ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PLAN

CITY OF HOLYOKE, MASSACHUSETTS

PROJECT NO.: 25000684.001A

JUNE 2024

.

A Report Prepared for:

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ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PROGRAM REPORT

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DEFINITIONS

Best Management Practice (BMP): An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of stormwater runoff.

Catch basin: A chamber or well, usually built to the curb line of a street that allows surface water to discharge into a storm water drain.

Clean Water Act: The Federal Water Pollution Control Act (33 U.S.C. § 1251 *et seq*.) as hereafter amended.

Discharge of Pollutants: The addition of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or Commonwealth from any source.

Groundwater: Water beneath the surface of the ground including water in soil and bedrock beneath water bodies

Illicit Connection: A surface or subsurface drain or conveyance, which allows an illicit discharge into the municipal storm drain system, including without limitation sewage, process wastewater, or wash water and any connections from indoor drains, sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved before the effective date of bylaws enacted to prohibit such discharges.

Illicit Discharge: Direct or indirect discharge to the municipal storm drain system that is not composed entirely of stormwater, except as exempted by the EPA's Phase II regulations.

Interconnection: The point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States.

Manhole: Sewer system structure typically made from brick, concrete block, or monolithic concrete sections. Manholes have solid covers that do not accept runoff like a catch basin. Manholes within a storm sewer system are installed typically at bends in pipe runs, every 300 feet to 400 feet within a storm sewer pipe run, intersections of two or more pipe runs, and at the ends of pipe runs. Manholes allow for the cleaning and inspection of storm sewer systems. Manholes are typically 'fed' stormwater by catch basins and upstream storm sewer pipes.

Junction Manhole: Per the MS4 Permit, a junction manhole is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both, are not considered junction manholes.

Municipal Separate Storm Sewer System (MS4): The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together

comprise the storm drainage system owned or operated by the Town of Wayland.

National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit: A permit issued by United States Environmental Protection Agency or jointly with the Commonwealth of Massachusetts that authorizes the discharge of pollutants to waters of the United States.

Non-Stormwater Discharge: Discharge to the municipal storm drain system not composed entirely of stormwater.

Outfall: A point source where a municipal separate storm sewer discharges to waters of the United States**.**

Point-source means a discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, (also bridge drains); this term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant: Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the Commonwealth. Pollutants shall include without limitation:

(1) paints, varnishes, and solvents;
(2) oil and other automotive fluids;
(3) non-hazardous liquid and solid wastes and yard wastes;
(4) refuse, rubbish, garbage, litter, or other discarded or abandoned objects, accumulations and floatables;
(5) pesticides, herbicides, and fertilizers;
(6) hazardous materials and wastes; sewage, fecal coliform and pathogens;
(7) dissolved and particulate metals;
(8) animal wastes;
(9) rock; sand; salt, soils;
(10) construction wastes and residues;
(11) and noxious or offensive matter of any kind.

Stormwater: Runoff from precipitation or snow melt.

Wastewater: Any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

Storm sewer: A sewer that carries only surface runoff, street wash, and snow melt from the land. In a separate sewer system, storm sewers are separate from those that carry domestic and commercial wastewater (sanitary sewers).

LIST OF ACRONYMS

BMP – Best Management Practice

USEPA – United States Environmental Protection Agency

GIS – Geographic Information System

GPS – Global Positioning System

IDDE – Illicit Discharge Detection and Elimination

MassDEP – Massachusetts Department of Environmental Protection

MassDOT – Massachusetts Department of Transportation

MS4 – Municipal Separate Storm Sewer System

NOI – Notice of Intent

NPDES – National Pollutant Discharge Elimination System

SWMP – Storm Water Management Plan

1 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PROGRAM

1.1 INTRODUCTION

1.1.1 MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PROGRAM

This document serves as a written plan for Illicit Discharge Detection and Elimination (IDDE) for the City of Holyoke, hereafter referred to as "the City" or "Holyoke" to address the requirements of the United States Environmental Protection Agency's (U.S. EPA) and the Massachusetts Department of Environmental Protection's (MassDEP) *General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts*, effective July 1st, 2018, hereinafter referred to as the "2016 MS4 Permit" or "MS4 Permit", and the 2023 MS4 Consent Decree, hereinafter referred to as the "Consent Decree".

The MS4 Permit requires regulated communities to address six Minimum Control Measures (MCM) including:

1. Public Education and Outreach;
2. Public Involvement and Participation;
3. Illicit Discharge Detection and Elimination Program (IDDE);
4. Construction Site Stormwater Runoff Control;
5. Post-construction Stormwater Management in New Development and Redevelopment; and
6. Good Housekeeping and Pollution Prevention for Permittee Owned Operations.

Under MCM 3, the City is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. The IDDE program must be recorded in a written (hardcopy or electronic) document. This IDDE Program has been prepared to address this requirement.

The City of Holyoke negotiated a Consent Decree, which was finalized in 2023 and defined the terms that the City shall take to reach compliance with the MS4 program. **Table 1-1** links sections of this IDDE Program to requirements outlined in the Consent Decree.

Table 1-1: Consent Decree Requirements included in the IDDE Plan

Consent Decree Section	Description of Requirement	IDDE Section
11-11e	Apply new IDDE screening thresholds to all MS4 outfalls and any MS4 discharges to other municipal MS4s or non-City owned outfalls	Table 6-4: Sampling Parameters and Analysis Methods
12a	Current MS4 Catchment area map with boundaries of each catchment area and all associated outfalls or interconnections	**Appendix C** Stormwater System Cover Map
12b	Identification of all combined manholes within MS4 catchment areas	Appendix A MS4 Outfall and Interconnection Prioritization and Table 8-1: Investigation and Screening
12c	Schedule to inspect all identified combined manholes	**Appendix A** Investigation Timeline and Procedure and
12d	Schedule to repair or eliminate the identified combined manholes	**Appendix A** Investigation Timeline and Procedure
12e	A prioritization of all Catchment areas based on EPA monitoring results, City monitoring results, applicable TMDLs for impaired waterbodies, and a schedule for completion of catchment investigations	Section 7.5 Screening Timeline and **Appendix E** Reprioritized Outfall Ranking
13	Dry-Weather Sampling	Section 5.3 Dry Weather Outfall Interconnection Screening and Sampling; Section 7.1 Dry Weather Manhole Inspections Section 6.4 Status of Outfall Screenings and Results **APPENDIX E** Field Investigation Records
14	Wet-Weather Sampling	Section 7.2 Wet Weather Outfall Sampling
15a-15c	Identification and Elimination of Illicit Discharges to MS4 area with schedule for actions	Section 6.2.2 Identification of Illicit Discharge
17	Semi-annual Consent Decree compliance report relating to implementation of IDDE Plan (Due 7/31/2024)	To be provided at a later date as required

1.1.2 GEOGRAPHICAL SCOPE OF IDDE PROGRAM

The MS4 Permit requires municipalities to implement the IDDE program for those portions of the MS4 that are located either fully or partially within the Urbanized Area (based on 2010 U.S. Census) or located in a geographical area designated by U.S.EPA as requiring a permit. The urbanized areas for Holyoke are shown in **Figure 1-1**.

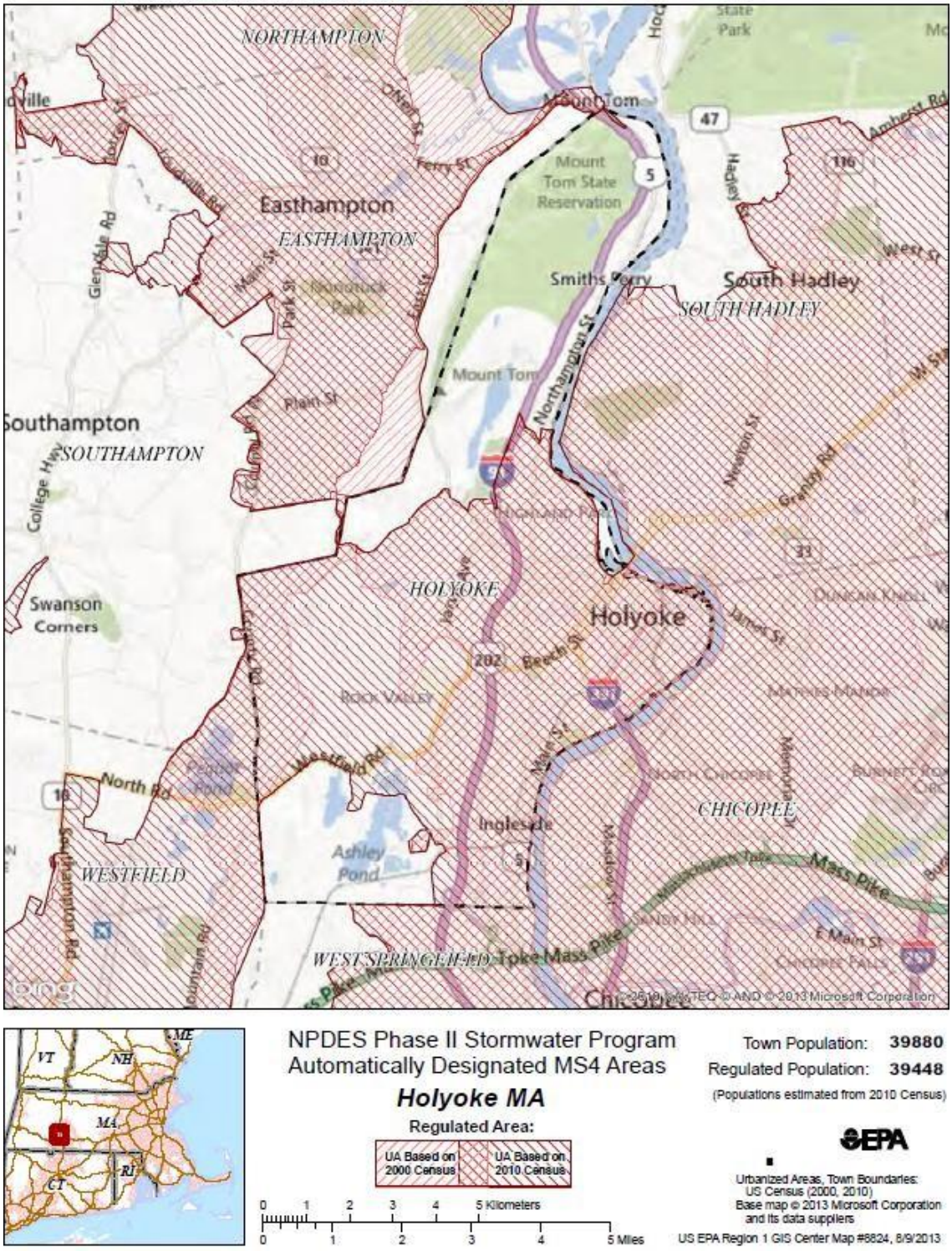


Figure 1-2: Holyoke MS4 Urbanized Area

1.1.3 ALLOWABLE NON-STORMWATER DISCHARGES

An illicit discharge is any discharge to an MS4 that is not composed entirely of stormwater, except for site-specific NPDES permitted discharges and discharges resulting from firefighting activities and allowable non-stormwater discharges.

Illicit discharges may enter the drainage system through direct or indirect connections and may be intentional or unintentional. Direct connections include cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect and may include failing septic systems that discharge untreated sewage to a storm ditch or swale that is part of an MS4, or a sump pump that discharges contaminated water to storm drains intermittently.

Some illicit discharges are intentional, such as dumping used oil into catch basins, seasonal dumping of swimming pool water, or illegally connecting a new sewer lateral into a storm drainpipe. Unintentional illicit discharges include breakouts from failing septic systems that enter the MS4, or disposal of floor wash water to a floor drain in an old building where the drain is thought to connect to a sewer line but connects to a storm drain instead.

When not addressed, illicit discharges can contribute high levels of pollutants such as metals, toxics, oil, grease, solvents, nutrients, and bacteria to surface waters.

The following non-stormwater discharges are allowed under the MS4 Permit unless the permittee, U.S.EPA, or MassDEP finds the discharge to be a significant contributor of pollutants to the MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation

- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

If any of the above discharges are identified as significant contributors of pollution to the MS4, they will be considered “illicit discharges” and addressed in the IDDE program.

1.1.4 RECEIVING WATERS AND IMPAIRMENTS

Impaired waters are water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat. The impaired waters that are within the boundaries of Holyoke’s regulated area based on the Final 2022 Massachusetts Integrated List of Waters are listed in **Table 1-2**.

Because Holyoke is in the watershed of Long Island Sound (LIS), which has an approved total maximum daily load (TMDL) for nitrogen, the City is required to meet additional requirements in the MS4 Permit with respect for nitrogen discharges (MAR041000, Appendix B part B1 of the Permit).

Table 1-2: Receiving Waters in Holyoke

Water Body Name	Segment ID	Category[1]	Impairment	Comments
Connecticut River	MA34-04	5	*Escherichia coli*, PCB in fish tissue, Non-Native aquatic plants (Water Chestnut)	Confluence with Deerfield River, Greenfield/Deerfield to Holyoke Dam (NATID: MA00973), Holyoke/South Hadley.
Connecticut River	MA34-05	5	*Escherichia coli*, PCB in fish tissue	Holyoke Dam (NATID: MA00973), Holyoke/South Hadley to Massachusetts/Connecticut border, Longmeadow.
Log Pond Cove	MA34124	5	Non-Native aquatic plants (Water Chestnut), PCB in fish tissue	Part of Connecticut River
Pequot Pond	MA32055	5	Eurasian milfoil, chlorophyll-a, Non- Native aquatic plants, *Enterococcus*, dissolved oxygen, Total Phosphorus	Located in Southampton Urban Area. Outfalls from Holyoke drain to a tributary of the Pond
Ashley Pond	MA32002	4C	Non-Native aquatic plants (Water Chestnut)	Holyoke
Lake Bray	MA34013	4C	Non-Native aquatic plants (Water Chestnut, Curly-leaf Pondweed)	Holyoke
Whiting Street Reservoir	MA34101	4C	Non-Native aquatic plants (Water Chestnut, Eurasian Water Milfoil, Myriophyllum Spicatum)	Holyoke
Mclean Reservoir	MA32050	3	N/A	Holyoke
Clear Pond	MA32077	3	N/A	Holyoke
Wright Pond	MA32078	3	N/A	Holyoke
Ashley Cutoff	MA32001	3	N/A	Holyoke
Connor Reservoir	MA32024	3	N/A	Holyoke
North Railroad Pond	MA32053	3	N/A	Holyoke
Barry Brook	MA32-57	3	N/A	Headwaters, outlet Snake Pond, Holyoke to mouth at confluence with Trask Brook (forming headwaters Bush Brook), Westfield.
Schoolhouse Brook	MA34-43	3	N/A	Headwaters, southeast of Connor Reservoir, Holyoke to mouth at confluence with Goldine Brook, West Springfield.

Table 1-2: Receiving Waters in Holyoke (Continued)

Water Body Name	Segment ID	Category[1]	Impairment	Comments
Broad Brook*	MA34-18	2	N/A	Headwaters, Holyoke to mouth at inlet Nashawannuck Pond, Easthampton. Uses attained – fish, other aquatic life and wildlife
Paucatuck Brook	MA32-29	2	N/A	From outlet of Bearhole Reservoir, West Springfield to mouth at confluence with Westfield River, West Springfield. Uses attained – fish, other aquatic life and wildlife

[1] Category 5: Impaired or threatened for one or more uses and requiring a TMDL.
Category 4C: Impaired waters not caused by a pollutant – TMDL not required.
Category 3: No uses assessed.
Category 2: Attaining some uses; other uses not assessed.
*Uses attained: Fish, other Aquatic Life and Wildlife

1.1.5 IDDE PROGRAM OBJECTIVES, REQUIREMENTS, AND TIMELINE

The goals of the IDDE program are to find and eliminate illicit discharges to the municipal separate storm sewer system and to prevent illicit discharges from happening in the future. The program consists of the following major components as outlined in the MS4 Permit:

- Legal authority and regulatory mechanism to prohibit illicit discharges and enforce this prohibition,
- Storm system mapping,
- Inventory and ranking of outfalls,
- Dry weather outfall screening,
- Catchment investigations,
- Identification/confirmation of illicit sources,
- Illicit discharge removal,
- Follow-up screening, and
- Employee training.

Investigation procedures and the required timeline for implementing the IDDE program are included in **Appendix A**.

2 OBJECTIVE, AUTHORITY AND IDDE RESPONSIBILITIES

The objective of the IDDE program is to systematically find and eliminate illicit discharges to Holyoke's MS4 and prevent them from happening in the future.

2.1 LEGAL AUTHORITY

Holyoke's Stormwater Ordinance was adopted by City Council on May 17th, 2010, and revised on September 1st, 2021. Specifically, Holyoke's Stormwater Ordinance grants the City the authority to:

- Prohibit illicit discharges.

The City plans to update regulations or ordinances to grant the City authority to:

- Investigate suspected illicit discharges;
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the City that discharge into the MS4; and
- Implement appropriate enforcement procedures and actions.

A copy of Holyoke's Stormwater Bylaw and additional relevant ordinance sections are included in **Appendix B**. The draft ordinance language, proposed by the Pioneer Valley Planning Commission (PVPC), is also included in **Appendix B.**

2.2 IDDE PROGRAM RESPONSIBILITIES

As owner and operator of the MS4 the City and Veolia, respectively, hold joint responsibility for implementing the IDDE program. The City Department of Public Works (DPW) is the lead municipal agency that works with Veolia and other departments to administer various aspects of the program. Specific IDDE Program responsibilities and responsible parties are listed in **Table 2-1**. The organizational structure of the responsible parties is shown in **Figure 2-1**.

Table 2-1: IDDE Responsibilities

Responsible Party	IDDE Responsibilities
City Engineer	• Enforcement of illicit discharge (ID) procedures and actions
VEOLIA Project Manager; City Engineer	• Catchment Investigations; identifying system vulnerability factors (SVF), manhole inspections and isolation to confirm sources of illicit discharges (ID) • Catchment prioritization • Dry weather outfall screens/inspections and outfall sample collection • Rank/Prioritize and reprioritize outfalls and interconnections • Wet and dry weather data review, tracking, collection, and annual reporting • IDDE Program Progress Annual Report (SSOs, IDs identified and removed; # and % total outfall catchments evaluated; dry and wet weather screening results; volume of sewage removed
VEOLIA Project Manager	• Illicit Discharge (ID) Investigations; removal, and removal confirmations • SSOs Investigations and Maintenance of SSO Inventory • Field checks and documentation of new / updated MS4 infrastructure; outfalls and interconnections; update MS4 maps • Wet weather outfall screens/inspections and outfall sample collection • Track and provide annual report of Illicit discharge removal • Confirmatory outfall and interconnection screening after ID has been removed • IDDE training frequency and type in annual report

Veolia Project Manager	**Holyoke Stormwater Coordinator**	**Holyoke Department of Public Works Director**	**Holyoke City Engineer**
Michael Williams Veolia (413) 534-2222	Miira Gates Public Works (DPW) (413) 322-5645	Carl Rossi Public Works (DPW) (413) 322-5645	Victoria Houle Public Works (DPW) (413) 322-5645

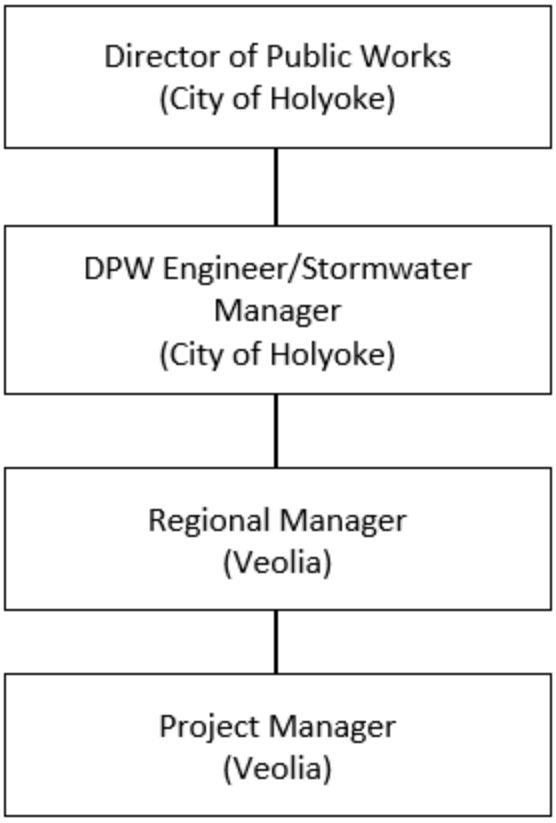


Figure 2-1: Organizational Structure

3 STORMWATER SYSTEM MAPPING

Holyoke's MS4 system maps are used to identify key stormwater infrastructure, factors influencing proper system operation, and the potential for illicit sanitary discharges. The City of Holyoke developed an updated stormwater map to begin addressing mapping requirements of the 2016 MS4 Permit and the Consent Decree Term 21. A copy of the Stormwater System Map is included in **Appendix C.** The Stormwater System Map includes outfalls categorized by priority, receiving water bodies, and preliminary catchment delineations.

The City is working with Veolia on the stormwater system mapping. Veolia is using both desktop analysis and field verification to further improve the accuracy of the existing GIS mapping data. There were about 15 outfalls added to the inventory as a result of mapping and field investigation efforts in West Holyoke. The rest of the increase is due to field investigation efforts that uncovered several previously unidentified outfalls. The inventory and ranking will be updated as additional information from the outfall screening and catchment investigations become available. The screening and catchment investigations are discussed in **Section 6** and **Section 7**, respectively.

Updated maps reflecting newly developed and/or discovered information, corrections, and modifications are submitted in conjunction with compliance reports semi-annually. In compliance with the MS4 Permit and Consent Decree Term 21, the following information and features are included on the MS4 map, and updated after new data becomes available:

- Base Map containing municipal property information.
- Water Resources and Topographic Features.
- Stormwater Infrastructure.
- Collection System (outside MS4)
- Investigations, remediation, and capital prxojects completed for the City's MS4 and collection system.

3.1 MAPPING NEXT STEPS

Gaps in Holyoke's GIS data are addressed in this IDDE Plan. Updates to the mapping will occur as field information from ongoing investigations is added to the database. In addition, the City is developing procedures to formalize the following updates to its map:

- Refine spatial location of outfalls and storm drain collection system as a whole
- Identify stormwater treatment structures and refine spatial location
- Refine catchment delineations
- Refine mapping of sanitary sewer collection and treatment system, including septic systems

4 SANITARY SEWER OVERFLOWS (SSOS)

The MS4 permit requires municipalities to prohibit illicit discharges, including sanitary sewer overflows (SSOs) to the MS4. An SSO is a discharge of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer system bypasses that allow stormwater and groundwater to overload the system, power failures, and human error.

4.1 SSO INVENTORY

As part of its Stormwater Management Plan (SWMP), the City maintains an SSO inventory that includes the following information:

- Location (approximate street crossing/address and receiving water, if any).
- A clear statement of whether the discharge entered a surface water directly or entered the MS4.
- Date(s) and time(s) of each known SSO occurrence.
- Estimated volume(s) of the occurrence.
- Description of the occurrence including known or suspected cause(s).
- Mitigation and corrective actions and completion dates as well as planned corrective measures and their implementation schedule.

The SSO inventory is updated annually and is included in the Annual Report. The SSO inventory is summarized in **Table 4-1**.

4.2 REMOVAL AND NOTIFICATION

Upon detecting or receiving notice of an SSO, the City shall eliminate it as soon as possible and take interim mitigation steps to minimize the discharge of pollutants to the MS4 until the SSO is eliminated. Holyoke must provide oral notification to the U.S.EPA within 24 hours of becoming aware of an SSO, as well as written notification within 5 days of becoming aware of an SSO.

The City is required to issue public advisory notifications within 2 hours of discovery of the SSO, posting public advisory notifications to the City's website and reporting into the MassDEP's online data system.

MassDEP Contact
Western Region (413) 784-1100
436 Dwight Street
Springfield, MA 01103
24-hour Emergency Line 1-888-304-1133

U.S. EPA Contact
New England (888) 372-7341
5 Post Office Square
Boston, MA 02109

Table 4-1: **MS4 SSO Inventory**

SSO Location[1]	Discharge Statement[2]	Date	Duration	Volume (gals)[3]	Description[4]	Mitigation Steps[5]	Date Completed[6]
50 Holy Family Rd.	Tannery Brook	1/24/2019	1.5 hrs.	2,250	Grease & Rags	Removed blockage. Jet cleaned sewer main.	12/08/2019
75 Reservation Rd. 200 Whiting Farms Rd.	Ground Tannery brook	4/24/2019 7/23/2019	2 hrs. 1.5hrs.	30 >10,000	Debris & Rocks Grease & Rags	Removed blockage. Sewer main will be jet cleaned Removed blockage Main was put on Bi-monthly cleaning list.	summer 2019 7/23/2019
20 Easthampton Rd.	Green Brook	1/13/2020	1hr	300	Grease	Removed blockage. De greased sewer main.	1/13/2020
63 Canal St.	Ct. River	4/26/2022	36 mins.	225	Debris	Removed blockage. Jet cleaned main.	4/26/2022
Whiting Reservoir	CT. River	06/07/2022	3.15 hrs.	900	Grease & debris	Removed blockage. Jet cleaned main.	06/07/2022
Yale St.	Ground	8/23/2022	Unknown	300-500	Unbolted man hole	Replaced missing bolts on manhole.	8/26/2022
50 Holy Family Rd.	Tannery Brook	12/08/2022	1.25 hrs.	1,500	Grease & Rags	Removed blockage. Jet cleaned sewer main.	12/08/2022
Highland Park Pump Station	Ct. River	3/17/2023	3.25hrs.	600	Force main failure	Setup bypass and shut station down. Replaced failed section of main.	3/27/2023
58 Canal St	No release to surface water	11/9/2023	1.5 hrs	<100	Sewer system blockage	Jetted main and removed blockage, vac cleaned the entire area.	11/9/2023
105 Old Easthampton Rd	No release to surface water	10/25/2023	1.25 hrs	25-50	Sewer system blockage	Jetted main and removed blockage, vac cleaned the entire area.	10/25/2023
145 Westfield Rd and Woodland Street	No release to surface water	4/6/2024	1 hr	1000	Sewer system blockage	Jetted main and removed blockage, vac cleaned the entire area.	4/6/2024

Notes:

1 Location (approximate street crossing/address and receiving water, if any)

2 A clear statement of whether the discharge entered a surface water directly or entered the MS4

3 Estimated volume(s) of the occurrence

4 Description of the occurrence indicating known or suspected cause(s)

5 Mitigation and corrective measures taken or planned

6 Date mitigation and corrective measures completed

5 ASSESSMENT OF CATCHMENTS AND OUTFALLS

The MS4 permit requires Holyoke to assess and rank outfalls and interconnections based on their illicit discharge potential and the significance of the potential public health issues associated with such discharges. The rankings are used to prioritize the order of screening outfalls and interconnections and the order of conducting catchment investigations for evidence of illicit discharges and SSOs. The rankings are also used to track progress towards meeting permit milestones.

