

Outfall No.	Responsible Permittee or Co-permittee	Receiving Water	Latitude and Longitude
MWR010	Massachusetts Water Resources Authority	Charles River	42° 21' 6" N, 71° 6' 22" W
MWR018	Massachusetts Water Resources Authority	Charles River	42° 21' 10" N, 71° 5' 15" W
MWR019	Massachusetts Water Resources Authority	Charles River	42° 21' 18" N, 71° 4' 51" W
MWR020	Massachusetts Water Resources Authority	Charles River	42° 21' 24" N, 71° 4' 34" W
MWR023	Massachusetts Water Resources Authority	Charles River	42° 21' 6" N, 71° 5' 33" W
BOS046	Boston Water and Sewer Commission	Muddy River	42° 20' 30" N, 71° 5' 34" W
BOS013	Boston Water and Sewer Commission	Boston Inner Harbor	42° 23' 3" N, 71° 2' 22" W
BOS014	Boston Water and Sewer Commission	Boston Inner Harbor	42° 22' 58" N, 71° 1' 38" W
BOS009	Boston Water and Sewer Commission	Boston Inner Harbor	42° 22' 13" N, 71° 2' 39" W
BOS010	Boston Water and Sewer Commission	Boston Inner Harbor	42° 22' 24" N, 71° 2' 32" W
BOS012	Boston Water and Sewer Commission	Boston Inner Harbor	42° 22' 40" N, 71° 2' 32" W
BOS057	Boston Water and Sewer Commission	Boston Inner Harbor	42° 21' 51" N, 71° 2' 58" W
BOS060	Boston Water and Sewer Commission	Boston Inner Harbor	42° 21' 34" N, 71° 2' 54" W
BOS003	Boston Water and Sewer Commission	Boston Inner Harbor	42° 21' 28" N, 71° 1' 40" W
BOS004	Boston Water and Sewer Commission	Boston Inner Harbor	42° 21' 53" N, 71° 1' 37" W
CHE008	City of Chelsea	Chelsea River	42° 23' 41" N, 71° 1' 9" W
BOS062	Boston Water and Sewer Commission	Fort Point Channel	42° 21' 16" N, 71° 3' 4" W
BOS064	Boston Water and Sewer Commission	Fort Point Channel	42° 21' 5" N, 71° 3' 10" W
BOS065	Boston Water and Sewer Commission	Fort Point Channel	42° 20' 55" N, 71° 3' 16" W
BOS068	Boston Water and Sewer Commission	Fort Point Channel	42° 20' 42" N, 71° 3' 34" W
BOS070	Boston Water and Sewer Commission	Fort Point Channel	42° 20' 34" N, 71° 3' 40" W

Outfall No.	Responsible Permittee or Co-permittee	Receiving Water	Latitude and Longitude
BOS073	Boston Water and Sewer Commission	Fort Point Channel	42° 20' 52" N, 71° 3' 13" W
BOS076	Boston Water and Sewer Commission	Reserve Channel	42° 20' 23" N, 71° 2' 31" W
BOS078	Boston Water and Sewer Commission	Reserve Channel	42° 20' 19" N, 71° 2' 24" W
BOS079	Boston Water and Sewer Commission	Reserve Channel	42° 20' 31" N, 71° 2' 8" W
BOS080	Boston Water and Sewer Commission	Reserve Channel	42° 20' 30" N, 71° 1' 31" W
BOS081	Boston Water and Sewer Commission	North Dorchester Bay	42° 19' 57" N, 71° 1' 30" W
BOS082	Boston Water and Sewer Commission	North Dorchester Bay	42° 19' 47" N, 71° 1' 49" W
BOS084	Boston Water and Sewer Commission	North Dorchester Bay	42° 19' 43" N, 71° 2' 29" W
BOS085	Boston Water and Sewer Commission	North Dorchester Bay	42° 19' 40" N, 71° 2' 43" W
BOS086	Boston Water and Sewer Commission	North Dorchester Bay	42° 19' 36" N, 71° 2' 44" W
MWR003	Massachusetts Water Resources Authority	Alewife Brook	42° 22' 8" N, 71° 3' 39" W
CAM001	City of Cambridge	Alewife Brook	42° 24' 7" N, 71° 8' 7" W
CAM002 <ul style="list-style-type: none"> • CAM002A • CAM002B (temporarily closed) 	City of Cambridge	Alewife Brook	42° 24' 4" N, 71° 8' 10" W
CAM401A	City of Cambridge	Alewife Brook	42° 23' 44" N, 71° 8' 38" W
CAM401B	City of Cambridge	Alewife Brook	42° 24' 4" N, 71° 8' 10" W
CAM005	City of Cambridge	Charles River	42° 22' 25" N, 71° 7' 58" W
CAM007	City of Cambridge	Charles River	42° 22' 24" N, 71° 7' 37" W
CAM009 (temporarily closed)	City of Cambridge	Charles River	42° 22' 10" N, 71° 07' 24" W

Outfall No.	Responsible Permittee or Co-permittee	Receiving Water	Latitude and Longitude
CAM011 (temporarily closed)	City of Cambridge	Charles River	42° 22' 8" N, 71° 07' 4" W
CAM017	City of Cambridge	Charles River	42° 21' 53" N, 71° 4' 35" W
SOM001A	City of Somerville	Alewife Brook	42° 24' 9" N, 71° 8' 6" W
SOM007A	City of Somerville	Mystic River	42° 23' 38" N, 71° 4' 34" W
BOS017	Boston Water and Sewer Commission	Mystic River	42° 23' 8" N, 71° 4' 8" W
BOS019	Boston Water and Sewer Commission	Mystic River	42° 22' 48" N, 71° 3' 4" W
CHE003	City of Chelsea	Mystic River	42° 23' 13" N, 71° 2' 27" W
CHE004	City of Chelsea	Mystic River	42° 23' 12" N, 71° 2' 21" W
CHE008	City of Chelsea	Chelsea River	42° 23' 41" N, 71° 1' 9" W

**MWRA Sewer Member Communities
and Co-permittees to NPDES Permit MA0103284
with individual permit number**

Permit Number	Co-permittee	Responsibilities
MAC013284	Town of Arlington Water and Sewer Department 51 Grove Street Arlington, MA 02476	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC023284	Town of Ashland Department of Public Works 20 Ponderosa Road Ashland, MA 01721	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC033284	Town of Bedford Department of Public Works 314 Great Road Bedford, MA 01730	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC043284	Town of Belmont Department of Public Works 19 Moore Street Belmont, MA 02478	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC063284	Town of Braintree Department of Public Works P.O. Box 850903 Braintree, MA 02185-0903	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC073284	Town of Brookline Department of Public Works 333 Washington Street Brookline, MA 02445	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC083284	Town of Burlington Department of Public Works 25 Center Street Burlington, MA 01803	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC103284	Town of Canton Department of Public Works 801 Washington Street Canton, MA 02021	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC123284	Town of Dedham Department of Public Works 55 River Street Dedham, MA 02026	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.

Permit Number	Co-permittee	Responsibilities
MAC133284	City of Everett Department of Public Works 19 Norman Street Everett, MA 02149	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC143284	City of Framingham Department of Public Works 110 Western Avenue Framingham, MA 01701	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC153284	Town of Hingham Department of Public Works 25 Bare Cove Park Drive Hingham, MA 02043	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC163284	Town of Holbrook Department of Public Works 50 N. Franklin Street Holbrook, MA 02343	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC173284	Town of Lexington Water & Sewer Department 201 Bedford Street Lexington, MA 02420	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC183284	City of Malden Department of Public Works 356 Commercial Street Malden, MA 02148	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC193284	City of Medford Department of Public Works 21 James Street Medford, MA 02155	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC203284	City of Melrose Department of Public Works 72 Tremont St. Melrose, MA 02176	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC213284	Town of Milton Department of Public Works 629 Randolph Avenue Milton, MA 02186	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC223284	Town of Natick Director of Public Works 75 West Street Natick, MA 01760	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.

Permit Number	Co-permittee	Responsibilities
MAC233284	Town of Needham Department of Public Works 500 Dedham Avenue Needham, MA 02492	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC243284	City of Newton Department of Public Works 1000 Commonwealth Avenue Newton, MA 02459	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC253284	Town of Norwood Department of Public Works 566 Washington Street Norwood, MA 02062	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC263284	City of Quincy Department of Public Works 55 Sea Street Quincy, MA 02169	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC273284	Town of Randolph Department of Public Works 41 South Main Street Randolph, MA 02368	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC283284	Town of Reading Department of Public Works 16 Lowell Street Reading, MA 01867	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC293284	City of Revere Department of Public Works 321 Rear Charger Street Revere, MA 02151	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC313284	Town of Stoneham Public Works Department 16 Pine Street Stoneham, MA 02180	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC323284	Town of Stoughton Department of Public Works 950 Central Street Stoughton, MA 02072	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC333284	Town of Wakefield Department of Public Works 1 Lafayette Street Wakefield, MA 01880	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.

Permit Number	Co-permittee	Responsibilities
MAC343284	Town of Walpole Department of Public Works 135 School Street Walpole, MA 02081	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC353284	City of Waltham Water & Sewer Division 165 Lexington Street Waltham, MA 02452	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC363284	Town of Watertown Department of Public Works 124 Orchard Street Watertown, MA 02472	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC373284	Town of Wellesley Department of Public Works 20 Municipal Way Wellesley, MA 02481	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC383284	Town of Westwood Department of Public Works 50 Carby Street Westwood, MA 02090	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC393284	Town of Weymouth Department of Public Works 120 Winter Street Weymouth, MA 02188	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC403284	Town of Wilmington Water & Sewer Division 121 Glen Road Wilmington, MA 01887	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC413284	Town of Winchester Department of Public Works 15 Lake Street Winchester, MA 01890	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC423284	Town of Winthrop Department of Public Works 100 Kennedy Drive Winthrop, MA 02152	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.
MAC433284	City of Woburn Public Works Sewer Division 50 North Warren Street Woburn, MA 01801	Draft Permit Part I.C., Part I.E., Part I.F., and Part I. J.

**MWRA Sewer Member Communities
and CSO-responsible Co-permittees
to NPDES Permit MA0103284
with individual permit number**

Permit Number	Co-permittee	Responsibilities
MAC053284	City of Boston Boston Water and Sewer Commission 980 Harrison Avenue Boston, MA 02119	Draft Permit Part I.B., Part I.C., Part I.D., Part I.E., Part I.F., and Part I.J.
MAC093284	City of Cambridge Department of Public Works 147 Hampshire Street Cambridge, MA 02139	Draft Permit Part I.B., Part I.C., Part I.D., Part I.E., Part I.F., and Part I.J.
MAC113284	City of Chelsea Department of Public Works 500 Broadway Chelsea, MA 02150	Draft Permit Part I.B., Part I.C., Part I.D., Part I.E., Part I.F., and Part I.J.
MAC303284	City of Somerville Department of Public Works 17 Franey Street Somerville, MA 02144	Draft Permit Part I.B., Part I.C., Part I.D., Part I.E., Part I.F., and Part I.J.

ATTACHMENT C

MARINE ACUTE TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable acute toxicity tests in accordance with the appropriate test protocols described below:

- **2007.0 - Mysid Shrimp (Americamysis bahia) definitive 48 hour test.**
- **2006.0 - Inland Silverside (Menidia beryllina) definitive 48 hour test.**

Acute toxicity data shall be reported as outlined in Section VIII.

II. METHODS

The permittee shall use the most recent 40 CFR Part 136 methods. Whole Effluent Toxicity (WET) Test Methods and guidance may be found at:

<https://www.epa.gov/cwa-methods/whole-effluent-toxicity-methods>

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. This protocol defines more specific requirements while still being consistent with the Part 136 methods. If, due to modifications of Part 136, there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

III. SAMPLE COLLECTION

A discharge and receiving water sample shall be collected. The receiving water control sample must be collected immediately upstream of the permitted discharge's zone of influence. The acceptable holding times until initial use of a sample are 24 and 36 hours for on-site and off-site testing, respectively. A written waiver is required from the regulating authority for any holding time extension. Sampling guidance dictates that, where appropriate, aliquots for the analysis required in this protocol shall be split from the samples, containerized and immediately preserved, or analyzed as per 40 CFR Part 136. EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection. Testing for the presence of total residual chlorine¹ (TRC) must be analyzed immediately or as soon as possible, for all effluent samples, prior to WET testing. TRC analysis may be performed on-site or by the toxicity testing laboratory and the samples must be dechlorinated, as necessary, using sodium thiosulfate

¹ For this protocol, total residual chlorine is synonymous with total residual oxidants.

prior to sample use for toxicity testing. If performed on site the results should be included on the chain of custody (COC) presented to WET laboratory.

Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1 mg/L chlorine. If dechlorination is necessary, a thiosulfate control consisting of the maximum concentration of thiosulfate used to dechlorinate the sample in the toxicity test control water must also be run in the WET test.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol. Grab samples must be used for pH, temperature, and total residual chlorine (as per 40 CFR Part 122.21).

All samples held for use beyond the day of sampling shall be refrigerated and maintained at a temperature range of 0-6° C.

IV. DILUTION WATER

Samples of receiving water must be collected from a reasonably accessible location in the receiving water body immediately upstream of the permitted discharge's zone of influence. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. EPA strongly urges that screening for toxicity be performed prior to the set up of a full, definitive toxicity test any time there is a question about the test dilution water's ability to achieve test acceptability criteria (TAC) as indicated in Section V of this protocol. The test dilution water control response will be used in the statistical analysis of the toxicity test data. All other control(s) required to be run in the test will be reported as specified in the Discharge Monitoring Report (DMR) Instructions, Attachment F, page 2, Test Results & Permit Limits.

The test dilution water must be used to determine whether the test met the applicable TAC. When receiving water is used for test dilution, an additional control made up of standard laboratory water (0% effluent) is required. This control will be used to verify the health of the test organisms and evaluate to what extent, if any, the receiving water itself is responsible for any toxic response observed.

If dechlorination of a sample by the toxicity testing laboratory is necessary a "sodium thiosulfate" control, representing the concentration of sodium thiosulfate used to adequately dechlorinate the sample prior to toxicity testing, must be included in the test.

If the use of alternate dilution water (ADW) is authorized, in addition to the ADW test control, the testing laboratory must, for the purpose of monitoring the receiving water, also run a receiving water control.

If the receiving water is found to be, or suspected to be toxic or unreliable, ADW of known quality with hardness similar to that of the receiving water may be substituted. Substitution is

species specific meaning that the decision to use ADW is made for each species and is based on the toxic response of that particular species. Substitution to an ADW is authorized in two cases. The first case is when repeating a test due to toxicity in the site dilution water requires an **immediate decision** for ADW use by the permittee and toxicity testing laboratory. The second is when two of the most recent documented incidents of unacceptable site dilution water toxicity require ADW use in future WET testing.

For the second case, written notification from the permittee requesting ADW use **and** written authorization from the permit issuing agency(s) is required **prior to** switching to a long-term use of ADW for the duration of the permit.

