

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND
ONE CONGRESS STREET
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.: MA0102695

NAME AND ADDRESS OF APPLICANT:

Department of Public Works
Town of Scituate
600 Chief Justice Cushing Way
Scituate, MA 02066

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Scituate Wastewater Treatment Plant
161 Driftway
Scituate, MA 02066

RECEIVING WATER: Tidal creek to Herring River
(South Shore Coastal Watershed - MA 94-07)

CLASSIFICATION: SA

PUBLIC NOTICE DATE:

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

The above named applicant has requested that the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) reissue its NPDES permit to discharge into the designated receiving water, a tidal creek which is tributary to the Herring River (Figure 1). The facility is engaged in the collection and treatment of primarily municipal wastewater. The existing permit expired on March 31, 2002 and was administratively continued. This permit, after it becomes effective, will expire in 2008.

The Town of Scituate Wastewater Treatment Plant (WWTP) (Figure 2) is a 1.6 million gallon per day (MGD) advanced treatment facility providing treatment primarily to domestic and commercial wastewater. The wastewater treatment facility was initially put in operation in 1965 and upgraded in 1980 and 2000. The wastewater treatment facility, sewer system and other relevant components of the overall wastewater program are outlined below (information supplied by the Town of Scituate- Robert Rowland, Chief Operator: June 5, 2002):

Treatment Plant Components:

- * mechanical bar screen
- * aerated grit tank
- * activated sludge with fine bubble aeration
- * clarification
- * down flow filters (for nitrogen removal)
- * ultraviolet disinfection
- * post aeration

Sludge Treatment:

- * aerobic digestion
- * two belt filter presses
- * sludge cake taken off-site under contract with Soil Preparation, Plymouth, ME

Chemicals used in the treatment process include:

- * soda ash for pH adjustment
- * methanol to provide a carbon source for nitrogen removal

Flow:

- * measured at the influent, the return and waste activated sludge lines and at the final effluent using a Parshall flume with an ultrasonic sensor
- * average annual design = 1.6 MGD
- * daily peak = 2.36 MGD
- * hourly maximum = 4.34 MGD

Septage:

- * the facility receives septage from the town only; in 2001, the monthly average amount was 0.25 million gallons per month

Sewerage System:

- * three pump stations all which are equipped with emergency generators; the system is a separate system with an on-going program to reduce inflow/infiltration
- * service area is comprised of a population of 5,110

A quantitative description of the discharge in terms of significant effluent parameters based on recent monitoring data is shown in **Fact Sheet Table 1**.

II. Limitations and Conditions

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

III. Permit Basis and Explanation of Effluent Derivation

The Clean Water Act (CWA or the Act) prohibits the discharge of pollutants to waters of the United States without an NPDES permit unless such a discharge is otherwise authorized by the Act. An NPDES permit is used to implement technology based and water quality based effluent limitations as well as other requirements including monitoring and reporting. This draft NPDES permit was developed in accordance with statutory and regulatory authorities established pursuant to the Act. The regulations governing the NPDES program are found in 40 CFR 122, 124, and 125.

Waterbody Classification and Usage

The Scituate Wastewater Treatment Plant discharges to an approximately 2,000 foot tidal creek which runs through a salt marsh and empties into the Herring River which is tributary to the North River which in turn empties into Massachusetts Bay.

The Herring River is classified as an SA water body by the Massachusetts Surface Water Quality Standards [314 CMR 4.06(2)(b)]. *Class SA waters are designated as an excellent habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. In approved areas they shall be suitable for shellfish harvesting without depuration (Open Shellfish Areas). These waters shall have excellent aesthetic value.* [314 CMR 4.05(4)(a)]

Section 303(d) of the Federal Clean Water Act (CWA) requires states to identify those water-bodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such require the development of total maximum daily loads (TMDL). The Herring and North Rivers are on the 1998, CWA 303(d) list for pathogens.

The effluent tidal creek is closed to shellfishing. The Massachusetts Department of Marine Fisheries establishes a mandatory “closure safety zone” in the vicinity of all wastewater treatment facilities which discharge to marine waters. The entire length of the effluent tidal creek has been designated as the closure zone. In addition, the Herring River (into which the tidal creek flows) is closed to shellfishing due to poor water quality in the river which is not related to the discharge from the Scituate WWTP.

