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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),

Town of Hopedale
Board of Water and Sewer Commission
P.O. Box 7
Hopedale, MA 01747

is authorized to discharge from a facility located at:

Hopedale Wastewater Treatment Facility
Junction Route 16 and Mendon Street
Hopedale, MA 01747

to receiving water named: **Mill River (Blackstone River Basin – USGS Code #01090003)**

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

This permit shall become effective on **(See ** below)**

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

This permit supersedes the permit signed on September 3, 1999, which was appealed to the Environmental Appeals Board on July 18, 2000, and became effective on May 1, 2001.

This permit consists of 17 pages in Part I including effluent limitations and monitoring requirements, 25 pages in Part II including NPDES Part II Standard Conditions, and **Attachment A (Discharge Outfall), Attachment B (Freshwater Chronic Toxicity Test Procedure and Protocol)**.

Signed this day of

_____	_____
Director Office of Ecosystem Protection Environmental Protection Agency Boston, MA	Director Massachusetts Wastewater Management Program Department of Environmental Protection Commonwealth of Massachusetts Boston, MA

** This permit will become effective on the date of signature if no comments are received during public notice. If comments are received during public notice, this permit will become effective no sooner than 30 days after signature.

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PART I

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 Mill River. Such discharge shall be limited and monitored by the permittee as specified below.

Effluent Characteristic		**Discharge Limitation**			**Monitoring Requirement** [*3]	
Parameter	**Units**	**Average Monthly**	**Average Weekly**	**Maximum Daily**	**Measurement Frequency**	**Sample Type** [*3]
Flow (Annual Average) [*2]	MGD	0.588 [*2]	—	Report	Continuous	Recorder
Flow [*2]	MGD	Report	—		Continuous	Recorder
BOD_5 [*4] (June 1 – Oct 31)	mg/l	15	15	Report	1/Week	24-Hour Composite* [5]
	lbs/day	74	74	Report	1/Week	24-Hour Composite* [5]
BOD_5 [*4] (Nov 1 – May 31)	mg/l	30	45	Report	1/Week	24-Hour Composite* [5]
	lbs/day	147	221	Report	1/Week	24-Hour Composite* [5]
TSS [*4] (June 1 – Oct 31)	mg/l	15	15	Report	1/Week	24-Hour Composite* [5]
	lbs/day	74	74	Report	1/Week	24-Hour Composite* [5]
TSS [*4] (Nov 1 – May 31)	mg/l	30	45	Report	1/Week	24-Hour Composite* [5]
	lbs/day	147	221	Report	1/Week	24-Hour Composite* [5]
E. Coliform Bacteria [*1, *6] (April 1 - Oct. 31)	cfu/100 ml	126	—	409	1/Week	Grab
Dissolved Oxygen (April 1 – Oct. 31)	mg/l	Not Less Than 6.0 mg/l			1/Week	Grab
pH [*1]	Standard Units	6.5 – 8.3 (See Permit Part I.A.1.b.)			1/Day	Grab

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Effluent Characteristic	Units	Discharge Limitation			Monitoring Requirement	
Parameter		**Average Monthly**	**Average Weekly**	**Maximum Daily**	**Measurement Frequency**	**Sample Type[*3]**
Total Ammonia Nitrogen[*7]						
November 1 – April 30	mg/l	11	—	Report	1/Week	24-Hour Composite*[5]
May 1 – May 31	mg/l	5	5	8	1/Week	24-Hour Composite*[5]
June 1 – October 31	mg/l	2	2	3	1/Week	24-Hour Composite*[5]
Total Kjeldahl Nitrogen[*7]	mg/l, lbs/day	Report	—	Report	1/Month	24-Hour Composite*[5]
Total Nitrate Nitrogen[*7]	mg/l, lbs/day	Report	—	Report	1/Month	24-Hour Composite*[5]
Total Nitrite Nitrogen[*7]	mg/l, lbs/day	Report	—	Report	1/Month	24-Hour Composite*[5]
Aluminum, Total [*8,*10]	mg/l	0.11	—	1.2	1/Month	24-Hour Composite*[5]
Copper, Total Recoverable[*9]	ug/l	8.14	—	11.82	1/Month	24-Hour Composite[*5]
Total Phosphorus (April 1 - Oct. 31) [*11]	lbs/day	0.49	—	Report	1/Week	24-Hour Composite*[5]
Total Phosphorus (Nov 1 – March 31) [*11]	mg/l	1.0	—	Report	1/Month	24-Hour Composite*[5]
Ortho-phosphorus, dissolved (Nov 1-March 31)	lbs/day	Report	—	—	1/Month	24-Hour Composite*[5]
Ortho-phosphorus, dissolved (Nov 1-March 31)	mg/l	Report	—	—	1/Month	24-Hour Composite*[5]
Whole Effluent Toxicity [*1, *12, *13, *14, *15]	%	Acute	LC_{50} $\geq$ 100%		4/Year	24-Hour Composite*[5]
	%	Chronic	NOEC $\geq$ 61%		4/Year	24-Hour Composite*[5]

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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 eleven previous months.

3. Effluent sampling shall be representative of the discharge.

   A routine sampling program shall be developed in which samples are taken at the same location, same time, and same days of every month. Occasional deviations from the routine sampling program described above 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.

   All required effluent samples shall be collected at the point specified herein. Any change in sampling location must be reviewed and approved in writing by EPA and MassDEP.

PARAMETER:	SAMPLE LOCATION:
FLOW	Recorder in the Effluent Flume
FECAL COLIFORM and E-COLI	After discharge from the disinfection chamber, prior to discharge into the Mill River
BOD_5, TSS, pH RANGE, TOTAL AMMONIA AS N, TOTAL KJELDAHL NITROGEN, TOTAL NITRITE, TOTAL NITRATE, and WHOLE EFFLUENT TOXICITY	After discharge from the disinfection chamber, prior to discharge into the Mill River WET Dilution Water: Mill River upstream of treated wastewater discharge outfall
BOD and TSS (Influent)	Influent Line prior to primary tanks

4. Sampling is required for influent and effluent.

5. A 24-hour composite sample 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. *Escherichia coli (E. coli)* bacteria limitations and monitoring requirements are effective from April 1st through October 31st. The monthly average limit is expressed as a geometric mean.

7. Total ammonia nitrogen, total Kjeldahl nitrogen, nitrite nitrogen, and nitrate nitrogen samples shall be collected concurrently.

   The permittee shall operate the treatment facility to reduce the discharge of total nitrogen to the maximum extent possible, using existing treatment equipment at the facility. **Within one (1) year after the effective date** of the permit, the permittee shall submit a report to EPA and the MassDEP that describes the measures it has taken to enhance the removal of nitrogen by its treatment facility and summarizes the effectiveness of these measures.

8. Total aluminum samples shall be collected concurrently with a total phosphorus sample. See also Part I.B. Special Condition 1.

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

10. See Part I.B., Special Condition 1 for a schedule of compliance.

11. The sampling frequency identified is the minimum sampling frequency and, in accordance with footnote #8 above, sampling must be conducted on the same day(s) each week. If any additional phosphorus sampling is conducted, including process control samples, the individual phosphorus results, including the day each sample was taken, the type of sample (i.e., 24-hour composite or grab), and the analytical method, must be reported on an attachment to the discharge monitoring report. Additionally, the chemical dosing rate for all chemicals added for the purpose of phosphorus removal shall be reported for each day of the month. Only 24-hour composite samples analyzed with an EPA-approved method shall be used in determining compliance with the permit limit.

    See Part I.B., Special Condition 2 for schedule of compliance and phosphorus interim limit.

12. The permittee shall conduct modified acute and chronic toxicity tests four times per year. The permittee shall test the daphnid, Ceriodaphnia dubia, only. Toxicity test samples shall be collected during the months of January, April, 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 February 28th, May 31th, August 31th, and November 30th, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachment B** of this permit.

Test Dates during the month of	**Submit Results By:**	**Test Species**	**Acute Limit** LC_{50}	**Chronic Limit** NOEC
January April July October	February 28th May 31th August 31th November 30th	Ceriodaphnia dubia (Daphnid) See **Attachment B**	≥ 100%	≥ 61%

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

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

14. The chronic-no observed effect concentration (C-NOEC) is defined as the highest tested concentration of toxicant in 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 "61% or greater" is defined as a sample which is composed of 61% (or greater) effluent, the remainder being dilution water.

15. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall follow procedures outlined in **Attachment B, Section IV., DILUTION WATER** in order to obtain permission to use an alternate dilution water. In lieu of individual approvals for alternate dilution water required in **Attachment B**, EPA-New England has developed a Self-Implementing Alternative Dilution Water Guidance document (called "Guidance Document") 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 the NPDES Program Instructions for the Discharge Monitoring Report Forms (DMRs) which is sent to all permittees with their annual set of DMRs and may also be found on the EPA, Region I web site at http://www.epa.gov/region01/enforcementandassistance/dmr.html. If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachment B**. Any modification or revocation to this guidance shall be transmitted to the

permittees as part of the annual DMR instruction package. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment B**. If the permittee has already received permission to use an alternative dilution water under the previous permit, the permittee does not need to repeat this approval process. If the permittee uses an alternative dilution water, the ambient water will still need to be tested.

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 nor greater than 8.3 Standard Units (S.U.) 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 will maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand. The percent removal will be based on monthly average values.

f. The results of sampling for any parameter analyzed 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 will submit a report to MassDEP by **March 31st** 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.

h. The permittee is not authorized to use chlorine as a method of disinfection.

i. **Within 24 months of the effective date of the** permit, the permittee shall submit a plan to EPA and the MassDEP that will verify the instream 7Q10 flow upstream of the treatment plant outfall. Options may include, but are not limited to, measuring the flow release from the upstream Hopedale Dam, or gaging the flow in the river.

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

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

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

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

(1) the quantity and quality of effluent introduced into the POTW; and
(2) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

3. Prohibitions Concerning Interference and Pass Through:

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

4. Toxics Control

a. The permittee will not discharge any pollutant or combination of pollutants in toxic amounts.

b. Any toxic components of the effluent will not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standard, this permit may be revised or amended in accordance with such standards.

5. Numerical Effluent Limitations for Toxicants

a. 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. SPECIAL CONDITIONS

1. Aluminum

a. The permittee shall evaluate the ability of the existing treatment facilities to achieve the monthly average and daily maximum aluminum limitations and shall submit a report on or before **36 months from the effective date of the permit** that summarizes the evaluation and includes a determination whether the existing facility is capable of reliably achieving the effluent limitations.

b. If the permittee concludes that the existing facilities can achieve the monthly average and daily maximum limitations, the limits will become effective **38 months from the effective date of the permit**.

c. If the permittee concludes that the existing facilities cannot achieve the monthly average and daily maximum limitations (and EPA and MassDEP concur), the limits will become effective **59 months from the effective date of the permit**. Until the limits are achieved, the Town shall submit a report to EPA and MassDEP at **12 months, 24 months, 38 months, and 50 months, from the effective date,** describing progress towards attaining the effluent limitations, including a description of planning, design, and construction of any necessary facilities.

d Until the limits become effective, the permittee shall minimize the discharge of aluminum, and conduct sampling as required by the permit (i.e., the compliance schedule does not affect the monitoring requirements).

2. Total Phosphorus

a. The permittee shall evaluate the ability of the existing treatment facilities to achieve the April – October 31 monthly average total phosphorus limitation and shall submit a report on or before **36 months from the effective date of the permit** that summarizes the evaluation and includes a determination whether the existing facility is capable of reliably achieving the effluent limitations.

b. If the permittee concludes that the existing facilities can achieve the April 1 – October 31 monthly average limit, the limits will become effective **38 months from the effective date of the permit**.

c. If the permittee concludes that the existing facilities cannot achieve the April 1 – October 31 monthly average limit (and EPA and MassDEP concur), the limits will become effective **59 months from the effective date of the permit**. Until the limit is achieved, the Town shall submit a report to EPA and MassDEP at **12 months, 24 months, 38 months, and 50 months, from the effective date**, describing progress towards attaining the effluent limitation, including a description of planning, design, and construction of any necessary facilities.

d. Until the April 1 – October 31 limit becomes effective, the permittee shall achieve a monthly average total phosphorus limit of 1.0 mg/l. Sampling for total phosphorus shall be conducted as required by the permit (i.e., the compliance schedule does not affect the monitoring requirements).

e The winter phosphorus limitation is new for this permit. The 1.0 mg/l seasonal (November 1st – March 31st) total phosphorus limit in this permit shall become effective **36 months from the effective date of the permit**. Until the limits become effective, the permittee shall minimize the discharge of phosphorus during the winter season and conduct sampling as required by the permit (i.e., the compliance schedule does not affect the monitoring requirements).

C. UNAUTHORIZED DISCHARGES

The permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from outfall 001 listed on **Attachment A** and in Part I.A.1. of this permit. Discharges of wastewater from any other point sources, including sanitary sewer overflows (SSOs) are not authorized by this permit and must be reported to EPA and MassDEP in accordance with Part II. Section D.1.e.(1) of the General Requirements of this permit (Twenty-four hour reporting).

Notification of SSOs to MassDEP will be made on its SSO reporting form (which includes MassDEP regional office telephone numbers). The reporting form and instructions for its completion can be found on-line at: http://www.mass.gov/dep/water/approvals/surffms.htm#sso.

D. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

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

2. Preventative Maintenance Program

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

3. Infiltration/Inflow:

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

4. Collection System Mapping

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

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

5. Collection System Operation and Maintenance Plan

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

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

      (1) A description of the collection system management goal, staffing, information management, and legal authorities;

(2) A description of the collection system and the overall condition of the collection system including a list of all pump stations and a description of all recent studies and construction activities; and

(3) A schedule for the development and implementation of the full Collection System O & M Plan including the elements in paragraphs b.1. through b.8. below.

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

(1) The required submittal from paragraph 5.a. above, update to reflect current information;

(2) A preventative maintenance and monitoring program for the collection system;

(3) Description of sufficient staffing necessary to properly operate and maintain the sanitary sewer collection system and how the operation and maintenance program is staffed;

(4) Description of funding, the source(s) of funding and provisions for funding sufficient for implementing the plan;

(5) Identification of known and suspected overflows and back-ups, including manholes. A description of the cause of the identified overflows and back-ups, corrective actions taken, and a plan for addressing the overflows and back-ups consistent with the requirements of this permit;

(6) A description of the permittee's programs for preventing I/I related effluent violations and all unauthorized discharges of wastewater, including overflows and by-passes and the ongoing program to identify and remove sources of I/I. The program shall include and inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts; and

(7) An educational public outreach program for all aspects of I/I control, particularly private inflow.

(8) An Overflow Emergency Response Plan to protect public health from overflows and unanticipated bypasses or upsets that exceed any effluent limitation in the permit.

