10.9**	0.48	1.2
Jun-08	6.58	7.69	1	1	NODI	NODI	**6.6**	**13.2**	0.76	1.2
May-08	**6.36**	7.95	**234**	30	NODI	NODI	**8.08**	**21.4**	0.91	1.3
Apr-08	**4.7**	7.16	1	1	NODI	NODI	2.59	3.31	0.48	0.69
Mar-08	**5.13**	7.4	1	1	NODI	NODI	2.7	7.37	0.3	0.5
Feb-08	6.6	7.4			NODI	NODI	1.64	3.45	0.5	0.5
Jan-08	6.6	7.8	1	4	NODI	NODI	2.22	3.87	0.76	1.37
Min	4.70	3.26	1	1	***	***	0.98	1.22	0.12	0.15
Max	7.01	8.51	234	223	***	***	25.45	29.15	2.50	2.94
Median	6.64	7.43	1	3	***	***	2.47	3.67	0.45	0.70
Number of sample	71	71	70	70	***	***	71	71	71	71
Number of exceedances	7	3	1	0	***	***	11	11	1	3

	Total Copper ug/l		Total Aluminum mg/l		Total Lead ug/l		LC50-Ceriodaphnia %	NOEC - Ceriodaphnia %
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Maximum Daily	Maximum Daily
Effluent Limit	**4.3**	**5.9**	**.087**	**.750**	**0.99**	**25**	**100**	**100**
Jan-14	***	***	***	***	***	***		
Dec-13	**4.5**	4.5	0.902	0.902	**1**	1		
Nov-13	***	***	***	***	***	***		
Oct-13	***	***	***	***	***	***	**70.7**	**50**
Sep-13	**10**	**10**	0.1	0.1	**40**	**40**		
Aug-13	***	***	***	***	***	***		
Jul-13	***	***	***	***	***	***	100	100
Jun-13	1	1	0.014	0.014	**1**	1		
May-13	***	***	***	***	***	***		
Apr-13	***	***	***	***	***	***	No Data	No Data
Mar-13	3.3	3.3	0.1	0.1	**1**	1		
Feb-13	***	***	***	***	***	***		
Jan-13	***	***	***	***	***	***	No Data	No Data
Dec-12	1.6	1.6	0.1	0.1	0.5	0.5		
Nov-12	***	***	***	***	***	***		
Oct-12	***	***	***	***	***	***	100	100
Sep-12	**4.65**	4.65	62.5	62.5	**1**	1		
Aug-12	***	***	***	***	***	***		
Jul-12	***	***	***	***	***	***	100	100
Jun-12	1	1	0.01	0.01	**1**	1		
May-12	***	***	***	***	***	***		
Apr-12	***	***	***	***	***	***		
Mar-12	1	1	1	1	**1**	1		
Feb-12	***	***	***	***	***	***		
Jan-12	***	***	***	***	***	***		
Dec-11								
Nov-11	***	***	***	***	***	***		
Oct-11	***	***	***	***	***	***	100	100
Sep-11	1	1	0.1	0.1	**1**	1		
Aug-11	***	***	***	***	***	***		
Jul-11	***	***	***	***	***	***	100	100
Jun-11	1.2	1.2	0.32	0.32	**1**	1		
May-11	***	***	***	***	***	***		
Apr-11	***	***	***	***	***	***		
Mar-11	0.8	0.8	0.02	0.02	0.8	0.8		
Feb-11	***	***	***	***	***	***		
Jan-11	***	***	***	***	***	***		
Dec-10	2.3	2.3	0.03	0.03	**1**	1		
Nov-10	***	***	***	***	***	***		

	Total Copper		Total Aluminum		Total Lead		LC50-Ceriodaphnia	NOEC - Ceriodaphnia
	ug/l		ug/l		ug/l		%	%
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Maximum Daily	Maximum Daily
Effluent Limit	**4.3**	**5.9**	**87**	**750**	**0.99**	**25**	**100**	**100**
Oct-10	***	***	***	***	***	***	100	100
Sep-10	1	1	0.04	0.04	**1**	1		
Aug-10	***	***	***	***	***	***		
Jul-10	***	***	***	***	***	***	100	100
Jun-10	1.1	1.1	0.04	0.04	**1**	1		
May-10	***	***	***	***	***	***		
Apr-10	***	***	***	***	***	***		
Mar-10	1.4	1.4	0.021	0.021	**1**	1		
Feb-10	***	***	***	***	***	***		
Jan-10	***	***	***	***	***	***		
Dec-09	2.6	2.6	10	10	**1**	1		
Nov-09	***	***	***	***	***	***		
Oct-09	***	***	***	***	***	***	100	100
Sep-09	1.3	1.3	0.129	0.129	**1**	1		
Aug-09	***	***	***	***	***	***		
Jul-09	***	***	***	***	***	***		
Jun-09								
May-09	***	***	***	***	***	***		
Apr-09	***	***	***	***	***	***		
Mar-09	**8.6**	**8.6**	0.011	0.011	**1**	1		
Feb-09	***	***	***	***	***	***		
Jan-09	***	***	***	***	***	***		
Dec-08								
Nov-08	***	***	***	***	***	***		
Oct-08	***	***	***	***	***	***		
Sep-08								
Aug-08	***	***	***	***	***	***		
Jul-08	***	***	***	***	***	***	100	100
Jun-08	**10**	**10**	0.796	0.796	**40**	**40**		
May-08	***	***	***	***	***	***		
Apr-08	***	***	***	***	***	***		
Mar-08	2.2	2.2	1	1	**1**	1		
Feb-08	***	***	***	***	***	***		
Jan-08	***	***	***	***	***	***		
Min	0.80	0.80	0.01	0.01	0.50	0.50	70.70	50.00
Max	10.00	10.00	62.50	62.50	40.00	40.00	100.00	100.00
Median	1.50	1.50	0.10	0.10	1.00	1.00	100.00	100.00
Number of sample	20	20	20	20	20	20	10	10
Number of exceedances	5	3	0	0	18	2	1	1

