



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

Laboratory Services and Applied Science Division

11 Technology Drive

North Chelmsford, Massachusetts 01863-2431

Drafted Date: November 10, 2021

Finalized Date: December 9, 2021

Subject: Compliance Sampling Inspection Report
Clean Water Act – National Pollutant Discharge Elimination System
City of Worcester, 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/

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:* City of Worcester, MA
- B. *Facility Location:* 20 East Worcester St, Worcester, MA 01604
- C. *Facility Contact:* Jay J. Fink, P.E. Commissioner, Dept. of Public Works and Parks,
(508)929-1300, dpw@worcesterma.gov
- D. *NPDES Permit ID:* MAS010002 (MS4)

II. Background Information

- A. *Date/Start time of sampling inspection:* November 9, 2021/8:45 AM
- B. *Weather conditions:* Clear, approximately 50°F
- C. *USEPA Representatives:* Michelle Coombs
- D. *State/Local Representatives:* None
- E. *Federally Enforceable Requirements Investigated:*
Stormwater discharges and certain non-stormwater discharges from the City of Worcester, MA (the City's) Municipal Separate Storm Sewer Systems (MS4) are authorized by the National Pollutant Discharge Elimination System (NPDES) General Permit for the Discharge of Stormwater from Small MS4 hereinafter, the Permit), issued by the Environmental Protection Agency (EPA) Region 1. The City obtained coverage under the Permit with NPDES Permit ID MAS010002.
- F. *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 compliance sampling inspection was to identify potential illicit connections or illegal discharges within the City of Worcester, MA MS4 that may adversely impact the water quality in the Fitzgerald Brook, Poor Farm Brook, and Coal Mine Brook. Samples were collected from four (4) locations in accordance with the FSB Investigations Team Stormwater Program Plan.

V. Permittee Details

The City of Worcester occupies approximately 38 square miles in Worcester County, MA, approximately 40 miles west of Boston, MA. The City shares borders with the municipalities of Auburn, Grafton, Holden, Leicester, Millbury, Paxton, Shrewsbury, and West Boylston. According to the 2010 U.S. Census, the population of Worcester was 181,045. There is 1 CSO permitted to discharge into the receiving waters of Mill Brook (MA0102997).

VI. 11/09/2021 Sampling Inspection Summary

On November 9, 2021, EPA inspector Michelle Coombs conducted an unannounced compliance sampling inspection of the Worcester, MA MS4 at the locations described in Section VII. She was not accompanied by any city or state representatives. The inspection started at Poor Farm Brook at approximately 8:45 AM. At the time of the inspection, the weather was clear with an ambient temperature of approximately 50°F.

According to Weather Underground for the Worcester Regional Airport (KMAWORCE80), the last precipitation event prior to the inspection occurred on October 31, 2021, with 0.42 inches recorded. No precipitation was recorded within the 72 hours before the inspection. According to the National Weather Service, in the month (to date) of the inspection, the City observed 0.00 inches of rain, which is a 0.13-inch departure from the 30-year normal value of 0.13 inches. According to the US Drought Monitor, as of November 9, 2021, Worcester County is experiencing no drought conditions.

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

VII. Description of Sampling Locations

Photographs depicting each sample location are included in Appendix A of this report.

