

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND OFFICE
1 Congress Street, Suite 1100 (CMP)
Boston, Massachusetts 02114-2023

FACT SHEET

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

NPDES PERMIT NO.: MA0101737

NAME AND ADDRESS OF APPLICANT:

Town of Marshfield
Department of Public Works
870 Morraine Street
Marshfield, MA 02050

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Marshfield Wastewater Treatment Facility
P.O.Box 268
200 Joseph Driebeck Way
Marshfield, MA 02020

RECEIVING WATER: Massachusetts Bay (South Coastal Watershed, State Code - 94)

CLASSIFICATION: SA

I. Proposed Action, type of facility, and discharge location.

The above named applicant has requested that the U.S. Environmental Protection Agency ("EPA") reissue its NPDES permit to discharge into the designated receiving water. The discharge is from the Town's wastewater treatment plant, which provides secondary treatment. The wastewater flow consists primarily of domestic waste, but also contains a significant amount of inflow and infiltration during wet weather. The facility accepts a small quantity of wastewater (3.1% of total volume) from the adjacent town of Duxbury. The facility also accepts septage from Marshfield, Duxbury, Cohasset, Hanover, Pembroke, and Kingston. The facility has a grease pretreatment system which enables it to accept grease from local restaurants.

Effluent from the wastewater treatment plant discharges at a location approximately 3000 feet offshore, northeast of the tower at Brant Rock. The discharge is through a 12 port diffuser. A map showing the location of the treatment plant and outfall is shown on **Attachment A**.

The outfall was repaired and stabilized during 1999. A summary of the outfall characteristics is shown below :

Distance offshore - 2900 feet to diffusers
3140 feet to end of diffuser zone

Number of Diffusers - 12

Spacing between ports - 40 feet between ports on same side
20 feet between alternating ports

Port/Nozzle diameter - 4.8 inches

Total Discharge - 5.7 MGD peak flow
2.1 MGD average design flow

Discharge Port Height - 1.5 feet above bottom

Vertical Discharge Angle - Design - 15 degrees above horizontal

Horizontal Angle - 90 degrees to outfall pipe (0 degrees to feeder pipes)

A dilution model of the discharge prepared by EPA indicates that the dilution factors are approximately 53/1 during average conditions and 44/1 during peak (peak flow, low tide, slack tidal current). The model predicts that this dilution is achieved at a distance of 17 feet (5.2 meters) from the discharge ports. This zone of initial dilution (ZID) is consistent with the recommended sizing of toxic dilution zones contained in EPA's Technical Support Document.

Massachusetts Bay has been classified as an SA water by Massachusetts. The designated uses for a Class SA water are 1) the protection and propagation of fish, other aquatic life and wildlife and 2) for primary and secondary contact recreation.

II. Description of Discharge.

The current discharge from the wastewater treatment facility consists of treated municipal wastewater containing BOD, TSS, fecal coliform, and other pollutants. A summary of effluent data submitted by the Town from November 2003 through November 2005 is shown on **Attachment B**.

III. Limitations and Conditions.

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

IV. Permit Basis and Explanation of Effluent Limitation Derivation

The Marshfield wastewater treatment facility is designed to treat an average flow of 2.1 mgd (million gallon per day) with a peak flow of 5.7 mgd. The treatment processes include head-works, aeration basins and final clarifiers. Disinfection is performed by ultraviolet light. Aerobically digested liquid sludge is thickened by a Somat Vertical Thickening Unit and hauled offsite by private contractor to either the Upper Blackstone Regional Wastewater Treatment Facility in Massachusetts or to the Cranston, Rhode Island Wastewater Treatment Facility for disposal. The annual quantity of sludge is approximately 218 dry metric tons.

POTW Discharges :

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). Publicly owned treatment works (POTWs) are required to achieve limits based on secondary treatment [see Section 301(b)(1)(B) of the CWA]. The secondary treatment requirements are set forth at 40 CFR Part 133.

Section 301(b)(1)(C) of the CWA requires 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.