Battle Road Farm WWTF 2008 Application Data

Parameter	**Maximum Daily Value**	**Maximum 30-day Value**	**Lon Term Avg. Value**	**Units**
pH (minimum)	6.5	***		Standard Units
pH (maximum)	8.0	***		Standard Units
Flow Rate	0.039	0.022	0.026	MGD
BOD	12.8	9.5	4.91	mg/l
Fecal Coliform Bacteria	311	89.5	9.91	cfu/100 mg
Total Suspended Solids	28	18.6	5.92	mg/l
Total Organic Nitrogen	24.5	14.3	3.5	mg/l
Total Phosphorus	2.8	1.48	1.0	mg/l

Whole Effluent Toxicity Tests Metals Data
Number of samples < 10

Date	Cadmium	Nickel	Zinc
	Effluent (ug/)	Effluent (ug/l)	Effluent (ug/l)
10/7/2013	<0.2	2	43
10/31/2012	<0.2	2	13
7/12/2011	<0.2	5	45
7/31/2010	<0.2	2	18
10/31/2009	<0.2	2	18
10/31/2008	0.39	3	17
Average	0.39	3	26
Median	0.39	2	18
Max	0.39	5	45
Min	0.39	2	13
Count	1	6	6

*Ambient background data is not available since discharge is to headwaters.

Reasonable Potential Analysis

no ND, <10 Data Points - assumed Lognormal distribution

Dilution Factor:	1

Date	Cd (ug/L)
10/7/2013	0
10/31/2012	0
7/12/2011	0
7/31/2010	0
10/29/2009	0
10/31/2008	0.39

Cd - (Lognormal distribution assumed)

Estimated Daily Maximum Effluent Concentration		
k = number of daily samples =	6	
Max Concentration	0.39	
cv(x)= Coefficient of Variation* =	0.6	
99th percentile multiplication factor**	3.8	
95th percentile multiplication factor**	2.1	
Daily Max Estimate = Max*99th percentile multiplication factor**		
Estimated Daily Max 99th percentile =	**1.4820**	**ug/L**
Estimated Daily Max including Dilution Factor =	**1.4820**	**ug/L**
Daily Max Estimate = Max*95th percentile multiplication factor**		
Estimated Daily Max 95th Percentile =	**0.8190**	**ug/L**
Estimated Daily Max including Dilution Factor =	**0.8190**	**ug/L**

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

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

Reasonable Potential Analysis

no ND, <10 Data Points - assumed Lognormal distribution

Dilution Factor:	1

Date	Ni(ug/L)
10/7/2013	2
10/31/2012	2
7/12/2011	5
7/31/2010	2
10/31/2009	2
10/31/2008	3

Ni - (Lognormal distribution assumed)

Estimated Daily Maximum Effluent Concentration		
k = number of daily samples =	6	
Max Concentration	5.00	
cv(x)= Coefficient of Variation* =	0.6	
99th percentile multiplication factor**	3.8	
95th percentile multiplication factor**	2.1	
Daily Max Estimate = Max*99th percentile multiplication factor**		
Estimated Daily Max 99th percentile =	**19.0000**	**ug/L**
Estimated Daily Max including Dilution Factor =	**19.0000**	**ug/L**
Daily Max Estimate = Max*95th percentile multiplication factor**		
Estimated Daily Max 95th Percentile =	**10.5000**	**ug/L**
Estimated Daily Max including Dilution Factor =	**10.5000**	**ug/L**

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

**Multiplication factors from Table 3-1 and Table 3-2 in Technical Support Document for Water Quality Based Toxics Control

These factors will automatically populate based on the number of samples (up to 10) entered in the data table

Reasonable Potential Analysis

no ND, <10 Data Points - assumed Lognormal distribution

Dilution Factor:	1

Date	Zn(ug/)
10/7/2013	43
10/31/2012	13
7/12/2011	45
7/31/2010	18
10/31/2009	18
10/31/2008	17

Zn - (Lognormal distribution assumed)

