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.: **MA0101478**

NAME AND ADDRESS OF APPLICANT:

Board of Public Works
City of Easthampton
109 Hendrick Street
Easthampton, MA 01027

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Easthampton Wastewater Treatment Plant
Gosselin Drive
Easthampton, MA 01027

LATITUDE: 42° 17' 14" LONGITUDE: 72° 37' 3" [Outfall #001]

RECEIVING WATER: **Connecticut River (Watershed: MA34)**

CLASSIFICATION: **B (warm water fishery)**

DATE OF PUBLIC NOTICE:

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

The above named applicant has requested that the U.S. Environmental Protection Agency (USEPA) and the Massachusetts Department of Environmental Protection (MassDEP) reissue its NPDES permit to discharge into the designated receiving waters through two outfalls. Outfall #001 is the main outfall and discharges to the Connecticut River; Outfall #002 is the auxiliary outfall and discharges to the Manhan River when flows exceed the capacity of Outfall #001 (See Figure 1).

The facility is engaged in the collection and treatment of municipal, commercial and industrial wastewater. The existing permit expired on October 29, 2000 and has been administratively continued. The City submitted its re-application on April 5, 2000. USEPA determined that the

application was complete on May 24, 2000. This permit, after it becomes effective, will expire five years from the last day of the month preceding the effective date.

I.B. Wastewater Treatment Plant and Collection System Description

The Easthampton Wastewater Treatment Plant (WWTP) is a 3.8 MGD secondary wastewater treatment plant (Figure 2) serving approximately 15,500 people in Easthampton, and receiving a total of about 10,000 gallons per day of wastewater from Northampton, Southampton and Holyoke. In addition, there is one categorical industrial user [CIU] and three non-categorical, significant industrial users (SIUs) in the sewered community [see Industrial Pre-Treatment Section in Part IX].

The WWTP consists of the following treatment units:

* preliminary treatment:
  - > mechanically cleaned bar screen
  - > manually cleaned bar rack [bypass]
  - > aerated grit chamber
  - > grit screw and bucket elevator
* primary treatment:
  - > rectangular primary clarifiers (2)
* secondary treatment:
  - > aeration basins with mechanical aeration (2)
  - > center feed secondary clarifiers (2)
* disinfection/dechlorination
  - > chlorination with sodium hypochlorite (flow paced);
  - > chlorine contact chambers
  - > dechlorination with sodium bisulfite [for discharge #002]
* outflow
  - > discharge to Connecticut River via outfall pipe (Outfall #001) or Manhan River (Outfall #002) when hydraulic capacity of 001 is exceeded
* sludge treatment
  - > gravity thickeners
  - > odor control with potassium permanganate
  - > chemical sludge condition polymer
  - > belt filter press
  - > sludge disposed off-site [Synagro-Northeast, Waterbury, CT]

The sewage collection system has approximately 78.8 miles of sewers and includes 16 pump stations. The collection system is completely separate (there are no storm water collection pipes tied into the sewage collection system).

I.C. Wastewater Treatment Plant Discharge Locations

The main effluent pipe is approximately 2.1 miles long and discharges to the Connecticut River by gravity. The outfall is located near shore, just downstream of the confluence of the Connecticut and Manhan Rivers. During periods when discharge flows exceed the capacity of Outfall #001, flow is discharged to the Manhan River through Outfall #002. The hydraulic capacity of Outfall #001 varies based on the hydraulic regime in the Connecticut River. For example, the permittee estimates that the peak capacity is 3.1 MGD at normal river level (101 ft.), 2.7 MGD at the ten year flood level and 1.2 MGD at the 50 year flood level (124 ft.). A review of the data in Tables 1 and 2 shows that during the summer months with no discharges from Outfall #002, the maximum daily flows (as opposed to the peak capacities listed above), as measured by the plant's influent flow meter, are about 2 MGD, indicating that the maximum daily flow capacity of Outfall #001 at normal river stage is about 2 MGD.

As shown in Table 2, during the period from January 2004 to December 2006, there were 210 days when there was a diversion to the Manhan River. The maximum daily flow through Outfall #002 during that period was 6.21 MGD [October 2005]while the total monthly flow varied significantly from 36,000 [August 2004] to 64,353,000 [April 2005].

It should be noted that the accuracy of the flow measurements for Outfall #002 has been questioned. SEA Consultants (P. Brinkman March 28, 2006) conducted a review of the flow measurement results and indicated that "...the MRO (Manhan River outfall) may not provide a level of accuracy appropriate for NPDES effluent flow monitoring". SEA Consultants recommended that there be "...an increase in the weir elevation of the Manhan River diversion structure...This change will likely increase effluent flow to the CTRO (Connecticut River outfall)". In addition SEA recommended "...The discharge weir for the MRO (Manhan River outfall) should be modified to increase the accuracy of the discharge volumes to the Manhan River."

The draft permit contains a special condition (Part I.F.1), requiring the permittee to evaluate the hydraulic capacity of Outfall #001, maximize the flow through Outfall #001, and evaluate the feasibility of eliminating flow to Outfall #002. The MassDEP believes this must be done to provide information necessary to assure proper operation of the wastewater treatment facility according to 314 CFR 12.00 (Operation and Maintenance Standards for Wastewater Treatment Plants). In addition, the draft permit contains schedules requiring installation of an effluent flow meter for the flow to the Connecticut River via Outfall #001 and an improvement and upgrade of the flow meter for Outfall #002 (Part I.F.2).

II. Effluent Quality Description

The permittee monitors and reports effluent quality as required by its current permit. This information is included in monthly Discharge Monitoring Reports [DMRs] which are submitted

to USEPA and MassDEP and Whole Effluent Toxicity [WET] reports which are required semi-annually for the discharge. The data and a comparison to permit limits are summarized for the period from January 2004- December 2006 below and each monthly value is presented in Table 1 of this Fact Sheet.

Easthampton WWTP: effluent characteristics from January 2004- December 2006

Parameter	Permit Limit	Average of Monthly Averages	Average of Daily Maximums
BOD [mg/l]	30 monthly avg	14.0	23.6
TSS [mg/l]	30 monthly avg	9.2	23.8
pH [std units]	6.0-8.3	***	6.0-8.0
Flow [MGD] 001	3.8 monthly avg	2.5	3.8
Flow [MGD] 002	report	***	***
fecal coliform [cfu/100 ml]	200 geometric mean monthly avg	5-141 [range]	35-520 [range]
TRC [mg/l] 001	1.0 monthly avg	0.72	0.98
TRC [mg/l] 002	0.05 monthly avg	range of 0 - 0.04	range of 0 - 0.15
LC50 [%]	$\geq$50 daily max	***	***

**** See full summary of data in Table 1 ****

III. Limitations and Conditions

The effluent limitations, monitoring requirements and other specific permit requirements are found in the draft NPDES permit which accompanies this fact sheet. The basis for effluent limits and other conditions are discussed below.

IV. Receiving Water Classification, Existing Quality and Flow Dynamics

A. Waterbody Classification and Usage

The Connecticut River and Manhan River are classified as Class B-warm water fishery river segments by the Massachusetts Surface Water Quality Standards (314 CMR 4.05(3)(b) and 4.06 Table 7). Class B waters are designated as habitat for fish, other aquatic life, and wildlife, and

for primary and secondary contact recreation. Where designated, they 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.

B. Water Quality Assessment of the Receiving Waters and 303d/TMDL Listing

The Connecticut River segment receiving the the Easthampton WWTP discharge is Segment MA34-04 (confluence with the Deerfield River to the Holyoke Dam). MassDEP evaluated the water quality in the segment as part of its assessment work and presented the findings in the report "Connecticut River Basin 1998 Water Quality Assessment Report" (Nov 2000; Report # 34-AC-1). The report indicated that the segment did not meet uses for fish consumption due to priority organics (PCBs: source unknown) and indicated that the segment had historically shown elevated bacteria levels. The Manhan River was not assessed due to lack of current information/data.