The Massachusetts Surface Water Quality Standards (314 CMR 4.00) include the 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 site specific criteria are established. The State will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained or attained.

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 caused, 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 requirement of the CWA.

EPA's anti-backsliding provisions are found in Section 402(o) and 303(d)(4) of the CWA and at 40 CFR 122.44(l). Anti-backsliding provisions restrict the relaxation of permits, standards, and conditions except under certain specific conditions. Effluent limits based on technology

standards as well as those based on BPJ, water quality, and state certification must meet the anti-backsliding provisions.

Conventional Pollutants:

The effluent limitations for BOD and TSS are the same as those limits found in the previous permit. These limits are in accordance with the secondary treatment requirements at 40 CFR 133.102 .

The numerical limitations for fecal coliform and pH are based on state certification requirements under Section 401(a)(1) of the CWA, as described in 40 CFR 124.53 and 124.55. The fecal coliform limits in the current permit are based on receiving water criteria for waters not designated for shellfishing. The actual receiving water quality standard is for open shellfishing [SA(O)], which has more stringent criteria. The effluent limits in the draft permit have therefore been set at the more stringent SA(O) criteria of 14 CFU/100 ml (monthly geometric mean) and 43 cfu/100 ml (maximum day). The limitations for pH are set at the SA water quality criteria of 6.5-8.5 standard units (SU) in accordance with the Massachusetts Surface Water Quality Standards.

In addition, EPA has established a monthly monitoring requirement for Enterococci to gather information for determining whether the discharge has the reasonable potential to cause or contribute to exceedances of recently promulgated federal water quality criteria established to protect primary contact recreational uses (see 40 CFR part 131 dated November 16, 2004). No limit is established at this time. EPA will review the results, and if necessary, reopen the permit and impose a limit.

Toxic Pollutants:

Certain metals like copper, nickel, cadmium and zinc can be toxic to aquatic life. EPA has evaluated the reasonable potential for the discharge of these metals to cause or contribute to violations of water quality standards (see below). Based on this evaluation, EPA has determined that there is no reasonable potential, and no need to limit or monitor these metals .

The calculation of reasonable potential for copper, lead, zinc and cadmium was done by calculating the allowable acute and chronic discharge concentration for each metal and comparing those values to the concentrations measured in the discharge. If the actual discharge concentration exceeds the allowable discharge concentration, there is reasonable potential and the permit must contain an effluent limit for that pollutant. The effluent metals concentrations were taken from the Whole Effluent Toxicity Test Reports for the period from May 2001 to November 2005.

Allowable discharge concentrations were calculated using the following equation:

$$C = WQC \times DF$$

where C = allowable effluent concentration

WQC = water quality criteria for the metal, expressed as total recoverable metal

DF = the dilution factor,

As described earlier, the dilution model run by EPA calculated a dilution factor of 53 under average conditions and a dilution factor of 44 under critical conditions.

The water quality criteria for were obtained from National Recommended Water Quality Criteria:2002 . Since the discharge is to a marine water, the criteria for salt water were used. Each metal has two criteria, one for acute exposure and the other for chronic exposure. Acute criteria are generally used to calculate maximum daily limits and chronic criteria are used to calculate monthly average limits. Therefore, for each metal an allowable chronic exposure concentration limit (C_c)is calculated using the chronic criteria and the average dilution factor(53), and an allowable acute exposure concentration limit (C_a)is calculated using the acute criteria and the critical dilution factor (44).

Total Recoverable Copper:

Chronic Criteria = 3.7 ug/l

Acute Criteria = 5.8 ug/l

$$\begin{aligned} C_c &= WQC \times DF \\ &= 3.7 \times 53 = 196 \text{ ug/l which is greater than the effluent concentration range of 12 - } \\ &\quad 87 \text{ ug/l. So, reasonable potential does not exist.} \end{aligned}$$

$$\begin{aligned} C_a &= WQC \times DF \\ &= 5.8 \times 44 = 255 \text{ ug/l which is greater than the maximum effluent concentration of } \\ &\quad 87 \text{ ug/l. So, reasonable potential does not exist.} \end{aligned}$$