Estimated Daily Maximum Effluent Concentration		
k = number of daily samples =	6	
Max Concentration	45.00	
cv(x)= Coefficient of Variation* =	0.6	
99th percentile multiplication factor**	3.8	
95th percentile multiplication factor**	2.1	
Daily Max Estimate = Max*99th percentile multiplication factor**		
Estimated Daily Max 99th percentile =	**171.0000**	**ug/L**
Estimated Daily Max including Dilution Factor =	**171.0000**	**ug/L**
Daily Max Estimate = Max*95th percentile multiplication factor**		
Estimated Daily Max 95th Percentile =	**94.5000**	**ug/L**
Estimated Daily Max including Dilution Factor =	**94.5000**	**ug/L**

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

**Multiplication factors from Table 3-1 and Table 3-2 in Technical Support Document for Water Quality Based Toxics Control

These factors will automatically populate based on the number of samples (up to 10) entered in the data table

WET Tests Metals Data and DMR Effluent Data
Number of samples >10

	Total Aluminum	Total Copper	Total Lead
	ug/l	ug/l	ug/l
Dec-13	902	4.5	1
Oct-13	1300	4	<0.5
Sep-13	100	10	40
Jun-13	14	1	1
Mar-13	100	3.3	1
Dec-12	100	1.6	1
Oct-12	14	1	<1
Sep-12	62500	<2	1
Jul-12	25	4.65	<1
Jun-12	10	1	
Mar-12	1000	1	1
Oct-11	89	3	2
Sep-11	100	1	1
Jun-11	320	1.2	1
Mar-11	20	0.8	0.8
Dec-10	30		1
Oct-10	88	2	<1
Sep-10	40	2.3	1
Jul-10	20	<1	<1
Jun-10	40	1.1	1
Mar-10	21	1.4	1
Dec-09	10000	2.6	1
Sep-09	129	1.3	1
Mar-09	11	8.6	1
Jun-08	796	10	40
Mar-08	1000	2.2	1
Average	3029.577	3.024	4.940
Median	94.500	2.000	1.000
Max	62500.000	10.000	40.000
Min	10	0.8	0.8
Count	26	23	20

*Ambient background data is not available since discharge is to headwaters.

Date	Al (ug/L)	*Yi* lnAl (ug/L)
Dec-13	902	6.8046
Oct-13	1300	7.1701
Sep-13	100	4.6052
Jun-13	14	2.6391
Mar-13	100	4.6052
Dec-12	100	4.6052
Oct-12	14	2.6391
Sep-12	62500	11.0429
Jul-12	25	3.2189
Jun-12	10	2.3026
Mar-12	1000	6.9078
Oct-11	89	4.4886
Sep-11	100	4.6052
Jun-11	320	5.7683
Mar-11	20	2.9957
Dec-10	30	3.4012
Oct-10	88	4.4773
Sep-10	40	3.6889
Jul-10	20	2.9957
Jun-10	40	3.6889
Mar-10	21	3.0445
Dec-09	10000	9.2103
Sep-09	129	4.8598
Mar-09	11	2.3979
Jun-08	796	6.6796
Mar-08	1000	6.9078
μ = mean of *ln*(X)		4.83655
σ = standard deviation of *ln*(X)		2.18727
95^{th} percentile = exp(μ+1.645σ)	4603.6502	
99^{th} percentile = (μ+2.326σ)	20417.2157	

Al - (Lognormal distribution, no ND)

Estimated Daily Maximum Effluent Concentration		
k = number of daily samples =	26	
u_y = Avg of Nat. Log of daily Discharge =	4.83655	
s_y = Std Dev. of Nat Log of daily discharge =	2.18727	
σ_y^2 = estimated variance = (SUM[$(y_i - u_y)^2$]) / (k-1) =	4.78413768	
cv(x)= Coefficient of Variation =	0.452237037	
99th Percentile Daily Max Estimate = exp (u_y + 2.326*s_y)		
Estimated Daily Max 99th percentile =	**20417.2157**	**ug/L**
Estimated Daily Max including Dilution Factor =	**20417.2157**	**ug/L**
95th Percentile Daily Max Estimate = exp (u_y + 1.645*s_y)		
Estimated Daily Max =	**4603.6502**	**ug/L**
Estimated Daily Max including Dilution Factor =	**4603.6502**	**ug/L**

Date	Cu* (ug/l)	lnCu (ug/l)	$(y_i - u_y)^2$
Dec-13	4.5	1.5041	0.528701
Oct-13	4	1.3863	0.3712894
Sep-13	10	2.3026	2.3275346
Jun-13	1	0.0000	0.6036655
Mar-13	3.3	1.1939	0.1738584
Dec-12	1.6	0.4700	0.0942217
Oct-12	1	0.0000	0.6036655
Sep-12	0		
Jul-12	4.65	1.5369	0.5774603
Mar-12	1	0.0000	0.6036655
Oct-11	1	0.0000	0.6036655
Sep-11	3	1.0986	0.1034608
Jun-11	1	0.0000	0.6036655
Mar-11	1.2	0.1823	0.3535938
Dec-10	0.8	-0.2231	1.0002053
Oct-10	2	0.6931	0.0070244
Sep-10	2.3	0.8329	0.0031304
Jul-10	0		
Jun-10	1.1	0.0953	0.4646453
Mar-10	1.4	0.3365	0.1940287
Dec-09	2.6	0.9555	0.0318809
Sep-09	1.3	0.2624	0.2648079
Mar-09	8.6	2.1518	1.8900835
Jun-08	10	2.3026	2.3275346
Mar-08	2.2	0.7885	0.0001322
μ = mean of *ln*(X)		0.77696	
σ = standard deviation of *ln*(X)		0.79005	
95^{th} percentile = exp(μ+1.645σ)	7.7235		
99^{th} percentile = (μ+2.326σ)	13.3303		