- **PFBrook:** In-stream sample of Poor Farm Brook, collected at the triplet street culvert on the east side of NE Cutoff, across the street from Great Brook Valley Park. Sample was collected from the north-most culvert. Flow was odorless and colorless, with a clear turbidity and no floatables observed. An outfall appeared to be discharging flow into the brook from inside the culvert.
- **FitzLakeAve:** In-stream sample of Fitzgerald Brook, collected at the street culvert on the east side of Lake Avenue, near the intersection with Anna Street. Sample was collected at the mouth of the culvert. Flow was odorless and colorless, with a clear turbidity and no floatables observed. An outfall appeared to be discharging flow into the brook from inside the culvert.
- **FitzCoburn:** In-stream sample of Fitzgerald Brook, collected at the street culvert on the east side of Coburn Avenue. Sample was collected at the mouth of the culvert. A slight musty odor was detected and dark brown algae growth was observed on the rocks downstream. The pool was slightly milky and turbid. A few pieces of trash were observed in the brook downstream.
- **CMBrook:** In-stream sample of Coal Mine Brook, collected at the street culvert on the east side of Plantation Street. Sample was collected approximately 10 feet downstream of the culvert and outfalls. Flow was odorless and colorless, with a clear turbidity and no floatables observed. Two outfalls, one on either side of the reinforced rectangular culvert, were flowing into Coal Mine Brook.

