

**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 North Brookfield

is authorized to discharge from a facility located at

**North Brookfield Wastewater Treatment Facility
59 East Brookfield Road
North Brookfield, MA**

to receiving water named **Forget-Me-Not Brook**

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

This permit shall become effective on June 1, 2007.

This permit and the authorization to discharge expire at midnight on May 31, 2012.

This permit supersedes the permit issued on September 16, 2002.

This permit consists of 10 pages in Part I, including effluent limitations and monitoring requirements, Part II including General Conditions and Definitions, and Attachment A, the toxicity testing protocols.

Signed this 19th day of March, 2007

/s/ SIGNATURE ON FILE

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

Director
Division of Watershed Management
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning with the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall number 001. Such discharge shall be limited and monitored by the permittee as specified below:

<u>Effluent Characteristic</u>	<u>Units</u>	<u>Discharge Limitation</u>			<u>Monitoring Requirement</u>	
		<u>Average Monthly</u>	<u>Average Weekly</u>	<u>Maximum Daily</u>	<u>Measurement Frequency</u>	<u>Sample Type²</u>
Flow ¹	MGD	0.76	----	----	Continuous	Recorder
Flow ¹	MGD	Report	----	Report	Continuous	Recorder
BOD ³ (<i>May 1- October 31</i>)	mg/l	15	22	----	1/Week	24-Hour Composite ⁴
	lbs/day	95	139	----		
(<i>November 1- April 30</i>)	mg/l	30	45	----		
	lbs/day	190	285	----		
TSS ³ (<i>May 1-October 31</i>)	mg/l	15	22	----	1/Week	24-Hour Composite ⁴
	lbs/day	95	139	----		
(<i>November 1- April 30</i>)	mg/l	30	45	----		
	lbs/day	190	285	----		
pH	S.U.	(See Condition I.A.1.a on page 5)			1/Day	Grab
Fecal Coliform Bacteria ⁵	cfu/100 ml	200	----	400	1/Week	Grab
E. coli ⁵	cfu/100 ml	Report	----	Report	1/Month	Grab

<u>Effluent Characteristic</u>	<u>Units</u>	<u>Discharge Limitation</u>			<u>Monitoring Requirement</u>	
		<u>Average Monthly</u>	<u>Average Weekly</u>	<u>Maximum Daily</u>	<u>Measurement Frequency</u>	<u>Sample Type²</u>
Ammonia-Nitrogen (May 1- October 31)	mg/l	1.0	1.5	-----	1/Week	24-Hour Composite ⁴
	lbs/day	6.3	9.5	-----		
(November 1- April 30)	mg/l	5.4	Report	-----		
	lbs/day	34.3	Report	-----		
TKN, Nitrite & Nitrate Nitrogen	mg/l	Report	-----	-----	1/Quarter	24-Hour Composite ⁴
	lbs/day	Report				
Total Phosphorus (April 1-October 31)	mg/l	0.2	-----	Report	1/Week	24-Hour Composite ⁴
	lbs/day	Report	-----	-----		
(November 1- March 31)	mg/l	1.0	-----	Report	1/Month	
	lbs/day	Report	-----	-----		
Dissolved Orthophosphorous (November 1 - March 31)	mg/l	Report	-----	Report	1/Month	24-Hour Composite ⁴
Total Copper	ug/l	5.2	-----	7.3	1/Month	24-Hour Composite ⁴
Total Zinc	ug/l	66.6	-----	66.6	1/Month	24-Hour Composite ⁴
Total Aluminum	ug/l	87	-----	750	1/Month	24-Hour Composite ⁴
LC ₅₀ ^{6,7,9}	%		100%		4/year	24-Hour Composite ⁴
Chronic NOEC ^{6,8,9}	%		100%		4Year	24-Hour Composite ⁴
Dissolved Oxygen (May 1- October 31)	mg/l		>5.0		1/Week	Grab

Footnotes:

1. 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.
2. All sampling shall be representative of the influent and the effluent that is discharged through outfall 001 to the Forget-Me-Not Brook. A routine sampling program shall be developed in which samples are taken at the same location, same time and same days of every month. Any deviations from the routine sampling program shall be documented in correspondence appended to the applicable discharge monitoring report that is submitted to EPA. In addition, all samples shall be analyzed using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136.
3. Sampling required for influent and effluent.
4. A 24-hour composite sample will consist of at least twenty-four (24) flow proportioned grab samples taken during one consecutive 24 hour period (e.g. 0700 Monday- 0700 Tuesday).
5. Fecal coliform and E. coli monitoring and effluent limits will be in effect for the period **April 1- October 31**. This is a state certification requirement. The monthly average limit is expressed as a geometric mean.
6. The permittee shall conduct chronic and modified acute toxicity test four times per year. The permittee shall test the daphnid specie, Ceriodaphnia dubia. The test samples shall be collected in **the second week of February, May, August, and November**. Results are to be submitted by the **30th day of the month after the sample, i.e. March, June, September, and December**. See Permit Attachment A, Toxicity Test Procedure and Protocol.
7. 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 that a 50% mortality rate.
8. C-NOEC (chronic-no observed effect concentration) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life cycle or partial life cycle test which causes no adverse effect on growth, survival, or reproduction at a specific time of observation as determined from hypothesis testing, where the test results exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, the permittee must report the lowest concentration where there is no observable effect. The 100% limit is defined as a sample which is composed of 100% effluent