Cu- (Lognormal distribution, ND)

Daily Maximum Effluent Derivation (some measurements < detection limit)		
Detection Limit** =	2.0	
u_y = Avg of Nat. Log of daily Discharge (mg/L) =	0.77696	
S $(y_i - u)^2$ =	13.73192	
k = number of daily samples =	25	
r = number of non-detects =	2	
s_y^2 = estimated variance = (S[$(y_i - u_y)^2$]) / (k-r-1) =	0.62418	
s_y = standard deviation = square root s_y^2 =	0.79005	
δ = number of nondetect values/number of samples =	0.08000	
z 99th percentile=z-score[(0.99-δ)/(1-δ)] =	2.29490	
z 95th percentile=z-score[(0.95-δ)/(1-δ)] =	1.604083483	
Daily Max = exp (u_y + z-score*s_y)		
99th Percentile Daily Max Estimate=	**13.3303**	**ug/l**
99th Percentile Daily Max Estimate including dilution factor=	**13.3303**	**ug/l**
95th Percentile Daily Max Estimate =	**7.7235**	**ug/l**
95th Percentile Daily Max Estimate including dilution factor=	**7.7235**	**ug/l**

** Detection limit here is the detection limit that resulted in the greatest number of Non Detects in the dataset

Date	Pb* (ug/l)	lnPb (ug/l)	$(y_i - u_y)^2$
Dec-13	1	0.0000	0.1539684
Oct-13	0		
Sep-13	40	3.6889	10.866855
Jun-13	1	0.0000	0.1539684
Mar-13	1	0.0000	0.1539684
Dec-12	1	0.0000	0.1539684
Oct-12	0		
Sep-12	1	0.0000	0.1539684
Jul-12	0		
Mar-12	1	0.0000	0.1539684
Oct-11	2	0.6931	0.090456
Sep-11	1	0.0000	0.1539684
Jun-11	1	0.0000	0.1539684
Mar-11	0.8	-0.2231	0.3788792
Dec-10	1	0.0000	0.1539684
Oct-10	0		
Sep-10	1	0.0000	0.1539684
Jul-10	0		
Jun-10	1	0.0000	0.1539684
Mar-10	1	0.0000	0.1539684
Dec-09	1	0.0000	0.1539684
Sep-09	1	0.0000	0.1539684
Mar-09	1	0.0000	0.1539684
Jun-08	40	3.6889	10.866855
Mar-08	1	0.0000	0.1539684

Pb- (Lognormal distribution, ND)

Daily Maximum Effluent Derivation (some measurements < detection limit)		
Detection Limit** =	2.0	
u_y = Avg of Nat. Log of daily Discharge (mg/L) =	0.39239	
S $(y_i - u)^2$ =	24.66654	
k = number of daily samples =	25	
r = number of non-detects =	5	
s_y^2 = estimated variance = $(S[(y_i - u_y)^2]) / (k-r-1)$ =	1.29824	
s_y = standard deviation = square root s_y^2 =	1.13940	
δ = number of nondetect values/number of samples =	0.20000	
z 99th percentile=z-score[(0.99-δ)/(1-δ)] =	2.24140	
z 95th percentile=z-score[(0.95-δ)/(1-δ)] =	1.534120544	
Daily Max = exp (u_y + z-score*s_y)		
99th Percentile Daily Max Estimate=	**19.0344**	**ug/l**
99th Percentile Daily Max Estimate including dilution factor=	**19.0344**	**ug/l**
95th Percentile Daily Max Estimate =	**8.5026**	**ug/l**
95th Percentile Daily Max Estimate including dilution factor=	**8.5026**	**ug/l**

** Detection limit here is the detection limit that resulted in the greatest number of Non Detects in the dataset

Date	Effluent Hardness, as $CaCO_3$ (mg/l)
10/7/2013	38.2
7/8/2013	
10/31/2012	34.1
7/31/2012	
10/31/2011	
7/12/2011	32.4
10/18/2010	
7/31/2010	27.7
10/31/2009	37.3
7/31/2009	
10/31/2008	52.1
Median	35.7

ATTACHMENT D – STATISTICAL ANALYSIS FOR METALS EFFLUENT DATA

In order to account for the uncertainty that arises from small sample sizes (n<10), EPA uses a methodology from the *Technical Support Document for Water Quality-based Toxics Control* ("the TSD") to calculate a projected upper bound of effluent concentrations based on a statistical analysis of the facility's effluent data. As the statistical parameters of the sample distribution may differ from the underlying population, this approach determines a projection of the possible upper bound effluent concentration at the 95th percentile with a 95 percent confidence level, assuming a lognormal distribution of the underlying sample population. This 95th percentile projected upper bound represents a conservative estimate of the possible upper bound concentration based on a limited dataset. Where this upper bound concentration would not result in an exceedance of water quality criteria in the receiving water, EPA can say with certainty (95 percent confidence) that the data excludes the potential for an exceedance. Where that is not the case, EPA requires additional monitoring to better characterize the effluent.