The MassDEP has listed the affected segment of the Connecticut River segment for non-attainment in the 2004 report, "Massachusetts Year 2004 Integrated List of Waters" (April 2005; Report CN: 175.0) and has placed the segment in category 5 which requires a TMDL to be developed to address the non-attainment parameters (PCBs and pathogens). The draft 2006 Integrated List contains the same designation. The Manhan River is listed as a Category 3 water (No Uses assessed).

The Easthampton WWTP draft permit includes bacteria limits equivalent to the water quality standard. There is no evidence that the bioaccumulation of PCBs in fish tissue is related to the discharge from the Easthampton WWTP, thus there will be no controls proposed for PCBs in this permit.

The MassDEP conducted water quality sampling at two locations in the Manhan River in 2003. One location was upstream from the Easthampton WWTP (Loudville Road, Easthampton; mile point 5.633 from the Connecticut River) and the other location was downstream from the Easthampton WWTP (Fort Hill Road, Easthampton; mile point 0.842 from the Connecticut River). A summary of the monitoring program and field data are given in the Fact Sheet Appendix 1 and monitoring data from the sampling program are given in Table 3.

The 2003 data will be used to conduct the evaluation of the water quality of the Manhan River for the 2008 Integrated List of Waters.

C. River Flow and Dilution Calculation

The 7Q10, or the 7-day mean stream low flow with 10-year recurrence interval, is the base flow used to calculate the effluent limits in NPDES permits (314 CMR 4.03(3)(a)). The 7Q10 flow in

the Connecticut River at the point of the Easthampton WWTP discharge is calculated using the 7Q10 value at the Montague USGS gage (01170500) (see table below) and using a proportion of drainage area at the gage and at the outfall site.

USGS Gage Data

USGS Gage Number and location	Drainage Area sq. miles	Period of Record	Annual Mean Flow [cfs]	90 % flow exceedance [cfs]	7Q10 [cfs]**
01170500 Connecticut River at Montague City	7,860	1904-2004	13,970	3,030	1,727
01171500 Mill River at Northampton	52.6	1938-2004	98.9	14	6.31
01172003 Connecticut River at Holyoke***	8,309	1983-2002	12,180	2,880	1142.6

** USGS low flow statistics updated 1998
*** gage below power plant diversion flow which is not measured; gage has been moved (October 2002) to account for all flow including diversion

The drainage area at the Monatgue City gage is 7,860 square miles; the drainage area at the Easthampton WWTP discharge location is approximately 8,228 square miles. The 7Q10 value at the discharge is:

7Q10 flow/drainage area = flow factor cfs/sq. mi.
1727/7860 = 0.22 cfs/sq. mi.
7Q10 = 8,228 x 0.22 = 1810 cfs

The dilution factor for Outfall #001 is based upon the 7Q10 and the 3.8 MGD design flow of the WWTP (5.9 cfs). The dilution factor is therefore:

(7Q10 {river} + effluent design flow)/ effluent flow =
(1810 + 5.9)/5.9 = 308

Note that this factor assumes the total design flow from the Easthampton WWTP will go to Outfall #001. Flows less than the design flow will actually be discharged due to the hydraulic limitations of the effluent pipe, thus, the dilution factor under most scenarios would be greater than the 308 using the total design flow.

The Manhan River 7Q10 was calculated using an adjacent watershed with a USGS gage and developing a proportional evaluation of flows. The watershed used is the Mill River in Northampton, with a drainage area of 52.6 square miles. The drainage area of the Manhan River at the location of Outfall #002 is 84 square miles. The 7Q10 value for the Mill River is 6.31 cfs, and the proportional 7Q10 for the Manhan River is 10.1 cfs. However, it should be noted that discharges from Outfall #002 do not appear to occur during low flow periods, thus the 7Q10 will not be used as the river flow to determine effluent limitations for Outfall #002.

Daily flow data for the Mill River gauge (U.S. Geological Survey: Water Years 2004 and 2005) were compared with dates on which there was an overflow from Outfall #002. The data indicated that overflows occurred when the Mill River flows were approximately 20 cfs or greater. A summary of the pertinent Mill River flows is attached as Table 4. Extrapolating flows in the Manhan River as described above results in flows of 30 cfs or greater in the Manhan River when overflows from Outfall #002 occur. This baseline flow condition of 30 cfs will be used in determining required effluent limitations for Outfall #002.

As discussed earlier, the daily maximum daily flow capacity of Outfall #001 appears to be about 2 MGD during normal Connecticut River levels. The effluent conditions and limitations for Outfall #002 will therefore be based upon a flow of 1.8 MGD (2.8 cfs), the difference between the wastewater treatment plant design capacity of 3.8 MGD and the capacity of Outfall #001.

The dilution factor for Outfall #002 is therefore:

(7Q10 {river} + effluent design flow)/ effluent flow =
(30 + 2.8)/2.8 = 11.7

V. Regulatory Basis for Permit Conditions

Federal and state laws and regulations provide the basis for establishing the conditions of this NPDES permit. The federal "Clean Water Act" (CWA or the Act) is the foundation of the NPDES permit program. The 1972 "Amendments to the Federal Water Pollution Control Act" (and subsequent modifications in 1977 and 1987) establish the key elements of the program. The regulations developed pursuant to the program are found at 40 CFR 122 ("EPA Administered Permit Programs: The National Pollutant Discharge Elimination System"). In addition, other relevant regulations are found at 40 CFR 125 (Criteria and Standards for NPDES), 40 CFR 133 (Secondary Treatment regulation) and 40 CFR 403 (Pretreatment Regulations). Important

elements of the CWA and 40 CFR 122 which apply to this permit are outlined below (the reviewer is urged to refer to these documents for additional detail on each element):

* establishment of the NPDES Program: CWA Section 402
* regulations for the NPDES Program: 40 CFR 122
* requirement for secondary treatment: CWA Section 301(b)
* definition of secondary treatment: 40 CFR 133
* establishment of water quality criteria including toxics: CWA Section 304
* effluent limits in permits based upon meeting water quality standards: CWA Section 301 and 40 CFR 122.44(d)
* sludge disposal: CWA Section 405(d)
* anti-backsliding: CWA Section 402(o) and 40 CFR 122.44(l)(1)
* pretreatment: CWA Section 307 and 40 CFR 122.44(j) and 40 CFR 403
* monitoring of effluent: CWA Section 308(a), 40 CFR 122.41(j), 122.44(i) and 122.48
* reporting to Congress on water quality: CWA Section 303(d)(1)(a)

The Massachusetts Clean Waters Act ("Chapter 21 of the General Laws, Sections 26-53":1966) provides the legal elements of the state program and is implemented through the regulations found at 314 CMR 3.00 ("Surface Water Discharge Permit Program") and is supplemented by 314 CMR 4.00 ("Surface Water Quality Standards").

The CWA 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.

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 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.

VI. Permit Limitations Conditions and Basis

A. Conventional Pollutants and Non-Conventional Pollutants

The evaluation of effluent limits which follows is for both Outfall #001 and Outfall #002. In cases where conditions for Outfall #001 are different from Outfall #002 it will be noted and the basis for such limits will be presented. It should be also noted that monitoring of all effluent parameters except total residual chlorine (TRC) and flow are done at one location.

Flow

The design flow of the plant is 3.8 MGD. During the period from January 2004 to December 2006 (Tables 1 & 2), the long term monthly average plant flow measured at the influent flow meter was 2.4 MGD (average of the monthly averages for a three year period), with a maximum daily average flow of 3.1 MGD (average of the maximum daily flows each month for the three year period). The monthly average influent flows ranged from 1.4 MGD to 4.1 MGD and the maximum daily flows ranged from 1.5 MGD to 7.5 MGD during the three year period.