9. 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 A 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 A**, the permittee may obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water, by following the procedure outlined in the "NPDES Permit Program Instructions for the Discharge Monitoring Report Forms (DMRs) Report Year 2004" (Attachment G, Common Pitfalls and Guidance, 14. **Dilution Water**). If this Guidance is revoked, the permittee shall revert to obtaining approval as outlined in **Attachment A**. The Instructions along with the annual set of DMRs are sent to all permittees separately and are not intended as a direct attachment to this permit. Any modification or revocation to this "Guidance Document" will 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 A**.

PART I.A.1 (continued)

- a. The pH of the effluent shall not be less than 6.5 S.U., nor greater than 8.3 S.U. at any time.
 - b. The discharge shall not cause objectionable discoloration of the receiving waters.
 - c. The effluent shall contain neither a visible oil sheen, or foam, nor floating solids at any time.
 - d. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand. The percent removal shall be based on monthly average values.
 - e. If the average annual flow in any calendar year exceeds 80% of the facility's design flow, the permittee shall submit a report to the MassDEP by March 31 of the following calendar year describing its plans for further flow increases and describing how it will maintain compliance with the flow limit and all other effluent limitations and conditions.
 - f. Sample results using EPA approved methods for any parameter above its required frequency must also be reported.
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 in a primary industry category discharging process water; and/or

- b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
- c. For purposes of this paragraph, adequate notice shall included 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 POTWs by a non-domestic source shall not pass through the POTW or interfere with the operation or performance of the works.
4. Toxics Control
 - a. The permittee shall not discharge any pollutant or combinations of pollutants in toxic amounts.
 - b. Any toxic components of the effluent shall not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standard, this permit may be revised or amended in accordance with such standards.
 - c. The permittee shall not discharge chlorine.
5. Numerical Effluent Limitations for Toxicants

EPA or MassDEP may use the results of the toxicity tests and chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to Section 304(a)(1) of the Clean Water Act (CWA), state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants, including by not limited to those pollutants listed in Appendix D of 40 CFR Part 122.

B. UNAUTHORIZED DISCHARGES

The permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from the outfall listed in Part I.A.1 of this permit.. Discharge of wastewater from any other surface water point source is not authorized by this permit and shall be reported in accordance with Section D.1.e.(1) of the General Requirements of this permit (Twenty-four hour reporting).

Notification of SSOs to MassDEP shall be made on its SSO Reporting Form (which includes MassDEP Regional Office telephone numbers). The reporting form and instructions for its completion may be found on-line at: <http://www.mass.gov/dep/water/approvals/surffms.htm#sso>.

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance of the sewer system shall be in compliance with the General Requirements of Part II and the following terms and conditions:

1. Maintenance Staff

The permittee shall provide adequate staff to carry out the operation, maintenance, repair and testing functions required to ensure compliance with the terms and conditions of this permit.

2. Infiltration/Inflow

The permittee shall develop and implement a plan to control infiltration and inflow (I/I) to the separate sewer system. The plan shall be submitted to EPA and Mass DEP **within six months of the effective date of this permit** (see page 1 of this permit for the effective date) and shall describe the permittee's program for preventing infiltration/inflow related effluent limit violations, and all unauthorized discharges of wastewater, including overflows and by-passes due to excessive infiltration/inflow.

The plan shall include:

- An ongoing program to identify and remove sources of infiltration and inflow. The program shall include the necessary funding level and the source(s) of funding.
- An inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts. Priority should be given to removal of public and private inflow sources that are upstream from, and potentially contribute to, known areas of sewer system backups and/or overflows
- Identification and prioritization of areas that will provide increased aquifer recharge as the result of reduction/elimination of infiltration and inflow to the system.
- An educational public outreach program for all aspects of I/I control, particularly private inflow.

Reporting Requirements:

A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the Mass DEP annually, *by March 31*. The summary report shall, at a minimum, include:

- A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year.
- Expenditures for any infiltration/inflow related maintenance activities and corrective actions taken during the previous year
- A map with areas identified for I/I-related investigation/action in the coming year.
- A calculation of the annual average I/I, the maximum month I/I for the reporting year.
- A report of any infiltration/inflow related corrective actions taken as a result of unauthorized discharges reported pursuant to 314 CMR 3.19(20) and reported pursuant to the Unauthorized Discharges section of this permit

3. Alternate Power Source

In order to maintain compliance with the terms and conditions of this permit, the permittee shall continue to provide an alternative power source with which to sufficiently operate its treatment works (as defined at 40 CFR § 122.2).