The statistical analysis characterizes the maximum measured concentration as a percentile of the underlying distribution at a particular confidence level, then scaling that number upward by a "multiplying factor" in order to project an upper bound concentration at that confidence level. For sample datasets with less than 10 data points, EPA uses the 95th percentile with a 95 percent confidence level to characterize the upper bound concentration.

The formula for characterizing a maximum measured concentration as a percentile is:

$$p_n = (1 - \text{confidence level})^{1/n}$$

This formula gives the lowest percentile that a maximum measurement may correspond to, given a specific confidence level (EPA uses the 95 percent confidence level). For example, where n=4, we can be 95 percent confident that the maximum measurement represents at least the 47th percentile of the underlying distribution, since:

$$p_n = (1 - 0.95)^{1/4} = 0.473.$$

TSD at 52. It should be noted that this represents the lower end of the 95 percent confidence interval. Because of the uncertainty due to the small sample size there is a significant range in interpretation of the maximum; where n=4 we can be 95 percent confident that the maximum value represents somewhere between the 47th and 99th percentile of the underlying distribution.

The calculated percentile is then scaled up to a projected upper bound based on a selected probability basis (here the 95th percentile). The scaling factor (or "multiplying factor") is

the ratio between the 95th percentile and the calculated percentile in a lognormal distribution with a particular coefficient of variation. These are calculated as follows:

Multiplying factor = C_{95}/ C_{pn}; where
$C_{95} = \exp(1.645\sigma - 0.5\sigma^2)$;
$C_{pn} = \exp(z_{pn} \times \sigma - 0.5\sigma^2)$;
z_{pn} = z-score of the calculated percentile
σ^2 = variance of the log-transformed data = $\ln (CV^2 + 1)$
CV = coefficient of variation

The *TSD* recommends use of a coefficient of variation of 0.6 where sample size is less than 10. Thus for n=4 the multiplying factor (for 95-percent confidence level and 95th percentile probability
basis) is:

$p_n = 0.473$
$z_{pn} = -0.068$
$C_{95} = 2.135$
$C_{61} = 0.826$
Multiplying factor = 2.6

In practice this process is implemented using tables set forth in *TSD,* chapter 3 and box 3-2, as follows:

Step 1) The maximum effluent value of the samples is determined.
Step 2) Coefficient of variation (CV) = 0.6, for less than 10 samples
Step 3) The multiplying factor (MF) is determined using table 3-2 in the TSD, based on the number of samples in the data set and a CV of 0.6.
Step 4) The 95th percentile projected upper bound is the maximum effluent value multiplied by the
MF.

RESPONSE TO PUBLIC COMMENTS
REISSUANCE OF NPDES PERMIT NO. MA0031658
BATTLE ROAD FARM WASTEWATER TREATMENT FACILITY
LINCOLN, MA 01773

From November 24, 2014 to January 7, 2015 (The original comment period was scheduled to close December 23, 2014 and was extended at that request of the permittee due to the holiday period.), Region 1 of the United States Environmental Protection Agency ("Region") and the Massachusetts Department of Environmental Protection ("MassDEP") (together, the "Agencies") solicited public comment on a draft National Pollutant Discharge Elimination System ("NPDES") permit, developed pursuant to an application from the Battle Road Farm Condominium Trust c/o First Realty Management Corporation ("Permittee"). The Permittee owns and contracts for the operation of the Battle Road Farm Wastewater Treatment Facility in Lincoln, MA. The Battle Road Farm WWTF discharges into a wetlands at the headwaters of the Shawsheen River.

After considering the comments received, the Agencies have decided to issue the Final Permit authorizing the discharge with several changes from the draft permit. This document responds to comments on the 2014 Draft Permit. EPA has reproduced all comments on the Draft Permit verbatim.

A copy of the final permit and this response to comments document will be posted on the EPA Region 1's website (http://www.epa.gov/region1/npdes/permits_listing_ma.html) or available from the permit writer, whose contact information is as follows:

Michele Cobban Barden
United States Environmental Protection Agency
5 Post Office Square - Suite 100
Mail Code: OEP0601
Boston, Massachusetts, 02109-3912
Telephone (617) 918-1539
Email: barden.michele@epa.gov

RESPONSE TO COMMENTS ON THE 2014 DRAFT PERMIT

A) Comments submitted by Todd Chaplin, PE, Mount Hope Engineering, Inc. on behalf of the Permittee, dated January 6, 2015.

Opening Statement: We have reviewed the proposed permit in comparison with the existing permit and the ability of the existing wastewater treatment facility to achieve these permit requirements in the near and long-term. We would offer the following comments with regard to the new permit requirements, the ability to meet said requirements, and the additional costs that would be associated with these requirements.