5.1 OUTFALL/INTERCONNECTION INVENTORY

The City maintains an inventory of each outfall and interconnection that discharges from the MS4. Currently, 103 public outfalls within the Holyoke MS4 area have been identified. The inventory includes the outfall and interconnection locations as well as a means of tracking all inspections, screenings, samplings, and other activities covered by the IDDE program.

5.2 OUTFALL CATCHMENT DELINEATIONS

A catchment is the area that drains to an outfall or interconnection. Catchment delineations define the contributing areas for investigations of potential sources of illicit discharges. Delineations are based on topographic maps (USGS Springfield North Quadrangle, Massachusetts, 7.5 minute, 2018 and Mount Tom Quadrangle, Massachusetts, 7.5 minute, 2018) and mapped drainage infrastructure. Initial catchment delineations are complete and can be found in **Appendix C**. Further refined delineations will be completed as catchment investigations continue.

5.3 PRELIMINARY RANKING OF OUTFALLS AND INTERCONNECTIONS

Last year's inventory of 67 outfalls was given a preliminary ranking based on receiving water body and whether they had been previously sampled by EPA (in May and July 2019). Outfalls were ranked and prioritized using a point system: one (1) point was assigned to each outfall that drains directly into an impaired water body, and one (1) point was given to each outfall that had been previously sampled by the EPA. The outfalls that the EPA sampled all yielded testing results above at least one analyte threshold, including ammonia, chlorine, surfactants, E. coli, and Enterococcus. Any outfall with one or more points is considered high priority. The Preliminary Prioritized Outfall list is included as **Appendix D**.

5.4 REPRIORITIZATION OF OUTFALLS AND INTERCONNECTIONS

Upon completion of all dry weather outfall screenings, the City updated the outfall priority rankings (see **Appendix E**) based on the dry weather screening data. The reprioritization was completed by adapting the Neponset Stormwater Partnership Outfall Inventory and Prioritization Tool to Holyoke's specific case.

There are a number of MS4 outfalls located in West Holyoke that were not included in the previous year's inventory. Field investigations and mapping efforts uncovered approximately 15 outfalls in the West Holyoke area between May 2023 and June 2024. The West Holyoke outfalls, in addition to the 21 other outfalls identified during field investigation and mapping efforts in Permit Year 2023-2024, were incorporated into the reprioritization, bringing the total MS4 outfall count from 67 outfalls previously to 103 outfalls currently.

As seen in **Table 5-1**, outfalls were differentiated between Problem, High, and Low priority to establish a priority ranking for catchment investigations. Ranking was based on a point system for the following factors:

- Impaired Receiving Water Bodies and Streams,
- Discharges to Water Bodies designated for recreational activities,
- Discharges to Zone 1 or Zone 2 Wellhead Protection Areas,
- Sewage indicators found during wet weather outfall screening (automatically prioritized as Problem),
- Seage indicators found during dry weather outfall screening (automatically prioritized as Problem),
- Recent CSO Separation,
- Land Use Data, and
- Stormwater Related Impairments.

Table 5-1: EPA Priority Categorization of Outfalls

EPA Priority Category	Description	No. of Outfalls in Holyoke
Problem	**Problem outfalls** have known or suspected contributions of illicit discharges and include outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input is indicated by bacteria levels above 410 MPN/100mL during dry or wet weather outfall screening.	19
High	**High Priority** outfalls discharge to any one of the following: • areas concerning public health due to their proximity to public beaches, recreational areas, or drinking water supplies; • bacteria/pathogen impaired water bodies; or • Zone 1 and Zone 2 Wellhead Protection areas designated by MassDEP	52
Low	**Low Priority** outfalls are considered to be low priority based on land use data and the absence of aforementioned environmental factors that would cause an outfall to be ranked as Problem or High Priority.	32
Excluded	**Excluded** outfalls have no potential for illicit discharges and are excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments that neither cross nor are in proximity to sanitary sewer alignments through undeveloped land.	0
Total Outfalls		103

The reprioritization was based on a two-tier ranking and categorization system, adapted from the Neponset Stormwater Partnership Reprioritization Tool. If an outfall was automatically triggered to be a Problem outfall based on likely sewer input/potential illicit discharges, it did not receive an outfall score because the investigation of catchments associated with any Problem outfall must be prioritized and investigated as soon as possible. As such, the 19 identified Problem outfalls and their associated catchments will be investigated during the next Permit year (2024-2025) before any High or Low ranked Priority outfalls.

If an outfall discharged to a public beach or water body designated for recreational or fishing use; a bacteria-impaired water body; or a Zone 1 or 2 Wellhead Protection area (designated by MassDEP), it is automatically ranked as High Priority. The outfalls that don't satisfy the aforementioned triggers to become Problem or High Priority are designated as Low Priority. The outfall score for Low Priority outfalls may increase based on land use data (open space = 1, residential = 2, commercial/industrial/institutional = 3) or stormwater related impairments (PCBs, debris, oil, etc.) to the receiving waterbody. Once outfalls are categorized into Problem, High, and Low priority, they are then ranked based on outfall score within the High and Low Priority categories. Rankings will be updated and presented in future reports as catchment investigations and wet weather outfall screenings continue.

The order of catchment investigations should go as follows whenever it is possible:

1. **Problem** outfalls and their associated catchments
2. **High Priority** outfalls and their associated catchments in order of highest to lowest outfall score
3. **Low Priority** outfalls and their associated catchments in order of highest to lowest outfall score

Out of a total of 103 outfalls in the MS4 urbanized areas of Holyoke, 19 were ranked as **Problem** outfalls, 52 were **High Priority** outfalls, and 32 were **Low Priority** outfalls. Both the MS4 map (**Appendix C**) and the Reprioritized Outfall Inventory Ranking Table (**Appendix E**) were updated according to recent data.

6 DRY WEATHER OUTFALL AND INTERCONNECTION SCREENING AND SAMPLING

(Consent Decree Term #13)

Outfalls can be in the form of pipes or ditches and are the final point of discharge into a body of water for an engineered storm drain system. Current and pending regulations require that all outfalls in the storm drain system be inspected and that their water quality be analyzed under dry and wet weather conditions. This section is a description of the objectives of dry weather outfall inspections. **Section 7.2** covers the objectives for wet weather outfall inspections.

Dry weather flow is a common indicator of potential illicit connections. Veolia inspects and screens outfalls and interconnections in accordance with their priority ranking and the IDDE Program Timeline (**Appendix A**). The proper identification of any potential source(s) of an illicit discharge is further described in **Section 7.4**.

6.1 WEATHER CONDITIONS

To ensure that sampling occurs during dry weather conditions, screening and sampling takes place when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period, or 48-hour period when possible, and during times when there is no significant snow melt.

6.2 SCREENING REQUIREMENTS

Screening data is included in the outfall/ interconnection inventory and is used to set and update priority rankings for future screenings. For every outfall and interconnection, the following data is collected and entered into the digital inventory:

- Unique identifier.
- Receiving water.
- Date of most recent inspection.
- Dimensions and shape.
- Material (concrete, PVC).
- Spatial location (latitude and longitude within +/- 30 feet).
- Physical condition (vegetation and damage to outfall structures).
- Visual/olfactory evidence of non-stormwater discharge (evidence of flow, odor, color, turbidity, floatables (suds, toilet paper, or sanitary products), deposits, oil sheen.

6.2.1 ACCESS

As per the 2016 Massachusetts Small MS4 General Permit, if an outfall/interconnection is inaccessible or submerged, the permittee shall proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results.

6.2.2 IDENTIFICATION OF ILLICIT DISCHARGE

Any flow observed during dry weather conditions at a stormwater outfall or manhole is a strong indicator of illicit discharges, though it is important to inspect within and around the outfall or manhole for other indicators of the type of discharge. If no flow is observed, there may be other visual or olfactory indicators that past flow existed, which are shown in **Table 6-1**.

Table 6-1: Visual Condition Assessment

Indicator	Possible Source
Foam	upstream vehicle washing activities or illicit discharge
Oil Sheen	leak or spill
Cloudiness	suspended solids (i.e. dust, ash, powdered chemicals, ground up materials, etc.)
Color or Odor	raw materials, chemicals, or sewage
Excessive Sediment	disturbed earth of unpaved areas lacking adequate erosion control measures
Sanitary Waste/ Optical Enhancers*	illicit discharge
Orange Staining	high mineral concentrations

* Fluorescent dyes added to laundry detergent and some toilet paper

While many of the indicators listed in **Table 6-1** would indicate an illicit discharge, some indicators may occur naturally. For example, orange staining could be the result of naturally occurring iron. Foam can also be naturally occurring or caused by a pollutant; however, it may be difficult to determine the difference between natural foam and foam caused by pollution. Natural foam can typically be found in water with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. As per the Central Massachusetts Regional Stormwater Coalition, it is important to consider the factors listed in **Table 6-2** when determining if the source of foam present at a stormwater outfall is natural or not.

Table 6-2: Conditional and Qualitative Considerations of Foam

Factors	Explanation
Wind Direction or Turbulence	Natural foam occurrences of the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
Proximity to Potential Pollution Source	Some entities including the textile industry, paper production facilities, oil industries, and firefighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. The presence of silt in water, such as from a construction site can cause foam.
Physical Feeling	Natural foam is typically persistent, light, not slimy to the touch.
Visual Observation	Prescence of decomposing plants or organic material in the water.

In addition to foam, both bacteria and petroleum can create a sheen on the water surface. Differentiating the two can be as simple as disturbing the “sheen” with a pole, stick, or similar object. A sheen caused by oil will remain intact and move in a swirl pattern while a sheen caused by bacteria will separate into several smaller patches and appear “blocky.” In addition, bacteria or naturally occurring sheens are usually silver or dull in color. While bacterial sheen is not a pollutant, it should be noted when describing the discharge.

Optical enhancers, however, can be visible to the naked eye when found in high enough concentrations and will appear as a bluish-purple haze. If a visual observation is unable to confirm the presence of this pollutant, a quantitative test can be used. To perform this test, a clean, white, cotton pad should be placed, either directly in, or within a sample of, the discharge for several days. After soaking, the cotton pad should be dried and then viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be the pollutant. The magnitude of the fluorescence, as measured in fluorescent units, can be used to determine the concentration of optical enhancers within the sample. Often a visual observation is enough. It is not typical that this analysis is required. If evidence of illicit flow exists, a sample should be taken and observations should be recorded.

6.2.3 SAMPLE COLLECTION AND TESTING

At least one (1) sample from each catchment during dry weather flow conditions is collected and analyzed for: ammonia, chlorine, conductivity, salinity, surfactants (such as MBAS), and temperature. E. Coli bacteria samples should be taken only if:

a. outfalls identified by EPA in sampling results previously supplied to the City on May 7-8, 2019 and July 7, 2019 based on field test kit screening;

b. olfactory or visual evidence of sewage;

c. an exceedance of a bacterial threshold concurrent with meeting or exceeding of both the surfactant and ammonia thresholds;

d. an exceedance of both the surfactant and ammonia thresholds concurrent with any detectable level of chlorine; and

e. an exceedance of a bacterial threshold concurrent with any detectable level of ammonia below its threshold.

A discrete manual or grab sample will be collected for dry weather outfall inspections due to the time-sensitive nature of the process. Grab samples classify water at a distinct point in time and are used primarily when the water quality of the discharge is expected to be homogenous, or unchanging, in nature. A flow-weighted composite sample captures water quality over a measured period of time and is used when the water quality of discharge is expected to be heterogenous, or fluctuating, in nature.

Protocols for collecting a grab sample, as per the Central Massachusetts Regional Stormwater Coalition, are as follows:

1. Fill out sample information on sample bottles and field sheets (see Attachment 4 for example field sheets).
7. Do not eat, drink, or smoke during sample collection and processing.
8. Do not collect or process samples near a running vehicle.
9. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
10. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
11. Never touch the inside surface of a sample container or lid, even with gloved hands.
12. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
13. Collect samples with a dipper or directly into sample containers. If possible, collect water while facing upstream of the flow into the sample bottles to not disturb water or sediments in the outfall pipe or ditch.

14. Do not overfill sample containers, and do not dump any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
15. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
16. Do not allow any object or material to fall into or contact the collected water sample.
17. Replace and tighten sample container lids immediately after sample collection.
18. Place laboratory samples on ice for analysis of bacteria and pollutants of concern.
19. Accurately label the sample with the time and location.
20. Document on the Dry Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on an Inspection Survey (See **Appendix F** for field inspection forms). This creates a reference point for samples.
21. Fill out chain-of-custody form for laboratory samples.
22. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled, except for bacteria sampling.
23. Store used test strips and test kit waste/ampules properly in a 5-gallon bucket with a cover. Storage and disposal shall be coordinated with the City.
24. Decontaminate all testing personnel and equipment.

Samples that are unable to be analyzed for parameters using field instrumentation require laboratory analysis. Coordination with the laboratory, including the pick-up and/or dropping off of samples, is the responsibility of the City. The laboratory requires that a chain-of-custody form be filled out and accompany any samples that require analysis. The laboratory will also provide additional details regarding how samples should be collected based on the sample containers and/or specific analytes.

Table 6-3 includes field equipment commonly used for outfall screening and sampling. **Table 6-4** summarizes tests performed for each analyte and indicates whether they are done in the field or sent to an outside laboratory.

Table 6-3: Field Equipment

Equipment	Purpose
Covered Metal Clipboard	For organization/ protection of field sheets and writing surface
Field Sheets or Tablet for Electronic Forms	Field sheets for both dry weather inspection and Dry weather sampling should be available with extra copies
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler and prevent contamination of samples
Flashlight/headlamp w/batteries	For inspecting outfalls or manholes
Cooler with Ice	For transporting samples to the laboratory (see sample holding requirements)
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, safety glasses, nitrile gloves and boots, steel toed shoes
Insect/Plant Repellant and Sunscreen	Protection from environmental conditions
GPS Receiver	For recording spatial location data
Distilled Water/Calibration Standards	For use with test kits and water quality meters; cleaning equipment and calibration
Water Quality Meter(s)	Handheld meters for testing various water quality parameters such as ammonia, surfactants, and chlorine
Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean and keep extra sample containers on hand at all times. Confirm sample containers are appropriate for what is being sampled for (i.e., sterile containers for bacteria).
Pry Bar. Shovel, or Pick	For opening catch basins and manholes
Sandbags	For damming low flows to collect water for sampling
Small Mallet or Hammer	To free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	To clearly mark areas where samplers are present
Hand Sanitizer	To disinfect hands and nitrile gloves especially prior to collecting samples for bacterial analysis
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes
5-Gallon Bucket w/ Cover	Disposal of chemical waste
Confined Space Entry Equipment (if needed)	DBI Sali Tripod and retrieval winch; MSA Tripod, rescue wench and material/personal wench; full body harness; 10’ ladder; waders; hard hat; air monitoring equipment (Ventis 4 gas meter)

Table 6-4: Sampling Parameters and Analysis Methods

Analyte/Indicator	Threshold Limits in a Single Field Sample	Instrumentation	Max. Hold Time	Preservatives
E. Coli	≥ 410 cfu/100 ml	Laboratory via approved method	8 hours	Cool ≤10°C, 0.0008% Na2S2O3
Enterococci	≥ 130 cfu/100 ml	Laboratory via approved method		
Surfactants	≥ 0.25 mg/l	MBAS Field Test Kit (e.g. CHEMetrics K-9400)	48 hours	Cool ≤6°C
	≥ 0.1 mg/l	Laboratory via approved method		
Ammonia (NH_3)	≥ 0.5 mg/l	Ammonia Field Test Strips (e.g. Hach Brand)	28 days	Cool ≤6°C, H2SO4 to pH <2, No preservative required if analyzed immediately
	≥ 0.1 mg/l	Laboratory via approved method		
Chlorine	≥ 0.02 mg/l	Field Meter (e.g. Hach Pocket Colorimeter II)	Analyze within 15 minutes	None Required
Temperature	N/A	Field Meter (e.g. YSI Model 30)	Immediate	None Required
Conductivity	N/A	Field Meter (e.g. YSI Model 30)	28 days	Cool ≤6°C
Salinity	N/A	Field Meter (e.g. YSI Model 30)	28 days	Cool ≤6°C

Notes:
Where water is being discharged directly into an impaired water body subject to an approved TMDL, the sample must be analyzed for the pollutant(s) of concern identified as the cause of the water quality impairment.

According to the 2016 MS4 Permit and Consent Decree, all analyses, except for indicator bacteria and pollutants of concern, can be performed with field tests or field instrumentation and are not subject to 40 CFR part 136 requirements. Sampling for bacteria and pollutants of concern shall be conducted using the analytical methods found in 40 CFR § 136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR § 136.

The City, facilitated by Kleinfelder, is responsible for selecting a laboratory or field kits intended for measuring each analyte. When selecting field kits, Kleinfelder will review the detection range for each field kit and ensure it corresponds to the threshold limits for each analyte of interest. These limits will be communicated to the laboratory so that the laboratory's instrumentation can be properly calibrated to account for the threshold concentrations. In addition, each analyte has a corresponding analytical method, as per Appendix G of the 2016 MS4 General Permit, that each field kit and laboratory analysis shall utilize to ensure compliance. Lastly, as per 40 CFR § 136, maximum holding times and preservation requirements should be communicated to the laboratory. This is not applicable for field kits since

samples are analyzed instantaneously after sample collection. **Table 6-4** summarizes this information, which should be shared with the selected laboratory to ensure compliance with the Permit.

Testing for indicator bacteria and any pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR §136. Samples for laboratory analysis must be stored and preserved in accordance with procedures found in 40 CFR §136. **Table 6-4** is a list of analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

6.3 INTERPRETING OUTFALL SAMPLING RESULTS

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. Screening values that exceed these benchmarks indicate the presence of pollution and/or illicit discharges.

Evaluation of sample data can show positive results due to sources other than human wastewater and false negative results due to chemical reactions or interferences. For example, elevated ammonia readings are common in the New England region due to sampling near historically filled tidal wetlands where the breakdown of biological organic material can skew sample results. The same elevated ammonia readings can also be triggered by discharge from a nearby landfill. In addition, elevated surfactant readings caused by salinity levels greater than one (1) part per thousand can be triggered by the presence of oil. Inconclusive surfactant readings, where the indicator ampule turns green instead of a shade of blue, can often be caused by fine suspended particulate matter being present in the sample being tested. Finally, very low bacteria concentrations can often be the result of elevated chlorine from leaking drinking water infrastructure inhibiting bacterial growth. As such, any detection of chlorine above the instrument Reporting Limit should be noted.

6.4 STATUS OF OUTFALL SCREENINGS AND RESULTS

Veolia has completed dry weather outfall screenings for the City of Holyoke and has begun the wet weather outfall screenings and catchment investigations as of June 2024.

Of the 103 outfalls that were screened during dry weather, 47 outfalls were flowing and were thus sampled. Of the 47 outfalls that were sampled, eight (8) outfalls have potential illicit discharges, indicated by an E. coli result equal to or greater than 410 MPN/100ml. These eight (8) outfalls are included in the nineteen (19) Problem outfalls and will be investigated during catchment investigations in the next Permit year (2024-2025). The IDs for these specific outfalls can be found in the Reprioritization table in **APPENDIX E**.

As wet weather outfall screening and catchment investigations continue, the City will update outfall priorities. Records of field investigations can be found in **Appendix H**.

7 CATCHMENT INVESTIGATIONS

This section of the IDDE describes the catchment investigation procedure to investigate outfall catchments to trace the source of potential illicit discharges. The MS4 Permit requires catchment investigations for outfalls and/or interconnections to begin no later than June 30, 2020, and that all catchments affiliated with problem outfalls be investigated by June 30, 2025. Catchment investigations affiliated with all the other high and low priority outfalls must be completed by June 30, 2028. Catchment investigation techniques include, but are not limited to, reviewing maps, historic plans, and records. Data collected during catchment investigations will be recorded and reported in each annual report. Infrastructure information gathered during catchment investigations will be incorporated into the MS4 maps.

7.1 DRY WEATHER MANHOLE INSPECTIONS (Consent Decree Term #13)

A key step in catchment investigations is dry weather investigations of the manholes in the storm drain network. Investigations involve systematically and progressively observing, sampling, and evaluating key junction manholes, defined as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets that are only from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.
- **Key Junction Manholes** can represent one or more junction manhole. Adequate implementation of the IDDE program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. Veolia may exclude a junction manhole located upstream and in the immediate vicinity from another manhole, or one that serves a drainage alignment that has no potential for illicit connections.

For all catchments requiring investigation during dry weather, Veolia systematically inspects key junction manholes for evidence of illicit discharges. The program requires progressive inspection and sampling at manholes to find evidence of illicit discharges and to isolate and eliminate them.

Prior to manhole inspections property owners will be notified and the storm drain system will be cleaned, catchment investigations can begin. Veolia's inspections are conducted in one of two ways (or a combination of both):

- Working progressively up from an outfall and inspecting key junction manholes along the way ("Bottom Up"), and/or
- Working progressively down from the upper parts of the catchment towards the outfall ("Top Down").

The decision to work bottom up or top down depends on the nature of the drainage system, the land use, and the availability of information on the catchment and drainage system. A bottom-up approach can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. A top-down approach requires more advance preparation and reliable drainage system information on the upstream segments of the storm drain system but may be more efficient if the sources of illicit discharged are believed to be located in the upstream portions of the catchment area.

Once an inspection direction has been chosen, the investigation can then begin with key junction manholes and mainline manholes. From there, the inspection can continue towards junction manholes and other manholes, if needed, with the purpose to isolate any illicit discharges. The specific steps are as follows:

1. Manholes are opened and inspected for visual and olfactory evidence of illicit connections during dry weather. Visual evidence may include toilet paper, gray filamentous bacterial growth, sanitary products, sewage, soap, food, or other indications of anything other than stormwater. Olfactory evidence may include sewage, soap, laundry, bleach, or other odors not typical of stormwater. Sample outfall and manhole inspection forms are in Appendix E.

25. When possible, condition information and measured elevation of the manhole rim as well as the invert depth should be recorded.

26. If flows are observed, the inlet and outlet direction of the flow should be recorded.

27. If no flow is observed, record whether the manhole is dry or has standing water and move on to the next manhole upstream or downstream.

28. As the investigation follows the catchment upstream or downstream, only the most upstream manhole with flow should be sampled. For example, if flow is observed at an outfall, as well as

at the next three (3) manholes upstream, then only sample and test at the third manhole upstream. Testing should include chlorine, ammonia, surfactants, conductivity, salinity, and temperature. Refer to **Section 6.2.3** for information on when to take E. Coli bacteria samples. Refer to **Table 6-4** for threshold limits for each analyte.

29. If sampling results or visual or olfactory observations indicate potential illicit discharges or SSOs, Veolia flags the area draining to the junction manhole for further upstream investigation and/or isolation and confirmation of sources.
30. Additional key junction manhole inspections will proceed until the location of the suspected illicit discharge(s) or SSO(s) are located and isolated to a pipe segment between two manholes.
31. If no evidence of an illicit discharge is found, the catchment investigation is complete upon completion of key junction manhole sampling.

7.2 WET WEATHER OUTFALL SAMPLING (Consent Decree Term #14)

Catchments that have a minimum of one (1) system vulnerability factor (SVF) are screened during wet weather conditions. These catchments are sampled and inspected to the extent necessary to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems-results in discharges of sanitary flows to the MS4. Catchment investigations are not considered complete until wet weather inspections are done.

Wet weather sampling events are scheduled to occur during the spring (March to June) when groundwater levels are high and timed to avoid sampling during the first flush of a wet weather event.

At least one (1) wet weather sample is collected and analyzed for: ammonia, chlorine, conductivity, salinity, E. coli, surfactants (such as MBAS), and pollutants of concern (nitrogen, if discharge directly flows to the Connecticut River).

In May 2024, 23 outfalls were screened during wet weather. Thirteen (13) of the 23 outfalls yielded data that indicated a potential illicit discharge due to their E. coli results exceeding the EPA threshold of 410 MPN/100mL. These thirteen (13) outfalls represent a portion of the nineteen (19) Problem outfalls and will be investigated in the next Permit year (2024-2025). Two (2) outfalls tested above the EPA bacteria threshold during both dry and wet weather screenings. The IDs for these specific outfalls can be found in the Reprioritization table in **APPENDIX E**. Veolia will continue to perform wet weather outfall screenings on the remaining outfalls throughout the Permit term. Screening records are in **APPENDIX H**.

7.3 ILLICIT DISCHARGE IDENTIFICATION, SOURCE ISOLATION, AND CONFIRMATION

Once the source of an illicit discharge is approximated between two manholes, a range of techniques can be used to isolate and confirm the source of the discharge that may include:

- Sandbagging
- Smoke Testing
- Dye Testing
- Video Inspections
- Optical Brightener Monitoring

These methods are described in further detail below.

7.3.1 SANDBAGGING

This technique is used to identify and isolate intermittent sources of illicit discharge or sources having little perceptible flow. Sandbagging involves placing sandbags or other temporary barriers (caulking, weirs/plates, etc.) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. The bags and barriers are only deployed during dry weather conditions and typically left in place for 48 hours. If water collects behind the barrier after 48 hours, it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of intermittent discharge.

7.3.2 SMOKE TESTING

Smoke testing is used on short sections of pipes or pipes with small diameters. It is used to trace illegal connections from buildings to the sewer. Smoke testing involves injecting non-toxic smoke into drain lines and the emergence of smoke from sanitary sewer vents in or from cracks and leaks in the system. Typically, a smoke bomb or smoke generator is used to inject smoke into a catch basin or manhole.

Before conducting any smoke testing, area residents, business owners, and local police and fire departments are notified. Smoke can cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the testing area to ensure safety.