Written requests for use of ADW with supporting documentation must be sent electronically to the NPDES Applications Coordinator in EPA Water Division (WD) at the following email address:

R1NPDESReporting@epa.gov

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the EPA Region 1 website at: www.epa.gov/aboutepa/epa-region-1-new-england (click on NPDES, EPA Permit Attachments, Self-Implementing Alternate Dilution Water Guidance) for important details on alternate dilution water substitution requests.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

EPA Region 1 requires tests be performed using four replicates of each control and effluent concentration because the non-parametric statistical tests cannot be used with data from fewer replicates. The following tables summarize the accepted Americamysis and Menidia toxicity test conditions and test acceptability criteria:

EPA NEW ENGLAND EFFLUENT TOXICITY TEST CONDITIONS FOR THE MYSID, AMERICAMYSIS BAHIA 48 HOUR TEST¹

1. Test type	48hr Static, non-renewal
2. Salinity	25ppt \pm 10 percent for all dilutions by adding dry ocean salts
3. Temperature (°C)	20°C \pm 1°C or 25°C \pm 1°C, temperature must not deviate by more than 3°C during test
4. Light quality	Ambient laboratory illumination
5. Photoperiod	16 hour light, 8 hour dark
6. Test chamber size	250 ml (minimum)
7. Test solution volume	200 ml/replicate (minimum)
8. Age of test organisms	1-5 days, <u>\leq 24 hours age range</u>
9. No. Mysids per test chamber	10
10. No. of replicate test chambers per treatment	4
11. Total no. Mysids per test concentration	40
12. Feeding regime	Light feeding using concentrated <u>Artemia</u> naupli while holding prior to initiating the test
13. Aeration ²	None
14. Dilution water	5-30 ppt, +/- 10%; Natural seawater, or deionized water mixed with artificial sea salts
15. Dilution factor	\geq 0.5
16. Number of dilutions ³	5 plus a control. An additional dilution at the permitted effluent concentration (%)

effluent) is required if it is not included in the dilution series.

17. Effect measured

Mortality - no movement of body appendages on gentle prodding

18. Test acceptability

90% or greater survival of test organisms in control solution

19. Sampling requirements

For on-site tests, samples are used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples must be first used within 36 hours of collection.

20. Sample volume required

Minimum 1 liter for effluents and 2 liters for receiving waters

Footnotes:

¹ Adapted from EPA 821-R-02-012.

² If dissolved oxygen falls below 4.0 mg/L, aerate at rate of less than 100 bubbles/min. Routine D.O. checks are recommended.

³ When receiving water is used for dilution, an additional control made up of standard laboratory dilution water (0% effluent) is required.

EPA NEW ENGLAND TOXICITY TEST CONDITIONS FOR THE INLAND SILVERSIDE, MENIDIA BERYLLINA 48 HOUR TEST¹

1. Test Type	48 hr Static, non-renewal
2. Salinity	25 ppt \pm 10 % by adding dry ocean salts
3. Temperature	20°C \pm 1°C or 25°C \pm 1°C, temperature must not deviate by more than 3°C during test
4. Light Quality	Ambient laboratory illumination
5. Photoperiod	16 hr light, 8 hr dark
6. Size of test vessel	250 mL (minimum)
7. Volume of test solution	200 mL/replicate (minimum)
8. Age of fish	9-14 days; 24 hr age range
9. No. fish per chamber	10 (not to exceed loading limits)
10. No. of replicate test vessels per treatment	4
11. Total no. organisms per concentration	40
12. Feeding regime	Light feeding using concentrated <u>Artemia</u> nauplii while holding prior to initiating the test
13. Aeration ²	None
14. Dilution water	5-32 ppt, +/- 10% ; Natural seawater, or deionized water mixed with artificial sea salts.
15. Dilution factor	≥ 0.5
16. Number of dilutions ³	5 plus a control. An additional dilution at the permitted concentration (% effluent) is required if it is not included in the dilution series.
17. Effect measured	Mortality-no movement on gentle prodding.

18. Test acceptability	90% or greater survival of test organisms in control solution.
19. Sampling requirements	For on-site tests, samples must be used within 24 hours of the time they are removed from the sampling device. Off-site test samples must be used within 36 hours of collection.
20. Sample volume required	Minimum 1 liter for effluents and 2 liters for receiving waters.

Footnotes:

- ¹ Adapted from EPA 821-R-02-012.
- ² If dissolved oxygen falls below 4.0 mg/L, aerate at rate of less than 100 bubbles/min. Routine D.O. checks recommended.
- ³ When receiving water is used for dilution, an additional control made up of standard laboratory dilution water (0% effluent) is required.

V.1. Test Acceptability Criteria

If a test does not meet TAC the test must be repeated with fresh samples within 30 days of the initial test completion date.

V.2. Use of Reference Toxicity Testing

Reference toxicity test results and applicable control charts must be included in the toxicity testing report.

In general, if reference toxicity test results fall outside the control limits established by the laboratory for a specific test endpoint, a reason or reasons for this excursion must be evaluated, correction made and reference toxicity tests rerun as necessary as prescribed below.

If a test endpoint value exceeds the control limits at a frequency of more than one out of twenty then causes for the reference toxicity test failure must be examined and if problems are identified corrective action taken. The reference toxicity test must be repeated during the same month in which the exceedance occurred.

If two consecutive reference toxicity tests fall outside control limits, the possible cause(s) for the exceedance must be examined, corrective actions taken and a repeat of the reference toxicity test must take place immediately. Actions taken to resolve the problem must be reported.

V.2.a. Use of Concurrent Reference Toxicity Testing

In the case where concurrent reference toxicity testing is required due to a low frequency of testing with a particular method, if the reference toxicity test results fall slightly outside of laboratory established control limits, but the primary test met the TAC, the results of the primary test will be considered acceptable. However, if the results of the concurrent test fall well outside the established **upper** control limits i.e. ≥ 3 standard deviations for IC25s and LC50 values and \geq two concentration intervals for NOECs or NOAECs, and even though the primary test meets TAC, the primary test will be considered unacceptable and must be repeated.

VI. CHEMICAL ANALYSIS

At the beginning of the static acute test, pH, salinity, and temperature must be measured at the beginning and end of each 24 hour period in each dilution and in the controls. The following chemical analyses shall be performed for each sampling event.

<u>Parameter</u>	<u>Effluent</u>	<u>Diluent</u>	<u>Minimum Level for effluent^{*1} (mg/L)</u>
pH	x	x	---
Salinity	x	x	ppt(o/oo)
Total Residual Chlorine ^{*2}	x	x	0.02
Total Solids and Suspended Solids	x	x	---
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
<u>Total Metals</u>			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005

Superscript:

^{*1} These are the minimum levels for effluent (fresh water) samples. Tests on diluents (marine waters) shall be conducted using the Part 136 methods that yield the lowest MLs.

^{*2} Either of the following methods from the 18th Edition of the APHA Standard Methods for the Examination of Water and Wastewater must be used for these analyses:

- Method 4500-Cl E Low Level Amperometric Titration (the preferred method);
- Method 4500-CL G DPD Photometric Method.

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration

An estimate of the concentration of effluent or toxicant that is lethal to 50% of the test organisms during the time prescribed by the test method.

Methods of Estimation:

- Probit Method
- Spearman-Kärber
- Trimmed Spearman-Kärber
- Graphical

See flow chart in Figure 6 on page 73 of EPA 821-R-02-012 for appropriate method to use on a given data set.

No Observed Acute Effect Level (NOAEL)

See flow chart in Figure 13 on page 87 of EPA 821-R-02-012.

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Toxicity Test summary sheet(s) (Attachment F to the DMR Instructions) which includes:
 - Facility name
 - NPDES permit number
 - Outfall number
 - Sample type
 - Sampling method
 - Effluent TRC concentration
 - Dilution water used
 - Receiving water name and sampling location
 - Test type and species
 - Test start date
 - Effluent concentrations tested (%) and permit limit concentration
 - Applicable reference toxicity test date and whether acceptable or not
 - Age, age range and source of test organisms used for testing
 - Results of TAC review for all applicable controls
 - Permit limit and toxicity test results
 - Summary of any test sensitivity and concentration response evaluation that was conducted

Please note: The NPDES Permit Program Instructions for the Discharge Monitoring Report Forms (DMRs) are available on EPA's website at: www.epa.gov/compliance/discharge-monitoring-reports-avoiding-common-mistakes

In addition to the summary sheets the report must include:

- A brief description of sample collection procedures;
- Chain of custody documentation including names of individuals collecting samples, times and dates of sample collection, sample locations, requested analysis and lab receipt with time and date received, lab receipt personnel and condition of samples upon receipt at the lab(s);
- Reference toxicity test control charts;
- All sample chemical/physical data generated, including minimum levels (MLs) and analytical methods used;
- All toxicity test raw data including daily ambient test conditions, toxicity test chemistry, sample dechlorination details as necessary, bench sheets and statistical analysis;
- A discussion of any deviations from test conditions; and
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review per species per endpoint.

ATTACHMENT D

MARINE CHRONIC TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall be responsible for the conduct of acceptable silverside chronic and sea urchin chronic toxicity tests in accordance with the appropriate test protocols described below:

- Inland Silverside (Menidia beryllina) Larval Growth and Survival Test
- Sea Urchin (Arbacia punctulata) 1 Hour Fertilization Test

Chronic toxicity data shall be reported as outlined in Section VIII.

II. METHODS

The permittee shall use 40 CFR Part 136 methods. Methods and guidance may be found at:

<https://www.epa.gov/cwa-methods/whole-effluent-toxicity-methods>

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. Where there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

III. SAMPLE COLLECTION AND USE

A total of three fresh samples of effluent and receiving water are required for initiation and subsequent renewals of a marine, chronic, toxicity test. The receiving water control sample must be collected immediately upstream of the permitted discharge's zone of influence. Fresh samples are recommended for use on test days 1, 3, and 5. However, provided a total of three samples are used for testing over the test period, an alternate sampling schedule is acceptable. The acceptable holding times until initial use of a fresh sample are 24 and 36 hours for on-site and off-site testing, respectively. A written waiver is required from the regulating authority for any hold time extension. All fresh test samples collected may be used for 24, 48 and 72 hour renewals after initial use. All samples held for use beyond the day of sampling shall be refrigerated and maintained at a temperature range of 0-6° C.

If any of the renewal samples are of sufficient potency to cause lethality to 50 percent or more of the test organisms in any of the test treatments for either species or, if the test fails to meet its permit limits, then chemical analysis for total metals (originally required for the initial sample only in Section VI) will be required on the renewal sample(s) as well.

Sampling guidance dictates that, where appropriate, aliquots for the analysis required in this protocol shall be split from the samples, containerized and immediately preserved, or analyzed as per 40 CFR Part 136. EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection. Testing for the presence of total residual chlorine (TRC) must be analyzed immediately or as soon as possible, for all effluent samples, prior to WET testing. For TRC analysis performed on site the results must be included on the chain of custody (COC) presented to WET laboratory. For the purpose of sample preparation, i.e. eliminating chlorine prior to toxicity testing, if called for by the permit, TRC analysis may also be performed by the toxicity testing laboratory and the samples must be dechlorinated, as necessary, using sodium thiosulfate prior to sample use for toxicity testing. According to Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992) dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1 mg/L chlorine.

If dechlorination of a sample by the toxicity testing laboratory is necessary a “sodium thiosulfate” control, representing the concentration of sodium thiosulfate used to adequately dechlorinate the sample prior to toxicity testing, must be included in the test.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol. Grab samples must be used for pH, temperature, and total residual oxidants (as per 40 CFR Part 122.21).

IV. DILUTION WATER

Samples of receiving water must be collected from a location in the receiving water body immediately upstream of the permitted discharge’s zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. EPA strongly urges that screening for toxicity be performed prior to the set up of a full, definitive toxicity test any time there is a question about the test dilution water's ability to achieve test acceptability criteria (TAC) as indicated in Section V of this protocol. The test dilution water control response will be used in the statistical analysis of the toxicity test data. All other control(s) required to be run in the test will be reported as specified in the Discharge Monitoring Report (DMR) Instructions, Attachment F, page 2, Test Results & Permit Limits.

The test dilution water must be used to determine whether the test met the applicable test acceptability criteria (TAC). When receiving water is used for test dilution, an additional control made up of standard laboratory water (0% effluent) is required. This control will be used to verify the health of the test organisms and evaluate to what extent, if any, the receiving water itself is responsible for any toxic response observed.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable, an alternatedilution water (ADW) of known quality with hardness similar to that of the receiving water may be substituted. Substitution is species specific meaning that the decision to use ADW is made for each species and is based on the toxic response of that particular species.

Substitution to an ADW is authorized in two cases. The first is the case where repeating a test due to toxicity in the site dilution water requires an immediate decision for ADW use be made by the permittee and toxicity testing laboratory. The second is in the case where two of the most recent documented incidents of unacceptable site dilution water toxicity requires ADW use in future WET testing. For the second case, written notification from the permittee requesting ADW use and written authorization from the permit issuing agency(s) is required **prior to** switching to a long-term use of ADW for the duration of the permit.

Written requests for use of ADW with supporting documentation must be sent electronically to the NPDES Applications Coordinator in EPA Water Division (WD) at the following email address:

R1NPDESReporting@epa.gov

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the EPA Region 1 website at <https://www.epa.gov/aboutepa/epa-region-1-new-england> (click on NPDES, EPA Permit Attachments, Self-Implementing Alternate Dilution Water Guidance) for important details on alternate dilution water substitution requests.

If the use of an alternate dilution water (ADW) is authorized, in addition to the ADW test control, the testing laboratory must, for the purpose of monitoring the receiving water, also run a receiving water control.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

EPA New England requires that if a reference toxicant test was being performed concurrently with an effluent or receiving water test and fails, both tests must be repeated.

The following tables summarize the accepted Menidia and Arbacia toxicity test conditions and test acceptability criteria:

**EPA NEW ENGLAND RECOMMENDED TEST CONDITIONS FOR THE
SEA URCHIN, ARBACIA PUNCTULATA, FERTILIZATION TEST¹**

1. Test type	Static, non-renewal
2. Salinity	30 o/oo \pm 2 o/oo by adding dry ocean salts
3. Temperature	20 \pm 1°C temperature must not deviate by more than 3°C during test
4. Light quality	Ambient laboratory illumination
5. Light intensity	10-20 uE/m ² /s, or 50-100 ft-c (Ambient Laboratory Levels)
6. Test vessel size	Disposal (glass) liquid scintillation vials (20 ml capacity), presoaked in control water
7. Test solution volume	5 ml
8. Number of sea urchins	Pooled sperm from four males and pooled eggs from four females are used per test
9. Number of egg and sperm cells	About 2000 eggs per chamber and 5,000,000 sperm cells per vial
10. Number of replicate chambers	4 per treatment
11. Dilution water	Uncontaminated source of natural seawater or deionized water mixed with artificial sea salts
12. Dilution factor	Approximately 0.5, must bracket the permitted RWC
13. Test duration	1 hour and 20 minutes
14. Effects measured	Fertilization of sea urchin eggs
15. Number of treatments per test ²	5 and a control. (receiving water and laboratory water control) An additional dilution at the permitted effluent concentration (% effluent) is required.

16. Acceptability of test	70% - 90% egg fertilization in all controls. Minimum of 70% fertilization in dilution water control. Effluent concentrations exhibiting greater than 70% fertilization, flagged as statistically significantly different from the controls, will not be considered statistically different from the controls for NOEC reporting.
17. Sampling requirements	For on-site tests, samples are to be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples must be first used within 36 hours of collection.
18. Sample volume required	Minimum 1 liter

Footnotes:

¹ Adapted from EPA 821-R-02-014

EPA NEW ENGLAND RECOMMENDED TEST CONDITIONS FOR THE INLAND SILVERSIDE, MENIDIA BERYLLINA, GROWTH AND SURVIVAL TEST¹

1. Test type	Static, renewal
2. Salinity	5 o/oo to 32 o/oo +/- 2 o/oo of the selected salinity by adding artificial sea salts
3. Temperature	25 ± 1°C, temperature must not deviate by more than 3°C during test
4. Light quality	Ambient laboratory light
5. Light intensity	10-20 uE/m ² /s, or 50-100 ft-C (Ambient Laboratory Levels)
6. Photoperiod	16 hr light, 8 hr darkness
7. Test vessel size	600 - 1000 mL beakers or equivalent (glass test chambers should be used)
8. Test solution volume	500-750 mL/replicate loading and DO restrictions must be met)
9. Renewal of test solutions	Daily using most recently collected sample
10. Age of test organisms	Seven to eleven days post hatch; 24 hr range in age
11. Larvae/test chamber	15 (minimum of 10)
12. Number of replicate chambers	4 per treatment
13. Source of food	Newly hatched and rinsed <u>Artemia</u> nauplii less than 24 hr old
14. Feeding regime	Feed once a day 0.10 g wet wt <u>Artemia</u> nauplii per replicate on days 0 – 2 feed 0.15 g wet wt <u>Artemia</u> nauplii per replicate on days 3-6
15. Cleaning	Siphon daily, immediately before test solution renewal and feeding
16. Aeration ²	None
17. Dilution water	Uncontaminated source of natural seawater; or deionized water mixed with artificial sea salts

18. Effluent concentrations	5 and a control (receiving water and laboratory water control) An additional dilution at the permitted effluent concentration (% effluent) is required
19. Dilution factor	≥ 0.5 , must bracket the permitted RWC
20. Test duration	7 days
21. Effects measured	Survival and growth (weight)
22. Acceptability of test	The average survival of dilution water control larvae is a minimum of 80%, and the average dry wt of unpreserved control larvae is a minimum of 0.5 mg, or the average dry wt of preserved control larvae is a minimum of 0.43 mg if preserved not more than 7 days in 4% formalin or 70% ethanol
23. Sampling requirements	For on-site tests, samples are collected daily and used within 24 hours of the time they are removed from the sampling device. For off-site tests, samples must be first used within 36 hours of collection.
24. Sample Volume Required	Minimum of 6 liters/day.