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

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).

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 caused, or has reasonable potential to cause, or contributes to an excursion above any water quality criterion [40 CFR 122.44(d)(1)]. An excursion occurs if the projected or actual instream 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, and the dilution of the effluent in the receiving water.

Dilution Calculation

Water quality based limits are calculated based on available dilution. The current permit, issued on January 30, 1997, established water quality based limits for total copper and whole effluent toxicity using a dilution ratio of 13:1, as calculated at the Herring River. The 13:1 dilution ratio allows a 2,000 foot mixing zone within the tidal creek that drains to the Herring and then North Rivers. The point where dilution is measured for toxic pollutants has been re-evaluated by EPA during this permit reissuance in recognition of the absence of dilution water in the tidal creek during low tide.

The point of dilution measurement for non conservative, non toxic pollutant loading calculations (BOD₅, TSS, and nitrogen) was not re-evaluated and shall remain at the confluence of the tidal creek with the Herring River as their point of influence will occur after mixing.

DEP established the original mixing zone from information derived from the Final Facilities Plan and Environmental Impact Report (EIR) prepared by Metcalf and Eddy¹. Contained within the report were results of modeling of the wastewater treatment plant effluent in the tidal creek and the Herring River. The report acknowledges a lack of dilution during portions of the tidal cycle. The report states that: *...at low tide, the effluent would account for most of the flow in the tidal ditch. There would be little, if any, dilution of the effluent entering the ditch. Therefore, the level of treatment must meet or exceed the water quality criteria for Class SA waters.*

The permit was written prior to both the completion of (except for nutrient removal) the treatment plant in October of 2000 and the drinking water system corrosion control program, which was completed in phases between 1992-2000. Based on reasonable assumptions generated with the best data available, Metcalf and Eddy, anticipated greater metals reductions in the effluent than were subsequently realized. M&E's report stated:

***Copper.** Copper levels measured during the study period ranged from 17 ug/l (June) to 50 ug/l (Day 4 of March sampling). Data collected during March exhibited daily variability, with a similar range documented during the 7-day sampling period. The Federal acute and chronic criteria for saltwater are both 2.9 ug/l (U.S. EPA, 1992). Copper concentrations were 6 to 17 times the criteria for receiving waters.*

Copper levels were likely attributable to copper leachate from plumbing systems due to the aggressive nature of the public water supply. Well water supplies typically exhibit pH values in the range of 6.3 to 6.5 (Kenney, 1989). Existing plans to implement corrosion control practices to raise the pH may effectively reduce copper concentrations in the WPCP effluent. These plans include a monitoring program, adjustment of pH in the well water as needed, and possibly the installation of an optimal corrosion control treatment process (Diercks, 1991). Corrosion control practices implemented in Boston in 1977 resulted in a mean reduction in copper concentrations of 71 percent in drinking water (Karalekas et al., 1983). Should similar reduction be achieved with corrosion controls in the Scituate water supply, the highest measured copper concentrations would be reduced to approximately 14 ug/l. Facilities Plan and EIR, page II-7-8 .

Recent Discharge Monitoring Report (DMR) data submitted by the permittee demonstrates higher concentrations of copper (and other metals) than were predicted prior to the implementation of corrosion control (see the table below).

EFFLUENT TOTAL COPPER CONCENTRATIONS			
DMR Reporting Period End Date	Maximum Concentration ug/l	DMR Reporting Period End Date	Maximum Concentration ug/l
05/31/01	56	05/31/02	39
06/30/01	47	06/30/02	26
07/31/01	75	07/31/02	38
08/31/01	< 25	08/31/02	39
09/30/01	31	09/30/02	< 25
10/31/01	86	10/31/02	26
11/30/01	45	11/30/02	25
12/31/01	45	12/31/02	17
01/31/02	43	01/31/03	17
02/28/02	25	02/28/03	< 25
03/31/02	32	03/31/03	27
04/30/02	43	04/30/03	< 25

The average total effluent copper concentration for 24 months was 37 ug/l, almost twice the 14 ug/l concentration anticipated with the implementation of drinking water system corrosion control. The highest reported copper value for this period was 18 times the Acute criteria (4.8 ug/l) and 28 times the chronic criteria (3.1 ug/l).