6. Annual Reporting Requirement

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

a. A description of the staffing levels maintained during the year;
b. A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year;
c. Expenditures for any collection system maintenance activities and corrective actions taken during the previous year;
d. A map with areas identified for investigation/action in the coming year;
e. If treatment plant flow has reached 80% of its design flow [0.47 mgd] based on the annual average flow during the reporting year, or there have been capacity related overflows, submit a calculation of the maximum daily, weekly, and monthly infiltration and the maximum daily, weekly, and monthly inflow for the reporting year; and
f. A summary of unauthorized discharges during the past year and their causes and a report of any corrective actions taken as a result of the unauthorized discharges reported pursuant to the Unauthorized Discharges section of this permit.

7. Alternate Power Source

In order to maintain compliance with the terms and conditions of this permit, the permittee shall provide an alternative power source(s) sufficient to operate its portion of the publicly owned treatment works1 it owns and operates.

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 §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 §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 §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.

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

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

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

   Which of the 40 CFR §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.[2]

6. The sludge shall be monitored for pollutant concentrations (all Part 503 methods), 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 than1500	1 /quarter
1500 to less than 15000	6 /year
15000 +	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.

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2 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

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 19th** (*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.

F. MONITORING AND REPORTING

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

a. Submittal of Reports Using NetDMR

NetDMR is accessed from: http://www.epa.gov/netdmr. **Within one year of the effective date of the Permit**, the permittee shall begin submitting DMRs and reports required under this permit electronically to EPA using NetDMR, unless the facility is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports ("opt out request").

DMRs shall be submitted electronically to EPA no later than the **15th day of the month** following the completed reporting period. All reports required under the permit shall be submitted to EPA, including the MassDEP Monthly Operations and Maintenance Report, as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees shall continue to send hard copies of reports other than DMRs (including Monthly Operation and Maintenance Reports) to MassDEP until further notice from MassDEP.

b. Submittal of NetDMR Opt Out Requests

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

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

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

c. Submittal of Reports in Hard Copy Form

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

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

Duplicate signed copies of all reports or notifications required above shall be submitted to the State at the following addresses:

MassDEP – Central Region
Bureau of Resource Protection (Municipal)
627 Main Street
Worcester, MA 01608

Copies of toxicity tests, nitrogen and phosphorus optimization reports, and aluminum evaluations only to:

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

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

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. This authorization also incorporates the state water quality certification issued by MassDEP under §401(a) of the Federal Clean Water Act, 40 C.F.R. 124.53, M.G.L.c.21, §27 and 314 CMR 3.07. All of the requirements (if any) contained in MassDEP's water quality certification for the permit are hereby incorporated by reference into this state surface water discharge permit as special conditions pursuant to 314 CMR 3.11.

3. Each Agency will have the independent right to enforce the terms and conditions of this permit. Any modification, suspension or revocation of this permit will be effective only with respect to the Agency taking such action, and will 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 will remain in full force and effect under Federal law as an 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 will remain in full force and effect under State law as a permit issued by the Commonwealth of Massachusetts.

Attachment A
Advanced Secondary Wastewater Treatment Plant Discharge Outfall
NPDES Permit No. MA0102202
Hopedale, MA

Outfall:	Description of Discharge:	Outfall Location/Receiving Water:
001	Advanced Secondary Wastewater Treatment Plant Effluent	Mill River

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND
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.

NPDES PERMIT NO.: **MA0102202**

PUBLIC NOTICE START AND END DATES: March 2, 2012 – March 31, 2012

NAME AND ADDRESS OF APPLICANT:

Town of Hopedale
Board of Water and Sewer Commission
P.O. Box 7
Hopedale, MA 01747

NAME AND ADDRESS OF FACILITY WHERE THE DISCHARGE OCCURS:

Hopedale Wastewater Treatment Facility
Junction Route 16 and Mendon Street
Hopedale, MA 01747

TO RECEIVING WATER: **Mill River (Blackstone River Basin – USGS Code #01090003)**

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

CLASSIFICATION: **B (Warm Water Fishery)**

Table of Contents

Figures and Attachments:

I. PROPOSED ACTION

The above named applicant has applied to the U.S. Environmental Protection Agency (EPA) for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving waters. The existing permit expired on May 1, 2006 and is still in effect. The draft permit proposes an expiration date five (5) years from the effective date of the final permit.

II. TYPE OF FACILITY AND DISCHARGE LOCATION

The facility is an advanced wastewater treatment plant and is engaged in the collection and treatment of municipal wastewater. Currently, the facility serves approximately 5,000 people in the Town of Hopedale and 500 people in the Town of Milford. The facility does not serve any significant industrial users (SIUs). The treatment plant discharges into the Mill River. The facility's location is shown in **Figure 1**.

Information regarding the facility's treated discharge outfall is listed below:

Outfall:	Description of Discharge:	Outfall Location:
001	Advanced Secondary Wastewater Treatment Plant Effluent	42^{O} 17' 59" / -71^{O} 54' 0"

III. DESCRIPTION OF THE DISCHARGE

A quantitative description of the wastewater treatment plant discharge in terms of significant effluent parameters based on recent monitoring data is shown on **Attachment A** of this fact sheet. This facility's flow schematic is shown in **Figure 2**.

IV. LIMITATIONS AND CONDITIONS

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

V. PERMIT BASIS AND EXPLANATION OF EFFLUENT LIMITATION DERIVATION

A. BACKGROUND

a. Treatment Process Description

The wastewater treatment facility (WWTF) treatment processes include: a headworks, in which grit and screening are removed, primary sedimentation, an Integrated Fixed-Film Activated Sludge (IFAS) biological treatment system, secondary clarification, cloth disk filtration, and disinfection using ultraviolet disinfection units. Waste sludge is trucked off-site to Synagro in Woonsocket, Rhode Island for incineration. The Hopedale WWTF generates approximately 1320 dry metric tons of sludge each year. The Town completed a construction upgrade on October 7, 2009 that added a grit washing system, added chemical feed systems, replaced the aeration system, added the IFAS system, and added a tertiary cloth disk filter.

b. Collection System Description

The Hopedale WWTF is a separate sewer system. A separate sanitary sewer conveys domestic, industrial and commercial sewage, but not storm water. It is part of a "two pipe system" consisting of separate sanitary sewers and storm sewers. The two systems have no interconnections; the sanitary sewer leads to a wastewater treatment plant and the storm sewer discharges to a local water body.

c. Enforcement Status

The permittee was issued an administrative compliance order on September 29, 2005 by EPA to address copper and ammonia-nitrogen permit limitation exceedances.

The Order included a requirement to prepare and submit an engineering report that would: (1) include an inventory of the copper sources that discharge to the WWTF, (2) include an evaluation of various treatment technologies and source reduction measures to reduce the level of copper discharged to, and from, the WWTF, and (3) recommend the treatment technologies and measures that would minimize the level of copper discharged from the WWTF. The Order also included a requirement to develop a schedule to implement the chosen technologies or source reduction measures.

The Order also required the Town to prepare a detailed evaluation and explanation of the specific causes of the violations of the ammonia-nitrogen limitations in the NPDES permit. The Town was required to develop an Ammonia-Nitrogen Report that was required to include interim and long-term corrective measures to eliminate the ammonia-nitrogen violations and an implementation schedule for achieving and maintaining compliance with their NPDES permit.

All of the Order's required reports, submissions, and construction schedules have been met by the Town. The Town's final construction and process upgrades were completed on October 7, 2009.

d. Permit Compliance Schedule

Given the Town's recent WWTF upgrades, and its plans for constructing a new water treatment facility, the draft permit proposes an extended three year compliance schedule for achieving new water quality-based limitations required by the permit. This schedule will allow time to complete the new water treatment plant (which should reduce concentrations of metals in the wastewater treatment plant influent) and to optimize the operations at the WWTF after the water treatment facility is fully functioning.

e. Overview of Federal and State Regulations

Congress enacted the Clean Water Act (CWA), "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." CWA §101(a). To achieve this objective, the CWA makes it unlawful for any person to discharge any pollutant into the waters of the United States from any point source, except as authorized by specific permitting sections of the CWA, one of which is Section 402. See CWA §§ 303(a), 402(a). Section 402(a) establishes one of the CWA's principal permitting programs, the National Pollutant Discharge Elimination System (NPDES). Under this section, EPA may "issue a permit for the discharge of any pollutant, or combination of pollutants" in accordance with certain conditions. See CWA § 402(a). NPDES permits generally contain discharge limitations and establish related monitoring and reporting requirements. See CWA § 402(a)(1)-(2).

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits: "technology-based" limitations and "water quality-based" limitations. See CWA §§ 301, 304(b); 40 C.F.R. 122, 125, 131. Technology-based limitations, generally developed on an industry-by-industry basis, reflect a specified level of pollutant reducing technology available and economically achievable for the type of facility being permitted. See CWA § 301(b). As a class, publicly owed treatment works (POTWs) must meet performance-based requirements based on available wastewater treatment technology. See CWA § 301(b)(1)(B). The performance level for POTWs is referred to as "secondary treatment". Secondary treatment is comprised of technology-based requirements expressed in terms of BOD_5, TSS, and pH. See 40 C.F.R. §133.
Water quality-based effluent limits are designed to ensure that State water quality standards are met regardless of the decision made with respect to technology and economics in establishing technology-based limitations. In particular, Section 301(b)(1)(C) requires achievement of, "any more stringent limitation, including those necessary to meet water quality standards…established pursuant to any State law or regulation…" See 40 C.F.R. §§ 122.4(d)(1) (providing that a permit must contain effluent limits as necessary to protect State water quality standards, "including State narrative criteria for water quality") (emphasis added) and 122.44(d)(5) (providing in part that a permit incorporate any more stringent limits required by Section 301(b)(1)(C) of the CWA).
The CWA requires that States develop water quality standards for all water bodies within the State. See CWA § 303. These standards have three parts: (1) one or more "designated uses" for each water body or water body segment in the state; (2) water quality "criteria", consisting of numeric concentration levels and/or narrative statements specifying the amounts of various pollutants that may be present in each water body without impairing the designated uses of that water body; and (3) an anti-degradation provision, focused on protecting existing uses. See CWA § 303(c)(2)(A) and 40 C.F.R. § 131.12. The limits and conditions of the permit reflect the goal of the CWA and EPA to achieve and then to maintain water quality standards.

Receiving stream requirements are established according to numeric and narrative standards adopted under State law for each stream classification. When using chemical-specific numeric criteria from the State's water quality standards to develop permit limits, both the acute and chronic aquatic life criteria are used and expressed in terms of maximum allowable in-stream pollutant concentrations. Acute aquatic life criteria are generally implemented through average monthly limits.

Where a State has not established a numeric water quality criterion for a specific chemical pollutant that is present in the effluent in a concentration that causes or has a reasonable potential to cause a violation of narrative water quality standards, the permitting authority must establish effluent limits in one of three ways: based on a "calculated numeric criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and fully protect the designated use," on a "case-by-case basis" using CWA Section 304(a) recommended water quality criteria, supplemented as necessary by other relevant information; or, in certain circumstances, based on an indicator parameter. See 40 C.F.R. § 122.44(d)(1)(vi)(A-C).

All statutory deadlines for meeting various treatment technology-based effluent limitations established pursuant to the CWA have expired. When technology-based effluent limits are included in a permit, compliance with those limitations is from the date the issued permit becomes effective. See 40 C.F.R. § 125.3(a)(1). Compliance schedules and deadlines not in accordance with the statutory provisions of the CWA cannot be authorized by an NPDES permit. The regulations governing EPA's NPDES permit program are generally found in 40 C.F.R. §122, §124, §125, and §136.

The permit must limit any pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that causes or has "reasonable potential" to cause or contribute to an excursion above any water-quality criterion. See 40 C.F.R. §122.44(d)(1)(i). An excursion occurs if the projected or actual in-stream concentration exceeds the applicable criterion.

Reasonable Potential

In determining reasonable potential, EPA considers: 1) existing controls on point and non-point sources of pollution; 2) pollutant concentration and variability in the effluent and receiving water as determined from the permit's reissuance application, DMRs, and State and Federal Water Quality Reports; 3) sensitivity of the species to toxicity testing; 4) the statistical approach outlined in *Technical Support Document for Water Quality-Based Toxics Control*, March 1991, EPA/505/2-90-001 in Section 3; and, where appropriate, 5) dilution of the effluent in the receiving water.

Anti-Backsliding

Section 402(o) of the CWA generally provides that the effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the previous permit. EPA has also promulgated anti-backsliding regulations, which are found at 40 C.F.R. §122.44(l). Unless applicable anti-backsliding requirements are met, the limits and conditions in the reissued permit must be at least as stringent as those in the previous permit.

State Certification

Section 401(a)(1) of the CWA requires all NPDES permit applicants to obtain a certification from the appropriate state agency stating that the permit will comply with all applicable federal effluent limitations and State water quality standards. See CWA § 401(a)(1). The regulatory provisions pertaining to State certification provide that EPA may not issue a permit until a certification is granted or waived by the state in which the discharge originates. See 40 C.F.R. § 124.53(a). The regulations further provide that, "when certification is required…no final permit shall be issued…unless the final permit incorporates the requirements specified in the certification under §124.53(e)." See 40 C.F.R. §124.55(a)(2). Section 124.53(e) in turn provides that the State certification shall include "any conditions more stringent than those in the draft permit which the State finds necessary" to assure compliance with, among other things, State water quality standards. See 40 C.F.R. §124.53(e)(2), and shall also include "[a] statement of the extent to which each conditions of the draft permit can be made less stringent without violating the requirements of State law, including water quality standards". See 40 C.F.R. §124.53(e)(3).

However, when EPA reasonably believes that a State water quality standard requires a more stringent permit limitation than that reflected in a state certification, it has an independent duty under CWA §301(b)(1)(C) to include more stringent permit limitations. See 40 C.F.R. §122.44(d)(1) and (5). It should be noted that under CWA § 401, EPA's duty to defer to consideration of state law is intended to prevent EPA from relaxing any requirements, limitations, or conditions imposed by State law. Therefore, "[a] State may not condition or deny a certification on the grounds that State law allows a less stringent permit condition." See 40 C.F.R. §12455(c). In such an instance, the regulation provides that, "The Regional Administrator shall disregard any such certification conditions or denials as waivers of certification." EPA regulations pertaining to permit limits based upon water quality standards and state requirements are contained in 40 C.F.R. §122.4(d) and 40 C.F.R. §122.44(d).

In accordance with the regulations found at 40 C.F.R. Section 131.12, the Massachusetts Department of Environmental Protection (MassDEP) has developed and adopted a statewide anti-degradation policy to maintain and protect existing in-stream water quality. The Massachusetts Anti-Degradation Policy is found at Title 314 CWR 4.04. No lowering of water quality is allowed, except in accordance with the anti-degradation policy. All existing uses of the Mill River must be protected. This draft permit is being reissued with allowable discharge limits as, or more, stringent than those in the current permit and with the same parameter coverage. There is no change in outfall location. The public is invited to participate in the anti-degradation finding through the permit public notice process.

f**. <u>Water Quality Standards; Designated Use; Outfall 001</u>**

The Hopedale WWTF discharges into the Mill River within Segment MA51-10. This river is 16.1 miles in length, and begins at the outlet of North Pond in Milford, Massachusetts. The Mill River flows in a southern direction through Milford, Upton, Hopedale, Mendon, and Blackstone, Massachusetts to the confluence with the Blackstone River in Woonsocket, Rhode Island. The Blackstone River then joins the Seekonk River in Pawtucket, Rhode Island. The Mill River is a part of the Blackstone River Basin and the Narragansett Bay Basin. The Hopedale treatment plant discharge is located approximately 6 river miles downstream of North Pond and approximately 1.25 river miles downstream of the dam at Hopedale Pond.