As discussed in Section I.C. above, the discharge from Outfall #001 to the Connecticut River is limited by the hydraulic capacity of the effluent discharge pipe and the stage of the Connecticut River. Flows greater than the hydraulic capacity of Outfall #001 are discharged to the Manhan River via Outfall #002.

The flow limit for the combined discharge from Outfall #001 and Outfall #002 will be 3.8 MGD as measured at the plant's influent flow meter, and will be reported as an annual average flow, using monthly average flows from the previous eleven months and the reporting month. Monthly average and maximum daily flow for both Outfalls will also be required to be reported on the facility's monthly discharge monitoring report (DMR). In addition, flows from Outfall #002 are required to be recorded for each day that effluent is discharged through the outfall and submitted each month in an attachment to the DMR.

As noted earlier, the draft permit also contains a special condition (Part I.F.) to evaluate the hydraulic capacity of Outfall #001, maximize the flow through Outfall #001, and evaluate the feasibility of eliminating flow to Outfall #002.

BOD and TSS

The draft permit includes average monthly and average weekly limits for BOD and TSS and average monthly percent removal which are based on the secondary treatment requirements in 40 CFR 133.102(a); 40 CFR 133.102(b); and 40 CFR 122.45 (f). The draft permit includes average monthly and average weekly concentration limits of 30 mg/l and 45 mg/l respectively, and mass monthly average and weekly average limitations. The draft permit also includes maximum daily reporting requirements for both Outfalls #001 and #002 based on state water quality certification requirements. The calculation of the mass limits are shown below. The frequency of monitoring for BOD and TSS are set at 1/week.

BOD and TSS mass limits calculations (total for Outfalls #001 & #002)

Mass limit [lbs/day] = flow [MGD] x limit [mg/l] x 8.34 [conversion factor]
Flow = 3.8 MGD
Limit = 30 mg/l [average monthly] and 45 mg/l [average weekly]
Mass limits [Outfall #001 and #002] = 3.8 x 30 x 8.34 = 951 lbs/day [average monthly]
Mass limits [Outfall #001 and #002] = 3.8 x 45 x 8.34 = 1426 lbs/day [average weekly]

pH

The pH limits for Outfall #001 are 6.0-8.3 (standard units) with daily monitoring required. The 6.0 value was part of the 1995 permit and is a reflection of pH levels which occur in the treatment process due to long detention times in the aeration system. Due to the high dilution factor in the Connecticut River, the agencies feel this is acceptable and will not cause any in-stream water quality violations of the in-stream state water quality standard for Class B waters [314 CMR 4.05(3)(b)] which is set at 6.5-8.3.

The pH limits for Outfall #002 are 6.5-8.3 which reflect the ambient water quality standard.

***Escherichia coli* Bacteria**

The Escherichia coli (*E. coli*) limits for Outfall #s 001 and 002 are based on state water quality standards for Class B waters (314 CMR 4.05(b)(4)). The State of Massachusetts recently (December 29, 2006) promulgated new bacteria criteria in the Surface Water Quality Standards (314 CMR 4.00). Fecal coliform bacteria have been replaced by *E. coli* in those standards. It is anticipated that these new bacteria criteria will be approved by EPA prior to the final issuance of the NPDES permit. Therefore, the draft permit specifies an *E. coli* reporting requirement for the first year as an adjustment period to meet the new *E. coli* limits. After one year, the new *E. coli* values will become the permit limits. As discussed below, fecal coliform limits will be in effect during the first year.

The effluent limits for Outfall #s 001 and 002 are 126 cfu/100 ml geometric monthly mean and 409 cfu/100 ml maximum daily value (this is the 90% distribution of the geometric mean of 126 cfu/100 ml). These limits are seasonal, and the season has been extended from April 1 to October 31. The draft permit includes a requirement that the *E. coli* samples should be taken at the same time as the daily total chlorine residual sample is collected. Two samples per week are required.

Fecal Coliform Bacteria

As discussed above, the new *E.coli* criteria have not yet been approved by EPA. Accordingly, the draft permit also includes fecal coliform limits for Outfalls #001 and 002 for the first year as an interim limit until the *E. coli* limits become effective. These limits are seasonal, and the season has been extended from April 1 to October 31. The weekly average bacteria limit, which was equivalent to the maximum daily limit of the existing permit, is not necessary and has been removed. The draft permit includes a requirement that the fecal coliform samples be taken at the same time as the daily total chlorine residual sample is collected. Weekly sampling is required. There were no effluent violations for fecal coliform bacteria during the period of 2004-2006.

Chlorine

Chlorine and chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. The effluent limit for daily maximum and monthly average Total Residual Chlorine (TRC) are based on the acute and chronic values defined in *EPA Quality Criteria for Water 1986 (EPA 440/5-86-001)* and *National Recommended Water Quality Criteria (EPA-822-R-02-047)*, as adopted into the Massachusetts Surface Water Quality Standards (314 CMR 4.00). The criteria states that the average total residual chlorine in the receiving water should not exceed 11 ug/l for chronic effects, and the maximum daily TRC concentration in the receiving water should not exceed 19 ug/l to protect aquatic life from acute toxicity.

Total residual chlorine effluent limits are based on the TRC criteria and the calculated dilution factor (see Part IV C for dilution factors).

<u>Total Residual Chlorine (TRC) Outfall #001</u>

National Recommended Water Quality Criteria: 2002 EPA-822-R-02-047:
Chronic criteria (CCC) = 11 ug/l
Acute criteria (CMC) = 19 ug/l

Average monthly limit = {criteria}{dilution factor} = (11 ug/l)(308) = 3388 ug/l = 3.39 mg/l
Maximum daily limit = (19 ug/l) (308) = 5852 ug/l = 5.85 mg/l

The allowable limits based upon meeting water quality criteria are higher than allowed under MassDEP policy, thus the limits have been set lower to be consistent with the *Massachusetts Implementation for the Control of Toxic Pollutants in Surface Waters (February 23, 1990)*. This

policy states that receiving waters shall be protected from unnecessary discharges of excess chlorine. In segments with dilution factors greater than 100, the maximum effluent concentration of chlorine shall not exceed 1.0 mg/l TRC.

Total Residual Chlorine (TRC) Outfall #002

National Recommended Water Quality Criteria: 2002 EPA-822-R-02-047:
Chronic criteria (CCC) = 11 ug/l
Acute criteria (CMC) = 19 ug/l

Average monthly limit = {criteria}{dilution factor} = (11 ug/l)(11.7) = 129 ug/l = 0.13 mg/l
Maximum daily limit = (19 ug/l) (11.7) = 222 ug/l = 0.22 mg/l

The current permit includes a TRC limit of 0.05 mg/l for both monthly average and daily maximum discharge. This limit will be retained based upon anti-backsliding regulations. These limits are less than the calculated values (see above) which would be allowable if the limit was based upon the dilution factor. Due to the periodic flow from Outfall #002 and the fact that the discharge occurs during precipitation events when stream flow is higher than base flow, the chlorine limit is protective and should result in compliance with the water quality criteria for chlorine in the Manhan River.

Copper and other metals

EPA and MassDEP are required to limit any pollutant that is or may be discharged at a level that caused, or has reasonable potential to cause, or contributes to an excursion above any water quality criterion. Copper may be toxic to aquatic life at low concentrations and is the metal species most likely in municipal wastewater to be present at levels to present possible violations of in-stream water quality criteria. Therefore, possible effluent limitations were compared to past monitoring data to determine if there is a reasonable potential for the effluent to cause or contribute to violate water quality. The water quality criteria were updated by EPA in 2002 [*National Recommended Water Quality Criteria: 2002*]. Many metals, including copper, are hardness dependent, and calculated according to a formula presented in the criteria document. Massachusetts implemented site-specific copper criteria for many river systems in the recent revisions to the Surface Water Quality Standards (314 CMR 4.00). However, the Connecticut River and the Manhan River were not among the rivers for which site-specific copper criteria were developed.