The EIR/Facilities Plan included discussion of options to move the outfall to the open ocean to insure greater dilution. The decision not build an extended outfall pipe was predicated on no exhibited acute toxicity within the tidal creek mixing zone. The dilution ratio at the edge of the mixing zone was determined by a model to be 13:1. This was supported by early acute whole effluent toxicity test results conducted prior to the upgrade of the treatment plant.

The current permit has a requirement for quarterly testing for whole effluent toxicity (WET), with a LC₅₀ concentration limit of ≥ 100 , where the LC₅₀ is the concentration of wastewater which causes mortality to 50% of the test organisms. The permit also has a monitoring requirement for the chronic no observable effects concentration or C-NOEC. The C-NOEC is defined as the highest effluent concentration at which no chronic observed effect will occur at continuous exposure to test organisms.

Quarterly WET test results submitted by the Town of Scituate from calendar year 2001 to the present were reviewed by EPA. Tests prior to 2001 were excluded in order to focus on the period after the implementation of corrosion control in the drinking water system. All LC₅₀ WET results were in compliance with the $\geq 100\%$ permit limit.

The May 2002, Acute WET test reported an acute no observable effects concentration (A-NOEL) of 50%. All other LC₅₀ and A-NOEL data reported for that period were at 100%. The State's mixing zone policy states that: *One way to prevent acute exposure is to prohibit acute concentration at the outfall structure or within a short distance from it.* This is consistent with EPA's Technical Support Document for Water Quality Based Toxics Control⁴.

The C-NOEC monitoring data collected during the same period indicates episodic chronic toxicity within the mixing zone

DMR End Date	Species	C-NOEC
09/30/01	Arbacia punctulata	12.5%
06/30/02	Arbacia punctulata	6.25%
03/31/01	Menidia beryllina	6.25%
12/31/02	Menidia beryllina	50%

Even though the available WET data shows only one exceedance of the acute water quality criterion, the chronic WET data, coupled with the large exceedances of the water quality criteria for copper and the large size of the impacted area, EPA has determined that the dilution for toxic pollutants (metals and WET) shall be measured at the point of initial dilution to conform with 314 CMR 4.05(5)(e), which states that: *All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife.* The State Water Quality Criteria for toxic pollutants shall be applied directly as limits without dilution. The limits for total copper and whole effluent toxicity shall be reduced accordingly. New limits for total zinc and total nickel shall be added to the draft permit. The calculations for all of the limits are presented later in this fact sheet.

EPA recognizes that the discontinuance of the mixing zone for toxic pollutants is a significant departure from the conditions found in the current permit. A 2,000' mixing zone with no dilution for a portion of each tidal cycle, where both the acute and chronic criteria are exceeded many fold, clearly covers far too great an area to meet the intent for which such zones are created.

There is insufficient information provided in the Facilities Plan/EIR to determine if the absence of dilution occurs throughout the length of the tidal creek, or just in the immediate area of the discharge. In the absence of further dilution modeling within the creek, EPA finds it necessary to take a conservative approach and eliminate the "toxic mixing zone". The Town may wish to explore additional dilution modeling. The Town may also wish to discuss compliance options with EPA's Water Technical Unit and the DEP regarding the achievability of the new and more stringent limits.

Footnotes:

- 1) Final Facilities Plan and Environmental Impact Report for Wastewater Management (EOEA # 5512: March 1,1995)
- 2) Massachusetts Water Quality Standards Implementation Policy for the control of Toxic Pollutants in Surface Waters, February 23, 1990.
- 3) Massachusetts Water Quality Standards Implementation Policy for Mixing Zones, January 8, 1993.
- 4) Technical Support Document for Water Quality Based Toxics Control, EPA/505/2-90-001, March 1991.

