



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region I - EPA New England
5 Post Office Square – Suite 100
Boston, MA 02109-3912

Drafted Date: December 19, 2019

Finalized Date: January 8, 2020

Subject: Cambridge Stormwater
City of Cambridge, MA
Compliance Sampling Inspection Report

From: Todd Borci, Enforcement Officer, Environmental Compliance and Assurance
Division (ECAD) \TJB\

Reviewed By: Michelle Coombs, Investigator, Laboratory Services and Applied Science
Division – Field Services Branch (LSASD-FSB), LSASD-FSB

To: Denny Dart, Water Compliance Section Chief,
Enforcement and Compliance Assurance Division (ECAD-EWC)

CC: Jerry Keefe, Investigations Team Leader, LSASD-FSB

I. Facility Information

A. Facility Name: City of Cambridge
B. Facility Location: Cambridge, MA
C. Facility Contact: Owen O' Riordan, DPW Commissioner
T: 617-349-4845, ooriordan@cambridgem.a.gov
D. NPDES MS4 Permit #: MAR041076
E. NPDES CSO Permit #: MA0101974

II. Background Information

A. Date/Start time of inspection: November 20, 2019/0930 HRs
B. USEPA Representatives: Michelle Coombs, Samantha Couture, and Todd Borci
C. Federally Enforceable Requirements Investigated: 40 CFR Part 122.26
D. Pollutants Sampled: Pharmaceuticals and Personal Care Products (PPCPs), E. coli/Enterococcus, Ammonia, Total Chlorine, and Surfactants

III. Disclaimer:

Unless otherwise noted, this report describes conditions at the facility/property as observed by EPA inspector(s), and/or through records provided to and/or information reported to EPA inspector(s) by facility representatives and as understood by the inspector(s). This report may not capture all operations or activities ongoing at the time of the inspection. This report does not make final determinations on potential areas of concern. Nothing in this report affects EPA's authorities under federal statutes and regulations to pursue further investigation or action.

IV. Type and Purpose of Inspection

The purpose of the compliance sampling inspection was to identify illicit connections or illegal discharges within the City of Cambridge, MA Municipal Separate Storm Sewer System (MS4) and/or Combined Sewer System (CSS) that may adversely impact the water quality in the Alewife Brook. Samples were collected from five (5) locations in accordance with the FSB Investigations Team Stormwater Program Plan.

V. Inspection Summary

On November 20, 2019 EPA inspectors Michelle Coombs, Samantha Couture, and Todd Borci ("the EPA Inspection Team") conducted a compliance sampling inspection within the City of Cambridge MS4 and Combined Sewer Overflows (CSOs) systems around the Alewife MBTA transit station at the locations described in Section VI. They were accompanied by City of Cambridge employees Jim Wilcox, Yilkal Bekele, George Stylianopoulos, and Catherine Woodbury for the duration of the inspection. The inspection was conducted as part of a training session for the 2019 EPA National Technical Inspector Workshop, with approximately 23 state and federal NPDES inspectors observing the inspection. While demonstration samples were collected and used as training aids during the inspection, all results presented herein were collected, transported, and analyzed by the EPA Inspection Team as official compliance samples, and were not handled or analyzed by the inspectors observing the inspection.

The inspection started at approximately 9:30AM. At the time of the inspection, the weather was cloudy with drizzle and an ambient temperature of approximately 40 degrees Fahrenheit. According to The National Weather Service for Logan International Airport (KBOS), there was 0.06 inches of precipitation recorded in the 24 hours prior to the inspection, and 0.46 inches of precipitation recorded in the 48 hours prior to the inspection. Between the inspection start at 9:30 AM and the inspection finish at 11 am, approximately 0.02 inches of precipitation were recorded.

The City of Cambridge, MA was issued Permit #MAR041076 under the National Pollutant Discharge Elimination System ("NPDES") program Phase II Small MS4 General Permit. The year 2018 is permit year 15 under the 2004 general permit. The City of Cambridge, MA was issued Permit #MA0101974 in 2009 under the NPDES program and is authorized to discharge from 12 CSOs to the receiving waters named Alewife Brook and Charles River.

The sampling locations described in Section VI were field screened using test kits for ammonia, surfactants, and total chlorine. In-situ measurements for specific conductivity, salinity, and temperature were also measured and recorded. Samples were delivered to and analyzed for E. coli/Enterococcus and Pharmaceutical and Personal Care Products (PPCPs) at the EPA New England Regional Laboratory (NERL) in North Chelmsford, MA. The following table(s) summarize the findings.

Table 1: Summary of Sampling and Analytical Data

VI. Description of Sampling Locations

Photographs depicting each sample location can be found in Attachment A of this report.

- **Alewifel1**: In-stream sample of Alewife Brook, approximately 150 feet downstream of the CAM401A outfall. The sample collection point is adjacent to an MWRA CSO siphon structure and was accessed via the Fitchburg Cutoff Bike Path near the Alewife Transit Station.
- **CAM401A**: A single circular concrete outfall approximately 60 inches in diameter. The outfall was submerged approximately 1/3 of the total outfall height, so an estimated flow could not be determined. The outfall is an overflow pipe for combined wastewater and stormwater runoff. Sample location was accessed via a dirt footpath along the north side of the parking garage that is located at 1 Alewife Place, across the street from the Alewife transit station. (No picture included in Attachment A)
- **MH01**: The sample was collected out of a manhole in front of the parking lot entrance located at 87 Cambridge Park Drive. According to the Cambridge Cityviewer GIS system, the ID number for the manhole is ACCESS269.
- **MH02**: The sample was collected out of a manhole in front of the Hanover Apartment Building at 88 Cambridge Park Drive. According to the Cambridge Cityviewer GIS system, the ID number for the manhole is S72CMH0075.
- **MH03**: The sample was collected out of a manhole located on the southern end of the parking lot at 402 Rindge Avenue. According to the Cambridge Cityviewer GIS system, the ID number for the manhole is S72CMH0113.