7.3.3 DYE TESTING

Dye testing involves flushing non-toxic dye into plumbing fixtures (toilets, showers, sinks) and observers standby at nearby storm drains, sewer manholes, and outfalls. Dye testing is done by a team of two or more with one person stationed inside the building, while others are stationed at the appropriate storm sewer and sanitary sewer manhole and/or outfall. The person inside the building adds dye into a plumbing fixture (sink or toilet) and runs water to move the dye through the system. Employees stationed outside are notified that the dye has been dropped and watch for the dye in the storm sewer and sanitary sewer.

Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses. Before dye testing is done, affected residents, business owners, the local police and fire departments, and public health staff are notified.

7.3.4 VIDEO INSPECTIONS

Video inspections use mobile video cameras that are guided remotely through the stormwater drain lines to observe possible illicit discharges.

7.3.5 OPTICAL BRIGHTENER MONITORING

Optical brighteners are fluorescent dyes that are used in detergents and paper products. The presence of optical brighteners in surface waters or dry weather discharges indicates a possible illicit discharge or insufficient wastewater treatment at nearby septic systems or wastewater treatment plants. Optical brightener monitoring involves placing a cotton pad in a wire cage and securing the cage in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is collected and viewed with a UV light or with a fluorometer to determine the presence or absence of brighteners. Additional instructions and Standard Operating Procedures (SOPs) for these methods are in Appendix F.

7.4 ILLICIT DISCHARGE REMOVAL

Once an illicit source is identified, the Veolia Project Manager contacts the Stormwater Manager and the City Engineer . The City Engineer, in accordance with legal authorities, notifies all responsible parties and requires immediate cessation of improper disposal practices. The City and Veolia take appropriate steps to eliminate the illicit discharge as expeditiously as possible. While the illicit discharge is being eliminated, all reasonable and prudent steps to minimize the discharge of pollutants to the MS4 are taken.

When an illicit discharge cannot be removed within 60 days of being identified, the City creates a schedule for elimination and reports dates and schedules for removal in the annual report.

For each confirmed source, Holyoke documents the following information in its Annual Report:

- Location of ID and its source(s);
- A description of the discharge;
- The method of discovery;
- The date of discovery;
- The date of elimination, mitigation or enforcement action or planned corrective measure and a schedule for completing the ID removal; and
- The estimate of the volume of flow removed.

7.4.1 CONFIRMATORY OUTFALL OR INTERCONNECTION SCREENING

Within one (1) year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening shall be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment shall be scheduled for additional investigation. Catchments investigations are considered complete upon confirmation of all illicit sources.

7.5 STATUS OF CATCHMENT INVESTIGATIONS AND RESULTS

Veolia has begun catchment investigations upon the completion of all dry weather outfall screenings. Veolia has reported the completion of 23 catchment investigations as of June 2024. The results and findings of these investigations are currently being reviewed and will be reported in the next compliance report due in July 2024.

8 INVESTIGATION AND SCREENING TIMELINE

The goal of the MS4 program is to conduct continual screening of each outfall and catchment area. After the initial screening of outfalls and catchment investigations are completed, and the illicit discharges identified, eliminated, and confirmed, the inspection and screening cycle continues. Ongoing screening consists of both dry weather and wet weather screening and sampling of all outfalls. Each outfall or interconnection will be reprioritized for screening once every five years based on previous screening results. The dry weather screenings are conducted once every five years for each outfall upon completion of all catchment investigations, and based on the 2023 Consent Decree, the wet weather screenings are conducted on a 3-year cycle.

Table 8-1 details a recommended timeline to complete the remaining fieldwork tasks by the end of the Permit.

Table 8-1: Investigation and Screening Schedule

5-Year Schedule							
Task	**Years to Complete**	**Total Number of Outfalls/ Catchments**	**Completed 2023-2024**	**2024-2025**	**2025-2026**	**2026-2027**	**2027-2028**
Catchment Investigations	5	103	23	20-25[1]	25-30	15-20	15-20
Dry Weather Screening	1	103	103	0	0	0	0
Wet Weather Screening[2]	3	103	24	40	39	35	35

1. Ranges are provided to account for variability in the size of individual catchments.
2. The 2023 Consent Decree requires the City to perform wet weather screenings on all outfalls once every three (3) years. The first 3-year wet weather screening cycle ends in June 2026; the subsequent cycle will range from July 2026 to June 2029 (the first two years of the cycle shown in this table).

Each task type will be performed on separate field days because catchment investigations must be completed during dry weather and wet weather outfall screenings must be completed during wet weather. The City may choose to follow their own timeline to complete fieldwork, but **Table 8-1** serves as a guide.

Additional instructions and Standard Operating Procedures (SOPs) for outfall screenings and catchment investigations are in **Appendix G**.

9 TRAINING

Veolia provides annual IDDE training to all employees involved in the IDDE program. At a minimum, training includes how to identify illicit discharges and SSOs. Training records, including the frequency and type, are recorded on a form included in **Appendix I** and included in the annual report.

10 ANNUAL REPORT

Holyoke and Veolia evaluate the progress of their IDDE Program annually. This evaluation is documented in the annual report and includes:

- Number of SSOs and Illicit discharges identified and removed;
- Number and percent of total outfall catchments served by the MS4 that have been evaluated using the catchment investigation procedure;
- Number of dry weather outfall inspections/screenings;
- Number of wet weather outfall inspections/sampling events;
- Number of enforcement notices issued;
- All dry weather and wet weather screening and sampling results;
- Estimates of the volume of stormwater removed; and
- Number of employees trained annually.

11 REFERENCES

1. United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal .–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf

2. Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures

3. United States Environmental Protection Agency (EPA). March 22, 2023. *United States and Massachusetts v. City of Holyoke* Consent Decree.

APPENDIX A

IDDE Implementation Timeline

IDDE Program Implementation Timeline

(Consent Decree Term #12c and #12d)

IDDE Program Requirement	Target Completion Date						Status
	Completed in 2019		5/31/23 (PY5)	6/30/24 (PY6)	6/30/25 (PY7)	6/30/27 (PY9)	
Written IDDE Program Plan			X				Completed (2024)
SSO Inventory	X						Completed (2024)
Preliminary Ranking of Outfalls and interconnections	X						Completed
Written Catchment Investigation Procedure		X					Completed
IDDE Regulatory Mechanism or By-law (if not already in place)			X				Completed
Dry Weather Outfall Screening				X			Completed
Follow-up Ranking of Outfalls and Interconnections				X			Completed
Catchment Investigations – Problem Outfalls			**Start**		**Finish**		Ongoing
Catchment Investigations – of High and Low Priority Outfalls			**Start**			**Finish**	Ongoing

APPENDIX B

Legal Authority (Stormwater Bylaw)

MODEL

ILLICIT CONNECTIONS AND DISCHARGES ORDINANCE

Pioneer Valley Planning Commission

City of Holyoke

Illicit Connections and Discharges To
The Municipal Storm Drain System Ordinance

SECTION _1. PURPOSE

The purpose of this ordinance is to regulate illicit connections and discharges to the storm drain system, which is necessary for the protection of the City of Holyoke's water bodies, wetlands, and groundwater, and to safeguard the public health, safety, welfare and the environment.

The objectives of this ordinance are:

(1) To prevent pollutants from entering the municipal separate storm sewer system;
(2) To prohibit illicit connections and unauthorized discharges to the stormwater system;
(3) To require the removal of all such illicit connections;
(4) To comply with state and federal statutes and regulations relating to stormwater discharges;
(5) To establish the legal authority to ensure compliance with the provisions of this ordinance through inspection, monitoring, and enforcement.

Increased and contaminated stormwater runoff are major causes of:

(1) Impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater;
(2) Contamination of drinking water supplies;
(3) Alteration or destruction of aquatic and wildlife habitat; and
(4) Local flooding.

SECTION _2. DEFINITIONS

For the purposes of this ordinance, the following shall mean:

Active Groundwater Dewatering (AGD) Device: Any active device used to transport groundwater, i.e. a sump pump.

Authorized Enforcement Agency: The Director of the Department of Public Works or designated representative**,** its employees or agents designated to enforce this ordinance.

Best Management Practice (BMP): An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of stormwater runoff. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act: The Federal Water Pollution Control Act (33 U.S.C. § 1251 *et seq*.) as hereafter amended.

Discharge of Pollutants: The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or Commonwealth from any source.

Grandfathered: Exempt from new legislation, restrictions, or requirements.

Groundwater: All water beneath the surface of the ground.

Illegal Discharge: Any direct or indirect non-stormwater discharge to the municipal storm drain system, except as specifically exempted in Section 7 of this ordinance. The term does not include a discharge in compliance with an NPDES Storm Water Discharge Permit or resulting from fire fighting activities exempted pursuant to Section 7 of this ordinance.

Illicit Connection: Any surface or subsurface drain or conveyance, which allows an illegal discharge into the municipal storm drain system. Illicit connections include conveyances which allow a non-stormwater discharge to the municipal storm drain system, including: sewage, process wastewater or wash water and any connections from indoor drainages sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved before the effective date of this ordinance.

Impervious Surface: Any material or structure on or above the ground that prevents water from infiltrating the underlying soil. Impervious surface includes, without limitation, roads, paved parking lots, sidewalks, and roof tops.

Municipal separate storm sewer system (MS4) or municipal storm drain system: The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drain system owned or operated by the City of Holyoke.

National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit: A permit issued by United States Environmental Protection Agency or jointly with the State that authorizes the discharge of pollutants to waters of the United States.

Non-Stormwater Discharge: Any discharge to the municipal storm drain system not composed entirely of stormwater.

Person: Any individual, partnership, association, firm, company, trust, corporation, and, any agency, authority, department or political subdivision of the Commonwealth or the federal government, to the extent permitted by-law, and any officer, employee, or agent of such person.

Pollutant: Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the Commonwealth. Pollutants shall include**:**

(1) paints, varnishes, and solvents;

(2) oil and other automotive fluids;

(3) liquid and solid wastes and yard wastes;

(4) refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnances, accumulations and floatables;

(5) pesticides, herbicides, and fertilizers;

(6) hazardous materials and wastes; sewage, fecal coliform and pathogens;

(7) dissolved and particulate metals;

(8) animal wastes;

(9) rock; sand; salt, soils;

(10) construction wastes and residues;

(11) and noxious or offensive matter of any kind.

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any material, intermediate product, finished product, or waste product.

Recharge: The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

Storm Drain System: The system of conveyance designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention, or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drain system on public or private ways within the City of Holyoke.

Stormwater: Runoff from precipitation or snow melt.

Toxic or Hazardous Material or Waste: Any material, which because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as Toxic or Hazardous under M.G.L. Ch.21C and Ch.21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

Wastewater: any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

Watercourses: A natural or man-made channel through which water flows or a stream of water, including a river, brook or underground stream.

Waters of the Commonwealth: all waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, costal waters, and groundwater.

SECTION _3. APPLICABILITY

This ordinance shall apply to all flows entering the storm drain system owned and operated by the City of Holyoke.

SECTION _4. AUTHORITY

This bylaw/ordinance is adopted under the authority granted by the Home Rule Amendment of the Massachusetts Constitution and the Home Rule Procedures Act, and pursuant to the regulations of the federal Clean Water Act found at 40 CFR 122:34.

SECTION _5. RESPONSIBILITY FOR ADMINISTRATION

The Director of the Department of Public Works or designated representative shall administer, implement and enforce this ordinance. Any powers granted to or duties imposed upon the Director of the Department of Public Works may be delegated in writing by the Director of the Department of Public Works to employees or agents of the Department of Public Works.

SECTION _6. REGULATIONS

The Director of the Department of Public Works may promulgate rules and regulations to effectuate the purposes of this ordinance. Failure by the Director of the Department of Public Works to promulgate such rules and regulations shall not have the effect of suspending or invalidating this ordinance.

SECTION _7. PROHIBITED ACTIVITIES

1. Illegal Discharges

   No person shall dump, discharge, cause or allow to be discharged any pollutant or non-stormwater discharge into any storm drain system, watercourse, or into the waters of the Commonwealth. Emergency pumping performed by the Fire Department must utilize appropriate best management practices (BMPs) and follow hazardous materials disposal guidelines to prevent contamination of the municipal storm drain system with hazardous materials. If hazardous materials are observed within the flooded area from the activities noted above, or are suspected to be contained therein, a qualified hazmat technician and applicable state and local agencies must be consulted. These agencies will be responsible for implementing the BMPs to the contamination of nearby water ways and the municipal storm drain system.

2. Illicit Connections

   No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection. No grandfathering is permitted.

3. Obstruction of the Municipal Storm Drain System

No person shall obstruct or interfere with the normal flow of stormwater into or out of the storm drain system without prior approval from the Director of the Department of Public Works or designated representative. No person shall dump or dispose of yard waste (leaves, grass clippings, etc.) into the MS4, or into open watercourses (swales, brooks and streams).

Could add the following to elaborate if desired:

a. Drains – No one shall tie any pump, cellar, yard, roof or area drain directly into the storm drain system without approval from the Applicable Authority.

b. Catch Basins – No Person shall directly or indirectly dump, discharge or cause or allow to be discharged into any catch basin, any solid waste, construction debris, paint or paint product, antifreeze, hazardous waste, oil, gasoline, grease and all other automotive and petroleum products, solvents and degreasers, drain cleaners, commercial or household cleaners, soap, detergent, ammonia, food and food waste, grease or yard waste, animal feces, dirt, sand gravel or other pollutant. Any person determined by the applicable authority to be responsible for the discharge of any of the above substances to a catch basin may be held responsible for cleaning the catch basin and any other portions of the storm water system impacted according to City/Town standards and requirements or paying the cost for such cleaning. In addition, the Person shall be responsible for paying any penalties assessed by the City/Town.

c. Septage – No person shall discharge or cause or allow to be discharged any septage, or septage tank or cesspool overflow into the City/Town's storm drain system.

d. Storage & Disposal of Hazardous Material – No one shall dispose of anything other than clear water into the City/Town's storm drain system. The disposal of waste, gasoline or any other hazardous material into the storm drain system is strictly prohibited and is in violation of state and federal pollution laws.

e. Private drainage systems – It is prohibited for anyone with a private drainage system from tying into the public storm drain system without written approval from the Applicable Authority. The maintenance of any and all private drainage systems shall be the responsibility of the owners.

4. Exemptions

This section shall not apply to any of the following non-stormwater discharges or flows provided that the source is not a significant contributor of a pollutant to the storm drain system.

(a.) Discharges or flows resulting from fire fighting activities;

(b) Municipal waterline flushing

(c) Discharges from landscape irrigation or lawn watering

(d) Diverted stream flows

(e) Rising groundwater

(f) Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater

(g) Flows from potable water sources

(h) Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems)

(i) Irrigation water, springs

(j) Water from crawl space pumps

(k) Water from individual residential car washing

(l) Natural flows from riparian habitats and wetlands

(m) Discharges from de-chlorinated swimming pool water provided it is allowed to stand for one week prior to draining, or tested for chlorine levels with a pool test kit prior to draining (less than one parts per million chlorine), and the pool is drained in such a way as not to cause a nuisance;

(n) Discharges from street sweepers of minor amounts of water during operation and other storm drain system maintenance;

(o) Dye testing, provided notification is given to the Director of the Department of Public Works or designated representative prior to the time of the test;

(p) Non-stormwater discharges permitted under an NPDES permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations;

(q) Discharges for which advanced written approval is received from the Director of the Department of Public Works or designated representative if necessary to protect public health, safety, welfare or the environment.

(r) Emergency repairs to either the municipal storm drain system, or any stormwater management structure or practice that poses a threat to public health or safety, or as deemed necessary by the Town.

SECTION 8. EMERGENCY SUSPENSION OF STORM DRAIN SYSTEM ACCESS

The Director of the Department of Public Works or designated representative may suspend storm drain system access to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened illegal discharge that presents or may present imminent risk of harm to the public health, safety, welfare or the environment. In the event any person fails to comply with an emergency suspension order, the Director of the

Department of Public Works or designated representative may take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

Not required by MS4 permit, but may be useful addition in some municipalities:

SECTION ___. WATERCOURSE PROTECTION

Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property free of trash, debris, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

Failure by the property owner to maintain the watercourse does not constitute an obligation on the part of the Town to assume this responsibility.

SECTION 9. NOTIFICATION OF SPILLS

Notwithstanding any other requirements of local, state or federal law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials at that facility operation which is resulting or may result in illegal discharge of pollutants that person shall take all necessary steps to ensure containment, and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal fire and police departments, the Director of the Department of Public Works or designated representative, and the Massachusetts Department of Environmental Protection (if release is reportable as defined by 310 CMR 40.00). In the event of a release of non-hazardous material, said person shall notify the Director of the Department of Public Works or designated representative no later than the next business day. Written confirmation of all telephone, facsimile or in person notifications shall be provided to the Director of the Department of Public Works or designated representative within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

SECTION 10. ENFORCEMENT

1. The Director of the Department of Public Works or an authorized agent of the Department of Public Works shall enforce this ordinance, and the regulations promulgated thereunder, as well as the terms and conditions of all permits, notices, and orders, and may pursue all civil and criminal remedies for such violations.

2. <u>Orders</u>

   The Director of the Department of Public Works or designated representative may issue a written order to enforce the provisions of this ordinance or the regulations thereunder, which include, but are not limited to:

   (a) Elimination of illicit connections or discharges to the storm drain system;
   (b) Termination of access to the storm drain system;

(c) Performance of monitoring, analyses, and reporting;
(d) Cessation of unlawful discharges, practices, or operations;
(e) Remediation of contamination in connection therewith.
(f) Implementation of source control or treatment BMPs

If the Director of the Department of Public Works or designated representative determines that abatement or remediation of contamination is required, the order shall set forth a deadline for completion of the abatement or remediation. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the City of Holyoke may, at its option, undertake such work and expenses thereof shall be charged to the violator or property owner.

Within thirty (30) days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the costs incurred by the City of Holyoke, including administrative costs for which payment is due to the City of Holyoke. The violator or property owner may file a written protest or appeal objecting to the amount or basis of costs with the City Council within thirty (30) days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within thirty (30) days following a decision of the City Council or designated representative affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs pursuant to MGL Ch. 40, §58. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in M.G.L. Ch. 59, §57 after the thirty-first day at which the costs first become due.

3. Equitable Remedy

If anyone violates the provisions of this ordinance, regulations, permit, notice, or order issued thereunder, the Director of the Department of Public Works or designated representative may seek injunctive relief in a court of competent jurisdiction to restrain the person from activities which would create further violations or compelling the person to abate or remediate the violation.

4. Criminal penalty

Any person who violates any provision of this Bylaw/Ordinance, regulation, order or written approval issued thereunder, shall be punished by a fine not to exceed $300 per violation. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

5. Non-Criminal Disposition

As an alternative to criminal prosecution or civil action, the City of Holyoke may elect to utilize the non-criminal disposition procedure set forth in M.G.L. Chapter 40, §21D. The Director of the Department of Public Works or designated representative shall be the enforcing person. The penalty for the 1st violation shall be up to $100. The penalty for the 2nd violation shall be $200. The penalty for the 3rd and subsequent violations shall be $300.00. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

6. Right-of-Entry

To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Director of the Department of Public Works or designated representative, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this ordinance and regulations and may make or cause to be made such examinations, surveys or sampling as the Director of the Department of Public Works or designated representative deems reasonably necessary

Be advised that any entry without express permission of the owner should be by warrant. Generally, the 4th Amendment to the U.S. Constitution prohibits entry onto private property without the express consent of the owner or person in charge, a warrant or exigent circumstances. Although there are similar provisions in regulations concerning commercial uses, residential property is generally afforded greater protections. Because private property rights are generally afforded rigid protections by Massachusetts courts, use of this provision may expose the Town to liability. Therefore, if you are going to include this provision, I recommend that it be used sparingly.

Recommendation to Town of Belchertown by Koppleman & Paige

7. Appeals

The decisions or orders of the Director of the Department of Public Works shall be final. Further relief shall be to a court of competent jurisdiction.

8. Remedies Not Exclusive

The remedies listed in this ordinance are not exclusive of any other remedies available under any applicable federal, state or local law.

SECTION _11. SEVERABILITY

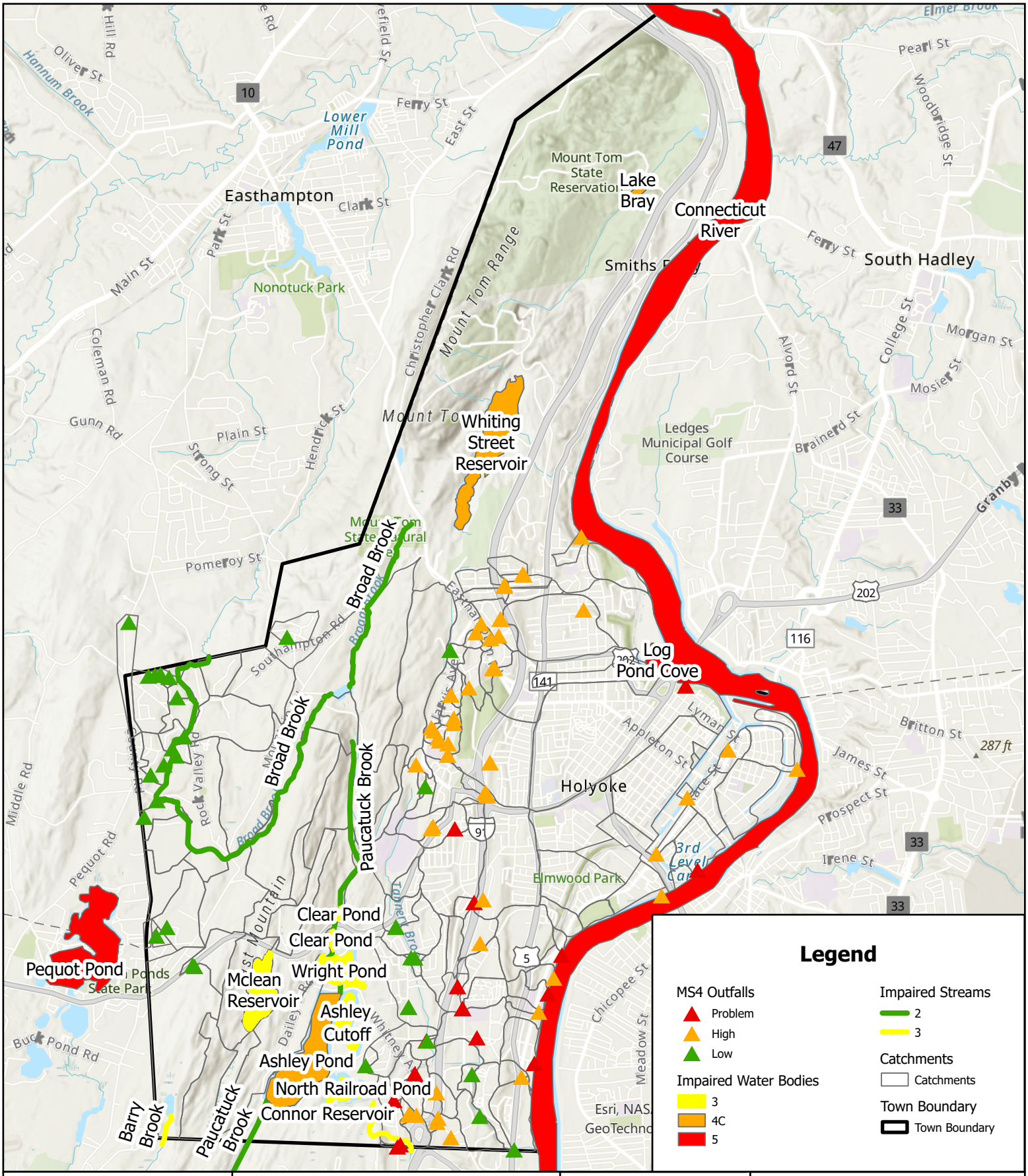
If any provision, paragraph, sentence, or clause, of this Bylaw/Ordinance or the application thereof to any person, establishment, or circumstances, shall be held invalid for any reason, such invalidity shall not affect any other provisions or applications of this Bylaw, and shall continue in full force and effect.

SECTION _12. TRANSITIONAL PROVISIONS

Property owners shall have _____ days from the effective date of the ordinance to comply with its provisions provided good cause is shown for the failure to comply with the ordinance during that period unless local, state, or federal agencies deem that immediate actions are warranted

APPENDIX C

Stormwater System Map



Legend

MS4 Outfalls
- Problem
- High
- Low

Impaired Water Bodies
- 3
- 4C
- 5

Impaired Streams
- 2
- 3

Catchments
- Catchments

Town Boundary
- Town Boundary

N

0 3,000 6,000 Feet

PROJECT NO.	25000684.001A
CREATED:	6/21/2024
CREATED BY:	SStMarie
FILE NAME:	Holyoke_Maps_V2.aprx

Storm System Map

City of Holyoke
122 Middle Water Street
Holyoke, MA 01040

APPENDIX D

Preliminary Prioritized Outfall Ranking

MS4 OUTFALL AND INTERCONNECTION PRIORITIZATION TABLE

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00001	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00002	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00003	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00004	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00005	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00006	TBD*	Pequot Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00007	TBD*	Pequot Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00008	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00009	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00010	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00011	Whiting Reservoir area	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00012	Whiting Reservoir area	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00013	SUMMIT AVE	Connecticut River	1	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	2	HIGH
OUTFALL-00014	Whiting Reservoir area	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00015	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00016	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00017	TBD*	Ashley Cutoff	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00018	16 HOLLY MEADOW RD	Pequot Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00019	22 HOLLY MEADOW RD	Pequot Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00020	BOBALA RD	Schoolhouse Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00021	HOMESTEAV AVE	Wright Pond	1	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	2	HIGH
OUTFALL-00022	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00023	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00024	WHITNEY AVE	North RailRoad Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00025	BOBALA RD	North RailRoad Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00026	WHITNEY AVENUE	North RailRoad Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00027	LOWER WESTFIELD RD	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00028	EASTHAMPTON RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00029	JARVIS AVE	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00030	EASTHAMPTON RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00031	EASTHAMPTON RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00032	LINDOR ST	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00033	2ND LEVEL CANAL CABOT ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00034	MAIN ST 3RD LEVEL CANAL	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00035	2ND LEVEL CANAL RACE ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00036	LONGFELLOW RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00037	BOBALA RD	Schoolhouse Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00038	LOWER WESTFIELD RD	Ashley Cutoff	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00039	LOWER WESTFIELD RD	Ashley Cutoff	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00040	WHITING FARMS RD	Connecticut River	1	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	2	HIGH
OUTFALL-00041	WHITING FARMS RD	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00042	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00043	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00044	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00045	BOBALA ROAD	Schoolhouse Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00046	KNOLLWOOD CIRCLE	Wright Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00047	EASTHAMPTON RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00048	MOSHER ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00049	Jones Ferry Pump Station	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00050	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00051	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00052	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00053	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00054	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00055	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00056	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00057	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00058	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00059	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00060	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00061	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00062	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00063	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00064	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00065	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00066	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00067	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00068 – OUTFALL-000XX	West Holyoke	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*

Notes:

1. TBD* - Will be updated with information gathered from future outfall investigation and mapping efforts
2. Previous screening results indicate likely sewer input if any of the following are true:
   - Outfalls identified by the EPA in sampling results previously supplied to the City on May 7-8, 2019 and July 7, 2019 based on field test kit screening,
   - Olfactory or visual evidence of sewage,
   - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water,
   - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine, or
   - Any exceedance of a bacteria threshold and any detectable level of ammonia below its threshold
3. Outfalls and interconnections discharging to or in the vicinity of any of the following: public beaches, recreational areas, or drinking water supplies.
4. Receiving water quality based on latest version of MassDEP Integrated List of Waters;
   - Poor = Waters with approved TMDLs (Category 4a Waters) where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment; also, waters exceeding the water quality standards for bacteria; ammonia >0.5 mg/L; surfactants ≥0.25 mg/L
   - Fair = Water quality limited waterbodies that receive a discharge from the MS4 (Category 5 Waters)
   - Good = No water quality impairments
5. Generating sites are institutional, municipal, commercial, or industrial sites with a potential to generate pollutants that could contribute to illicit discharges (e.g., car dealers, car washes, gas stations, garden centers, and industrial manufacturing areas).
6. Age of development and infrastructure: High = developments with stormwater and sewer infrastructure > 40 years old; medium = developments with infrastructure 20-40 years old; Low = developments with infrastructure <20 years old.
7. Historic Combined Sewers or Septic: Yes = Areas once served by combined sewers that have been separated, or areas once served by septic that have converted to sanitary sewers.
8. Aging septic systems: Yes = septic systems 30 years or older in residential areas.
9. Local Priority due to Environmental Qualities of the area and land use development.
10. Any river or stream that is culverted for distance greater than a simple roadway crossing.