The calculations are based on an in-stream hardness for the Connecticut River of 35 mg/l. The maximum daily limit to meet in-stream criteria for copper based on the acute water quality criteria at 7Q10 flows with zero background (river samples analyzed 2004-2006 showed total copper concentrations mostly below detection {0.0025 mg/l}) would be 1.78 mg/l and the average monthly limit, based on the chronic criteria, would be 1.26 mg/l (see data and calculations below).

The Easthampton WWTP conducts effluent toxicity tests twice per year which include effluent chemical analysis for many constituents including total copper. The results of tests conducted from 2004-2006 (n= 6 samples) showed an average effluent total copper value of 0.014 mg/l with a maximum value of 0.021 mg/l. There is no reasonable potential to exceed the ambient water quality criteria due to the discharge, thus a copper limit is not imposed in the permit. The flow to the Manhan River from Outfall #002 as shown below approaches a possible concern. A limit will not be imposed at this time but increased toxicity testing requirements for Outfall #002 will provide additional data to determine if any changes in permit conditions are required in the future. However, the WWTP should continue to maintain the copper levels to the 0.02 mg/l or less range which is normally achievable at municipal WWTP's with proper corrosion control systems in water distribution operations.

Total Copper Data: Effluent and Connecticut River

Date Sampled	Hardness mg/l	Effluent Copper mg/l	Connecticut River Copper mg/l
DEC 13, 2006	36 mg/l	0.021 mg/l	0.010 mg/l
JUN 6, 2006	27 mg/l	0.016 mg/l	0.0019 mg/l
DEC 14, 2005	36 mg/l	0.015 mg/l	< 0.0025 mg/l
JUN 14, 2005	34 mg/l	0.019 mg/l	< 0.0025 mg/l
DEC 14, 2004	26 mg/l	0.008 mg/l	< 0.0025 mg/l
JUN 9, 2004	35 mg/l	0.01 mg/l	< 0.003 mg/l

Copper Effluent Limits Evaluation

Outfall #s 001 & 002:

Chronic criteria (CCC) for total copper based on a 35 mg/l hardness is:
exp [0.8545 (ln 35) - 1.702] = 3.8 ug/l

Average monthly limit = water quality criteria x dilution factor
Average monthly limit = (3.8 ug/l) (308) = 1170 ug/l = 1.17 mg/l [Outfall #001]
Average monthly limit = (3.8 ug/l) (11.7) = 44 ug/l = 0.044 mg/l [Outfall #002]

Acute criteria (CMC) for total copper based on a 35 mg/l hardness is:
exp [0.9422 (ln 35) - 1.700] = 5.2 ug/l
Maximum daily limit = (5.2 ug/l) (308) = 1540 ug/l = 1.6 mg/l [Outfall #001]
Maximum daily limit = (5.2 ug/l) (11.7) = 60 ug/l = 0.061 mg/l [Outfall #002]

Based on this analysis, no copper limit is required.

Monitoring results are part of the whole effluent toxicity (WET) testing program from 2004-2006 for total lead, nickel, zinc and aluminum and are shown below.

Date Sampled	Aluminum mg/l	Lead mg/l	Nickel mg/l	Zinc mg/l
DEC 13, 2006	0.036	0.003	0.002	0.038
JUN 6, 2006	0.034	<0.001	0.0029	0.035
DEC 14, 2005	<0.02	<0.005	<0.004	0.034
JUN 14, 2005	0.14	<0.005	<0.004	0.046
DEC 14, 2004	0.03	<0.005	<0.004	0.029
JUN 9, 2004	0.03	<0.005	<0.004	0.042

The water quality criteria for these metals at a hardness of 35 mg/l, expressed as total metals are:

Criteria	Aluminum mg/l	Lead mg/l	Nickel mg/l	Zinc mg/l
Acute	0.75	0.0215	0.193	0.049
Chronic	0.087	0.0008	0.021	0.049

Based upon the substantial dilution available for both Outfall #s 001 and #002, there is no reasonable potential to violate water quality standards in the Connecticut River or the Manhan River for these metals. Thus, there is no limit in the permit for these metals. However, monitoring for these metals will be part of the whole effluent toxicity testing requirements.

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)(l) 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 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 potential toxicity of the effluent and in conformance with EPA and MassDEP policy, acute toxicity tests are required for Outfall #001 on a semi-annual basis, using the daphnid, *Ceriodaphnia dubia*. The months that toxicity tests are to be conducted has been changed to June and September to be consistent with other facilities in the Connecticut River watershed. The LC50 limit for Outfall #001 is ≥50% in accordance with the MassDEP toxicity policy for dischargers with dilution factors greater than 100. The LC50 limit for Outfall #002 is ≥100%. In addition, based upon a dilution factor of 11.7, there is a chronic (C-NOEC) monitoring requirement for Outfall #002. Testing for Outfall #002 will be required two times per year during the months of March and December when the discharge sampling conditions necessary to perform WET tests are most likely to occur.

Results from tests during the 2004-2006 period are shown in Table 1. The December, 2005 and June, 2006 LC50 values were 70.7% and 69.8% respectively, which are in compliance with the permit limit of >/= 50% but demonstrated some degree of effluent toxicity. Review of the effluent data does not lead to any suspect causes. The other tests during that period had an LC50 of ≥100%. The increased testing frequency for Outfall #002 will provide additional data to evaluate possible sources of toxicity.

Phosphorus

State water quality standards require any existing point source discharge containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practical treatment to remove such nutrients. Phosphorus interferes with water uses and reduces in-stream dissolved oxygen.

The MassDEP 2004 report, "Massachusetts Year 2004 Integrated List of Waters" (April 2005; Report CN: 175.0) does not list either the Connecticut River or the Manhan River as impaired due to nutrient enrichment. The lack of a substantial data base does leave the possibility in the future of the need for a phosphorus limit. Due to lack of evidence to demonstrate "reasonable potential" to violate standards, the draft permit includes monitoring for the period of May through October. This will begin to establish a data base in anticipation of future nutrient criteria for all rivers in Massachusetts. If a Total Maximum Daily Load (TMDL) or other data show that the WWTP is contributing to eutrophication of the river or leading to the exceedance of water quality criteria, EPA and MassDEP may exercise the re-opener clause in Part II.A.4 of this permit and revise effluent conditions.

If the permittee undertakes wastewater facilities planning during the life of the permit, it should consider the development of a long- range phosphorus control and reduction strategy through comprehensive wastewater facility planning which can lead to a reduction in effluent phosphorus loadings if necessary.

Nitrogen

It has been determined that excessive nitrogen loadings are causing significant water quality problems in Long Island Sound, including low dissolved oxygen. The State of Connecticut has begun to impose nitrogen limitations on Connecticut discharges to Long Island Sound and its tributaries. EPA believes there is a need to determine the loadings of nitrogen from sources in Massachusetts which are tributary to Long Island Sound, and to help determine what limits, if any should be imposed on discharges in Massachusetts. Therefore, based on Section 308 of the Clean Water Act, EPA has included monthly monitoring requirements in the draft permit for total nitrogen (Total Kjeldahl nitrogen plus nitrite and nitrate nitrogen). 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 to Long Island Sound. The monitoring data will provide a basis for more sound decision-making in any future decisions relating to nitrogen loadings to the Sound and the need for effluent limits in municipal wastewater treatment plants in Massachusetts. This monitoring requirements may be removed by the agencies after sufficient data collection.