Map of Sample Locations

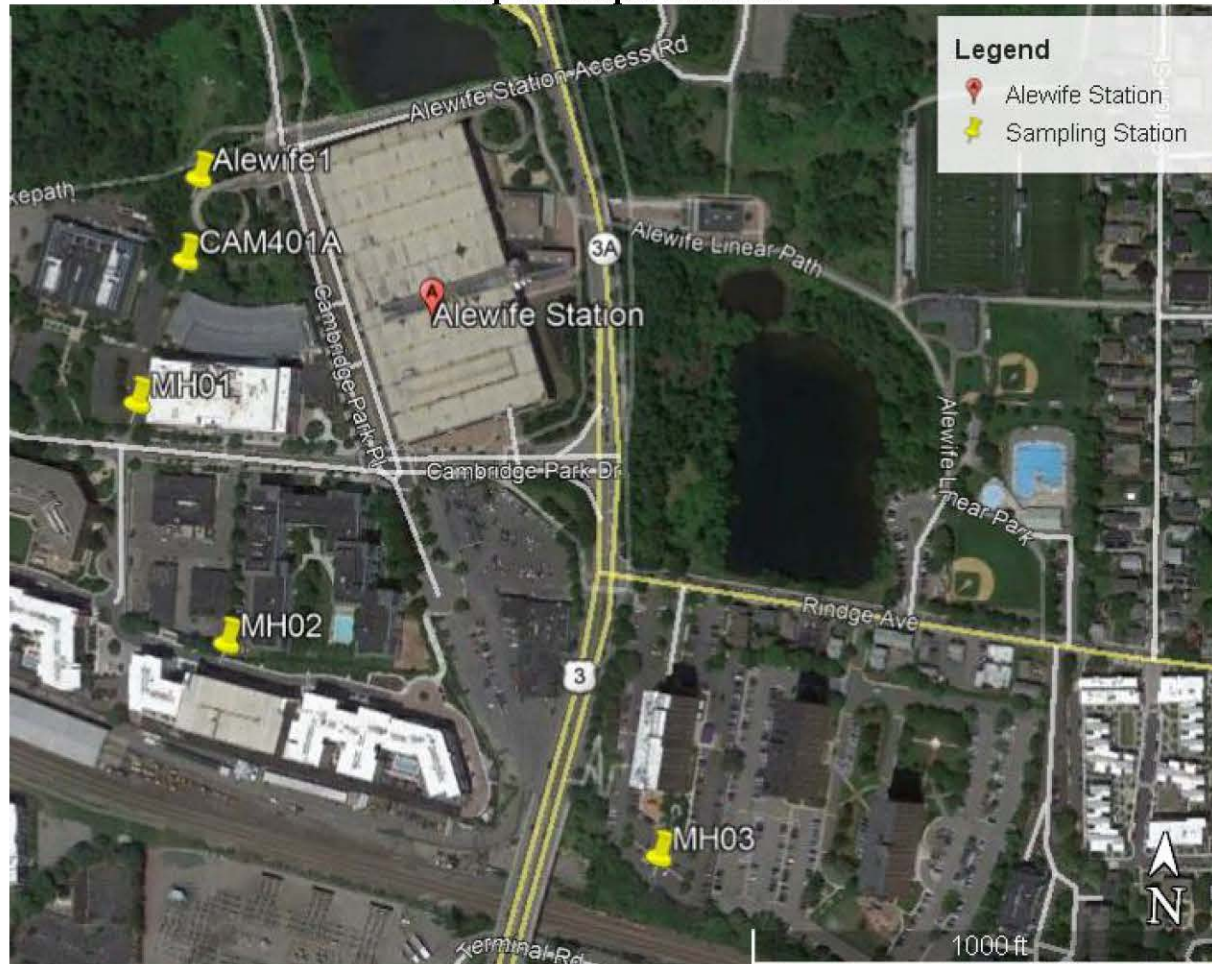


Table 1: Summary of Sampling and Analytical Data

Location	Site ID	Alewife1	CAM401A	MH01	MH02	MH03
	Sample Date	11/20/2019	11/20/2019	11/20/2019	11/20/2019	11/20/2019
	Sample Time	9:40 AM	9:50 AM	10:15 AM	10:30 AM	11:00 AM
Coordinates (decimal degrees)	North	42.396121	42.395643	42.394805	42.393439	42.392314
	West	-71.143899	-71.143976	-71.144309	-71.143530	-71.140078
YSI Meter	Salinity, ppt.	0.4	0.4	0.4	0.7	0.5
	Temperature, °C	10.8	11.1	11.2	13.0	13.7
	Conductivity, μ S/cm	739	777	841	1340	1087
Field Test Kits (mg/L)	Ammonia	NA	2.0	2.0	1.0	1.0
	Chlorine	NA	0.0	0.0	0.13	0.03
	Surfactants	NA	0.3	0.3	1.0	0.6
Bacteria (MPN/100mL)	E. coli	2,908	2,190*	>9,678	1,164	6,932
	Enterococcus	650	738*	581	301	798
Pharmaceuticals and Personal Care Products (ng/L)	Cotinine	35	37	36	34	51
	Acetaminophen	130	150	150	54	85
	Paraxanthine	60	63	74	80	150
	Atenolol	14	18	18	91	190
	Caffeine	960	910	800	440	340
	Metoprolol	ND	ND	ND	ND	ND
	Diphenhydramine	ND	ND	0.55	0.52	ND
	Carbamazepine	ND	0.63	0.55	ND	ND

Abbreviations and Notes:

* Field Duplicate results in MPN/100mL were as follows: E. coli (1,642) and Enterococcus (635)

NA: Not Analyzed

ND: Not Detected Above Reporting Limit (RL)**

E. Coli: Red $\geq$ 10,000 col/100ml, Orange $\geq$ 1,260 col/100ml, Yellow $\geq$ 235 col/100ml, Black < 235 col/100ml

Entero: Red $\geq$ 1,000 col/100ml, Orange $\geq$ 350 Yellow $\geq$ 61 col/100ml, Black < 61 col/100ml

NH₃: Red $\geq$ 6 mg/L, Orange $\geq$ 0.5 mg/L, Yellow $\geq$ 0.25 mg/L, Black < 0.25 mg/L

Cl₂: Red $\geq$ 1.0 mg/L, Orange $\geq$ 0.3 mg/L, Yellow $\geq$ 0.02 mg/L, Black < 0.02 mg/L

Surfactants: Red $\geq$ 1.0 mg/L, Orange $\geq$ 0.5 mg/L, Yellow $\geq$ 0.25 mg/L, Black < 0.25 mg/L (may give false positive at salinity greater than 1 ppt)

PPCP: Dark Pink $\geq$ 100x the RL; Pink $\geq$ 10x the RL; Light Pink $\geq$ 3x the RL; No Pink < 3x the RL**

**See RL values for each compound in attached Laboratory Report(s)

EPA notes while there are currently no numerical standards to compare pharmaceutical results against, it is EPA's experience that acetaminophen is the single best bacterial source tracking compound of those listed above, and any detection of this compound may indicate a source of sanitary sewage. With respect to all

of the above compounds, when a sanitary sewage source is present, depending on the type of source, distance from the sample location, and the strength of the source, concentrations of these compounds may range from the low ng/l range up to thousands of ng/L.

VII. Attachments

Photography Log (Attached below)
Laboratory Report for Pharmaceuticals and Personal Care Products (Source Tracking) Analysis
Laboratory Report for E. coli Analysis
Laboratory Report for Enterococcus Analysis
NOAA Climate Data for November 2019

Photography Log

Please note all sample locations are identical to those sampled as part of a similar inspection on 10/29/19. For a photo of each location please see that inspection report. A limited number of photos were taken on 11/20/19 to provide comparative information regarding water levels and general conditions. The 11/20/19 photographs are provided below.



Photo 1: View facing east of Alewife Brook and sample location Alewife01. Note MWRA sanitary sewer access manhole in foreground and access vault to left in photo.



Photo 2: View facing south of CAM401A outfall.



Photo 3: View of sample collection in MH01.