D. 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 and with the CWA Section 405(d) technical standards.
2. The permittee shall comply with the more stringent of either state or federal requirements.
3. The technical standards (Part 503 regulations) apply to facilities which perform one or more of the following 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. Placement of sludge in a municipal solid waste landfill.
4. These conditions do not apply to facilities which transport sewage sludge to another facility for use or disposal or which do not use or dispose of sewage sludge (e.g. lagoons - reed beds); or material described in 40 CFR 503.6 (Exclusions).

5. The permittee shall use and comply with the attached guidance document to determine appropriate conditions. Appropriate conditions contain the following elements:
- General requirements
 - Pollutant limitations
 - Operational standards (pathogen reduction requirements and vector attraction reduction requirements)
 - Management practices
 - Record keeping
 - Monitoring
 - Reporting

Depending upon the quality of material produced by a facility, all conditions may not apply to the facility.

6. The permittee shall monitor the pollutant concentrations, pathogen reduction and vector attractions reduction at the following frequency. This frequency is based upon the volume of sewage sludge generated at the facility in dry metric tons per year.

<u>Sludge Volume (dry metric tons/year)</u>	<u>Monitoring Frequency</u>
less than 290	1/year
290 to less than 1500	1/quarter
1500 to less than 15,000	6/year
15,000+	1/month

7. The permittee shall sample the sewage sludge using the procedures detailed in 40 CFR 503.8.
8. The permittee shall submit an annual report containing the information specified in the guidance by **February 19**. Reports shall be submitted to the address contained in the reporting section of the permit. Sludge monitoring is not required by the permittee when the permittee is not responsible for the ultimate sludge disposal. The permittee must be assured that any third party contractor is in compliance with appropriate regulatory requirements. In such case, the permittee is required only to submit an annual report by **February 19** containing the following information:
- Name and address of contractor responsible for sludge disposal
 - Quantity of sludge in dry metric tons removed from the facility by the sludge contractor

E. MONITORING AND REPORTING

1. Reporting

Monitoring results obtained during the previous month shall be summarized for each month and reported on separate Discharge Monitoring Report Forms(s) postmarked no later than the **15th day of the month** following the effective date of the permit.

Signed and dated originals of these, and all other reports required herein, shall be submitted to the Director and the State at the following addresses:

Environmental Protection Agency
Water Technical Unit (SEW)
P.O. Box 8127
Boston, Massachusetts 02114

The State agency is:

Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Central Regional Office
627 Main Street
Worcester, MA 01608

Signed and dated Discharge Monitoring Report forms and toxicity test reports required by this permit shall also be submitted to the State at:

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

E STATE PERMIT CONDITIONS

1. This discharge permit is issued jointly by the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) under federal and state law, respectively. As such, all the terms and conditions of this permit are hereby incorporated into and constitute a discharge permit issued by the MassDEP pursuant to M.G.L. Chap. 21, §43.
2. Each agency shall have the independent right to enforce the terms and conditions of this permit. Any modification, suspension, or revocation of this permit shall be effective only with respect to the agency taking such action, and shall not affect the validity or status of this permit as issued by the other agency, unless and until each agency has concurred in writing with such modification, suspension, or revocation. In the event any portion of this permit is declared invalid, illegal, or otherwise issued in violation of state law such

permit shall remain in full force and effect under federal law as 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 shall remain in full force and effect under state law as a permit issued by the Commonwealth of Massachusetts.

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND
1 CONGRESS STREET
SUITE 1100
BOSTON, MASSACHUSETTS 02203**

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES

NPDES PERMIT NO.: **MA0101061**

NAME AND ADDRESS OF APPLICANT:

**Town of North Brookfield
Sewer Superintendent
59 East Brookfield Road
North Brookfield, MA 01535**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**North Brookfield Wastewater Treatment Facility
59 East Brookfield Road
North Brookfield, MA**

RECEIVING WATER: **Forget-Me-Not Brook (a tributary of Dunn Brook, which flows to the Quabog River)**

CLASSIFICATION: **B: warm water fishery (Chicopee Watershed MA-36)**

I. Proposed Action, Type of Facility, and Discharge Location

The above named applicant has applied to the U.S. Environmental Protection Agency for the reissuance of its NPDES permit to discharge into Forget-Me-Not Brook, a tributary of Dunn Brook, which flows to the Quabog River. The facility is engaged in the collection and treatment of municipal and commercial wastewater. Figure 1 shows the facility location.

Wastewater Treatment Facility, Sewerage Collection System and other Related Operational Information:

The wastewater collection and treatment system serves 2,800 residents in the community with the collection system primarily focused in the town center (Route 67 corridor). The system is a separate sewer system with no combined sewers. Wastewater is comprised of mostly domestic

sewage with some commercial sewage. The permit application does not report any significant industrial users discharging to the treatment plant.

Treatment Plant Process:

The treatment plant has a design flow of 0.76 MGD and consists of the following units:

- * influent screens
- * aerated grit chamber
- * parallel rotating biological contactor units (RBCs)
- * secondary clarification
- * cloth filtration
- * ultraviolet disinfection
- * post aeration

Phosphorus removal is accomplished by chemical addition which is added prior to the secondary clarifier. Nitrification is accomplished biologically in the RBC units. The final effluent is discharged to Forget-Me- Not Brook.