Total Recoverable Lead :

Chronic Criteria = 8.5 ug/l

Acute Criteria = 221 ug/l

$$\begin{aligned} C_c &= WQC \times DF \\ &= 8.5 \times 53 = 450 \text{ ug/l which is greater than the effluent concentration range of 2 - 3 } \\ &\quad \text{ug/l. So, reasonable potential does not exist.} \end{aligned}$$

$$\begin{aligned} C_a &= 221 \times 44 = 9724 \text{ ug/l which is greater than the maximum effluent concentration of } \\ &\quad 3 \text{ ug/l. So, reasonable potential does not exist.} \end{aligned}$$

Total Recoverable Zinc:

Chronic Criteria: 86ug/l
Acute Criteria: 95 ug/l

$C_c = 86 \times 53 = 4558$ ug/l which is far greater than the effluent concentration range of 20 - 70 ug/l. So, reasonable potential does not exist.

$C_a = 95 \times 44 = 4180$ ug/l which is far greater than the maximum effluent concentration of 70 ug/l. So, reasonable potential does not exist.

Total Recoverable Cadmium:

Chronic Criteria: 9.4 ug/l
Acute Criteria: 42.3 ug/l

$C_c = 9.4 \times 53 = 498$ ug/l which is far greater than the reported effluent concentration range of value of 0 to 5 ug/l. So, reasonable potential does not exist.

$C_a = 42.3 \times 44 = 1861$ ug/l which is far greater than the reported effluent concentration of value of 5 ug/l. So, reasonable potential does not exist.

Whole Effluent Toxicity :

National studies conducted by the Environmental Protection Agency have demonstrated that domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents and aromatic hydrocarbons among others. The Region's current policy is to include toxicity testing requirements in all municipal permits, while Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts.

Based on the potential for toxicity resulting from domestic sewage, and in accordance with EPA regulation and policy, the draft permit includes acute toxicity limitations and monitoring requirements. (See, e.g., "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 50 Fed. Reg. 30,784 (July 24, 1985); see also, EPA's Technical Support Document for Water Quality-Based Toxicity Control). EPA Region I has developed a toxicity control policy. The policy requires wastewater treatment facilities to perform toxicity tests on their effluents. The Commonwealth of MassDEP requires bioassay toxicity testing for state certification. The frequency and the type of WET test depends on the dilution ratio and risk factor.

Pursuant to EPA Region I policy, discharges having a dilution ratio of more than 20 : 1 and less than 100:1 require acute toxicity testing four times per year with $LC_{50} = 100\%$ with two species. 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 analyses; (2) bioavailability of pollutants after discharge is best measured by toxicity testing including any synergistic effects of pollutants; and (3) pollutants for which there are inadequate chemical analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic

pollutants.

The existing permit requires that the permittee conduct acute WET testing for the Outfall 001 effluent four times per year and that each test include the use of Mysid shrimp only. A review of the toxicity test data from January 2001 to September 2005 reveals that test results of LC-50 are consistently equal to or greater than 100% for the species. In a letter dated May 5, 2006, the permittee requested a reduction in the frequency of testing to two per year. Based on the above toxicity results, the frequency is reduced from four per year to two per year. The permittee is required to continue to test Mysid shrimp using the EPA Region I protocol found in **permit attachment A**.

As a condition of this permit, the testing requirements may be reduced by a certified letter from the EPA. This permit provision anticipates that the permittee may wish to request a reduction in WET testing. After four consecutive WET tests, demonstrating compliance with the permit limits for whole effluent toxicity, the permittee may submit a written request to the EPA seeking a review of the toxicity test results. The EPA will review the test results and pertinent information to make a determination. The permittee is required to continue testing at the frequency and species specified in the permit until the permit is either formally modified or until the permittee receives a certified letter from the EPA indicating a change in the permit conditions.