Date	Temperature (F)							Degree Days (base 65F)		Sun (LST)		Weather	Precipitation (in)			Pressure (inHg)		Wind	Maximum Wind Speed = MPH							
	Max	Min	Avg	Dep	ARH	ADP	AWB	Heat	Cool	Rise	Set	Weather Type	TLC	Snow Fall	Snow Depth	Avg Stn	Avg SL	Avg Speed	Direction = Degrees							
																			Peak Speed	Peak Dir	Sust. Speed	Sust. Dir				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
01	72*	44	58	8.7	54	43	53	7	0	0617	1638	RA	0.01	0.0		29.78	29.79	20.6	51	200	38	200				
02	51	39	45	-4.0	52	29	39	20	0	0618	1636		0.00	0.0		30.12	30.14	6.9	18	300	14	290				
03	57	42	50	1.3	48	30	41	15	0	0620	1635		0.00	0.0		29.99	30.03	10.0	23	280	18	280				
04	55	41	48	-0.4	47	29	41	17	0	0621	1634		0.00	0.0		30.29	30.31	8.7	21	200	17	200				
05	58	45	52	3.8	79	47	51	13	0	0622	1633	RA BR	0.40	0.0		30.16	30.18	7.8	25	300	17	300				
06	56	42	49	1.1	42	27	41	16	0	0623	1632		0.00	0.0		30.22	30.28	10.6	26	250	20	260				
07	59	40	50	2.4	58	37	45	15	0	0625	1630	RA	0.23	0.0		30.09	30.08	11.3	25	200	20	330				
08	42	30	36	-11.3	53	24	35	29	0	0626	1629		T	T		29.99	30.07	16.7	39	330	28	330				
09	41	28	35	-12.1	47	19	32	30	0	0627	1628		0.00	0.0		30.23	30.28	9.6	20	200	16	200				
10	54	33	44	-2.8	51	29	39	21	0	0628	1627		0.00	0.0		30.02	30.08	11.1	28	220	23	230				
11	54	43	49	2.5	64	37	44	16	0	0630	1626	RA	T	0.0		30.03	30.07	8.4	20	360	17	010				
12	44	26	35	-11.2	76	36	41	30	0	0631	1625	RA SN BR HZ	0.08	T		29.75	29.83	13.1	35	330	26	320				
13	33	21*	27	-18.9	44	12	27	38	0	0632	1624		0.00	0.0		30.16	30.15	16.1	33	290	25	290				
14	42	23	33	-12.6	59	24	33	32	0	0633	1623		0.00	0.0		30.39	30.34	6.9	15	190	13	180				
15	54	36	45	-0.3	49	27	38	20	0	0635	1622		0.00	0.0		30.11	30.13	13.0	30	270	22	280				
16	43	28	36	-9.0	35	10	30	29	0	0636	1621		0.00	0.0		30.38	30.30	13.3	33	340	24	340				
17	45	27	36	-8.7	62	25	33	29	0	0637	1621	RA DZ	T	0.0		30.35	30.22	13.4	26	060	22	060				
18	41	36	39	-5.4	79	33	37	26	0	0638	1620	RA DZ SN BR	0.24	T		29.82	29.83	14.0	28	010	21	360				
19	45	41	43	-1.1	84	38	41	22	0	0639	1619	RA DZ BR HZ	0.24	0.0		29.74	29.77	4.8	14	360	13	360				
20	42	39	41	-2.8	82	35	38	24	0	0641	1618	RA DZ BR	0.23	0.0		29.86	29.91	10.6	20	310	15	320				
21	51	36	44	0.5	65	32	38	21	0	0642	1617		0.00	0.0		30.03	30.08	8.4	21	310	15	310				
22	56	39	48	4.8	61	35	42	17	0	0643	1617	RA	0.09	0.0		29.70	29.72	15.6	37	290	26	300				
23	48	35	42	-0.8	40	18	33	23	0	0644	1616		0.00	0.0		29.85	29.88	9.9	27	290	21	290				
24	48	40	44	1.5	79	37	40	21	0	0645	1616	RA BR	1.51	0.0		29.31	29.38	16.4	43	010	35	020				
25	54	41	48	5.8	57	32	41	17	0	0647	1615		0.00	0.0		29.69	29.72	11.0	28	270	22	280				
26	63	40	52	10.2	60	37	44	13	0	0648	1615	BR	0.00	0.0		29.94	29.98	9.1	28	220	23	230				
27	54	40	47	5.5	81	43	46	18	0	0649	1614	RA DZ FG BR	0.20	0.0		29.72	29.85	6.2	30	250	21	250				
28	53	35	44	2.8	65	32	39	21	0	0650	1614	RA	0.14	0.0		29.63	29.71	19.5	39	330	29	320				
29	44	31	38	-2.8	52	21	32	27	0	0651	1613		0.00	0.0		30.03	30.07	17.6	35	320	26	320				
30	39	26	33	-7.5	35	6	25	32	0	0652	1613		0.00	0.0		29.92	29.95	16.1	32	330	23	320				
	49.9	35.6	42.8							Monthly Averages Totals			3.37	T		29.98	30.01	11.9								
	-1.6	-2.4	-1.9	Departure from Normal (1981-2010)									-0.62													
Degree Days												Number of days with...														
	Monthly				Season-to-date				Temperature				Precipitation			Snow		Weather								
	Total		Departure		Total		Departure		Max		Min															
Heating	667		59		940				>=90°		<=32°		<=32°		<=0°		>=0.01"		>=0.1"		>=1"		T-Storms		Heavy Fog	
Cooling	0		0		980				0		0		9		0		11		8		0					
Date of 5-sec to 3-sec wind equipment change									Sea Level Pressure						Greatest...											
2006-10-05									Maximum		30.52		Date		Time		24-Hr...				Snowfall		Snow Depth			
									Minimum		29.08		24		1554		1.51									
																							Date			
Station Augmentation														24-24				18-18								
Name:MWRA DEER ISLAND TREATMENT PLANT Lat: 42.3517 Lon: -70.9606 Elevation: N/A Distance: 2.6mi ESE Elements: SNOW Equipment: SNOWBOARD, SNOW RULER																										

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Current Location: Elev: 12 ft. Lat: 42.3606° N Lon: -71.0097° W
Station: **BOSTON, MA US WBAN: 72509014739 (KBOS)**

Local Climatological Data
Hourly Observations
November 2019
Generated on 01/08/2020