Footnotes:

¹ Adapted from EPA 821-R-02-014

² If dissolved oxygen (D.O.) falls below 4.0 mg/L, aerate all chambers at a rate of less than 100 bubbles/min. Routine D.O. checks are recommended.

V.1. Test Acceptability Criteria

If a test does not meet TAC the test must be repeated with fresh samples within 30 days of the initial test completion date.

V.2. Use of Reference Toxicity Testing

Reference toxicity test results and applicable control charts must be included in the toxicity testing report.

In general, if reference toxicity test results fall outside the control limits established by the laboratory for a specific test endpoint, a reason or reasons for this excursion must be evaluated, correction made and reference toxicity tests rerun as necessary as prescribed below.

If a test endpoint value exceeds the control limits at a frequency of more than one out of twenty then causes for the reference toxicity test failure must be examined and if problems are identified corrective action taken. The reference toxicity test must be repeated during the same month in which the exceedance occurred.

If two consecutive reference toxicity tests fall outside control limits, the possible cause(s) for the exceedance must be examined, corrective actions taken and a repeat of the reference toxicity test must take place immediately. Actions taken to resolve the problem must be reported.

V.2.a. Use of Concurrent Reference Toxicity Testing

In the case where concurrent reference toxicity testing is required due to a low frequency of testing with a particular method, if the reference toxicity test results fall slightly outside of laboratory established control limits, but the primary test met the TAC, the results of the primary test will be considered acceptable. However, if the results of the concurrent test fall well outside the established upper control limits i.e. ≥ 3 standard deviations for IC₂₅s values and \geq two concentration intervals for NOECs, and even though the primary test meets TAC, the primary test will be considered unacceptable and must be repeated.

VI. CHEMICAL ANALYSIS

The toxicity test requires measurement of pH, salinity, and temperature at the beginning and end of each 24 hour period in each dilution and controls for both daily test renewal and waste. The following chemical analyses shall be performed for each initial sample as well as any renewal samples, if necessary pursuant to the requirement of Part III above.

<u>Parameter</u>	<u>Effluent</u>	<u>Diluent</u>	<u>Minimum Level for effluent^{*1} (mg/L)</u>
pH	x	x	---
Salinity	x	x	ppt(o/oo)
Total Residual Chlorine ^{*2}	x	x	0.02
Total Solids and Suspended Solids	x	x	---
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
<u>Total Metals</u>			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005

Superscript:

^{*1} These are the minimum levels for effluent (fresh water) samples. Tests on diluents (marine waters) shall be conducted using the Part 136 methods that yield the lowest MLs.

^{*2} Either of the following methods from the 18th Edition of the APHA Standard Methods for the Examination of Water and Wastewater must be used for these analyses:

- Method 4500-Cl E Low Level Amperometric Titration (the preferred method);
- Method 4500-CL G DPD Photometric Method.

VII. TOXICITY TEST DATA ANALYSIS AND REVIEW

A. Test Review

1. Concentration / Response Relationship

A concentration/response relationship evaluation is required for test endpoint determinations from both Hypothesis Testing and Point Estimate techniques. The test report is to include documentation of this evaluation in support of the endpoint values reported.

The dose-response review must be performed as required in Section 10.2.6 of EPA-821-R-02-014. Guidance for this review can be found at:

<https://www.epa.gov/cwa-methods/whole-effluent-toxicity-methods>

In most cases, the review will result in one of the following three conclusions: (1) Results are reliable and reportable; (2) Results are anomalous and require explanation; or (3) Results are inconclusive and a retest with fresh samples is required.

2. Test Variability (Test Sensitivity)

This review step is separate from the determination of whether a test meets or does not meet TAC. Within test variability is to be examined for the purpose of evaluating test sensitivity. This evaluation is to be performed for the sub-lethal hypothesis testing endpoint growth for *Menidia beryllina* as required by the permit. The test report is to include documentation of this evaluation to support that the endpoint values reported resulted from a toxicity test of adequate sensitivity. This evaluation must be performed as required in Section 10.2.8 of EPA-821-R-02-014.

To determine the adequacy of test sensitivity, USEPA requires the calculation of test percent minimum significant difference (PMSD) values. In cases where NOEC determinations are made based on a non-parametric technique, calculation of a test PMSD value, for the sole purpose of assessing test sensitivity, shall be calculated using a comparable parametric statistical analysis technique. The calculated test PMSD is then compared to the upper and lower PMSD bounds shown for marine tests in Section 10.2.8.3, p. 54, Table 6 of EPA-821-R-02-014. The comparison will yield one of the following determinations.

- The test PMSD exceeds the PMSD upper bound test variability criterion in Table 6, the test results are considered highly variable and the test may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC). If the test results indicate that the discharge is not toxic at the PLC, then the test is considered insufficiently sensitive and must be repeated within 30 days of the initial test completion using fresh samples. If the test results indicate that the discharge is toxic at the PLC, the test is considered acceptable and does not have to be repeated.
- The test PMSD falls below the PMSD lower bound test variability criterion in Table 6, the test is determined to be very sensitive. In order to determine which treatment(s) are statistically significant and which are not, for the purpose of reporting a NOEC, the relative percent difference (RPD) between the control and each treatment must be calculated and compared to the lower PMSD boundary. See *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program*, EPA 833-

R-003, June 2000, Section 6.4.2. This document can be located under Guidance Documents at the following USEPA website location:

<https://www.epa.gov/aboutepa/epa-region-1-new-england>
(click on NPDES, EPA Permit Attachments)

If the RPD for a treatment falls below the PMSD lower bound, the difference is considered statistically insignificant. If the RPD for a treatment is greater than the PMSD lower bound, then the treatment is considered statistically significant.

- The test PMSD falls within the PMSD upper and lower bounds in Table 6, the sub-lethal test endpoint values shall be reported as is.

B. Statistical Analysis

1. General - Recommended Statistical Analysis Method

Refer to general data analysis flowchart, EPA 821-R-02-014, page 45

For discussion on Hypothesis Testing, refer to EPA 821-R-02-014, Section 9.6

For discussion on Point Estimation Techniques, refer to EPA 821-R-02-014, Section 9.7

2. *Menidia beryllina*

Refer to survival hypothesis testing analysis flowchart, EPA 821-R-02-014, page 181

Refer to survival point estimate techniques flowchart, EPA 821-R-02-013, page 182

Refer to growth data statistical analysis flowchart, EPA 821-R-02-014, page 193

3. *Arbacia punctulata*

Refer to fertilization data testing flowchart, EPA 821-R-02-014, page 312

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Toxicity Test summary sheet(s) (Attachment F to the DMR Instructions) which includes:
 - Facility name
 - NPDES permit number
 - Outfall number
 - Sample type
 - Sampling method
 - Effluent TRC concentration
 - Dilution water used
 - Receiving water name and sampling location
 - Test type and species
 - Test start date
 - Effluent concentrations tested (%) and permit limit concentration
 - Applicable reference toxicity test date and whether acceptable or not
 - Age, age range and source of test organisms used for testing
 - Results of TAC review for all applicable controls
 - Test sensitivity evaluation results (test PMSD for growth)
 - Permit limit and toxicity test results
 - Summary of test sensitivity and concentration response evaluation

Please note: The NPDES Permit Program Instructions for the Discharge Monitoring Report Forms (DMRs) are available on EPA's website at:

www.epa.gov/compliance/discharge-monitoring-reports-avoiding-common-mistakes

In addition to the summary sheets the report must include:

- A brief description of sample collection procedures;
- Chain of custody documentation including names of individuals collecting samples, times and dates of sample collection, sample locations, requested analysis and lab receipt with time and date received, lab receipt personnel and condition of samples upon receipt at the lab(s);
- Reference toxicity test control charts;
- All sample chemical/physical data generated, including minimum limits (MLs) and analytical methods used;
- All toxicity test raw data including daily ambient test conditions, toxicity test chemistry, sample dechlorination details as necessary, bench sheets and statistical analysis;
- A discussion of any deviations from test conditions; and
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review.

ATTACHMENT E

USEPA REGION 1 FRESHWATER ACUTE TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable acute toxicity tests in accordance with the appropriate test protocols described below:

- **Daphnid (Ceriodaphnia dubia) definitive 48 hour test.**
- **Fathead Minnow (Pimephales promelas) definitive 48 hour test.**

Acute toxicity test data shall be reported as outlined in Section VIII.

II. METHODS

The permittee shall use 40 CFR Part 136 methods. Methods and guidance may be found at:

<https://www.epa.gov/cwa-methods/whole-effluent-toxicity-methods>

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. This protocol defines more specific requirements while still being consistent with the Part 136 methods. If, due to modifications of Part 136, there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

III. SAMPLE COLLECTION

A discharge sample shall be collected. Aliquots shall be split from the sample, containerized and preserved (as per 40 CFR Part 136) for chemical and physical analyses required. The remaining sample shall be measured for total residual chlorine and dechlorinated (if detected) in the laboratory using sodium thiosulfate for subsequent toxicity testing. (Note that EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection.) Grab samples must be used for pH, temperature, and total residual chlorine (as per 40 CFR Part 122.21).

Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1.0 mg/L chlorine. If dechlorination is necessary, a thiosulfate control (maximum amount of thiosulfate in lab control or receiving water) must also be run in the WET test.

All samples held overnight shall be refrigerated at 1- 6°C.

IV. DILUTION WATER

A grab sample of dilution water used for acute toxicity testing shall be collected from the receiving water at a point immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. In the case where an alternate dilution water has been agreed upon an additional receiving water control (0% effluent) must also be tested.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable, an alternate standard dilution water of known quality with a hardness, pH, conductivity, alkalinity, organic carbon, and total suspended solids similar to that of the receiving water may be substituted **AFTER RECEIVING WRITTEN APPROVAL FROM THE PERMIT ISSUING AGENCY(S).**

Written requests for use of ADW with supporting documentation must be sent electronically to the NPDES Applications Coordinator in EPA Water Division (WD) at the following email address:

R1NPDESReporting@epa.gov

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the EPA Region 1 website at <https://www.epa.gov/aboutepa/epa-region-1-new-england> (click on NPDES, EPA Permit Attachments, Self-Implementing Alternate Dilution Water Guidance) for important details on alternate dilution water substitution requests.

EPA NEW ENGLAND EFFLUENT TOXICITY TEST CONDITIONS FOR THE DAPHNID, CERIODAPHNIA DUBIA 48 HOUR ACUTE TESTS¹

1.	Test type	Static, non-renewal
2.	Temperature (°C)	20 ± 1°C or 25 ± 1°C
3.	Light quality	Ambient laboratory illumination
4.	Photoperiod	16 hour light, 8 hour dark
5.	Test chamber size	Minimum 30 ml
6.	Test solution volume	Minimum 15 ml
7.	Age of test organisms	1-24 hours (neonates)
8.	No. of daphnids per test chamber	5
9.	No. of replicate test chambers per treatment	4
10.	Total no. daphnids per test concentration	20
11.	Feeding regime	As per manual, lightly feed YCT and <u>Selenastrum</u> to newly released organisms while holding prior to initiating test
12.	Aeration	None
13.	Dilution water ²	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q ^R or equivalent deionized water and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	≥ 0.5, must bracket the permitted RWC
15.	Number of dilutions	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution series.

February 28, 2011
(updated links/addresses 2023)

16. Effect measured	Mortality-no movement of body or appendages on gentle prodding
17. Test acceptability	90% or greater survival of test organisms in dilution water control solution
18. Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples must first be used within 36 hours of collection.
19. Sample volume required	Minimum 1 liter

Footnotes:

1. Adapted from EPA-821-R-02-012.
2. Standard prepared dilution water must have hardness requirements to generally reflect the characteristics of the receiving water.

**EPA NEW ENGLAND TEST CONDITIONS FOR THE FATHEAD MINNOW
(PIMEPHALES PROMELAS) 48 HOUR ACUTE TEST¹**

1. Test Type	Static, non-renewal
2. Temperature (°C)	20 + 1 ° C or 25 + 1°C
3. Light quality	Ambient laboratory illumination
4. Photoperiod	16 hr light, 8 hr dark
5. Size of test vessels	250 mL minimum
6. Volume of test solution	Minimum 200 mL/replicate
7. Age of fish	1-14 days old and age within 24 hrs of each other
8. No. of fish per chamber	10
9. No. of replicate test vessels per treatment	4
10. Total no. organisms per concentration	40
11. Feeding regime	As per manual, lightly feed test age larvae using concentrated brine shrimp nauplii while holding prior to initiating test
12. Aeration	None, unless dissolved oxygen (D.O.) concentration falls below 4.0 mg/L, at which time gentle single bubble aeration should be started at a rate of less than 100 bubbles/min. (Routine D.O. check is recommended.)
13. dilution water ²	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q ^R or equivalent deionized and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14. Dilution series	> 0.5, must bracket the permitted RWC

15. Number of dilutions	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution series.
16. Effect measured	Mortality-no movement on gentle prodding
17. Test acceptability	90% or greater survival of test organisms in dilution water control solution
18. Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples are used within 36 hours of collection.
19. Sample volume required	Minimum 2 liters

Footnotes:

1. Adapted from EPA-821-R-02-012
2. Standard dilution water must have hardness requirements to generally reflect characteristics of the receiving water.

VI. CHEMICAL ANALYSIS

At the beginning of a static acute toxicity test, pH, conductivity, total residual chlorine, oxygen, hardness, alkalinity and temperature must be measured in the highest effluent concentration and the dilution water. Dissolved oxygen, pH and temperature are also measured at 24 and 48 hour intervals in all dilutions. The following chemical analyses shall be performed on the 100 percent effluent sample and the upstream water sample for each sampling event.

<u>Parameter</u>	Effluent	Receiving Water	ML (mg/l)
Hardness ¹	x	x	0.5
Total Residual Chlorine (TRC) ^{2, 3}	x		0.02
Alkalinity	x	x	2.0
pH	x	x	--
Specific Conductance	x	x	--
Total Solids	x		--
Total Dissolved Solids	x		--
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
Total Metals			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02
Other as permit requires			

Notes:

- Hardness may be determined by:
 - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
 - Method 2340B (hardness by calculation)
 - Method 2340C (titration)
- Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.
 - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
 - Method 4500-CL E Low Level Amperometric Titration
 - Method 4500-CL G DPD Colorimetric Method
- Required to be performed on the sample used for WET testing prior to its use for toxicity testing.

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration (Determined at 48 Hours)

Methods of Estimation:

- Probit Method
- Spearman-Kärber
- Trimmed Spearman-Kärber
- Graphical

See the flow chart in Figure 6 on p. 73 of EPA-821-R-02-012 for appropriate method to use on a given data set.