Map of Sample Locations

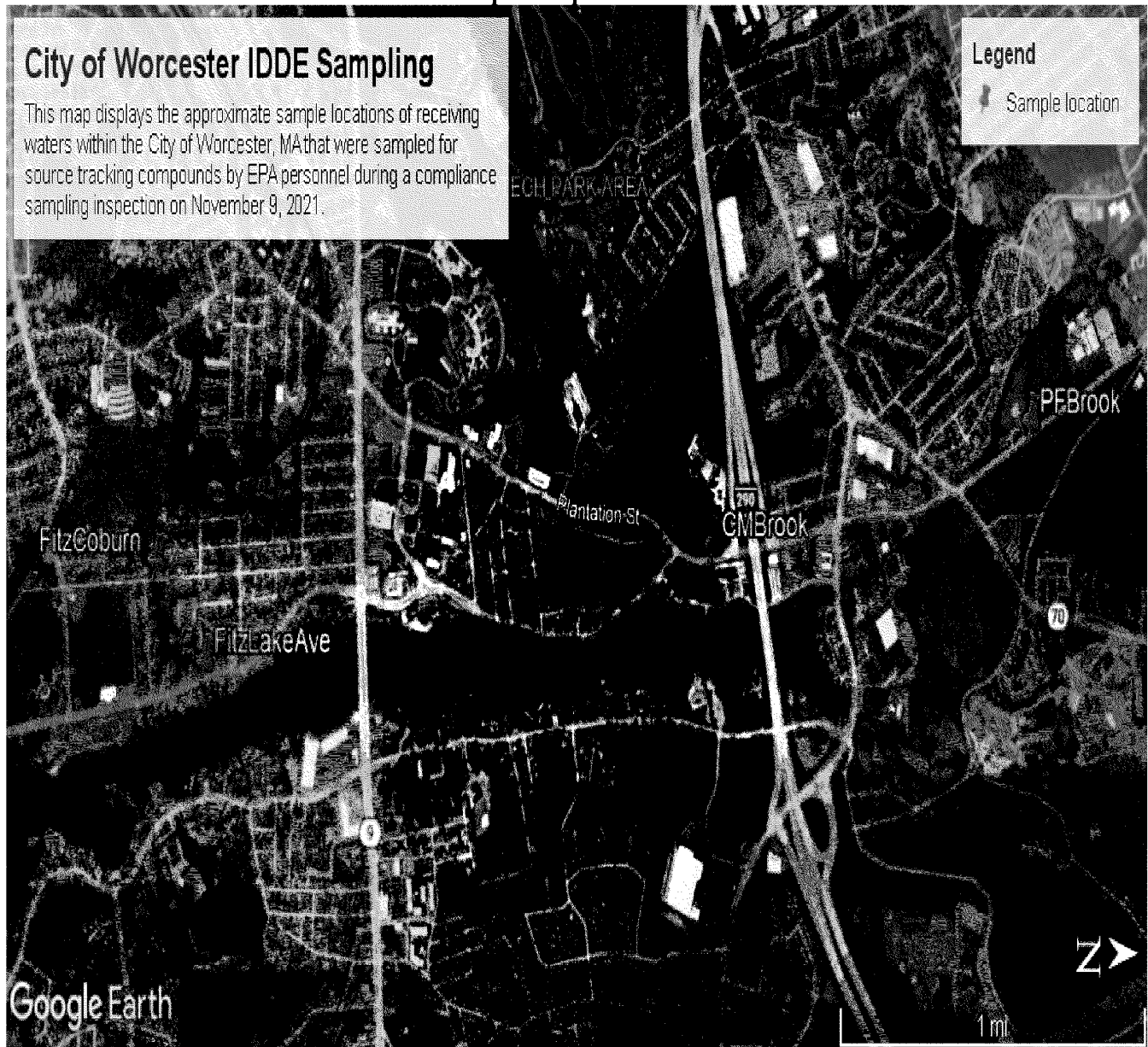


Table 1: Summary of Sampling and Analytical Data

Location	Site ID	PFBrook	FitzLakeAve	DUP01	FitzCoburn	CMBrook
	Sample Date	11/9/21	11/9/21	11/9/21	11/9/21	11/9/21
	Sample Time	09:00	09:40	09:40	10:05	10:40
YSI Meter	Salinity, ppt.	0.3	0.2	NA	0.2	0.4
	Temperature, °C	8.9	12.1	NA	13.3	9.9
	Conductivity, µS/cm	617	419.1	NA	409.5	889
Field Test Kits (mg/L)	Ammonia	0.25	0.25	NA	0.50	0.00
	Total Chlorine	0.00	0.00	NA	0.15	0.00
	Surfactants	0.25	0.25	NA	0.25	0.25
Bacteria (MPN/100mL)	E. coli	138	287	NA	774	1,140
	Enterococcus	10	10	NA	160	30
PPCPs (ng/L)	Cotinine	1.3	5.1	5.7	3.1	3.7
	Acetaminophen	30.6	30.0	33.7	47.0	74.2
	Paraxanthine	5.3	20.3	24.0	37.9	11.6
	Atenolol	ND	ND	ND	ND	ND
	Caffeine	18.2	112.5	123.5	86.9	33.0
	Metoprolol	ND	3.0	3.1	3.3	ND
	Diphenhydramine	ND	0.8	0.5	1.3	0.9
	Carbamazepine	0.6	2.2	2.4		ND

Abbreviations and Notes:

NA: Not Analyzed

ND: Not Detected above Reporting Limit*

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

Enterococcus: Red ≥ 1,000 col/100ml, Orange ≥ 350 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: [REDACTED]; Pink ≥ 10x the RL; Light Pink ≥ 3x the RL; No Pink < 3x the RL*

*See Reporting Limit (RL) values for each compound in attached Laboratory Report for Source Tracking

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.