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Date	Time (LST)	Station Type	Sky Conditions	Visibility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Speed (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press. Tend	Net 3-Hr Change (inHg)	Sea Level Press. (inHg)	Report Type	Precip Total (in)	Alti-meter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
20	0054	7	BKN:07 12 OVC:08 17	10.00		42	5.6	39	3.9	36	2.2	79	7	350		29.82	5	+0.01	29.85	FM-15	0.00	29.85
20	0100	4	15	9.94		42	5.6	39	3.9	36	2.2	79	7	350		29.83	5	+0.01	29.85	FM-12		
20	0154	7	BKN:07 7 OVC:08 11	5.00	-DZ:01 BR:1 DZ DZ	41	5.0	39	3.9	37	2.8	86	9	330		29.81			29.84	FM-15	T	29.84
20	0252	6	OVC:08 10	5.00	-RA:02 BR:1 RA RA	41	5.0	39	3.9	37	2.8	87	11	350		29.81				FM-16		29.84
20	0254	7	OVC:08 10	5.00	BR:1	41	5.0	39	3.9	37	2.8	86	10	360		29.81			29.83	FM-15	T	29.84
20	0302	7	SCT:04 8 OVC:08 12	5.00	-RA:02 BR:1 RA RA	41	5.0	39	3.9	37	2.8	86	10	350		29.80				FM-16	T	29.83
20	0340	7	FEW:02 7 BKN:07 19 OVC:08 24	10.00		41	5.0	39	3.9	37	2.8	86	9	350		29.82				FM-16	T	29.85
20	0354	7	SCT:04 8 BKN:07 17 OVC:08 24	10.00		41	5.0	39	3.9	37	2.8	86	10	350		29.81	5	+0.01	29.84	FM-15	T	29.84
20	0400	4	8	9.94		41	5.0	39	3.9	37	2.8	86	10	350		29.82	5	+0.01	29.84	FM-12		
20	0416	7	SCT:04 12 OVC:08 18	6.00	-DZ:01 BR:1 DZ DZ	41	5.0	39	3.9	37	2.8	86	10	340		29.81				FM-16	T	29.84
20	0430	7	BKN:07 10 OVC:08 15	7.00	-DZ:01 DZ DZ	41	5.0	39	3.9	37	2.8	86	10	350		29.82				FM-16	T	29.85
20	0454	7	BKN:07 11 OVC:08 17	10.00		42	5.6	39	3.9	36	2.2	79	13	350		29.82			29.85	FM-15	T	29.85
20	0552	6	SCT:04 9 OVC:08 14	7.00	-DZ:01 DZ DZ	41	5.0	39	3.9	36	2.2	81	11	360		29.84				FM-16		29.87
20	0554	7	SCT:04 9 OVC:08 14	6.00	-DZ:01 DZ DZ	41	5.0	39	3.9	36	2.2	82	10	360		29.84			29.86	FM-15	T	29.87
20	0654	7	BKN:07 7 BKN:07 14 OVC:08 21	4.00	-DZ:01 BR:1 DZ DZ	41	5.0	39	3.9	36	2.2	82	13	350		29.84	1	-0.03	29.87	FM-15	T	29.87
20	0700	4	8	3.73	DZ	41	5.0	39	3.9	36	2.2	82	13	350		29.85	1	-0.03	29.87	FM-12		
20	0752	6	SCT:04 7 OVC:08 10	4.00	-DZ:01 BR:1 DZ DZ	41	5.0	39	3.9	37	2.8	87	9	350		29.85				FM-16		29.88
20	0754	7	SCT:04 7 OVC:08 10	4.00	-DZ:01 BR:1 DZ DZ	41	5.0	39	3.9	37	2.8	86	10	350		29.85			29.88	FM-15	T	29.88
20	0806	7	OVC:08 8	7.00		41	5.0	39	3.9	37	2.8	86	9	360		29.86				FM-16	T	29.89
20	0852	6	OVC:08 10	10.00		41	5.0	39	3.9	36	2.2	81	11	010		29.87				FM-16		29.90
20	0854	7	OVC:08 10	10.00		41	5.0	39	3.9	36	2.2	82	11	010		29.87			29.90	FM-15	T	29.90
20	0939	7	FEW:02 6 OVC:08 10	2.00	-RA:02 RA RA	41	5.0	39	3.9	36	2.2	82	10	010		29.88				FM-16	T	29.91
20	0952	6	FEW:02 6 BKN:07 10 OVC:08 17	1.75	-RA:02 RA RA	41	5.0	39	3.9	36	2.2	81	11	360		29.88				FM-16		29.91
20	0954	7	FEW:02 6 BKN:07 10 OVC:08 17	1.75	-RA:02 BR:1 RA RA	40	4.4	38	3.3	36	2.2	86	10	360		29.88	2	-0.04	29.91	FM-15	0.01	29.91
20	1000	4	5	1.74	RA	40	4.4	38	3.3	36	2.2	86	10	360		29.89	2	-0.04	29.91	FM-12		
20	1013	7	BKN:07 8 OVC:08 18	1.75	-DZ:01 BR:1 DZ DZ	40	4.4	38	3.3	36	2.2	86	9	350		29.88				FM-16	T	29.91
20	1052	6	BKN:07 6 OVC:08 12	2.00	-DZ:01 BR:1 DZ DZ	39	3.9	38	3.3	36	2.2	87	10	350		29.87				FM-16		29.90
20	1054	7	BKN:07 6 OVC:08 12	2.00	-DZ:01 BR:1 DZ DZ	40	4.4	38	3.3	36	2.2	86	10	340		29.87			29.90	FM-15	0.01	29.90

20	1056	7	OVC:08 10	2.00	-DZ:01 BR:1 DZ DZ	40	4.4	38	3.3	36	2.2	86	8	340		29.87				FM-16	T	29.90
20	1103	7	BKN:07 7 OVC:08 12	2.00	-DZ:01 BR:1 DZ DZ	40	4.4	38	3.3	36	2.2	86	9	340		29.87				FM-16	T	29.90
20	1120	7	OVC:08 10	3.00	-DZ:01 BR:1 DZ DZ	40	4.4	38	3.3	36	2.2	86	10	350		29.86				FM-16	T	29.89
20	1130	7	BKN:07 8 OVC:08 12	4.00	-DZ:01 BR:1 DZ DZ	40	4.4	38	3.3	36	2.2	86	10	350		29.86				FM-16	T	29.89
20	1154	7	BKN:07 8 OVC:08 39	6.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	11	350		29.86		29.89		FM-15	0.01	29.89
20	1215	7	BKN:07 10 BKN:07 16 OVC:08 37	10.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	10	350		29.86				FM-16	T	29.89
20	1252	6	SCT:04 12 BKN:07 18 OVC:08 25	10.00	-RA:02 RA RA	39	3.9	37	2.8	34	1.1	81	9	340		29.87				FM-16		29.90
20	1254	7	SCT:04 12 BKN:07 18 OVC:08 25	10.00	-RA:02 RA RA	40	4.4	37	2.8	34	1.1	79	9	340		29.87	5	+0.01	29.90	FM-15	0.03	29.90
20	1300	4	15	9.94	RA	40	4.4	37	2.8	34	1.1	79	9	340		29.88	5	+0.01	29.90	FM-12		
20	1325	7	FEW:02 9 BKN:07 23 OVC:08 31	7.00	-RA:02 RA RA	39	3.9	37	2.8	34	1.1	82	8	350		29.87				FM-16	0.02	29.90
20	1343	6	FEW:02 7 BKN:07 11 OVC:08 23	7.00	-RA:02 RA RA	39	3.9	37	2.8	34	1.1	82	8	340		29.87				FM-16		29.90
20	1354	7	FEW:02 7 BKN:07 11 OVC:08 23	6.00	-RA:02 RA RA	40	4.4	37	2.8	34	1.1	79	10	330		29.87		29.90		FM-15	0.05	29.90
20	1454	7	FEW:02 7 BKN:07 10 OVC:08 35	8.00	-RA:02 RA RA	40	4.4	37	2.8	34	1.1	79	8	340		29.88		29.91		FM-15	0.02	29.91
20	1511	7	SCT:04 9 BKN:07 23 OVC:08 31	8.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	10	350		29.88				FM-16	T	29.91
20	1545	7	SCT:04 8 BKN:07 14 OVC:08 25	8.00	-RA:02 RA RA	41	5.0	38	3.3	35	1.7	79	9	350		29.88				FM-16	0.02	29.91
20	1554	7	SCT:04 8 BKN:07 12 OVC:08 25	8.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	11	350		29.89	3	-0.01	29.91	FM-15	0.02	29.92
20	1600	4	8	7.46	RA	40	4.4	38	3.3	35	1.7	83	11	350		29.90	3	-0.01	29.91	FM-12		
20	1619	7	FEW:02 7 SCT:04 14 OVC:08 20	8.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	11	350		29.89				FM-16	0.01	29.92
20	1654	7	FEW:02 8 SCT:04 14 OVC:08 23	8.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	10	350		29.91		29.93		FM-15	0.03	29.94
20	1754	7	FEW:02 6 BKN:07 16 OVC:08 23	9.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	8	350		29.92		29.95		FM-15	0.03	29.95
20	1810	7	FEW:02 6 BKN:07 10 OVC:08 24	9.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	10	330		29.93				FM-16	T	29.96
20	1854	7	FEW:02 7 BKN:07 12 OVC:08 40	9.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	10	330		29.93	1	-0.05	29.96	FM-15	0.02	29.96
20	1900	4	8	8.70	RA	40	4.4	38	3.3	35	1.7	83	10	330		29.94	1	-0.05	29.96	FM-12		
20	1935	7	BKN:07 8 OVC:08 14	9.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	10	330		29.94				FM-16	T	29.97
20	1954	7	BKN:07 9 OVC:08 14	10.00	-RA:02 RA RA	40	4.4	38	3.3	35	1.7	83	9	320		29.95		29.97		FM-15	T	29.98
20	2036	7	SCT:04 9 OVC:08 12	10.00	-RA:02 RA RA	40	4.4	37	2.8	34	1.1	79	10	330		29.96				FM-16	T	29.99
20	2054	7	SCT:04 9 BKN:07 12 OVC:08 21	10.00	-RA:02 RA RA	40	4.4	37	2.8	34	1.1	79	13	320		29.96		29.99		FM-15	T	29.99