Mill River has been designated as a Class B warm water fishery by the Massachusetts Surface Water Quality Standards(SWQS), 314 Code of Massachusetts Regulations ("CMR") 4.05(4)(a). The SWQS (314 CMR 4.02) defines warm water fisheries as waters in which the maximum mean monthly temperature generally exceeds 68 ^{o} Fahrenheit (20^{o} Celsius) during the summer months and are not capable of supporting a year-round population of cold water stenothermal aquatic life. The SWQS at 314 CMR 4.05(3)(b) state that Class B waters are designated as habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. They shall be a source of public water supply (i.e., where designated and with appropriate treatment). They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. They shall also have consistently good aesthetic value.

The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. To meet this goal, the CWA requires states to develop information on the quality of their water resources and report this information to EPA, the U.S. Congress, and the public. To this end, the EPA released guidance on November 19, 2001, for the preparation of an integrated "List of Waters" that could combine reporting elements of both §305(b) and 303(d) of the CWA. The integrated list format allows the states to provide the status of all their assessed waters in one list. States choosing this option must list each water body or segment in one of the following five categories:

1) Unimpaired and not threatened for all designated uses; 2) Unimpaired waters for some uses and not assessed for others; 3) Insufficient information to make assessments for any uses; 4) Impaired or threatened for one or more uses but not requiring the calculation of a Total Maximum Daily Load (TMDL); and 5) Impaired or threatened for one or more uses and requiring a TMDL.

A comprehensive assessment program of the Blackstone River Watershed began in 1991, under a cooperative agreement with the EPA, MassDEP, Rhode Island Department of Environmental Management (RIDEM), and the University of Rhode Island. This assessment program was part of the Blackstone River Initiative (BRI). The BRI included an extensive water quality survey of the Blackstone River and its tributaries, and was conducted during 1991 – 1994 by the MassDEP. The

survey included both dry and wet weather sampling, as well as sediment quality, biological and habitat assessment (Wright et al.). Twenty-three water quality stations were selected for analysis, including stations located along the mainstem of the river, six major tributaries, and near the discharge locations of the two largest point sources (Upper Blackstone Water Pollution Abatement District and Woonsocket WWTF) within the watershed.

In MassDEP's 2001 Blackstone River Watershed Water Quality Assessment Report, the 0.3-mile reach of the Mill River downstream from the Hopedale WWTF discharge was determined to be in partial attainment for aquatic life criteria. This was reported to be caused by organic enrichment and nutrient loadings from the Hopedale WWTF, compounded by the low-base flow conditions in the Mill River. The Aesthetics Use was also assessed as partial support for the 0.3-mile reach of the Mill River downstream from the Hopedale WWTF because of effluent odor and the presence of green filamentous algae.

The MassDEP's 2010 Water Quality final report 303(d) list includes the Mill River as impaired and in need of a total maximum daily load (TMDL) assessment due to priority pollutants and metals. Spindleville Pond, a 2.4 acre impoundment located approximately one mile downstream from the Hopedale WWTF discharge, is listed as impaired due to priority pollutants and noxious aquatic plants. This assessment is based on the results of the 1998 Blackstone River Survey conducted by the MassDEP.

g**. Available Dilution**

7 Day, 10 Year Low Flow

Water quality-based effluent limitations are established with the use of a calculated dilution factor, based on the available dilution of the effluent. Massachusetts water quality regulations require that the available effluent dilution be based upon the 7 day, 10 year low flow (7Q10 flow) of the receiving water (314 CMR § 4.03(3)(a)). The 7Q10 low flow is the mean low flow over seven consecutive days, recurring every ten years.

The facility design flow is 0.588 million gallons per day (mgd) or 0.9096 cubic feet per second (cfs). The dilution factor used to calculate the water quality-based limits in the current permit was 1.8, based on a calculated 7Q10 receiving water flow of 0.7 cfs. It appears that this value was calculated using the 7Q10 flow at United States Geological Survey gage number 01112250, located on the Mill River downstream of the treatment plant, adjusted for runoff area. The watershed area at the treatment plant discharge is about 11 square miles, and the watershed area at the dam is 25.3 square miles. Using this information, with current 7Q10 data from the USGS gage, a 7Q10 at the Hopedale outfall can be calculated as follows:

$$Q_s = Q_{001} = \frac{(A_{001})}{(A_{gage})} * (Q_{gage}) = \frac{(11 \text{ miles}^2)}{(25.3 \text{ miles}^2)} * (1.73 \text{ cfs}) = 0.75 \text{ cfs}$$

The dilution factor can then be calculated as follows:

$$\text{Dilution Factor (DF)} = \frac{(Q_s) + (Q_d)}{(Q_d)} = \frac{(0.75 \text{ cfs}) + (0.9096 \text{ cfs})}{(0.9096 \text{ cfs})} = 1.8$$

This dilution factor is the same as the one used to calculate the limits in the current permit.

In reviewing this methodology, EPA realized that the 7Q10 flow at the treatment plant outfall, assumed to be the flow upstream of the treatment plant was too high, given that the measured 7Q10 flow at the downstream gage included the discharge flow. A more appropriate calculation of the 7Q10 would include subtracting the treatment plant flow from the downstream 7Q10 flow, and then apportioning that flow according to the watershed area. Recalculating the 7Q10 just upstream of the treatment plant, using a treatment plant flow of 0.3867 cfs (the lowest monthly average flow over the past five years) resulted in a 7Q10 of 0.5838 and a dilution factor of 1.64. The calculations are as follows:

$$Q_s = Q_{001} = \frac{(A_{001})}{(A_{gage})} * (Q_{gage} - Q_d) = \frac{(11 \text{ miles}^2)}{(25.3 \text{ miles}^2)} * (1.73 \text{ cfs} - 0.3867 \text{ cfs}) = 0.5838 \text{ cfs}$$

Where:

Q_{gage} = Estimated 7Q10 flow for the Mill River near the Blackstone, MA gage station in the Blackstone River Basin (gage station # 01112250, downstream from the WWTF discharge) = 1.73 cfs

A_{gage} = Drainage area at the gage station = 25.3 miles^2

A_{001} = Mill River drainage area at Outfall 001 = 11 miles^2

Q_d = Treatment plant dry weather flow = (0.25 mgd x 1.547) = 0.3867 cfs

1.547 = converts million gallons per day (mgd) to cubic feet per second (cfs) units

Based on the most recent instream low flow data available, the resulting dilution factor at the Hopedale WWTF Outfall 001 is re-calculated to be 1.64 using the following equation and data:

$$\text{Dilution Factor (DF)} = \frac{(Q_s) + (Q_d)}{(Q_d)} = \frac{(0.5838 \text{ cfs}) + (0.9096 \text{ cfs})}{(0.9096 \text{ cfs})} = \mathbf{1.64}$$

Where:

Q_s = 7Q10 flow upstream of the treatment plant outfall = 0.5838 cfs

Q_d = Treatment plant design flow = (0.588 mgd * 1.547) = 0.9096 cfs

This dilution factor is slightly less than the value used to calculate water quality based limits for the current permit.

The following statistical tools and stream flow gage data was used to prepare the preceding calculations.

USGS – *StreamStats is a web-based tool that allows users to obtain stream flow statistics, drainage-basin characteristics, and other information for user-selected sites on streams (i.e.,* http://water.usgs.gov/osw/streamstats/massachusetts.html). Streamstats was used to calculate the drainage area at the POTW.

USGS – gage flow data derived from the National Water Information System, Web Interface, http://ma.water.usgs.gov/water/default.htm.

As described previously, the treatment plant is located approximately 1.25 river miles downstream of the privately owned dam on Hopedale Pond. There is no information currently available to verify that water released from the pond is equal to or greater than the estimated 7Q10 at all times. The draft permit therefore includes a requirement that a plan be submitted to EPA and MassDEP that will verify the instream 7Q10 flow at the treatment plant outfall. Options may include, but are not limited to, measuring the flow release from the upstream Hopedale Pond Dam, or gaging the flow in the river.

30 Day, 10 Year Low Flow

Additionally, the 30-day, ten-year low flow (30Q10 flow) of the receiving water is used in the calculation of water quality-based limitations for parameters such as ammonia (EPA 1999 Update of Ambient Water Quality Criteria for Ammonia).

Because there is no stream flow gage on the Mill River with 30Q10 flow values, flow data from the Branch River gage number 01112250 in Forestdale Rhode Island was used. Reliable estimations can be obtained, given that the two watersheds have similar characteristics. The Branch River gage data was also used in the current permit's 30Q10 calculations. At this gage, the 7Q10 is 11.8 cfs and the winter season 30Q10 is 47.1 cfs. These values were derived with flow data up through 2011. The ratio of 30Q10 to 7Q10 for this gage is 3.9. Applying this ratio to the 7Q10 from the Mill River of 0.5838 cfs, we obtained an estimated winter period 30Q10 flow of 2.28 cfs.

Background Information:

Flow Gaging Information for the Branch River gage for the period 1941 – 2011 annual values for the year ending March 31:

In the February 28, 2002 Fact Sheet	Updated in this Fact Sheet
7Q10 = 13.5 cfs	7Q10 = 11.8 cfs
30Q10 = 18.4 cfs	30Q10 = 15.9 cfs

Seasonal values for period November 1 – May 31:

In the February 28, 2002 Fact Sheet	Updated in this Fact Sheet
7Q10 = 29.5 cfs	7Q10 = 29.5 cfs
30Q10 = 48.8 cfs	30Q10 = 47.1 cfs

Calculations:

Therefore, the updated ratio of 30Q10 to 7Q10 for the Branch River gage is 3.9.

30Q10 to 7Q10 for the Branch River gage = (Winter 30Q10)/(7Q10)
= (47.1 cfs)/(11.8 cfs)
= 3.9

Mill River 30Q10 estimate

Applying this ratio to the 7Q10 from the Mill River of 0.5838 cfs, we obtained an estimated winter period of 30Q10 flow of 2.28 cfs.

Winter 30Q10 flow = (Mill River 7Q10) * (Winter 30Q10)/(7Q10 of the B.R. gage)
= (0.5838 cfs * 3.9 cfs)
= 2.28 cfs

Therefore, the 30Q10 dilution factor is 3.51.

30Q10 dilution factor = (WWTF design flow + Winter 30Q10 flow)/(WWTF design flow)
= (0.9096 cfs + 2.28 cfs)/(0.9096 cfs)
= 3.51

B. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Outfall 001)

In addition to the State and Federal regulations described above, data submitted by the permittee in its permit application as well as in monthly discharge monitoring reports (DMRs) and in whole effluent toxicity (WET) test reports from 2005 to 2011 was used to evaluate the discharge during the effluent limitations development process (see **Attachment A**).

a. Flow

The 12 month rolling average flow limitation of 0.588 MGD in the current permit has been maintained in the draft permit. This is the design flow of the facility found in Form 2A, Part A, Section a.6. of the permit application. The draft permit requires continuous flow measurement, and also requires reporting of the average monthly and maximum daily flows.

b. Conventional Pollutants

1. Biochemical Oxygen Demand (BOD)

The draft permit includes technology-based effluent limitations for the months of November through May and more stringent water quality-based limits for the months of June through October.

The November through May limits include average monthly and average weekly concentration limits and average monthly percent removal limitations based on the requirements of 40 CFR § 133.102(a)(1), (2), (3), and average monthly and average weekly mass limits based on the concentration limits and the treatment plant design flow, pursuant to 40 CFR § 122.45(f) and 40 CFR 122.45(b)(1). The draft permit also requires that the maximum daily concentration and mass be reported.

The more restrictive June through October concentration limits are necessary to meet water quality standards. These limits have been carried over from the permittee's 1991 and 1999 permits, consistent with anti-backsliding regulations. The corresponding mass limits were calculated using the concentration limits and the treatment plant design flow. The percent removal limit during this period is based on secondary treatment requirements in 40 CFR §133.102. The draft permit also requires that the maximum daily concentration and mass be reported.

Calculations are presented following the TSS Section.

2. Total Suspended Solids (nonfilterable) (TSS)

The draft permit includes technology-based limitations for the months of November through May and more stringent water quality-based limits for the months of June through October.

The November through May limits include average monthly and average weekly concentration limits and average monthly percent removal limits based on the requirements of 40 CFR § 133.102(a)(1), (2), (3), and average monthly and average weekly mass limitations based on the concentration limits and the treatment plant design flow, pursuant to 40 CFR § 122.45(f) and 40 CFR 122.45(b)(1). The draft permit also requires that the maximum daily concentration and mass be reported.

The more restrictive June through October concentration limits are necessary to meet water quality standards. These limits have been carried over from the permittee's 1991 and 1999 permits, consistent with anti-backsliding regulations. The corresponding mass limits were calculated using the concentration limits and the treatment plant design flow. The percent removal limit during this period is based on secondary treatment requirements in 40 CFR 133.102. The draft permit also requires that the maximum daily concentration and mass be reported.

Calculations for BOD and TSS Limitations

The average monthly and average weekly mass limitations for BOD and TSS were calculated as follows:

Mass Limitation (lbs/day) = C * DF * 8.34

Where:
C = Concentration limit
DF = Design flow of the facility, in million gallons per day (MGD)
8.34 = Factor to convert effluent concentration in mg/l and design flow in MGD to lbs/day. The units of this 8.34 conversion factor are (lbs)(l)/(mg)(gal).

June 1 – October 31 Limitations

Average Monthly Mass Limit = 15 mg/l * 0.588 MGD * 8.34 = 73.5 lbs/day = 74 lbs/day
Average Weekly Mass Limit = 15 mg/l * 0.588 MGD * 8.34 = 73.5 lbs/day = 74 lbs/day

The mass limitations in the draft permit are the same as those in the current permit and are consistent with anti-backsliding requirements.

November 1 – May 31 Limitations

Average Monthly Mass Limit = 30 mg/l * 0.588 MGD * 8.34 = 147.1 lbs/day = 147 lbs/day
Average Weekly Mass Limit = 45 mg/l * 0.588 MGD * 8.34 = 220.6 lbs/day = 221 lbs/day

The mass limitations in the draft permit are the same as those in the current permit and are consistent with anti-backsliding requirements.

3. pH

The draft permit includes pH limitations which are required by state water quality standards, and are protective of pH standards set forth at Title 314 CMR 4.05(b)(3), for Class B waters. The pH requirements are more stringent than those required under 40 CFR § 133.102(c). The pH limits are carried forward from the current permit, and so are consistent with antibacksliding requirements of 40 CFR § 122.44(1). The monitoring frequency for pH is set at once per day in the draft permit.