VIII. Appendix

Appendix A: Photograph Log

IX. Attachments

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

Attachment B: Laboratory Report for E. coli Analysis

Attachment C: Laboratory Report for Enterococcus Analysis

End of Report

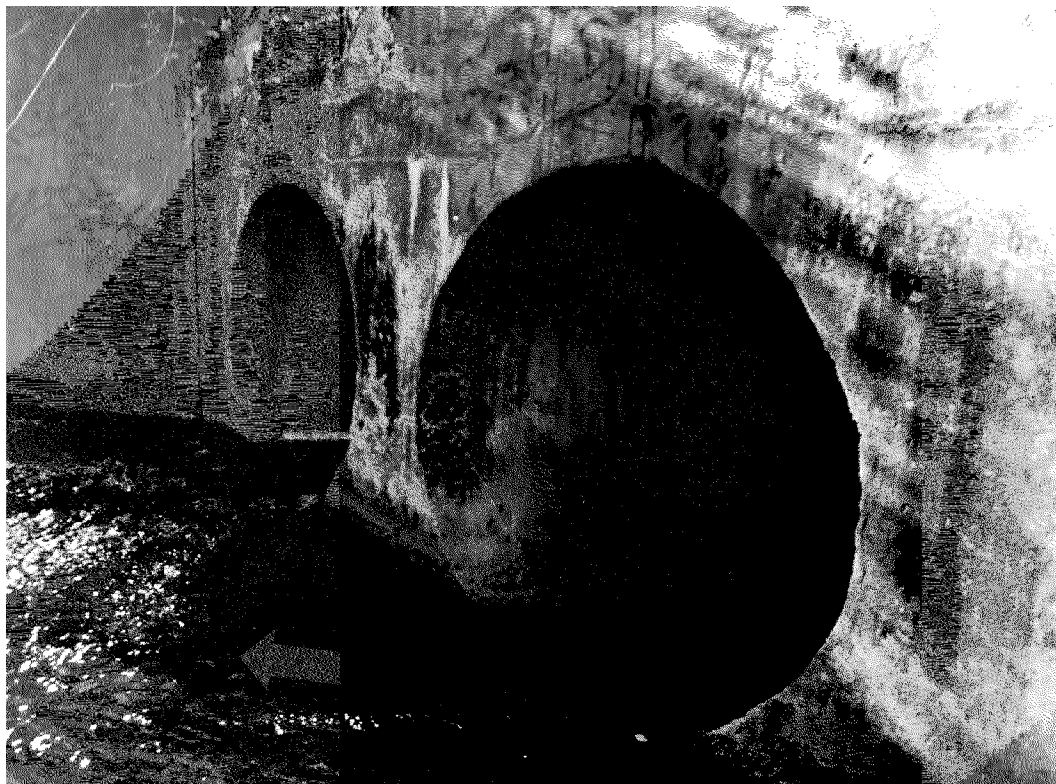
Appendix A

Photograph Log

Photo Name	Date Taken	Time Taken
PFBrook1	11/9/2021	08:56
PFBrook2	11/9/2021	08:56
PFBrook3	11/9/2021	08:56
FitzLakeAve1	11/9/2021	09:36
FitzLakeAve2	11/9/2021	09:37
FitzLakeAve3	11/9/2021	09:43
FitzCoburn1	11/9/2021	10:01
FitzCoburn2	11/9/2021	10:02
CMBrook	11/9/2021	10:34



PFBrook1: Poor Farm Brook north-most culvert located on the east side of NE Cutoff. Note the flowing outfall inside the culvert (red circle). Flow direction indicated by a blue arrow. Sample location is just outside the frame, approximately 3 feet from mouth of culvert.



PFBrook2: Poor Farm Brook southern culverts located on the east side of NE Cutoff. Flow direction indicated by a blue arrow.



PFBrook3: Poor Farm Brook downstream view from triplet culvert on the east side of NE Cutoff. Flow direction indicated by a blue arrow.