No Observed Acute Effect Level (NOAEL)

See the flow chart in Figure 13 on p. 87 of EPA-821-R-02-012.

VIII. TOXICITY TEST REPORTING

A report of the results will include the following:

- Description of sample collection procedures, site description
- Names of individuals collecting and transporting samples, times and dates of sample collection and analysis on chain-of-custody
- General description of tests: age of test organisms, origin, dates and results of standard toxicant tests; light and temperature regime; other information on test conditions if different than procedures recommended. Reference toxicant test data should be included.
- All chemical/physical data generated. (Include minimum detection levels and minimum quantification levels.)
- Raw data and bench sheets.
- Provide a description of dechlorination procedures (as applicable).
- Any other observations or test conditions affecting test outcome.

EPA - New England**Reassessment of Technically Based Industrial Discharge Limits**

Under 40 CFR §122.210(4), all Publicly Owned Treatment Works (POTWs) with approved Industrial Pretreatment Programs (IPPs) shall provide the following information to the Director: a written evaluation of the need to revise local industrial discharge limits under 40 CFR §403.5(c)(1).

Below is a form designed by the U.S. Environmental Protection Agency (EPA - New England) to assist POTWs with approved IPPs in evaluating whether their existing Technically Based Local Limits (TBLLs) need to be recalculated. The form allows the permittee and EPA to evaluate and compare pertinent information used in previous TBLLs calculations against present conditions at the POTW.

Please read direction below before filling out form.

ITEM I.

- * In Column (1), list what your POTW's influent flow rate was when your existing TBLLs were calculated. In Column (2), list your POTW's present influent flow rate. Your current flow rate should be calculated using the POTW's average daily flow rate from the previous 12 months.
- * In Column (1) list what your POTW's SIU flow rate was when your existing TBLLs were calculated. In Column (2), list your POTW's present SIU flow rate.
- * In Column (1), list what dilution ratio and/or 7Q10 value was used in your old/expired NPDES permit. In Column (2), list what dilution ratio and/or 7Q10 value is presently being used in your new/reissued NPDES permit.

The 7Q10 value is the lowest seven day average flow rate, in the river, over a ten year period. The 7Q10 value and/or dilution ratio used by EPA in your new NPDES permit can be found in your NPDES permit "Fact Sheet."

- * In Column (1), list the safety factor, if any, that was used when your existing TBLLs were calculated.
- * In Column (2), note how your bio-solids were managed when your existing TBLLs were calculated. In Column (3), note how your POTW is presently disposing of its biosolids and how your POTW will be disposing of its biosolids in the future.

ITEM II.

- * List what your existing TBLLs are - as they appear in your current Sewer Use Ordinance (SUO).

ITEM III.

- * Identify how your existing TBLLs are allocated out to your industrial community. Some pollutants may be allocated differently than others, if so please explain.

ITEM IV.

- * Since your existing TBLLs were calculated, identify the following in detail:
 - (1) if your POTW has experienced any upsets, inhibition, interference or pass-through as a result of an industrial discharge.
 - (2) if your POTW is presently violating any of its current NPDES permit limitations - include toxicity.

ITEM V.

- * Using current sampling data, list in Column (1) the average and maximum amount of pollutants (in pounds per day) received in the POTW's influent. Current sampling data is defined as data obtained over the last 24 month period.

All influent data collected and analyzed must be in accordance with 40 CFR §136. Sampling data collected should be analyzed using the lowest possible detection method(s), e.g. graphite furnace.

- * Based on your existing TBLLs, as presented in Item 11., list in Column (2), for each pollutant the Maximum Allowable Headwork Loading (MAHL) values derived from an applicable environmental criteria or standard, e.g. water quality, sludge, NPDES, inhibition, etc. For more information, please see EPA's Local Limit Guidance Document (July 2004).

Item VI.

- * Using current sampling data, list in Column (1) the average and maximum amount of pollutants (in micrograms per liter) present your POTW's effluent. Current sampling data is defined as data obtained during the last 24 month period.

(Item VI. continued)

All effluent data collected and analyzed must be in accordance with 40 CFR §136. Sampling data collected should be analyzed using the lowest possible detection method(s), e.g. graphite furnace.

- * List in Column (2A) what the Water Quality Standards (WQS) were (in micrograms per liter) when your TBLLs were calculated, please note what hardness value was used at that time. Hardness should be expressed in milligram per liter of Calcium Carbonate.

List in Column (2B) the current WQSs or "Chronic Gold Book" values for each pollutant multiplied by the dilution ratio used in your new/reissued NPDES permit. For example, with a dilution ratio of 25:1 at a hardness of 25 mg/l - Calcium Carbonate (copper's chronic WQS equals 6.54 ug/l) the chronic NPDES pennit limit for copper would equal 156.25 ug/l.

ITEM VII.

- * In Column (1), list all pollutants (in micrograms per liter) limited in your new/reissued NPDES permit. In Column (2), list all pollutants limited in your old/expired NPDES pennit.

ITEM VIII.

- * Using current sampling data, list in Column (I) the average and maximum amount of pollutants in your POTW's biosolids. Current data is defined as data obtained during the last 24 month period. Results are to be expressed as total dry weight.

All biosolids data collected and analyzed must be in accordance with 40 CFR §136.

In Column (2A), list current State and/or Federal sludge standards that your facility's biosolids must comply with. Also note how your POTW currently manages the disposal of its biosolids. If your POTW is planing on managing its biosolids differently, list in Column (2B) what your new biosolids criteria will be and method of disposal.

In general, please be sure the units reported are correct and all pertinent information is included in your evaluation. If you have any questions, please contact your pretreatment representative at EPA - New England.

In Column (1) list the conditions that existed when your current TBLLs were calculated. In Column (2), list current conditions or expected conditions at your POTW.		
	Column (1) EXISTING TBLLs	Column (2) PRESENT CONDITIONS
POTW Flow (MGD)		
Dilution Ratio or 7QIO (from NPDES Permit)		
SIU Flow (MGD)		
Safety Factor		N/A
Biosolids Disposal Method(s)		

ITEM II.

EXISTING TBLLs			
POLLUTANT	NUMERICAL LIMIT (mg/l) or (lb/day)	POLLUTANT	NUMERICAL LIMIT (mg/l) or (lb/day)

ITEM III.

Note how your existing TBLLs, listed in Item II., are allocated to your Significant Industrial Users (SIUs), i.e. uniform concentration, contributory flow, mass proportioning, other. Please specify by circling.

ITEM IV.

Has your POTW experienced any upsets, inhibition, interference or pass-through from industrial sources since your existing TBLLs were calculated?

If yes, explain.

Has your POTW violated any of its NPDES permit limits and/or toxicity test requirements?

If _____ yes, _____ explain.

ITEMV.

Using current POTW influent sampling data fill in Column (1). In Column (2), list your Maximum Allowable Headwork Loading (MAHL) values used to derive your TBLLs listed in Item II. In addition, please note the Environmental Criteria for which each MAHL value was established, i.e. water quality, sludge, NPDES etc.

Pollutant	Column (I) Influent Data Analyses		Column (2)	Criteria
	Maximum (lb/day)	Average (lb/day)	MAHL Values (lb/day)	
Arsenic				
Cadmium				
Chromium				
Copper				
Cyanide				
Lead				
Mercury				
Nickel				
Silver				
Zinc				
Other (List)				

ITEM VI.

Using current POTW effluent sampling data, fill in Column (1). In Column (2A) list what the Water Quality Standards (Gold Book Criteria) were at the time your existing TBLLs were developed. List in Column (2B) current Gold Book values multiplied by the dilution ratio used in your new/reissued NPDES permit.				
Pollutant	Column (1)		Columns {2A} (2B)	
	Effluent Data Analyses Maximum (ug/l)	Average (ug/l)	Water Quality Criteria (Gold Book) From TBLLs Today (ug/l) (ug/l)	
Arsenic				
*Cadmium				
*Chromium				
*Copper				
Cyanide				
*Lead				
Mercury				
*Nickel				
Silver				
*Zinc				
Other (List)				

*Hardness Dependent (mg/l - CaCO₃)

[illegible]

ITEM VIII.

Using current POTW biosolids data, fill in Column (1). In Column (2A), list the biosolids criteria that was used at the time your existing TBLLs were calculated. If your POTW is planing on managing its biosolids differently, list in Column (2B) what your new biosolids criteria would be and method of disposal.			
Pollutant	Column (1) Data Analyses Average (mg/kg)	Biosolids	Columns (2A) (2B) Biosolids Criteria From TBLLs New (mg/kg) (mg/kg)
Arsenic			
Cadmium			
Chromium			
Copper			
Cyanide			
Lead			
Mercury			
Nickel			
Silver			
Zinc			
Molybdenum			
Selenium			
Other (List)			

Industrial Pretreatment Program Annual Report

The Permittee shall provide to the Approval Authority with an annual report that briefly describes the POTW's program activities, including activities of all participating agencies, if more than one jurisdiction is involved in the local program. The report required by this section shall be submitted no later than one year after approval of the POTW's Pretreatment Program, and at least annually thereafter, and must include, at a minimum, the applicable required data in appendix A to 40 CFR part 127. The report required by this section must also include a summary of changes to the POTW's pretreatment program that have not been previously reported to the Approval Authority and any other relevant information requested by the Approval Authority. As of December 21, 2025 all annual reports submitted in compliance with this section must be submitted electronically by the POTW Pretreatment Program to the Approval Authority or initial recipient, as defined in 40 CFR 127.2(b), in compliance with this section and 40 CFR part 3 (including, in all cases, subpart D to part 3), 40 CFR 122.22, and 40 CFR part 127. Part 127 is not intended to undo existing requirements for electronic reporting. Prior to this date, and independent of part 127, the Approval Authority may also require POTW Pretreatment Programs to electronically submit annual reports under this section if specified by a particular permit or if required to do so by state law.

The permitted shall submit to Approval Authority and the state permitting authority a report that contains the following information requested by EPA:

1. An updated list of the POTW's Industrial Users by category as set forth in 40 C.F.R. 403.8(f)(2)(i), to include:
 - a. Names and addresses, or a list of deletions and additions keyed to a previously submitted list. The POTW shall provide a brief explanation of each deletion. This list shall identify which Industrial Users are subject to categorical Pretreatment Standards and specify which Standards are applicable to each Industrial User. The list shall indicate which Industrial Users are subject to local standards that are more stringent than the categorical Pretreatment Standards. The POTW shall also list the Industrial Users that are subject only to local Requirements. The list must also identify Industrial Users subject to categorical Pretreatment Standards that are subject to reduced reporting requirements under paragraph (e)(3), and identify which Industrial Users are Non-Significant Categorical Industrial Users.
 - b. Permit status. Whether each SIU has an unexpired control mechanism and an explanation as to why any SIUs are operating without a current, unexpired control mechanism (e.g. permit);
 - c. Baseline monitoring reporting requirements for newly promulgated industries
 - d. In addition, a brief description of the industry and general activities;

2. A summary of compliance and enforcement activities during the preceding year, including the number of:
 - a. significant industrial users inspected by POTW (include inspection dates for each industrial user),
 - b. significant industrial users sampled by POTW (include sampling dates for each industrial user),
 - c. compliance schedules issued (include list of subject users),
 - d. written notices of violations issued (include list of subject users),
 - e. administrative orders issued (include list of subject users),
 - f. criminal or civil suits filed (include list of subject users) and,
 - g. penalties obtained (include list of subject users and penalty amounts);
3. A narrative description of program effectiveness including present and proposed changes to the program, such as funding, staffing, ordinances, regulations, rules and/or statutory authority;
4. The Permittee shall prepare annually a list of industrial users, which during the preceding twelve (12) months have significantly violated Pretreatment Standards or requirements 40 C.F.R. 403.8(f)(2)(vii). This list is to be published annually in a newspaper of general circulation in the Permittee's service area.
5. A summary of all monitoring activities performed within the previous twelve (12) months. The following information shall be reported:

Total number of SIUs inspected; and

Total number of SIUs sampled.

- a. For all industrial users that were in Significant Non-Compliance during the previous twelve (12) months, provide the name of the violating industrial user; indicate the nature of the violations, the type and number of actions taken (administrative order, criminal or civil suit, fines or penalties collected, etc.) and current compliance status. Indicate if the company returned to compliance and the date compliance was attained. Determination of Significant Non-Compliance shall be performed.
6. A summary of all enforcement actions not covered by the paragraph above conducted in accordance with the approved Enforcement Response Plan.
7. A description of actions being taken to reduce the incidence of significant violations by significant industrial users.
8. A detailed description of all interference and pass-through that occurred during the past year.
9. A thorough description of all investigations into interference and pass-through during the past year.
10. A description of monitoring, sewer inspections and evaluations which were done during the past year to detect interference and pass-through, specifying parameters and

frequencies;

11. The Permittee shall analyze the treatment facility influent and effluent at least Annually for the presence of the toxic pollutants listed in 40 CFR Part 122 Appendix D (NPDES Application Testing Requirements) Table III as follows:

Antimony

Arsenic

Beryllium

Cadmium

Chromium

Copper

Lead

Mercury

Nickel

Selenium

Silver

Thallium

Zinc

Cyanide

Phenols

The sampling program shall consist of one 24-hour flow-proportioned composite and at least one grab sample that is representative of the flows received by the POTW. The composite shall consist of hourly flow-proportioned grab samples taken over a 24-hour period if the sample is collected manually or shall consist of a minimum of 48 samples collected at 30 minute intervals if an automated sampler is used. Cyanide shall be taken as a grab sample during the same period as the composite sample. Sampling and preservation shall be consistent with 40 CFR Part 136. All analytical procedures and method detection limits must be specified when reporting the results of such analyses.

12. The Permittee shall analyze the treatment facility sludge (biosolids) prior to disposal, for the presence of toxic pollutants listed above in 40 CFR 122 Appendix D (NPDES

Application Testing Requirements) Table III at least once per year. If the Permittee does not dispose of biosolids during the calendar year, the Permittee shall certify to that in the Pretreatment Annual Report and the monitoring requirements in this paragraph shall be suspended for that calendar year.

- a. The Permittee shall use sample collection and analysis procedures as approved for use under 40 CFR Part 503 or specified in the EPA Region 8 General Permit for biosolids.
13. The summary shall include an evaluation of influent sampling results versus threshold inhibitory concentrations for the Wastewater Treatment System and effluent sampling results versus water quality standards. Such a comparison shall be based on the sampling program described in the paragraphs above or any similar sampling program described in this Permit.
14. Identification of the specific locations, if any, designated by the Permittee for receipt (discharge) of trucked or hauled waste, if modified;
15. Information as required by the Approval Authority or state permitting authority on the discharge to the POTW from the following activities:
 - (A) Ground water clean-up from underground storage tanks;
 - (B) Trucked or hauled waste; and,
 - (C) Groundwater clean-up from RCRA or Superfund sites.
16. A description of all changes made during the previous calendar year to the Permittee's pretreatment program that were not submitted as substantial or non substantial modifications to EPA.
17. The date of the latest adoption of local limits and an indication as to whether or not the Town is under a State or Federal compliance schedule that includes steps to be taken to revise local limits.
18. Results of all PFAS sampling conducted of industrial sectors in accordance with Section E.7 (if applicable) of the NPDES permit of the following pollutants:

PFAS Analytes per Draft Method 1633
19. Any other information that may be deemed necessary by the Approval Authority.