The long term average flow at the facility is about 0.54 MGD (million gallons per day). Maximum daily flows during wet weather were: 2.11 MGD in 2005 and 1.375 MGD in 2004.

Waste sludge is pumped from the clarifiers' return sludge lines to an aerated sludge holding tank and then dewatered following chemical addition. The dried sludge is transported under contract with a private hauler for incineration. The annual volume of sludge is 40.5 dry-weight tons.

II. Description of Discharge

A quantitative description of the discharge, in terms of significant effluent parameters, may be found in Table 1 which summarizes effluent data from November 2003 to October 2005.

III. Permit Limitations and Conditions

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

IV. Permit Basis and Explanation of Effluent Limitation Derivation

Waterbody Classification and Usage:

Forget-Me-Not Brook is classified as Class B-warm water fisheries water body by the Massachusetts Department of Environmental Protection (MassDEP) in the Massachusetts Surface Water Quality Standards (314 CMR 4.00). Class B waters are designated as habitat for fish, other aquatic life, and wildlife and for primary and secondary contact recreation. Where designated Class B waters shall be suitable as a source of public water supply with appropriate treatment. They shall be suitable for

irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value.

Forget-Me-Not Brook, from the North Brookfield WWTP to the confluence with Dunn Brook (segment MA36-28-2002), is listed on the Massachusetts Year 2002 Integrated List of Waters as a Category 5 Water (Waters Requiring a TMDL). The pollutants identified as needing a TMDL include unknown toxicity, organic enrichment/low dissolved oxygen, taste, odor, and color.

Municipal Waste Water Treatment Facility [also referred to as “Publicly Owned Treatment Works” (POTW Discharges)] Regulatory Basis for Effluent Limits

EPA is required to consider technology and water quality requirements when developing permit effluent limits. Technology-based treatment requirements represent the minimum level of control that must be imposed under Sections 402 and 301(b) of the Clean Water Act (CWA) (see 40 CFR 125 Subpart A). For publicly owned treatment works, technology based requirements are effluent limitations based on secondary treatment as defined in 40 CFR Part 133.

EPA regulations require NPDES permits to contain effluent limits more stringent than technology-based limits where more stringent limits are necessary to maintain or achieve federal or state water quality standards.

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limits based on water quality standards. The Massachusetts Surface Water Quality Standards (314 CMR 4.00) include requirements for the regulation and control of toxic constituents and also require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site-specific criteria is established. The state will limit or prohibit discharge of pollutants to surface waters to assure that water quality of the receiving waters are protected and maintained, or attained.

The permit must limit any pollutant or 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 contributes to an excursion above any water quality criterion. An excursion occurs if the projected or actual in-stream concentrations exceed the applicable criterion. In determining reasonable potential, EPA considers existing controls on point and non-point sources of pollution, variability of the pollutant in the effluent, sensitivity of the species to toxicity and where appropriate, the dilution of the effluent in the receiving water.

A permit may not be renewed, reissued, or modified with less stringent limitations or conditions than those contained in the previous permit unless in compliance with the anti-backsliding requirements of the CWA. Anti-backsliding provisions are found in Section 402(o) of the CWA and 40 CFR 122.44(l) and require that limits in a reissued permit be at least as stringent as those in the previous permit, except under certain limited circumstances. Effluent limitations based on technology standards, water quality, and state certification requirements must all meet anti-backsliding provisions.

Dilution Factor:

The 7-day, 10-year low flow used in the draft permit is extrapolated from two U.S. Geological Survey gage stations in the area of Dunn Brook (which does not have a permanent flow gage station). The discharge is located 1.5 miles downstream of the headwaters of Forget-Me-Not Brook, which joins Dunn Brook about 0.3 miles downstream of the discharge. (see page 167 of Appendix 2 of the Massachusetts Year 2002 Integrated List of Waters) The total drainage area for the Dunn Brook watershed is about 6.35 square miles; the drainage area upstream of the discharge is about 1 square mile. Using a low-flow factor of 0.05 cfs/mi² yields a receiving water 7Q10 flow of about 0.05 cfs (0.032 MGD) and a dilution factor of 1.04. The dilution factor calculations are shown below:

$$\begin{aligned} \text{Dilution factor (DF)} &= (\text{Receiving water 7Q10} + \text{discharge design flow}) / \text{discharge design flow} \\ \text{DF} &= (0.032 \text{ MGD} + 0.76 \text{ MGD}) / 0.76 \text{ MGD} \\ \text{DF} &= 0.792 / 0.76 = 1.04 \end{aligned}$$

The previous permit used a dilution factor of 1.00 in evaluating the effluent limits. The 4% difference between the previous dilution factor and the dilution factor calculated above is negligible. For the purpose of consistency from permit to permit, the previous dilution factor of 1.00 will also be used in this permit.