4. *Escherichia Coli Bacteria (E. coli)*

The *Escherichia Coli (E. coli)* limits for outfall 001 are based on state water quality standards for Class B waters (314 CMR 4.05(b)(4)). The State of Massachusetts promulgated new bacteria criteria in the Surface Water Quality Standards (314 CMR § 4.00) on December 29, 2006, which were approved by EPA on September 19, 2007. The *E. coli* bacteria limits proposed in the draft permit for Outfall 001 are 126 cfu per 100 ml geometric mean and 409 cfu per 100 ml maximum daily value (this is the 90% distribution of the geometric mean of 126 cfu per 100 ml). The current permit requires bacteria limitations and monitoring year round. Since seasonal limits will provide adequate water quality protection, the draft permit proposes seasonal bacteria limits and monitoring, from April 1st – October 31st, to ensure the protection of the receiving water during the recreational period. The proposed bacteria monitoring frequency in the draft permit is once per week.

c. Non-Conventional Pollutants

Nutrients: Ammonia-Nitrogen, Nitrogen, and Phosphorus

Nutrients are compounds containing nitrogen and phosphorus. Although nitrogen and phosphorus are essential for plant growth, high concentrations of these nutrients can cause eutrophication, a condition in which aquatic plant and algal growth is excessive. Plant and algae respiration and decomposition reduces dissolved oxygen concentrations in the water, creating poor habitat for fish and other aquatic animals. In addition, nitrogen in the form of ammonia can be toxic to aquatic life. The toxicity level of ammonia depends on the temperature and pH of the receiving water (USEPA 1999).

1. Ammonia-Nitrogen (NH_3-N)

The current permit includes ammonia-nitrogen limits of 11 mg/l average monthly and a maximum daily monitoring requirement during November through April; 5 mg/l average monthly, 5 mg/l average weekly, and 8 mg/l maximum daily limits in May; and, 2 mg/l average weekly, 2 mg/l average monthly, and 3 mg/l maximum daily during June through October. All of the reporting requirements for ammonia-nitrogen in the current permit are once per week.

EPA published new ammonia criteria in December 1999, which were included in the 2002 State of Massachusetts Water Quality Standards, and are required to be used unless there is a site specific criteria. Based on these criteria, revised warm weather and cold weather ammonia limits have been reviewed for potential draft permit limits to protect the sensitive life stages of fish species which are expected to be present in the Mill River. The following values are based on the most recent ammonia criteria published by EPA in December 1999, which were unavailable when the current permit became effective on October 3, 1999.

Ammonia-Nitrogen Warm Weather Limit Calculation:

Critical instream temperature = 24 C (75 F) (summer instream temperature)
Critical instream pH = 7.0 (summer instream pH)
Chronic ammonia criteria (chronic criterion for Early Life Stages Present) = 3.21 mg/l

Therefore, the ammonia-nitrogen monthly average summer limit:
(7Q10 dilution factor x summer instream ammonia criterion)
(1.64 * 3.21 mg/l) = 5.26 mg/l

Ammonia-Nitrogen Cold Weather Limit:

Critical instream temperature = 10 C (winter instream temperature)
Critical instream pH = 7.0 (winter instream pH)
Chronic ammonia criteria (chronic criterion for Early Life Stages Present) = 5.91 mg/l
Therefore, the ammonia-nitrogen monthly average winter limit:
(30Q10 winter dilution factor x winter instream ammonia criterion)
(3.51 * 5.91 mg/l) = 20.74 mg/l

These calculated limits are less stringent than the limits in the current permit.

Proposed Ammonia-Nitrogen Limitations - Section 402(o) of the Clean Water Act generally provides that the effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the previous permit. EPA has also promulgated anti-backsliding regulations that are found at 40 CFR § 122.44(l). For water-quality limits, anti-backsliding is satisfied if the relaxed limits achieve water quality standards, including anti-degradation. Typically, where it is shown that less stringent limits will attain water quality standards, the Region will only relax the limits to values reflecting the demonstrated performance of the facility, if those values are more stringent than the new water quality-based limits, in order to satisfy anti-degradation requirements.

EPA reviewed the effluent data submitted by the facility for the period from October 7, 2009 to April 2010, which reflect the performance of the upgraded facilities, and noted that the reported summer period average monthly values ranged from 0 mg/l to 0.2 mg/l, and the maximum daily values ranged from 0.2 mg/l to 0.4 mg/l. The winter period monthly average values ranged from 3 mg/l to 4 mg/l, and the maximum daily values ranged from 6 mg/l to 8 mg/l. Also, the reported effluent average monthly and maximum daily values for the month of May in 2010 were 4 mg/l and 6 mg/l, respectively. Since these values are lower than both the current ammonia-nitrogen permit limits and the calculated water quality-based limits (i.e., winter limit of 20.74 mg/l average monthly, and summer limit of 5.26 mg/l average monthly), the current ammonia-nitrogen permit limits are proposed for the draft permit.

Potential Future Ammonia Criteria – Additionally, EPA has recently noticed its intention to re-evaluate the current aquatic life ambient water quality criteria for ammonia to determine whether it should be revised based on new toxicity data for aquatic organisms (USEPA 2004). If future ammonia criteria demonstrates that more stringent ammonia limits are needed to meet water quality standards, this permit may be re-opened and modified.

2. Total Nitrogen

As described earlier, nutrients such as phosphorus and nitrogen, are necessary for the growth of aquatic plants and animals to support a healthy ecosystem. In excess, however, nutrients can contribute to fish disease, brown tide, algae blooms and low dissolved oxygen (DO). Excessive nutrients, generally phosphorus in freshwater and nitrogen in salt water, stimulate the growth of algae, which could start a chain of events detrimental to the health of the aquatic ecosystem. The algae prevent sunlight from penetrating through the water column. As the algae decay, they depress the DO levels in the water. Fish are in turn deprived of oxygen. Excessive algae may also cause foul smells and decrease aesthetic value, which could affect swimming and recreational uses.

It has been documented that the Providence and Seekonk Rivers (in Rhode Island) are impacted by low DO levels and high phytoplankton concentrations that stem from excessive nitrogen loadings. Significant areas of these rivers suffer from hypoxic (low DO) and anoxic (no DO) conditions and violate water quality Federal and State (Rhode Island) water quality standards.

In its Section 305(b) report, the State of Rhode Island assessed the health of its receiving waters. Significant nutrient impairments to shellfish harvesting and swimming, due to nitrogen, were noted in the Providence River, Seekonk River and Upper Narragansett Bay. These waters were given the highest priority consistent with the State of RI's goal of restoring such waters.

The State of Rhode Island conducted water quality modeling to estimate the nitrogen loading that was being contributed to Upper Narragansett Bay from Massachusetts sources. It was found that WWTFs contributed over 90% of the nitrogen loading to the MA/RI state line. Since it has demonstrated that a significant portion of the overall nitrogen loading discharged to Narragansett Bay originates from WWTF effluents in Massachusetts, we believe that limits on nitrogen must be considered at the Massachusetts WWTFs to protect the downstream uses in Rhode Island.

In particular, based on an annual estimate of nitrogen flux into the Upper Narragansett Bay from rivers, the Blackstone River was estimated to be the largest contributor of nitrogen. Thus, EPA believes there is a need to determine the loadings of nitrogen from sources in Massachusetts which are tributary to the Blackstone River. An understanding of nitrogen loadings from Massachusetts sources will help to determine whether these loadings are impacting the water quality in Narragansett Bay. Ultimately, as mentioned above, an understanding of nitrogen loadings from Massachusetts will help determine if nitrogen limits are necessary for discharges in Massachusetts.

According to 40 CFR §122.44(d)(4), EPA should include any requirements in permits to "conform to applicable water quality requirements under Section 401(a)(2) of the CWA when the discharge affects a State other than the certifying State. Based on monitoring conducted in the Blackstone River in support of the State of Rhode Island's assessment efforts, it was found that the nitrogen input from the Hopedale WWTF to the main stem of the Blackstone River (and eventually to Upper Narragansett Bay) was relatively small in comparison to other larger wastewater treatment facilities, and that controls on these larger facilities should be sufficient to ensure that water quality standards are attained. See *Evaluation fof Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*, RIDEM December 2004. Therefore, EPA has not included nitrogen limits at this time.

However, EPA has included monitoring requirements for total nitrogen in the draft permit (total Kjeldahl nitrogen, nitrite, and nitrate). The data submitted by the permittee will help to establish a database of nitrogen loadings, which can be used to quantitatively assess the impact of loading and transport of nitrogen to Narragansett Bay. The monitoring data will provide a more sound decision-making basis in the future decisions relating to nitrogen loadings to Narragansett Bay.

Specifically, average monthly and maximum daily reporting requirements for total Kjeldahl nitrogen (TKN), total nitrite nitrogen (NO_2), and total nitrate nitrogen (NO_3) at a frequency of once per month have been proposed in the draft permit in order to assess the annual average total nitrogen loading from this facility. A nitrogen optimization removal requirement is also proposed in the draft permit, with a requirement to submit a report to the permitting agencies within one year, summarizing the measures taken to enhance the removal of nitrogen by its treatment facility and the effectiveness of these measures. The proposed nitrogen requirements in the draft permit are consistent with the requirements for other small WWTFs that ultimately discharge to Narragansett Bay.

3. Phosphorus

While phosphorus is an essential nutrient for the growth of aquatic plants, it can stimulate rapid plant growth in freshwater ecosystems when it is present in high quantities. The excessive growth of aquatic plants and algae within freshwater systems negatively impacts water quality and can interfere with the attainment of designated uses by: (1) increasing the oxygen demand within the water body (to support an increase in both plant respiration and the biological breakdown of dead organic (plant) matter); (2) causing an unpleasant appearance and odor; (3) interfering with navigation and recreation; (4) reducing water clarity; and (5) reducing the quality and availability of suitable habitat for aquatic life. Cultural (or accelerated) eutrophication is the term used to describe dense and excessive plant growth in a water body that results from nutrients entering the system as a result of human activities. Discharges from municipal and industrial wastewater treatment plants, agriculture runoff, and stormwater are examples of human-derived (i.e., anthropogenic) sources of nutrients in surface waters.

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

EPA has produced several guidance documents which contain recommended total phosphorus criteria for receiving waters. EPA has published national guidance documents which contain recommended total phosphorus criteria and other indicators of eutrophication. EPA's 1986 *Quality Criteria for Water* (the "Gold Book") recommends that instream phosphorus concentrations not exceed 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l (100 ug/l) for any stream not discharging directly into lakes or impoundments, and 0.025 mg/l (25 ug/l) within a lake or reservoir.

More recently, EPA has released recommended Ecoregional Nutrient Criteria, established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. The published criteria represent conditions in waters within ecoregions that are minimally impacted by human activities, and thus free from the effects of cultural eutrophication. Charlton is located within Ecoregion XIV, Eastern Coastal Plains. The recommended total phosphorus criterion for this ecoregion, found in Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV (EPA December 2000) is 0.024 mg/l (24 ug/l).

Currently, the Massachusetts Water Quality Standards do not contain numerical criteria for phosphorus. The narrative criterion for nutrients, found at 314 CMR § 4.05(5)(c), states that nutrients " Unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses ." The Massachusetts Water Quality Standards also require that "any existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment…" "…, including, where necessary, highest and best practical treatment (HBPT) for POTWs…" (314 CMR § 4.05(5)(c)). The MassDEP has established that a monthly average total phosphorus limit of 0.2 mg/l (200 ug/l) represents the highest and best practical treatment for POTWs.

The existing (1999) permit includes a seasonal monthly average total phosphorus limit of 1 mg/l. This limit was continued from the previous permit, and was determined necessary to achieve water quality standards. In this reissuance, EPA has evaluated whether this limit is sufficient to meet water quality standards.

In this evaluation, EPA has decided to apply the Gold Book criterion because it was developed from an effects- based approach versus the reference conditions-based approach used in the derivation of the ecoregion criteria. The effects-based approach is preferred in this case because it is more directly associated with an impairment of designated use (e.g., fishing). The effects-based approach provides a threshold value above which water quality impairments are likely to occur. It applies empirical observations of a causal variable (i.e., phosphorus) and a response variable (i.e., algal growth) associated with impairment of designated uses. Reference-based values are statistically derived from a comparison within a population of rivers in the same ecoregional class. They are a quantitative set of river characteristics (physical, chemical, and biological) that represent minimally impacted conditions.

The impacts associated with excessive phosphorus inputs are well documented in the Spindleville Pond, a 2.4 acre pond located approximately one mile downstream of the Hopedale WWTF discharge. See Blackstone River Watershed 1998 and 2003 Water Quality Assessment Reports (MassDEP 1998 and 2003). The Pond is on the Massachusetts 2010 Integrated List of Waters (the 303(d) list) as impaired and needing a TMDL for priority organics and noxious aquatic plants.

The MassDEP's Blackstone River Watershed 1998 and 2003 Water Quality Assessment Reports indicated a need for additional studies in order to understand the eutrophication impacts within the Mill River segment MA51-10, since the impacts were observed without the support of sampling data. The Blackstone River Basin Volunteer Monitoring Program, which MassDEP convened and oversees as part of the Blackstone River Initiative, has been conducting water quality sampling for the Mill River for several years at sampling stations that are located upstream and downstream of the Hopedale WWTF discharge location. Monitoring is conducted monthly from April through November, on the second Saturday of the month. The samples are analyzed by trained volunteers using HACH colorimeters, and participants follow an approved Quality Assurance Project Plan (QAPP) signed by EPA, MassDEP, and RIDEM. Phosphorus sampling results and sampling station locations are attached to this Fact Sheet. (see **Attachments B and C,** respectively.)

The samples taken immediately downstream of the treatment plant outfall show concentrations far in excess of the Gold Book criteria of 100 ug/l for free flowing waters and, and samples at the outlet of Spindleville Pond show concentrations in excess of the Gold Book criteria of 25 ug/l for lakes and reservoirs.

The table below shows phosphorus concentrations in the receiving water upstream of the discharge. The table also includes the receiving water flow for the sampling dates measured at the Branch River gaging station. The total phosphorus concentrations, and the estimated instream flow occurring on the sampling dates, are listed below:

Table 1. Sampling Station at Thwing Street Upstream of the Hopedale WWTF

Date of Sample	Phosphorus, Total (ug/l)	Branch River gage (cfs)
8/9/08	10	97
8/21/08	7	58
9/13/08	10	71
9/23/08	33	37
10/11/08	65	85
Average	25	
Median	10	

The sampling station at Thwing Street is located just upstream of the Hopedale WWTF's discharge. Since the phosphorus concentration values do not seem to correlate to the flow at the Branch River gage station during the low flow season, the median value of 10 ug/l, which represents the upstream phosphorus concentrations was used to calculate the sufficiency of the existing monthly average limit of 1 mg/l. The following calculations show that the existing limits are not sufficiently stringent to ensure that the discharge does not cause or contribute to an exceedance of water quality standards.