APPENDIX E

Reprioritized Outfall Ranking

Reprioritized Outfall Ranking and Inventory
Illicit Discharge Detection and Elimination Program
City of Holyoke, MA
Reprioritized: June 2024

Owner	EPA Priority Category	Outfall ID	Address	MassDEP Stream Segment (AU ID)	Waterbody Name	Sewage Indicators Found During DRY Screening	Septic to Sewer Conversion or CSO Separation?	Sewage Indicators Found During WET Screening	Infra-structure Score	Land Use Data	Density/Land Use of Generating Sites	Catchment Score	Discharge to Pub Beach, Shellfish or Rec	Discharge to Bacteria/ Pathogen Impaired Waterbody	Discharge to Zone I and Zone II	Stormwater Related Impairments	Receiving Water Score	Final Outfall Score
						1 or 0 (1=auto problem)	1 or 0	1 or 0 (1=auto problem)					1 or 0 (1=auto high)	1 or 0 (1=auto high)	1 or 0 (1=auto high)			
Holyoke	Problem	CA086	Jackson Street Flood Station	MA34-05	CONNECTICUT RIVER	1	1	0	0.500	industrial	3.000	1.000	0	1	0	1	0.333	n/a
Holyoke	Problem	CA158-A	6 Appleton St	MA34-05	CONNECTICUT RIVER	1	1	0	0.500	commercial	3.000	1.000	0	1	0	1	0.333	n/a
Holyoke	Problem	CA046	14 Bobala Rd	MA34-05	CONNECTICUT RIVER	0	0	1	0.250	commercial	3.000	1.000	0	1	0	1	0.333	n/a
Holyoke	Problem	CA047-A	361 Whitney Ave	MA34-05	CONNECTICUT RIVER	0	0	1	0.250	industrial	3.000	1.000	0	1	0	1	0.333	n/a
Holyoke	Problem	CA047-B	361 Whitney	MA34-05	CONNECTICUT RIVER	0	0	1	0.250	industrial	3.000	1.000	0	1	0	1	0.333	n/a
Holyoke	Problem	CA049	59 Bobala	MA34-05	CONNECTICUT RIVER	0	0	1	0.250	commercial	3.000	1.000	0	1	0	1	0.333	n/a
Holyoke	Problem	CA073	938 Main St	MA34-05	CONNECTICUT RIVER	1	0	0	0.250	commercial	3.000	1.000	0	1	0	1	0.333	n/a
Holyoke	Problem	CA068	Jones Ferry PS	MA34-05	CONNECTICUT RIVER	1	0	1	0.500	suburban_residential	2.000	0.667	0	1	0	1	0.333	n/a
Holyoke	Problem	CA143	14 Nicholls Drive	MA34-05	CONNECTICUT RIVER	1	0	1	0.500	suburban_residential	2.000	0.667	0	1	0	1	0.333	n/a
Holyoke	Problem	CA045	150 lower Westfield rd		TANNERY BROOK	0	0	1	0.250	commercial	3.000	1.000	0	0	0	0	0.000	n/a
Holyoke	Problem	CA052	100 Bobala	MA34-43	SCHOOLHOUSE BROOK	0	0	1	0.250	industrial	3.000	1.000	0	0	0	0	0.000	n/a
Holyoke	Problem	CA053	100 Bobala	MA34-43	SCHOOLHOUSE BROOK	0	0	1	0.250	industrial	3.000	1.000	0	0	0	0	0.000	n/a
Holyoke	Problem	CA064	86 Lower Westfield Rd		TANNERY BROOK	0	0	1	0.250	commercial	3.000	1.000	0	0	0	0	0.000	n/a
Holyoke	Problem	CA065	200 Whiting Farms Rd	MA34-05	CONNECTICUT RIVER	0	0	1	0.250	suburban_residential	2.000	0.667	0	1	0	1	0.333	n/a
Holyoke	Problem	CA066	6 jeane Dr	MA34-05	CONNECTICUT RIVER	0	0	1	0.250	urban_residential	2.000	0.667	0	1	0	1	0.333	n/a
Holyoke	Problem	CA071	1030 Main St	MA34-05	CONNECTICUT RIVER	1	0	0	0.250	suburban_residential	2.000	0.667	0	1	0	1	0.333	n/a
Holyoke	Problem	CA132	200 Whiting Farms Rd	MA34-05	CONNECTICUT RIVER	0	0	1	0.250	suburban_residential	2.000	0.667	0	1	0	1	0.333	n/a
Holyoke	Problem	CA142	50 Bray Park Dt	MA34-05	CONNECTICUT RIVER	1	0	0	0.250	suburban_residential	2.000	0.667	0	1	0	1	0.333	n/a
Holyoke	Problem	CA039	Highland Park PS	MA34-04	CONNECTICUT RIVER	1	0	0	0.250	open_space	1.000	0.333	1	1	0	1	0.500	n/a
Holyoke	High	CA158-B	138 Appleton St	MA34-05	CONNECTICUT RIVER	0	1	0	0.250	commercial	3.000	1.000	0	1	0	1	0.333	0.52778
Holyoke	High	CA012	Sullivan school	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	institutional	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA016	Sullivan school	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	institutional	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA037	1 Berkshire St	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA042	1 Bigelow St	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA048	36 Bobala	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	industrial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA050	36 Bobala	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	industrial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA051	36 Bobala	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	industrial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA054	400 Whitney	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA055	400 Whitney	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA057-B	Holyoke mall	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA067	1 Sullivan Rd	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA072	990 Main St Paper city car wash	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA084	1 Main St	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA085	Mosher St Pump Station	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444
Holyoke	High	CA087	636 Main St	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	commercial	3.000	1.000	0	1	0	1	0.333	0.44444

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Owner	EPA Priority Category	Outfall ID	Address	MassDEP Stream Segment (AU ID)	Waterbody Name	Sewage Indicators Found During DRY Screening	Septic to Sewer Conversion or CSO Separation?	Sewage Indicators Found During WET Screening	Infra-structure Score	Land Use Data	Density/Land Use of Generating Sites	Catchment Score	Discharge to Pub Beach, Shellfish or Rec	Discharge to Bacteria/ Pathogen Impaired Waterbody	Discharge to Zone I and Zone II	Stormwater Related Impairments	Receiving Water Score	Final Outfall Score
						1 or 0 (1=auto problem)	1 or 0	1 or 0 (1=auto problem)					1 or 0 (1=auto high)	1 or 0 (1=auto high)	1 or 0 (1=auto high)			
Holyoke	High	CA003	T1 university park	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	urban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA004	6 Hawthorne Ln	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA005-A	29 Longfellow Rd	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA005-B	29 Longfellow Rd	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA005-C	29 Longfellow Rd	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA005-E	36 Longfellow Rd	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA006-A	10 Lindor Heights	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA006-B	10 Lindor Heights	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA006-C	10 Lindor Heights	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA006-D	10 Beaudoin Ter	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA007	14 Scott hollow rd	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	urban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA009	330 Jarvis ave	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	urban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA010	27 Scotthollow	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA011	20 Wayne Court	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA013	26 Jarvis way	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	urban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA014	30 Jarvis Heights	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA015	338 Jarvis ave	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	urban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA017	Sullivan school	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	urban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA018	393 cherry st	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	urban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA023-B	105 Cherry Street	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA023-C	105 Cherry St	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA027	14 Philip dr	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	urban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA035-A	85 Woodland St	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA070	1030 Main St	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA078-A	124 Ridgewood Ave	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA078-B	124 Ridgewood Ave	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA079	73 Madison Ave	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA133-A	115 Bemis Rd	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA133-B	115 Bemis Rd	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA134	29 Claren Dr	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA135	30 Claren Dr	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA144	College way	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	urban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA147	105 Cherry street	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA002	2 Burns Way	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	suburban_residential	2.000	0.667	0	1	0	1	0.333	0.33333
Holyoke	High	CA056	91 South, mile 12 before exit 11	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	open_space	1.000	0.333	0	1	0	1	0.333	0.22222

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Reprioritized: June 2024

Owner	EPA Priority Category	Outfall ID	Address	MassDEP Stream Segment (AU ID)	Waterbody Name	Sewage Indicators Found During DRY Screening	Septic to Sewer Conversion or CSO Separation?	Sewage Indicators Found During WET Screening	Infra-structure Score	Land Use Data	Density/Land Use of Generating Sites	Catchment Score	Discharge to Pub Beach, Shellfish or Rec	Discharge to Bacteria/ Pathogen Impaired Waterbody	Discharge to Zone I and Zone II	Stormwater Related Impairments	Receiving Water Score	Final Outfall Score
						1 or 0 (1=auto problem)	1 or 0	1 or 0 (1=auto problem)					1 or 0 (1=auto high)	1 or 0 (1=auto high)	1 or 0 (1=auto high)			
Holyoke	High	CA060	1152 Main St	MA34-05	CONNECTICUT RIVER	0	0	0	0.000	open_space	1.000	0.333	0	1	0	1	0.333	0.22222
Holyoke	High	CA082	River Terrace CSO	MA34-04	CONNECTICUT RIVER	0	0	0	0.000	open_space	1.000	0.333	0	1	0	1	0.333	0.22222
Holyoke	Low	CA026	518 Wesrfield Rd		TANNERY BROOK	0	0	0	0.000	commercial	3.000	1.000	0	0	0	0	0.000	0.33333
Holyoke	Low	CA058	Holyoke mall		TANNERY BROOK	0	0	0	0.000	commercial	3.000	1.000	0	0	0	0	0.000	0.33333
Holyoke	Low	CA062	Mount Marie Rd		TANNERY BROOK	0	0	0	0.000	commercial	3.000	1.000	0	0	0	0	0.000	0.33333
Holyoke	Low	CA138	150 lower Westfield rd		TANNERY BROOK	0	0	0	0.000	commercial	3.000	1.000	0	0	0	0	0.000	0.33333
Holyoke	Low	CA145	518 Homestead Ave		TANNERY BROOK	0	0	0	0.000	commercial	3.000	1.000	0	0	0	0	0.000	0.33333
Holyoke	Low	CA088	24 Holly Meadow	MA32055	PEQUOT POND	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	1	0.167	0.27778
Holyoke	Low	CA089	16 Holly Meadow Rd	MA32055	PEQUOT POND	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	1	0.167	0.27778
Holyoke	Low	CA091-A	700 Westfield Rd	MA32055	PEQUOT POND	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	1	0.167	0.27778
Holyoke	Low	CA091-B	700 Westfield Rd	MA32055	PEQUOT POND	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	1	0.167	0.27778
Holyoke	Low	CA019	2 hickory st		TANNERY BROOK	0	0	0	0.000	urban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA034	957 Homestead Ave		TANNERY BROOK	0	0	0	0.000	urban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA059	1256 Main St		TANNERY BROOK	0	0	0	0.000	urban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA096-A	6 hollygrape dr	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA096-B	6 Holly Grape Cir	MA34-18	BROAD BROOK	0	0	0	0.000	urban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA098	9 winterberry cir	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA099	113 County Rd Southampton	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA100	3 hemlock Dr	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA101-A	9 deer run	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA101-B	9 deer run	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA102	10 deer run	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA103	2 deer run	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA105	15 Lemay Dr	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA122	45 Keyes Rd	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA128	95 Knollwood Circle		TANNERY BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA137	71 richard eger dr	MA32002	ASHLEY POND	0	0	0	0.000	urban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA139	18 bray berry Dr	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA140	26 Ross rd	MA34-18	BROAD BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA141	95 Knollwood Dr		TANNERY BROOK	0	0	0	0.000	suburban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA146	967 Homestead Ave		TANNERY BROOK	0	0	0	0.000	urban_residential	2.000	0.667	0	0	0	0	0.000	0.22222
Holyoke	Low	CA008	100 Jarvis ave	MA34101	WHITING STREET RESERVOIR	0	0	0	0.000	open_space	1.000	0.333	0	0	0	0	0.000	0.11111
Holyoke	Low	CA094	Pilsudski Park 200 County Rd	MA34-18	BROAD BROOK	0	0	0	0.000	open_space	1.000	0.333	0	0	0	0	0.000	0.11111

APPENDIX F

Field Inspection Forms and Sampling Procedures

OUTFALL INVENTORY FIELD SHEET

Section 1: Background Data

City/Town:	Street:	Tax Map #:	Outfall ID: OF-
Owner: ☐ City ☐ State ☐ Private ☐ Other: _____		Nearest House/Utility Pole #:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Northing:	Easting:	GPS Unit:	GPS LMK #:
Rim Elevation:		Invert Elevation:	
Elevation Datum:		Receiving Water:	
Camera:		Photo #s: -- Take 1 Upstream (head on) and 1 Downstream view	

Land Use in Drainage Area (Check all that apply):

☐ Industrial ☐ Open Space

☐ Urban Residential ☐ Institutional

☐ Suburban Residential Other: _____

☐ Commercial Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

TYPE	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ Closed Pipe	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Pavement/Scupper ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
Flow Present?	☐ Yes ☐ No	***If No, Skip to Section 3. If Yes, Notify Town and continue field reconnaissance.***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial			Flow Direction (If Present):	

Section 3: Sketch

Outfall Inventory Field Sheet

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in outfall flow	☐ 2 – Clearly visible in outfall flow	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Potential for Illicit Discharge

☐ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a severity of 3) ☐ Obvious

Section 7: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Manhole Inspection Report

MH#

Catchment Area: _____

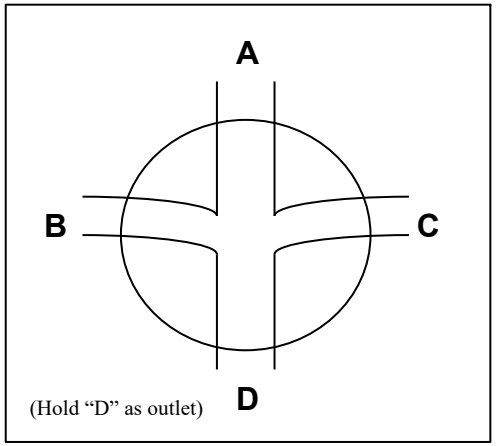
Inspector: _____

Date/Time: _____

Weather: _____

Street/Location: _____

General Comments: _____



Structural Information:

Cover Size: 24" 30" Other: _____

MH Size: 4' 5' Other: _____

MH Sump: Y / N Sump Depth: _____

MH Channel: Y / N

Weir: Y / N Rim to Top of Weir: _____

Internal Drop: Y / N

Depth to Wet Ring from Rim: _____

General Information:

Manhole Type:	Sanitary ☐	Storm ☐	Combined ☐	Common ☐							
Location of MH:	Roadway ☐	Sidewalk ☐	Roadside ☐	Alley ☐	Easement ☐	Other ☐					
Manhole Material:	Brick ☐	Clay Block ☐	Poured Concrete ☐		Manhole Block ☐	Precast Concrete ☐	Other ☐				
Paved Area Around MH:	Satisfactory ☐		Cracked ☐	☐	Missing Pavement ☐	Vegetation Growth					
Unpaved Area Around MH:	Satisfactory ☐		Eroded ☐								
Odors:											
Recommendations:	No Action ☐	Rebuild ☐	Line Manhole Wall ☐		Reset Frame ☐	Clean / Remove debris from Invert ☐					

Field Test Kit Results:

Pipe (A-F):						
Ammonia, mg/L (Compliant ≤ 0.5 mg/L)						
Surfactants, mg/L (Compliant ≤ 0.25 mg/L)						
Chlorine, mg/L (Compliant < 0.02 mg/L)						

Pipe Information:

	Pipe Size	Material	From / To MH#	Invert Depth (from Rim)	Flow Depth (from Invert)	Debris Depth (from Invert)	Condition	Flow	Clarity of Flow
A.									
B.									
C.									
D.									
E.									
F.									

Ammonia Nitrogen Test Kit

NI-SA (2428700)

DOC326.98.00007

Test preparation

CAUTION: ⚠ Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.

- Put the color disc on the center pin in the color comparator box (numbers to the front).
- Use sunlight or a lamp as a light source to find the color match with the color comparator box.
- Rinse the tubes with sample before the test. Rinse the tubes with deionized water after the test.
- If the color match is between two segments, use the value that is in the middle of the two segments.
- If the color disc becomes wet internally, pull apart the flat plastic sides to open the color disc. Remove the thin inner disc. Dry all parts with a soft cloth. Assemble when fully dry.
- To verify the test accuracy, use a standard solution as the sample.
- This test kit is for seawater. If used for brackish or fresh water, the test kit gives a higher than actual value. The error in brackish water is usually less than 10%. The error in low salinity or fresh water is a maximum 16%.
- This test is very sensitive to contamination. Try to get the same result on a second test. Fully rinse the tubes with fresh sample before the second test. The reagents clean the tubes during the first test.
- To increase the range of this test to 4 mg/L NH_3–N, dilute the sample as follows. Use a 3-mL syringe to add 2.5 mL of sample to each tube. Dilute the sample to the 5-mL mark with deionized water. Use the diluted sample in the test procedure and multiply the result by 2.

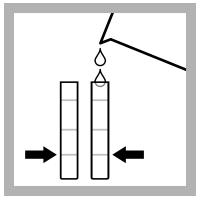
Replacement items

Description	Unit	Item no.
Ammonia Salicylate Reagent Powder Pillows, 5 mL	50/pkg	2395266
Ammonia Cyanurate Reagent Powder Pillows, 5 mL	50/pkg	2395466
Color disc, ammonia nitrogen, salicylate, 0–2.0 mg/L	each	9261300
Color comparator box	each	173200
Glass viewing tubes, glass, 18 mm	6/pkg	173006
Stoppers for 18-mm glass tubes and AccuVac Ampuls	6/pkg	173106

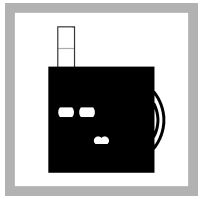
Optional items

Description	Unit	Item no.
Nitrogen ammonia standard solution, 1.0 mg/L NH_3–N	500 mL	189149
Water, deionized	500 mL	27249
Syringe, Luer-Lok® Tip, 3 mL	each	4321300

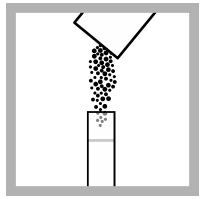
Test procedure—Ammonia-nitrogen (0–2.0 mg/L NH_3–N)



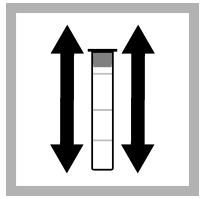
1. Fill two tubes to the first line (5 mL) with sample.



2. Put one tube into the left opening of the color comparator box.

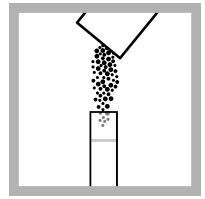


3. Add one Ammonia Salicylate Reagent Powder Pillow to the second tube.

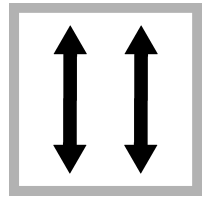


4. Put a stopper on the tube. Shake until the powder fully dissolves.

5. Wait 3 minutes.

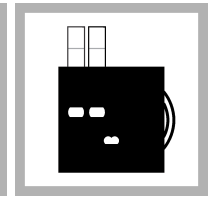


6. Add one Ammonia Cyanurate Reagent Powder Pillow to the same tube. Put a stopper on the tube.

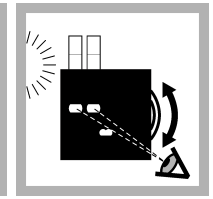


7. Shake until the powder fully dissolves.

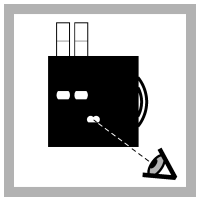
8. Wait 15 minutes. A green color develops.



9. Put the second tube into the color comparator box.



10. Hold the color comparator box in front of a light source. Turn the color disc to find the color match.



11. Read the result in mg/L in the scale window.

Calculate the mg/L NH_3 and mg/L NH_4^+

Ammonia in water is in the form of the ammonium ion (NH_4^+) and un-ionized ammonia (NH_3). NH_3 is toxic to fish. Table 1 shows that the percent of NH_3 increases as the pH and temperature increase. This test kit measures both NH_4^+ and NH_3 as ammonia nitrogen (NH_3–N).

To calculate the mg/L NH_3 in the sample, refer to Table 1 and the equation that follows.

mg/L NH_3 = ((mg/L NH_3–N x percent NH_3 from Table 1) ÷ 100) × 1.2

Example: *The test result was 1.6 mg/L NH_3–N. The sample pH was 7.6 and the sample temperature was 16 °C. The mg/L NH_3 is ((1.6 x 1.16) ÷ 100) × 1.2 = 0.02 mg/L NH_3.*

To calculate the mg/L NH_4^+ in the sample, refer to Table 1 and the equation that follows.

mg/L NH_4^+ = ((mg/L NH_3–N x (100 – percent NH_3 from Table 1)) ÷ 100) × 1.3

Example: *The test result was 1.6 mg/L NH_3–N. The sample pH was 7.6 and the sample temperature was 16 °C. The mg/L NH_4^+ is ((1.6 x (100 – 1.16)) ÷ 100) × 1.3 = 2.056 mg/L NH_4^+.*

Table 1 Percent of NH_3 in water

pH	16 °C	18 °C	20 °C	22 °C	24 °C	26 °C	28 °C	30 °C	32 °C
7.0	0.29	0.34	0.39	0.46	0.52	0.60	0.69	0.80	0.91
7.2	0.46	0.54	0.62	0.82	0.83	0.96	1.10	1.26	1.44
7.4	0.73	0.85	0.98	1.14	1.31	1.50	1.73	1.98	2.26
7.6	1.16	1.34	1.55	1.79	2.06	2.36	2.71	3.10	3.53
7.8	1.82	2.11	2.44	2.81	3.22	3.70	4.23	4.82	5.48
8.0	2.86	3.30	3.81	4.38	5.02	5.74	6.54	7.43	8.42
8.2	4.45	5.14	5.90	6.76	7.72	8.80	9.98	11.29	12.72
8.4	6.88	7.90	9.04	10.31	11.71	13.26	14.95	16.78	18.77
8.6	10.48	11.97	13.61	15.41	17.37	19.50	21.78	24.22	26.80
8.8	15.66	17.73	19.98	22.41	25.00	27.74	30.62	33.62	36.72
9.0	22.73	25.46	28.36	31.40	34.56	37.83	41.16	44.53	47.91
9.2	31.80	35.12	38.55	42.04	45.57	49.09	52.58	55.99	59.31
9.4	42.49	46.18	49.85	53.48	57.02	60.45	63.73	66.85	69.79
9.6	53.94	57.62	61.17	64.56	67.77	70.78	73.58	76.17	78.55
9.8	64.99	68.31	71.40	74.28	76.92	79.33	81.53	83.51	85.30
10.0	74.63	77.35	79.83	82.07	84.08	85.88	87.49	88.92	90.19
10.2	82.34	84.41	86.25	87.88	89.33	90.60	91.73	92.71	93.58

Detergents CHEMets Kit

K-9400/R-9400: 0 - 3 ppm

Test Procedure

1. Rinse the reaction tube with the sample to be tested, and then fill it to the 5 mL mark with the sample.
2. While holding the double-tipped ampoule in a vertical position, snap the upper tip using the tip breaking tool (fig. 1).
3. Invert the ampoule and position the open end over the reaction tube. Snap the upper tip and allow the contents to drain into the reaction tube (fig. 1).
4. Cap the reaction tube and shake it vigorously for **30 seconds**. Allow the tube to stand undisturbed for **1 minute**.
5. Make sure that the flexible tubing is firmly attached to the CHEMet ampoule tip.
6. Insert the CHEMet assembly (tubing first) into the reaction tube making sure that the end of the flexible tubing is at the bottom of the tube. Break the tip of the CHEMet ampoule by gently pressing it against the side of the reaction tube (fig. 2). The ampoule should draw in fluid only from the organic phase (bottom layer).
7. When filling is complete, remove the CHEMet assembly from the reaction tube.