Target Analyte Name	Abbreviation	CAS Number
Perfluoroalkyl carboxylic acids		
Perfluorobutanoic acid	PFBA	375-22-4
Perfluoropentanoic acid	PFPeA	2706-90-3
Perfluorohexanoic acid	PFHxA	307-24-4
Perfluoroheptanoic acid	PFHpA	375-85-9
Perfluorooctanoic acid	PFOA	335-67-1
Perfluorononanoic acid	PFNA	375-95-1
Perfluorodecanoic acid	PFDA	335-76-2
Perfluoroundecanoic acid	PFUnA	2058-94-8
Perfluorododecanoic acid	PFDoA	307-55-1
Perfluorotridecanoic acid	PFTTrDA	72629-94-8
Perfluorotetradecanoic acid	PFTeDA	376-06-7
Perfluoroalkyl sulfonic acids		
Acid Form		
Perfluorobutanesulfonic acid	PFBS	375-73-5
Perfluoropentanesulfonic acid	PFPeS	2706-91-4
Perfluorohexanesulfonic acid	PFHxS	355-46-4
Perfluoroheptanesulfonic acid	PFHpS	375-92-8
Perfluorooctanesulfonic acid	PFOS	1763-23-1
Perfluorononanesulfonic acid	PFNS	68259-12-1
Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Fluorotelomer sulfonic acids		
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid	4:2FTS	757124-72-4
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid	6:2FTS	27619-97-2
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid	8:2FTS	39108-34-4
Perfluorooctane sulfonamides		
Perfluorooctanesulfonamide	PFOSA	754-91-6
N-methyl perfluorooctanesulfonamide	NMeFOSA	31506-32-8
N-ethyl perfluorooctanesulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids		
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols		
N-methyl perfluorooctanesulfonamidoethanol	NMeFOSE	24448-09-7
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE	1691-99-2
Per- and Polyfluoroether carboxylic acids		
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6

Target Analyte Name	Abbreviation	CAS Number
Ether sulfonic acids		
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS	756426-58-1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7
Fluorotelomer carboxylic acids		
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4

Exhibit B to Second Stipulation

SUMMARY OF TYPICAL YEAR CSO ACTIVATION FREQUENCY AND VOLUME

OUTFALL	TYPICAL YEAR		REFERENCE (*)
	LONG TERM CONTROL PLAN 2005 (*) _O		
	Activation _O Frequency	Volume (MG) _O	
ALEWIFE BROOK ⁽¹⁾			
CAM001	5	0.19	5
CAM002O	40	0.69	5
MWR003O	5	0.98	5
CAM004O	To be closed	N/A	5
CAM400O	To be closed	N/A	5
CAM401AO	5	1.61O	5
CAM401BO	7	2.15	5
SOM001A	3O	1.67	5
SOM001O	Closed	N/A	
SOM002AO	Closed	N/A	
SOM003O	Closed	N/A	
SOM004	ClosedO	N/A	
TOTAL		7.29	
UPPER MYSTIC RIVER			
SOM007A/MWR205A (Somerville Marginal)	3O	3.48	
SOM007	Closed	N/A	
TOTAL		3.48	
MYSTIC / CHELSEA CONFLUENCE			
MWR205 (Somerville Marginal)	39	60.58	
BOS013	4O	0.54O	6
BOS014	0	0.00	6
BOS015	Closed	N/A	6O
BOS017	1	0.02O	9
CHE002	4O	0.22	
CHE003	3	0.04	
CHE004	3	0.32	
CHE008	0	0.00	
TOTAL		61.72	
UPPER INNER HARBOR			
BOS009	5	0.59	6
BOS010	4	0.72O	6O
BOS012	5	0.72	6O
BOS019	2	0.58	
BOS050	Closed	N/A	
BOS052	Closed	N/A	
BOS057	1	0.43	
BOS058	Closed	N/A	
BOS060	0	0.00	
MWR203 (Prison Point)O	30	335.00O	1, 9O
TOTAL		338.04	
LOWER INNER HARBORO			
BOS003O	4	2.87	6O
BOS004O	5	1.84O	6O
BOS005O	1	0.01O	6O
BOS006	4O	0.24	6O
BOS007O	6O	1.05	6O
TOTAL		6.01	

Exhibit B to Second Stipulation

SUMMARY OF TYPICAL YEAR CSO ACTIVATION FREQUENCY AND VOLUME

OUTFALL	TYPICAL YEAR		REFERENCE (*)
	LONG TERM CONTROL PLAN 2005 (*)		
	Activation Frequency	Volume (MG)	
CONSTITUTION BEACH			
MWR207	Closed	N/A	
TOTAL		0.00	
FORT POINT CHANNEL			
BOS062	1	0.01	
BOS064	0	0.00	
BOS065	1	0.06	
BOS068	0	0.00	
BOS070			
BOS070/DBC	3	2.19	3
UPPS	17	71.37	
BOS070/RCC	2	0.26	
BOS072	0	0.00	4
BOS073	0	0.00	4
TOTAL		73.89	
RESERVED CHANNEL			
BOS076	3	0.91	7
BOS078	3	0.28	7
BOS079	1	0.04	7
BOS080	3	0.25	7
TOTAL		1.48	
NORTHERN DORCHESTER BAY			
BOS081	0 / 25 year	N/A	
BOS082	0 / 25 year	N/A	
BOS083	0 / 25 year	N/A	
BOS084	0 / 25 year	N/A	
BOS085	0 / 25 year	N/A	
BOS086	0 / 25 year	N/A	
BOS087	0 / 25 year	N/A	
TOTAL		0.00	
SOUTHERN DORCHESTER BAY			
BOS088	To be closed	N/A	
BOS089 (Fox Point)	To be closed	N/A	
BOS090 (Commercial Point)	To be closed	N/A	
TOTAL		0.00	
UPPER CHARLES			
BOS032	Closed	N/A	
BOS033	Closed	N/A	
CAM005	3	0.84	8
CAM007	1	0.03	8
CAM009	2	0.01	8
CAM011	0	0.00	8
TOTAL		0.88	

Exhibit B **to** **Second Stipulation** **SUMMARY OF TYPICAL YEAR CSO ACTIVATION FREQUENCY AND VOLUME**

OUTFALL	TYPICAL YEAR		REFERENCE (*)
	LONG TERM CONTROL PLAN 2005 (*)		
	Activation Frequency	Volume (MG)	
LOWER CHARLES			
BOS028	Closed	N/A	
BOS042	Closed	N/A	
BOS049	To be closed	N/A	
CAM017	1	0.45	8
MWR010	0	0.00	2
MWR018	0	0.00	1
MWR019	0	0.00	1
MWR020	0	0.00	1
MWR021	Closed	N/A	
MWR022	Closed	N/A	
MWR201 (Cottage Farm)	2	6.30	8
MWR023	2	0.13	
SOM010	Closed	N/A	
TOTAL		6.88	
NEPONSET RIVER			
BOS093	Closed	N/A	
BOS095	Closed	N/A	
TOTAL		0.00	
BACK BAY FENS			
BOS046	2	5.38	
TOTAL		5.38	

(*) Long-term Control Plan activation frequency and volumes were established in the 1997 CSO Facilities Plan and Environmental Impact Report or as noted in the "Reference" column.

- 1- Re-assessing Long Term Floatables Control for Outfalls MWR018, 019 and 020, February 2001.
- 2- Report on Re-Assessment of CSO Activation Frequency and Volume for Outfall MWR010, April 2001, and supplemental letter report (Metcalf & Eddy, Inc.), May 31, 2001.
- 3- Report on Re-Assessment of CSO Activation Frequency and Volume to Dorchester Brook Conduit and Outfall BOS086, January 2001 and supplemental letter report (Metcalf & Eddy, Inc.), June 28, 2001.
- 4- MWRA Long Term CSO Control Plan, Fort Point Channel Sewer Separation and System Optimization Project, Level of Control at CSO Outfalls BOS072 and BOS073, June 7, 2004.
- 5- Final Variance Report for Alewife Brook and the Upper Mystic River, July 2003, and supplemental letter report (Metcalf & Eddy, Inc.), July 8, 2003.
- 6- East Boston Branch Sewer Relief Project Reevaluation Report, February 2004.
- 7- Supplemental Facilities Plan and Environmental Impact Report on the Long-term CSO Control Plan for North Dorchester Bay and Reserved Channel, April 27, 2004.
- 8- Recommendations and Proposed Schedule for Long-Term CSO Control for the Charles River, Alewife Brook and East Boston, August 2, 2005; MWRA Revised Recommended CSO Control Plan for the Charles River, Typical Year CSO Discharge Activations and Volumes, November 15, 2005; MWRA Long-Term CSO Control Plan, Response to Additional EPA Questions Regarding Prison Point Discharges, January 9, 2005 (2006).
- 9- MWRA Long Term CSO Control Plan Target CSO Activation Frequency and Volume by Outfall, December 9, 2005.



Department of Environmental Protection

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Kathleen A. Theoharides
Secretary

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Commissioner

FINAL DETERMINATION TO ADOPT A VARIANCE FOR COMBINED SEWER OVERFLOW DISCHARGES TO CHARLES RIVER BASIN

The Massachusetts Department of Environmental Protection (“MassDEP”) hereby adopts a Variance for Combined Sewer Overflow (“CSO”) Discharges to the Charles River Basin (the “Variance”), originally issued on October 1, 1998, from September 1, 2019 to August 31, 2024. This discharger-specific variance, if finalized, would authorize limited CSO discharges from the Massachusetts Water Resources Authority (“MWRA”) and the City of Cambridge which are subject to NPDES permit Nos. MA0103284 and MA0101974, respectively. During wet weather events where the limited CSO discharges are authorized, Class B requirements at 314 CMR 4.05(3)(b) for bacteria, solids, color and turbidity, and taste and odor may not be met. The Variance is a water quality standards revision subject to EPA review and approval under EPA’s regulations at 40 CFR Part 131. It is adopted pursuant to the Massachusetts Surface Water Quality Standards (“SWQS”) at 314 CMR 4.00 and the federal Water Quality Standards regulations at 40 CFR Part 131, and subject to the specific conditions which follow. This Variance is intended to establish requirements to (1) achieve the highest attainable water quality conditions in the receiving water; (2) provide for an assessment of the level of CSO control achieved, and the associated water quality impacts of CSO and non-CSO sources; (3) establish requirements for public notification of CSO events and their impacts; and (4) continue to assess the costs and feasibility of achieving higher levels of CSO control beyond the requirements of this variance. MWRA currently remains subject to the orders of the United States District Court for the District of Massachusetts, Civil Action Nos. 85-0489-MA and 83-1614-MA, including amended Schedule Seven, dated October 19, 2011 (the “Federal Court Order”) regarding its implementation of the revised Long-Term CSO Control Plan (“LTCP”).

MassDEP adopts this Variance based on its determination described in the accompanying fact sheet that implementation of more stringent CSO controls to meet the underlying designated use and criteria at this time would result in substantial and widespread social and economic impact as specified in 314 CMR 4.03(4)(f) and 40 CFR 131.10(g)(6). Further, implementation of the requirements that follow represent the highest attainable interim effluent conditions during the term of the variance until such time as information to support further regulatory determinations is available. Information gathered during the term of the CSO Variance is intended to be used to make a subsequent determination on the appropriate water quality standard for the Charles River

segments that are currently affected by CSO discharges. Issuance of this Variance for CSO discharges to the Charles River Basin is consistent with EPA's regulations at 40 CFR 131.14 and with the U.S. Environmental Protection Agency's Guidance (*Coordinating CSO Long-Term Planning with Water Quality Standard Reviews, July 31, 2001*), which states that longer term variances and renewal of variances are warranted given the extended duration necessary for implementation of long-term control plans.

MWRA and the City of Cambridge, as of December 2015, have completed all construction work in MWRA's LTCP, consistent with the requirements of the Federal Court Order. MWRA is now in the midst of a CSO Performance Assessment, also a requirement of the Federal Court Order, which is intended to document the level of CSO control achieved. This Variance affirms that, as an element of this Assessment work, MWRA undertake a CSO/water quality assessment, through development and use of a receiving water model, to determine the impacts of CSO and non-CSO sources in the Charles River, pursuant to EPA's 1994 *Combined Sewer Overflow (CSO) Control Policy* ("EPA CSO Policy").

Once approved by EPA under CWA section 303(c), this Variance and its conditions will be incorporated into NPDES permits for the MWRA and the City of Cambridge at the time of reissuance of those permits, consistent with 40 CFR 131.14(c). Failure by the MWRA and/or the City of Cambridge to comply with the conditions of this Variance following its effective date and as implemented in their NPDES permits will constitute a violation of the permit, as well as the Massachusetts SWQS (314 CMR 4.00) and the Surface Water Discharge Permit Program regulations (314 CMR 3.00).

The Variance is a short-term modification of the Massachusetts SWQS, issued by MassDEP and subject to EPA approval. The Variance allows limited CSO discharges from the outfalls along the Charles River Basin permitted to MWRA and the City of Cambridge, subject to specific conditions. Other standards and criteria of the receiving water's Class B designation are unaffected and remain in force.

VARIANCE CONDITIONS

The Variance is conditioned upon MWRA and the City of Cambridge complying with their individual and joint requirements, as identified below:

A. Level of Required CSO Control During Variance

Per the requirements included in the "Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control" ("Second Stipulation"), filed March 15, 2006, as amended in the aforementioned actions, CSO discharges shall be limited to those set forth in attached Exhibit B, with allowance for any conditions that exceed Typical Year¹ conditions.

¹ "Typical Year" rainfall has been the basis for development, recommendation and approval of MWRA's LTCP, the establishment of the federal court mandated levels of control, and the assessment of system performance toward attainment of the LTCP levels of control. The Typical Year was developed from 40 years of rainfall records (1949-1987, plus 1992), and it includes 93 storms with a total precipitation of 46.8 inches.

Consistent with 40 CFR 131.14(b)(1)(ii)(A)(3), this is the effluent condition that reflects the greatest pollutant reduction achievable within the five-year term of this variance with the pollutant control technologies installed at the time the state is adopting this variance.

B. Receiving Water Quality Monitoring

MWRA shall continue and expand the water quality monitoring program in the Charles River to demonstrate the effectiveness of CSO controls implemented in the watershed. The work shall be adequate to assess the water quality impacts of remaining CSO pollutant sources and loads over a range of storm events, and the associated level of attainment of water quality standards in the Charles River.

On or before July 15 each year, for the duration of this Variance, MWRA shall submit to MassDEP and EPA a report on the previous year's sampling program. The report shall include a summary of the receiving water sampling data collected over the past calendar year, including sampling locations and parameters, and comparisons between results during wet and dry weather, a characterization of rainfall events for which wet weather sampling was done, and an assessment of the water quality impacts of CSO and non-CSO sources.

C. CSO Performance Assessment

1. CSO Activations and Volumes

By December 31, 2021, MWRA shall submit the results of the CSO Performance Assessment to EPA and MassDEP, documenting the level of CSO control achieved through implementation of the LTCP throughout the CSO planning area, in regard to CSO activations and volumes in the Typical Year, relative to the Second Stipulation levels of control (Exhibit B), and shall also post the Assessment Report on its website. During the course of completing this work, MWRA shall also undertake the following actions:

- a) Progress Reports: MWRA shall submit progress reports to MassDEP and to EPA, and shall post the reports to the MWRA website in accordance with the following schedule:
 - i. Progress Reports #1, 2, and 3 shall be submitted and posted on or before October 31, 2019, and together shall be inclusive of all work done for the CSO Performance Assessment through June 30, 2019;
 - ii. Progress Report #4 shall be submitted and posted on or before April 30, 2020, and shall be inclusive of all work done for the CSO Performance Assessment through December 31, 2019;
 - iii. Progress Report #5 shall be submitted and posted on or before October 31, 2020, and shall be inclusive of all work done for the CSO Performance Assessment through June 30, 2020;
 - iv. Progress Report #6 shall be submitted and posted on or before April 30, 2021, and shall be inclusive of all work done for the CSO Performance Assessment through December 31, 2020; and

- v. Progress Report #7 shall be submitted and posted on or before October 31, 2021, and shall be inclusive of all work done for the CSO Performance Assessment through June 30, 2021.