VII. Monitoring and reporting

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. The draft permit requires the submittal of information from monitoring data and other permit reporting requirements which are outlined in the following table :

Reporting Requirement	Permit Page	Due Date(s)
Whole effluent toxicity	Page 5 of 14	January 30, April 30, July 30, October 30
Evaluation of the need to revise local limits	Page 7 of 14	within 120 days of the effective date of the permit
Revision of local limits	Page 8 of 14	within 120 days of notification from EPA
Annual Industrial Pretreatment report	Page 8 of 14	March 1st of each year
Proposed changes (if any) to the Industrial Pretreatment Program	Page 9 of 14	within 180 days of the effective date of the permit
Unauthorized discharges	Page 9 of 14	with 24 hours
Infiltration/Inflow plan	Page 10 of 14	within 12 months of the effective date of the permit
Annual Infiltration/Inflow report	Page 10 of 14	annually on the anniversary date of the effective date of the permit
Annual sludge report	Page 12 of 14	by February 19th for previous calendar year
Hydraulic assessment of Outfall #001	Page 12 of 14	within 24 months of the effective date of the permit
Monthly Discharge Monitoring Reports (DMR)	Page 13 of 14	no later than the 15th day of the following month

VIII. Operation and Maintenance of the Sewer System Requirements

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 these programs are an integral component of ensuring permit compliance under both of these provisions.

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.

MassDEP has stated that the inclusion of the I/I conditions as outlined in its policy 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).

IX. Pretreatment Program and Regulatory Requirements

The facility accepts industrial wastewater from one categorical industrial user (CIU) and three significant industrial users (SIUs) including:

> Nonwovens, Pleasant Street [permit flow = 20,000 gpd]
> Nonwovens, Mechanic Street [permit flow = 200,000 gpd]
> Chemetal {CIU} [permit flow = 1,000 gpd]
> City of Easthampton Landfill [permit flow = 25,000 gpd]

The permittee is required to administer a pretreatment program based on the authority granted under 40 CFR §122.44(j), 40 CFR Part 403 and Section 307 of the Act. The Permittee's pretreatment program received EPA approval on September 24, 1984 and, as a result, appropriate pretreatment program requirements were incorporated into the previous permit which were consistent with that approval and federal pretreatment regulations in effect when the permit was issued.

The Federal Pretreatment Regulations in 40 CFR Part 403 require the permittee to: (1) develop and enforce EPA approved specific effluent limits (technically-based local limits); (2) revise the local sewer-use ordinance or regulation, as appropriate, to be consistent with Federal Regulations; (3) develop an enforcement response plan; (4) implement a slug control evaluation program; (5) track significant noncompliance for industrial users; and (6) establish a definition of and track significant industrial users.

These requirements are necessary to ensure continued compliance with the POTW's NPDES permit and its sludge use or disposal practices.

In addition to the requirements described above, the draft permit requires the permittee to submit to EPA in writing, within 180 days of the permit's effective date, a description of proposed changes, if applicable, to the permittee's pretreatment program deemed necessary to assure conformity with current federal pretreatment regulations. These requirements are included in the draft permit to ensure that the pretreatment program is consistent and up-to-date with all pretreatment requirements in effect. The permittee must also continue to submit, by March 1 each year, an annual pretreatment report detailing the activities of the program for the previous year.

The Permit requires te permittee to submit to EPA, within 90 days of the permit's effective date, all required modifications of the Streamlinimg Rule in order to be consistent with the provisions of the newly promulgated rule. To the extent the permittee's legal authority is not consistent with the required changes, they must be revised and submitted to EPA for review.

X. Sludge Information and Requirements

The Easthampton WWTP generates approximately 350 dry tons of sludge yearly. Sludge is treated by: gravity thickening, odor control, chemical conditioning and belt filter. The processed sludge is disposed at Synagro-Northeast, Waterbury, Connecticut.

Section 405(d) of the CWA requires that EPA develop technical regulations regarding the use and disposal of sewage sludge. These regulations are found at 40 CFR Part 503 and apply to any facility engaged in the treatment of domestic sewage. The CWA further requires that these conditions be implemented through permits. The sludge conditions in the draft permit are intended to implement these regulations.

The draft permit has been conditioned to ensure 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 (Attachment D) 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.

XI. Anti-degradation Review

The Massachusetts Anti-degradation Policy is found at 314 CMR 4.04. All existing uses of the Connecticut River and the Manhan River must be protected. This draft permit is being reissued

with allowable discharge limits as or more stringent than the current permit. There is no change in the outfall locations. 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.

XII. Anti-backsliding

Anti-backsliding as defined at 40 CFR §122.44(l)(1) requires reissued permits to contain limitations as stringent or more stringent than those of the previous permit unless the circumstances allow application of one of the defined exceptions to this regulation. Anti-backsliding does not apply when changes to limits are based on new information not available at the time of the previous permit reissuance (40 CFR §122.44 (l)(2)(i)(B)(1)) or when limits are changed as a result of material and substantial additions or alterations to the permitted facility which occurred after permit issuance which justify the application of less stringent limitations, as defined 40 CFR § 122.44 (l)(2)(i)(A).

XIII. NMF 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 CFR § 600.910(a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. 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.

EPA and MassDEP have discussed the fisheries issues in the Connecticut River with NMFS. The species of particular concern are Atlantic salmon and short nose sturgeon which is an endangered species. A formal EFH consultation does not seem necessary but may be required if NMFS requests such an action to determine if the proposed discharge impacts EFH.

XIV. Endangered Species

Section 7(a) of the Endangered Species Act of 1973, as amended ("Act") grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants and habitat of such species that have been designated as critical. Section 7(a)(2) of the Act requires every Federal agency, in consultation with and with the assistance of

the Secretary of the Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of critical habitat. The National Marine Fisheries Service (NMFS) administers Section 7 consultations for marine species and anadromous fish. The United States Fish and Wildlife Service (USFWS) administers Section 7 consultations for freshwater species.

The Department of the Interior has listed the Shortnosed Sturgeon (Acipenser brevirostrum) as endangered for portions of the Connecticut River. Therefore, EPA has entered into consultation with NMFS and USFWS regarding the reissuance of the NPDES permits to be reissued in the Connecticut River Watershed.

XV. 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.

XVI. Public Comment Period and Procedures for Final Decision

All person, 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 **Brian Pitt, U.S. EPA, 1 Congress Street, Suite 1100, Boston, Massachusetts 02114-2023 and Paul Hogan, Massachusetts 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 MassDEP. 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.

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 decision to the applicant and each person who has submitted written comments or requested notice.