Using an upstream concentration of 10 ug/l, an effluent concentration of 1000 ug/l (1 mg/l), the treatment plant design flow of 0.9096 cfs and an upstream receiving water 7Q10 of 0.5838 cfs, the conccentration in the receiving water downstream of the discharge can be calculated as follows:

$$Cr = \frac{QsCs + QdCd}{Qr}$$

Where:
Qr = Flow of the Mill River downstream of the discharge = Qd + Qs = 1.4934 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
Qs = 7Q10 flow upstream of the discharge = 0.5838 cfs
Cs = In-stream water quality concentration upstream of the discharge = 10 ug/l
Cr = Resulting in-stream phosphorus concentration downstream of the discharge
Cd = Phosphorus concentration in the Hopedale discharge = 1000 ug/l (1 mg/l)

$$Cr = \frac{[(0.5838 * 10) + (0.9096 * 1000)]}{1.4934}$$

Cr = 612.98 ug/l = 0.613 mg/l

As can be seen, the current effluent limit is insufficiently stringent to achieve the Gold Book criterion of 100 ug/l downstream of the discharge. Accordingly, a more stringent limit has been calculated that will ensure attainment of the Gold Book criteria.

Phosphorus Permit Limits:

The proposed phosphorus limitation was calculated using the same mass balance equation that was used to calculate reasonable potential, but was instead solved to calculate an effluent limitation (Cd) that would result in attainment of the Gold Book criterion of 100 ug/l under 7Q10 conditions. The calculations are as follows:

$$Cd = \frac{QrCr - QsCs}{Qd}$$

Where:
Qr = Flow of the Mill River downstream of the discharge = Qd + Qs = 1.493 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
Qs = 7Q10 flow upstream of the discharge = 0.5838 cfs
Cs = In-stream water quality concentration upstream of the discharge = 10 ug/l
Cr = Resulting in-stream phosphorus concentration downstream of the discharge = 100 ug/l
Cd = Phosphorus concentration in the Hopedale discharge = discharge limit

$$Cd = \frac{(1.493 * 100) - (0.5838 * 10)}{0.9096}$$

Cd = 157.7 ug/l = 0.158 mg/l

EPA notes that this calculated limitation also meets the level of treatment to achieve the "highest and best practical treatment" for point sources contributing to eutrophication, since this level of treatment has been defined as achieving a monthly average total phosphorus concentration of 0.2 mg/l or less.

In discussions with the permittee regarding the proposed limit, the permittee requested that the limit be expressed in terms of mass, rather than concentration. The advantage of this approach to the permittee is that at discharge flows less than full design flow, an effluent concentration greater than the calculated limit would be protective of water quality standards. EPA believes that a mass discharge limit is protective provided that the mass limit would result in a downstream concentration equal to, or less than, 100 ug/l under all discharge flow conditions.

Under design flow conditions of 0.59 MGD (0.9096 cfs) a mass limit of 0.78 lbs per day would be protective, based on a discharge concentration of 0.158 mg/l:

Mass limitation (lbs/day) = discharge concentration (mg/L) * flow (MGD) * 8.34
= 0.158 * 0.59 * 8.34
= 0.78 lbs per day

However, this mass limit would not be protective at lower discharge flows because of the effect of the lower discharge flow on the available dilution (i.e., as the discharge flow is decreased, there becomes less total flow in the river). Therefore, EPA selected the minimum monthly average discharge flow recorded over the previous five years (0.25 MGD, or 0.39 cfs) to calculate an effluent concentration limit, which was then converted to a mass limit.

$$Cd = \frac{QrCr - QsCs}{Qd}$$

Where:
Qr = Flow of the Mill River downstream of the discharge = Qd + Qs = 0.39 + 0.5838 = 0.97 cfs
Qd = Summer low flow of the Hopedale WWTF = 0.39 cfs
Qs = 7Q10 flow upstream of the discharge = 0.5838 cfs
Cs = In-stream water quality concentration upstream of the discharge = 10 ug/l
Cr = Resulting in-stream phosphorus concentration downstream of the discharge = 100 ug/l
Cd = Phosphorus concentration in the Hopedale discharge = discharge limit

$$Cd = \frac{(0.97 * 100) - (0.5838 * 10)}{0.39}$$

Cd = 233 ug/l = 0.233 mg/l

Mass limitation (lbs/day) = discharge concentration (mg/L) * flow (MGD) * 8.34
= 0.233 * 0.25 * 8.34
= 0.49 lbs per day

April 1 – October 31 Limitation

A monthly average limit of 0.49 lbs per day is proposed in the draft permit, in order to control cultural eutrophication. If new information becomes available that demonstrates the need to change the phosphorus permit limit, the permit may be re-opened and modified as necessary to include a different phosphorus permit limit. The existing monitoring frequency of once per week is also maintained.

The proposed cold weather limit (November 1 – March 31) is 1.0 mg/l. The cold weather limitation on phosphorus is necessary to ensure that the higher levels of phosphorus discharged during the winter period do not result in the accumulation of phosphorus in the sediments, and subsequent release during the warm weather growing season. The limitation assumes that the vast majority of the phosphorus discharged will be in the dissolved fraction and that dissolved phosphorus will pass through the system and not accumulate in the sediments. A dissolved orthophosphorus monitoring requirement has been included to verify the dissolved fraction.

A seasonal (November 1st – March 31st) once per month monitoring requirement for dissolved ortho-phosphorus is also proposed in the draft permit. Monitoring for ortho-phosphorus is necessary to identify whether the particulate fraction remains low and to further understand the dynamics of phosphorus during the non-growing season.

The draft permit allows a reasonable period of time for the facility to begin meeting the new, more restrictive total phosphorus (TP) limit. During the first three years of the permit, the permittee is required to continue meeting the 1 mg/l monthly average total phosphorus limit from the 2006 permit, while it works towards meeting the new limit. If the new limit can be achieved in three years with the current treatment facility upgrades (coupled with expected improvements resulting from the new water treatment facility), the new TP limit will become effective three years and two months from the effective date of the permit. If the new TP limit is not achievable during the first three years of the permit, the permittee is required make necessary upgrades to the facility in order to meet the new limit before the permit expires.

NPDES permits may include compliance schedules for achieving new or revised water quality based permit limits. Schedules in permits are only granted (see In Re Star-kist Caribe, Inc., NPDES Appeal No. 88-5 (EAB, May 25, 1992)), when the state's water quality standards or their implementing regulations allow such schedules. Massachusetts regulations permit schedules under Title 314 CMR, §4.03(1). Schedules must be consistent with the CWA, be as short as possible, and be based on a consideration of technological and economic impacts. Note, additionally, that consistent with Section B.1. of Part II (General Conditions) of the draft permit, the permittee shall properly operate and maintain the existing phosphorus removal facilities at the treatment plant to obtain the lowest effluent phosphorus concentration that can be reasonably achieved.

d. Metals (Aluminum, Cadmium, Copper, Lead, Nickel, and Zinc)

Relatively low concentrations of metals in receiving waters can be toxic to resident aquatic life species. EPA is required to limit any pollutant that is, or may be discharged at a level that caused, or has reasonable potential to cause, or contributes to an excursion above any water quality criterion. See 40 CFR 122.44(d)(l)(vi). Effluent metals data submitted with the permit application, toxicity tests results and discharge monitoring reports were reviewed to determine if metals in the discharge have the potential to exceed aquatic life criteria in the Mill River.

As required by Massachusetts Water Quality Standards (314 CMR 4.05(5)(e)), the EPA National Recommended Water Quality Criteria: 2002 were used to calculate reasonable potential, and where necessary, effluent limits. The EPA- recommended approach to set and measure compliance with water quality standards is to use dissolved metals, because dissolved metals more closely approximates the bioavailable fraction of metals in the water column than does the total recoverable metal. Most toxicity to aquatic organisms is by adsorption of uptake across the gills which require the metals to be in dissolved form. When toxicity tests were originally conducted to develop EPA's Section 304(a) metals criteria, the concentrations were expressed as total metals. Subsequent testing determined the percent of the total metals that is dissolved in the water column. The calculations that follow use the freshwater conversion factors in EPA National Recommended Water Quality Criteria: 2002 to calculate the dissolved acute and chronic water quality criteria for metals (Appendix A).

Regulations in 40 CFR 122.45(c) require that the permit limits be based on total recoverable metals. The chemical differences between the effluent and the receiving water may cause changes in the partitioning between dissolved and particulate forms of metals. As the effluent mixes with the receiving water, absorbed metals from the discharge may dissolve in the water column.

In this case, measuring dissolved metals would underestimate the impact on the receiving water, and an additional calculation, using a site-specific translator would determine total metal criteria. Based on EPA's Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA-823-B-96-007), the conversion factor is equivalent to the translator if site-specific studies for partitioning have not been conducted. In subsequent calculations, conversion from dissolved metals to total recoverable metals have been done using the conversion factor for the particular metals found in Appendix A of National Recommended Water Quality Criteria: 2002, in lieu of a translator.

Hardness-dependent Metals (Cadmium, Copper, Lead, Nickel, and Zinc)

Certain metals, including cadmium, lead, nickel, and zinc, are more toxic at lower hardness, and this is factored into calculations of the water quality criteria. EPA's Office of Water – Office of Science and Technology stated in a letter dated July 7, 2000 that: *The hardness of the water containing the discharged toxic metals should be used for determining the applicable criterion. Thus, the downstream hardness should be used.*

The theoretical hardness of the Mill River downstream of the treatment plant during critical low flow periods and design discharge flow was calculated based on average ambient and effluent hardness data as shown in Table 2, Mill River Hardness Upstream of the Hopedale WWTP, below as reported in the facility's whole effluent toxicity tests conducted in the summer months of August 2006, 2007, 2008 and 2009.

The hardness of Mill River downstream of the treatment plant during critical low flow periods was calculated based on average ambient and effluent hardness data collected for the whole effluent toxicity tests conducted in the summer months of August 2006 – 2009.

Table 2. Mill River Hardness Upstream of the Hopedale WWTF

WET Test Date	Effluent Hardness, mg/l (as $CaCO_3$)	Ambient Hardness, mg/l (data collected upstream)
8/13/07	56	---
8/15/07	58	---
8/17/07	58	---
8/11/08	68	39
8/13/08	75	45
8/15/08	68	42
8/17/09	52	36
8/19/09	55	38
8/21/09	54	38
Average	60.4	39.6

Calculation of hardness in the receiving water:

$$Cr = \frac{QdCd + QsCs}{Qr} = \frac{(0.9096 \text{ cfs})(60.4 \text{ mg/l}) + (0.5838 \text{ cfs})(39.6 \text{ mg/l})}{(0.5838 \text{ cfs} + 0.9096 \text{ cfs})} = 52.3 \text{ mg/l}$$

Where:

Qs = 7Q10 river stream flow upstream of plant = 0.5838 cfs
Qd = Design discharge flow from plant = 0.588 MGD = 0.9096 cfs
Qr = Combined stream flow (7Q10 + plant flow) = (0.5838 + 0.9096) = 1.4934 cfs
Cs = Upstream hardness concentration = 39.6 mg/l as $CaCo_3$
Cd = Plant discharge hardness concentration = 60.4 mg/l as $CaCo_3$
Cr = Receiving water hardness concentration

Therefore, a hardness of 52.3 mg/l as $CaCo_3$ was used to calculate the water quality criteria for certain metals. The water quality criteria formulas are found in Appendix B of EPA's National Recommended Water Quality Criteria – 2006:

1. Acute Criteria $_{(Dissolved)} = \exp\{m_a[\ln(h)]+b_a\}(CF)$[1]

[1] EPA Metal Translator Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criteria (EPA-823-B96-007) was used as the basis for the use of the criteria conversion factor (CF). National Guidance requires that permit limits for metals are to be expressed in terms of total recoverable metal and not dissolved metal. As such, conversion factors are used to develop total recoverable limits from dissolved criteria. The conversion factor reflects how the discharge of a particular metal partitions between the particulate and dissolved form after mixing with the receiving water. In the absence of site-specific data describing how a particular discharge partitions in the receiving water, a default assumption equivalent to the criteria conversion factor is used in accordance with the Metal Translator Guidance.

Where:

m_a = Pollutant-specific coefficient
b_a = Pollutant-specific coefficient
ln = Natural logarithm
h = Hardness of the receiving water, expressed in terms of mg/l $CaCo_3$
CF = Pollutant-specific conversion factor used to convert total recoverable metals to dissolved metal

2. Chronic Criteria $_{(Dissolved)} = \exp\{m_c[\ln(h)]+b_c\}(CF)$

Where:

m_c = Pollutant-specific coefficient
b_c = Pollutant-specific coefficient
ln = Natural logarithm
h = Hardness of the receiving water, expressed in terms of mg/l $CaCo_3$
CF = Pollutant-specific conversion factor used to convert total recoverable metals to dissolved metal

Table 3. Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness Dependent

					Freshwater Conversion Factors (CF)	
Chemical	m_A	b_A	m_c	b_c	CMC	CCC
Cadmium	1.0166	-3.924	0.7409	-4.719	1.136672-[(ln hardness)(0.041838)]	1.101672-[(ln hardness)(0.041838)]
Copper	0.9422	-1.700	0.8545	-1.702	0.960	0.960
Lead	1.273	-1.460	1.273	-4.705	1.46203-[(ln hardness)(0.145712)]	1.46203-[(ln hardness)(0.145712)]
Nickel	0.8460	2.255	0.8460	0.0584	0.998	0.997
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

The dissolved acute and chronic criteria and total recoverable maximum daily and average limits are listed on the summary table below.

Metals Criteria and Limits

In order to determine the reasonable potential to cause or contribute to exceedances of the metals criteria in the Mill River, metals data submitted with the toxicity test reports from October 2009 through May 2011 and DMRs from October 2009 through April 2010 were evaluated against potential water quality based effluent limits based on the respective water quality criteria for each metal. The table below summarizes the criteria, potential water quality based limits, and discharge quality for six trace metals (aluminum, copper, cadmium, lead, nickel, and zinc) that are commonly present in the effluent of POTWs.

Table 4. Summary of Reasonable Potential Analysis for Selected Trace Metals

Metal	Acute Criterion, Dissolved (ug/l)	Chronic Criterion, Dissolved (ug/l)	Maximum Daily Limit, Total (ug/l)	Average Monthly Limit, Total (ug/l)	Effluent	
					Range (ug/l)	Number of Exceedances
Aluminum	750	87	1199	111	56 – 1000	13
Copper	7.3	5.15	11.82	8.14	7 – 53	21
Cadmium	1.08	0.16	1.81	0.28	< 0.5 (bdl)	0
Lead	32.13	1.4	58	1.85	< bdl – 0.7	0
Nickel	270.6	30.1	444.7	49.5	< bdl - 2	0
Zinc	67.7	68.2	109.45	109.41	19 - 31	0

Copper

The current permit includes monthly average and daily maximum copper limits of 5.0 ug/l and 7.0 ug/l, respectively. These limits were calculated using the 1998 National Recommended Water Quality Criteria for copper using a hardness of 25 mg/l as $CaCO_3$ and a dilution factor of 1.8. However, a letter from EPA's Office of Water – Office of Science and Water Technology dated July 7, 2000 stated that: "The hardness of water containing the discharged toxic metal should be used for determining the applicable criterion." Therefore, since the downstream hardness should be used, the hardness of the Mill River downstream of the treatment plant was calculated based on ambient and effluent hardness data collected from the August 2006, 2007, 2008, and 2009 whole effluent toxicity tests.