Progress Reports shall include a summary of work completed, metering data collected, integration with MWRA's sewer system model, estimated CSO discharges from metering data (or model simulations when approved by MassDEP), a discussion of any locations where metered, or when approved by MassDEP, modeled CSO discharges appear to exceed Second Stipulation levels of CSO control, and any measures taken to optimize the Nine Minimum Control actions to further control CSO discharges.

b) Public Meetings:

- i. MWRA shall arrange for public meetings in May 2020 and May 2021, to present information on the progress of the work and findings to date, and allow for public input;
- ii. MWRA shall arrange for a public meeting in February 2022 to present the findings of the CSO Performance Assessment, and to allow public comment on the Assessment and its findings; and
- iii. Notice for the date, time, and location of each public meeting shall be provided in the Environmental Monitor at least thirty days in advance of each public meeting.

2. Assessment of CSO Water Quality Impacts

MWRA shall implement the Receiving Water Model Workplan, dated May 24, 2019 and revised July 18, 2019, along with the Receiving Water Modeling of Upper Mystic River/Alewife Brook and Charles River Basin: Work Plan for Stormwater and Combined Sewer Overflow Monitoring, 2019-2020, dated June 6, 2019 and revised August 27, 2019, and develop and calibrate a receiving water quality model, and use such model to present information on the water quality impacts of CSO and non-CSO discharges in the Charles River Basin watershed.

The Final CSO Water Quality Impact Report shall be submitted to MassDEP and EPA on or before December 31, 2021, and shall include a description of the data collected and used for developing and calibrating the model; information on CSO and non-CSO water quality impacts for a range of design storms and the Typical Year; and a sensitivity analysis showing the water quality benefits of further pollutant reductions in upstream sources, stormwater, and CSO discharges.

D. Notification to the Public of CSO Discharges and Impacts

1. MWRA and the City of Cambridge shall maintain outfall signs that are visible both from the shore and from in stream locations for their permitted CSO discharges. Pursuant to their NPDES Permits, the following language, at a minimum, shall be included:

WARNING:
WET WEATHER
SEWAGE DISCHARGE
OUTFALL (discharge serial number)

2. MWRA and the City of Cambridge shall issue a joint press release by April 15 of each year to watershed advocacy groups, local health agents, and newspapers of local circulation in the Charles River watershed, which shall include general information on CSOs, the location of outfalls in the Charles River watershed, and potential health risks posed by exposure to CSO events.
3. MWRA and the City of Cambridge shall, by December 31, 2020, develop and implement a CSO Subscriber-Based Notification System to provide CSO Alert Notifications to any interested parties. MWRA and the City of Cambridge may choose to develop the Notification System collaboratively. The Notification System shall include the following components:
 - a. A CSO Alert Notification shall be issued no later than 4 hours after becoming aware of a CSO event from one or more of the permittee's CSO outfalls, but in no event later than 12 hours after onset of the CSO discharge, which shall be issued to: MassDEP, EPA, Cambridge Public Health Department, City of Boston Public Health Commission, Boston Water and Sewer Commission, the Charles River Watershed Association, and any person subscribed to receive such Alert Notifications.

The CSO Alert Notification shall provide, at a minimum, the following information:

- i. Outfall location(s);
- ii. Approximate time and date of onset of the discharge;
- iii. Whether, at the time of notification, the discharge has ceased, and if so, the approximate time that the discharge ended;
- iv. Waters and land areas potentially affected by such discharge;
- v. Precautionary measures for the public to avoid health risks from contact with effluent; and
- vi. Link to the permittee's website for additional information on CSOs and its CSO abatement program.

Until such time as the Subscriber-based system is in place, the MWRA shall continue its current practice of providing a CSO Alert email notification to MassDEP, EPA, the Community Sailing Program, health departments, and boathouses in the areas affected by CSO discharges, within 12 hours of a CSO discharge event at the MWRA Cottage Farm CSO Treatment Facility.

- b. MWRA, and the City of Cambridge shall each establish and maintain a public website, which shall include, at a minimum, the information listed below, for their

permitted CSO outfalls in the Charles River Basin. If agreed upon by MWRA and the City of Cambridge, this requirement may be met by one entity compiling and posting the data on their website, and the second entity providing a link on their own website to the data.

- i. A map showing the locations of the CSO outfalls, correlating to the CSO outfall numbers included in their respective NPDES Permits;
- ii. On or before December 31, 2020, instructions on how an interested person can self-register for the CSO Subscriber-Based Notification System;
- iii. Within 5 business days of any CSO Alert Notification issued, updated information on the estimated duration and volume of the CSO discharge and event rainfall data; and
- iv. Annual lists of the permittees' CSO outfalls within the variance waters with information compiled on duration and volume of discharges from each outfall, as well as cumulative discharge volume from all CSOs. Each annual calendar year summary shall be updated and posted on the website no later than April 30th of each year.

E. Other Actions to Minimize CSO Discharges

1. MWRA and the City of Cambridge shall continue to implement the Nine Minimum Controls (NMC), as set forth in their respective NPDES Permits and the Variance conditions, which must include the following components:
 - a. Proper operation and regular maintenance programs for the sewer system and the CSOs.
 - b. Maximum use of the collection system for storage.
 - c. Review and modification of the pretreatment program to assure CSO impacts are minimized.
 - d. Maximization of flow to the POTW for treatment.
 - e. Prohibition of dry weather overflows from CSOs.
 - f. Control of solid and floatable materials in CSOs.
 - g. Pollution prevention programs that focus on contaminant reduction activities.
 - h. Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts.
 - i. Monitoring to effectively characterize CSO and the efficacy of CSO controls.

Any enhancements to the MWRA and community NMC programs identified by MassDEP or the permittees during the CSO Performance Assessment can and shall be implemented after obtaining all necessary approvals, providing the enhancements do not conflict with the overall goals and requirements of the LTCP, as measures to further reduce CSO discharges so that highest attainable interim effluent conditions can be achieved and maintained during the Variance period.

2. Variance Pollutant Minimization Program as required by 40 CFR 131.14(b)(1)(ii)(A)(3):

MWRA, with assistance/support from the City of Cambridge, shall implement the Additional System Optimization measures as set forth in the scope and schedule of actions in attached Exhibit A. MWRA shall coordinate with the City of Cambridge to evaluate the impact of any Additional System Optimization measures on both systems' performance. Beginning in 2021 and on or before January 31 of each year until the end of this Variance, MWRA shall submit to MassDEP and EPA, and shall post on its website, progress reports on the implementation of the Additional System Optimization measures. Exhibit A represents the pollutant minimization activities that MWRA will implement in this variance term.

3. MWRA shall continue to provide technical assistance related to the identification and removal of Infiltration/Inflow (I/I) to member communities. Where requested by any member community, or by MassDEP or EPA, MWRA shall provide information from MWRA metering data, including but not limited to:
 - a. A system map showing locations of MWRA metering points;
 - b. MWRA metering data by each MWRA member sewer community, broken down into estimates of average monthly sanitary flow, average monthly infiltration and average monthly inflow; and
 - c. MWRA metering data by meter subarea correlating to a specific storm event.
4. The City of Cambridge shall consider use of Green Infrastructure technologies where feasible to increase stormwater infiltration.

F. Updated CSO Control Planning

On or before April 1, 2022, MWRA and the City of Cambridge shall each submit for MassDEP and EPA review and approval, a scope and schedule for an updated CSO Control Plan for the CSO outfalls that each permittee owns and operates that discharge to the Charles River Basin. The updated CSO Control Plan shall conform to the EPA CSO Policy and MassDEP's 1997 *Guidance for Abatement of Pollution from CSO Discharges*, and shall specifically include the following elements:

1. A description of the existing level of CSO control;
2. An evaluation of the costs and performance (i.e., effectiveness in reducing CSO discharge frequency and/or volume) and water quality improvements achieved by additional CSO control alternatives, up to and including, elimination of CSO discharges. For the City of Cambridge, use of Green Infrastructure technologies shall be considered. The evaluation of costs and water quality benefits may include the impacts of stormwater discharges;
3. A public participation plan sufficient to provide for ample opportunities for the public to be informed about the development of the Plans at critical junctures, and to have opportunities to provide informed comments on the CSO abatement alternatives and recommendations. The scope of the plan, as an element of full scope of work, shall be subject to MassDEP review and approval. This plan shall include submittals to comply with the Massachusetts Environmental Policy Act, 301 CMR 11.00;

4. An affordability analysis consistent with EPA's November 24, 2014 *Memorandum on Financial Capability Assessment Framework for Municipal Clean Water Act Requirements*, along with any other relevant information to assess financial capacity;
5. A Draft Recommended Plan, to be submitted to MassDEP and EPA by June 30, 2023, which achieves compliance with the federal Clean Water Act, the federal Water Quality Standards regulations (40 CFR Part 131) and the Massachusetts Surface Water Quality Standards regulations (314 CMR 4.00), supporting as needed any recommendations for changing the classification of any CSO-impacted receiving waters and Use Attainability Analyses.
6. A Final Recommended Plan, to be submitted to MassDEP and EPA for review and approval by December 31, 2023, which responds to comments received on the Draft Recommended Plan.

Subject to the conditions included in this Variance, MWRA and the City of Cambridge shall be authorized to discharge limited CSOs during wet weather events to the Charles River Basin.

8-30-2019
Date Issued

8-31-2019
Effective Date

Kathleen M. Baskin
Kathleen M. Baskin
Assistant Commissioner
Bureau of Water Resources

Exhibit A
MWRA CSO Variance
Additional System Optimization Measures

Below is a summary of the specific additional system optimization measures that MWRA will undertake during a 5-year variance period beginning September 1, 2019. These activities are intended to further MWRA's goals of improving water quality in the Lower Charles River, Upper Mystic River, and Alewife Brook. These measures are consistent with the requirements of 40 CFR 131.14, and allow for progress to be made towards attaining designated use(s) and water quality criteria. Collectively with the other elements of the CSO Variance requirements, these efforts comprise the Pollutant Minimization Program to be implemented during the course of the CSO Variance. Additional CSO system optimization efforts and on-going implementation of the "CSO Nine Minimum Controls" will be informed by MWRA's hydraulic model, which is in the process of being calibrated with extensive flow and overflow meter data being gathered, which commenced in 2018. MWRA expects the calibration to be complete by the fall of 2019. These efforts will also be informed by MWRA's updated receiving water quality models, which will be produced and available in the early years of the variance period.

Mystic River Watershed Project

1. Evaluate alternatives to reduce CSO activation frequency and volume at the Somerville Marginal CSO Treatment Facility, and associated CSO outfalls SOM007A/MWR205A, and MWR205, while avoiding any increase in the frequency and volume of CSO discharges at MWRA's Prison Point CSO Treatment Facility (MWR203), and CSO outfalls CAM017 and BOS017. Alternatives to be evaluated, at a minimum, will include:
 - Construction of dry weather connection relief/control from the City of Somerville's CSO regulator RE071A to MWRA's Somerville-Medford Branch Sewer; and
 - Relocation of MassDOT I-93 drainage from upstream to downstream of the Somerville-Marginal facility to reduce the frequency and volume of facility activations.

The work will need to address heavy traffic and underground utilities in the project area, and will also require close coordination with MassDOT. MWRA will develop a Somerville Marginal CSO Reduction Plan, which will include the outcome of the feasibility study; preliminary design plans for projects recommended to further reduce CSO discharges at this facility, and a schedule for final design and construction of recommended facilities. Construction will proceed unless the feasibility evaluation clearly demonstrates that construction is technically infeasible, that the project will not provide water quality benefits through the reduction of CSO volume or frequency, or that the costs, alone or in conjunction with other activities specified in Exhibit A, would cause widespread social and economic impact.

MWR205 & SOM007/MWR205A Somerville Marginal CSO Reduction Project, Study and Preliminary Design

Notice to Proceed – **December 2020**

Study Report/Preliminary Design Submittal to MassDEP for review and approval –
December 2021

Alewife Brook Project

2. MWRA proposes to evaluate maximizing beneficial use of enhanced pumping capacity at the recently rehabilitated Alewife Brook Pump station to lower wastewater elevations in the upstream collection system and potentially reduce CSO activations and volumes at upstream CSO outfalls CAM001, CAM002, MWR003, and SOM001A. During the Variance period, MWRA will assess alternative pumping strategies and expected upstream benefits using the MWRA's calibrated hydraulic model. Alternatives determined to provide potential benefits will be tested for a range of storm events. MWRA will develop an Alewife Brook Pump Station Optimization Report with findings and recommendations, including modeled control alternatives and testing, and an implementation plan to establish a schedule for any required programming of automated facility control changes and operator training, which shall become the standard operating procedure to minimize CSO discharges. Implementation will proceed unless the feasibility evaluation clearly demonstrates that construction is technically infeasible, that the project will not provide water quality benefits through the reduction of CSO volume or frequency, or that the costs, alone or in conjunction with other activities specified in Exhibit A, would cause widespread social and economic impact.

Alewife Brook Pump Station Optimization Evaluation Project

Notice to Proceed – **April 2020**

Alewife Brook Pump Station Optimization Report submittal to MassDEP for review and approval – **April 2021**

Alewife Brook and Charles River Watershed

3. Using the calibrated hydraulic model and coordinating technical evaluations with the Cities of Cambridge and Somerville and the Boston Water and Sewer Commission, MWRA will conduct system optimization evaluations at the remaining active regulators tributary to CSO outfalls discharging to the Alewife Brook and Charles River watersheds. The MWRA will then implement recommended modifications to those regulators owned by MWRA and will provide technical support to member communities in their efforts to implement recommended modifications to community owned CSO regulators. The MWRA anticipates evaluating and implementing optimization measures such as regulator closing, overflow weir modification or raising, dry weather connection relief and flow reallocation opportunities.

System optimization on a regulator by regulator basis is an important component of the Nine Minimum Control measures. The improved hydraulic model now being calibrated with extensive metering data will facilitate MWRA's ability to further refine the components of individual regulators. These refinements are expected to help reduce frequency and volume of CSO discharges while also protecting against adverse impacts, such as upstream system

flooding, especially in larger storms, or higher CSO discharges at other hydraulically related outfalls. A preliminary list of tasks is provided below to support the 2-year study and preliminary design schedule:

- Meeting and coordinating with CSO communities to determine what modifications/studies they have already performed, areas of concern for flooding (historic record research), planned community improvements in upstream systems, recommendations communities may have to modify regulator structures/shift flows, etc.
- Extending MWRA's hydraulic model into upstream pipe networks if needed to better assess proposed modification impacts on systems tributary to each regulator.
- Studying the hydraulics of the existing system for various storm events to look for opportunities to maximize flows to the wastewater conveyance system throughout various types of storm events (high intensity short duration, long duration low intensity, etc.), while maintaining protective relief in larger storms.
- Developing proposed modifications to regulators (weir height adjustment), additional relief opportunities during large events (e.g., bending weirs), dry weather connection modifications (increase size, one-way valve control, etc.) to take advantage of any available hydraulic capacity in the downstream interceptors.
- Performing model simulations of typical storm events as well as large events (10 – 25 year recurrence interval) to evaluate proposed modification benefits and potential adverse impacts.
- Developing and garnering consensus on sewer operation modifications.
- Developing preliminary design of recommended/approved sewer operation modifications for those which require excavation/significant construction for modification to the regulators.

Implementation will proceed unless the feasibility evaluation clearly demonstrates that construction is technically infeasible, that the project will not provide water quality benefits through the reduction of CSO volume or frequency, or that the costs, alone or in conjunction with other activities specified in Exhibit A, would cause widespread social and economic impact.