Conventional Pollutants and Non-Conventional Pollutants

The design flow of the plant is 1.6 MGD. The flow limit will be reported as an annual average flow, using monthly average flows from the previous eleven months. Flow shall be monitored in accordance with 40 CFR §122.44(i)(1)(ii), which requires monitoring of *the volume of effluent discharged from each outfall*. During the period from May 2000 to April 2002, the monthly average plant flow was 1.13 MGD (see Table 1). The facilities planning threshold in Part I.A.1.f is based on monthly average plant flows.

The draft permit includes proposed average monthly and average weekly *carbonaceous biochemical oxygen demand (CBOD) and total suspended solids (TSS)* concentrations are based upon the previous permit which was a result of the previously referenced facility plan study (1995). The CBOD and TSS limits in the model (the model used was WQONN: Water Quality of Networks/Nutrient Version; reference: Harleman et al 1977) used in the facility planning effort evaluated a limit of 10 mg/l monthly average. The percent removal BOD and TSS limitations are based on the 85 % removal requirements found at 40 CFR §133.102(b)(3).

The draft permit also includes average monthly and average weekly mass limitations based upon design flow (e.g. 1.6 MGD X 8.34 X 10 mg/l = 133 lbs/day) and a maximum daily reporting requirement (mg/l only) which are based on current state water quality certification requirements. The frequency of monitoring for CBOD and TSS remains at 1/week. DEP evaluated flow in NPDES permits which was traditionally determined by the design flow [the average annual flow] being applied as a monthly average. At DEP's request, EPA changed its designation of flow from a monthly average to an annual average [12 month rolling average] in order to account for seasonal flow variations, particularly that associated with high flow and high groundwater which commonly occur in the spring time. In order to maintain loadings to the receiving water which are consistent with the anti-backsliding and anti-degradation provisions of the Massachusetts Surface Water Quality Standards [314 CMR 4.00], DEP determined that mass limits should be imposed as well as limitations for mg/l. The pounds per day are applied using the annual average design flow for both the monthly and weekly averages. DEP also requested implementation of a more comprehensive inflow/infiltration requirements in order that high seasonal flows which are impacted by excessive I/I are addressed.

The *pH* limits are based on state water quality standards for Class SA waters [314 CMR 4.05(4)(a)(3)].

The *fecal coliform* limits are based on state water quality standards for Class SA waters [314 CMR 4.05(4)(a)(4)]. These limits are year-round.

Settleable solids monitoring requirements have been removed from the draft permit, as these are no longer state certification requirements.

Total Copper, Total Zinc, and Total Nickel

EPA is required to limit any pollutant 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 (40 CFR §122.44(d)). These metals are toxic to aquatic life at low concentrations. Recent effluent monitoring data was evaluated against the criteria and available dilution to determine if there is a reasonable potential for metals in the effluent to cause or contribute to a violation of water quality standards.

The criteria found in EPA's *National Recommended Water Quality Criteria* was published in the Federal Register on December 10, 1998 (63 FR 68354) and updated November 2002 (EPA-822-R-02-047). Pollutant specific conversion factors (CF) are used for converting a metal criterion expressed as a total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. The equations and constants for determining the water quality criteria for each metal and the conversion factors and equation parameters are listed in the Federal Register notice and subsequent correction. 40 CFR §122.45(c) requires that permit limits be expressed as total recoverable metal.

National Recommended Water Quality Criteria (63 FR 68354, December 10, 1998) as updated November 2002 (EPA-822-R-02-047), based on Interim Final National Toxics Rule (60 FR 22233, May 4, 1995):

Parameter	Maximum Reported Effluent Discharge Concentration ug/l	Dissolved Criteria CMC ug/l	Dissolved Criteria CCC ug/l	Translator	Total Criteria CMC ug/l	Total Criteria CCC ug/l
Total Copper	86 ¹ (50) ²	4.8	3.1	0.83	5.8	3.7
Total Nickel	30 ³	74	8.2	0.990	74.7	8.3
Total Zinc	108 ⁴ (60) ²	90	81	0.946	95	86

(note: conversion factor for CCC is not available; EPA uses CMC factor for both CCC & CMC)