The effluent limits for the various parameters are discussed below:

Flow: The wastewater treatment plant design flow is 0.76 MGD. This flow has been retained as the annual average flow limit in the draft permit. The draft permit requires that the facility also report the monthly average and daily maximum flow each month.

BOD₅ and total suspended solids: The limits are based upon the previous permit. The loads vary according to seasons and are also expressed as a mass loading. The facility easily met the limits between November 2003 and October 2005, with monthly average BOD results ranging from 1.8 to 9.2 mg/l and TSS values 1.6 to 13.8 mg/l.

pH: The limit is 6.5-8.3 SU based on Massachusetts Surface Water Quality Standards.

Minimum dissolved oxygen concentration: The limit is based upon the previous permit and is necessary to maintain an in-stream dissolved oxygen level above the Massachusetts Surface Water Quality Standards of 5.0 mg/l particularly during low flow periods.

Fecal coliform: The limit is based upon the previous permit and reflects the in-stream Class B standard. This is a seasonal limit.

Ammonia: The seasonal limits for May to October are based upon the current permit, and reflect a need to reduce the oxygen demanding component of the nitrogen cycle and also reflect the need to reduce ammonia from a toxicity perspective. The permit contains a monthly average limit of 1.0 mg/l for ammonia-nitrogen for the period of May 1- October 31.

The limit for the months of November through April is based on toxicity. The determination of the ammonia in-stream criteria are dependent on pH and temperature (chronic only), and on whether there are sensitive fish species present. The chronic criteria was calculated using a pH of 7 and a temperature of 15 degrees Celsius, with early life stages present. The acute criteria is calculated using a pH of 7 with salmonids present. Limits are then calculated using the design flow and the critical 30-day, 10-year flow for period as recommended in the Federal register, Volume 64, No. 245 published on December 22,1999 of November to April.

The Quaboag and Spencer gages data indicates that the summer 30Q10 flow to 7Q10 flow ratio is on average 1.5 and that the winter period low flows are on average 2.5 average times the summer low flows. This would result in a winter 30Q10 flow of approximately $0.005 \text{ cfs} * 1.5 * 2.5 = 0.19 \text{ cfs}$ and a winter dilution factor of 1.2.

Total Ammonia, as N Limitations (November 1 - April 30):

Acute (Daily Maximum) Criteria = 24.1 mg/l (At pH 7.0)

$$\begin{aligned} (\text{acute criteria} * \text{dilution factor}) &= \text{Acute (Daily Maximum)} \\ (24.1 \text{ mg/l} * 1.2) &= 24.1 \text{ mg/l} \end{aligned}$$

Because the calculated limit far exceeds the concentration of ammonia in the discharge, EPA determined that there was no reasonable potential for the discharge of ammonia to cause or contribute to an exceedance of the acute criteria and did not include an acute (maximum daily) limit in the permit.

Chronic (Monthly Average) Criteria = 5.4 mg/l (At pH 7.0 and 15° C)

$$\begin{aligned} (\text{chronic criteria} * \text{dilution factor}) &= \text{Chronic (Monthly Average)} \\ (5.4 \text{ mg/l} * 1.2) &= 5.4 \text{ mg/l} \end{aligned}$$

It was determined that there was reasonable potential for the discharge to cause or contribute to an exceedance of the chronic criteria, so the chronic limit was include in the permit.

Total Nitrogen: It has been determined that excessive nitrogen loadings are causing significant water quality problems, including low dissolved oxygen, in Long Island Sound. As a result, the State of Connecticut has begun to impose nitrogen limitations on discharges to the Connecticut River and its tributaries. EPA believes there is a need to determine the loadings of nitrogen from similar sources in Massachusetts to determine their impact on the water quality in the Sound and to determine what limits, if any, should be imposed on discharges to the River and its tributaries in Massachusetts. Therefore, EPA has included quarterly monitoring for ammonia, nitrite and nitrate, and TKN in the draft permit. The information 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 Long Island Sound. The data will provide a basis for future decisions relating to nitrogen loadings to the Sound. No numerical limitations for these pollutants are established in the draft permit.

Phosphorus:

The Massachusetts Surface Water Quality Standards (314 CMR 4.00) do not contain numerical criteria for total phosphorus. The criteria for nutrients is found at 314 CMR 4.05(5)(c), which states that nutrients “shall not exceed the site specific limits necessary to control accelerated or cultural eutrophication”. The Water Quality Standards also require that “any existing point source discharges containing nutrients in concentrations which encourage eutrophication or the growth of weeds or algae shall be provided with the highest and best practicable treatment to remove such nutrients (314 CMR 4.04). MassDEP has established that a monthly average total phosphorus limit of 0.2 mg/l represents highest and best practical treatment for POTWs.

EPA has produced several guidance documents which contain recommended total phosphorus criteria for receiving waters. The 1986 Quality Criteria of Water (“the Gold Book”) recommends in-stream phosphorus concentrations of 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l for any stream not discharging directly to lakes or impoundments, and 0.025 mg/l within the lake or reservoir.