CSO System Optimization for Alewife Brook and Lower Charles River Basins Project, Study and Preliminary Design

Notice to Proceed – **December 2020**

System Optimization Report submittal to MassDEP for review and approval – **December 2022**

EXHIBIT B
LTCP Levels of Control from Second Stipulation

CSO OUTFALL	LONG TERM CONTROL PLAN	
	TYPICAL YEAR	
	Activation Frequency	Volume (MG)
ALEWIFE BROOK		
CAM001	5	0.19
CAM002	4	0.69
MWR003	5	0.98
CAM004	To be closed	N/A
CAM400	To be closed	N/A
CAM401A	5	1.61
CAM401B	7	2.15
SOM001A	3	1.67
SOM001	Closed	N/A
SOM002A	Closed	N/A
SOM003	Closed	N/A
SOM004	Closed	N/A
TOTAL		7.29
UPPER MYSTIC RIVER		
SOM007A/MWR205A (Somerville Marginal)	3	3.48
SOM007	Closed	N/A
TOTAL		3.48
MYSTIC / CHELSEA CONFLUENCE		
MWR205 (Somerville Marginal)	39	60.58
BOS013	4	0.54
BOS014	0	0.00
BOS015	Closed	N/A
BOS017	1	0.02
CHE002	4	0.22
CHE003	3	0.04
CHE004	3	0.32
CHE008	0	0.00
TOTAL		61.72
UPPER INNER HARBOR		
BOS009	5	0.59
BOS010	4	0.72
BOS012	5	0.72
BOS019	2	0.58
BOS050	Closed	N/A
BOS052	Closed	N/A
BOS057	1	0.43
BOS058	Closed	N/A
BOS060	0	0.00
MWR203 (Prison Point)	17	243.00
TOTAL		246.04

CSO OUTFALL	LONG TERM CONTROL PLAN	
	TYPICAL YEAR	
	Activation Frequency	Volume (MG)
LOWER INNER HARBOR		
BOS003	4	2.87
BOS004	5	1.84
BOS005	1	0.01
BOS006	4	0.24
BOS007	6	1.05
TOTAL		6.01
CONSTITUTION BEACH		
MWR207	Closed	N/A
TOTAL		0.00
FORT POINT CHANNEL		
BOS062	1	0.01
BOS064	0	0.00
BOS065	1	0.06
BOS068	0	0.00
BOS070		
BOS070/DBC	3	2.19
UPPS	17	71.37
BOS070/RCC	2	0.26
BOS072	0	0.00
BOS073	0	0.00
TOTAL		73.89
RESERVED CHANNEL		
BOS076	3	0.91
BOS078	3	0.28
BOS079	1	0.04
BOS080	3	0.25
TOTAL		1.48
NORTHERN DORCHESTER BAY		
BOS081	0 / 25 year	N/A
BOS082	0 / 25 year	N/A
BOS083	0 / 25 year	N/A
BOS084	0 / 25 year	N/A
BOS085	0 / 25 year	N/A
BOS086	0 / 25 year	N/A
BOS087	0 / 25 year	N/A
TOTAL		0.00
SOUTHERN DORCHESTER BAY		
BOS088	To be closed	N/A
BOS089 (Fox Point)	To be closed	N/A
BOS090 (Commercial Point)	To be closed	N/A
TOTAL		0.00

CSO OUTFALL	LONG TERM CONTROL PLAN	
	TYPICAL YEAR	
	Activation Frequency	Volume (MG)
UPPER CHARLES		
BOS032	Closed	N/A
BOS033	Closed	N/A
CAM005	3	0.84
CAM007	1	0.03
CAM009	2	0.01
CAM011	0	0.00
TOTAL		0.88
LOWER CHARLES		
BOS028	Closed	N/A
BOS042	Closed	N/A
BOS049	To be closed	N/A
CAM017	1	0.45
MWR010	0	0.00
MWR018	0	0.00
MWR019	0	0.00
MWR020	0	0.00
MWR021	Closed	N/A
MWR022	Closed	N/A
MWR201 (Cottage Farm)	2	6.30
MWR023	2	0.13
SOM010	Closed	N/A
TOTAL		6.88
NEPONSET RIVER		
BOS093	Closed	N/A
BOS095	Closed	N/A
TOTAL		0.00
BACK BAY FENS		
BOS046	2	5.38
TOTAL		5.38



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

FINAL DETERMINATION TO ADOPT A VARIANCE FOR COMBINED SEWER OVERFLOW DISCHARGES TO ALEWIFE BROOK/UPPER MYSTIC RIVER BASIN

The Massachusetts Department of Environmental Protection ("MassDEP") hereby adopts a Variance for Combined Sewer Overflow ("CSO") Discharges to the Alewife Brook/Upper Mystic River Basin (the "Variance"), originally issued on March 5, 1999, from September 1, 2019 to August 31, 2024. This discharger-specific variance, if finalized, would authorize limited CSO discharges from the Massachusetts Water Resources Authority ("MWRA") and the Cities of Cambridge and Somerville, which are subject to NPDES permit Nos. MA0103284, MA0101974, and MA0101982, respectively. During wet weather events where the limited CSO discharges are authorized, Class B requirements at 314 CMR 4.05(3)(b) for bacteria, solids, color and turbidity, and taste and odor may not be met. The Variance is a water quality standards revision subject to EPA review and approval under EPA's regulations at 40 CFR Part 131. It is adopted pursuant to the Massachusetts Surface Water Quality Standards ("SWQS") at 314 CMR 4.00 and the federal Water Quality Standards regulations at 40 CFR Part 131, and subject to the specific conditions which follow. This Variance is intended to establish requirements to (1) achieve the highest attainable water quality conditions in the receiving water; (2) provide for an assessment of the level of CSO control achieved, and the associated water quality impacts of CSO and non-CSO sources; (3) establish requirements for public notification of CSO events and their impacts; and (4) continue to assess the costs and feasibility of achieving higher levels of CSO control beyond the requirements of this variance. MWRA currently remains subject to the orders of the United States District Court for the District of Massachusetts, Civil Action Nos. 85-0489-MA and 83-1614-MA, including amended Schedule Seven, dated October 19, 2011 (the "Federal Court Order") regarding its implementation of the revised Long-Term CSO Control Plan ("LTCP").

MassDEP adopts this Variance based on its determination described in the accompanying fact sheet that implementation of more stringent CSO controls to meet the underlying designated use and criteria at this time would result in substantial and widespread social and economic impact as specified in 314 CMR 4.03(4)(f) and 40 CFR 131.10(g)(6). Further, implementation of the requirements that follow represent the highest attainable interim effluent conditions during the

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.
TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

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term of the variance, until such time as information to support further regulatory determinations is available. Information gathered during the term of the CSO Variance is intended to be used to make a subsequent determination on the appropriate water quality standard for the Alewife Brook and the Upper Mystic River segments that are currently affected by CSO discharges. Issuance of this Variance for CSO discharges to the Alewife Brook/Upper Mystic River is consistent with EPA's regulations at 40 CFR 131.14, and with the U.S. Environmental Protection Agency's Guidance (*Coordinating CSO Long-Term Planning with Water Quality Standard Reviews, July 31, 2001*), which states that longer term variances and renewal of variances are warranted given the extended duration necessary for implementation of long-term control plans.

MWRA and the Cities of Cambridge and Somerville, as of December 2015, have completed all construction work in MWRA's LTCP, consistent with the requirements of the Federal Court Order. MWRA is now in the midst of a CSO Performance Assessment, also a requirement of the Federal Court Order, which is intended to document the level of CSO control achieved. This Variance affirms that, as an element of this Assessment work, MWRA undertake a CSO/water quality assessment, through development and use of a receiving water model, to determine the impacts of CSO and non-CSO sources in Alewife Brook and the Upper Mystic River, pursuant to EPA's 1994 *Combined Sewer Overflow (CSO) Control Policy* ("EPA CSO Policy").

Once approved by EPA under CWA section 303(c), this Variance and its conditions will be incorporated into NPDES permits for the MWRA and the Cities of Cambridge and Somerville at the time of reissuance of those permits, consistent with 40 CFR 131.14(c). Failure by the MWRA and/or the Cities of Cambridge or Somerville to comply with the conditions of this Variance following its effective date and as implemented in their NPDES permits will constitute a violation of the permit, as well as the Massachusetts SWQS (314 CMR 4.00) and the Surface Water Discharge Permit Program regulations (314 CMR 3.00).

The Variance is a short-term modification of the Massachusetts SWQS, issued by MassDEP and subject to EPA approval. The Variance allows limited CSO discharges from the outfalls along the Alewife Brook/Upper Mystic River permitted to MWRA and the Cities of Cambridge and Somerville, subject to specific conditions. Other standards and criteria of the receiving waters' Class B designation are unaffected and remain in force.

VARIANCE CONDITIONS

This Variance is conditioned upon MWRA and the Cities of Cambridge and Somerville complying with their individual and joint requirements, as identified below:

A. Level of Required CSO Control During Variance

Per the requirements included in the "Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control" ("Second Stipulation"), filed March 15, 2006, as amended in the aforementioned actions, CSO discharges shall be limited to those set forth in

attached Exhibit B, with allowance for any conditions that exceed Typical Year¹ conditions. Consistent with 40 CFR 131.14(b)(1)(ii)(A)(3), this is the effluent condition that reflects the greatest pollutant reduction achievable within the five-year term of this variance with the pollutant control technologies installed at the time the state is adopting this variance.

B. Receiving Water Quality Monitoring

MWRA shall continue and expand the water quality monitoring program in the Alewife Brook/Upper Mystic River to demonstrate the effectiveness of CSO controls implemented in the watershed. The work shall be adequate to assess the water quality impacts of remaining CSO pollutant sources and loads over a range of storm events, and the associated level of attainment of water quality standards in Alewife Brook and the Upper Mystic River.

On or before July 15 each year, for the duration of this Variance, MWRA shall submit to MassDEP and EPA a report on the previous year's sampling program. The report shall include a summary of the receiving water sampling data collected over the past calendar year, including sampling locations and parameters, and comparisons between results during wet and dry weather, a characterization of rainfall events for which wet weather sampling was done, and an assessment of the water quality impacts of CSO and non-CSO sources.

C. CSO Performance Assessment

1. CSO Activations and Volumes

By December 31, 2021, MWRA shall submit the results of the CSO Performance Assessment to EPA and MassDEP, documenting the level of CSO control achieved through implementation of the LTCP throughout the CSO planning area, in regard to CSO activations and volumes in the Typical Year, relative to the Second Stipulation levels of control (Exhibit B), and shall also post the Assessment Report on its website. During the course of completing this work, MWRA shall also undertake the following actions:

- a) Progress Reports: MWRA shall submit progress reports to MassDEP and to EPA, and shall post the reports to the MWRA website in accordance with the following schedule:
 - i. Progress Reports #1, 2, and 3 shall be submitted and posted on or before October 31, 2019, and together shall be inclusive of all work done for the CSO Performance Assessment through June 30, 2019;
 - ii. Progress Report #4 shall be submitted and posted on or before April 30, 2020, and shall be inclusive of all work done for the CSO Performance Assessment through December 31, 2019;

¹ "Typical Year" rainfall has been the basis for development, recommendation and approval of MWRA's LTCP, the establishment of the federal court mandated levels of control, and the assessment of system performance toward attainment of the LTCP levels of control. The Typical Year was developed from 40 years of rainfall records (1949-1987, plus 1992), and it includes 93 storms with a total precipitation of 46.8 inches.

- iii. Progress Report #5 shall be submitted and posted on or before October 31, 2020, and shall be inclusive of all work done for the CSO Performance Assessment through June 30, 2020;
- iv. Progress Report #6 shall be submitted and posted on or before April 30, 2021, and shall be inclusive of all work done for the CSO Performance Assessment through December 31, 2020; and
- v. Progress Report #7 shall be submitted and posted on or before October 31, 2021, and shall be inclusive of all work done for the CSO Performance Assessment through June 30, 2021.

Progress Reports shall include a summary of work completed, metering data collected, integration with MWRA's sewer system model, estimated CSO discharges from metering data (or model simulations when approved by MassDEP), a discussion of any locations where metered, or when approved by MassDEP, modeled CSO discharges appear to exceed Second Stipulation levels of CSO control, and any measures taken to optimize the Nine Minimum Control actions to further control CSO discharges.

b) Public Meetings:

- i. MWRA shall arrange for public meetings in May 2020 and May 2021, to present information on the progress of the work and findings to date, and allow for public input;
- ii. MWRA shall arrange for a public meeting in February 2022 to present the findings of the CSO Performance Assessment, and to allow public comment on the Assessment and its findings; and
- iii. Notice for the date, time, and location of each public meeting shall be provided in the Environmental Monitor at least thirty days in advance of each public meeting.

2. Assessment of CSO Water Quality Impacts

MWRA shall implement the Receiving Water Model Workplan, dated May 24, 2019 and revised July 18, 2019, along with the Receiving Water Modeling of Upper Mystic River/Alewife Brook and Charles River Basin: Work Plan for Stormwater and Combined Sewer Overflow Monitoring, 2019-2020, dated June 6, 2019 and revised August 27, 2019, and develop and calibrate a receiving water quality model, and use such model to present information on the water quality impacts of CSO and non-CSO discharges in the Alewife Brook/Upper Mystic River watershed.

The Final CSO Water Quality Impact Report shall be submitted to MassDEP and EPA on or before December 31, 2021, and shall include a description of the data collected and used for developing and calibrating the model; information on CSO and non-CSO water quality impacts for a range of design storms and the Typical Year; and a sensitivity analysis showing the water quality benefits of further pollutant reductions in upstream sources, stormwater, and CSO discharges.

D. Notification to the Public of CSO Discharges and Impacts

1. MWRA and the Cities of Cambridge and Somerville shall maintain outfall signs that are visible both from the shore and from in stream locations for their permitted CSO discharges. Pursuant to their NPDES Permits, the following language, at a minimum, shall be included:

WARNING:
WET WEATHER
SEWAGE DISCHARGE
OUTFALL (discharge serial number)

2. MWRA and the Cities of Cambridge and Somerville shall update and maintain informational signs at John Wald Memorial Park in East Arlington and other public access locations to be recommended by the permittees and approved by MassDEP in order to advise the public of CSO discharges and potential public health impacts and to provide contact information and website links. The text of the notice shall be subject to prior approval by MassDEP.
3. MWRA and the Cities of Cambridge and Somerville shall issue a joint press release by April 15 of each year to watershed advocacy groups, local health agents, and newspapers of local circulation in the Alewife Brook/Upper Mystic River watershed, which shall include general information on CSOs, the location of outfalls in the Alewife Brook/Upper Mystic River watershed, and potential health risks posed by exposure to CSO events.
4. MWRA, and the Cities of Cambridge and Somerville shall, by December 31, 2020, develop and implement a CSO Subscriber-Based Notification System to provide CSO Alert Notifications to any interested parties, which shall include the following components:
 - a. A CSO Alert Notification shall be issued no later than 4 hours after becoming aware of a CSO event from one or more of the permittee's CSO outfalls, but in no event later than 12 hours after onset of the CSO discharge, which shall be issued to: MassDEP, EPA, local boards of health in Cambridge, Somerville, Arlington, and Medford, the Mystic River Watershed Association, and any person subscribed to receive such Alert Notifications.

The CSO Alert Notification shall provide, at a minimum, the following information:

- i. Outfall location(s);
- ii. Approximate time and date of onset of the discharge;
- iii. Whether, at the time of notification, the discharge has ceased, and if so, the approximate time that the discharge ended;
- iv. Waters and land areas potentially affected by such discharge;
- v. Precautionary measures for the public to avoid health risks from contact

- with effluent; and
- vi. Link to the permittee's website for additional information on CSOs and its CSO abatement program.

Until such time as the Subscriber-based system is in place, the City of Cambridge shall continue its current practice of providing a CSO Alert email notification to MassDEP, EPA, local Boards of Health, and the Mystic River Watershed Association, within 24 hours of a CSO event from one or more of their permitted CSO outfalls.