Comment A.1: A major concern with regard to the new permit requirements is that the phosphorus limit has been reduced from 1 ppm to 0.1 ppm during the period April to October. The current limit of 1.0 ppm remains in effect during the winter months. The current plant will not be able to meet this limit and options will need to be explored. Options may include but are not limited to the additional treatment added to the existing plant, replacement of the existing plant with a new and improved plant, new effluent disposal options and connections to other wastewater treatment facilities. All options will result in significant capital costs and additional operational costs.

Response: The growing season effluent limit for total phosphorus of 0.1 mg/l is based on the fact that there is no dilution and the Gold Book–recommended criteria for total phosphorus of 0.1 mg/l.

EPA recognizes that the permittee must evaluate its options for achieving the total phosphorus limits. Section D of the Permit details a 48-month compliance schedule with interim alternatives for achieving the limits. If the permittee cannot achieve the effluent limits within the timeline laid out in the compliance schedule, then the permittee should contact George Harding in the Region 1's Office of Environmental Stewardship at 617-918-1870 to discuss an alternative schedule via an administrative order.

Comment A.2: The new permit requires weekly E. coli sampling. The cost is expected to be slightly higher for the actual testing and will be duplicative until fecal sampling is eliminated.

Response: There is no duplicative effort required by the permit. Footnote 6 of the permit clearly states "The fecal coliform limit is only in effect until the E. coli limit becomes effective **1 year** from the effective date of the permit." The current Massachusetts Surface Water Quality Standards are based on E.coli; and therefore, the effluent limit must limit E.coli. If there is any increased cost for E.coli testing over fecal coliform testing, it would be minimal.

Comment A.3: In the new permit an effluent limit has been included for cadmium. There is no mechanism for removal at this time. Due to this new requirement there would be additional costs for testing.

Response: As detailed in the fact sheet, NPDES permits "must control any pollutant or pollutant parameter (conventional, non-conventional or toxic) 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 water quality standard, including State narrative criteria for water quality."

A review of effluent data submitted by the permittee has determined there is reasonable potential for cadmium (chronic only) to cause and/or contribute to an exceedance of water quality standards. EPA is required to include an effluent limit. The applicable limit is set at criteria since there is no dilution at the point of discharge.

If the permittee cannot achieve the effluent limits set in the permit, then the permittee should contact George Harding in the Region 1's Office of Environmental Stewardship at 617-918-1870 to discuss a compliance schedule.

Comment A.4: The permit requires a lower limit for aluminum. There is currently no aluminum removal.

Response: The permit limitations for aluminum are the same as those in the previous permit which was issued on August 11, 2003.

As detailed in the fact sheet, NPDES permits "must control any pollutant or pollutant parameter (conventional, non-conventional or toxic) 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 water quality standard, including State narrative criteria for water quality."

A review of effluent data submitted by the permittee has determined there is reasonable potential for aluminum to cause and/or contribute to an exceedance of water quality standards. EPA is required to include an effluent limit. The applicable limit is set at criteria since there is no dilution at the point of discharge.

Comment A.5: There will be additional testing costs associated with the new requirement for the reporting of zinc in the final effluent.

Response: This requirement only adds two (2) additional analyses for zinc. The permittee should use the chemical analysis data required by EPA Region 1's "Freshwater Chronic Toxicity Test Procedure and Protocol" section VI to provide the other two (2) analyses.

EPA believes this reporting requirement is necessary to provide a more robust data set for future permitting decisions.

Comment A.6: The requirements note a slightly lower effluent limit for copper and lead. There is currently no copper or lead removal being completed on site. Trace metals are often a reflection of the drinking water supply serving the facility.

Response: The median effluent hardness for the review period, 2008-2013, was 35.7 mg/l as CaCO3 which is lower than the 40 mg/l used in the previous permit. The copper and lead criteria are hardness-based and the lower effluent hardness results in lower criteria values. A full explanation can be found in the fact sheet which accompanied the draft permit.

As detailed in the fact sheet, NPDES permits "must control any pollutant or pollutant parameter (conventional, non-conventional or toxic) 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 water quality standard, including State narrative criteria for water quality."

A review of effluent data submitted by the permittee has determined there is reasonable potential for copper and lead to cause and/or contribute to an exceedance of water quality standards. EPA is required to include an effluent limit. The applicable limit is set at criteria since there is no dilution at the point of discharge.

If the permittee cannot achieve the effluent limits set in the permit, then the permittee should contact George Harding in the Region 1's Office of Environmental Stewardship at 617-918-1870 to discuss a compliance schedule.

Comment A.7: Whole effluent toxicity (WET) testing twice per year will add an additional cost to the operation of the facility.

Response: The requirement for twice per year WET testing is a requirement of the existing permit. This should not represent any additional cost.

Comment A.8: A collection system map is a requirement of the new permit. We would assume this reflects a concern for inflow and infiltration in the collection system. While this information would be useful, we are not sure that daily flow variations reflect a concern during wet weather flows. There will be additional costs to perform this engineering study.

Response: This requirement has been reviewed and removed from the permit requirements.

Comment A.9: A facility evaluation or infrastructure report is required. Two financial assurance accounts also will be required, one based on the estimation of immediate

replacement/emergency funds and the second for the long term replacement account for the facility. Costs will be incurred for the evaluation study and significant costs associated with funding the financial assurance accounts.