In December 2000, EPA released “Ecoregional Nutrient Criteria”, which was 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 in each specific ecoregion which are minimally impacted by human activities, and thus representative of waters without cultural eutrophication. North Brookfield is within Ecoregion XIV, Eastern Coastal Plains. The total phosphorus criteria for this Ecoregion XIV is 24 ug/l (0.024 mg/l) and can be found in the *Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV*, (USEPA 2000).

More recently, Mitchell, Liebman, Ramseyer, and Card (in draft 2004), in conjunction with the New England States, developed potential nutrient criteria for rivers and streams in New England. Using several river examples representative of typical conditions for New England streams and rivers, they investigated several approaches for the development of river and stream nutrient criteria that would be dually protective of designated uses in both upstream reaches and downstream impoundments. Based on this investigation an instream total phosphorus concentration of 0.020 - 0.022 mg/l was identified as protective of designated uses for New England rivers and streams. The development of this New England-wide total phosphorus concentration was based on more recent data than the National Ecoregional nutrient criteria, and has been subject to quality assurance measures. Additionally, the development of the New England-wide concentration included reference conditions for waters presumed to be protective of designated uses.

There has been no assessment of the receiving water by MassDEP since the Chicopee Basin 1998 Water Quality Assessment Report, which reported that a Rapid Bioassessment Protocol (RBP) survey downstream of the treatment plant indicated moderate impairment of the benthic community, likely due to organic enrichment, and that approximately 40 percent of the reach was covered by algal growth.

The current permit contains a monthly average total phosphorus limit of 1 mg/l and a weekly average

limit of 1.5 mg/l. These limit are in effect for the months of May through October. Over the past two years the facility has consistently complied with these limits, reporting a range of monthly average concentrations from 0.13 mg/l to 0.6 mg/l and a range of maximum weekly average concentrations from 0.2 mg/l to 1.2 mg/l.

The current monthly average limit in the permit of 1.0 mg/l would be expected to significantly exceed the national guidance for in-stream phosphorus concentration due to the absence of any significant dilution under 7Q10 conditions. It is clear that the existing limits must be made more stringent to address the documented water quality problems in the receiving water. A monthly average total phosphorus limit of 0.2 mg/l has been established based on the “highest and best” practical treatment as defined by the MAWQS. This limit will be in effect seasonally, from April 1 to October 31. The application of the lower seasonal limit has been extended to the month of April in order to encompass the entire season when aquatic plant growth is active.

In addition to the seasonal total phosphorus limit of 0.2 mg/l, the permit contains a winter period total phosphorus limit of 1.0 mg/l for November through March. The winter period limitation on total phosphorus is necessary to ensure that the higher levels of phosphorus discharged in the winter period do not result in the accumulation of phosphorus in the downstream sediments. 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 orthophosphorous monitoring requirement has been included to verify the dissolved fraction. If future evaluations indicate that phosphorus may be accumulating in downstream sediments, the winter period phosphorus limit may be reduced in future permit actions.

When MassDEP adopts numeric nutrient criteria, a TMDL is completed, or additional water quality information shows that the phosphorus limits are not stringent enough to meet water quality standards, more stringent limits may be imposed.

Copper: Analytical data submitted on the discharge monitoring reports (DMRs: see Table 1) indicates that the discharge will cause the in-stream copper level to be above the water quality standard as defined in EPA Quality Criteria for Water as adopted into the State Water Quality Standards. The limits for copper are based on the national recommended water quality criteria published in National Recommended Water Quality Criteria: 2002.

The average of recent whole effluent toxicity test effluent hardness values, 50 mg/l, was used to calculate the criteria and the dilution factor of 1 is used to calculate the limits.

Water Quality Criteria for hardness-dependent metals:

Acute criteria (dissolved) = $\exp\{ m_a [\ln(\text{hardness})] + b_a \}$ (CF)

m_a = pollutant specific coefficient

b_a = pollutant specific coefficient

h = hardness

ln = natural logarithm

CF = pollutant specific conversion factor used to convert total recoverable to dissolved metal

Calculation of acute limit for copper:

$$m_a = 0.9422 \quad b_a = -1.700 \quad CF = 0.960 \quad h = 50$$

$$\text{Acute criteria (dissolved)} = \exp \{ 0.9422 [\ln (50)] + -1.700 \} * (0.960) = 6.99 \text{ ug/l}$$

$$\text{Effluent limitation for dissolved copper} = 1(\text{dilution factor}) * 6.99 \text{ ug/l} = 6.99 \text{ ug/l}$$

$$\text{Effluent limitation for total recoverable copper} = 6.99/0.96 = 7.3 \text{ ug/l}^1$$

The maximum daily water quality based limitation for total recoverable copper is 7.3 ug/l

$$\text{Chronic criteria (dissolved)} = \exp \{ m_c [\ln(\text{hardness})] + b_c \} (CF)$$

m_c = pollutant specific coefficient

b_c = pollutant specific coefficient

h = hardness

\ln = natural logarithm

CF = pollutant specific conversion factor used to convert total recoverable to dissolved metal

Calculation of chronic limit for copper:

$$m_c = 0.8545 \quad b_c = -1.702 \quad CF = 0.960 \quad h = 50$$

$$\text{Chronic criteria (dissolved)} = \exp \{ 0.8545 [\ln (50)] + -1.702 \} * (0.960) = 4.95 \text{ ug/l}$$

$$\text{Effluent limitation for dissolved copper} = 1(\text{dilution factor}) * 4.95 \text{ ug/l} = 4.95 \text{ ug/l}$$

$$\text{Effluent limitation for total recoverable copper} = 4.95/0.96 = 5.2 \text{ ug/l}$$

The monthly average water quality based limitation for total recoverable copper is 5.2 ug/l.

Zinc: Analytical data submitted with toxicity test results indicates that the discharge will cause the in-stream zinc level to be above the water quality standard as defined in EPA Quality Criteria for Water as adopted into the State Water Quality Standards. The limits for zinc are based on the national recommended water quality criteria published in National Recommended Water Quality Criteria: 2002, at a hardness of 50 mg/l and a dilution factor of 1.

A hardness of 50 mg/l was used to calculate the criteria. This value is the average of recent whole effluent toxicity test effluent hardness values.

¹The conversion factor is used to determine total recoverable metal. EPA Metal Translator Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA-823-B-96-007) is used as the basis for using the criteria conversion factor. National guidance requires that permit limits be based on total recoverable metals and not dissolved criteria. The translator reflects how a discharge partitions between the particulate and dissolved phases after mixing with the receiving water. In the absence of site specific data on how a particular discharge partitions in the receiving water, a default assumption is equivalent to the criteria conversion factor used in accordance with the Translator Guidance.

Water Quality Criteria for hardness-dependent metals:

Acute criteria (dissolved) = $\exp\{ m_a [\ln(\text{hardness})] + b_a \}$ (CF)

m_a = pollutant specific coefficient

b_a = pollutant specific coefficient

h = hardness

ln = natural logarithm

CF = pollutant specific conversion factor used to convert total recoverable to dissolved metal

Calculation of acute limit for zinc:

$$m_a = 0.8473 \quad b_a = 0.884 \quad CF = 0.978 \quad h = 50$$

$$\text{Acute criteria (dissolved)} = \exp \{ 0.8473 [\ln (50)] + 0.884 \} * (0.978) = 65.13 \text{ ug/l}$$

$$\text{Effluent limitation for dissolved zinc} = 1(\text{dilution factor}) * 65.13 \text{ ug/l} = 65.13 \text{ ug/l}$$

$$\text{Effluent limitation for total recoverable zinc} = 65.13 / 0.978 = 66.6 \text{ ug/l}$$

The maximum daily water quality based limitation for total recoverable zinc is 66.6 ug/l.

Chronic criteria (dissolved) = $\exp\{ m_c [\ln(\text{hardness})] + b_c \}$ (CF)

m_c = pollutant specific coefficient

b_c = pollutant specific coefficient

h = hardness

ln = natural logarithm

CF = pollutant specific conversion factor used to convert total recoverable to dissolved metal

Calculation of chronic limit for zinc:

$$m_c = 0.8473 \quad b_c = 0.884 \quad CF = 0.986 \quad h = 50$$

$$\text{Chronic criteria (dissolved)} = \exp \{ 0.8473 [\ln (50)] + 0.884 \} * (0.986) = 65.66 \text{ ug/l}$$

$$\text{Effluent limitation for dissolved zinc} = 1(\text{dilution factor}) * 65.66 \text{ ug/l} = 65.66 \text{ ug/l}$$

$$\text{Effluent limitation for total recoverable zinc} = 65.66 / 0.978 = 66.6 \text{ ug/l}$$

The monthly average water quality based limitation for total recoverable zinc is 66.6 ug/l.

Aluminum: Recent Discharge Monitoring Reports indicate that the discharge of aluminum has the reasonable potential to cause or contribute to exceedances of water quality criteria, as defined in EPA Quality Criteria for Water as adopted into the State Water Quality Standards. The limits for aluminum

are based on the national recommended water quality criteria published in National Recommended Water Quality Criteria: 2002, and a dilution factor of 1.

Aluminum:

Acute (Daily Maximum) Criteria = 750 ug/l

$$\begin{aligned} (\text{acute criteria} * \text{dilution factor}) &= \text{Acute (Daily Maximum)} \\ (750 \text{ ug/l} * 1) &= 750 \text{ ug/l} = 0.75 \text{ mg/l} \end{aligned}$$

Chronic (Monthly Average) Criteria = 87 ug/l

$$\begin{aligned} (\text{chronic criteria} * \text{dilution factor}) &= \text{Chronic (Monthly Average)} \\ (87 \text{ ug/l} * 1) &= 87 \text{ ug/l} = 0.087 \text{ mg/l} \end{aligned}$$

Whole Effluent Toxicity Testing

Under Section 301(b)(1) of the CWA, discharges are subject to effluent limitations based on water quality standards. The State Surface Water Quality Standards (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. Where the State determines that a specific pollutant not otherwise listed in 314 CMR 4.00 could reasonably be expected to adversely affect existing or designated uses, the State shall use the recommended limit published by EPA pursuant to 33 U.S.C. 1251 §304(a) as the allowable receiving water concentrations for the affected waters unless a site-specific limit is established. 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 contribute toxic constituents to POTWs as well as those which may be contributed from industrial users. These pollutants include metals, chlorinated solvents, aromatic hydrocarbons and other constituents.