- b. MWRA, and the Cities of Cambridge and Somerville shall each establish and maintain a public website, which shall include, at a minimum, the information listed below, for their permitted CSO outfalls in the Alewife Brook/Upper Mystic River watershed. If agreed upon by MWRA and the Cities of Cambridge and Somerville, this requirement may be met by one entity compiling and posting the data on their website, and the other entities providing a link on their own websites to the data.
 - i. A map showing the locations of the CSO outfalls, correlating to the CSO outfall numbers included in their respective NPDES Permits;
 - ii. On or before December 31, 2020, instructions on how an interested person can self-register for the CSO Subscriber-Based Notification System;
 - iii. Within 5 business days of any CSO Alert Notification issued, updated information on the estimated duration and volume of the CSO discharge and event rainfall data; and
 - iv. Annual lists of the permittees' CSO outfalls within the variance waters with information compiled on duration and volume of discharges from each outfall, as well as cumulative discharge volume from all CSOs. Each annual calendar year summary shall be updated and posted on the website no later than April 30th of each year.

E. Other Actions to Minimize CSO Discharges

- 1. MWRA and the Cities of Cambridge and Somerville shall continue to implement the Nine Minimum Controls (NMC), as set forth in their respective NPDES Permits and the Variance conditions, which must include the following components:
 - a. Proper operation and regular maintenance programs for the sewer system and the CSOs.
 - b. Maximum use of the collection system for storage.
 - c. Review and modification of the pretreatment program to assure CSO impacts are minimized.
 - d. Maximization of flow to the POTW for treatment.
 - e. Prohibition of dry weather overflows from CSOs.
 - f. Control of solid and floatable materials in CSOs.
 - g. Pollution prevention programs that focus on contaminant reduction activities.

- h. Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts.
- i. Monitoring to effectively characterize CSO and the efficacy of CSO controls.

Any enhancements to the MWRA and community NMC programs identified by MassDEP or the permittees during the CSO Performance Assessment can and shall be implemented after obtaining all necessary approvals, providing the enhancements do not conflict with the overall goals and requirements of the LTCP, as measures to further reduce CSO discharges so that highest attainable interim effluent conditions can be achieved and maintained during the Variance period.

2. Variance Pollutant Minimization Program as required by 40 CFR 131.14(b)(1)(ii)(A)(3): MWRA, with assistance/support from the Cities of Cambridge and Somerville, shall implement the Additional System Optimization measures as set forth in the scope and schedule of actions in attached Exhibit A. MWRA shall coordinate with the Cities of Cambridge and Somerville to evaluate the impact of any Additional System Optimization measures on all three systems' performance. Beginning in 2021 and on or before January 31 of each year until the end of this Variance, MWRA shall submit to MassDEP and EPA, and shall post on its website, progress reports on the implementation of the Additional System Optimization measures. Exhibit A represents the pollutant minimization activities that MWRA will implement in this variance term.
3. MWRA shall continue to provide technical assistance related to the identification and removal of Infiltration/Inflow (I/I) to member communities. Where requested by any member community, or by MassDEP or EPA, MWRA shall provide information from MWRA metering data, including but not limited to:
 - a. A system map showing locations of MWRA metering points;
 - b. MWRA metering data by each MWRA member sewer community, broken down into estimates of average monthly sanitary flow, average monthly infiltration and average monthly inflow; and
 - c. MWRA metering data by meter subarea correlating to a specific storm event.
4. The Cities of Cambridge and Somerville shall consider use of Green Infrastructure technologies where feasible to increase stormwater infiltration.

F. Updated CSO Control Planning

On or before April 1, 2022, MWRA, and the Cities of Cambridge and Somerville shall each submit for MassDEP and EPA review and approval, a scope and schedule for an updated CSO Control Plan for the CSO outfalls that each permittee owns and operates that discharge to the Alewife Brook/Upper Mystic River. The updated CSO Control Plan shall conform to the EPA CSO Policy and MassDEP's 1997 *Guidance for Abatement of Pollution from CSO Discharges*, and shall specifically include the following elements:

1. A description of the existing level of CSO control;
2. An evaluation of the costs and performance (i.e., effectiveness in reducing CSO discharge frequency and/or volume) and water quality improvements achieved by additional CSO control alternatives, up to and including, elimination of CSO discharges. For the Cities of Cambridge and Somerville, use of Green Infrastructure technologies shall be considered. The evaluation of costs and water quality benefits may include the impacts of stormwater discharges;
3. A public participation plan sufficient to provide for ample opportunities for the public to be informed about the development of the Plans at critical junctures, and to have opportunities to provide informed comments on the CSO abatement alternatives and recommendations. The scope of the plan, as an element of full scope of work, shall be subject to MassDEP review and approval. This plan shall include submittals to comply with the Massachusetts Environmental Policy Act, 301 CMR 11.00;
4. An affordability analysis consistent with EPA's November 24, 2014 *Memorandum on Financial Capability Assessment Framework for Municipal Clean Water Act Requirements*, along with any other relevant information to assess financial capacity;
5. A Draft Recommended Plan, to be submitted to MassDEP and EPA by June 30, 2023, which achieves compliance with the federal Clean Water Act, the federal Water Quality Standards regulations (40 CFR Part 131) and the Massachusetts Surface Water Quality Standards regulations (314 CMR 4.00), supporting as needed any recommendations for changing the classification of any CSO-impacted receiving waters with Use Attainability Analyses.
6. A Final Recommended Plan, to be submitted to MassDEP and EPA for review and approval by December 31, 2023, which responds to comments received on the Draft Recommended Plan.

Subject to the conditions included in this Variance, MWRA, and the Cities of Cambridge and Somerville shall be authorized to discharge limited CSOs during wet weather events to the Alewife Brook/Upper Mystic River Basin.

8-30-2019
Date Issued

8-30-2019
Effective Date

Kathleen M Baskin
Kathleen M. Baskin
Assistant Commissioner
Bureau of Water Resources

Exhibit A
MWRA CSO Variance
Additional System Optimization Measures

Below is a summary of the specific additional system optimization measures that MWRA will undertake during a 5-year variance period beginning September 1, 2019. These activities are intended to further MWRA's goals of improving water quality in the Lower Charles River, Upper Mystic River, and Alewife Brook. These measures are consistent with the requirements of 40 CFR 131.14, and allow for progress to be made towards attaining designated use(s) and water quality criteria. Collectively with the other elements of the CSO Variance requirements, these efforts comprise the Pollutant Minimization Program to be implemented during the course of the CSO Variance. Additional CSO system optimization efforts and on-going implementation of the "CSO Nine Minimum Controls" will be informed by MWRA's hydraulic model, which is in the process of being calibrated with extensive flow and overflow meter data being gathered, which commenced in 2018. MWRA expects the calibration to be complete by the fall of 2019. These efforts will also be informed by MWRA's updated receiving water quality models, which will be produced and available in the early years of the variance period.

Mystic River Watershed Project

1. Evaluate alternatives to reduce CSO activation frequency and volume at the Somerville Marginal CSO Treatment Facility, and associated CSO outfalls SOM007A/MWR205A, and MWR205, while avoiding any increase in the frequency and volume of CSO discharges at MWRA's Prison Point CSO Treatment Facility (MWR203), and CSO outfalls CAM017 and BOS017. Alternatives to be evaluated, at a minimum, will include:
 - Construction of dry weather connection relief/control from the City of Somerville's CSO regulator RE071A to MWRA's Somerville-Medford Branch Sewer; and
 - Relocation of MassDOT I-93 drainage from upstream to downstream of the Somerville-Marginal facility to reduce the frequency and volume of facility activations.

The work will need to address heavy traffic and underground utilities in the project area, and will also require close coordination with MassDOT. MWRA will develop a Somerville Marginal CSO Reduction Plan, which will include the outcome of the feasibility study; preliminary design plans for projects recommended to further reduce CSO discharges at this facility, and a schedule for final design and construction of recommended facilities. Construction will proceed unless the feasibility evaluation clearly demonstrates that construction is technically infeasible, that the project will not provide water quality benefits through the reduction of CSO volume or frequency, or that the costs, alone or in conjunction with other activities specified in Exhibit A, would cause widespread social and economic impact.

MWR205 & SOM007/MWR205A Somerville Marginal CSO Reduction Project, Study and Preliminary Design

Notice to Proceed – **December 2020**

Study Report/Preliminary Design Submittal to MassDEP for review and approval –
December 2021

Alewife Brook Project

2. MWRA proposes to evaluate maximizing beneficial use of enhanced pumping capacity at the recently rehabilitated Alewife Brook Pump station to lower wastewater elevations in the upstream collection system and potentially reduce CSO activations and volumes at upstream CSO outfalls CAM001, CAM002, MWR003, and SOM001A. During the Variance period, MWRA will assess alternative pumping strategies and expected upstream benefits using the MWRA's calibrated hydraulic model. Alternatives determined to provide potential benefits will be tested for a range of storm events. MWRA will develop an Alewife Brook Pump Station Optimization Report with findings and recommendations, including modeled control alternatives and testing, and an implementation plan to establish a schedule for any required programming of automated facility control changes and operator training, which shall become the standard operating procedure to minimize CSO discharges. Implementation will proceed unless the feasibility evaluation clearly demonstrates that construction is technically infeasible, that the project will not provide water quality benefits through the reduction of CSO volume or frequency, or that the costs, alone or in conjunction with other activities specified in Exhibit A, would cause widespread social and economic impact.

Alewife Brook Pump Station Optimization Evaluation Project

Notice to Proceed – **April 2020**

Alewife Brook Pump Station Optimization Report submittal to MassDEP for review and approval – **April 2021**

Alewife Brook and Charles River Watershed

3. Using the calibrated hydraulic model and coordinating technical evaluations with the Cities of Cambridge and Somerville and the Boston Water and Sewer Commission, MWRA will conduct system optimization evaluations at the remaining active regulators tributary to CSO outfalls discharging to the Alewife Brook and Charles River watersheds. The MWRA will then implement recommended modifications to those regulators owned by MWRA and will provide technical support to member communities in their efforts to implement recommended modifications to community owned CSO regulators. The MWRA anticipates evaluating and implementing optimization measures such as regulator closing, overflow weir modification or raising, dry weather connection relief and flow reallocation opportunities.

System optimization on a regulator by regulator basis is an important component of the Nine Minimum Control measures. The improved hydraulic model now being calibrated with extensive metering data will facilitate MWRA's ability to further refine the components of individual regulators. These refinements are expected to help reduce frequency and volume of CSO discharges while also protecting against adverse impacts, such as upstream system

flooding, especially in larger storms, or higher CSO discharges at other hydraulically related outfalls. A preliminary list of tasks is provided below to support the 2-year study and preliminary design schedule:

- Meeting and coordinating with CSO communities to determine what modifications/studies they have already performed, areas of concern for flooding (historic record research), planned community improvements in upstream systems, recommendations communities may have to modify regulator structures/shift flows, etc.
- Extending MWRA's hydraulic model into upstream pipe networks if needed to better assess proposed modification impacts on systems tributary to each regulator.
- Studying the hydraulics of the existing system for various storm events to look for opportunities to maximize flows to the wastewater conveyance system throughout various types of storm events (high intensity short duration, long duration low intensity, etc.), while maintaining protective relief in larger storms.
- Developing proposed modifications to regulators (weir height adjustment), additional relief opportunities during large events (e.g., bending weirs), dry weather connection modifications (increase size, one-way valve control, etc.) to take advantage of any available hydraulic capacity in the downstream interceptors.
- Performing model simulations of typical storm events as well as large events (10 – 25 year recurrence interval) to evaluate proposed modification benefits and potential adverse impacts.
- Developing and garnering consensus on sewer operation modifications.
- Developing preliminary design of recommended/approved sewer operation modifications for those which require excavation/significant construction for modification to the regulators.

Implementation will proceed unless the feasibility evaluation clearly demonstrates that construction is technically infeasible, that the project will not provide water quality benefits through the reduction of CSO volume or frequency, or that the costs, alone or in conjunction with other activities specified in Exhibit A, would cause widespread social and economic impact.

CSO System Optimization for Alewife Brook and Lower Charles River Basins Project, Study and Preliminary Design

Notice to Proceed – **December 2020**

System Optimization Report submittal to MassDEP for review and approval – **December 2022**

EXHIBIT B
LTCP Levels of Control from Second Stipulation

CSO OUTFALL	LONG TERM CONTROL PLAN	
	TYPICAL YEAR	
	Activation Frequency	Volume (MG)
ALEWIFE BROOK		
CAM001	5	0.19
CAM002	4	0.69
MWR003	5	0.98
CAM004	To be closed	N/A
CAM400	To be closed	N/A
CAM401A	5	1.61
CAM401B	7	2.15
SOM001A	3	1.67
SOM001	Closed	N/A
SOM002A	Closed	N/A
SOM003	Closed	N/A
SOM004	Closed	N/A
TOTAL		7.29
UPPER MYSTIC RIVER		
SOM007A/MWR205A (Somerville Marginal)	3	3.48
SOM007	Closed	N/A
TOTAL		3.48
MYSTIC / CHELSEA CONFLUENCE		
MWR205 (Somerville Marginal)	39	60.58
BOS013	4	0.54
BOS014	0	0.00
BOS015	Closed	N/A
BOS017	1	0.02
CHE002	4	0.22
CHE003	3	0.04
CHE004	3	0.32
CHE008	0	0.00
TOTAL		61.72
UPPER INNER HARBOR		
BOS009	5	0.59
BOS010	4	0.72
BOS012	5	0.72
BOS019	2	0.58
BOS050	Closed	N/A
BOS052	Closed	N/A
BOS057	1	0.43
BOS058	Closed	N/A
BOS060	0	0.00
MWR203 (Prison Point)	17	243.00
TOTAL		246.04

CSO OUTFALL	LONG TERM CONTROL PLAN	
	TYPICAL YEAR	
	Activation Frequency	Volume (MG)
LOWER INNER HARBOR		
BOS003	4	2.87
BOS004	5	1.84
BOS005	1	0.01
BOS006	4	0.24
BOS007	6	1.05
TOTAL		6.01
CONSTITUTION BEACH		
MWR207	Closed	N/A
TOTAL		0.00
FORT POINT CHANNEL		
BOS062	1	0.01
BOS064	0	0.00
BOS065	1	0.06
BOS068	0	0.00
BOS070		
BOS070.DBC	3	2.19
UPPS	17	71.37
BOS070.RCC	2	0.26
BOS072	0	0.00
BOS073	0	0.00
TOTAL		73.89
RESERVED CHANNEL		
BOS076	3	0.91
BOS078	3	0.28
BOS079	1	0.04
BOS080	3	0.25
TOTAL		1.48
NORTHERN DORCHESTER BAY		
BOS081	0 / 25 year	N/A
BOS082	0 / 25 year	N/A
BOS083	0 / 25 year	N/A
BOS084	0 / 25 year	N/A
BOS085	0 / 25 year	N/A
BOS086	0 / 25 year	N/A
BOS087	0 / 25 year	N/A
TOTAL		0.00
SOUTHERN DORCHESTER BAY		
BOS088	To be closed	N/A
BOS089 (Fox Point)	To be closed	N/A
BOS090 (Commercial Point)	To be closed	N/A
TOTAL		0.00

CSO OUTFALL	LONG TERM CONTROL PLAN	
	TYPICAL YEAR	
	Activation Frequency	Volume (MG)
UPPER CHARLES		
BOS032	Closed	N/A
BOS033	Closed	N/A
CAM005	3	0.84
CAM007	1	0.03
CAM009	2	0.01
CAM011	0	0.00
TOTAL		0.88
LOWER CHARLES		
BOS028	Closed	N/A
BOS042	Closed	N/A
BOS049	To be closed	N/A
CAM017	1	0.45
MWR010	0	0.00
MWR018	0	0.00
MWR019	0	0.00
MWR020	0	0.00
MWR021	Closed	N/A
MWR022	Closed	N/A
MWR201 (Cottage Farm)	2	6.30
MWR023	2	0.13
SOM010	Closed	N/A
TOTAL		6.88
NEPONSET RIVER		
BOS093	Closed	N/A
BOS095	Closed	N/A
TOTAL		0.00
BACK BAY FENS		
BOS046	2	5.38
TOTAL		5.38