The Massachusetts Surface Water Quality Standards were revised in December 2006 to include site-specific criteria that were developed for receiving waters where national criteria are invalid due to site-specific physical, chemical, or biological considerations, and do not exceed the safe exposure levels determined by toxicity testing (314 CMR 4.06(7) Table 28). EPA approved these criteria on March 26, 2007. The MassDEP has adopted an acute dissolved copper criterion of 25.7 ug/l and a chronic dissolved criterion of 18.1 ug/l for several rivers, and river segments, in Massachusetts. The MassDEP has not adopted site-specific copper criteria for the Mill River. If the MassDEP adopts new criteria for the effluent's receiving water, and if EPA approves, the permit may be re-opened and modified in order to reflect this change.

Calculations for Copper Limits:

The available instream data was evaluated to determine the background concentration of copper in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 5. Mill River upstream of the Hopedale WWTF Copper Concentrations

Date	Upstream Copper Concentration, mg/l
8/11/08	0.002
11/3/08	bdl
11/1/10	bdl
8/8/11	bdl
11/14/11	bdl
Average	0.0012
Median	0.001

Note: "bdl" means below detection level. When calculating the average values within this document, half the quantifiable limit was used for "bdl" values.

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute copper criteria (dissolved) = exp{0.9422 [ln 52.3)] - 1.7}(0.96) = 7.30 ug/l
CCC = Chronic copper criteria (dissolved) = exp{0.85452 [ln 52.3)] - 1.702}(0.96) = 5.15 ug/l

Calculation With Background Copper:

$\{(Qs + Qd) * C_{WQ} – (Qs * Cs)\} / Qd = Cd$

Where:
Qs = 7Q10 flow of Mill River at the point of discharge = 0.5838 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
C_{WQ} = In-stream water quality criteria = 7.3 ug/l (acute dissolved criteria)
C_{WQ} = In-stream water quality criteria = 5.15 ug/l (chronic dissolved criteria)
C_S = In-stream copper concentration located upstream of the discharge = 1 ug/l
Cd = Copper concentration limit for the Hopedale WWTF

Acute:
{(0.5838 + 0.9096) * 7.30 – (0.5838 * 1)} / 0.9096 = 11.34 ug/l (dissolved)
(10.7 / 0.96 converts Cu acute dissolved to total recoverable) = 11.15 ug/l total recoverable limit

Chronic:
{(0.5838 + 0.9096) * 5.15 – (0.5838 * 1)} / 0.9096 = 7.17 ug/l (dissolved)
(7.17 / 0.96 converts Cu chronic dissolved to t. recoverable) = 7.47 ug/l total recoverable limit

These limitations are less stringent than the limits in the current permit. A review of monthly discharge monitoring reports (DMRs) submitted by the permittee from October 2009 to April 2010 found concentrations of copper in the effluent ranging from a minimum of 10 ug/l to a maximum of 22 ug/l, and a review WET test reports submitted by the permittee from October 2009 to May 2011 found concentrations of copper in the effluent ranging from a minimum of 7 ug/l to a maximum of 53 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility has a reasonable potential to cause or contribute to a violation of the calculated allowable acute and chronic concentration values, effluent limitations for copper are proposed in the draft permit. The proposed copper limitations, based on the calculations above, are less stringent than the existing limits, but are in accordance with the state's antidegradation policy, because the receiving water will meet water quality standards and will not cause any adverse impact to the existing uses.

Lead

The current permit does not include lead limits.

Calculations for Lead Limits:

The available instream data was evaluated to determine the background concentration of lead in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 6. Mill River upstream of the Hopedale WWTF Lead Concentrations

Date	Upstream Lead Concentration, mg/l
8/11/08	0.003
11/3/08	---
11/1/10	0.001
8/8/11	0.001
11/14/11	0.0007
Average	0.001
Median	---

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute lead criteria (dissolved) = exp{1.273 [ln (52.3)] - 1.460}(0.898) = 32.13 ug/l
CCC = Chronic lead criteria (dissolved) = exp{1.273 [ln (52.3)] - 4.702}(0.898) = 1.4 ug/l

Calculation With Background Lead:

$\{(Qs + Qd) * C_{WQ} – (Qs * Cs)\} / Qd = Cd$

Where:
Qs = 7Q10 flow of Mill River at the point of discharge = 0.5838 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
C_{WQ} = In-stream water quality criteria = 32.13 ug/l (acute dissolved criteria)
C_{WQ} = In-stream water quality criteria = 1.4 ug/l (chronic dissolved criteria)
Cs = In-stream lead concentration located upstream of the discharge = 1 ug/l
Cd = Lead concentration limit for the Hopedale WWTF

Acute:
{(0.5838 + 0.9096) * 32.13 – (0.5838 * 1)} / 0.9096 = 52.11 ug/l (dissolved)
(52.11/ 0.898 converts Pb acute dissolved to total recoverable) = 58 ug/l total recoverable limit

Chronic:
{(0.5838 + 0.9096) * 1.4 – (0.5838 * 1)} / 0.9096 = 1.66 ug/l (dissolved)
(1.66 / 0.898 converts Pb chronic dissolved to t. recoverable) = 1.85 ug/l total recoverable limit

A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of lead in the effluent ranging from not being detected to a maximum of 0.7 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility does not have a reasonable potential to cause or contribute to a violation of the calculated allowable acute or chronic concentration values, limitations and monitoring requirements are not proposed in the draft permit. The permittee will continue to monitor lead as part of their whole effluent toxicity (WET) testing.

Nickel

The current permit does not include nickel limits.

Calculations for Nickel Limits:

The available instream data was evaluated to determine the background concentration of nickel in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 7. Mill River upstream of the Hopedale WWTF Nickel Concentrations

Date	Upstream Nickel Concentration, mg/l
8/11/08	<0.002
11/3/08	<0.002
11/1/10	<0.002
8/8/11	<0.002
11/14/11	<0.002
Average	Below detection level
Median	Below detection level

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute nickel criteria (dissolved) = exp{0.8460 [ln(52.3)] + 2.255}(0.998) = 270.6 ug/l
CCC = Chronic nickel criteria (dissolved) = exp{0.8460 [ln(52.3)] + 0.0584}(0.997) = 30.1 ug/l

Calculation Without Background Nickel (since the background level was below detection):

Maximum Daily Effluent Limitation:
(CMC)(dilution factor) = (270.6)(1.64) = 443.78 ug/l (dissolved)
Total recoverable limit = 443.78 / (0.998) = 444.67 ug/l

Monthly Average Effluent limitation:
(CCC)(dilution factor) = (30.1)(1.64) = 49.36 ug/l (dissolved)
Total recoverable limit = 49.36 / (0.997) = 49.5 ug/l

A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of nickel in the effluent ranging from not being detected to a maximum of 2 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility does not have a reasonable potential to cause or contribute to a violation of the calculated allowable acute or chronic concentration values, limitations and monitoring requirements are not proposed in the draft permit. The permittee will continue to monitor nickel as part of their whole effluent toxicity (WET) testing.

Cadmium

The current permit does not include cadmium limits.

Calculations for Cadmium Limits:

The available instream data collected during the low flow season was evaluated to determine the background concentration of cadmium in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 8. Mill River upstream of the Hopedale WWTF Cadmium Concentrations

Date	Upstream Cadmium Concentration, mg/l
8/11/08	-0.0005
11/3/08	-0.0005
11/1/10	-0.0005
8/8/11	-0.0005
11/14/11	-0.0005
Average	Below detection level
Median	Below detection level

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute cadmium criteria (dissolved) = exp{1.0166 [ln(52.3)] - 3.924}(0.976) = 1.08 ug/l
CCC = Chronic cadmium criteria (dissolved) = exp{0.7409 [ln(52.3)] - 4.72}(0.941) = 0.16 ug/l

Calculation Without Background Cadmium (since the background level was below detection):

Maximum Daily Effluent limitations:
(CMC)(dilution factor) = (1.08)(1.64) = 1.77 ug/l (dissolved)
Total recoverable limit = 1.77 / (0.976) = 1.81 ug/l

Monthly Average Effluent limitations:
(CCC)(dilution factor) = (0.16)(1.64) = 0.26 ug/l (dissolved)
Total recoverable limit = 0.26 / (0.941) = 0.28 ug/l

A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of cadmium in the effluent not being detected (see **Attachment A**). Since the facility's discharge data indicates that the facility does not have a reasonable potential to cause or contribute to a violation of the calculated allowable acute or chronic concentration values, limitations and monitoring requirements are not proposed in the draft permit. The permittee will continue to monitor cadmium as part of their whole effluent toxicity (WET) testing.

Zinc

The current permit does not include zinc limits.
Calculations for Zinc Limits:

The available instream data collected during the low flow season was evaluated to determine the background concentration of zinc in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 9. Mill River upstream of the Hopedale WWTF Zinc Concentrations

Date	Upstream Zinc Concentration, mg/l
8/17/09	0.011
11/09/09	0.004
11/1/10	0.012
8/8/11	0.003
11/14/11	0.002
Average	0.0064
Median	---

Acute and Chronic Dissolved Criteria Calculations:

CMC = Acute zinc criteria (dissolved) = exp{0.8473 [ln(52.3)] + 0.8847}(0.978) = 67.7 ug/l
CCC = Chronic zinc criteria (dissolved) = exp{0.8473 [ln(52.3)] + 0.884}(0.986) = 68.21 ug/l

Calculation With Background Zinc:

$\{(Qs + Qd) * C_{WQ} – (Qs * Cs)\} / Qd = Cd$

Where:
Qs = 7Q10 flow of Mill River at the point of discharge = 0.5838 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
C_{WQ} = In-stream water quality criteria = 67.7 ug/l (acute dissolved criteria)
C_{WQ} = In-stream water quality criteria = 68.21 ug/l (chronic dissolved criteria)
Cs = In-stream zinc concentration located upstream of the discharge = 6.4 ug/l
Cd = Zinc concentration limit for the Hopedale WWTF

Acute:
{(0.5838 + 0.9096) * 67.7 – (0.5838 * 6.4)} / 0.9096 = 107.04 ug/l (dissolved)
(107.04 /0.978 converts Zn acute dissolved to total recoverable) = 109.4 ug/l total recoverable limit

Chronic:
{(0.5838 + 0.9096) * 68.21 – (0.5838 * 6.4)} / 0.9096 = 107.88 ug/l (dissolved)
(107.88 / 0.986 converts Zn chronic dissolved to t. recoverable) = 109.4 ug/l total recoverable limit

A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of zinc in the effluent ranging from 19 ug/l to a maximum of 31 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility does not have a reasonable potential to cause or contribute to a violation of the calculated allowable acute or chronic concentration values, limitations and monitoring requirements are not proposed in the draft permit. The permittee will continue to monitor zinc as part of their whole effluent toxicity (WET) testing.

Aluminum

The current permit includes a once per month reporting requirement, without numerical limits.

Sample Calculations for Aluminum Limits:

The available instream data collected during the low flow season was evaluated to determine the background concentration of cadmium in the Mill River upstream of the treatment plant discharge. This data, from the WET test dilution water samples, is shown below:

Table 10. Mill River upstream of the Hopedale WWTF Aluminum Concentrations

Date	Upstream Aluminum Concentration, mg/l
8/11/08	0.09
11/3/08	0.03
11/1/10	0.045
8/8/11	0.031
Average	0.05
Median	---

Acute and Chronic Dissolved Criteria Calculations:

The aluminum criteria is expressed in terms of total recoverable metal in the water column but is not hardness-dependent. The following criteria from the EPA 2002 National Recommended Water Quality Criteria were used in the calculation of permissible effluent concentrations of aluminum:

CMC = Acute aluminum criteria = 750 ug/l
CCC = Chronic aluminum criteria= 87 ug/l

Calculation With Background Aluminum:

$\{(Qs + Qd) * C_{WQ} - (Qs * Cs)\} / Qd = Cd$

Where:
Qs = 7Q10 flow of Mill River at the point of discharge = 0.5838 cfs
Qd = Design flow of the Hopedale WWTF = 0.9096 cfs
C_{WQ} = In-stream water quality criteria = 750 ug/l (acute)
C_{WQ} = In-stream water quality criteria = 87 ug/l (chronic)
Cs = In-stream aluminum concentration located upstream of the discharge = 50 ug/l
Cd = Aluminum concentration limit for the Hopedale WWTF

Maximum Daily Effluent limitation:
Total recoverable acute limit ={(0.5838 + 0.9096) * 750 – (0.5838 * 50)} / 0.9096 = 1199 ug/l

Monthly Average Effluent limitations:
Total recoverable chronic limit ={(0.5838 + 0.9096) * 87 – (0.5838 * 50)} / 0.9096 = 111 ug/l

A review of monthly discharge monitoring reports (DMRs) submitted by the permittee from October 2009 to April 2010 showed monthly average effluent concentrations of aluminum ranging from not being detected to a maximum of 1.0 mg/l. A review of WET test reports submitted by the permittee from October 2009 to May 2011 showed concentrations of aluminum in the effluent ranging from 56 ug/l to a maximum of 680 ug/l (see **Attachment A**). Since the facility's discharge data indicates that the facility exceeded the proposed chronic limitation and has a reasonable potential to cause or contribute to a violation of the calculated allowable acute concentration value, limitations and monitoring requirements are proposed in the draft permit. The permittee will also continue to monitor aluminum as part of their whole effluent toxicity (WET) testing.

The draft permit allows a reasonable period of time for the facility to begin meeting the new aluminum limits. During the first three years of the permit, the permittee is required to monitor the effluent and work towards attaining the limits. If the limits can be achieved in three years with the current treatment facility upgrades (with expected improvements from the new water treatment facility) the aluminum limits will become effective three years and two months from the effective date of the permit. If the new limits have not been achieved after three years, any necessary improvements to the treatment facility must be made and the new limits achieved before the permit expires (five years from the effective date).

e. Whole Effluent Toxicity

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The Massachusetts State Surface Water Quality Standards, found at 314 CMR § 4.05(5)(e), include the following narrative statements and require 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. For pollutants not otherwise listed in 314 CMR 4.00,the National recommended water quality criteria: 2002, EPA 822-r-02-047, November 2002 published by EPA pursuant to Section 304(a) of the Federal Water Pollution Control Act, are the allowable receiving water concentrations for the affeccted waters, unless the State either establishes a site specific criterion or determines that natually occurring background concentrations are higher. Where the State determines that naturally occurring background concentrations are higher, those concentrations shall be the allowable receiving water concentrations The State may establish site specific criteria for toxic pollutants based on site specific considerations. Site-specific limits, human health risk levels and permit limits will be established in accordance with 314 CMR 4.05(5)(e)(1)(2)(3)(4).