As a result, EPA New England and the MassDEP have developed toxicity control policies. These policies require wastewater treatment facilities to perform toxicity bioassays on their effluent. Discharges having a dilution of less than 10:1 require acute and chronic toxicity limits and testing four times per year.

The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analysis; (2) bioavailability of pollutants after discharge is measured by toxicity testing including any synergistic effect of pollutants; and (3) pollutants for which there are inadequate analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in connection with pollutant-specific control procedures to control the discharge of toxic pollutants.

The current permit requires toxicity testing for two species, the daphnid (*Ceriodaphnia dubia*) and the fathead minnow (*Pimephales promelas*) four times per year. Tests are required to be conducted the second week in February, May, August and November using the protocol in Toxicity Testing attachment. Based on the WET test results submitted by the permittee, the requirement for testing the

fathead minnow has been eliminated. The draft permit still requires quarterly WET testing of the daphnid (*Ceriodaphnia dubia*), the more sensitive species.

The Chronic - No Observed Effect Concentration (C-NOEC) limitation of 100 % in the draft permit prohibits chronic adverse effects (e.g., on survival, growth, or reproduction) when aquatic organisms are exposed to the POTW discharge at the calculated available dilution. The limit is determined based upon no dilution available at critical low flow periods (see Table 2 for the flow information).

Chlorine:

The permit does not contain a limit for chlorine due to the fact that disinfection is accomplished with ultraviolet light. The draft permit prohibits the use of chlorine.

Monitoring: The effluent monitoring requirements have been specified in accordance with 40 CFR 122.41(j), 122.44(i) and 122.48 to yield data representative of the discharge.

V. Infiltration/Inflow

The draft permit includes requirements for the permittee to control infiltration and inflow (I/I). Infiltration/inflow is extraneous water entering the wastewater collection system through a variety of sources. The permittee shall develop an I/I removal program commensurate with the severity of the I/I in the collection system. Where portions of the collection system have little I/I, the control program will logically be scaled down.

Infiltration is groundwater that enters the collection system through physical defects such as cracked pipes, or deteriorated joints. Inflow is extraneous flow entering the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems.

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 to secondary treatment. It greatly increases the potential for sanitary sewer overflows (SSO) in separate systems, and combined sewer overflows in combined systems.

The permit standard conditions for 'Proper Operation and Maintenance' are found at 40 CFR §122.41(e). These require proper operation and maintenance of permitted wastewater systems and related facilities to achieve permit conditions. Similarly, the permittee has a 'duty to mitigate' as stated in 40 CFR §122.41 (d). This requires the permittee to take all reasonable steps to minimize or prevent any discharge in violation of the permit which has a reasonable likelihood of adversely effecting human health or the environment. EPA and MassDEP maintain that an I/I removal program is an integral component to insuring permit compliance under both of these provisions.

The MassDEP has stated that inclusion of the I/I conditions in the draft permit shall be a standard State Certification requirement under Section 401 of the Clean Water Act and 40 CFR §124.55(b).

VI. Sludge Information and Requirements

Section 405(d) of the Clean Water Act requires that sludge conditions be included in all POTW permits. The North Brookfield Wastewater Treatment Facility has its sludge hauled off-site for treatment. The facility produces 40.5 dry metric tons of sludge per year which is taken for incineration under contract with a private sludge treatment firm. Sludge requirements for the facility are outlined in the permit. The EPA Region I NPDES Permit Sludge Compliance Guidance is transmitted to the permittee with the draft permit. If the ultimate sludge disposal method changes, the permit requirements pertaining to sludge monitoring and other conditions would change accordingly.

VII. Unauthorized Discharges

The permittee is not authorized to discharge wastewater from any pump station emergency overflow. Overflows must be reported in accordance with reporting requirements found in Section D.1.e. of Part II of the permit (24-hour reporting). If a discharge does occur, the permittee must notify the EPA, the MassDEP, and others, as appropriate (i.e. local Public Health Department), both orally and in writing as specified in the draft permit.

VIII. 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 as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 (10)). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

Forget-Me-Not Brook is not covered by the EFH designation for riverine systems and thus EPA and MassDEP have determined that a formal EFH consultation with NMFS is not required.

IX. State Certification Requirements

The staff of the Massachusetts Department of Environmental Protection has reviewed the draft permit. EPA has requested permit certification by the State and expects that the draft permit will be certified.

X. Comment Period, and Procedures for Final Decisions

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

Protection (CMP), One Congress Street-Suite 1100 Boston, Massachusetts 02114-2023. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit, the Regional Administrator 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 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.

XI. 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:

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