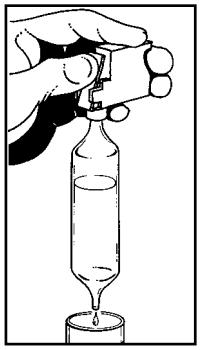


Figure 1

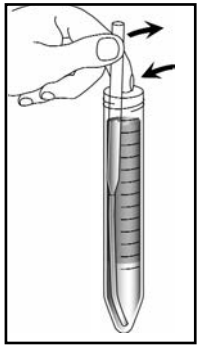


Figure 2

8. Remove the flexible tubing from the CHEMet ampoule and wipe all liquid from the exterior of the ampoule. Place an ampoule cap firmly onto the tip of the CHEMet ampoule. Invert the ampoule several times, allowing the bubble to travel from end to end.
9. Obtain a test result by placing the ampoule, flat end first, into the comparator. Hold the comparator up toward a source of light and view from the bottom. Rotate the comparator until the best color match is found (fig. 3).

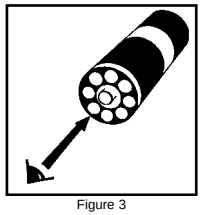


Figure 3

Tip Breaker

The tip breaker opens for easy disposal of the glass tips (pull lever away from body of tip breaker or pull open the side wall). The tip breaker will work most effectively if the tips are emptied out frequently.

Test Method

The Detergents CHEMets®[1] test kit employs the methylene blue extraction method[2,3,4]. Anionic detergents react with methylene blue to form a blue complex that is extracted into an immiscible organic solvent. The intensity of the blue color is directly related to the concentration of "methylene blue active substances (MBAS)" in the sample. Anionic detergents are one of the most prominent methylene blue active substances. Test results are expressed in ppm (mg/Liter) linear alkylbenzene sulfonate (equivalent weight 325).

1. CHEMets is a registered trademark of CHEMetrics, Inc. U.S. Patent No. 3,634,038
2. APHA Standard Methods, 22nd ed., Method 5540 C - 2000
3. EPA Methods for Chemical Analysis of Water and Wastes, Method 425.1 (1983)
4. ASTM D 2330-02, Methylene Blue Active Substances

Safety Information

Read SDS (available at www.chemetrics.com) before performing this test procedure. Wear safety glasses and protective gloves.

CHEMetrics

Simplicity in Water Analysis

www.chemetrics.com
4295 Catlett Road, Midland, VA 22728 U.S.A.
Phone: (800) 356-3072; Fax: (540) 788-4856
E-Mail: orders@chemetrics.com

Feb. 18, Rev. 10

CHLORINE, TOTAL, Low Range (0 to 2.00 mg/L Cl_2)

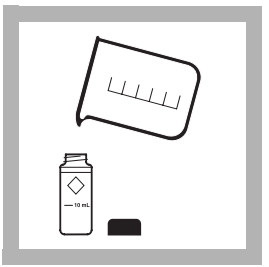
For water, wastewater and seawater

DPD Method* USEPA accepted (powder pillows only)**

Measuring Hints

If the sample temporarily turns yellow after reagent addition or the display shows overrange (flashing **2.20** in display), dilute a fresh sample and repeat the test. A slight loss of chlorine may occur because of the dilution. Multiply the result by the appropriate dilution factor.

* Adapted from *Standard Methods for the Examination of Water and Wastewater.*
** Procedure is equivalent to USEPA method 330.5 for wastewater and Standard Method 4500-Cl G for drinking water.



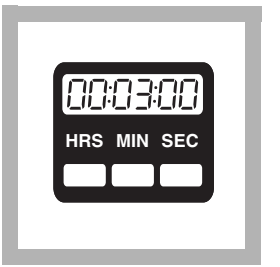
1. Fill a 10-mL cell to the 10-mL line with sample. Cap.

Note: *Samples must be analyzed immediately and cannot be preserved for later analysis.*

Note: *Be sure the instrument is in the low range mode. See page 37.*

2. Add the contents of one DPD Total Chlorine Powder Pillow to the sample cell (the prepared sample). Cap and gently shake for 20 seconds.

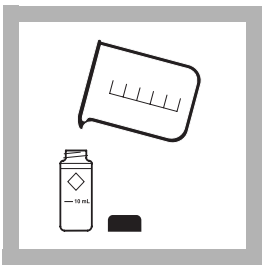
Note: *Gently shaking dissipates bubbles which may form in samples containing dissolved gases.*



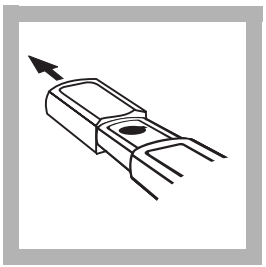
3. Wait 3 minutes. During this period, proceed with *steps 4–8*.

Note: *A pink color will form if chlorine is present.*

Note: *Accuracy is not affected by undissolved powder.*

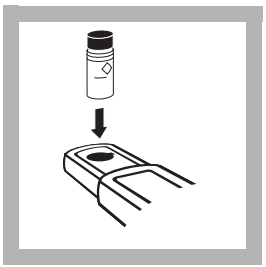


4. Fill a 10-mL sample cell to the 10-mL line with sample (the blank). Cap.



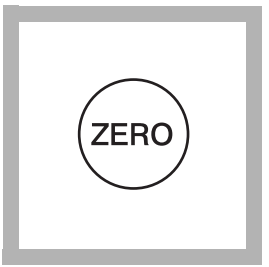
5. Remove the instrument cap.

Note: *For best results, zero the instrument and read the sample under the same lighting conditions.*



6. Place the blank in the cell holder, with the diamond mark facing you. Tightly cover the cell with the instrument cap (flat side should face the back of the instrument).

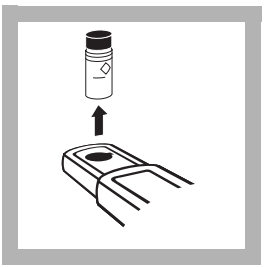
Note: *Wipe liquid off sample cells.*



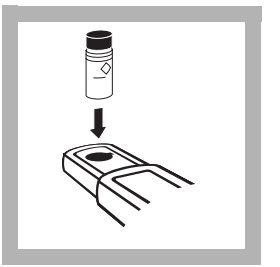
7. Press: **ZERO**

The instrument will turn on and the display will show **- - -** followed by **0.00**.

Note: *The instrument automatically shuts off after 1 minute and stores the last zero in memory. Press* **READ** *to complete the analysis.*

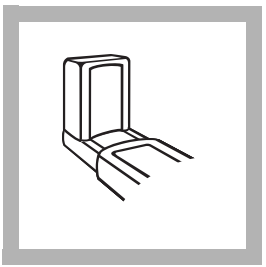


8. Remove the cell from the cell holder.

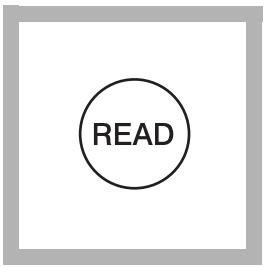


9. Within 3 minutes after the 3-minute reaction period, place the prepared sample in the cell holder.

Note: *Wipe liquid off sample cells.*



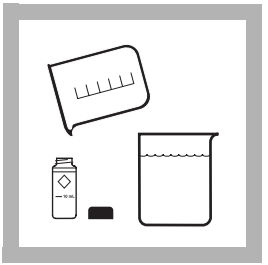
10. Cover the cell with instrument cap.



11. Press: **READ**
The instrument will show **- - -** followed by the result in mg/L total chlorine.

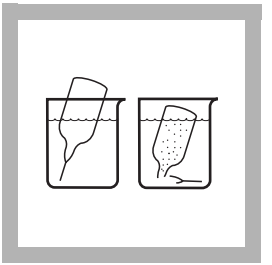
Note: *If the sample temporarily turns yellow after reagent addition or shows overrange (flashing* **2.20***), dilute a fresh sample and repeat the test. Some loss of chlorine may occur. Multiply the result by the dilution factor.*

Using AccuVac® Ampuls



1. Fill a 10-mL sample cell to the 10-mL line with sample (the blank). Cap. Collect at least 40 mL of sample in a 50-mL beaker.

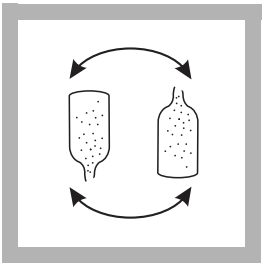
Note: *Samples must be analyzed immediately and cannot be preserved for later analysis.*



2. Fill a DPD Total Chlorine Reagent AccuVac Ampul with sample (the prepared sample).

Note: *Keep the tip immersed until the ampule fills completely.*

Note: *Be sure the instrument is in low range. See page 37.*

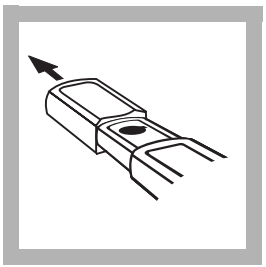


3. Quickly invert the ampule several times to mix. Wipe off any liquid or fingerprints.

Note: *A pink color will develop if chlorine is present.*

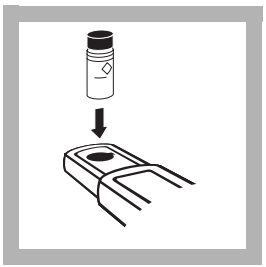
Note: *Accuracy is not affected by undissolved powder.*

4. Wait 3 minutes. During this period, proceed with *steps 5–8*.



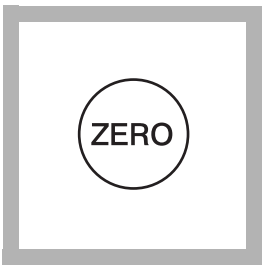
5. Remove the instrument cap.

Note: *For best results, zero and read the sample measurements under the same lighting conditions.*



6. Place the blank in the cell holder with the diamond mark facing you. Tightly cover the cell with the instrument cap (flat side should face the back of the instrument).

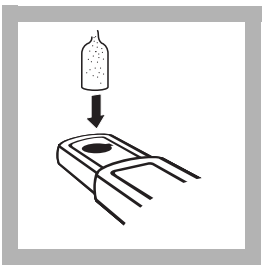
Note: *Wipe liquid off sample cells.*



7. Press: **ZERO**

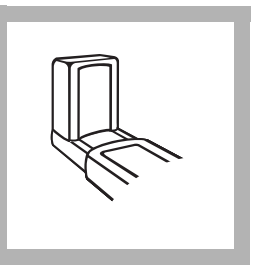
The instrument will turn on and the display will show **- - -** then **0.00**.

Note: *The instrument automatically shuts off after 1 minute and stores the last zero in memory. Press* **READ** *to complete the analysis.*

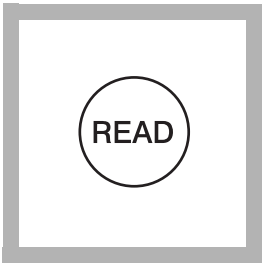


8. Within 3 minutes after the 3-minute reaction period, place the prepared sample in the cell holder.

Note: *Wipe liquid off sample cells.*



9. Cover the ampule with the instrument cap.



10. Press: **READ**

The instrument will show **- - -** followed by the result in mg/L total chlorine.

Note: *If the sample temporarily turns yellow after reagent addition or shows overrange (flashing* **2.20***), dilute a fresh sample and repeat the test. Some loss of chlorine may occur. Multiply the result by the dilution factor.*

Accuracy Check

Standard Additions Method

a. Snap the neck off a Chlorine Standard Solution Voluette® Ampule.

b. Use a TenSette® pipet to add 0.1, 0.2, and 0.3 mL of standard to three 25-mL samples. Swirl gently to mix. (For AccuVac Ampuls, use 50-mL beakers.)

c. Analyze a 10-mL aliquot of each sample as described in the procedure. Each 0.1 mL of standard will cause an incremental increase in chlorine, the exact value depends on the concentration of the Voluette ampule standard. Check the certificate enclosed with the Voluette ampules for this value.

d. If these increases do not occur, call Hach at 800-227-4224. Outside the United States, contact the Hach office or distributor serving you.

Interferences

Samples containing more than the 250 mg/L alkalinity or 150 mg/L acidity as $CaCO_3$ may inhibit full color development, or the color may fade instantly. Neutralize these samples to pH 6–7 with 1 N Sulfuric Acid or 1 N Sodium Hydroxide. Determine the

amount required on a separate 10-mL sample. Add the same amount to the sample to be tested. Correct for the additional volume.

Bromine, iodine, ozone and oxidized forms of manganese and chromium may also react and read as chlorine.

To compensate for the effects of manganese (Mn^{4+}) or chromium (Cr^{6+}), adjust the pH to 6–7 as described above. To a 25-mL sample, add 3 drops of 30 g/L Potassium Iodide Solution, mix, and wait one minute. Add 3 drops of 5 g/L Sodium Arsenite and mix. If chromium is present, allow exactly the same reaction period with DPD for both analyses. Subtract the result of this test from the original analysis to obtain the accurate chlorine concentration.

DPD Total Chlorine Reagent Powder Pillows and AccuVac Ampuls contain a buffer formulation that withstands high levels (at least 1000 mg/L) of hardness without interference.

REQUIRED REAGENTS

Description	Unit	Cat. No.
DPD Total Chlorine Reagent Powder Pillows	100/pkg	21056-69
or		
DPD Total Chlorine Reagent AccuVac® Ampuls	25/pkg	25030-25

REQUIRED APPARATUS (AccuVac® Ampuls)

Beaker, 50 mL	each	500-41

OPTIONAL REAGENTS

Chlorine Standard Solution Voluette® Ampules, 50-75 mg/L, 10 mL	16/pkg	14268-10
Chlorine Standards, secondary, Specv™, 0.0, 0.2, 0.8, and 1.5 mg/L	4/set	26353-00
DPD Total Chlorine Reagent w/dispensing cap	250 tests	21056-29
Potassium Iodide Solution, 30 g/L	100 mL MDB*	343-32
Sodium Arsenite Solution, 5 g/L	100 mL MDB	1047-32
Sodium Hydroxide Standard Solution, 1 N	100 mL MDB	1045-32
Sulfuric Acid Standard Solution, 1 N	100 mL MDB	1270-32
Water, deionized	4 L	272-56

* Marked Dropper Bottle

OPTIONAL APPARATUS

Description	Unit	Cat. No.
AccuVac® Snapper Kit	each	24052-00
Batteries, AAA, alkaline	4/pkg	46743-00
Caps for 10-mL sample cells	12/pkg	24018-12
Cylinder, graduated, 25 mL, poly	each	1081-40
Cylinder, graduated, 100 mL, PMP	each	2172-42
sens*ion*™*1* Basic Portable pH Meter, with electrode	each	51700-10
Pipet, TenSette®, 0.1 to 1.0 mL	each	19700-01
Pipet Tips, For 19700-01 TenSette®	50/pkg	21856-96
Sample Cells, 10-mL with screw caps	6/pkg	24276-06

REPLACEMENT PARTS

Instrument Cap/light shield	each	46704-00
Instrument Manual	each	46760-88

Pro30

USER MANUAL

English

Item #606082
Rev A
Drawing # A606082
July 2011

CONTENTS

WARRANTY

The YSI Professional 30 instrument (Pro30) is warranted for three (3) years from date of purchase by the end user against defects in materials and workmanship, exclusive of batteries and any damage caused by defective batteries. Pro30 cable/probe assemblies are warranted for two (2) years from date of purchase by the end user against defects in material and workmanship. Pro30 instruments & cables are warranted for 90 days from date of purchase by the end user against defects in material and workmanship when purchased by rental agencies for rental purposes. Within the warranty period, YSI will repair or replace, at its sole discretion, free of charge, any product that YSI determines to be covered by this warranty.

To exercise this warranty, call your local YSI representative, or contact YSI Customer Service in Yellow Springs, Ohio at +1 937 767-7241, 800-897-4151 or visit www.YSI.com for a Product Return Form. Send the product and proof of purchase, transportation prepaid, to the Authorized Service Center selected by YSI. Repair or replacement will be made and the product returned, transportation prepaid. Repaired or replaced products are warranted for the balance of the original warranty period, or at least 90 days from date of repair or replacement.

LIMITATION OF WARRANTY

This Warranty does not apply to any YSI product damage or failure caused by:

1. Failure to install, operate or use the product in accordance with YSI's written instructions;
2. Abuse or misuse of the product;
3. Failure to maintain the product in accordance with YSI's written instructions or standard industry procedure;
4. Any improper repairs to the product;
5. Use by you of defective or improper components or parts in servicing or repairing the product;
6. Modification of the product in any way not expressly authorized by YSI.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. YSI'S LIABILITY UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT, AND THIS SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY DEFECTIVE PRODUCT COVERED BY THIS WARRANTY. IN NO EVENT SHALL YSI BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY DEFECTIVE PRODUCT COVERED BY THIS WARRANTY.

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INTRODUCTION

Thank you for purchasing the YSI Pro30, an instrument from the YSI *Professional Series* product family. The Pro30 measures conductivity and temperature in water. The Pro30 features an impact resistant and waterproof (IP-67) case, a rugged MS-8 (military-spec) cable connector, backlit display, user-selectable sensor options, 50 data set memory, internal barometer and a rubber over-mold case.

The Pro30 provides valuable instructions and prompts near the bottom of the display that will guide you through operation and use. However, reading the entire manual is recommended for a better understanding of the instrument's features.

> ⓘ *The Pro30 cannot communicate to a PC via a Pro Series communications saddle. Connecting the Pro30 to a communication saddle may cause erratic instrument behavior.*

GETTING STARTED

INITIAL INSPECTION

Carefully unpack the instrument and accessories and inspect for damage. Compare received parts with items on the packing list. If any parts or materials are damaged or missing, contact YSI Customer Service at 800-897-4151 (+1 937 767-7241) or the authorized YSI distributor from whom the instrument was purchased.

BATTERY INSTALLATION

The instrument requires 2 alkaline C-cell batteries. Under normal conditions, the average battery life is 425 hours at room temperature without using the back light. A battery symbol  will blink in the lower, left corner of the display to indicate low batteries when approximately 1 hour of battery life remains.

To install or replace the batteries:

1. Turn the instrument off and flip over to view the battery cover on the back.
2. Unscrew the four captive battery cover screws.
3. Remove the battery cover and remove the old batteries if necessary.
4. Install the new batteries, ensuring correct polarity alignment (figure 1).

5. Place the battery cover on the back of the instrument and tighten the four screws. Do not over-tighten.

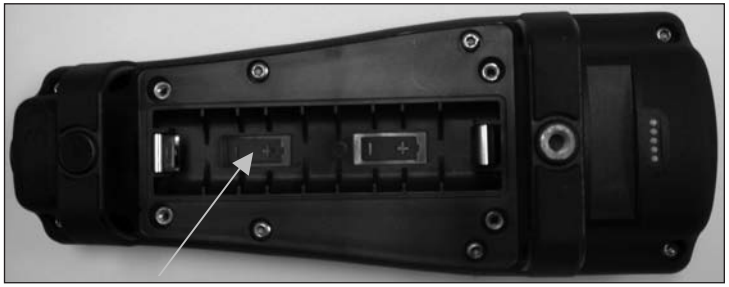


Figure 1. Pro30 with battery cover removed. Notice battery symbols indicating polarities.

> *The waterproof instrument case is sealed at the factory and is not to be opened, except by authorized service technicians. Do not attempt to separate the two halves of the instrument case as this may damage the instrument, break the waterproof seal, and will void the warranty.*

KEY PAD

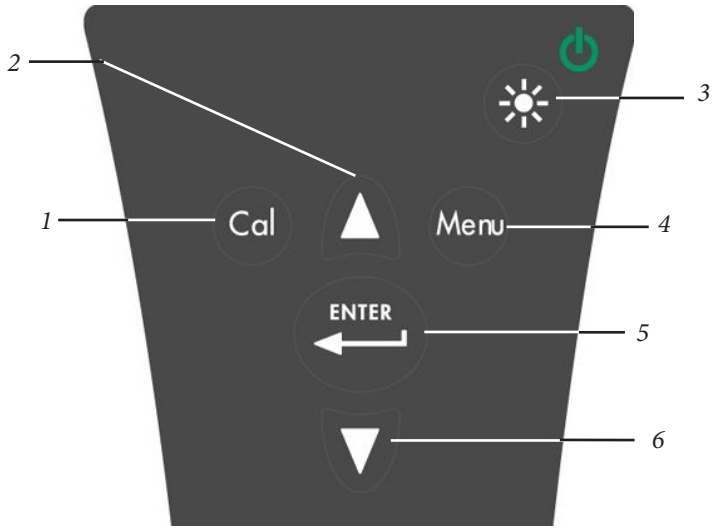


Figure 2, Keypad

Number	*Key*	*Description*
1	Cal	**Calibrate** Press and hold for 3 seconds to calibrate. Opens Calibrate menu from the Run screen.
2	▲	**Up Arrow** Use to navigate through menus, to navigate through box options along the bottom of the Run screen and to increase numerical inputs.
3	⏻ ☀	**Power and Backlight** Press once to turn instrument on. Press a second time to turn backlight on. Press a third time to turn backlight off. Press and hold for 3 seconds to turn instrument off.
4	Menu	**Menu** Use to enter the System Setup menu from the Run screen.
5	ENTER	**Enter** Press to confirm entries and selections.
6	▼	**Down Arrow** Use to navigate through menus, to navigate through box options at the bottom of the Run screen and to decrease numerical inputs.

CONNECTING THE PROBE/CABLE ASSEMBLY TO THE INSTRUMENT

The conductivity and temperature sensors are integral to the cable assembly; therefore, they cannot be removed from the cable.

To connect the cable, align the keys on the cable connector to the slots on the instrument connector. Push together firmly and then twist the outer ring until it locks into place (figure 3). This connection is water-proof.

Figure 3, Note the keyed connector.

RUN SCREEN

Press the power/backlight key to turn the instrument on. The instrument will run through a self test and briefly display a splash screen with system information before displaying the main Run screen (figure 4). The first time the Pro30 is turned on, it will prompt you to select a language; see the First Power On section of this manual for more information.

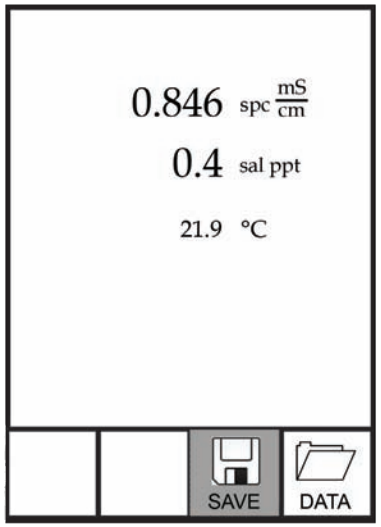


Figure 4, Run screen.

BACKLIGHT

Once the instrument is powered on, pressing the power/backlight key will turn on the display backlight. The backlight will remain on until the key is pressed again or after two minutes of not pressing any key on the keypad.

POWERING OFF

To turn the instrument off, press and hold the power/backlight key for three seconds.

NAVIGATION

The up and down arrow keys allow you to navigate through the functions of the Pro30.

NAVIGATING THE RUN SCREEN

When in the Run screen, the up and down arrow keys will move the highlighted box along the bottom options. Once a box is highlighted, press enter to access the highlighted option.

Description of Run screen box functions from left to right:

Option	*Description*
SAVE	Highlight and press enter to save displayed data to memory.
DATA	Highlight and press enter to view and/or erase saved data.

NAVIGATING THE SYSTEM SETUP MENU

When in the System Setup menu, the up and down arrow keys will move the highlighted bar up and down the system setup options. See the System Setup menu section of this manual for more information about these options.

FIRST POWER ON

The instrument will step through an initial language configuration when powered on for the first time. Use the up or down arrow keys to highlight the

appropriate language then press enter to confirm (figure 5). If an incorrect language is selected, it may be changed in the System Setup menu.

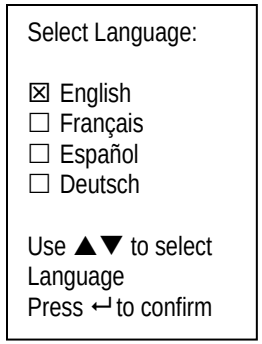


Figure 5, Select language.

After selecting a language, the Run screen will be displayed. The next time the instrument is powered up, the Run screen will display immediately after the splash screen.

SYSTEM SETUP MENU

Press the menu Menu key to access the System Setup menu. The System Setup menu contains multiple screens that are notated as 'pages'. The current page is indicated near the bottom of the display (figure 6).

Use the up and down arrow keys to scroll through menu options and menu pages.

EXITING THE SYSTEM SETUP MENU

To exit the System Setup menu, press the down arrow key until the ESC - Exit box is highlighted, then press enter to return to the Run screen.

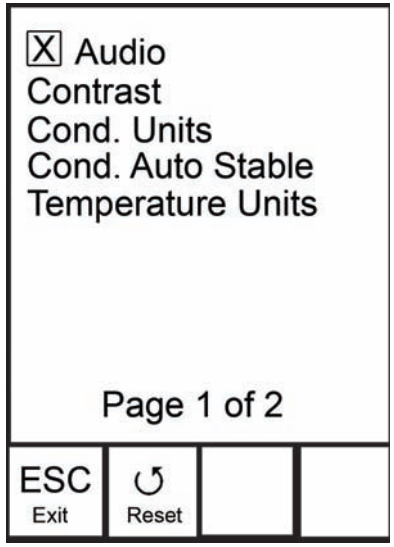


Figure 6, page 1 of System Setup menu. Audio is enabled.

AUDIO

Audio can be enabled or disabled by using the up or down arrow keys to highlight Audio and pressing enter. When enabled, there will be an 'X' in the box next to Audio.

When Audio is enabled, the Pro30 will beep twice to indicate stability when Auto Stable is enabled. The instrument will also beep when a key is pressed. When Audio is disabled, the Pro30 will not beep.

CONTRAST

To adjust the display Contrast, use the up or down arrow keys to highlight Contrast, then press enter. Next, use the up or down arrow keys to adjust the contrast. The up arrow key will darken the contrast and the down arrow key will lighten the contrast. After adjusting the contrast, press enter to save and exit the Contrast adjustment option.

EMERGENCY CONTRAST ADJUSTMENT

If necessary, there is an alternate method of adjusting the contrast. To adjust the contrast, press and hold the menu key, then press the up arrow key to darken the contrast or press the down arrow key to lighten the contrast.