XVII. EPA and MassDEP 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:

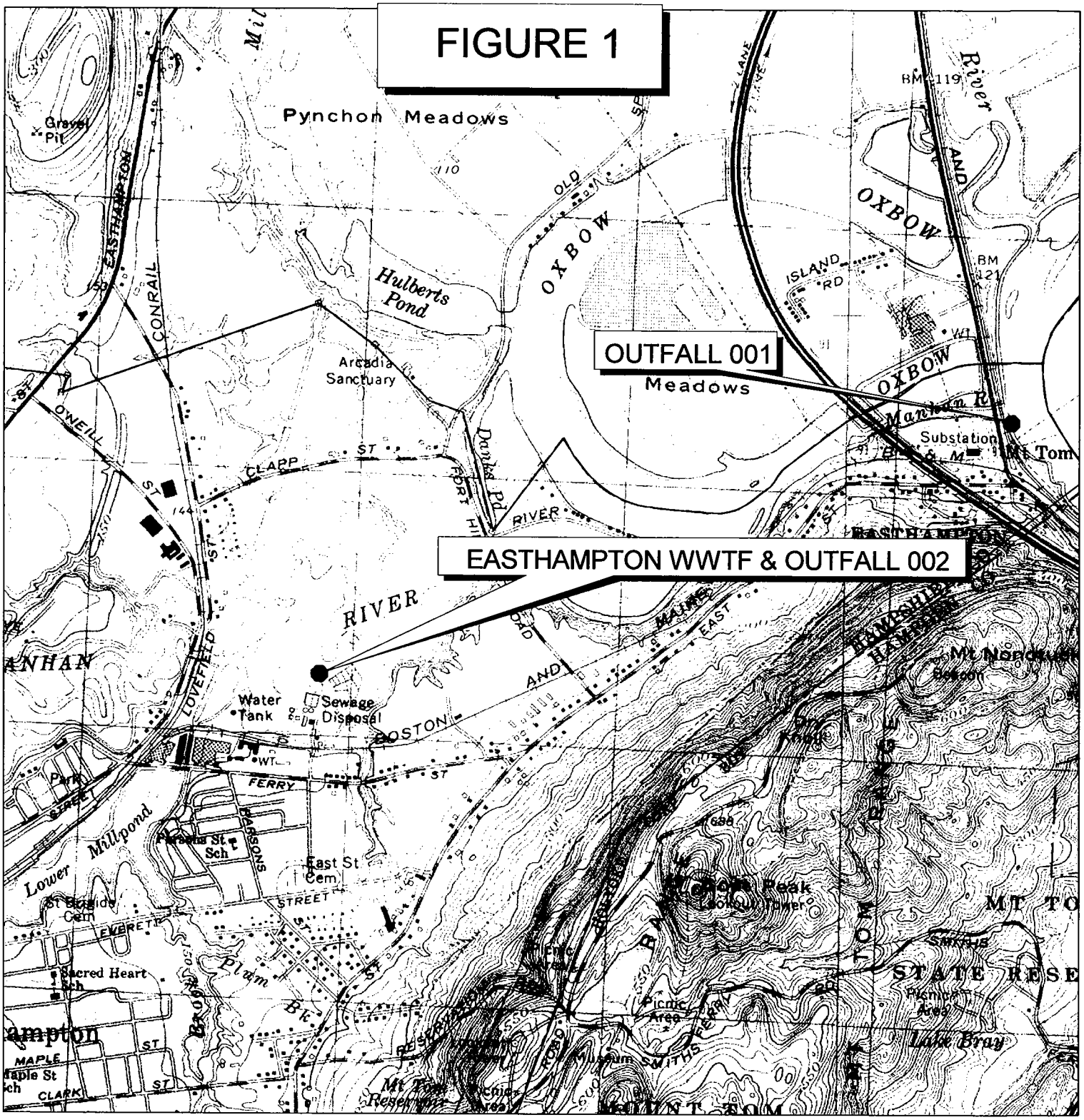
Mark Malone
US Environmental Protection Agency
1 Congress Street
Suite 1100 (CMA)
Boston, Massachusetts 02114-2023
Telephone: (617) 918-1619
Email: malone.mark@epa.gov

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

Date:

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

FIGURE 1



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EASTHAMPTON
WASTEWATER TREATMENT FACILITY
MA0101478

Massachusetts Department of Environmental Protection

Data from MassGIS & MA DEP.
All Data Subject to Revision.