National studies conducted by the EPA have demonstrated that domestic sources, as well as industrial 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 contributions, the state narrative water quality criterion, the level of 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 acute toxicity (lethal concentration to 50% of the test organisms, or LC_{50}) limitation and a chronic toxicity (no observed effluent concentration, or C-NOEC) monitoring requirement. (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-Based Toxics Control*, September, 1991.)

The MassDEP's Division of Watershed Management has a current toxics policy which requires toxicity testing for all major dischargers such as the Hopedale WWTF (*Implementation Policy for the Control of Toxic Pollutants in Surface Waters*, MassDEP 1990). In addition, EPA feels that toxicity testing is required to assure that the synergistic effect of the pollutants in the discharge does not cause toxicity, even though the pollutants may be at low concentrations in the effluent. The inclusion of whole effluent toxicity limitations in the draft permit will assure that the Hopedale WWTF does not discharge combinations of toxic compounds into the Mill River in amounts which would affect aquatic or human life.

Pursuant to EPA Region I Policy, and MassDEP's *Implementation Policy for the Control of Toxic Pollutants in Surface Waters* (February 1990), dischargers having a dilution factor less than 10 are required to conduct acute and chronic toxicity testing four times per year unless there are passing results over an extended period of time. In accordance with the above guidance, the draft permit includes an acute toxicity limit (LC_{50} of $\geq$ 100%) and a chronic toxicity limit (C-NOEC of $\geq$ 61 %). The permittee shall conduct the modified acute and chronic toxicity tests using the daphnid, *Ceriodaphnia dubia* (*C. dubia*), as the test species. Toxicity testing must be performed in accordance with the EPA Region I test procedures and protocols specified in **Attachment B** of the draft permit (Freshwater Chronic Toxicity Procedure and Protocol), and the tests will be conducted four times a year. EPA and the MassDEP may use the results of the toxicity tests and chemical analyses conducted by the permittee, required by the permit, as well as national water quality criteria, state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants.

The C-NOEC calculations are as follows: (1/dilution factor * 100) = (1/1.64 * 100) = 61 percent

VI. SLUDGE CONDITIONS

Section 405(d) of the Clean Water Act requires that EPA develop technical standards regarding the use and disposal of sewage sludge. On February 19, 1993, EPA promulgated technical standards. These standards are required to be implemented through permits. The conditions in the permit satisfy this requirement.

VII. INFILTRATION/INFLOW (I/I)

Infiltration is groundwater that enters the collection system through physical defects such as cracked pipes or deteriorated joints. Inflow is extraneous flow that enters the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems. Significant I/I in a collection system may displace sanitary flow, reducing the capacity and the efficiency of the treatment works and may cause bypasses of secondary treatment. It greatly increases the potential for sanitary sewer overflows (SSO) in separate systems, and combined sewer overflows (CSO) in combined systems.

The draft permit includes a requirement for the permittee to control infiltration and inflow (I/I) within the sewer collection system it owns and operates. The permittee shall develop an I/I removal program commensurate with the severity of I/I in the collection system. This program may be scaled down in sections of the collection system that have minimal I/I.

VIII. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

The standard permit conditions for "Proper Operation and Maintenance", set forth at 40 C.F.R. §122.41(e), require the proper operation and maintenance of permitted wastewater systems and associated facilities to achieve permit conditions. The requirements at 40 C.F.R. §122.41(d) impose a "duty to mitigate" upon the permittee, which requires that "all reasonable steps be taken to minimize or prevent any discharge violation of the permit which has a reasonable likelihood of adversely affecting human health or the environment". EPA and the MassDEP maintain that an I/I removal program is an integral component to ensuring compliance with the requirements of the permit under the provisions at 40 C.F.R. §122.41(d) and (e).

General requirements for proper operation and maintenance, and mitigation have been included in Part II of the permit. Specific permit conditions have also been included in Part I.D. and I.E. of the draft permit. These requirements include mapping of the wastewater collection system, preparing and implementing a collection system operation and maintenance plan, reporting of unauthorized discharges including SSOs, maintaining an adequate maintenance staff, performing preventative maintenance, controlling inflow and infiltration to separate sewer collection systems (combined sewers are not subject to I/I requirements) to the extent necessary to prevent SSOs and I/I related effluent violations at the wastewater treatment plant, and maintaining alternate power where necessary. These requirements are included to minimize the occurrence of permit violations that have a reasonable likelihood of adversely affecting human health or the environment.

Several of the requirements in the draft permit are not included in the current permit, including collection system mapping, and preparation of a collection system operation and maintenance plan. EPA has determined that these additional requirements are necessary to ensure the proper operation and maintenance of the collection system and has included schedules for completing these requirements in the draft permit.

IX. ESSENTIAL FISH HABITAT DETERMINATION (EFH)

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et.seq. (1998)), EPA is required to consult with the National Marine Fisheries Services (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, "may adversely impact any essential fish habitat," (16 U.S.C. § 1855(b)).

The Amendments broadly define "essential fish habitat" (EFH) as: "waters and substrate necessary to fish for spawning, breeding, 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 of habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

EFH is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b)(1)(A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999. The Mill River is not covered by the EFH designation for riverine systems and thus EPA and the MassDEP have determined that a formal consultation with NMFS is not required.

X. ENDANGERED SPECIES ACT (ESA)

Section 7(a) of the Endangered Species Act (ESA) of 1973, as amended (the "Act"), grants authority to and imposes requirements upon Federal agencies regarding threatened or endangered species of fish, wildlife, or plants ("listed species") and habitat of such species that have been designated as critical ("critical habitat").

Section 7(a)(2) of the CWA requires every Federal agency in consultation with and with the assistance of the Secretary of the Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The NMFS administers Section 7 consultations for freshwater species. EPA has reviewed the federal endangered or threatened species of fish and wildlife to determine if any listed species might potentially be impacted by the re-issuance of this NPDES permit. The review revealed that there are no known federally listed threatened or endangered species or their critical habitat within the vicinity of the Hopedale discharge and, therefore, a formal ESA consultation will not be required for this discharge.

The permittee should contact the State regarding a Massachusetts Natural Heritage and Endangered Species Program (NHESP) review. According to the NHESP website, there are no threatened or endangered species listed for the Town of Hopedale, MA. However, the American Brook Lamprey (*Lampetra appendix*) and the Blanding's Turtle (*Emydoidea blandingii*) were listed as threatened endangered species within the Town of Mendon, MA, located downstream of the Hopedale WWTF.

XI. MONITORING AND REPORTING

The permittee is obligated to monitor and report sampling results to EPA and the MassDEP within the time specified within the permit. Timely reporting is essential for the regulatory agencies to expeditiously assess compliance with permit conditions.

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

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

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

NetDMR is a national web-based tool for regulated Clean Water Act permittees to submit discharge monitoring reports (DMRs) electronically via a secure Internet application to U.S. EPA through the Environmental Information Exchange Network. NetDMR allows participants to discontinue mailing in hard copy forms under 40 CFR 122.41 and 403.12. NetDMR is accessed from the following url: http://www.epa.gov/netdmr Further information about NetDMR, including contacts for EPA Region 1, is provided on this website.

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

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

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

XII. 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 Director of the Division of Watershed Management pursuant to M.G.L. Chap. 21, §43.

XIII. GENERAL CONDITIONS

The general conditions of the permit are based on 40 C.F.R. §122, Subparts A and D and 40 C.F.R. §124, Subparts A, D, E, and F and are consistent with management requirements common to other permits.

XIV. STATE CERTIFICATION REQUIREMENTS

The staff of the MassDEP has reviewed the draft permit. EPA has requested permit certification by the State pursuant to CWA §401(a)(1) and 40 C.F.R. §124.53 and expects that the draft permit will be certified.

XV. PUBLIC COMMENT PERMIT, PUBLIC HEARING, 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 before the close of the public comment period, to the U.S.EPA, Office of Ecosystem Protection, Municipal Permits Unit (OEP06-1), 5 Post Office Square, Suite 100, Boston, MA 02109-3912. Any person, prior to such date, may submit a request in writing to EPA and the state 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. 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. Permits may be appealed to the Environmental Appeals Board in the manner described at 40 CFR § 124.19.

XVI. 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:

Janet Deshais
Chemical/Environmental Engineer
U.S. Environmental Protection Agency
Office of Ecosystem Protection (OEP06-1)

5 Post Office Square, Suite 100
Boston, MA 02109 - 3912

Telephone: (617) 918-1667
E-mail: deshais.janet@epa.gov

Claire Golden
Environmental Engineer
Bureau of Resource Protection
Department of Environmental Protection
205B Lowell Street
Wilmington, MA 01887
Telephone: (978) 694-3244
E-mail: claire.golden@state.ma.us

Date: _____

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

*Please address all comments to Janet Deshais and Claire Golden at the addresses above.

Map Reference: USGS Milford and Blackstone Quads, 1982

TATA & HOWARD INCORPORATED

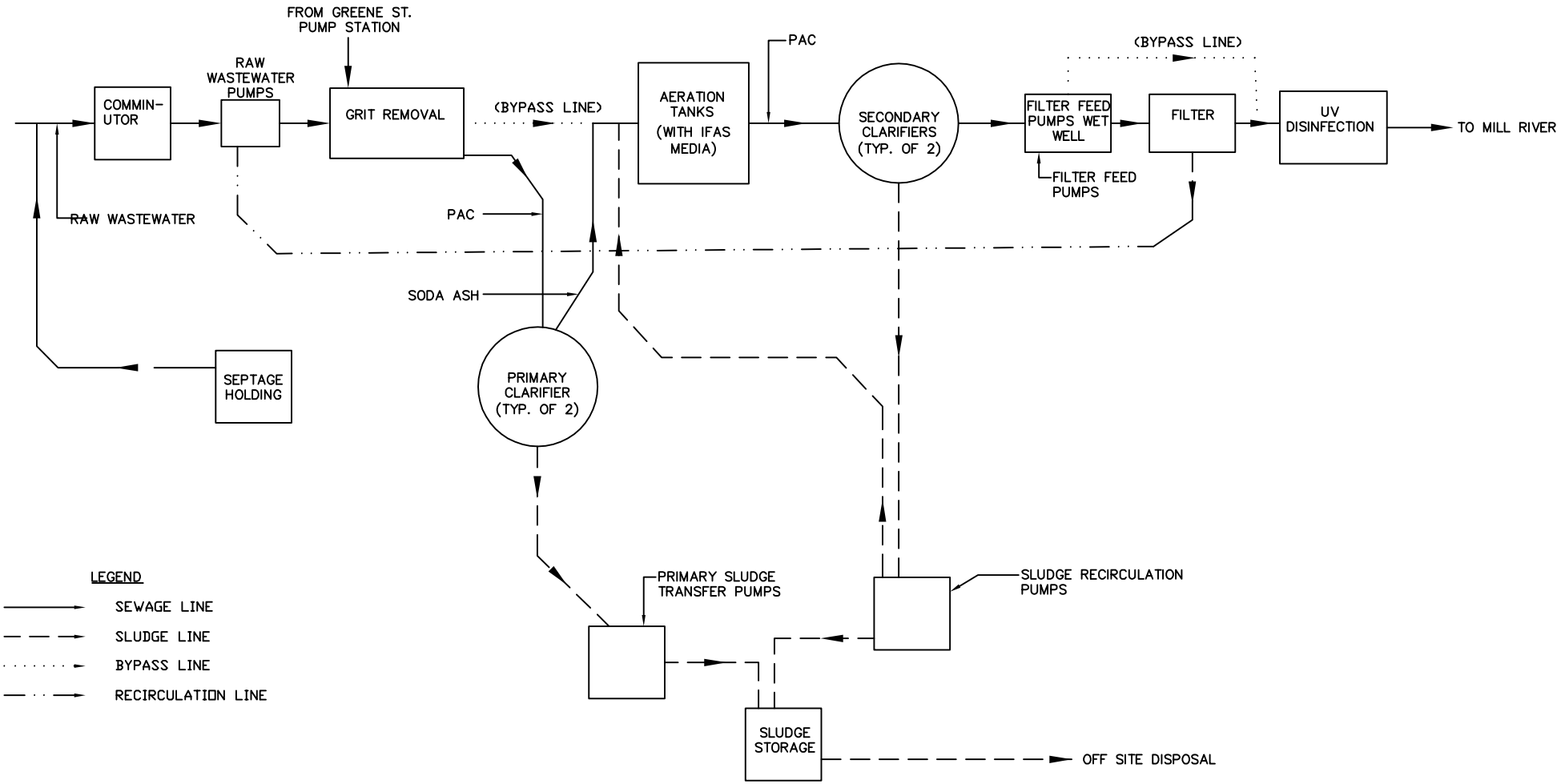
Date: January 2011 Scale: 1:12,000

Locus Map

Operation and Maintenance Manual
Hopedale, Massachusetts

Figure No.

1-1



TATA & HOWARD
INCORPORATED
Consulting Engineers
67 Forest Street Marlborough, MA

Facility Flow Schematic

Operation and Maintenance Manual

Hopedale, Massachusetts

Figure No.

1-2

ATTACHMENT A
EFFLUENT MONITORING DATA
NPDES Permit No. MA0102202
HOPEDALE, MA

DESCRIPTION OF DISCHARGE: Advanced Secondary Wastewater Treatment Plant Effluent

DISCHARGE: Outfall 001 (The receiving water is the Mill River.)

The discharge monthly reports for monthly average and daily maximum values listed below, were reported from February 2007 to April 2010 unless otherwise indicated.

EFFLUENT CHARACTERISTICS AT THE POINT OF DISCHARGE:

Parameter	Monthly Average (range)	Weekly Average (range)	Daily Maximum
Flow, MGD (annual average)	0.25 - 1.08	-----	-----
BOD, mg/l (June 1 – Oct 31)	2.0 – 32	3.0 - 15	3.0 - 55
BOD, mg/l (Nov 1 – May 31)	2.0 - 102	7.0 - 32	7.0 - 32
BOD, lb/day (June 1 – Oct 31)	9.5 - 99	13.9 - 470	13.9 - 470
BOD, lb/day (Nov 1 – May 31)	18.0 - 107	22 - 169	22- 238
TSS, mg/l (June 1 – Oct 31)	6.0 - 34	8.0 - 53	8.0 - 53
TSS, mg/l (Nov 1 – May 31)	4.0 - 27	6.0 - 55	6.0 - 159.38
TSS, lb/day (Nov 1 – May 31)	19 - 104	23 - 159.38	13.6 - 818
TSS, lb/day (June 1 – Oct 31)	13.5 - 200	18 - 818	16.7 - 159.38
pH, standard units	6.54 – 8.2 (range)		
Dissolved Oxygen, mg/l	6.4 – 8.8 (range)		
Total Fecal Coliform, cfu/100 ml	1.0 – 153 (monthly geometric mean, range)		3.0 - 194
Total Phosphorus, mg/l (Apr 1–Oct 31)	0.32 – 1.0	0.5 – 1.0	0.5 – 1.4
Total Nitrogen, Ammonia (as N), mg/l			
February 2007 – October 7, 2009 (prior to construction upgrades):			
November 1 – April 30	0.3 – 20	-----	0.7 – 24
May	3.0 – 20	8.0 – 24	8.0 – 24
June 1 – October 31	0.2 – 5	0.4 – 8	0.4 – 8
October 8, 2009 – October 31, 2010 (after construction upgrades were fully functioning):			
November 1 – April 30	0 – 5	-----	0 – 8
May	4.0	6.0	6.0
June 1 – October 31	0 – 0.2	0 – 0.4	0 – 0.4
Aluminum, mg/l	0 – 1	-----	0 – 1
Copper, ug/l	8 – 69	-----	8 – 69

Whole Effluent Toxicity (WET) Tests submitted by the permittee (March 2006 – November 2011):
LC_{50} (Ceriodaphnia dubia) $\geq$ 100% (24 tests)
NOEL (Ceriodaphnia dubia) $\geq$ 100% (11 tests), $\geq$ 57% (1 test), $\geq$ 50% (3 tests), $\geq$ 12.5% (3 tests), $\geq$ 6.25% (2 tests)

ATTACHMENT A, Continued;

Metals Chemistry Effluent Data
August 2006 – November 2008 (monthly average range, prior to construction upgrades):

Aluminum, ug/l	0 – 58
Copper, ug/l	13 – 51
Lead, ug/l	0 – 7
Zinc, ug/l	29 – 62
Nickel, ug/l	0 – 9
Cadmium, ug/l	bdl

Metals Chemistry Effluent Data
October 8, 2009 – May 16, 2011 (monthly average range, after construction upgrades were fully functioning):

Aluminum, ug/l	56 – 680
Copper, ug/l	7 – 19
Lead, ug/l	bdl – 0.7
Zinc, ug/l	19 – 31
Nickel, ug/l	bdl – 2
Cadmium, ug/l	bdl

Effluent Chemistry WET Data, mg/l:

Parameter	8/07/06	11/13/06	2/26/07	5/07/07	8/13/07	11/5/07	2/25/08	3/17/08	6/09/08
Aluminum	bdl	0.021	bdl	bdl	bdl	bdl	0.03	0.058	bdl
Copper	0.036	0.043	0.036	0.027	0.02	0.013	0.031	0.036	0.023
Lead	bdl	bdl	bdl	bdl	bdl	bdl	0.0007	bdl	bdl
Zinc	0.036	0.047	0.056	0.048	0.029	0.032	0.049	0.054	0.056
Nickel	0.009	0.006	bdl	bdl	bdl	bdl	---	bdl	bdl
Cadmium	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl

Parameter	8/11/08	11/03/08	2/02/09	5/04/09	8/17/09	11/09/09	5/03/10
Aluminum	0.03	0.03	0.05	0.01	0.02	0.24	0.52
Copper	0.016	0.023	0.053	0.015	0.024	0.01	0.014
Lead	bdl	bdl	bdl	bdl	bdl	bdl	bdl
Zinc	---	---	0.044	0.014	0.017	0.014	0.028
Nickel	0.004	0.002	0.003	0.003	0.005	0.002	0.002
Cadmium	bdl	bdl	bdl	bdl	bdl	bdl	bdl

Effluent Chemistry WET Data, mg/l (after construction upgrades were fully functioning):

Parameter	2/01/10	5/03/10	7/26/10	11/01/10	2/28/11	5/16/11
Aluminum	0.056	0.52	0.14	0.67	0.35	0.68
Copper	0.019	0.014	0.01	0.011	0.007	0.013
Lead	bdl	bdl	0.0006	0.0007	bdl	0.0006
Zinc	0.019	0.028	0.019	0.031	---	0.022
Nickel	0.002	0.002	bdl	0.002	0.002	0.002
Cadmium	bdl	bdl	bdl	bdl	bdl	bdl

ATTACHMENT A, Continued;

Instream Chemistry WET Data, mg/l (located upstream of the Hopedale WWTF):

Parameter	Quantifiable Limit, mg/l	8/13/08	11/6/08	2/27/09	5/7/09	8/25/09	11/12/09	2/4/10	5/11/10
Aluminum	0.02	0.09	0.03	0.07	0.06	0.075	0.04	bdl	0.072
Copper	0.002	0.002	bdl	0.003	0.002	bdl	0.002	0.01	0.014
Lead	0.0005	0.003	0.0007	bdl	0.001	0.0014	0.0007	0.001	0.001
Zinc	0.002	0.008	0.01	0.01	0.008	0.011	0.004	0.005	0.005
Nickel	0.003	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
Cadmium	0.0005	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl

Parameter	7/26/10	11/1/10	2/28/11	5/16/11	8/8/11	11/14/11
Aluminum	0.044	0.045	0.13	0.93	0.031	0.57
Copper	0.004	bdl	bdl	bdl	bdl	bdl
Lead	0.002	0.001	0.001	0.002	0.001	0.0007
Zinc	0.004	0.012	0.008	0.004	0.003	0.002
Nickel	bdl	bdl	bdl	bdl	bdl	bdl
Cadmium	bdl	bdl	bdl	bdl	bdl	bdl

Average and Median Instream Chemistry WET Data, mg/l (located upstream of the Hopedale WWTF):

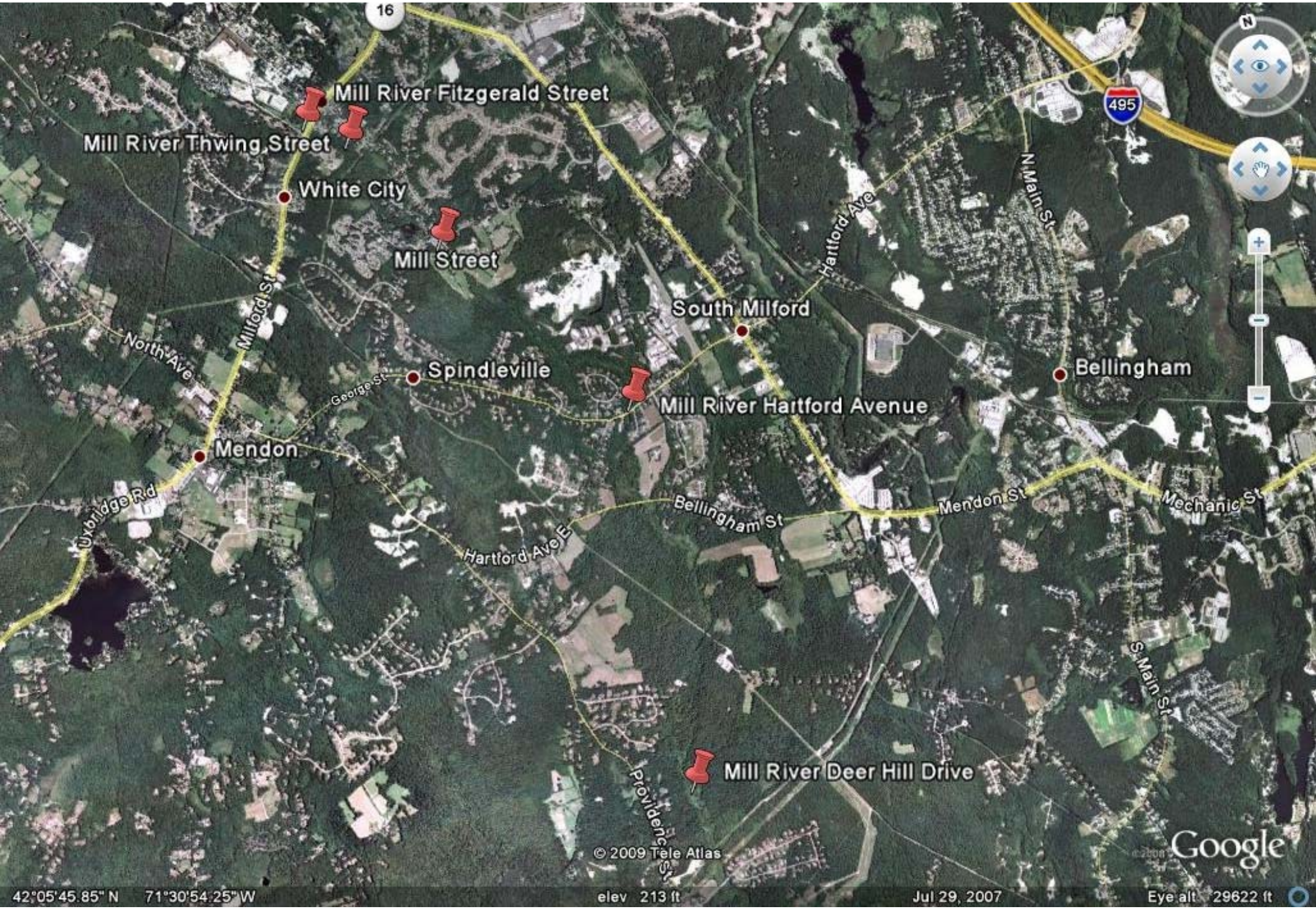
Parameter	Average (8/13/08 – 11/14/11)	Median (8/13/08 – 11/14/11)
Aluminum	0.162	0.065
Copper	0.003	0.002
Lead	0.0012	0.001
Zinc	0.007	0.0065
Nickel	bdl	bdl
Cadmium	bdl	bdl

Note: “bdl” means below detection level. When calculating the average values above, half the quantifiable limit was used for “bdl” values.

ATTACHMENT B
BLACKSTONE RIVER INITIATIVE
VOLUNTEER MONITORING PROGRAM
PHOSPHORUS SAMPLING DATA
NPDES Permit No. MA0102202
HOPEDALE, MA

The following sampling data was collected from the Mill River by the Blackstone River Volunteer Monitoring Program, downstream from the Hopedale Wastewater Treatment Facility. Specifically, the "Mill Street" sampling location is approximately one mile downstream of the Hopedale WWTF's discharge at the outlet of Spindleville Pond, and the "Downstream" sampling location is approximately fifteen (15) feet downstream from the Hopedale WWTF's discharge.

DATE	SAMPLING LOCATION	ORTHOPHOSPHATE AS PHOSPHORUS (mg/l)
5//15/08	Mill Street	0.189
6/22/08	Downstream	0.557
6/22/08	Mill Street	0.124
7/30/08	Downstream	0.401
7/30/08	Mill Street	0.083
8/21/08	Downstream	0.176
8/21/08	Mill Street	0.044
9/23/08	Downstream	0.059
9/23/08	Mill Street	0.065
4/10/10	Mill Street	0.059
5/8/10	Mill Street	0.065
6/12/10	Mill Street	0.033
7/10/10	Mill Street	0.052
8/14/10	Mill Street	0.062
9/11/10	Mill Street	0.062
10/9/10	Mill Street	0.055
11/13/10	Mill Street	0.062


16
Mill River Fitzgerald Street
Mill River Thwing Street
White City
Mill Street
Milford St
North Ave
Spindleville
George St
Mendon
Uxbridge Rd
South Milford
Hartford Ave
N Main St
495
Bellingham
Mill River Hartford Avenue
Bellingham St
Mendon St
Mechanic St
Hartford Ave E
S Main St
Mill River Deer Hill Drive
Providence St
© 2009 Tele Atlas
Google
42°05'45.85" N 71°30'54.25" W
elev 213 ft
Jul 29, 2007
Eye alt 29622 ft

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
COMMONWEALTH OF MASSACHUSETTS
1 WINTER STREET
BOSTON, MASSACHUSETTS 02108

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ECOSYSTEM PROTECTION
REGION I
BOSTON, MASSACHUSETTS 02109

JOINT PUBLIC NOTICE OF A DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE INTO THE WATERS OF THE UNITED STATES UNDER SECTIONS 301 AND 402 OF THE CLEAN WATER ACT, AS AMENDED, AND UNDER SECTIONS 27 AND 43 OF THE MASSACHUSETTS CLEAN WATERS ACT, AS AMENDED, AND REQUEST FOR STATE CERTIFICATION UNDER SECTION 401 OF THE CLEAN WATER ACT.

DATE OF NOTICE: March 2, 2012

PERMIT NUMBER: **MA0102202**

PUBLIC NOTICE NUMBER: MA-010-12

NAME AND MAILING ADDRESS OF APPLICANT:

Mr. Tim Watson, Superintendent of Water & Sewer Department
Town of Hopedale
P.O. Box 7
Hopedale, Massachusetts 01747

NAME AND ADDRESS OF THE FACILITY WHERE DISCHARGE OCCURS:

Hopedale Wastewater Treatment Facility
Junction Route 16 and Mendon Street
Hopedale, MA 01747

RECEIVING WATER: Mill River

RECEIVING WATER CLASSIFICATION: Class B (Warm Water Fishery)

PREPARATION OF THE DRAFT PERMIT:

The U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) have cooperated in the development of a permit for the above identified facility. The effluent limits and permit conditions imposed have been drafted to assure compliance with the Clean Water Act, 33 U.S.C. sections 1251 et seq.,, the Massachusetts Clean Waters Act, G.L. c. 21, §§ 26-53, 314 CMR 3.00 and State Surface Water Quality Standards at 314 CMR 4.00. EPA has formally requested that the State certify this draft permit pursuant to Section 401 of the Clean Water Act and expects that the draft permit will be

certified. However, sludge conditions in the draft permit are not subject to State certification requirements.

INFORMATION ABOUT THE DRAFT PERMIT:

A fact sheet (describing the type of facility; type and quantities of wastes; a brief summary of the basis for the draft permit conditions; and significant factual, legal and policy questions considered in preparing this draft permit) and the draft permit may be obtained at no cost at http://www.epa.gov/region1/npdes/draft_permits_listing_ma.html or by writing or calling EPA's contact person named below:

Janet Deshais
U.S. Environmental Protection Agency – Region 1
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109-3912
Telephone: (617) 918-1667

The administrative record containing all documents relating to this draft permit is on file and may be inspected at the EPA Boston office mentioned above between 9:00 a.m. and 5:00 p.m., Monday through Friday, except holidays.

PUBLIC COMMENT AND REQUEST FOR PUBLIC HEARING:

All persons, including applicants, who believe any condition of this draft permit is inappropriate, must raise all issues and submit all available arguments and all supporting material for their arguments in full by **March 31, 2012**, to the U.S. EPA, 5 Post Office Square, Boston, Massachusetts 02109-3912. Any person, prior to such date, may submit a request in writing to EPA and the State Agency for a public hearing to consider this 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 significant public interest. In reaching a final decision on this draft permit, the Regional Administrator will respond to all significant comments and make the responses available to the public at EPA's Boston office.

FINAL PERMIT DECISION:

Following the close of the comment period, and after a public hearing, if such 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.

DAVID FERRIS, DIRECTOR
MASSACHUSETTS WASTEWATER
MANAGEMENT PROGRAM
MASSACHUSETTS DEPARTMENT OF
ENVIRONMENTAL PROTECTION

STEPHEN S. PERKINS, DIRECTOR
OFFICE OF ECOSYSTEM PROTECTION
ENVIRONMENTAL PROTECTION
AGENCY – REGION 1