Response: The requirement for a facility evaluation has been eliminated provided that the requirement for a financial assurance mechanism is set in place.

The requirement for financial assurance documents is not intended to be burdensome but, rather, a means to provide some readily available funds to make immediate repairs. The past enforcement history of the facility indicates that funding of required upgrades has often been difficult. Financial assurance document provides the needed funding when it is needed. The requirement has been reviewed and revised to reflect only one account for immediate repair/emergency funds with a $10,000 funding requirement and additional time has been allocated for initial funding and repayment, as required.

Closing Statement: The existing condo association consists of 120 residences, of which 49 of the units are part of the 40B affordable housing program in Lincoln and are owned by residents whose income is limited. The additional permit requirements will result in a substantial financial burden when fully implemented. Sampling and analysis costs will increase. Engineering costs will increase for the performance of the collection system study and the facility evaluation. Financial assurance funds will increase with the seeding of these accounts with sufficient funds to initiate these investment accounts. Lastly, capital costs will be significant to meet the new permit limits for phosphorus and possibly other parameters.

The existing facility will not be able to meet the new permit limit for phosphorus as is. It is assumed that at a minimum, substantial improvements would be required to the end of the plant to meet these limits. This would also increase the cost of operations due to chemical costs and sludge disposal. Alternatives will also need to be investigated to determine if the existing plant should be added on to, or if it may be economically more prudent to move forward in a different treatment facility to meet these and future treatment demands. Alternatives such as groundwater discharge and off-site disposal should also be investigated further.

We would ask that you reconsider the necessity of these new permit requirements. We would also ask that as much time as possible be allowed for implementation should the new requirements come into being. The funding of financial accounts will be difficult with a short time frame and we would ask especially for additional time relief in that regard.

Response: EPA recognizes that the existing treatment plant will be unable to achieve many of the new water quality-based limits in the permit. However, Federal regulations found at 40 CFR § 122.44(d)(1) require the inclusion of permit requirements necessary to achieve water quality standards established under Section 303 of the Clean Water Act including State narrative criteria for water quality. Further, the Massachusetts Surface Water Quality Standards (MASWQS) at 314 CMR 4.01(4) states that the MASWQS "designate the most sensitive uses for which the various waters of the Commonwealth shall be enhanced, maintained and protected;

which prescribe the minimum water quality criteria required to sustain the designated uses; and which contain regulations necessary to achieve the designated uses and maintain existing water quality including, where appropriate, the prohibition of discharges" and 314 CMR 4.03 states 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 Massachusetts Surface Water Quality Standards at 314 CMR 4.03(1)(b) specifically provide for the inclusion of compliance schedules in a permit. "The purpose of a schedule of compliance generally is to afford a permittee adequate time to comply with one or more permit requirements or limitations that are based on new, newly interpreted or revised water quality standards that became effective after both issuance of the initial permit for a discharge and 1977. As previously discussed a detailed schedule of compliance for meeting the new total phosphorus limits has been included in the permit. The MASWQS specifically state that "[a] schedule of compliance shall require compliance at the earliest practicable time." Based on past experience EPA believes that a 48-month schedule is adequate and provides interim compliance dates for alternatives evaluations. EPA also recommends that the permittee refer to EPA's *Interim Economic Guidance for Water Quality Standards Workbook* (EPA-823-B-95-002 March 1995) to determine if an extended schedule would be warranted based on economic concerns. If the permittee cannot meet the requirements of the compliance schedule in the final permit, the permittee is encouraged to contact George Harding of EPA Region 1's Office of Environmental Stewardship at 617-918-1870.

EPA has addressed the permittee's concerns with many of the other new permit requirements in response to the individual comments above. In some cases, these requirements are not new and were required by the previous permit which was issued on August 11, 2003.

B) Comments submitted by David R. Ferris, Director, Wastewater Management Program, Bureau of Resource Protection, Massachusetts Department of Environmental Protection, dated December 22, 2014.

Comment B.1: Battle Road's current permit established year-round total phosphorus limitations of 1 mg/l (monthly average) and 2 mg/l (maximum daily) with weekly monitoring. Between January 2008 and January 2014, there have been only two violation of the maximum and only one violation of the monthly average. The median monthly average for this same time period is 0.45 mg/l whereas the median maximum daily is 0.70 mg/l.

The Massachusetts Surface Water Quality Standards ("MA SWQS") do not contain a numeric criterion for phosphorus: the standard is narrative and addresses nutrients in general. Specifically the MA SWQS state *Unless naturally occurring, all surface water 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* [See 314 CMR 4.05(5)(c).] EPA used the 1986 Quality Criteria of Water (the "Gold Book") as a basis for determining that more restrictive seasonal

(April-October) total phosphorus limitation of 0.1 mg/l. This limitation is based on the Gold Book standard of 0.1 mg/l and assumes no dilution at the Battle Road outfall.