11/17/2005, Massachusetts DEP

For Intra-Agency Policy Deliberations

EASTHAMPTON WWTF

FIGURE 2

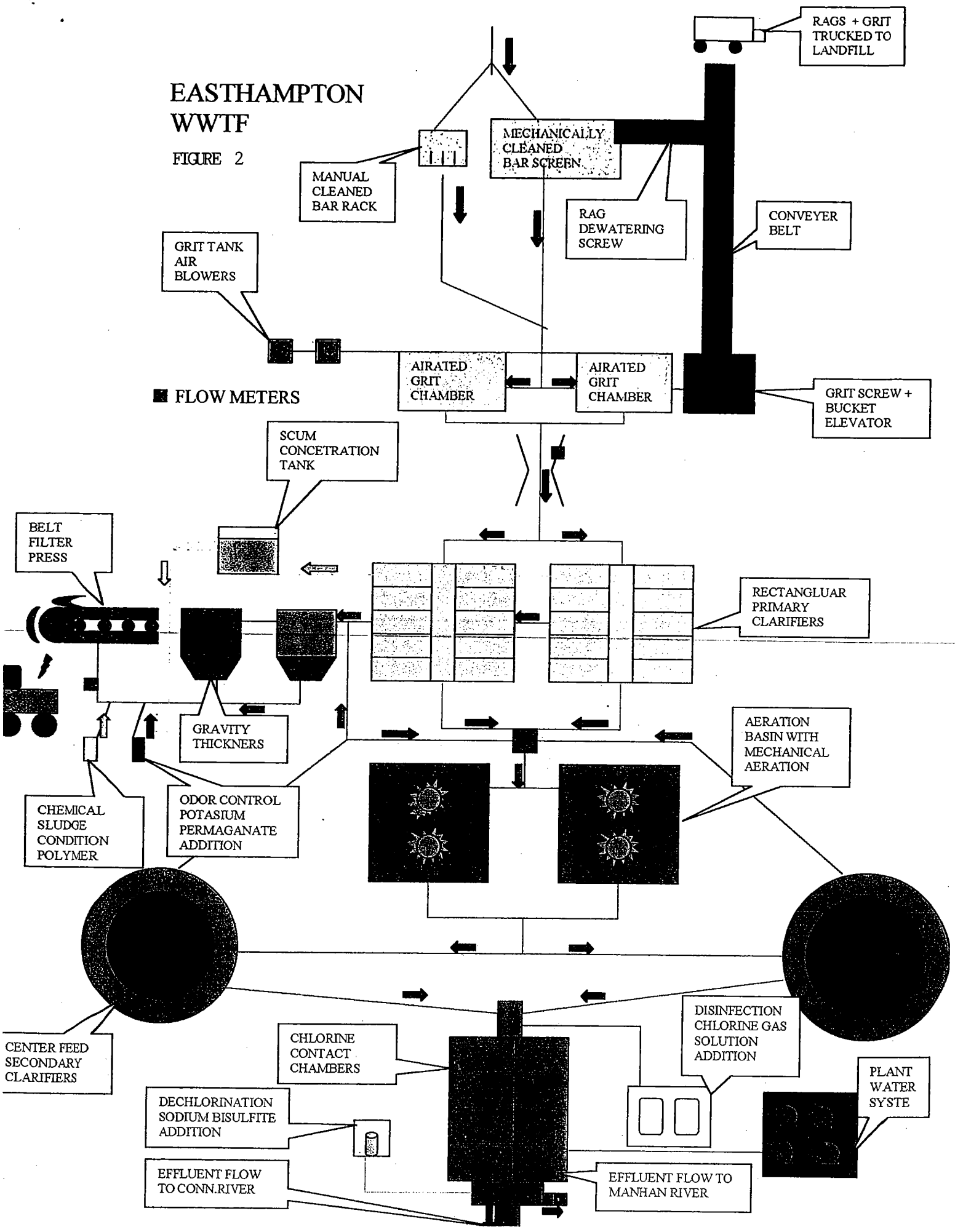

Table 1. Easthampton Effluent Data: January 2004- December 2006

Month/Year	Flow Influent (MGD)		BOD_5 (mg/l)		TSS (mg/l)		pH (su)		Total Residual Chlorine (mg/l)		Fecal coliform (cfu/100 ml)		LC50
	MonthlyAverage	Maximum Daily	MonthlyAverage	Maximum Daily	MonthlyAverage	Maximum Daily	Minimum	Maximum	MonthlyAverage	Maximum Daily	Monthly Geometric Mean	Maximum Daily	Ceriodaphina
Existing Limits	3.8	****	30 mg/l	50 mg/l	30 mg/l	50 mg/l	6.0	8.3	1.0 mg/l	1.0 mg/l	200	400	>50
Dec 2006	2.1	2.4	32.4	52.0	30.2	54.0	7.0	7.2	***	***	***	***	>100
Nov 2006	2.8	3.6	17.9	24.9	10.4	28.0	6.8	7.2	***	***	***	***	***
Oct 2006	1.9	3.2	9.7	9.7	11.3	20.5	6.8	7.2	dna	dna	dna	dna	***
Sep 2006	1.5	1.7	21.7	28.1	9.4	18.4	7.1	7.5	0.61	0.94	37	150	***
Aug 2006	1.5	1.6	20.7	30.6	12.9	25.0	6.8	7.4	0.68	1.0	64	134	***
Jul 2006	1.9	2.4	13.8	23.8	10.5	29.5	6.7	7.4	0.46	0.99	31	91	***
Jun 2006	2.4	2.9	20.8	27.5	13.8	25.0	6.8	7.3	0.16	0.30	67	200	69.8
May 2006	2.6	3.5	13.4	20.3	7.1	12.4	6.4	7.2	0.4	1.0	7	120	***
Apr 2006	2.0	2.2	15.3	21.8	5.4	9.4	7.0	7.5	0.3	0.5	19	130	***
Mar 2006	2.1	2.3	16.2	28.0	6.2	9.0	6.9	7.3	***	***	***	***	***
Feb 2006	3.4	5.4	11.7	16.3	7.2	9.2	6.5	7.0	***	***	***	***	***
Jan 2006	3.9	6.7	9.7	21.3	7.5	14.5	6.5	7.0	***	***	***	***	***
Dec 2005	2.7	3.7	9.7	15.1	6.6	10.6	6.7	7.2	***	***	***	***	70.7
Nov 2005	3.1	3.8	12.5	15.7	6.3	10.4	6.6	7.1	***	***	***	***	***
Oct 2005	3.9	7.5	14.3	19.2	11.7	31.0	6.6	7.3	0.3	0.9	25	184	***
Sep 2005	1.4	1.5	13.7	27.3	6.9	15.0	6.4	7.0	0.5	0.95	13	176	***
Aug 2005	1.5	1.9	13.1	16.8	8.2	13.3	6.9	7.6	0.5	1.0	46	400	***
Jul 2005	1.7	1.9	11.3	19.0	9.9	20.0	6.7	7.3	0.6	1.0	14	44	***
Jun. 2005	1.9	2.2	13.6	29.0	8.9	24.0	6.9	7.3	0.5	1.0	48	90	>100
May 2005	2.6	3.6	9.4	20.0	5.8	11.0	6.9	7.4	0.6	0.8	13	35	***
Apr. 2005	3.7	5.8	13.0	36.0	6.6	14.5	6.5	7.3	0.5	0.8	28	198	***
Mar. 2005	2.7	5.8	15.4	26.0	14.2	23.0	6.7	7.3	***	***	***	***	***
Feb. 2005	2.5	3.2	12.1	16.2	11.4	33.0	6.7	7.3	***	***	***	***	***
Jan. 2005	2.7	4.4	17.8	9.6	2.5	6	6.6	7.5	***	***	***	***	***
Dec. 2004	2.7	3.2	38.4	51.6	9.4	17.5	6.6	7.4	***	***	***	***	>100
Nov. 2004	1.9	2.5	12.4	20.1	9.0	17.5	6.6	8.0	***	***	***	***	***

Month/Year	Flow Influent (MGD)		BOD_5 (mg/l)		TSS (mg/l)		pH (su)		Total Residual Chlorine (mg/l)		Fecal coliform (cfu/100 ml)		LC50
	Monthly Average	Maximum Daily	Monthly Average	Maximum Daily	Monthly Average	Maximum Daily	Minimum	Maximum	Monthly Average	Maximum Daily	Monthly Geometric Mean	Maximum Daily	Ceriodaphina
Existing Limits	3.8	****	30 mg/l	50 mg/l	30 mg/l	50 mg/l	6.0	8.3	1.0 mg/l	1.0 mg/l	200	400	>50
Oct. 2004	2.4	2.7	7.5	10.2	4.8	10.0	6.6	7.5	0.9	1.0	17	28	***
Sep. 2004	2.1	3.6	10.3	15.6	10.1	23.2	6.6	8.0	0.9	1.2	50	226	***
Aug. 2004	1.8	2.0	17.6	34.8	16.3	26.5	6.8	7.3	0.8	1.0	141	520	***
Jul. 2004	1.8	2.0	13.0	19.7	7.8	17.0	6.8	7.3	0.76	1.00	23	129	***
Jun.. 2004	2.2	2.6	10.5	14.7	7.2	13.6	6.8	7.6	0.7	1.0	5	58	>100
May 2004	2.8	3.5	9.0	17.9	7.7	16.0	6.5	7.5	0.8	1.0	40	140	***
Apr. 2004	4.1	6.2	9.1	19.2	9.7	35.0	6.7	7.6	0.7	1.0	84	250	***
Mar. 2004	2.4	3.5	7.2	8.3	6.0	9.0	6.9	7.9	***	***	***	***	***
Feb. 2004	2.0	2.2	12.9	21.9	8.1	19.4	6.5	7.5	***	***	***	***	***
Jan. 2004	2.8	3.9	22.5	33.3	9.7	26.0	6.2	7.0	***	***	***	***	***

Source: monthly DMR submittals; *** = no limit for the period thus no monitoring required; dna = data not available

Table 2: Easthampton WWTP: Flow Discharges to Manhan River

Month/Year	Days in Month w/ Flow	Total Flow Month gallons	Maximum Day Flow gallons	Influent flow Monthly Total MGD
December 2006	30	1,410,000	150,000	66.5
November 2006	30	10,486,000	1,026,000	83.1
October 2006	4	595,000	220,000	58.5
September 2006	0	0	0	45.1
August 2006	0	0	0	45.6
July 2006	14	143,000	41,000	58.3
June 2006	25	4,905,000	834,000	73.1
May 2006	26	12,106,000	1,050,000	79.2
April 2006	17	316,000	130,000	58.3
March 2006	23	663,500	95,000	64.7
February 2006	28	24,701,000	1,900,000	95.4
January 2006	31	62,520,600	5,300,000	121.9
December 2005	31	21,270,000	2,372,000	85.0
November 2005	30	35,534,000	2,706,000	92.3
October 2005	24	92,097,000	6,213,000	121.6
September 2005	0	0	0	43.4
August 2005	2	318,000	317,000	47.5
July 2005	1	1,000	1,000	51.5
June 2005	8	388,000	171,000	57.4
May 2005	28	8,881,000	1,838,000	81.9
April 2005	30	64,353,000	5,826,000	109.5
March 2005	30	19,951,000	5,788,000	83.0
February 2005	25	3,245,00	768,000	69.3
January 2005	30	12,613,000	3,845,000	82.6

December 2004	31	7,976,000	947,000	82.8
November 2004	4	413,000	202,000	57.1
October 2004	10	216,000	98,000	74.0
September 2004	9	2,675,000	1,643,000	63.9
August 2004	2	36,000	21,000	54.9
July 2004	3	166,000	123,000	54.9
June 2004	9	226,000	68,000	64.7
May 2004	25	2,355,000	459,000	86.3
April 2004	30	59,374,000	6,049,000	122.7
March 2004	8	894,000	848,000	75.3
February 2004	0	0	0	57.9
January 2004	21	6,414,000	1,564,000	87.4

Table 3: Manhan River Data 2003 (MassDEP; unpublished Technical Memorandum)

Mahan River Station 11A: Mile Point 5.633; Loudville Road, Easthampton

Date/Time	Fecal coliform CFU/100 ml	E. coli CFU/100 ml	Ammonia-nitrogen mg/l	Total phosphorus mg/l	Total suspended solids mg/l
04/30/03 12:22	20	<0.9	<0.02	0.018	4.4
06/04/03 12:09	180	167	<0.02	0.031	5
07/09/03 13:05	1820	1120	<0.02	0.035	3
08/06/03 12:05	2500	780	<0.06	0.061	11
09/10/03 12:35	70	46	<0.06	0.019	<2
10/0103 12:10	400	160	<0.06	0.043	16