- 1) October 2001 Discharge Monitoring Report and 2001 Permit Application
- 2) Highest reported value indicated in the Final Facilities Plan and Environmental Impact Report for Wastewater Management (EOEA # 5512: March 1, 1995 Pages, II-7-(8-10))
- 3) March 7-9, 2001 2001 whole effluent toxicity test
- 4) May 13, 2002 whole effluent toxicity test

The calculations for the criteria and limits are as follows:

- ▶ Chronic criteria (CCC) for dissolved copper = 3.1 ug/l
- ▶ conversion factor for dissolved versus total recoverable copper = 0.83
- ▶ $3.1 \text{ ug/l} / 0.83$ equivalent value to total recoverable copper is = 3.7 ug/l \approx 4 ug/l

- ▶ Acute criteria (CMC) for dissolved copper = 4.8 ug/l
- ▶ conversion factor for dissolved versus total recoverable copper = 0.83
- ▶ $4.8 \text{ ug/l} / 0.83$ equivalent value to total recoverable copper is = 5.8 ug/l \approx 6 ug/l

The average monthly limit for total recoverable copper based on the chronic water quality criteria will be 4 ug/l and the maximum daily limit, based on the acute criteria, will be 6 ug/l. These limits are changed from the existing permit based upon the revised criteria.

The M&E Report¹ stated that: *Zinc was reported in concentrations ranging from 11 to 60 ug/l, and present in all effluent samples. Its concentration was below the marine chronic criterion of 86 ug/l (U.S. EPA, 1986) in all samples.* More recent zinc samples collected as part of the WET Protocol requirements have reported concentrations as high as 107 ug/l. The acute and chronic criteria for zinc are 90 ug/l and 81 ug/l, respectively. Similarly, recent data for nickel shows concentrations as high as 96 ug/l. The acute and chronic criteria for nickel are 74 ug/l and 8.2 ug/l, respectively.

- ▶ Chronic criteria (CCC) for dissolved zinc = 81 ug/l
- ▶ conversion factor for dissolved versus total recoverable zinc = 0.946
- ▶ $81 \text{ ug/l} / 0.946$ equivalent value to total recoverable zinc is = 86 ug/l

- ▶ Acute criteria (CMC) for dissolved zinc = 90 ug/l
- ▶ conversion factor for dissolved versus total recoverable zinc = 0.946
- ▶ $90 \text{ ug/l} / 0.946$ equivalent value to total recoverable zinc is = 95 ug/l

The average monthly limit for total recoverable zinc based on the chronic water quality criteria will be 86 ug/l and the maximum daily limit, based on the acute criteria, will be 95 ug/l.

- ▶ Chronic criteria (CCC) for dissolved nickel = 8.2
- ▶ conversion factor for dissolved versus total recoverable nickel = 0.990
- ▶ $8.2 \text{ ug/l} / 0.990$ equivalent value to total recoverable nickel is = 8.3 ug/l \approx 8 ug/l

- ▶ Acute criteria (CMC) for dissolved nickel = 74 ug/l
- ▶ conversion factor for dissolved versus total recoverable nickel = 0.990
- ▶ $74 \text{ ug/l} / 0.990$ equivalent value to total recoverable nickel is = 74.7 \approx 75 ug/l

The average monthly limit for total recoverable nickel based on the chronic water quality criteria will be 8 ug/l and with no maximum daily limit.

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)(1-4).”

National studies conducted by the EPA have demonstrated that domestic sources contribute toxic constituents to POTWs above those which may be contributed from industrial users. These pollutants include metals, chlorinated solvents, aromatic hydrocarbons and other constituents.

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.

In order to evaluate the toxicity of the WWTP discharge, acute and chronic toxicity tests are required using marine test species *Arbacia punctulata* (chronic) and *Menidia beryllina* (acute and chronic) four times per year in keeping with *Massachusetts Water Quality Standards Implementation Policy for the Control of Toxic Pollutants in Surface Waters*. Additionally, the two species are retained in this draft because they have historically exhibited toxicity when exposed to the plants effluent. The months that toxicity tests are to be conducted are January, April, July, and October to be consistent with other facilities in the South Coastal and the Massachusetts Watershed Initiative. See Permit Attachment A, Toxicity Test Procedure and Protocol, for a description of the testing requirements. The chronic no observed effects concentration (C-NOEC) is the inverse of the receiving water dilution. The limit in the draft permit has been recalculated as $\geq 100\%$ based on the absence of dilution at low tide.

Disinfection

The WWTP has two parallel ultra-violet disinfection units consisting of two 36-foot channels with three lamp banks each. Each channel is designed to provide an energy dose level of approximately 64,000 uW-sec/cm² at peak flow with a 45 second retention time at peak flow. The power supply is automatically varied in direct proportion to plant flow.

Nitrogen

The draft permit limits nitrogen in the effluent based upon studies conducted as part of the facility planning effort in the 1990's. The draft permit limits total inorganic nitrogen (TIN) to 4.0 mg/l and 53 pounds per day. The existing permit has a limit 39.5 lbs/day of total nitrogen (TN). The new limit will be an 12 month rolling annual average. The TIN is more bioavailable to aquatic organisms than organic nitrogen portion of the total nitrogen which has gone through extensive reduction in the treatment process. Wastewater treatment facilities designed for nitrogen tend to have a residual organic nitrogen of 1.0- 2.0 mg/l which cannot be removed without more advanced treatment such as carbon absorption. See the Anti-degradation (Section V) of this Fact Sheet for more detail.

Dissolved Oxygen (DO)

The limit of ≥ 6.0 mg/l of dissolved oxygen is carried forward in this draft permit from the current permit. The Final Facilities Plan and EIR indicates that seasonally, the 6.0 mg/l Class SA Water Quality Standard (WQS) for dissolved oxygen is not met in the estuary. Sampling locations in the estuary, but away from the discharge, indicate that this may be a naturally occurring phenomenon common to New England estuaries, and not as a result of the POTW discharge. Denitrifying plants tend to have low effluent dissolved oxygen unless effluent reaeration occurs prior to discharge. The limit is in place to insure that the POTW does not cause or contribute to an exceedance (depression) of the State WQS for DO.

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.

Anti-backsliding

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. The anti-backsliding provisions found in 40 CFR 122.44(l) prohibit the relaxation of permit limits, standards, and conditions. Therefore, the technology-based effluent limits in a reissued permit must be at least as stringent as those in the previous permit. Relaxation is only allowed when cause for permit modification is met (see 40 CFR 122.62).

Effluent limits based on BPJ, water quality, and state certification requirements must also meet the anti-backsliding provisions found under Section 402(0) and 303(d)(4) of the CWA, as described in 40 CFR 122.44(l).

Effluent limits based on water quality and state certification requirements must also meet the anti-backsliding provisions found under Section 402(o) and 303(d)(4) of the CWA, as described in 40 CFR 122.44(l). The relaxation of the limits may be allowed under the anti-backsliding regulations in 40 CFR 122.44(l), when new information is available that was not available at the time of the previous permit issuance or a technical mistake has been made.

Anti back-sliding does not apply to the discontinuance of settleable solids monitoring as the need to monitor this parameters is better measured by other means.

Nitrogen limits are now expressed in terms of total inorganic nitrogen rather than total nitrogen due to review of technical information about nutrient treatability and biological responses to nutrient addition. Research and treatment operations manuals indicate that following nitrification and denitrification, there remains some low level amount of organic nitrogen which is in refractory form and is not removed in the treatment process but is also significantly less bioavailable to aquatic plants thus not providing additional available nitrogen loading to the receiving water. Total inorganic nitrogen is the most bioavailable form of nitrogen. Engineering texts support these positions (e.g. "Design and Retrofit of Wastewater Treatment Plants for Biological Nutrient Removal [1992- Randall, Barnard and Stensel]). The new limit for nitrogen is not backsliding but is now aimed at controlling the proper form of nitrogen.

IV. Operation and Maintenance of the Sewer System

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

Infiltration/Inflow Requirements

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.

DEP has stated that the 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).

V. Anti-degradation Review

The Massachusetts Anti-degradation Provisions are found at 314 CMR 4.04. All existing uses of the Herring River must be protected. This draft permit is being reissued with allowable discharge limits as or more stringent than the current permit with the exception of the limitations for settleable solids and total nitrogen (now included as total inorganic nitrogen). All such changes are allowable under the regulations of both regulatory agencies (see above discussions). There is no change in the outfall location. The Commonwealth of Massachusetts has indicated that there will be no lowering of water quality and no loss of existing water uses and that no additional anti-degradation review is warranted. The following is excerpted from the March 24, 2003 MEDEP anti-degradation review statement:

The current permit limits the amount of nitrogen which can be discharged into the Herring River and North River due to nutrient enrichment problems in those water bodies. The permit contains an effluent limit of 39.5 pounds per day [lbs/day] for total nitrogen. The limit is a 12 month moving average limit [moving average is the arithmetic mean of the monthly average values for the preceding 12 months]. The draft permit will contain a total nitrogen limit of 53 lbs/day based upon the following:

The wastewater treatment process which converts nitrogen to nitrogen gas uses “down-flow” denitrification filters which treat effluent from the secondary settling tanks and use methanol as a carbon source; during the treatment process, a residual organic nitrogen portion of 1.0-1.5 mg/l remains as it is highly refractive and resistant to conversion; this portion of the total nitrogen load is less available to aquatic species than the inorganic portion.

The inorganic nitrogen portion is the nutrient which is most bio-available to aquatic species thus it is this portion which is the element of needed control

The permit limit will be raised from 39.5 lbs/day to 53.0 lbs/day total nitrogen [which includes approximately 1.0-1.5 mg/l of low reactive, less available soluble, organic nitrogen].

It is the opinion of the Department that the change from 39.5 lbs/day to 53.0 lbs/day will not result in a lowering of water quality [due to the low availability of the organic nitrogen] and is acceptable within the anti-degradation provisions of 314 CMR 4.04

VI. 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 permit and advised EPA that the limitations are adequate to protect water quality. EPA has requested permit certification by the State and expects that the permit will be certified.

VII. National Marine Fisheries Service: Essential Fish Habitat

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq. (1998)), EPA is required to consult with National Marine Fisheries Service (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, "may adversely impact any essential fish habitat." 16 U.S.C. § 1855(b). The Amendments broadly define "essential fish habitat" as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. 16 U.S.C. § 1802(10).

Adverse impact means any impact, which reduces the quality and/or quantity of EFH. 50 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. Id.

Essential fish habitat is only designated for fish species for which Federal Fisheries Management Plans exist. 16 U.S.C. § 1855(b)(1)(A). The U.S. Department of Commerce on March 3, 1999 approved EFH designations for New England.

Summary of Essential Fish Habitat (EFH) Designation for the Herring River

Species	Eggs	Larvae	Juveniles	Adults
Atlantic cod (<i>Gadus morhua</i>)	X	X	X	X
haddock (<i>Melanogrammus aeglefinus</i>)	X			
pollock (<i>Pollachius virens</i>)	X	X	X	X
whiting (<i>Merluccius bilinearis</i>)	X	X	X	X
red hake (<i>Urophycis chuss</i>)	X	X	X	X
white hake (<i>Urophycis tenuis</i>)	X	X	X	X
redfish (<i>Sebastes fasciatus</i>)	n/a			
winter flounder (<i>Pleuronectes americanus</i>)	X	X	X	X
yellowtail flounder (<i>Pleuronectes ferruginea</i>)	X		X	X
windowpane flounder (<i>Scopthalmus aquosus</i>)	X	X	X	X
American plaice (<i>Hippoglossoides platessoides</i>)	X	X	X	X
ocean pout (<i>Macrozoarces americanus</i>)	X	X	X	X
Atlantic halibut (<i>Hippoglossus hippoglossus</i>)	X	X	X	X
Atlantic sea scallop (<i>Placopecten magellanicus</i>)	X	X	X	X
Atlantic sea herring (<i>Clupea harengus</i>)		X	X	X
monkfish (<i>Lophius americanus</i>)	X	X		X
bluefish (<i>Pomatomus saltatrix</i>)			X	X
long finned squid (<i>Loligo pealei</i>)	n/a	n/a	X	X
short finned squid (<i>Illex illecebrosus</i>)	n/a	n/a	X	X
Atlantic butterfish (<i>Peprillus triacanthus</i>)	X	X	X	X
Atlantic mackerel (<i>Scomber scombrus</i>)	X	X	X	X
summer flounder (<i>Paralichthys dentatus</i>)				X
scup (<i>Stenotomus chrysops</i>)	n/a	n/a	X	X
black sea bass (<i>Centropristus striata</i>)	n/a		X	X
surf clam (<i>Spisula solidissima</i>)	n/a	n/a	X	X
ocean quahog (<i>Artica islandica</i>)	n/a	n/a		
spiny dogfish (<i>Squalus acanthias</i>)	n/a	n/a		X
bluefin tuna (<i>Thunnus thynnus</i>)			X	X