CONDUCTIVITY UNITS (COND. UNITS)

Highlight Cond. Units (Conductivity Units) and press enter to open a submenu that allows you to select the conductivity units to be displayed on the Run screen. Highlight a unit and press enter to enable or disable it. An enabled conductivity unit will have an 'X' in the box next to it. Highlight the ESC-Exit box along the bottom of the display and press enter to save any changes and to close the conductivity units submenu.

There are seven options for displaying conductivity. Only four units can be enabled at the same time:

- COND-mS/cm displays conductivity in milliSiemens per centimeter.
- COND-uS/cm displays conductivity in microSiemens per centimeter.
- SPC-mS/cm displays Specific Conductance in milliSiemens per centimeter. Specific Conductance is temperature compensated conductivity.
- SPC-uS/cm displays Specific Conductance in microSiemens per centimeter. Specific Conductance is temperature compensated conductivity.
- Sal ppt displays salinity in parts per thousand. The salinity reading is calculated from the instrument's conductivity and temperature values using algorithms found in *Standard Methods for the Examination of Water and Wastewater*.
- TDS g/L displays Total Dissolved Solids in grams per liter. TDS is calculated from conductivity and temperature using a user-selectable TDS constant.
- TDS mg/L displays Total Dissolved Solids in milligrams per liter. TDS is calculated from conductivity and temperature using a user-selectable TDS constant.

Note: 1 milliSiemen = 1,000 microSiemens.

SPECIFIC CONDUCTANCE

The conductivity of a sample is highly dependent on temperature, varying as much as 3% for each change of one degree Celsius (temperature coefficient = 3%/°C). In addition, the temperature coefficient itself varies with the nature of the ionic species present in the sample. Therefore, it is useful to compensate for this temperature dependence in order to quickly compare conductivity readings taken at different temperatures.

The Pro30 can display non-temperature compensated conductivity as well as temperature compensated Specific Conductance. If Specific Conductance is selected, the Pro30 uses the temperature and conductivity values associated with

each measurement to calculate a specific conductance value compensated to a user selected reference temperature, see below. Additionally, the user can select the temperature coefficient from 0% to 4%.

Using the Pro30's default reference temperature and temperature coefficient (25 °C and 1.91%), the calculation is carried out as follows:

$$\text{Specific Conductance (25°C)} = \frac{\text{Conductivity of sample}}{1 + 0.0191 * (T - 25)}$$

T = Temperature of the sample in °C

CONDUCTIVITY AUTO STABLE (COND. AUTO STABLE)

Auto Stable utilizes preset values to indicate when a reading is stable. The preset values are adjustable in the System Setup menu. The user can input a % change in readings (0.0 to 1.9) over 'x' amount of time in seconds (3-19).

Highlight Cond. Auto Stable, then press enter to open the submenu.

Use the up or down arrow keys to highlight the % change or seconds (secs) input field, then press enter to make the highlighted field adjustable. Use the up or down arrow keys to adjust the selected value, then press enter to confirm changes. Once you have confirmed any changes, highlight the ESC-Exit box along the bottom of the display and press enter to close the Auto Stable submenu.

To disable Auto Stable, set the % Change input to 0.0.

When Auto Stable is enabled, an (AS) symbol will display next to the reading on the Run screen and blink during stabilization. When the dissolved oxygen and/or conductivity reading stabilizes based on the Auto Stable settings, the (AS) symbol will display steadily and the instrument will beep twice if Audio is turned on.

TEMPERATURE UNITS

Highlight Temperature Units and press enter to open a submenu that allows you to change the temperature units displayed on the Run screen. Highlight the desired unit (Celsius or Fahrenheit) and press enter to enable. The enabled temperature unit will have an 'X' in the box next to it. Only one unit may be enabled at a time. Highlight the ESC-Exit box and press enter to save any changes and to close the Temperature Units submenu.

SPECIFIC CONDUCTANCE REFERENCE TEMPERATURE (SPC REF. TEMP.)

SPC Ref. Temp. (Specific Conductance Reference Temperature) is the reference temperature used to calculate Specific Conductance. The reference temperature range is 15 and 25 °C. The default value is 25 °C.

To change the reference temperature, highlight SPC Ref. Temp. and press enter to open the submenu. With the reference temperature highlighted, press enter to make the field adjustable. Next, use the up or down arrow key to increase or decrease the value. Press enter to save the new reference temperature. Next, highlight the ESC-Exit box and press enter to close the submenu.

SPECIFIC CONDUCTANCE TEMPERATURE COEFFICIENT (SPC %/°C)

SPC %/°C (Specific Conductance Temperature Coefficient) is the temperature coefficient used to calculate Specific Conductance. The coefficient range is 0.00 to 4.00. The default value is 1.91% which is based on KCl standards.

To change the temperature coefficient, highlight SPC %/°C and press enter to open the submenu. With the temperature coefficient highlighted, press enter to make the field adjustable. Next, use the up or down arrow key to increase or decrease the value. Press enter to save the new coefficient. Next, highlight the ESC-Exit box and press enter to close the submenu.

TDS CONSTANT

TDS Constant is a multiplier used to calculate an estimated TDS (Total Dissolved Solids) value from conductivity. The multiplier is used to convert Specific Conductance in mS/cm to TDS in g/L. The Pro30's default value is 0.65. This multiplier is highly dependent on the nature of the ionic species present in the water sample. To be assured of moderate accuracy for the conversion, you must determine a multiplier for the water at your sampling site. Use the following procedure to determine the multiplier for a specific sample:

1. Determine the specific conductance of a water sample from the site;
2. Filter a sample of water from the site;
3. Completely evaporate the water from a carefully measured volume of the filtered sample to yield a dry solid;
4. Accurately weigh the remaining solid;
5. Divide the weight of the solid (in grams) by the volume of water used (in liters) to yield the TDS value in g/L for this site;
6. Divide the TDS value in g/L by the specific conductance of the water in mS/cm to yield the conversion multiplier. Be certain to use the correct units.

If the nature of the ionic species at the site changes between sampling studies, the TDS values will be in error. TDS cannot be calculated accurately from specific conductance unless the make-up of the chemical species in the water remains constant.

To change the TDS Constant in the Pro30, highlight TDS Constant and press enter to open the submenu. With the TDS Constant highlighted, press enter to make the field adjustable. Next, use the up or down arrow key to increase or decrease the value. The input range is 0.30 to 1.00. Press enter to save the new TDS Constant. Next, highlight the ESC-Exit box and press enter to close the submenu.

LANGUAGE

Highlight Language and press enter to open a submenu that allows you to change the language. Highlight the desired language (English, Spanish, German, or French) and press enter to enable. The enabled language will have an 'X' in the box next to it. Highlight ESC-Exit box and press enter to save any changes and to close the Language submenu.

The text in the boxes along the bottom of the Run screen will always be displayed in English regardless of the language enabled in the System Setup menu.

AUTO SHUTOFF

Auto Shutoff allows you to set the instrument to turn off automatically after a period of time. Use the up or down arrow keys to highlight Auto Shutoff, then press enter to open the submenu. Press enter while the minute field is highlighted to make it adjustable. Next, use the up or down arrow keys to adjust the shut off time from 0 to 60 minutes. Press enter to save the new shutoff time. Next, highlight the ESC-Exit box and press enter to close the submenu.

To disable Auto Shutoff, set the Time in Minutes to 0 (zero).

CELL CONSTANT

The Cell Constant displays the cell constant of the conductivity cell. The cell constant is calculated and updated each time a conductivity calibration is performed. The cell constant range is 4.0 to 6.0. Resetting the System Menu resets the cell constant to 5.0.

RESETTING THE SYSTEM SETUP MENU TO FACTORY DEFAULT

To reset the Pro30 settings to factory default, press the down arrow key while in the System Setup menu until the Reset - ↺ box is highlighted, then press enter. The instrument will ask you to confirm the reset. Highlight Yes and press enter to continue with the reset or highlight No and press enter to cancel the reset. A Factory Reset will not affect data saved in the instrument's memory.

The following will be set in the Pro30 after performing a reset:

Parameter	*Reset Defaults*
Audio	On
Contrast	Set to mid range
Conductivity Units	cond uS/cm, spc mS/cm, spc uS/cm and sal ppt
Conductivity Auto Stable	Off (0.0 % Change and 10 seconds)
SPC Reference Temperature	25°C
SPC Temperature Coefficient	1.91%/°C
TDS Constant	0.65
Temperature Units	°C
Language	English
Auto Shutoff	30 minutes
Conductivity Cell Constant	Cell constant reset to 5.0*

*It is recommended to perform a Conductivity calibration after performing a reset.

CALIBRATION

TEMPERATURE

All Pro30 cables have built-in temperature sensors. Temperature calibration is not required nor is it available.

CONDUCTIVITY CALIBRATION

Ensure the conductivity sensor is clean and dry before performing a conductivity, specific conductance or salinity calibration.

> ⓘ *It is not necessary to calibrate conductivity, specific conductance and salinity. Calibrating one of these parameters will simultaneously calibrate the others. YSI recommends calibrating specific conductance for greatest ease.*

CALIBRATING SPECIFIC (SP.) CONDUCTANCE OR CONDUCTIVITY

Note: When calibrating Specific Conductance, the Pro30 uses the factory default values for the Specific Conductance Reference Temperature and the Specific Conductance Temperature Coefficient regardless of what is configured in the System Setup Menu. The default value for the Reference Temperature is 25°C and the default value for the Temperature Coefficient is 1.91%/°C. It is important to note that the Temperature Coefficient of a calibration solution is dependent on the contents of the solution. Therefore, YSI recommends using a traceable calibration solution made of KCl (potassium chloride) when calibrating Specific Conductance since these solutions typically have a Temperature Coefficient of 1.91%/°C. Additionally, be sure to enter the value of the solution as it is listed for 25°C when calibrating Specific Conductance.

1. Fill a clean container (i.e. plastic cup or glass beaker) with fresh, traceable conductivity calibration solution and place the sensor into the solution. The solution must cover the holes of the conductivity sensor that are closest to the cable (figure 7). Ensure the entire conductivity sensor is submerged in the solution or the instrument will read approximately half the expected value. Gently move the probe up and down to remove any air bubbles from the conductivity sensor.

Figure 7, solution above two holes near cable.

2. Turn the instrument on and allow the conductivity and temperature readings to stabilize. Press and hold the Cal key for 3 seconds. Highlight Conductivity and press enter. Next, highlight the desired calibration method, Sp. Conductance or Conductivity, and press enter.
3. Highlight the units you wish to calibrate, either uS/cm or mS/cm, and press enter. 1 mS = 1,000 uS. Next, use the up or down arrow key to adjust the value on the display to match the value of the conductivity calibration solution. If calibrating conductivity, it is necessary to look up the value of the solution at the current temperature and enter that value into the Pro30. Most conductivity solutions are labeled with a value at 25°C. If calibrating specific conductance, enter the value listed for 25°C. Depressing either the up or down arrow key for 5 seconds will move the changing digit one place to the left. The Pro30 will remember the entered calibration value and display it the next time a conductivity calibration is performed.
4. Press enter to complete the calibration. Or, press Cal to cancel the calibration and return to the Run screen.
5. 'Calibration Successful' will display for a few seconds to indicate a successful calibration and then the instrument will return to the Run screen.
6. If the calibration is unsuccessful, an error message will display on the screen. Press the Cal key to exit the calibration error message and return to the Run screen. See the Troubleshooting guide for possible solutions.

CALIBRATING IN SALINITY

1. Fill a clean container (i.e. plastic cup or glass beaker) with fresh, traceable salinity calibration solution and place the sensor into the solution. The solution must cover the holes of the conductivity sensor that are closest to the cable (figure 7). Ensure the entire conductivity sensor is submerged in the solution or the instrument will read approximately half the expected value. Gently move the probe up and down to remove any air bubbles from the conductivity sensor.
2. Turn the instrument on and allow the conductivity and temperature readings to stabilize. Press and hold the Cal key for 3 seconds. Highlight Conductivity and press enter. Next, highlight Salinity and press enter.
3. Use the up or down arrow key to adjust the value on the display to match the value of the salinity solution. Depressing either the up or down arrow key for 5 seconds will move the changing digit one place to the left. The Pro30 will remember the entered calibration value and display it the next time a salinity calibration is performed.
4. Press enter to complete the calibration. Or, press Cal to cancel the calibration and return to the Run screen.
5. 'Calibration Successful' will display for a few seconds to indicate a successful calibration and then the instrument will return to the Run screen.
6. If the calibration is unsuccessful, an error message will display on the screen. Press the Cal key to exit the calibration error message and return to the Run screen. See the Troubleshooting guide for possible solutions.

TAKING MEASUREMENTS

Before taking measurements, be sure the instrument has been calibrated to ensure the most accurate readings. Place the probe in the sample to be measured and give the probe a quick shake to release any air bubbles. Be sure the conductivity sensor is completely submerged in the sample. The two holes near the cable should be covered by the sample for accurate conductivity readings (figure 7). Allow the temperature readings to stabilize.

SAVING AND VIEWING DATA

The Pro30 can store 50 data sets in non-volatile memory for later viewing. A data set includes the values currently on the display, i.e. temperature, dissolved oxygen and two conductivity parameters. Each data point is referenced with a data set number, 01 through 50.

SAVING DATA

> *The Pro30 can not communicate to a PC via a Pro Series communications saddle. Connecting the Pro30 to a communication saddle may cause erratic instrument behavior.*

From the Run screen, use the up or down arrow keys to highlight the Save box and press enter to save the current readings. The instrument will indicate the data set is saved and display the saved data set's number (figure 8).

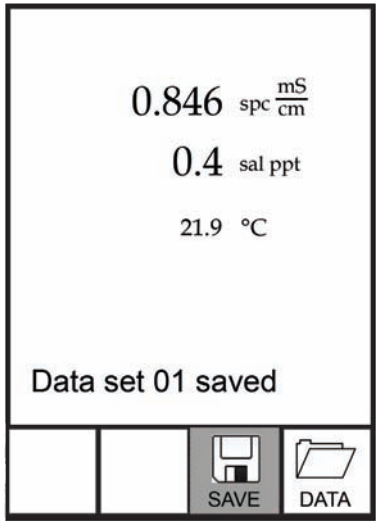


Figure 8, data set saved.

The instrument will display 'Memory Full' if all 50 data sets have been saved and you attempt to save another data set.

VIEWING AND ERASING SAVED DATA - DATA MODE

Data mode allows you to view and erase saved data. From the Run screen, use the up or down arrow keys to highlight Data and press enter to access Data mode. Note that the function boxes at the bottom of the display are different in Data mode (figure 9).

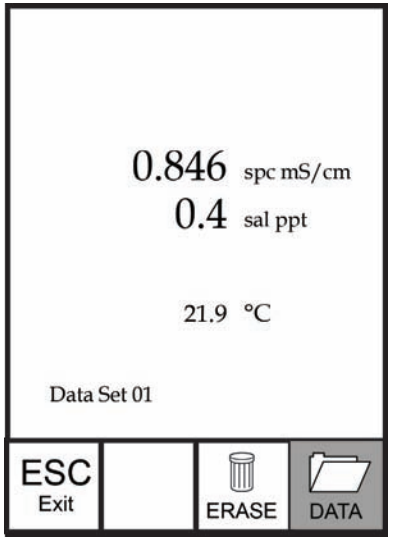


Figure 9, Data mode.

VIEWING DATA

Once in Data mode, use the up and down arrow keys to view saved data sets in sequential order or press enter to access the bottom functions. After accessing the bottom functions, highlight the Data box and press enter to regain access to viewing data. The data set displayed is indicated by the data set number, 01 through 50.

ERASING DATA

While viewing saved data, press the enter key to access the function boxes at the bottom of the display. Next, use the up or down arrow keys to highlight Erase, then press enter. The instrument will give you the option to erase one data set or all data sets (figure 10).

Figure 10, Erase data mode.

Use the up or down arrow key to select Erase Data Set, Erase All Sets or the ESC-Exit function box, then press enter to confirm.

Select ESC-Exit and press enter to exit Erase mode without erasing any data.

Select Erase Data Set and press enter to erase the data set that was displayed before entering Erase mode. For example, if data set 12 was displayed before entering erase mode, and Erase Data Set is selected, Data Set 12 will be erased from memory and the data sets AFTER that number will move up to keep them sequential. For example, if there are15 records and number 12 is erased then 13 becomes 12, 14 becomes 13, and 15 becomes 14. The instrument will return to Data mode after erasing one data set.

Select Erase All Data Sets and press enter to clear the Pro30 memory and return to Data mode.

EXITING DATA MODE

While in Data mode, press enter to access the bottom functions. Next, highlight the ESC-Exit box and press enter to return to the Run screen.

CARE, MAINTENANCE AND STORAGE

This section describes the proper procedures for care, maintenance and storage of the instrument. The goal is to maximize their lifetime and minimize down-time associated with improper instrument usage.

GENERAL MAINTENANCE

GENERAL MAINTENANCE - GASKET

The instrument utilizes a gasket as a seal to prevent water from entering the battery compartment. Following the recommended procedures will help keep the instrument functioning properly.

If the gasket and sealing surfaces are not maintained properly, it is possible that water can enter the battery compartment. If water enters this area, it can severely damage the battery terminals causing loss of battery power and corrosion to the battery terminals. Therefore, when the battery compartment lid is removed, the gasket that provides the seal should be carefully inspected for contamination (i.e. debris, grit, etc.) and cleaned with water and mild detergent if necessary.

SENSOR MAINTENANCE

SENSOR MAINTENANCE - TEMPERATURE

You must keep the temperature sensor free of build up. Other than that, no additional maintenance is required. A toothbrush can be used to scrub the temperature sensor if needed.

SENSOR MAINTENANCE - CONDUCTIVITY

The openings that allow sample access to the conductivity electrodes should be cleaned regularly. The small cleaning brush included in the Maintenance Kit is intended for this purpose. Dip the brush in clean water and insert it into each hole 10 to 12 times. In the event that deposits have formed on the electrodes, it may be necessary to use a mild detergent (laboratory grade soap or bathroom foaming tile cleaner) with the brush. Rinse thoroughly with clean water, then check the response and accuracy of the conductivity cell with a calibration solution.

SENSOR STORAGE

SHORT AND LONG TERM STORAGE

For both short and long term storage, the conductivity sensor should be stored clean and dry.

Remove the batteries from the instrument when storing it for long periods of time (>30 days).

Long Term Storage Temperature: -5 to 70°C (23 to 158°F)

TROUBLESHOOTING

Symptom	*Possible Solution*
Instrument will not turn on, a battery symbol appears, or "Critical Shutdown" displays on the screen.	1. Low battery voltage, replace batteries. 2. Batteries installed incorrectly, check battery polarity. 3. Return system for service.
Temperature values display Over or Undr on Run screen.	1. Sample temperature is less than -5° C or more than +55°C. Increase or decrease the sample temperature to bring within the allowable range. 2. Contact YSI Tech Support.
Instrument will not calibrate the Conductivity sensor; instrument displays "Calibration Over", "Calibration Under", or "Unstable Reading" during calibration.	1. Ensure the conductivity sensor is clean. Follow the cleaning procedures in the Care, Maintenance and Storage section of this manual. 2. Verify the calibration solution is above the two holes near the cable, see figure 8. 3. Verify the calibration solution is not expired or contaminated. Try a new bottle of solution. 4. Ensure you are entering in the correct value for the solution according to the measurement units. 1 mS = 1,000 uS. 5. Allow sufficient stabilization time for conductivity and temperature AND wait at least 3 seconds before confirming a calibration. 6. Contact YSI Tech Support.

Symptom	*Possible Solution*
Conductivity readings are inaccurate.	1. Ensure the conductivity sensor is clean. Follow the cleaning procedures in the Care, Maintenance and Storage section of this manual. 2. Verify the sample is above the two holes near the cable, see figure 8. 3. Verify calibration. 4. Verify temperature readings are accurate. 5. Verify the correct units are setup in the System Setup menu, i.e. uS vs mS and Conductivity vs. Specific Conductance. 6. Contact YSI Tech Support.
Conductivity values display Over or Undr on Run screen.	1. Ensure the conductivity sensor is clean. Follow the cleaning procedures in the Care, Maintenance and Storage section of this manual. 2. Verify the sample is above the two holes near the cable, see figure 8 3. Verify calibration. 4. Verify temperature readings are accurate. 5. Sample conductivity is outside the measurement range of the instrument, i.e. 0-200 mS. 6. Contact YSI Tech Support.

SPECIFICATIONS

These specifications represent typical performance and are subject to change without notice. For the latest product specification information, please visit YSI's website at www.ysi.com or contact YSI Tech Support.

Parameter	*Range*	*Resolution*	*Accuracy*
Temperature	-5 to 55°C	0.1°C	± 0.2°C
Conductivity	0-500 uS/cm 0-5 mS/cm 0-50 mS/cm 0-200 mS/cm (auto ranging)	0.0001 to 0.1 mS/cm; 0.1 to 0 uS/cm (range dependent)	Instrument only: ± 0.5% of the reading or 1 uS/cm, whichever is greater. Instrument with 1 or 4 meter cables: ± 1.0% of the reading or 1 uS/cm, whichever is greater. Instrument with 10, 20, or 30 meter cables: ± 2.0% of the reading or 1 uS/cm, whichever is greater.
Salinity	0 to 70 ppt	0.1 ppt	± 1.0% of the reading or ± 0.1 ppt, whichever is greater.
Total Dissolved Solids (TDS)	0 to 100 g/L. TDS Constant range: 0.3 to 1.00 (0.65 default)	0.0001 to 0.1 g/L (range dependent)	Dependent on accuracy of temperature, conductivity and TDS Constant.

ACCESSORIES / PART NUMBERS

Part Number	*Description*
6050030	Pro30 Instrument
60530-1, -4, -10, -20, or -30	1, 4, 10, 20, 30-meter cable assembly*
603077	Flow cell
603056	Flow cell mounting spike
603075	Carrying case, soft-sided
603074	Carrying case, hard-sided
603069	Belt clip
063517	Ultra clamp for instrument
063507	Tripod for instrument
603062	Cable management kit, included with all cables longer then 1 meter.
605978	Cable weight, 4.9 oz, stackable
603070	Shoulder strap
060907	Conductivity Calibration Solution, 1,000 µS/cm. 1 box of 8 pints.
060911	Conductivity Calibration Solution, 10,000 µS/cm. 1 box of 8 pints.
060660	Conductivity Calibration Solution, 50,000 µS/cm. 1 box of 8 pints.
065274	Conductivity Calibration Solution, 100,000 µS/cm. 1 box of 8 pints.

*All cables include a temperature and conductivity sensor.

DECLARATION OF CONFORMITY

The undersigned hereby declares on behalf of the named manufacturer under our sole responsibility that the listed product conforms to the requirements for the listed European Council Directive(s) and carries the CE mark accordingly.

Manufacturer:	YSI Incorporated 1725 Brannum Lane Yellow Springs, OH 45387 USA
Product Name:	Pro30 Water Quality Instrument
Model Numbers	
Instrument/Accessory:	Pro30 (6050030)
Probe/Cable Assemblies:	60530-1, -4, -10, -20, and -30
Conforms to the following:	
Directives:	IEC 61326-1:2005 RoHS 2002/95/EC WEEE 2002/96/EC IP-67 Protection per ANSI/IEC 60529-2004
Harmonized Standards:	• EN61326-1:2006 (IEC 61326-1:2005) Basic Immunity
Supplementary Information:	All performance met the operation criteria as follows: 1. ESD, IEC 61000-4-2:2001, Performance Criterion B 2. Radiated Immunity, IEC 61000-4-3, Performance Criterion A 3. Electrical Fast Transient (EFT), IEC 61000-4-4:2004, +Corr. 1:2006 + Corr. 2:2007, Performance Criterion B 4. Radio Frequency, Continuous Conducted Immunity, IEC61000-4-6, Performance Criterion A 5. Radiated Emissions, EN 61326-1:2006 (IEC61326-1:2005) Class B
Authorized EU Representative	YSI Hydrodata Ltd Unit 2 Focal Point, Lacerta Court, Works Road Letchworth, Hertfordshire, SG6 1FJ UK

Signed: Lisa M. Abel Date: 27 June 2011
Title: Director of Quality

RECYCLING

YSI is committed to reducing the environmental footprint in the course of doing business. Even though materials reduction is the ultimate goal, we know there must be a concerted effort to responsibly deal with materials after they've served a long, productive life-cycle. YSI's recycling program ensures that old equipment is processed in an environmentally friendly way, reducing the amount of materials going to landfills.

- Printed Circuit Boards are sent to facilities that process and reclaim as much material for recycling as possible.
- Plastics enter a material recycling process and are not incinerated or sent to landfills.
- Batteries are removed and sent to battery recyclers for dedicated metals.

When the time comes for you to recycle, follow the easy steps outlined at www.ysi.com.

BATTERY DISPOSAL

The Pro30 is powered by alkaline batteries which the user must remove and dispose of when the batteries no longer power the instrument. Disposal requirements vary by country and region, and users are expected to understand and follow the battery disposal requirements for their specific locale.

CONTACT INFORMATION

ORDERING AND TECHNICAL SUPPORT

Telephone: 800 897 4151 (USA)
+1 937 767 7241 (Globally)
Monday through Friday, 8:00 AM to 5:00 ET

Fax: +1 937 767 9353 (orders)
+1 937 767 1058 (technical support)

Email: environmental@ysi.com
Mail: YSI Incorporated
1725 Brannum Lane
Yellow Springs, OH 45387 USA

Internet: www.ysi.com

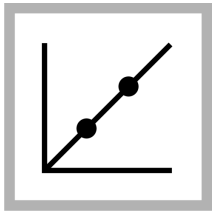
When placing an order please have the following available:
1.) YSI account number (if available)
2.) Name and phone number
3.) Purchase Order or Credit Card number
4.) Model Number or brief description
5.) Billing and shipping addresses
6.) Quantity

SERVICE INFORMATION

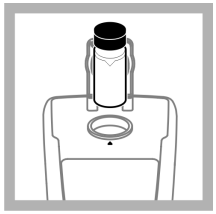
YSI has authorized service centers throughout the United States and Internationally. For the nearest service center information, please visit www.ysi.com and click 'Support' or contact YSI Technical Support directly at 800-897-4151 (+1 937-767-7241).

When returning a product for service, include the Product Return form with cleaning certification. The form must be completely filled out for a YSI Service Center to accept the instrument for service. The form may be downloaded from www.ysi.com by clicking on the 'Support".