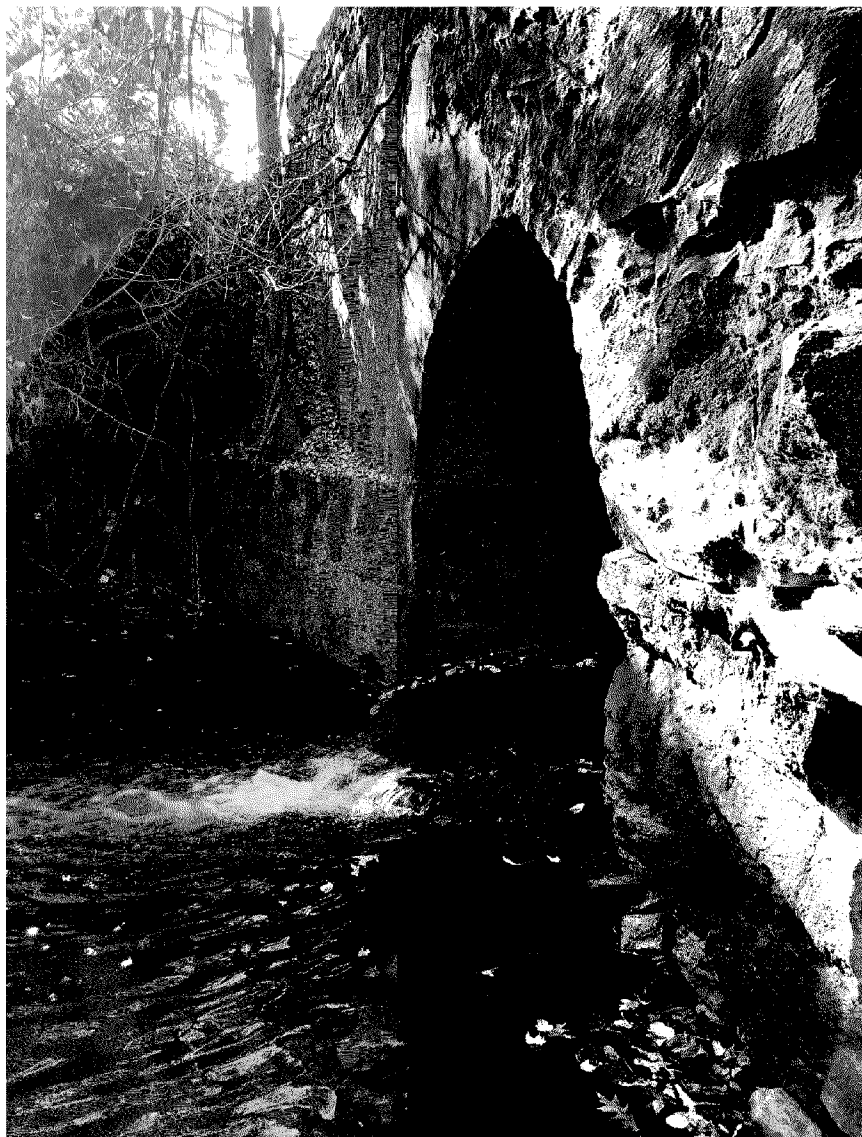
FitzLakeAve1: Fitzgerald Brook street culvert located on Lake Avenue near the intersection with Anna St. Sample location indicated by a red X. Flow direction indicated by a blue arrow.



FitzLakeAve2: Fitzgerald Brook street culvert on Lake Avenue. Note the flowing outfall inside the culvert (red circle). Flow direction indicated by a blue arrow.



FitzLakeAve3: Fitzgerald Brook downstream of the street culvert, with Lake Quinsigamond in view toward the top of the photo. Flow direction indicated by a blue arrow.



FitzCoburn1: Fitzgerald Brook street culvert on Coburn Avenue. Sample location indicated by a red X. Flow direction indicated by a blue arrow.



FitzCoburn2: Fitzgerald Brook downstream of street culvert. Flow direction indicated by a blue arrow.



CMBrook: Coal Mine Brook street culvert located on the east side of Plantation Street. Both outfalls are flowing into the brook. Flow direction indicated by a blue arrow. Sample location indicated by a red X.

Attachment A
Laboratory Report for
Source Tracking Analysis

Author: LSASD Laboratory Services Branch
Pages: 12

Laboratory Report

December 01, 2021

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 21110016
Project: Worcester, MA MS4
Analysis: HPLC/MS/MS Source Tracking Analysis
EPA Chemist: Peter Philbrook

Date Samples Received by the Laboratory: 11/09/2021

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,

21110016\$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.

21110016\$STA

Worcester, MA MS4

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	PFBrook	Lab Sample ID:	AB95982
Date of Collection:	11/09/2021	Matrix:	Stormwater
Date of Preparation:	11/15/2021	Amount Prepared:	500 mL
Date of Analysis:	11/16/2021	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	1.3	1	0.40	
103-90-2	Acetaminophen	31	1	2.0	
611-59-6	Paraxanthine	5.3	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	18	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	0.57	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	74	59 - 137
Diphenhydramine-D3	60	19 - 135

Comments:

Worcester, MA MS4

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: FitzLakeAve
Date of Collection: 11/09/2021
Date of Preparation: 11/15/2021
Date of Analysis: 11/16/2021
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AB95983
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	5.1	1	0.40	
103-90-2	Acetaminophen	30	1	2.0	
611-59-6	Paraxanthine	20	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	110	1	4.0	
56392-17-7	Metoprolol	3.0	1	2.0	
58-73-1	Diphenhydramine	0.76	1	0.40	
298-46-4	Carbamazepine	2.2	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	67	59 - 137
Diphenhydramine-D3	63	19 - 135

Comments:

Worcester, MA MS4

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	DUP01	Lab Sample ID:	AB95984
Date of Collection:	11/09/2021	Matrix:	Stormwater
Date of Preparation:	11/15/2021	Amount Prepared:	500 mL
Date of Analysis:	11/16/2021	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	5.7	1	0.40	
103-90-2	Acetaminophen	34	1	2.0	
611-59-6	Paraxanthine	24	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	120	1	4.0	
56392-17-7	Metoprolol	3.1	1	2.0	
58-73-1	Diphenhydramine	0.53	1	0.40	
298-46-4	Carbamazepine	2.4	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	75	59 - 137
Diphenhydramine-D3	46	19 - 135

Comments:

Worcester, MA MS4

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: FITZCoburn
Date of Collection: 11/09/2021
Date of Preparation: 11/15/2021
Date of Analysis: 11/16/2021
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AB95985
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	3.1	1	0.40	
103-90-2	Acetaminophen	47	1	2.0	
611-59-6	Paraxanthine	38	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	87	1	4.0	
56392-17-7	Metoprolol	3.3	1	2.0	
58-73-1	Diphenhydramine	1.3	1	0.40	
298-46-4	Carbamazepine	55	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	75	59 - 137
Diphenhydramine-D3	64	19 - 135

Comments:

Worcester, MA MS4

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	CMBrook	Lab Sample ID:	AB95986
Date of Collection:	11/09/2021	Matrix:	Stormwater
Date of Preparation:	11/15/2021	Amount Prepared:	500 mL
Date of Analysis:	11/16/2021	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	3.7	1	0.40	
103-90-2	Acetaminophen	74	1	2.0	
611-59-6	Paraxanthine	12	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	33	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	0.86	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	78	59 - 137
Diphenhydramine-D3	65	19 - 135

Comments:

Worcester, MA MS4

Laboratory Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Stormwater
Date of Preparation:	11/15/2021	Amount Prepared:	500 mL
Date of Analysis:	11/16/2021	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	66	19 - 135

Comments:

Worcester, MA MS4

MATRIX SPIKE (MS) RECOVERY

Sample ID: AB95982

PARAMETER	SPIKE ADDED ng/L	SAMPLE CONCENTRATION ng/L	MS CONCENTRATION ng/L	MS % REC	QC LIMITS (% REC)
Acetaminophen	120	31.0	124	78	61 - 100
Atenolol	120	ND	119	99	59 - 122
Caffeine	240	18.0	231	89	54 - 128
Carbamazepine	24.0	0.57233	21.4	87	61 - 120
Cotinine	24.0	1.3	23.8	94	48 - 124
Diphenhydramine	24.0	ND	16.9	70	30 - 130
Metoprolol	120	ND	101	84	59 - 128
Paraxanthine	120	5.3	115	91	42 - 125

Worcester, MA MS4

Laboratory Duplicate Results

Sample ID: AB95986

PARAMETER	SAMPLE RESULT ng/L	SAMPLE DUPLICATE RESULT ng/L	PRECISION RPD %	QC LIMITS
Acetaminophen	74.0	69.9	6.0	50
Atenolol	ND	ND	NC	50
Caffeine	33.0	30.7	7.3	50
Carbamazepine	ND	ND	NC	50
Cotinine	3.7	3.50	4.8	50
Diphenhydramine	0.85654	0.837	2.3	50
Metoprolol	ND	ND	NC	50
Paraxanthine	12.0	10.6	8.6	50

Worcester, MA MS4

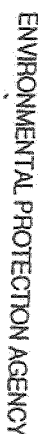
Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ng/L	LFB RESULT ng/L	LFB RECOVERY %	QC LIMITS %
Acetaminophen	120	44.3	37	53 - 105
Atenolol	120	102	85	62 - 117
Caffeine	240	189	79	50 - 127
Carbamazepine	24	19.7	82	28 - 126
Cotinine	24	22.0	92	52 - 134
Diphenhydramine	24	16.9	70	30 - 130
Metoprolol	120	94.7	79	33 - 139
Paraxanthine	120	113	94	61 - 113

Comments:

The LFB recovery of acetaminophen was below expected QC limits. The matrix spike recovery of acetaminophen was however within limits. No action taken. (all internal standard recoveries were acceptable)

Samples in Batch: AB95982, AB95983, AB95984, AB95985, AB95986



REGION 1

CHAIN OF CUSTODY RECORD

Pg 1 of 2

[illegible]

Attachment B
Laboratory Report for
E. coli Analysis

Author: LSASD Laboratory Services Branch
Pages: 4



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

Microbiology Laboratory Report

December 08, 2021

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 21110018
Project: Worcester, MA MS4
Analysis: E. Coli Defined Substrate
Analyst: Jack Paar

Date Samples Received by the Laboratory: 11/09/2021

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

21110018ECMM

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

21110018ECMM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1 - NEW ENGLAND
LABORATORY SERVICES BRANCH
Worcester, MA MS4
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
PFBrook	AB96057	11/09/21 9:00 am	11/09/21 12:15 pm	E. Coli Defined Substrate	138	4	
FitzLakeAve	AB96058	11/09/21 9:40 am	11/09/21 12:15 pm	E. Coli Defined Substrate	287	4	
FitzCoburn	AB96059	11/09/21 10:05 am	11/09/21 12:15 pm	E. Coli Defined Substrate	774	4	
CMBrook	AB96060	11/09/21 10:40 am	11/09/21 12:15 pm	E. Coli Defined Substrate	1140	4	

Number of Samples: 4

[illegible]

Attachment C
Laboratory Report for
Enterococcus Analysis

Author: LSASD Laboratory Services Branch
Pages: 4



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

Microbiology Laboratory Report

December 08, 2021

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 21110018
Project: Worcester, MA MS4
Analysis: Enterococcus in Water
Analyst: Jack Paar

Date Samples Received by the Laboratory: 11/09/2021

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.

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

21110018ENTERO

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

21110018ENTERO

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1 - NEW ENGLAND
LABORATORY SERVICES BRANCH
Worcester, MA MS4
Enterococcus in Water

Matrix: Stormwater

Sample Number	Lab ID	Date of Collection	Date of Analysis	Compound	Concentration MPN/100mL	RL MPN/100mL	Qualifier
PFBrook	AB96057	11/09/21 9:00 am	11/09/21 12:15 pm	Enterococcus in Water	10	10	
FitzLakeAve	AB96058	11/09/21 9:40 am	11/09/21 12:15 pm	Enterococcus in Water	10	10	
FitzCoburn	AB96059	11/09/21 10:05 am	11/09/21 12:15 pm	Enterococcus in Water	160	10	
CMBrook	AB96060	11/09/21 10:40 am	11/09/21 12:15 pm	Enterococcus in Water	30	10	

Number of Samples: 4



CHAIN OF CUSTODY RECORD

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[illegible]