20	2123	7	FEW:02 5 BKN:07 9 OVC:08 17	10.00	-RA:02 RA RA	40	4.4	37	2.8	34	1.1	79	13	310		29.97				FM-16	T	30.00
20	2152	6	BKN:07 10 BKN:07 17 OVC:08 90	10.00		39	3.9	37	2.8	34	1.1	81	10	310		29.97				FM-16		30.00
20	2154	7	BKN:07 10 BKN:07 17 OVC:08 90	10.00		40	4.4	37	2.8	34	1.1	79	10	310		29.97	1	-0.04	30.00	FM-15	T	30.00
20	2200	4	15	9.94		40	4.4	37	2.8	34	1.1	79	10	310		29.98	1	-0.04	30.00	FM-12		
20	2226	7	SCT:04 11 BKN:07 24 OVC:08 65	10.00		40	4.4	37	2.8	34	1.1	79	10	310		29.98				FM-16		30.01
20	2239	7	SCT:04 13 BKN:07 60 OVC:08 85	10.00		39	3.9	37	2.8	33	0.6	79	11	320		29.97				FM-16		30.00
20	2254	7	FEW:02 25 BKN:07 70 OVC:08 85	10.00		39	3.9	37	2.8	33	0.6	79	13	310		29.97			30.00	FM-15	0.00	30.00
20	2354	7	FEW:02 25 BKN:07 42 BKN:07 160	10.00		39	3.9	36	2.2	32	0.0	76	13	320		29.98			30.01	FM-15	0.00	30.01

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Current Location: Elev: 12 ft. Lat: 42.3606° N Lon: -71.0097° W
Station: **BOSTON, MA US WBAN: 72509014739 (KBOS)**

Local Climatological Data
Hourly Remarks
November 2019
Generated on 01/08/2020

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Date	Time (LST)	Remarks
20	0054	MET12611/20/19 00:54:02 METAR KBOS 200554Z 35006KT 10SM BKN012 OVC017 06/02 A2985 RMK AO2 SLP107 T00560022 10067 20056 55004 \$ (ETM)
20	0100	SYN08072509 32466 83506 10056 20022 30101 40107 55004 90554 333 10067 20050 555 92006=
20	0154	MET12611/20/19 01:54:02 METAR KBOS 200654Z 33008KT 5SM -DZ BR BKN007 OVC011 05/03 A2984 RMK AO2 DZB29 SLP105 P0000 T00500028 \$ (ETM)
20	0252	MET11211/20/19 02:52:02 SPECI KBOS 200752Z 35010KT 5SM -RA BR OVC010 05/03 A2984 RMK AO2 DZE51RAB51 P0000 \$ FIBI (ETM)
20	0254	MET12311/20/19 02:54:02 METAR KBOS 200754Z 36009KT 5SM BR OVC010 05/03 A2984 RMK AO2 DZE51RAB51E54 SLP103 P0000 T00500028 \$ (ETM)
20	0302	MET12111/20/19 03:02:02 SPECI KBOS 200802Z 35009KT 5SM -RA BR SCT008 OVC012 05/03 A2983 RMK AO2 RAB0756 P0000 T00500028 \$ (ETM)
20	0340	MET12511/20/19 03:40:02 SPECI KBOS 200840Z 35008KT 10SM FEW007 BKN019 OVC024 05/03 A2985 RMK AO2 RAB0756E21 P0000 T00500028 \$ (ETM)
20	0354	MET14411/20/19 03:54:02 METAR KBOS 200854Z 35009KT 10SM SCT008 BKN017 OVC024 05/03 A2984 RMK AO2 RAB0756E21 SLP105 P0000 60000 T00500028 55002 \$ (ETM)
20	0400	SYN07072509 12366 83509 10050 20028 30097 40105 55002 69907 90854 555 92009=
20	0416	MET11911/20/19 04:16:02 SPECI KBOS 200916Z 34009KT 6SM -DZ BR SCT012 OVC018 05/03 A2984 RMK AO2 DZB09 P0000 T00500028 \$ (ETM)
20	0430	MET11611/20/19 04:30:02 SPECI KBOS 200930Z 35009KT 7SM -DZ BKN010 OVC015 05/03 A2985 RMK AO2 DZB09 P0000 T00500028 \$ (ETM)
20	0454	MET12311/20/19 04:54:02 METAR KBOS 200954Z 35011KT 10SM BKN011 OVC017 06/02 A2985 RMK AO2 DZB09E49 SLP108 P0000 T00560022 \$ (ETM)
20	0552	MET11011/20/19 05:52:02 SPECI KBOS 201052Z 36010KT 7SM -DZ SCT009 OVC014 05/02 A2987 RMK AO2 DZB46 P0000 \$ FIBI (DH)
20	0554	MET12211/20/19 05:54:02 METAR KBOS 201054Z 36009KT 6SM -DZ SCT009 OVC014 05/02 A2987 RMK AO2 DZB46 SLP113 P0000 T00500022 \$ (DH)
20	0654	MET15611/20/19 06:54:02 METAR KBOS 201154Z 35011KT 4SM -DZ BR BKN007 BKN014 OVC021 05/02 A2987 RMK AO2 SLP115 P0000 60000 70017 T00500022 10056 20050 51010 \$ (DH)
20	0700	SYN10472509 11356 83511 10050 20022 30107 40115 51010 69901 751// 91154 333 10072 20050 70043 96010 555 92012=
20	0752	MET10711/20/19 07:52:02 SPECI KBOS 201252Z 35008KT 4SM -DZ BR SCT007 OVC010 05/03 A2988 RMK AO2 P0000 \$ FIBI (DH)
20	0754	MET11911/20/19 07:54:02 METAR KBOS 201254Z 35009KT 4SM -DZ BR SCT007 OVC010 05/03 A2988 RMK AO2 SLP118 P0000 T00500028 \$ (DH)
20	0806	MET10411/20/19 08:06:02 SPECI KBOS 201306Z 36008KT 7SM OVC008 05/03 A2989 RMK AO2 DZE01 P0000 T00500028 \$ (DH)
20	0852	MET10011/20/19 08:52:02 SPECI KBOS 201352Z 01010KT 10SM OVC010 05/02 A2990 RMK AO2 DZE01 P0000 \$ FIBI (DH)
20	0854	MET11211/20/19 08:54:02 METAR KBOS 201354Z 01010KT 10SM OVC010 05/02 A2990 RMK AO2 DZE01 SLP125 P0000 T00500022 \$ (DH)
20	0939	MET12511/20/19 09:39:02 SPECI KBOS 201439Z 01009KT 2SM -RA FEW006 OVC010 05/02 A2991 RMK AO2 TWR VIS 3 RAB06 P0000 T00500022 \$ (DH)
20	0952	MET11911/20/19 09:52:02 SPECI KBOS 201452Z 36010KT 1 3/4SM -RA FEW006 BKN010 OVC017 05/02 A2991 RMK AO2 RAB06 P0001 FIBI (DH)
20	0954	MET14611/20/19 09:54:02 METAR KBOS 201454Z 36009KT 1 3/4SM -RA BR FEW006 BKN010 OVC017 04/02 A2991 RMK AO2 RAB06 SLP128 P0001 60001 T00440022 52013 (DH)
20	1000	SYN08672509 11228 83609 10044 20022 30121 40128 52013 69937 761// 91454 333 96010 555 92015=
20	1013	MET12511/20/19 10:13:02 SPECI KBOS 201513Z 35008KT 1 3/4SM -DZ BR BKN008 OVC018 04/02 A2991 RMK AO2 RAE09DZB09 P0000 T00440022 (DH)
20	1052	MET11611/20/19 10:52:02 SPECI KBOS 201552Z 35009KT 2SM -DZ BR BKN006 OVC012 04/02 A2990 RMK AO2 RAE09DZB09 P0001 FIBI (DH)
20	1054	MET12811/20/19 10:54:02 METAR KBOS 201554Z 34009KT 2SM -DZ BR BKN006 OVC012 04/02 A2990 RMK AO2 RAE09DZB09 SLP125 P0001 T00440022 (DH)
20	1056	MET10311/20/19 10:56:02 SPECI KBOS 201556Z 34007KT 2SM -DZ BR OVC010 04/02 A2990 RMK AO2 P0000 T00440022 (DH)
20	1103	MET11011/20/19 11:03:02 SPECI KBOS 201603Z 34008KT 2SM -DZ BR BKN007 OVC012 04/02 A2990 RMK AO2 P0000 T00440022 (DH)
20	1120	MET10311/20/19 11:20:02 SPECI KBOS 201620Z 35009KT 3SM -DZ BR OVC010 04/02 A2989 RMK AO2 P0000 T00440022 (DH)
20	1130	MET11011/20/19 11:30:02 SPECI KBOS 201630Z 35009KT 4SM -DZ BR BKN008 OVC012 04/02 A2989 RMK AO2 P0000 T00440022 (DH)
20	1154	MET12511/20/19 11:54:02 METAR KBOS 201654Z 35010KT 6SM -RA BKN008 OVC039 04/02 A2989 RMK AO2 DZE50RAB50 SLP121 P0001 T00440017 (DH)
20	1215	MET11511/20/19 12:15:02 SPECI KBOS 201715Z 35009KT 10SM -RA BKN010 BKN016 OVC037 04/02 A2989 RMK AO2 P0000 T00440017 (DH)
20	1252	MET12011/20/19 12:52:02 SPECI KBOS 201752Z 34008KT 10SM -RA SCT012 BKN018 OVC025 04/01 A2990 RMK AO2 CIG 010 E P0002 FIBI (DH)
20	1254	MET15611/20/19 12:54:02 METAR KBOS 201754Z 34008KT 10SM -RA SCT012 BKN018 OVC025 04/01 A2990 RMK AO2 CIG 010 E SLP124 P0003 60006 T00440011 10050 20044 55004 (DH)
20	1300	SYN09272509 11466 83408 10044 20011 30118 40124 55004 60021 761// 91754 333 10056 20044 555 92018=
20	1325	MET12411/20/19 13:25:02 SPECI KBOS 201825Z 35007KT 7SM -RA FEW009 BKN023 OVC031 04/01 A2990 RMK AO2 CIG 010 E P0002 T00390011 (DH)
20	1343	MET11411/20/19 13:43:02 SPECI KBOS 201843Z 34007KT 7SM -RA FEW007 BKN011 OVC023 04/01 A2990 RMK AO2 P0004 T00390011 (DH)
20	1354	MET12211/20/19 13:54:02 METAR KBOS 201854Z 33009KT 6SM -RA FEW007 BKN011 OVC023 04/01 A2990 RMK AO2 SLP125 P0004 T00440011 (HGC)
20	1454	MET12211/20/19 14:54:02 METAR KBOS 201954Z 34007KT 8SM -RA FEW007 BKN010 OVC035 04/01 A2991 RMK AO2 SLP127 P0003 T00440011 (HGC)
20	1511	MET11511/20/19 15:11:02 SPECI KBOS 202011Z 35009KT 8SM -RA SCT009 BKN023 OVC031 04/02 A2991 RMK AO2 P0000 T00440017 (HGC)
20	1545	MET11511/20/19 15:45:02 SPECI KBOS 202045Z 35008KT 8SM -RA SCT008 BKN014 OVC025 05/02 A2991 RMK AO2 P0002 T00500017 (HGC)
20	1554	MET13411/20/19 15:54:02 METAR KBOS 202054Z 35010KT 8SM -RA SCT008 BKN012 OVC025 04/02 A2992 RMK AO2 SLP130 P0002 60009 T00440017 53005 (HGC)
20	1600	SYN07672509 11362 83510 10044 20017 30124 40130 53005 60027 761// 92054 555 92021=
20	1619	MET11511/20/19 16:19:02 SPECI KBOS 202119Z 35010KT 8SM -RA FEW007 SCT014 OVC020 04/02 A2992 RMK AO2 P0001 T00440017 (HGC)
20	1654	MET12211/20/19 16:54:02 METAR KBOS 202154Z 35009KT 8SM -RA FEW008 SCT014 OVC023 04/02 A2994 RMK AO2 SLP136 P0002 T00440017 (HGC)
20	1754	MET12211/20/19 17:54:02 METAR KBOS 202254Z 35007KT 9SM -RA FEW006 BKN016 OVC023 04/02 A2995 RMK AO2 SLP142 P0004 T00440017 (HGC)
20	1810	MET11511/20/19 18:10:02 SPECI KBOS 202310Z 33009KT 9SM -RA FEW006 BKN010 OVC024 04/02 A2996 RMK AO2 P0000 T00440017 (HGC)
20	1854	MET14611/20/19 18:54:02 METAR KBOS 202354Z 33009KT 9SM -RA FEW007 BKN012 OVC040 04/02 A2996 RMK AO2 SLP146 P0002 60017 T00440017 10050 20039 51016 (HGC)

20	1900	SYN09272509 11364 83309 10044 20017 30138 40146 51016 60041 761// 92354 333 10050 20039 555 92100=
20	1935	MET10811/20/19 19:35:03 SPECI KBOS 210035Z 33009KT 9SM -RA BKN008 OVC014 04/02 A2997 RMK AO2 P0000 T00440017 (HGC)
20	1954	MET11611/20/19 19:54:03 METAR KBOS 210054Z 32008KT 10SM -RA BKN009 OVC014 04/02 A2998 RMK AO2 SLP150 P0000 T00440017 (HGC)
20	2036	MET10911/20/19 20:36:03 SPECI KBOS 210136Z 33009KT 10SM -RA SCT009 OVC012 04/01 A2999 RMK AO2 P0000 T00440011 (HGC)
20	2054	MET12311/20/19 20:54:03 METAR KBOS 210154Z 32011KT 10SM -RA SCT009 BKN012 OVC021 04/01 A2999 RMK AO2 SLP156 P0000 T00440011 (HGC)
20	2123	MET11611/20/19 21:23:03 SPECI KBOS 210223Z 31011KT 10SM -RA FEW005 BKN009 OVC017 04/01 A3000 RMK AO2 P0000 T00440011 (HGC)
20	2152	MET12111/20/19 21:52:03 SPECI KBOS 210252Z 31009KT 10SM BKN010 BKN017 OVC090 04/01 A3000 RMK AO2 RAE33DZB34E49 P0000 FIBI (ETM)
20	2154	MET14511/20/19 21:54:03 METAR KBOS 210254Z 31009KT 10SM BKN010 BKN017 OVC090 04/01 A3000 RMK AO2 RAE33DZB34E49 SLP158 P0000 60000 T00440011 51012 (ETM)
20	2200	SYN07072509 12466 83109 10044 20011 30151 40158 51012 69907 90254 555 92103=
20	2226	MET10611/20/19 22:26:03 SPECI KBOS 210326Z 31009KT 10SM SCT011 BKN024 OVC065 04/01 A3001 RMK AO2 T00440011 (ETM)
20	2239	MET10611/20/19 22:39:03 SPECI KBOS 210339Z 32010KT 10SM SCT013 BKN060 OVC085 04/01 A3000 RMK AO2 T00390006 (ETM)
20	2254	MET11311/20/19 22:54:03 METAR KBOS 210354Z 31011KT 10SM FEW025 BKN070 OVC085 04/01 A3000 RMK AO2 SLP159 T00390006 (ETM)
20	2354	MET12311/20/19 23:54:03 METAR KBOS 210454Z 32011KT 10SM FEW025 BKN042 BKN160 04/00 A3001 RMK AO2 SLP162 T00390000 400560039 (ETM)

Local Climatological Data
Hourly Precipitation
November 2019
Generated on 01/08/2020

Date	For Hour (LST) Ending at																								Date	
	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	NOON	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	MID		
01	T	T	T	T	0.01	T														M	M	M	M	M	01	
02																									02	
03																							M	M	03	
04	M																								04	
05			M		T	T		T		T	0.01	0.01		0.04	0.26	0.07	0.01								05	
06						M																M			06	
07										M	M					T	0.01	0.04	0.08	0.05	0.03	T	0.02	T	07	
08													T							M	M	M	M	M	08	
09																				M	M	M	M	M	09	
10																				M	M	M	M	M	10	
11																		T	T	M	T	M			11	
12		M	M							T	T	0.02	0.03	0.03	T	T	T			M	M	M	M	M	12	
13																				M	M	M	M	M	13	
14																				M	M	M	M	M	14	
15																				M	M	M	M		15	
16														M	M								M	M	16	
17		M							M					T	T	T	T								17	
18				T	T	0.01	T	T	T	T		T	0.05	0.07	0.05	0.03	0.02	0.01	T						18	
19						0.03	0.05	0.09	0.04		T	0.01	0.01	0.01	T	T									19	
20		T	T	T	T	T	T	T	T	0.01	0.01	0.01	0.03	0.05	0.02	0.02	0.03	0.03	0.02	T	T	T			20	
21																								M	21	
22		0.01			T	T								T	0.05	M	T								22	
23																									23	
24	M	M	M	0.02	0.03	0.02	0.02	0.06	0.11	0.10	0.19	0.22	0.21	0.26	0.20	T	T	0.01	0.04	0.01	0.01	T	T	M	24	
25																									25	
26																								M	26	
27																	T	0.02	0.01	0.11	0.06				27	
28				0.01	T	0.05	0.02	0.03	0.02		T	T	0.01	T											28	
29																								M	29	
30																									30	
Maximum Short Duration Precipitation																										
Time Period (Minutes)				5		10		15		20		30		45		60		80		100		120		150		180
Precipitation (inches)				0.10		0.16		0.21		0.24		0.32		0.38		0.40		0.43		0.50		0.55		0.71		0.80
Ending Date Time (yyyy-mm-dd hh:mi)				2019-11-24 13:56		2019-11-24 13:58		2019-11-24 13:58		2019-11-24 13:58		2019-11-24 14:12		2019-11-24 14:17		2019-11-24 14:27		2019-11-24 14:27		2019-11-24 14:12		2019-11-24 14:20		2019-11-24 14:09		2019-11-24 14:27

Hourly, daily, and monthly totals on the Daily Summary page and the Hourly Precipitation Table are shown as reported by the instrumentation at the site. However, NWS does not edit hourly values for its ASOS sites, but may edit the daily and monthly totals for selected sites which will be reflected on the Daily Summary page.

T = Trace
s = Suspect
* = Erroneous
blank = No precipitation observed
M = Missing



United States Environmental Protection Agency
Laboratory Services and Applied Science Division
11 Technology Drive
North Chelmsford, MA 01863-2431

Microbiology Laboratory Report

December 19, 2019

Todd Borci - Mail Code 04-4
US EPA New England R1

Project Number: 19110031
Project: NPDES Workshop
Analysis: Enterococcus in Water
Analyst: Jack Paar

Date Samples Received by the Laboratory: 11/20/2019

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA LSASD SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, ECA Enterolert3.

Sample preparation and analysis was done following the EPA Region I method: Enterococcus by Defined Substrate

Data were reviewed in accordance with the internal verification procedures described in the EPA New England LSASD Biology QA Plan.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8604.

Sincerely,

Jack A. Paar, III
Biology Laboratory Manager

19110031ENTERO

**Water Microbiology Laboratory
Data Qualifier Codes**

J = Estimate
H = Exceeds holding time
I = Exceeds incubation time
At = Atypical overgrowth
S = Lost sample
V = Insufficient sample volume
TNTC = Too numerous to count
MB = Media blank
+++ = Positive control
- - - = Negative control
SP = Spiked Sample
L = Estimated, result below reporting limit (RL)
ND = Not Detected, result less than RL
D = Lab Duplicate
P = Plate counts outside preferred range
FDUP = Field Duplicate collect time not specified on Chain of Custody. Field duplicate
LIMS default time = 12:00AM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION 1 - NEW ENGLAND
 LABORATORY SERVICES BRANCH
NPDES Workshop
Enterococcus in Water

Matrix: Water

Sample Number	Lab ID	Date of Collection	Date of Analysis	Compound	Concentration MPN/100mL	RL MPN/100mL	Qualifier
Alewife 01	AB84002	11/20/19 9:40 am	11/20/19 1:30 pm	Enterococcus in Water	650	10	
Cam 401A	AB84003	11/20/19 9:50 am	11/20/19 1:30 pm	Enterococcus in Water	738	10	
Cam 401A2	AB84004	11/20/19 9:50 am	11/20/19 1:30 pm	Enterococcus in Water	675	10	
MH01	AB84005	11/20/19 10:15 am	11/20/19 1:30 pm	Enterococcus in Water	581	10	
MH02	AB84006	11/20/19 10:30 am	11/20/19 1:30 pm	Enterococcus in Water	301	10	
MH03	AB84007	11/20/19 11:00 am	11/20/19 1:30 pm	Enterococcus in Water	798	10	

Number of Samples: 6



REGION 1

CHAIN OF CUSTODY RECORD

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United States Environmental Protection Agency
Laboratory Services and Applied Science Division
11 Technology Drive
North Chelmsford, MA 01863-2431

Microbiology Laboratory Report

December 19, 2019

Todd Borci - Mail Code 04-4
US EPA New England R1

Project Number: 19110031
Project: NPDES Workshop
Analysis: E. Coli Defined Substrate
Analyst: Jack Paar

Date Samples Received by the Laboratory: 11/20/2019

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA LSASD SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, TC/ECColilert4.

Sample preparation and analysis was done following the EPA Region I method: Total Coliform/E. coli by Defined Substrate.

Data were reviewed in accordance with the internal verification procedures described in the EPA New England LSASD Biology QA Plan.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8604.

Sincerely,

Jack A. Paar, III
Biology Laboratory Manager

19110031ECMM

Water Microbiology Laboratory Data Qualifier Codes

J = Estimate
H = Exceeds holding time
I = Exceeds incubation time
At = Atypical overgrowth
S = Lost sample
V = Insufficient sample volume
TNTC = Too numerous to count
MB = Media blank
+++ = Positive control
- - - = Negative control
SP = Spiked Sample
L = Estimated, result below reporting limit (RL)
ND = Not Detected, result less than RL
D = Lab Duplicate
P = Plate counts outside preferred range
FDUP = Field Duplicate collect time not specified on Chain of Custody. Field duplicate
LIMS default time = 12:00AM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION 1 - NEW ENGLAND
 LABORATORY SERVICES BRANCH
NPDES Workshop
E. Coli Defined Substrate

Matrix: Water

Sample Number	Lab ID	Date of Collection		Date of Analysis		Compound	Concentration MPN/100 mL	RL MPN/100 mL	Qualifier
Alewife 01	AB84002	11/20/19	9:40 am	11/20/19	1:30 pm	E. Coli Defined Substrate	2908	4	
Cam 401A	AB84003	11/20/19	9:50 am	11/20/19	1:30 pm	E. Coli Defined Substrate	2190	4	
Cam 401A2	AB84004	11/20/19	9:50 am	11/20/19	1:30 pm	E. Coli Defined Substrate	1642	4	
MH01	AB84005	11/20/19	10:15 am	11/20/19	1:30 pm	E. Coli Defined Substrate	>9678	4	
MH02	AB84006	11/20/19	10:30 am	11/20/19	1:30 pm	E. Coli Defined Substrate	1164	4	
MH03	AB84007	11/20/19	11:00 am	11/20/19	1:30 pm	E. Coli Defined Substrate	6932	4	

Number of Samples: 6



CHAIN OF CUSTODY RECORD

[illegible]



Laboratory Report

December 03, 2019

Todd Borci - Mail Code 04-4
US EPA New England R1

Project Number: 19110030
Project: NPDES Workshop
Analysis: HPLC/MS/MS Source Tracking Analysis
EPA Chemist: Peter Philbrook

Date Samples Received by the Laboratory: 11/20/2019

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, EIA-LCMS STA.1.

The SOP is based on an EPA Regional Analytical Method developed at the EPA New England Laboratory.

Data were reviewed in accordance with the internal verification procedures described in the EPA New England Quality Manual for NERL.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8340 .

Sincerely,

Digitally signed by DANIEL BOUDREAU
DN: c=US, o=U.S. Government, ou=Environmental
Protection Agency, cn=DANIEL BOUDREAU,
0.9.2342.19200300.100.1.1=68001003654558
Date: 2019.12.03 15:21:21 -05'00'

19110030\$STA

Qualifiers:

RL = Reporting limit

ND = Not Detected above Reporting limit

NA = Not Applicable due to high sample dilutions or sample interferences

NC = Not calculated since analyte concentration is ND.

J = Estimated value

J1 = Estimated value due to MS recovery outside acceptance criteria

J2 = Estimated value due to LFB result outside acceptance criteria

J3 = Estimated value due to RPD result outside acceptance criteria

J4 = Estimated value due to LCS result outside acceptance criteria

E = Estimated value exceeds the calibration range

L = Estimated value is below the calibration range

B = Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 10 times the concentration in the blank.

R = No recovery was calculated since the analyte concentration is greater than four times the spike level.

P = The confirmation value exceeded 35% difference and is less than 100%. The lower value is reported.

C = The identification has been confirmed by GC/MS.

A = Suspected Aldol condensation product.

N = Tentatively identified compound.

NPDES Workshop

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Alewife 1	Lab Sample ID:	AB83997
Date of Collection:	11/20/2019	Matrix:	Water
Date of Preparation:	11/25/2019	Amount Prepared:	500 mL
Date of Analysis:	11/25/2019	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	35	1	0.40	
103-90-2	Acetaminophen	130	1	2.0	
611-59-6	Paraxanthine	60	1	2.0	
29122-68-7	Atenolol	14	1	2.0	
58-08-2	Caffeine	960	5	20	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	62	59 - 137
Diphenhydramine-D3	34	19 - 135

Comments:

NPDES Workshop

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: CAM401A
Date of Collection: 11/20/2019
Date of Preparation: 11/25/2019
Date of Analysis: 11/25/2019
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AB83998
Matrix: Water
Amount Prepared: 500 mL
Percent Solids: N/A
Extract Dilution: 1
pH: N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	37	1	0.40	
103-90-2	Acetaminophen	150	1	2.0	
611-59-6	Paraxanthine	63	1	2.0	
29122-68-7	Atenolol	18	1	2.0	
58-08-2	Caffeine	910	5	20	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	0.63	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	82	59 - 137
Diphenhydramine-D3	51	19 - 135

Comments:

NPDES Workshop

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	MH01	Lab Sample ID:	AB83999
Date of Collection:	11/20/2019	Matrix:	Water
Date of Preparation:	11/25/2019	Amount Prepared:	500 mL
Date of Analysis:	11/25/2019	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	36	1	0.40	
103-90-2	Acetaminophen	150	1	2.0	
611-59-6	Paraxanthine	74	1	2.0	
29122-68-7	Atenolol	18	1	2.0	
58-08-2	Caffeine	800	5	20	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	0.55	1	0.40	
298-46-4	Carbamazepine	0.55	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	77	59 - 137
Diphenhydramine-D3	45	19 - 135

Comments:

NPDES Workshop

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	MH02	Lab Sample ID:	AB84000
Date of Collection:	11/20/2019	Matrix:	Water
Date of Preparation:	11/25/2019	Amount Prepared:	500 mL
Date of Analysis:	11/25/2019	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	34	1	0.40	
103-90-2	Acetaminophen	54	1	2.0	
611-59-6	Paraxanthine	80	1	2.0	
29122-68-7	Atenolol	91	1	2.0	
58-08-2	Caffeine	440	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	0.52	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	71	59 - 137
Diphenhydramine-D3	36	19 - 135

Comments:

NPDES Workshop

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	MH03	Lab Sample ID:	AB84001
Date of Collection:	11/20/2019	Matrix:	Water
Date of Preparation:	11/25/2019	Amount Prepared:	500 mL
Date of Analysis:	11/25/2019	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	51	1	0.40	
103-90-2	Acetaminophen	85	1	2.0	
611-59-6	Paraxanthine	150	1	2.0	
29122-68-7	Atenolol	190	1	2.0	
58-08-2	Caffeine	340	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	73	59 - 137
Diphenhydramine-D3	43	19 - 135

Comments:

NPDES Workshop

Laboratory Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Water
Date of Preparation:	11/25/2019	Amount Prepared:	500 mL
Date of Analysis:	11/25/2019	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	ND	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	ND	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	ND	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	84	59 - 137
Diphenhydramine-D3	72	19 - 135

Comments:

NPDES Workshop

MATRIX SPIKE (MS) RECOVERY

Sample ID: AB84001

PARAMETER	SPIKE ADDED ng/L	SAMPLE CONCENTRATION ng/L	MS CONCENTRATION ng/L	MS % REC	QC LIMITS (% REC)
Acetaminophen	120	85.0	171	72	61 - 100
Atenolol	120	189	270	68	59 - 122
Caffeine	240	343	466	51	54 - 128
Carbamazepine	24.0	ND	16.2	68	61 - 120
Cotinine	24.0	51.0	68	72	48 - 124
Diphenhydramine	24.0	ND	5.8	24	30 - 130
Metoprolol	120	ND	65	54	59 - 128
Paraxanthine	120	146	234	73	42 - 125

NPDES Workshop

Laboratory Duplicate Results

Sample ID: AB84000

PARAMETER	SAMPLE RESULT ng/L	SAMPLE DUPLICATE RESULT ng/L	PRECISION RPD %	QC LIMITS
Acetaminophen	54.0	56.4	4.7	50
Atenolol	91.0	93.9	3.4	50
Caffeine	443	343	25	50
Carbamazepine	ND	ND	NC	50
Cotinine	34.0	35.3	5.2	50
Diphenhydramine	0.523	ND	ND	50
Metoprolol	ND	ND	NC	50
Paraxanthine	80.0	83.2	3.9	50

NPDES Workshop

Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ng/L	LFB RESULT ng/L	LFB RECOVERY %	QC LIMITS %
Acetaminophen	120	94.8	79	53 - 105
Atenolol	120	109	91	62 - 117
Caffeine	240	153	64	50 - 127
Carbamazepine	24	22.0	92	28 - 126
Cotinine	24	21.8	91	52 - 134
Diphenhydramine	24	12.2	51	30 - 130
Metoprolol	120	80.7	67	33 - 139
Paraxanthine	120	114	95	61 - 113

Comments:

Samples in Batch: AB83997, AB83998, AB83999, AB84000, AB84001



Page 12 of 12

CHAIN OF CUSTODY RECORD

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