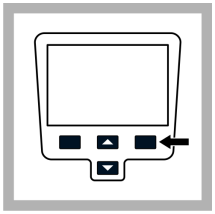
Item # 606082
Rev A
Drawing # A606082
July 2011



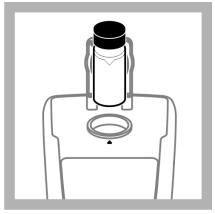
1. Push the **CALIBRATION** key to enter the Calibration mode. Follow the instructions on the display.
Note: *Gently invert each standard before inserting the standard.*



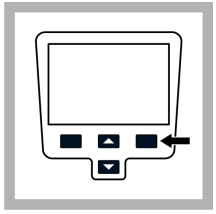
2. Insert the 20 NTU StablCal Standard and close the lid.
Note: *The standard to be inserted is bordered.*



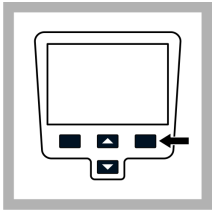
3. Push **Read**. The display shows Stabilizing and then shows the result.



4. Repeat Step 2 and 3 with the 100 NTU and 800 NTU StablCal Standard.
Note: *Push* ***Done*** *to complete a 2 point calibration.*



5. Push **Done** to review the calibration details.



6. Push **Store** to save the results.
After a calibration is complete, the meter automatically goes into the Verify Cal mode. Refer to Calibration verification (Verify Cal) on page 16.

Turbidity measurement

⚠ WARNING

Potential explosion and fire hazard. This turbidimeter is designed for water based samples. Do not measure solvent or combustible based samples.

Readings can be taken with the Normal reading mode, Signal Average mode or in the Rapidly Settling Turbidity mode. Refer to Reading modes on page 16 for more information. For accurate turbidity readings use clean sample cells and remove air bubbles (degassing).

Measurement notes

Proper measurement techniques are important in minimizing the effects of instrument variation, stray light and air bubbles. Use the following measurement notes for proper measurements.

Instrument

- Make sure that the meter is placed on a level, stationary surface during the measurement.
  Note: *Do not hold the meter in the hand during measurement.*
- Always close the sample compartment lid during measurement, calibration and storage.
- Remove sample cell and batteries from the instrument if the instrument is stored for an extended time period (more than a month).
- Keep the sample compartment lid closed to prevent the entry of dust and dirt.

Sample cells

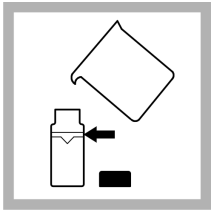
- Always cap the sample cell to prevent spillage of the sample into the instrument.
- Always use clean sample cells in good condition. Dirty, scratched or damaged cells can cause inaccurate readings.
- Make sure that cold samples do not “fog” the sample cell.
- Store sample cells filled with distilled or deionized water and cap tightly.

Measurement

- Measure samples immediately to prevent temperature changes and settling. Before a measurement is taken, always make sure that the sample is homogeneous throughout.
- Avoid sample dilution when possible.
- Avoid operation in direct sunlight.

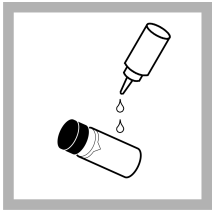
Turbidity measurement procedure

Note: *Before a measurement is taken, always make sure that the sample is homogeneous throughout.*



1. Collect a representative sample in a clean container. Fill a sample cell to the line (about 15 mL). Take care to handle the sample cell by the top. Cap the cell.

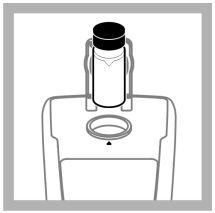
2. Wipe the cell with a soft, lint-free cloth to remove water spots and fingerprints.



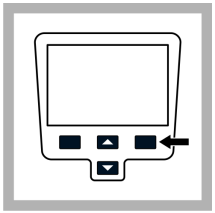
3. Apply a thin film of silicone oil. Wipe with a soft cloth to obtain an even film over the entire surface (Apply silicone oil to a sample cell on page 17).

4. Push the **Power** key to turn the meter on. Place the instrument on a flat, sturdy surface.

Note: *Do not hold the instrument while making measurements.*



5. Gently invert and then insert the sample cell in the instrument cell compartment so the diamond or orientation mark aligns with the raised orientation mark in front of the cell compartment. Close the lid.



6. Push **Read**. The display shows Stabilizing then the turbidity in NTU (FNU). The result is shown and stored automatically (Refer to Data management on page 11)

Data management

About stored data

The following types of data are stored in the data log:

- Reading Log: stores automatically each time a sample reading is taken (500 records).
- Calibration Log: stores only when **Store** is selected at the end of a calibration (25 records).
- Verify Cal Log: stores only after **Done** is selected at the end of a verification calibration (250 records).

When the data log becomes full, the oldest data point is deleted when more data is added to the log.

View data log

The data log contains Reading Log, Calibration Log and Verify Cal log. All logs can be sorted by date.

APPENDIX G

Field Investigation Standard Operating Procedures (SOPs)

SOP 1: Dry Weather Outfall Inspection

Introduction

Outfalls can be in the form of pipes or ditches and is the final point of discharge into a body of water for an engineered storm drain system. Current and pending regulations require that all outfalls, that are part of the storm drain system, be inspected, and that the water quality at these outfalls be analyzed under both dry and wet weather conditions. "SOP 2: Wet Weather Outfall Inspection," covers the objectives for wet weather outfall inspections. This SOP discusses the objectives of dry weather outfall inspections.[1]

During a dry weather period, it is expected that minimal flow will be observed, if at all, at any stormwater outfall. As such, the objective of dry weather outfall inspections is to analyze the presence of any flow at each stormwater outfall and identify any potential source(s) of an illicit discharge further described in "SOP 3: Locating Illicit Discharges."

As per the Consent Decree, by May 31st, 2023, the City of Holyoke (the City) shall submit to the EPA for review an Illicit Discharge Detection and Elimination (IDDE) Plan which includes screening and monitoring all known MS4 outfalls and interconnections under dry weather conditions. As defined in the Consent Decree, the City shall conduct dry-weather inspections only when no more than 0.1 inches of rainfall or significant snowmelt has occurred in the preceding 24 hours, but 48 hours when possible.[2] Unlike wet weather sampling, dry weather inspections are not intended to capture a "first flush" event, but rather identify any discharge that may be present at a stormwater outfall during a period without recorded rain or snowmelt in order to facilitate the detection of an illicit discharge.

Catchment Investigations

In order to determine the approximate location of suspected illicit discharges, the first step is to complete an investigation of the storm drain system under dry weather conditions. This includes systematically and progressively observing, sampling, and evaluating key junction manholes and sump manholes within the City. The City's DPW is responsible for completing catchment investigations, incorporating updates to the City's infrastructure into their storm system maps, and refining catchment delineations based on field investigations.

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1 *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

2 *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

As per the 2016 Massachusetts Small MS4 General Permit, the following definitions of important terms related to the dry weather manhole inspection program are as follows[3]:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.
- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections. A pictorial example of junction manholes and how they relate to key junction manholes can be found in Figure 1 below.

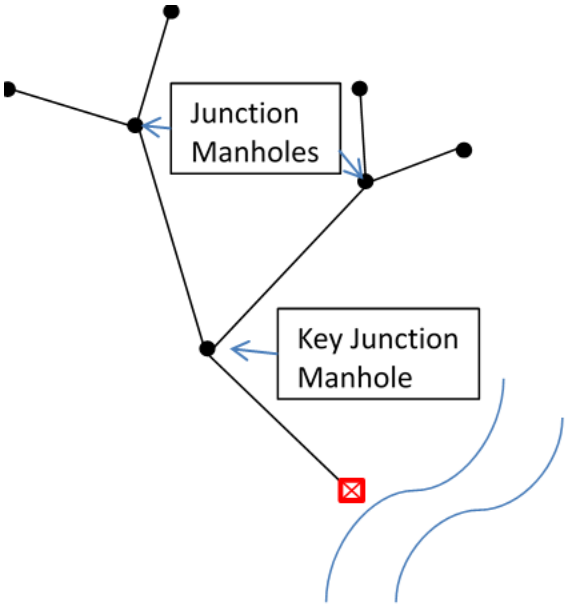

Figure 1 – Junction vs. Key Junction Manholes

- **Common Manholes** have connections to both the sewer and drain system and therefore provide a potential for cross-contamination.

In addition to the manhole types identified above, sump manholes may also be located in the City's system. These structures have a significant difference in elevation between the bottom of the structure and bottom of the outlet pipe. This difference in elevation, also known as a sump, could potentially allow illicit discharges to collect and, as a result, not flow downstream. In preparation for field inspections, the City's DPW should identify all key junction manholes, mainline sump manholes, as well as any potential connections to other catchments such as weirs or overflows. These structures will then systematically be inspected for evidence of illicit discharges, and if found, eventual isolation and elimination.

Prior to field investigations, the City shall notify property owners of upcoming investigations via flyers and/or door hangers. Ideally, storm drains and sump manholes should be cleaned prior to investigations, but it is not required. Specifically, any known problem areas or areas with known blockages should be prioritized for cleaning.

[3] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal … –US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

Once property owners have been notified and cleaning of the storm drain system has occurred, catchment investigations can begin. This can occur in one of two ways, or via a combination of both:

(1) By working progressively down from the upper parts of the catchment toward the outfall ("Top Down") or
(2) By working progressively up from the outfall and inspecting key junction manholes along the way ("Bottom-Up").

Both methods have their advantages. Starting upstream can be more efficient, whereas starting downstream works well for small catchments that aren't influenced by receiving water bodies. As such, inspection direction can depend on the nature of the drainage system (e.g. size, receiving water influence) and also the completeness and accuracy of the City's GIS mapping. This can also depend on whether or not most outfalls are partially or totally submerged. In the event that manholes are partially or completely submerged, samples should not be collected. Rather these structures should be investigated furthered via building inspections, dye testing, or even bypass pumping so as to remove flow from the structure so it can be further visually inspected.

Once an inspection direction has been chosen, the investigation can then begin with key junction manholes and mainline sump manholes. From here, the inspection can continue towards junction manholes and other manholes, as needed, with the purpose to isolate any illicit discharges. The specific steps shall be as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections during dry weather. A sample manhole inspection report is provided in Attachment 1. Visual evidence may include toilet paper, sanitary products, sewage, soap, food, or other indications of anything other than stormwater. Olfactory evidence may include sewage, soap, laundry, bleach, or other odors not typical of stormwater.
2. Where possible, condition information and measured elevation of the manhole rim as well as the invert depth should be recorded.
3. If flow is observed, a sample shall be collected and analyzed in accordance with the procedures outlined in the following sections.
4. If no flow is observed, the inlet or outlets to the manholes may be partially blocked using sandbags or similar barriers. More details associated with this method can be found in "SOP 3: Locating Illicit Discharges."
5. Where sampling results or visual or olfactory evidence indicate potential illicit discharges, the area draining to the manhole should be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.
6. Subsequent manhole inspections shall proceed until the location of the suspected illicit discharges can be isolated to a pipe segment between two manholes.
7. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completed of key junction manhole sampling.

Condition Assessment

If any flow is observed during dry weather conditions at a stormwater outfall, a sample shall be taken after a visual observation of the discharge is complete. If any pollution or signs of potential illicit connections are observed, they should be noted and investigated further. As per the Central Massachusetts Regional Stormwater Coalition, the following visual indicators shown in Table 1 may be the result of the following sources listed in Table 1.[4]

[4] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Table 1 – Visual Condition Assessment

Indicator	Possible Source
Foam	upstream vehicle washing activities or illicit discharge
Oil Sheen	leak or spill
Cloudiness	suspended solids (i.e. dust, ash, powdered chemicals, ground up materials, etc.)
Color or Odor	raw materials, chemicals, or sewage
Excessive Sediment	disturbed earth of unpaved areas lacking adequate erosion control measures
Sanitary Waste/ Optical Enhancers*	illicit discharge
Orange Staining	high mineral concentrations

* Fluorescent dyes added to laundry detergent and some toilet paper

While many of the indicators listed in Table 1 would indicate an illicit discharge, some indicators may occur naturally. For example, orange staining could be the result of naturally occurring iron. However, it may be difficult to determine the difference between natural foam and foam caused by pollution. Natural foam can typically be found in water with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. As per the Central Massachusetts Regional Stormwater Coalition, it's important to consider the following factors listed in Table 2 when determining if the source of foam present at a stormwater outfall is natural or not.[5]

Table 2 – Conditional and Qualitative Considerations of Foam

Factors	Explanation
Wind Direction or Turbulence	Natural foam occurrences of the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
Proximity to Potential Pollution Source	Some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. The presence of silt in water, such as from a construction site can cause foam.
Physical Feeling	Natural foam is typically persistent, light, not slimy to the touch.
Visual Observation	Prescence of decomposing plants or organic material in the water.

In addition to foam, both bacteria and petroleum can create a sheen on the water surface. Differentiating the two can be as simple as disturbing the "sheen" with a pole, stick, or similar object. A sheen caused by oil will remain intact and move in a swirl pattern while a sheen caused by bacteria will separate into a number of smaller patches and appear "blocky." In addition, bacteria or naturally occurring sheens are usually silver or dull in color. While bacterial sheen is not a pollutant, it should be noted when describing the discharge.[6]

[5] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[6] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Optical enhancers on the other hand can be visible to the naked eye when found in high enough concentrations and will appear as a bluish-purple haze. If a visual observation is unable to confirm the presence of this pollutant, a quantitative test can be used. In order to perform this test, a clean, white, cotton pad should be placed, either directly in, or within a sample of, the discharge for several days. After soaking, the cotton pad should be dried and then viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be the pollutant and present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to determine the concentration of optical enhancers within the sample. Often a visual observation is enough as it is not typical that this analysis is required.

Sample Collection

Table 3 lists the field equipment commonly used for dry weather outfall screening and sampling.

Table 3 – Field Equipment for Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Forms or Tablet for Electronic Forms	Field sheets for both dry weather inspection and dry weather sampling should be available, with extra sheets included
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/Headlamp w/ Batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, safety glasses, hard hats, and boots at a minimum. Work gloves, long pants, and sleeves for protection from environmental conditions such as brush, insects, and poisonous plants.
Insect/Plant Repellant and Sunscreen	For protection from environmental conditions.
GPS Receiver	For taking spatial location data
Distilled water	For use with test kits and water quality meters
Water Quality Meters	Hand-held meters for testing various water quality parameters.
Field Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Rinse Water/Calibration standards	Cleaning equipment and calibration
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean.
	Keep extra sample containers on hand at all times.
	Make sure there are proper sample containers for what is being sampled for (i.e., bacteria and total phosphorus analysis require sterile containers and preservatives).
	Telescopic Sampling Pole/Dipper for hard to reach locations.
Cooler with Ice	Laboratory sample submittals

Equipment	Use/Notes
Pry Bar, Pick, and/or Shovel	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Traffic Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Machete/Clippers	Accessing overgrown infrastructure
Flashlight with batteries	For looking in outfalls, manholes, and catch basins
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard-to-reach outfalls and manholes
5-gallon Bucket w/ Cover	Disposal of chemical waste
Confined Space Entry Equipment (if needed)	DBI Sali Tripod and retrieval wench; MSA Tripod, rescue wench and material/personal wench; full body harness; 10' ladder; waders; hard hat; air monitoring equipment (Ventis 4 gas meter)

As per the 2016 Massachusetts Small MS4 General Permit, where dry weather flow is found at an outfall/interconnection, at least one (1) sample shall be collected.[7] A discrete manual or grab sample shall be collected for dry weather outfall inspections due to the time-sensitive nature of the process. Grab samples classify water at a distinct point in time and are used primarily when the water quality of the discharge is expected to be homogenous, or unchanging, in nature. A flow-weighted composite sample classifies water quality over a measured period of time and are used when the water quality of discharge is expected to be heterogenous, or fluctuating, in nature.[8]

Protocols for collecting a grab sample as per the Central Massachusetts Regional Stormwater Coalition are as follows:

1. Fill out sample information on sample bottles and field sheets (see Attachment 4 for example field sheets).
2. Do not eat, drink, or smoke during sample collection and processing.
3. Do not collect or process samples near a running vehicle.
4. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
5. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
6. Never touch the inside surface of a sample container or lid, even with gloved hands.
7. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.

[7] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ... – US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

[8] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

8. Collect sample with dipper or directly into sample containers. If possible, collect water while facing upstream of the flow into the sample bottles so as to not to disturb water or sediments in the outfall pipe or ditch.
9. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
10. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
11. Do not allow any object or material to fall into or contact the collected water sample.
12. Do not allow rainwater to drip from rain gear or other surfaces into sample containers.
13. Replace and tighten sample container lids immediately after sample collection.
14. Place laboratory samples on ice for analysis of bacteria and pollutants of concern.
15. Accurately label the sample with the time and location.
16. Document on the Dry Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on an Inspection Survey (see Attachment 2 and 3 for examples). This creates a reference point for samples.
17. Fill out chain-of-custody form for laboratory samples.
18. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled, except for bacteria sampling.
19. Store used test strips and test kit waste/ampules properly in a 5-gallon bucket with a cover. Storage and disposal shall be coordinated with the City.
20. Decontaminate all testing personnel and equipment.

Samples that are unable to be analyzed for parameters using field instrumentation require laboratory analysis. Coordination with the laboratory, including the pick-up and/or dropping off, of samples, is the responsibility of the City. The laboratory requires that a chain-of-custody form be filled out and accompany any samples that require analysis. The laboratory will also provide additional details regarding how samples should be collected based on the sample containers and/or specific analytes.

Parameter Analysis

As per the Consent Decree, the City shall utilize the following IDDE screening thresholds shown in Table 4 as guidelines for its analysis of the data generated for each outfall and interconnection discharge sample.[9] In addition, each outfall and interconnection discharge sample shall be concurrently analyzed for all the parameters shown using laboratory analysis or field instrumentation defined in Table 4 as per EPA's Region 1's "EPA New England Bacteria Source Tracking Protocol," January 2012 Draft.[10]

Table 4 – Freshwater Water Quality Criteria, Threshold Limits, and Example Instrumentation[1]

Analyte/Indicator	Threshold Limits/ Single Sample[3]	Instrumentation
E. coli [2]	≥ 410 cfu/100ml	Laboratory via approved method
Enterococci [2]	≥ 130 cfu/100ml	Laboratory via approved method
Surfactants (as MBAS)	≥ 0.25 mg/l	MBAS Field Test Kit (e.g. CHEMetrics K-9400)
	≥ 0.1 mg/l	Laboratory via approved method
Ammonia (NH_3)	≥ 0.5 mg/l	Ammonia Field Test Strips (e.g. Hach Brand)
	≥ 0.1 mg/l	Laboratory via approved method
Chlorine	≥ 0.02 mg/l	Field Meter (e.g. Hach Pocket Colorimeter II)
Temperature	N/A	Field Meter (e.g. YSI Model 30)
Conductivity	N/A	Field Meter (e.g. YSI Model 30)
Salinity	N/A	Field Meter (e.g. YSI Model 30)

[A] The mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. EPA

[B] Class A or B Waters

[C] Levels that may be indicative of potential wastewater or washwater contamination

As per the 2016 Massachusetts Small MS4 General Permit and Consent Decree, all analyses, with the exception of indicator bacteria and pollutants of concern, can be performed with field tests or field instrumentation and are not subject to 40 CFR part 136 requirements. Sampling for bacteria and pollutants of concern shall be conducted using the analytical methods found in 40 CFR § 136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR § 136.[11]

The City is responsible for selecting a laboratory or field kits intended for measuring each analyte. When selecting field kits, review the detection range for each field kit and ensure it corresponds to the threshold limits for each analyte of interest, as listed in Table 4. These limits should be communicated to the laboratory so that the laboratory's instrumentation can be properly calibrated to account for the threshold concentrations. In addition, each analyte has a corresponding analytical method as per Appendix G of the 2016 Massachusetts Small MS4

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[9] *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

[9] *United States Environmental Protection Agency (EPA). (n.d.). EPA New England Bacterial Source Tracking Protocol Purpose. EPA New England Bacterial Source Tracking Protocol. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2014AppendixI.pdf*

[10] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ...–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

General Permit[12], that each field kit and laboratory analysis shall utilize to ensure compliance. Lastly, as per 40 CFR § 136[13], maximum holding times and preservation requirements should be communicated to the laboratory. This is not applicable for field kits since samples are analyzed instantaneously after sample collection. Table 5 summarizes this information and it should be shared with the selected laboratory to ensure compliance with the Consent Decree.

Table 5 – Analytical Methods, Hold Times, and Preservatives for Laboratory Analysis

Analyte or Parameter	EPA or Approved Method No.[1]	Max. Hold Time[2]	Preservation[2]
E. coli	**EPA**: 1103.1; 1603	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
	Other: Colilert ®, Colilert-18®, mColiBlue-24®		
Enterococcus	**EPA**: 1106.1; 1600	8 hours	Cool ≤10°C, 0.0008% Na2S2O3
	Other: Enterolert ® 12 22.		
Surfactants[3]	**SM**: 5540-C	48 hours	Cool ≤6°C
Ammonia[3]	**EPA**: 350.1	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM = Standard Methods

[1]EPA or Approved Method No. obtained from Appendix G of the MA Small MS4 Permit, except for Surfactants obtained from 40 CFR Part 136

[2]Max Holding Time and Preservation obtained from 40 CFR Part 136

[3]Ammonia and Surfactants can be analyzed in the field. Samples are sent to the lab to confirm field results if desired (not required to meet 40 CFR Part 136).

Evaluation of sample data can show positive results due to sources other than human wastewater and false negative results due to chemical reactions or interferences. For example, elevated ammonia readings are common in the New England region due to sampling near historically filled tidal wetlands where the breakdown of biological organic material can skew sample results. The same elevated ammonia readings can also be triggered by discharge from a nearby landfill. In addition, elevated surfactant readings caused by salinity levels greater than one (1) part per thousand can be triggered by the presence of oil. Inconclusive surfactant readings, where the indicator ampule turns green instead of a shade of blue, can often be caused by fine suspended particulate matter being present in the sample being tested. Finally, very low bacteria concentrations can often be the result of elevated chlorine from

[12] *United States Environmental Protection Agency (EPA). (n.d.). Appendix G Massachusetts Small MS4 Permit Monitoring Requirements For Discharges into Impaired Waters – Parameters and Methods. Retrieved January 30, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/appendix-g-2016-ma-sms4-gp.pdf*

[13] *The Federal Register. Federal Register. (n.d.). Retrieved January 30, 2023, from https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-136?toc=1*

leaking drinking water infrastructure inhibiting bacterial growth. As such, any detection of chlorine above the instrument Reporting Limit should be noted.[14]

Inspection Reporting

The City shall maintain detailed and accurate records of outfall and interconnection discharge samples that includes the following information:

- Date and time that sampling was conducted
- Weather conditions both during, and in the 48 hours prior to, each sampling event
- Unique identifier
- Receiving water
- Date of most recent inspection
- Dimensions
- Shape
- Material (concrete, PVC, etc.)
- Spatial location (latitude and longitude with a minimum accuracy of +/-30 feet
- Physical condition
- Indicators of potential non-stormwater discharges (including presence or evidence of suspect flow and sensory observations such as odor, color, turbidity, floatable, or oil sheen)

The Dry Weather Outfall Inspection Survey (Attachment 2) developed by the Central Massachusetts Regional Stormwater Coalition and Outfall Inventory Field Sheet (Attachment 4) are templates that can be used for documenting the listed observations related to both quantitative and qualitative characteristics of any/all flows conveyed by the structure.[15]

As per the 2016 Massachusetts Small MS4 General Permit, if an outfall/interconnection is inaccessible or submerged, the permittee shall proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. In addition, if no flow is observed, but evidence of illicit flow exists (see SOP 3 Locating Illicit Discharges), the City shall revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow.[16]

Attachments

1. Manhole Inspection Report
2. Dry Weather Outfall Inspection Survey developed by the Central Massachusetts Regional Stormwater Coalition
3. Field Data Collection Sheet
4. Outfall Inventory Field Sheet

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[14] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[15] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[13] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ...–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

Related Standard Operating Procedures

1. SOP 2: Wet Weather Outfall Inspection
2. SOP 3: Locating Illicit Discharges

SOP 2: Wet Weather Outfall Inspection

Introduction

Outfalls can be in the form of pipes or ditches and is the final point of discharge into a body of water for an engineered storm drain system. Current and pending regulations require that all outfalls, that are part of the storm drain system, be inspected, and that the water quality at these outfalls be analyzed under both dry and wet weather conditions. "SOP 1: Dry Weather Outfall Inspection," covers the objectives for dry weather outfall inspections. This SOP discusses the objectives of wet weather outfall inspections.