Mahan River Station 11C: Mile Point 0.842; Fort Hill Road, Easthampton

Date/Time	Fecal coliform CFU/100 ml	E. coli CFU/100 ml	Ammonia-nitrogen mg/l	Total phosphorus mg/l	Total suspended solids mg/l
04/30/03 11:59	58 *	5 *	0.06 d	0.029	3.6 *
06/04/03 11:46	170 *	168 *	0.08	0.043	8 *
07/09/03 12:35	590 *	260 *	0.07	0.066 d	6 *
08/06/03 11:35	3700 *	720 *	<0.06	0.099	31 *
09/10/03 11:53	260 *	210 *	0.08	0.027	2 *
10/01/03 11:50	600 *	460 *	0.08	0.067 h	20 *

Qualifiers:* = analysis performed by laboratory other than MassDEP Wall Experiment Station
d = precision of field duplicates did not meet project quality objectives identified for program
h = holding time violation

Table 4

Mill River Flows (cfs) as measured at USGS gage

Oct 2003	59 >A
Nov 2003	96 >A
Dec 2003	107 >A
Jan 2004	80 >B
Feb 2004	80 >C
Mar 2004	82 >B
Apr 2004	109 >A
May 2004	55 >B
Jun 2004	20 >B
Jul 2004	57 >B
Aug 2004	27 >B
Sep 2004	48 >B
Oct 2004	44 >B
Nov 2004	174 >B
Dec 2004	92 >A
Jan 2005	85 >B
Feb 2005	74 >B
Mar 2005	67 >A
Apr 2005	74 >A
May 2005	61 >B
Jun 2005	36 >B
Jul 2005	27 >B
Aug 2005	16 >B
Sep 2005	46 >C

>A = discharge every day from Outfall 002; flow is lowest in the month at Mill River Gage.
>B = periodic discharge from Outfall 002; flow is lowest in the month at Mill River Gage on days when Outfall 002 is discharging.
>C = no discharge from Outfall 002 during the month; flow is highest during the month at Mill River Gage.

Appendix 1: Manhan River Water Quality Data: 2003

The MassDEP conducted ambient monitoring of two locations in the Manhan River in 2003 as part of the MassDEP on-going, state-wide ambient monitoring program. The monitoring locations are described below. The information and data are taken from the full report, *Technical Memorandum 34-5, Connecticut River Watershed DWM 2003 Water Quality Monitoring Data* (DWM Control Number CN: 105.2) (unpublished). A copy of the full report is available upon request to MassDEP.

Station 11A: Manhan River, Loudville Road, Easthampton

This station has a 58 mi^2 contributing drainage area, and is 5.7 miles upstream from the Connecticut River. Station 11A was located upstream of the most urbanized portion of Easthampton. A downstream site (Station 11C) was used to compare conditions with the upstream site.

The Manhan River, at this station, is a low-gradient stream. It meanders through an area of pasture and residential land use. This station was accessed by parking along the side of Loudville Road, and walking to the sample collection point, approximately 100-feet upstream of the Loudville Road bridge. The substrates were primarily sand, and the banks showed some signs of cut-bank erosion. The water was clear on all sampling occasions except August 6th and October 1st. At these times, the water was slightly turbid and murky.

Station 11C: Manhan River, Fort Hill Road, Easthampton

This station is the furthest downstream accessible location on the Manhan River, and is 0.86 miles from the confluence with the Connecticut River. The station has a drainage area of 84 mi^2. The Manhan River flows through several mills in Easthampton. Between station 11B and this station (11C), the Manhan River receives the inflow from Lower Mill Pond. This pond, fed by Broad Brook, Rubber Thread Pond, and Nashawannuck Pond, receives the majority of the potential industrial effluent. This station is also 0.75 miles downstream of the Easthampton WWTP.

This station was accessed by parking along the side of Fort Hill Street and walking to the upstream side of the Fort Hill Road bridge. Samples were collected by using the “Bottle Basket Sampling Device”. The water color was almost always brown (except during the April and June samplings). There were signs of erosion in the sandy / muddy banks. It is assumed that the substrates are primarily comprised of sand and mud, but the bottom was unobservable due to the depth (and turbidity) of the water.

Water Quality Data

Raw data files, field sheets, lab reports and chain of custody (COC) records are stored in open files at the MassDEP DWM in Worcester. All MassDEP DWM water quality data are managed and maintained in the *Water Quality Data Access Database*. Data exports for publishing are provided by DWM's database manager. Data are ***QC Status 4*** ("Final") data exports for the Connecticut Watershed. This level of data reflects project-level review by appropriate staff for reasonableness, completeness and acceptability. These data can be freely used and cited in documents without caution or caveat.

Water quality data for multi-probe parameters (dissolved oxygen, percent dissolved oxygen saturation, pH, conductivity, water temperature and total dissolved solids) are in data table below, and for nutrients (total phosphorus, nitrate-nitrite, ammonia), fecal coliform and *E. coli* bacteria are in Appendix: Table 3.

Data validation procedures are described in *Data Validation Report for Year 2003 Project Data* (Chase et al 2005b). Validation of data from discrete water samples is based on acceptable relative percent differences for field duplicates and the lack of contamination (i.e. less than method detection limits) for ambient field blanks.

MANHAN RIVER (SARIS: 3418175)
Unique_ID: W1064 Station: 11A, Mile Point: 5.633
Description: [Loudville Road, Easthampton]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25˚C	TDS	DO	SAT
		(24hr)	(m)	(˚C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/29/03	34-0145	14:33	0.6	13.0	6.9 c	96.8	62.0	10.1	97
06/03/03	34-0179	03:26	1.2	14.5	7.0 u	110	70.3	9.2 u	92 u
07/08/03	34-0244	05:13	0.8	20.8	7.1 u	140	91.0	8.0 iu	90 iu
08/05/03	34-0347	04:13	0.7	20.3	7.1 uc	117	76.0	7.8	87
08/06/03	34-0405	12:06	0.5	20.6	7.1 uc	120	78.0	8.3	92
09/09/03	34-0452	04:10	0.7	15.7	7.2 u	154	100	8.9	89
10/01/03	34-0517	12:14	0.7	13.0	6.9 u	96.0	62.0	10.0 u	95 u

MANHAN RIVER (SARIS: 3418175)
Unique_ID: W1065 Station: 11C, Mile Point: 0.842
Description: [Fort Hill Road, Easthampton]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25˚C	TDS	DO	SAT
		(24hr)	(m)	(˚C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/29/03	34-0146	13:48	2.0	13.2	7.1 cu	131	83.5	10.2	98
06/03/03	34-0178	03:50	0.3	13.8	6.8 c	84.8	54.3	9.1	90
07/08/03	34-0243	04:52	0.4	22.8	7.2 u	175	114	7.4 i	86 i
08/05/03	34-0346	03:38	0.4	21.6	7.3 c	144	94.0	8.0	91
08/06/03	34-0404	11:32	0.4	21.5	7.3 c	153	99.0	8.3	94
09/09/03	34-0451	03:44	0.7 u	17.4	7.3	186	121	8.4	88
10/01/03	34-0516	11:50	1.7 u	13.5	7.0 u	113	74.0	10.1	97

Qualifiers:

" u " = unstable readings, due to lack of sufficient equilibration time prior to final readings, non-representative location, highly-variable water quality conditions, etc.

" c " = unit not calibrated for a particular parameter and/or greater than calibration standard used for pre-calibration, or outside the acceptable range about the calibration standard.

" i " = inaccurate readings from multi-probe <u>likely</u>; may be due to significant pre-survey calibration problems, post-survey checks outside typical acceptance ranges for the low ionic and deionized water checks, lack of calibration of the depth sensor prior to use, or to checks against laboratory analyses. Where documentation on unit pre-calibration is lacking, but SOPs at the time of sampling dictated pre-calibration prior to use, then data are considered <u>potentially</u> inaccurate.