V. SLUDGE

Section 405(d) of the CWA requires that EPA develop technical standards regulating the use and disposal of sewage sludge. These regulations were signed on November 25, 1992, published in the Federal Register on February 19, 1993, and became effective on March 22, 1993. Domestic sludge which is land applied, disposed of in a surface disposal unit, or fired in a sewage sludge incinerator are subject to Part 503 technical standards. Part 503 regulations have a self implementing provision, however, the CWA requires implementation through permits. Domestic sludge which is disposed of in a municipal solid waste landfill is in compliance with Part 503 regulations provided that the sludge meets the quality criteria of the landfill and the landfill meets the requirements of 40 C.F.R. Part 258.

The draft permit requires that sewage sludge use and disposal practices meet Section 405(d) Technical Standards of the CWA. In addition, the EPA Region I – NPDES Permit Sludge Compliance Guidance document dated November 4, 1999 is available for use by the permittee in determining its appropriate sludge conditions for its chosen method of sludge disposal.

The draft permit requires that sewage sludge use and disposal practices meet the CWA Section 405(d) Technical Standards. In addition, EPA New England has included with the draft permit a 72-page *Sludge Compliance Guidance* document for use by the permittee in determining their appropriate sludge conditions for their chosen method of sludge disposal.

The permittee is also required to submit to EPA an annual report containing the information specified in the *Sludge Compliance Guidance* document for the permittee's chosen method of sludge disposal.

VI. INDUSTRIAL USERS

The permittee is required to identify, in terms of character and volume of pollutants, any significant indirect dischargers into the POTW subject to pretreatment standards under Section 307(b) of the CWA and 40 CFR Part 403.

VII. ANTIDegradation

This draft permit is being reissued with an allowable wasteload identical to the current permit with no change in outfall location. The State of Massachusetts has indicated that there will be no lowering of water quality and no loss of existing water uses and that no additional antidegradation review is warranted.

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 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 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 fish species for which federal Fisheries Management Plans exist. 16 U.S.C. § 1855(b)(1)(A). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

The following species (**see Attachment C**) are believed to be present during one or more lifestage within the EFH Area, which encompasses the existing discharge site. No "habitat areas of particular concern", as defined under §600.815(a)(9) of the Magnuson-Stevens Act, have been designated for this site. Although EFH has been designated for this general location, EPA has concluded that this activity is not likely to adversely affect EFH or its associated species for the following reasons:

- This is a reissuance of an existing permit;
- The quantity of discharge from the WWTF is 2.1 mgd monthly average; Effluent receives minimum secondary treatment with the activated sludge process;
- Effluent is discharged into the Massachusetts Bay with an estimated dilution factor of 44;
- Chlorine is not used for disinfection;
- Acute toxicity tests will be conducted two times per year. Present toxicity test results are in compliance with the permit limits;
- The permit will prohibit any violation of state water quality standards.

Accordingly, EPA has determined that a formal EFH consultation with NMFS is not required. If adverse impacts to EFH are detected as a result of this permit action, NMFS will be notified and an EFH consultation will be promptly initiated.

IX. STATE CERTIFICATION REQUIREMENTS

EPA may not issue a permit unless the Massachusetts Department of Environmental Protection with jurisdiction over the receiving waters certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The staff of the Massachusetts Department of Environmental Protection has reviewed the draft permit. EPA has requested permit certification by the State pursuant to 40 CFR 124.53 and expects that the draft permit will be certified.

X. PUBLIC COMMENT PERIOD, 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 a supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, MA Office of Ecosystem Protection, 1 Congress Street, Suite 1100 (CPE) Boston, Massachusetts 02114-2023. 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. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest in reaching a final decision on the draft permit. The Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston Office. Following the close of the comment period, and after 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. Within 30 days following the notice of the final permit decision, interested parties may petition the Environmental Appeals Board to review any condition of the permit decision. Regulations regarding the appeal of NPDES permits may be found at 40 CFR Part 124.19.

XI. EPA CONTACT

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:

Suproakash Sarker
MA Office of Ecosystem Protection
U.S. Environmental Protection Agency
1 Congress Street, Suite 1100 (CMP)
Boston, MA 02114-2023
Telephone: (617) 918-1693

Date

Linda M. Murphy, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency