



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

Laboratory Services and Applied Science Division

11 Technology Drive

North Chelmsford, Massachusetts 01863-2431

Drafted Date: September 1, 2021

Finalized Date: October 22, 2021

Subject: Reconnaissance and Sampling Inspection Report
Clean Water Act – National Pollutant Discharge Elimination System (NPDES)
City of Lynn, MA

From: Michelle Coombs, Inspector \MRC\
Field Services Branch (FSB)
Laboratory Services and Applied Science Division (LSASD)

Reviewed By: Jerome Keefe, Investigations Team Leader, LSASD-FSB \JCK\
Jerome Keefe, Investigations Team Leader, LSASD-FSB

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

CC: Douglas Koopman, Inspector, ECAD-EWC

I. Facility Information

- A. Facility Name:* Lynn Water and Sewer Commission
- B. Facility Location:* 400 Parkland Avenue, Lynn, MA 01905
- C. Facility Contact:* Daniel F. O'Neill, Executive Director
(781)596-2400, doneill@lynnwatersewer.org
- D. NPDES Permit ID:* MAR041044 (MS4)

II. Background Information

- A. Date/Start time of recon inspection:* August 31, 2021/08:45 HRS
- B. Weather conditions:* Partly cloudy, ~70°F
- C. USEPA Representatives:* Michelle Coombs & Shannon Brunelle (FSB)
- D. State/Local Representatives:* None
- E. Date/Start time of sampling inspection:* September 8, 2021/07:30 HRS
- F. Weather conditions:* Partly cloudy, ~65°F
- G. USEPA Representatives:* Michelle Coombs and Rachel Olugbemi (ECAD)
- H. State/Local Representatives:* None
- I. Federally Enforceable Requirements Investigated:*
Stormwater discharges and certain non-stormwater discharges from the City of Lynn (the City's) Municipal Separate Storm Sewer System (MS4) are authorized by the NPDES General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (hereinafter, the Permit), issued by the Environmental Protection Agency (EPA) Region 1. The City obtained coverage under the Permit with NPDES Permit ID MAR041044.

J. Pollutants Sampled: Pharmaceuticals and Personal Care Products (PPCPs), E. coli/Enterococcus, Ammonia (nitrogen), 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(s)

The purpose of the reconnaissance inspection was to locate stormwater outfalls, associated manholes, and/or catch basins which discharge into the Lynn Harbor, Flax Pond, Sluice Pond, and the Saugus River, while noting appearance, presence of flow, and access requirements for one or more sampling inspections.

The purpose of the compliance sampling inspection was to identify potential illicit connections or illegal discharges within the City of Lynn MS4 and Combined Sewer System that may adversely impact the water quality in the Lynn Harbor, Flax Pond, Sluice Pond, and the Saugus River. Samples were collected from six (6) locations in accordance with the FSB Investigations Team Stormwater Program Plan. Sample sites were identified during a reconnaissance inspection conducted on August 31, 2021.

V. Permittee Details

The City of Lynn occupies approximately 13.5 square miles in Essex County, MA, approximately 10 miles northeast of Boston, MA. The City shares borders with the municipalities of Nahant to the south, Swampscott to the east, Salem to the northeast, Peabody to the north, Lynnfield to the northwest, Saugus to the west and Revere to the southeast. According to the 2010 U.S. Census, the population of City was 90,329. There are four (4) CSOs permitted to discharge into the receiving waters of Lynn Harbor, Stacey Brook, and the Saugus River. Lynn Harbor, Flax Pond, Sluice Pond, and the Saugus River are listed as MS4 receiving waters in the City Notice of Intent (NOI) for coverage under the MS4 permit.

VI. 08/31/2021 Reconnaissance Inspection Summary

On August 31, 2021, EPA inspectors Michelle Coombs and Shannon Brunelle conducted an unannounced reconnaissance inspection of the City of Lynn, MA MS4. They were not accompanied by any city or state representatives. The inspection started at Sluice Pond at approximately 08:45 HRS. At the time of the inspection, the weather was partly cloudy with an ambient temperature of approximately 70°F.

According to the National Weather Service for the Beverly Municipal Airport (KBVY), the last precipitation event prior to the inspection occurred on Sunday, 08/29/2021, with 0.02 inches recorded.

None of the locations visited during the reconnaissance inspection were field screened with the test kits or the YSI water quality meter. Locations visited were noted for appearance, presence of flow, and access requirements.

VII. 09/08/2021 Sampling Inspection Summary

On September 8, 2021, EPA inspectors Michelle Coombs and Rachel Olugbemi conducted an unannounced compliance sampling inspection of the City of Lynn, MA MS4 at the locations described in Section VIII. They were not accompanied by any city or state representatives. The inspection started at the Blossom Street Boat Ramp at approximately 07:30 HRS. At the time of the inspection, the weather was partly cloudy and approximately 65°F.

According to the National Weather Service for the Beverly Municipal Airport (KBVY), the last precipitation event prior to the inspection occurred on 09/02/2021, with 2.11 inches recorded. According to the National Weather Service, in the month (to inspection date) of September, the City observed 3.84 inches of rain, compared to the 30-year normal value of 0.93 inches. According to the US Drought Monitor, as of 09/07/2021, Essex County is experiencing no drought conditions. Based on the National Oceanic and Atmospheric Administration (NOAA) tide predictions, low tide was recorded at 06:43 AM at Lynn Harbor (ID 8443187).

The sampling locations described in Section VIII were field screened using test kits for ammonia (nitrogen), surfactants, and total chlorine, as appropriate. In-situ measurements for specific conductivity, salinity, and temperature were also measured using a YSI water quality meter and recorded. All field data were recorded on field data sheets. Samples were analyzed for E. coli, Enterococcus, and PPCPs at the New England Regional Laboratory (NERL) in North Chelmsford, MA. Table 1 below summarizes the sampling and analytical data.

VIII. Description of Locations Visited During the Sampling and Recon Inspections:

Photographs taken during the inspections are included in Appendix A of this report, unless otherwise noted.

- **Blossom**: A singular elliptical concrete outfall approximately 36" in diameter located at the west side of the end of Blossom Street boat ramp. Discharge flow was approximately 5 gallons per minute (gpm) into Lynn Harbor. A slight musty odor was detected and grey staining on the rocks was observed. Sample was collected approximately 6 inches downstream from the mouth of the outfall.
- **Surfside**: A singular circular steel outfall approximately 30" in diameter located on the southeast side of the apartment complex at 50 Lynnway. Discharge flow was approximately 2-3 gpm into Lynn Harbor. Brown algae growth was observed inside the pipe. Sample was collected at the mouth of the outfall.
- **Bates**: Asset located along the beach north of the baseball field at the end of Bates St. Asset construction and material could not be determined as it appeared to be collapsed under a large pile of concrete material. Discharge flow was visible, and it appeared to be flowing

from under the rubble at approximately 1-2 gpm into the Saugus River. Sample was collected from a small pool where the flow appeared to be occurring.

- **Strawb**: A single concrete box culvert of the Strawberry Brook outflow, approximately 7 ft by 9ft located along Summer Street that discharges into the Saugus River. Discharge flow could not be estimated, as it was an open stream. Some white suds were observed floating from inside the culvert upstream. Sample was collected at the mouth of the culvert.
- **FlaxOut**: A singular reinforced concrete box culvert with steel grate approximately 6' by 4' located along Chestnut Street adjacent to the Flax Pond Playground. The asset discharges flow from Flax Pond. Sample was collected at the mouth of the culvert upstream of the gate.
- **Pondview**: A singular elliptical concrete outfall approximately 36" in diameter located on the west side of the end of the boat ramp in the Pondview Lodge parking lot. Discharge flow into Sluice Pond could not be determined as the height of the pond water was too high and caused the pond water to backfill into the pipe. Flow could be heard further inside the pipe upstream. A slight musty odor was detected and the color of the sample was slightly brown. Sample was collected approximately 12 inches upstream from the top of the culvert opening. A photograph was not collected at this location.

At the time of the reconnaissance inspection, the following outfalls were either dry or backfilled with water from the receiving water body (preventing inspectors from determining if the outfall was flowing) and were therefore not visited during the sampling inspection:

- **SluicePond1-3**: Three outfalls located along a retaining wall on Sluice Pond to the west of the Knights of Columbus building on Lynnfield Street.
- **CarterN/CarterS**: Two outfalls located along the bank of Flax Pond on Carter Road.
- **LVAveW**: A single concrete outfall on Flax Pond located near 91 Lake View Avenue.
- **51LVAve**: A single cast iron outfall on Flax Pond located near 51 Lake View Avenue.
- **Verona**: A single cast iron outfall on Flax Pond located near the Verona Street and Lake View Avenue rotary.
- **826Lincoln**: A single concrete outfall on the Saugus River located on the northeast side of the Lincoln Avenue Bridge.
- **Lynnway1-3**: Three outfalls located along the Lynn Harbor walkway at Lynn Heritage State Park.

The following outfalls were flowing during the reconnaissance inspection but were not sampled during the sampling inspection due to time constraints or inaccessibility due to tidal activity:

- **Magnolia**: A concrete box culvert located on the northwest end of Flax Pond adjacent to 100 Magnolia Avenue.
- **GenEdBr**: A single outfall located on the Saugus River on the northeast side of the General Edwards Bridge at the Willis Fishing Pier.
- **Heritage**: Several outfalls and CSOs located at the northwest corner of Lynn Heritage State Park on Lynn Harbor.

Map of Sample Locations

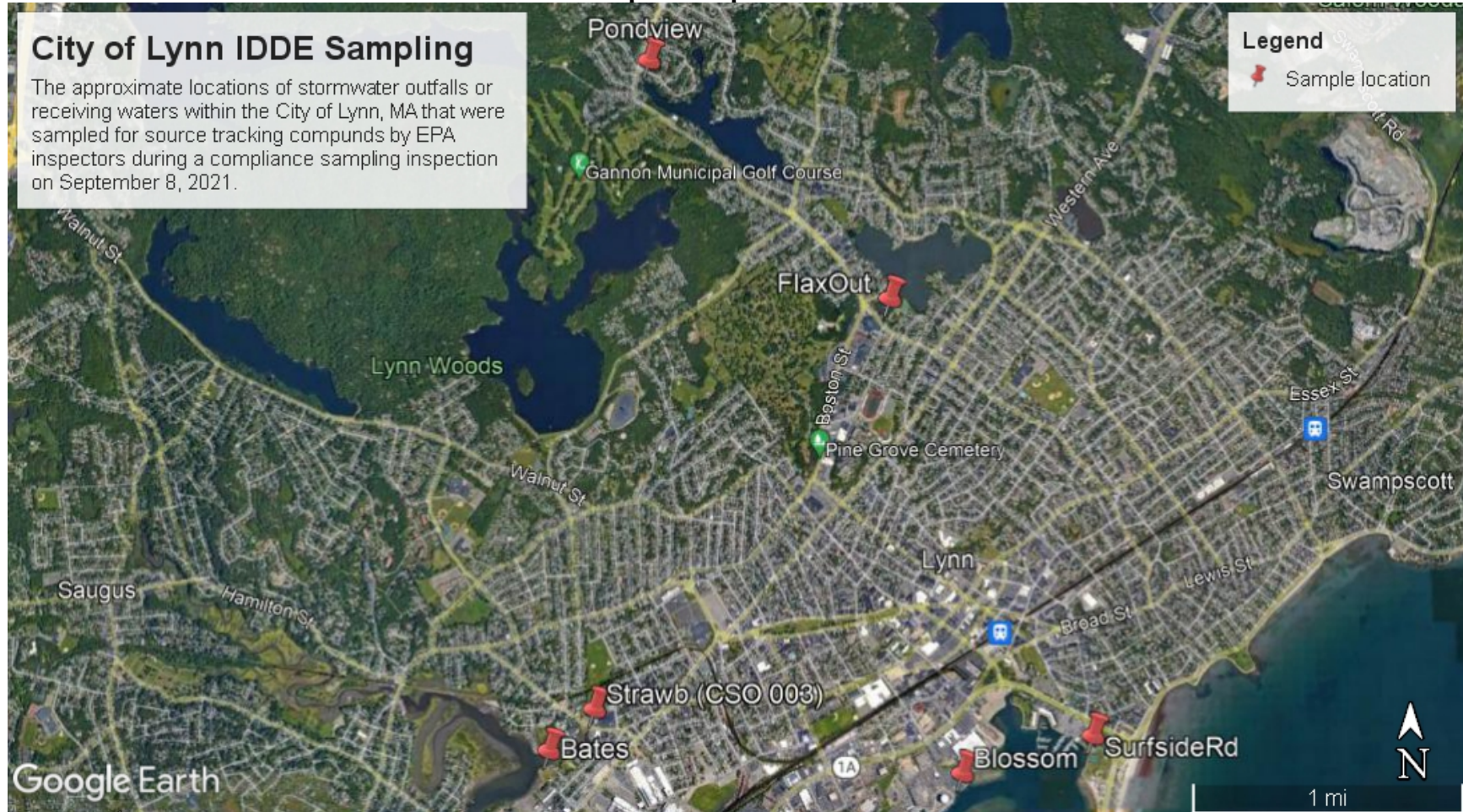


Table 1: Summary of Sampling and Analytical Data

Location	Site ID	Blossom	Surfside	Bates	Strawb	FlaxOut	Pondview	DUP01
	Sample Date	09/08/2021	09/08/2021	09/08/2021	09/08/2021	09/08/2021	09/08/2021	09/08/2021
	Sample Time	0745	0842	0938	1016	1111	1148	1148
Coordinates ¹ (decimal degrees)	North	42.454452	42.456458	42.455656	42.457856	42.479724	42.492448	42.492448
	West	-70.948668	-70.939222	-70.978521	-70.975237	-70.953853	-70.971330	-70.971330
YSI Meter	Salinity, ppt.	14.3	23.2	14.5	0.9	0.3	0.3	NA
	Temperature, °C	19.8	20.5	20.6	21.5	23.0	20.1	NA
	Conductivity, µS/cm	23.52 mS	36.57 mS	23.87 mS	3,000	614	659	NA
Field Test Kits (mg/L)	Ammonia	0.25	0.25	0.10	0.00	0.25	0.00	NA
	Total Chlorine	0.08	0.00	0.10	0.08	0.17	0.04	NA
	Surfactants	NA	NA	NA	0.25	0.25	0.25	NA
Bacteria (MPN/100mL)	E. coli	507	737	102	246	138	52	NA
	Enterococcus	52	63	63	20	10	ND	NA
PPCPs (ng/L)	Cotinine	1.4	4.9	0.82	9.5	9.3	4.9	4.2
	Acetaminophen	ND	12	ND	4.6	3.7	ND	ND
	Paraxanthine	ND	16	ND	15	13	10	8.8
	Atenolol	ND	2.8	ND	ND	ND	ND	ND
	Caffeine	ND	48	ND	36	36	26	20
	Metoprolol	ND	9.3	ND	ND	ND	ND	ND
	Diphenhydramine	ND	2.8	ND	ND	ND	ND	ND
	Carbamazepine	ND	1.1	0.83	0.72	0.71	0.97	0.98

Abbreviations and Notes:

1. The coordinates listed in Table 1 were derived from the map created in Google Earth, therefore the coordinates are estimates of the actual locations.

NA: Not Analyzed

ND: Not Detected above Reporting Limit (RL)

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

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

NH₃: Red ≥ 6 mg/L, Orange ≥ 0.5 mg/L, Yellow ≥ 0.25 mg/L, Black < 0.25 mg/L

Cl₂: Red ≥ 1.0 mg/L, Orange ≥ 0.3 mg/L, Yellow ≥ 0.02 mg/L, Black < 0.02 mg/L

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

PPCPs: Dark Pink ≥ 100x the RL; Pink ≥ 10x the RL; Light Pink ≥ 3x the RL; No Pink < 3x the RL

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.

IX: Appendices:

Appendix A: Photograph Log

X. Attachments

Attachment A: Laboratory Report for PPCPs analysis (Source Tracking)

Attachment B: Laboratory Report for E. Coli Analysis

Attachment C: Laboratory Report for Enterococcus Analysis

End of Report

Appendix A

Photograph Log

08/31/2021 Reconnaissance Inspection			
Photograph #	Photograph Name	Date Taken	Time Taken
1	SluicePond1	8/31/2021	09:13 AM
2	SluicePond2	8/31/2021	09:11 AM
3	SluicePond3	8/31/2021	09:10 AM
4	CarterN	8/31/2021	09:29 AM
5	CarterS	8/31/2021	09:25 AM
6	LVAveW	8/31/2021	10:16 AM
7	51LVAve	8/31/2021	10:20 AM
8	Verona	8/31/2021	10:28 AM
9	Magnolia	8/31/2021	10:47 AM
10	826Lincoln	8/31/2021	11:06 AM
11	Bates	8/31/2021	11:38 AM
12	GenEdBr	8/31/2021	12:00 PM
13	Blossom	8/31/2021	12:17 PM
14	Heritage	8/31/2021	12:26 PM
15	Lynnway1	8/31/2021	12:29 PM
16	Lynnway2	8/31/2021	12:30 PM
17	Lynnway3	8/31/2021	12:31 PM
18	Surfside	8/31/2021	12:42 PM

09/08/21 Sampling Inspection			
Photograph #	Photograph Name	Date Taken	Time Taken
19	Strawb	09/08/2021	10:23 AM
20	FlaxOut	09/08/2021	11:16 AM



1. SluicePond1: One of three outfalls located on Sluice Pond along a retaining wall adjacent to the Knights of Columbus property along Lynnfield Street. Dry at the time of recon inspection. Not visited during sampling inspection.



2. SluicePond2: One of three outfalls located on Sluice Pond along a retaining wall adjacent to the Knights of Columbus property along Lynnfield Street. Dry at the time of recon inspection. Not visited during sampling inspection.



3. SluicePond3: One of three outfalls located on Sluice Pond along a retaining wall adjacent to the Knights of Columbus property along Lynnfield Street. Dry at the time of recon inspection. Not visited during sampling inspection.



4. CarterN: the northmost outfall on Flax Pond along Carter Road. Height of pond caused water to backfill into the pipe, but discharge flow did not appear to be occurring. Not visited during sampling inspection.



5. CarterS: the southmost outfall on Flax Pond along Carter Road. Dry at the time of recon inspection. Not visited during sampling inspection.



6. LV Ave W: Outfall on Flax Pond near 91 Lake View Avenue. Height of pond caused water to backfill into pipe, but discharge flow did not appear to be occurring. Not visited during sampling inspection.



7. 51LV Ave: Outfall on Flax Pond located near 51 Lake View Avenue. Dry at the time of recon inspection. Not visited during sampling inspection.



8. Verona: Outfall on Flax Pond located near the Verona and Lake View Avenue rotary. Dry at the time of the recon inspection. Not visited during sampling inspection.



9. Magnolia: Outflow of Sluice Pond into Flax Pond, located adjacent to 100 Magnolia Avenue. Due to time constraints during the sampling inspection, no sample was collected at this location.



10. 826Lincoln: Outfall on the Saugus River located on the northeast corner of the Lincoln Avenue Bridge. Dry at the time of the recon inspection. Not visited during the sampling inspection.



11. Bates: Collapsed outfall on the beach to the north of the baseball field at the end of Bates St. Sample point indicated by a red arrow.



12. GenEdBr: Outfall on the Saugus River located on the northeast corner of the General Edwards Bridge, at the Willis Fishing Pier. Due to tidal activity, the outfall was submerged during the sampling inspection, so no sample was collected here.



13. Blossom: Outfall located on the west side of the Blossom Street boat ramp. Sample point indicated by a red arrow.



14. Heritage: Outfall in bottom right corner (red circle) appeared to be flowing during the recon inspection. During the sampling inspection, the outfall was submerged due to tidal activity with no apparent discharge flow, so no sample was collected.



15. Lynnway1: One of three outfalls located along the walkway along the Lynn Hertiage Stage Park. Dry at the time of the recon inspection. Not visited during the sampling inspection.



16. Lynnway2: One of three outfalls located along the walkway along the Lynn Hertiage Stage Park. Dry at the time of the recon inspection. Not visited during the sampling inspection.



17. Lynnway3: One of three outfalls located along the walkway along the Lynn Hertiage Stage Park. Dry at the time of the recon inspection. Not visited during the sampling inspection.



18. Surfside: Outfall located on the southeast side of the Ocean Shores apartment complex. Sample point indicated by a red arrow.



19. Strawb: Box culvert outfall for Strawberry Brook, located along Summer Street, flowing into the Saugus River. Sample point is indicated by a red arrow.



20. FlaxOut: Outlet structure of Flax Pond adjacent to the playground located along Chestnut Street. Sample point is indicated by a red arrow.

Laboratory Report

September 23, 2021

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 21090012
Project: King's Beach MS4 - Lynn, MA
Analysis: HPLC/MS/MS Source Tracking Analysis
EPA Chemist: Peter Philbrook

Date Samples Received by the Laboratory: 09/08/2021

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, LSBSOP-LCMS_STA3.

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,

21090012\$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.

King's Beach MS4 - Lynn, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Blossom	Lab Sample ID:	AB94579
Date of Collection:	9/08/2021	Matrix:	Stormwater
Date of Preparation:	9/09/2021	Amount Prepared:	500 mL
Date of Analysis:	9/20/2021	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	1.4	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	52	59 - 137
Diphenhydramine-D3	57	19 - 135

Comments: Phentermine-D4 surrogate recovery was below QC limits

King's Beach MS4 - Lynn, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Surfside	Lab Sample ID:	AB94580
Date of Collection:	9/08/2021	Matrix:	Stormwater
Date of Preparation:	9/09/2021	Amount Prepared:	500 mL
Date of Analysis:	9/20/2021	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	4.9	1	0.40	
103-90-2	Acetaminophen	12	1	2.0	
611-59-6	Paraxanthine	16	1	2.0	
29122-68-7	Atenolol	2.8	1	2.0	
58-08-2	Caffeine	48	1	4.0	
56392-17-7	Metoprolol	9.3	1	2.0	
58-73-1	Diphenhydramine	2.8	1	0.40	
298-46-4	Carbamazepine	1.1	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	66	59 - 137
Diphenhydramine-D3	67	19 - 135

Comments:

King's Beach MS4 - Lynn, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	RivStPL	Lab Sample ID:	AB94581
Date of Collection:	9/08/2021	Matrix:	Stormwater
Date of Preparation:	9/09/2021	Amount Prepared:	500 mL
Date of Analysis:	9/20/2021	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	0.82	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	0.83	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	67	59 - 137
Diphenhydramine-D3	68	19 - 135

Comments:

King's Beach MS4 - Lynn, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Strawb	Lab Sample ID:	AB94582
Date of Collection:	9/08/2021	Matrix:	Stormwater
Date of Preparation:	9/09/2021	Amount Prepared:	500 mL
Date of Analysis:	9/20/2021	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	9.5	1	0.40	
103-90-2	Acetaminophen	4.6	1	2.0	
611-59-6	Paraxanthine	15	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	36	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	0.72	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	67	59 - 137
Diphenhydramine-D3	75	19 - 135

Comments:

King's Beach MS4 - Lynn, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	FlaxOut	Lab Sample ID:	AB94583
Date of Collection:	9/08/2021	Matrix:	Stormwater
Date of Preparation:	9/09/2021	Amount Prepared:	500 mL
Date of Analysis:	9/20/2021	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	9.3	1	0.40	
103-90-2	Acetaminophen	3.7	1	2.0	
611-59-6	Paraxanthine	13	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	36	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	0.71	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	63	59 - 137
Diphenhydramine-D3	79	19 - 135

Comments:

King's Beach MS4 - Lynn, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: Pondview
Date of Collection: 9/08/2021
Date of Preparation: 9/09/2021
Date of Analysis: 9/20/2021
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AB94584
Matrix: Stormwater
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	4.9	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	10	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	26	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	0.97	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	65	59 - 137
Diphenhydramine-D3	75	19 - 135

Comments:



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

Microbiology Laboratory Report

October 04, 2021

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 21090015
Project: King's Beach MS4 - Lynn, MA
Analysis: E. Coli Defined Substrate
Analyst: Jack Paar

Date Samples Received by the Laboratory: 09/08/2021

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, 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 OEME 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

21090015ECMM

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
King's Beach MS4 - Lynn, MA
E. Coli Defined Substrate

Matrix: Stormwater

Sample Number	Lab ID	Date of Collection		Date of Analysis		Compound	Concentration MPN/100 mL	RL MPN/100 mL	Qualifier
Blosson	AB94596	09/08/21	7:45 am	09/08/21	2:00 pm	E. Coli Defined Substrate	507	4	
Surfside	AB94597	09/08/21	8:42 am	09/08/21	2:00 pm	E. Coli Defined Substrate	737	4	
RivStPL	AB94598	09/08/21	9:38 am	09/08/21	2:00 pm	E. Coli Defined Substrate	102	4	
Strawb	AB94599	09/08/21	10:16 am	09/08/21	2:00 pm	E. Coli Defined Substrate	246	4	
FlaxOut	AB94600	09/08/21	11:11 am	09/08/21	2:00 pm	E. Coli Defined Substrate	138	4	
Pondview	AB94601	09/08/21	11:48 am	09/08/21	2:00 pm	E. Coli Defined Substrate	52	4	

Number of Samples: 6



CHAIN OF CUSTODY RECORD

[illegible]

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King's Beach MS4 - Lynn, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	DUP-01	Lab Sample ID:	AB94585
Date of Collection:	9/08/2021	Matrix:	Stormwater
Date of Preparation:	9/09/2021	Amount Prepared:	500 mL
Date of Analysis:	9/20/2021	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	4.2	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	8.8	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	20	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	0.98	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	65	59 - 137
Diphenhydramine-D3	71	19 - 135

Comments:

King's Beach MS4 - Lynn, MA

Laboratory Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Stormwater
Date of Preparation:	9/09/2021	Amount Prepared:	500 mL
Date of Analysis:	9/20/2021	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	67	59 - 137
Diphenhydramine-D3	69	19 - 135

Comments:

King's Beach MS4 - Lynn, MA

MATRIX SPIKE (MS) RECOVERY

Sample ID: AB94585

PARAMETER	SPIKE ADDED ng/L	SAMPLE CONCENTRATION ng/L	MS CONCENTRATION ng/L	MS % REC	QC LIMITS (% REC)
Acetaminophen	120	ND	92.1	77	61 - 100
Atenolol	120	ND	147	122	59 - 122
Caffeine	240	20.0	235	90	54 - 128
Carbamazepine	24.0	0.98	22.4	89	61 - 120
Cotinine	24.0	4.2	26.7	94	48 - 124
Diphenhydramine	24.0	ND	19.6	82	30 - 130
Metoprolol	120	ND	120	100	59 - 128
Paraxanthine	120	8.8	103	79	42 - 125

King's Beach MS4 - Lynn, MA

Laboratory Duplicate Results

Sample ID: AB94583

PARAMETER	SAMPLE RESULT ng/L	SAMPLE DUPLICATE RESULT ng/L	PRECISION RPD %	QC LIMITS
Acetaminophen	3.7	3.58	2.0	50
Atenolol	ND	ND	NC	50
Caffeine	36.0	32.8	9.7	50
Carbamazepine	0.71	0.654	8.2	50
Cotinine	9.3	9.07	2.5	50
Diphenhydramine	ND	ND	NC	50
Metoprolol	ND	ND	NC	50
Paraxanthine	13.0	12.7	3.7	50

King's Beach MS4 - Lynn, MA

Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ng/L	LFB RESULT ng/L	LFB RECOVERY %	QC LIMITS %
Acetaminophen	120	86.3	72	53 - 105
Atenolol	120	105	88	62 - 117
Caffeine	240	179	75	50 - 127
Carbamazepine	24	19.8	83	28 - 126
Cotinine	24	20.2	84	52 - 134
Diphenhydramine	24	17.2	72	30 - 130
Metoprolol	120	99.4	83	33 - 139
Paraxanthine	120	103	86	61 - 113

Comments:

Samples in Batch: AB94579, AB94580, AB94581, AB94582, AB94583, AB94584, AB94585

REGION 1

CHAIN OF CUSTODY RECORD

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Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

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United States Environmental Protection Agency
Laboratory Services and Applied Science Division
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Microbiology Laboratory Report

October 04, 2021

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 21090015
Project: King's Beach MS4 - Lynn, MA
Analysis: Enterococcus in Water
Analyst: Jack Paar

Date Samples Received by the Laboratory: 09/08/2021

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, 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 OEME Biology QA Plan.

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Jack A. Paar, III
Biology Laboratory Manager

21090015ENTERO

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Strawb	AB94599	09/08/21	10:16 am	09/08/21	2:00 pm	Enterococcus in Water	20	10	
FlaxOut	AB94600	09/08/21	11:11 am	09/08/21	2:00 pm	Enterococcus in Water	10	10	
Pondview	AB94601	09/08/21	11:48 am	09/08/21	2:00 pm	Enterococcus in Water	ND	10	

Number of Samples: 6



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