The Herring River is designated essential fish habitat (EFH) for the above listed species of finfish and mollusks. Based on the effluent limitations and other permit requirements identified in this Fact Sheet that are designed to be protective of all aquatic species, including those with designated EFH, EPA has determined that a formal EFH consultation with NMFS is not required because the proposed discharge will not adversely impact EFH.

VIII. COASTAL ZONE MANAGEMENT (CZM) CONSISTENCY REVIEW

40CFR §122.49 (d) states: *The Coastal Zone Management Act, 16 U.S.C. 1451 et seq. section 307(c) of the Act and implementing regulations (15 CFR part 930) prohibit EPA from issuing a permit for an activity affecting land or water use in the coastal zone until the applicant certifies that the proposed activity complies with the State Coastal Zone Management program, and the State or its designated agency concurs with the certification (or the Secretary of Commerce overrides the State's nonconcurrence).* The permittee is required submit a letter to the Massachusetts Coastal Zone Management Program stating their intention to abide by the CZM water quality and habitat policies. The CZM shall review the draft permit and it will only be issued after CZM certification.

IX. Public Comment Period and Procedures for Final Decision

All persons, including applicants, who believe any condition of the permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to **Doug Corb, U.S. EPA, 1 Congress Street, Suite 1100 (CPE), Boston, Massachusetts 02114-2023** and **Paul Hogan, Department of Environmental Protection, Division of Watershed Management, 627 Main Street, 2nd Floor, Worcester, MA 01608**. Any person, prior to such date, may submit a request in writing for a public hearing to consider the 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 permit, the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

A similar request for a hearing should also be filed with the Department of Environmental Protection's Docket Clerk in accordance with the provisions of the Massachusetts Administrative Procedures Act, the Division's Rules for the Conduct of Adjudicatory Proceedings, and the Timely Action Schedule and Fee Provisions. The hearing request should be sent to the Docket Clerk at:

Docket Clerk
Massachusetts Department of Environmental Protection
1 Winter Street
Boston, MA 02108

and a valid check for \$100 payable to the Commonwealth of Massachusetts must be mailed by the end of the comment period to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

The hearing request to the Commonwealth will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver.

The filing fee is not required if the appellant is a city, town (or municipal agency), county, district of the Commonwealth, or a municipal housing authority. The Department may waive the hearing filing fee for a permittee who shows that paying the fee will create undue financial hardship. A permittee seeking a waiver must file, along with the hearing request, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator of EPA and the Director of DEP/DWM will issue a final permit decision and forward a copy of the decision to the applicant and each person who has submitted written comments or requested notice.

X. EPA and MA DEP Contacts

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

Doug Corb
US Environmental Protection Agency
1 Congress Street
Suite 1100 (CPE)
Boston, Massachusetts 02114-2023
Telephone: (617) 918-1565
Fax: 617-918-0565
e-mail: corb.doug@epa.gov

and Paul Hogan
MA Department of Environmental Protection
Division of Watershed Management
627 Main Street, 2nd floor
Worcester, MA 01608
Telephone: (508) 767-2796
Fax: 508-791-4131
email: paul.hogan@state.ma.us

November 19, 2003 Linda M. Murphy, Director*
Date Office of Ecosystem Protection
U.S. Environmental Protection Agency

* Please address all comments to Doug Corb and Paul Hogan at the addresses above