MassDEP recognizes that the Battle Road outfall discharges to a wetland. The Gold Book standard used in the EPA's analysis as stated in the Fact Sheet "is for any stream not discharging directly to lakes or impounds". In addition, EPA's methodology has not accounted for any phosphorus uptake by the wetland itself. At design flow and with the current permit limit of 1 mg/l, the average phosphorus limitation results in a mass loading of 4.4 ounces of phosphorus to the wetland. The proposed limitation of 0.1 mg/l would reduce this loading to 0.444 ounces per day. EPA has not demonstrated that any impairment within the Shawsheen basin is directly attributable to this discharge: the low dissolved oxygen impairments downstream reaches may be naturally occurring and the macrophyte issue in the impoundment in Lowell (quite distant from this discharge) is likely caused by detention time within said impoundment and sediment issues thereof. These two impairments are discussed in the Massachusetts Year 2012 Integrated List of Water (CWA Sections 303d and 305b). For these reasons, MassDEP cannot support the proposed phosphorus limitation.

Since this is such an insignificant discharge of phosphorus MassDEP recommends maintaining the existing limits in the expired permit, while the permittee monitor the phosphorus concentration in the outlet of the wetland to the Shawsheen River. That information could then be used to determine the need in future permits to limit phosphorus.

Response: During the development of this permit, MassDEP offered to provide an interpretation of its narrative criteria for nutrients as it relates to this facility. An interpretation was never submitted to EPA.

Water quality-based effluent limitations "must control any pollutant or pollutant parameter (conventional, non-conventional, or toxic) which the Director determines are or may be discharges 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 CFR § 122.44(d)(1)). MassDEP appears to misunderstand these requirements and infers that a documented impairment must exist. This is incorrect.

As noted in the Response to Comment A.1, EPA has included a 48-month compliance schedule with interim alternatives for achieving the limits. Included in that schedule (See Permit Section D.2) is an alternative that allows the permittee to "hire a wetlands ecologist to determine an alternative total phosphorus criteria level that would not result in adverse impacts to the wetland vegetation or the channelized portion of the receiving stream and submit a report to EPA and MassDEP for consideration." We believe that the site-specific alternative or the detailed schedule allowing the permittee up to 48 months to achieve compliance with the total phosphorus limit provides the permittee the necessary flexibility.

Comment B.2: The current permit limits total copper to 4.3 µg/l, average monthly, and 5.9 µg/l, maximum daily. Sampling is performed quarterly. These permit limitations are based on 1998 National Recommended Water Quality Criterion.

Between January 2008 and January 2014, there have been only five violations of the maximum and three violations of the monthly average. The median monthly average of both for the same period is 1.5 µg/l

MassDEP recently revised the MA SWQS to include a site specific criterion for copper in the Shawsheen River, the discharge location of Battle Road. However that criterion has not yet been approved by EPA.

As noted in MassDEP's May 2, 2014 comments on the pre-draft which were not addressed in the draft permit, MassDEP suggests that the permittee be given twelve (12) months to meet the new limits with the existing copper limits being the interim limits. This will allow for EPA action on the site specific criterion and for the permittee to apply for a permit modification upon EPA approval of the site specific criteria. Therefore additional costs (essentially for naught) would not have to be incurred by the permittee.

Response: As noted in the Fact Sheet which accompanied the draft permit, under EPA regulation at 40 CFR 131.21(c)(2) ,EPA cannot use new or revised standards submitted after May 30, 2000 for Clean Water Act purposes if they have not been approved by EPA.

The lower permit limit is solely based on an updated effluent hardness, 35.7 mg/l as $CaCO_3$. Given that this is a lower effluent limit than the previous permit, EPA has included language to allow the permittee 12 months to achieve the effluent limits for copper.

Comment B.3: The draft permit requires that WET testing be performed in the second week of July and October. MassDEP and EPA-Region 1 have agreed to no longer specify the week of testing, only the month. This better addresses laboratory scheduling issues. MassDEP noted this edit in its May comments on the pre-draft but this edit was not incorporated into the draft as now available for public notice. MassDEP hereby requests that the requirements in Footnote 13 of the draft permit, both in text of the paragraph and in the table, be modified to remove the requirement for testing during the second week of the respective months.

Response: EPA has removed the references to the second week.

CORRECTION

An error was identified in Appendix C of the Fact Sheet in which the non-detect values for cadmium (<0.2 µg/l) were not factored into the average and median calculations. It has been practice in Region 1 that non-detect values for metals be factored into calculations as zeros. EPA re-calculated the average and the median values for Cadmium using a concentration of zero for

the non-detect values. These average and median values were not used in the reasonable potential or effluent limits calculations so no changes were made to the effluent limits, however, the corrected table is found below.

Whole Effluent Toxicity Tests Metals Data
Number of samples < 10

Date	Cadmium	Nickel	Zinc
	Effluent (µg/l)	Effluent (µg/l)	Effluent (µg/l)
10/7/2013	<0.2	2	43
10/31/2012	<0.2	2	13
7/12/2011	<0.2	5	45
7/31/2010	<0.2	2	18
10/31/2009	<0.2	2	18
10/31/2008	0.39	3	17
Average	0.065	3	26
Median	0	2	18
Max	0.39	5	45
Min	0	2	13
Count	6	6	6

*Ambient background data is not available since discharge is to headwaters.