The objective of wet weather inspections is to determine whether wet weather-induced high flows in sanitary sewers, or high groundwater in areas served by septic systems, results in discharges of sanitary flow to the MS4. As per the Consent Decree, by May 31st, 2023, the City of Holyoke (the City) shall submit to the EPA for review an Illicit Discharge Detection and Elimination (IDDE) Plan which includes screening and monitoring all known MS4 outfalls and interconnections in wet weather conditions. As defined in the Consent Decree, the City shall conduct wet-weather inspections once every three years when at least 0.25-inches of rain has occurred over a 24-hour period prior to sampling. However, precipitation events that produce enough flow from outfalls or interconnections to be sampled, will also be acceptable.[1]

Condition Assessment

Typical practice is to prepare for a wet weather inspection event when weather forecasts show a 40% chance of rain or greater. Early preparation is key to sampling first flush which is within the first 30 minutes of discharge to and reflects the maximum pollutant load. In some watersheds, increased discharge from an outfall may not occur with the required 0.25-inches of rain due to the amount of impervious surface present. Therefore, as more inspections occur, and the City understands how their outfalls respond to rain events, this precipitation amount can be modified. [2]

Dry weather sampling is required at any outfall or interconnection where *any* flow is observed under dry weather conditions, but sampling during wet weather conditions is required at *all* outfalls. Particularly, any outfalls that did not have any observed flow during dry weather conditions or those with dry weather flow that passed screening thresholds. Unlike dry weather conditions, wet weather conditions can help to identify a number of situations that would otherwise go unnoticed during dry weather. For example, wet weather can help identify locations where elevated groundwater exists and is causing an exchange of wastewater between cracked or broken sanitary sewers, failed septic systems, underdrains, or storm drains. Wet weather can also help to identify instances when there's an increase in sewer volume and sewage may be entering the storm drain system at common manholes or directly-piped connections to storm drains. Finally, wet weather can also help to identify locations subject to capacity-related SSO discharges or illicit connections that are not carried through the storm drain system during dry weather conditions.[3]

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[1] *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

[2] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[3] *United States Environmental Protection Agency (EPA). (n.d.). EPA New England Bacterial Source Tracking Protocol Purpose. EPA New England Bacterial Source Tracking Protocol. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2014AppendixI.pdf*

Prior to samples being taken, a visual observation of the discharge should occur. During this observation, the presence of any pollution should be noted and further investigated. As per the Central Massachusetts Regional Stormwater Coalition, the following visual indicators shown in Table 1 may be the result of the following.[4]

Table 1 – Visual Condition Assessment

Indicator	Possible Source
Foam	upstream vehicle washing activities or illicit discharge
Oil Sheen	leak or spill
Cloudiness	suspended solids (i.e. dust, ash, powdered chemicals, ground up materials, etc.)
Color or Odor	raw materials, chemicals, or sewage
Excessive Sediment	disturbed earth of unpaved areas lacking adequate erosion control measures
Sanitary Waste/ Optical Enhancers*	illicit discharge
Orange Staining	high mineral concentrations

* Fluorescent dyes added to laundry detergent and some toilet paper

While many of the indicators listed in Table 1 would indicate an illicit discharge, some indicators may occur naturally. For example, orange staining could be the result of naturally occurring iron. However, it may be more difficult to determine the difference between natural foam and foam caused by pollution. Natural foam can typically be found in water with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. As per the Central Massachusetts Regional Stormwater Coalition, it's important to consider the following factors listed in Table 2 when determining if the source of foam present at a stormwater outfall is natural or not.[5]

Table 2 – Conditional and Qualitative Considerations of Foam

Factors	Explanation
Wind Direction or Turbulence	Natural foam occurrences of the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
Proximity to Potential Pollution Source	Some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. The presence of silt in water, such as from a construction site can cause foam.
Physical Feeling	Natural foam is typically persistent, light, not slimy to the touch.
Visual Observation	Prescence of decomposing plants or organic material in the water.

[4] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[5] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

In addition to foam, both bacteria and petroleum can create a sheen on the water surface. Differentiating the two can be as simple as disturbing the "sheen" with a pole, stick, or similar object. A sheen caused by oil will remain intact and move in a swirl pattern while a sheen caused by bacteria will separate into a number of smaller patches and appear "blocky." In addition, bacteria or naturally occurring sheens are usually silver or dull in color. While bacterial sheen is not a pollutant, it should be noted when describing the discharge.[6]

Optical enhancers on the other hand can be visible to the naked eye when found in high enough concentrations and will appear as a bluish-purple haze. If a visual observation is unable to confirm the presence of this pollutant, a quantitative test can be used. In order to perform this test, a clean, white, cotton pad should be placed, either directly in, or within a sample of, the discharge for several days. After soaking, the cotton pad should be dried and then viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be the pollutant and present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to determine the concentration of optical enhancers within the sample. Often a visual observation is enough. It's not typical that this analysis is required.

Sample Collection

Table 3 lists the field equipment commonly used for wet weather outfall screening and sampling.

Table 3 – Field Equipment for Wet Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Forms or Tablet for Electronic Forms	Field sheets for both dry weather inspection and dry weather sampling should be available, with extra sheets included
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/Headlamp w/ Batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, safety glasses, hard hats, and boots at a minimum. Work gloves, long pants, and sleeves for protection from environmental conditions such as brush, insects, and poisonous plants.
Insect/Plant Repellant and Sunscreen	For protection from environmental conditions.
GPS Receiver	For taking spatial location data
Distilled water	For use with test kits and water quality meters
Water Quality Meters	Hand-held meters for testing various water quality parameters.
Field Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day

[6] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Equipment	Use/Notes
Rinse Water/Calibration standards	Cleaning equipment and calibration
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean.
	Keep extra sample containers on hand at all times.
	Make sure there are proper sample containers for what is being sampled for (i.e., bacteria and total phosphorus analysis require sterile containers and preservatives).
	Telescopic Sampling Pole/Dipper for hard to reach locations.
Cooler with Ice	Laboratory sample submittals
Pry Bar, Pick, and/or Shovel	For opening catch basins and manholes when necessary
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Traffic Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Machete/Clippers	Accessing overgrown infrastructure
Flashlight with batteries	For looking in outfalls, manholes, and catch basins
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard-to-reach outfalls and manholes
5-gallon Bucket w/ Cover	Disposal of chemical waste
Confined Space Entry Equipment (if needed)	DBI Sali Tripod and retrieval wench; MSA Tripod, rescue wench and material/personal wench; full body harness; 10' ladder; waders; hard hat; air monitoring equipment (Ventis 4 gas meter)

A discrete manual or grab sample shall be collected for wet weather outfall inspections due to the time-sensitive nature of the process. Grab samples classify water at a distinct point in time and are used primarily when the water quality of the discharge is expected to be homogenous, or unchanging, in nature. A flow-weighted composite sample classifies water quality over a measured period of time and are used when the water quality of discharge is expected to be heterogenous, or fluctuating, in nature.[7]

Protocols for collecting a grab sample as per the Central Massachusetts Regional Stormwater Coalition are as follows:

1. Fill out sample information on sample bottles and field sheets (see Attachment 3 for example field sheets).
2. Do not eat, drink, or smoke during sample collection and processing.
3. Do not collect or process samples near a running vehicle.
4. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
5. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
6. Never touch the inside surface of a sample container or lid, even with gloved hands.

[7] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

7. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
8. Collect sample with dipper or directly into sample containers. If possible, collect water while facing upstream of the flow into the sample bottles so as to not to disturb water or sediments in the outfall pipe or ditch.
9. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
10. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
11. Do not allow any object or material to fall into or contact the collected water sample.
12. Do not allow rainwater to drip from rain gear or other surfaces into sample containers.
13. Replace and tighten sample container lids immediately after sample collection.
14. Place laboratory samples on ice for analysis of bacteria and pollutants of concern.
15. Accurately label the sample with the time and location.
16. Document on the Dry Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on an Inspection Survey (see Attachment 1 and 2 for examples). This creates a reference point for samples.
17. Fill out chain-of-custody form for laboratory samples.
18. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled, except for bacteria sampling.
19. Store used test strips and test kit waste/ampules properly in a 5-gallon bucket with a cover. Storage and disposal shall be coordinated with the City.
20. Decontaminate all testing personnel and equipment.

Samples that are unable to be analyzed for parameters using field instrumentation require laboratory analysis. Coordination with the laboratory, including the pick-up and/or dropping off, of samples, is the responsibility of the City. The laboratory requires that a chain-of-custody form be filled out and accompany any samples that require analysis. The laboratory will also provide additional details regarding how samples should be collected based on the sample containers and/or specific analytes.

Parameter Analysis

As per the Consent Decree, the City shall utilize the following IDDE screening thresholds shown in Table 4 as guidelines for its analysis of the data generated for each outfall and interconnection discharge sample.[8] In addition, each outfall and interconnection discharge sample shall be concurrently analyzed for all the parameters shown using laboratory analysis or field instrumentation defined in Table 4 as per EPA's Region 1's "EPA New England Bacteria Source Tracking Protocol," January 2012 Draft.[9]

Table 4 – Freshwater Water Quality Criteria, Threshold Limits, and Example Instrumentation[1]

Analyte/Indicator	Threshold Limits/ Single Sample[3]	Instrumentation
E. coli [2]	≥ 410 cfu/100ml	Laboratory via approved method
Enterococci [2]	≥ 130 cfu/100ml	Laboratory via approved method

[8] *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

[9] *United States Environmental Protection Agency (EPA). (n.d.). EPA New England Bacterial Source Tracking Protocol Purpose. EPA New England Bacterial Source Tracking Protocol. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2014AppendixI.pdf*

Analyte/Indicator	Threshold Limits/ Single Sample[3]	Instrumentation
Surfactants (as MBAS)	≥ 0.25 mg/l	MBAS Field Test Kit (e.g. CHEMetrics K-9400)
	≥ 0.1 mg/l	Laboratory via approved method
Ammonia (NH_3)	≥ 0.5 mg/l	Ammonida Field Test Strips (e.g. Hach Brand)
	≥ 0.1 mg/l	Laboratory via approved method
Chlorine	≥ 0.02 mg/l	Field Meter (e.g. Hach Pocket Colorimeter II)
Temperature	N/A	Field Meter (e.g. YSI Model 30)
Conductivity	N/A	Field Meter (e.g. YSI Model 30)
Salinity	N/A	Field Meter (e.g. YSI Model 30)

[A] The mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. EPA

[B] Class A or B Waters

[C] Levels that may be indicative of potential wastewater or washwater contamination

As per the 2016 Massachusetts Small MS4 General Permit and Consent Decree, all analyses, with the exception of indicator bacteria and pollutants of concern, can be performed with field tests or field instrumentation and are not subject to 40 CFR part 136 requirements. Sampling for bacteria and pollutants of concern shall be conducted using the analytical methods found in 40 CFR § 136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR § 136.[10]

The City is responsible for selecting a laboratory, or field kits for measuring each analyte. When selecting field kits, review the detection range for each field kit and ensure that it corresponds to the threshold limits for each analyte of interest, as listed in Table 4. These limits should be communicated to the laboratory so that the laboratory's instrumentation can be properly calibrated to account for the threshold concentrations. In addition, each analyte has a corresponding analytical method as per Appendix G of the 2016 Massachusetts Small MS4 General Permit[11], that each field kit and laboratory analysis shall utilize to ensure compliance. Lastly, as per 40 CFR § 136[12], maximum holding times and preservation requirements should be communicated to the laboratory. This is not applicable for field kits since samples are analyzed instantaneously after sample collection. Table 5 summarizes this information and it should be shared with the selected laboratory to ensure compliance with the Consent Decree.

[10] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ...–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

[11] *United States Environmental Protection Agency (EPA). (n.d.). Appendix G Massachusetts Small MS4 Permit Monitoring Requirements For Discharges into Impaired Waters – Parameters and Methods. Retrieved January 30, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/appendix-g-2016-ma-sms4-gp.pdf*

[12] *The Federal Register. Federal Register. (n.d.). Retrieved January 30, 2023, from https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-136?toc=1*

Table 5 – Analytical Methods, Hold Times, and Preservatives for Laboratory Analysis

Analyte or Parameter	EPA or Approved Method No.[1]	Max. Hold Time[2]	Preservation[2]
E. coli	**EPA**: 1103.1; 1603	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
	Other: Colilert ®, Colilert-18®, mColiBlue-24®		
Enterococcus	**EPA**: 1106.1; 1600	8 hours	Cool ≤10°C, 0.0008% Na2S2O3
	Other: Enterolert ® 12 22.		
Surfactants[3]	**SM**: 5540-C	48 hours	Cool ≤6°C
Ammonia[3]	**EPA**: 350.1	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM = Standard Methods

[1]EPA or Approved Method No. obtained from Appendix G of the MA Small MS4 Permit, except for Surfactants obtained from 40 CFR Part 136

[2]Max Holding Time and Preservation obtained from 40 CFR Part 136

[3]Ammonia and Surfactants can be analyzed in the field. Samples are sent to the lab to confirm field results if desired (not required to meet 40 CFR Part 136).

Evaluation of sample data can show positive results due to sources other than human wastewater and false negative results due to chemical reactions or interferences. For example, elevated ammonia readings are common in the New England region due to sampling near historically filled tidal wetlands where the breakdown of biological organic material can skew sample results. The same elevated ammonia readings can also be triggered by discharge from a nearby landfill. In addition, elevated surfactant readings caused by salinity levels greater than one (1) part per thousand can be triggered by the presence of oil. Inconclusive surfactant readings, where the indicator ampule turns green instead of a shade of blue, can often be caused by fine suspended particulate matter being present in the sample being tested. Finally, very low bacteria concentrations can often be the result of elevated chlorine from leaking drinking water infrastructure inhibiting bacterial growth. As such, any detection of chlorine above the instrument Reporting Limit should be noted.[13]

[13] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Inspection Reporting

The City shall maintain detailed and accurate records of outfall and interconnection discharge samples that includes the following information:

- Date and time that sampling was conducted
- Weather conditions both during, and in the 24 hours prior to, each sampling event
- Unique identifier
- Receiving water
- Date of most recent inspection
- Dimensions
- Shape
- Material (concrete, PVC, etc.)
- Spatial location (latitude and longitude with a minimum accuracy of +/-30 feet
- Physical condition
- Indicators of potential non-stormwater discharges (including presence or evidence of suspect flow and sensory observations such as odor, color, turbidity, floatable, or oil sheen)

The Wet Weather Outfall Inspection Survey (Attachment 1) developed by the Central Massachusetts Regional Stormwater Coalition and the Outfall Inventory Field Sheet (Attachment 3) are templates that can be used for documenting the listed observations related to both quantitative and qualitative characteristics of any flows conveyed by the structure..[14]

Attachments

1. Wet Weather Outfall Inspection Survey developed by the Central Massachusetts Regional Stormwater Coalition
2. Field Data Collection Sheet
3. Outfall Inventory Field Sheet

Related Standard Operating Procedures

1. SOP 2: Wet Weather Outfall Inspection
2. SOP 3: Locating Illicit Discharges

[14] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

SOP 3: Locating Illicit Discharges

Introduction

An "illicit discharge" is any discharge to an engineered storm drain system that is not composed entirely of stormwater. Exceptions for allowable non-stormwater discharge are detailed in the Massachusetts MS4 Permit and are as follows[1]:

a. Water line flushing
b. Landscape irrigation
c. Diverted stream flows
d. Rising ground water
e. Uncontaminated ground water infiltration (as defined at 40 CFR § 35.2005(20))
f. Uncontaminated pumped ground water
g. Discharge from potable water sources
h. Foundation drains
i. Air conditioning condensation
j. Irrigation water, springs
k. Water from crawl space pumps
l. Footing drains
m. Lawn watering
n. Individual resident car washing
o. Flows from riparian habitats and wetlands
p. De-chlorinated swimming pool discharges
q. Street wash waters
r. Residential building wash waters without detergents

Illicit discharges can enter an engineered storm drain system via direct and indirect connections. These connections can include: cross-connections of sewer services to storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to storm drain systems. As such, the discharges from these illicit connections can contribute high levels of pollutants, including heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to the receiving body of water.[2]

The City of Holyoke's (City) Stormwater Ordinance, adopted by the City Council on May 17th, 2017, grants the City the authority to prohibit illicit discharges, investigate suspected illicit discharges, eliminate illicit discharges (including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4), and implement appropriate enforcement procedures and actions.

[1] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ...–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

[2] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Identifying Illicit Discharges

Illicit discharges can be located be several methods, including routine dry weather outfall inspections (as described in detail in "SOP 1: Dry Weather Outfall Inspection") and citizen reports. As per the Central Massachusetts Regional Stormwater Coalition, the following indicators shown in Table 1 may be the result of an illicit discharge.[3]

Table 1 – Visual Condition Assessment

Indicator	Possible Source
Foam	upstream vehicle washing activities or illicit discharge
Oil Sheen	leak or spill
Cloudiness	suspended solids (i.e. dust, ash, powdered chemicals, ground up materials, etc.)
Color or Odor	raw materials, chemicals, or sewage
Excessive Sediment	disturbed earth of unpaved areas lacking adequate erosion control measures
Sanitary Waste/ Optical Enhancers*	illicit discharge
Orange Staining	high mineral concentrations

* Fluorescent dyes added to laundry detergent and some toilet paper

While many of the indicators listed in Table 1 would indicate an illicit discharge, some indicators may occur naturally. For example, orange staining could be the result of naturally occurring iron. However, it may be difficult to determine the difference between natural foam and foam caused by pollution. Natural foam can typically be found in water with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. As per the Central Massachusetts Regional Stormwater Coalition, it's important to consider the following factors listed in Table 2 when determining if the source of foam present at a stormwater outfall is natural or not.[4]

Table 2 – Conditional and Qualitative Considerations of Foam

Factors	Explanation
Wind Direction or Turbulence	Natural foam occurrences of the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
Proximity to Potential Pollution Source	Some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. The presence of silt in water, such as from a construction site can cause foam.
Physical Feeling	Natural foam is typically persistent, light, not slimy to the touch.
Visual Observation	Prescence of decomposing plants or organic material in the water.

[3] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[4] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

In addition to foam, both bacteria and petroleum can create a sheen on the water surface. Differentiating the two can be as simple as disturbing the "sheen" with a pole, stick, or similar object. A sheen caused by oil will remain intact and move in a swirl pattern while a sheen caused by bacteria will separate into a number of smaller patches and appear "blocky." In addition, bacteria or naturally occurring sheens are usually silver or dull in color. While bacterial sheen is not a pollutant, it should be noted when describing the discharge.[5]

Optical enhancers on the other hand can be visible to the naked eye when found in high enough concentrations and will appear as a bluish-purple haze. If a visual observation is unable to confirm the presence of this pollutant, a quantitative test can be used. In order to perform this test, a clean, white, cotton pad should be placed, either directly in, or within a sample of, the discharge for several days. After soaking, the cotton pad should be dried and then viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be the pollutant and present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to determine the concentration of optical enhancers within the sample. Often a visual observation is enough. It's not typical that this analysis is required.

Citizen Reports

Reports by residents and other users can be effective tools in helping the City to identify illicit discharges. The City's Department of Public Works (DPW) set up a phone hotline for this purpose, the phone number is (413) 534-2222. In addition, DPW should also provide guidance to the local City police department(s) and dispatch centers on how to manage data reported if residents should decide to report an illicit discharge with the police. An example Incident Tracking Sheet, provided by the Central Massachusetts Regional Stormwater Coalition, is included as Attachment 1 and can be used as an example that guides the responder to ensure that all pertinent details about the reported discharge are accurately documented. Reported illicit discharges should be communicated with the DPW.

Tracing Illicit Discharges

Once identified, suspected illicit connections must then be confirmed by the City. If confirmed, but the source is unidentified, the following additional procedures, as per the Central Massachusetts Regional Stormwater Coalition, should be completed[6]:

1. Review and consider information collected when an illicit discharge was initially identified, including, but not limited to, the time of day and the weather conditions for the previous 72 hours. Also review past reports or investigations of similar illicit discharges in the area.
2. Obtain storm drain mapping for the area of the reported illicit discharge. If possible, use a tracking system that can be linked to the City's GIS.
3. Document current conditions at the location of the observed illicit discharge point, including odors, water appearance, estimated flow, presence of floatables, and other pertinent information. Photograph relevant evidence.
4. If there continues to be evidence of the illicit discharge, collect water quality data using the methods described in "SOP 1: Dry Weather Outfall Inspection" and "SOP 2: Wet Weather Outfall Inspection". This may include using field test kits or instrumentation or collecting analytical samples for full laboratory analysis.

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[5] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[6] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

5. Move upstream from the point of observation to identify the source of the discharge, using the system mapping to determine infrastructure, tributary pipes, and drainage areas that contribute. At each point, survey the general area and surrounding properties to identify potential sources of the illicit discharge. Document observations at each point on an Incident Tracking Sheet (Attachment 1) as well as with photographs.
6. Continue this process until the illicit discharge is no longer observed, which will define the boundaries of the likely source. For example, if the illicit discharge is present in catch basin 137 but not the next upstream catch basin, 138, the source of the illicit discharge is between these two structures.

If the source of an illicit discharge cannot be determined via the procedures listed above, additional methods, such as sandbagging, dye testing, smoke testing, and/or closed-circuit television inspection (CCTV) may need to be utilized. Descriptions for these four (4) methods are listed below[7].

Sandbagging

Sandbagging can be particularly useful when attempting to isolate intermittent or illicit discharges with very little perceptible flow. This technique involves placing sandbags, caulking, weirs/plates, or other temporary barriers within the outlets of a manhole to form a temporary dam. Sandbags and other barriers should only be installed when dry weather is forecasted and are typically left in place for 48 hours. If flow is present after 48 hours behind the sandbags/barriers, this would allow the inspector to properly observe and sample the flow, however, if no flow collects behind the sandbags/barriers, the upstream pipe network can be ruled out as a source of the intermittent discharge. Unlike the other three (3) methods described subsequently, this method can be quite time-consuming.

Dye Testing

Dye testing consists of discharging or flushing non-toxic dye into a suspended plumbing fixture and observing a nearby storm drain structure and/or sanitary sewer manhole for the presence of the same dye downstream. Fixtures, such as sinks, toilets, and sump pumps can all be tested with dye, but should be tested separately. This test should ideally be conducted with a team of two or more people, with one person adding the dye to the fixture of interest, while the other person watches for the presence or absence of dye near the source. Unlike the other methods mentioned, dye testing is relatively quick, effective, and inexpensive. This method is best used when the source of the illicit discharge has been relatively narrowed down. Dye testing can be done by the City or a third-party contractor and requires the City to receive permission prior to accessing any sites that may contain the suspected fixtures. Residents, business owners, police, fire, and local public health staff shall be notified prior to testing in preparation for responding to citizen phone calls concerning the dye and their presence in local surface waters.

Smoke Testing

Unlike dye testing, smoke testing is a useful method to utilize if the source of an illicit discharge is not as obvious. Smoke testing often works best when trying to locate an illicit discharge along short sections of pipe and, more specifically, along small diameters pipes. This method involves injecting a non-toxic smoke with the use of a smoke bomb or smoke generator. When added to the storm drain system, smoke will emerge in connected locations, allowing for an inspector to locate a less obvious source of an illicit discharge. Similar to dye testing, this testing activity can be performed by a third-party contractor. Proper notifications to residents, business owners, local police, and fire departments that may be in the area of interest is critical. Smoke may cause minor irritation for residents with respiratory conditions. These individuals should be monitored or evacuated from the area of testing.

[7] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Closed Circuit Television Inspection (CCTV)

In CCTV inspections, cameras are used to record the interior of storm drain pipes. These cameras can be manually pushed with a stiff cable or guided remotely on treads or wheels. Video can be watched live, or reviewed as a recording, to locate illicit connections and infiltration from sanitary sewers into the storm drain. Again, this testing activity can be performed by a third-party contractor.

If the source of an illicit discharge still cannot be located, further investigation in a future program is necessary. Figure 1 below, from the Central Massachusetts Regional Stormwater Coalition shows a pictorial summary of this section.

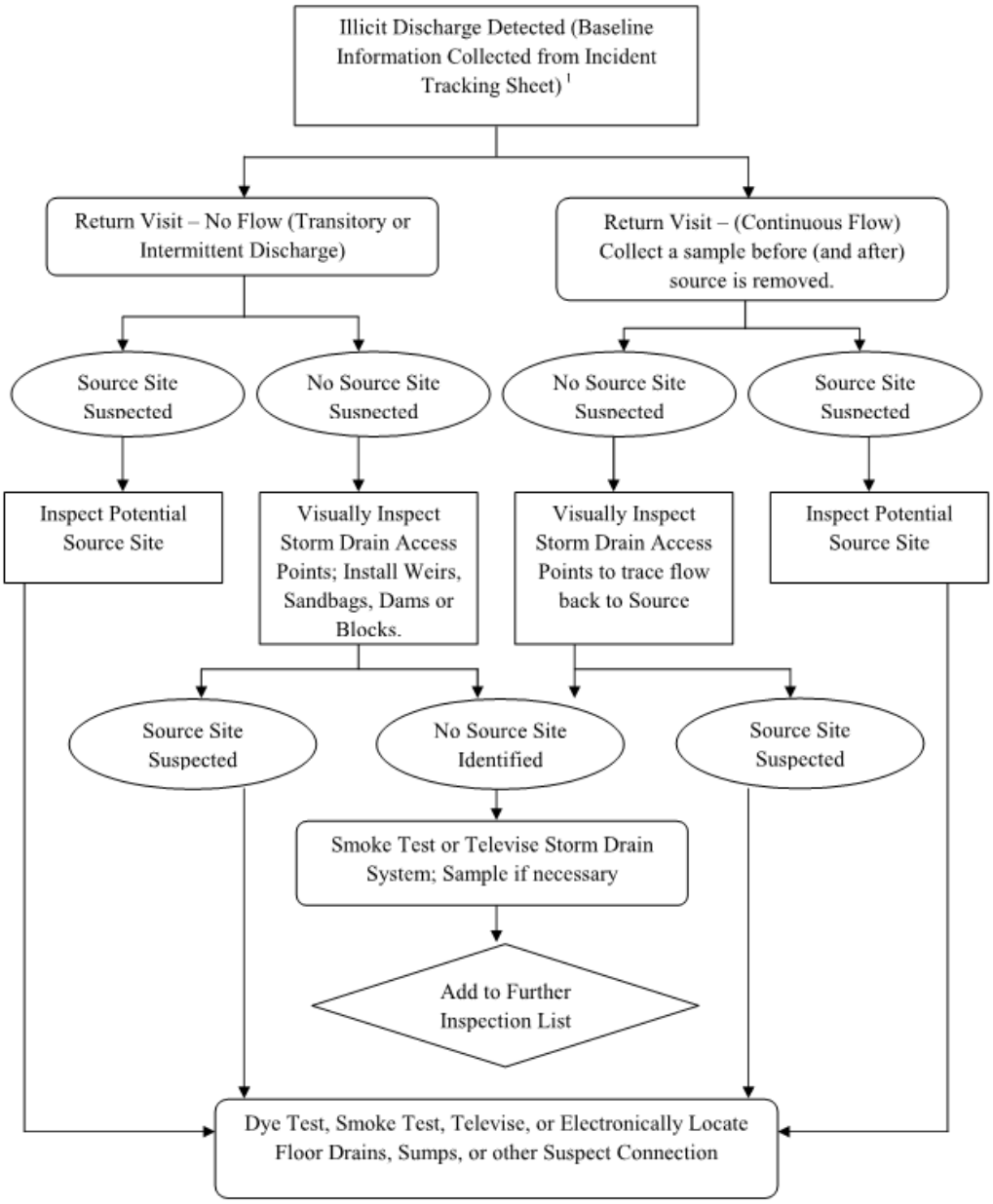

Figure 1 – Steps for Tracing Illicit Discharges

Removal and Abatement of Illicit Discharges

As per the Consent Decree, the "date of verification" of an illicit discharge shall be the date on which the City has identified a point of entry of an illicit discharge from a specific location, or address, that contributes wastewater flow to the MS4. Figure 2 summarizes the steps the City shall take upon identification of an illicit source.[8]

[8] *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

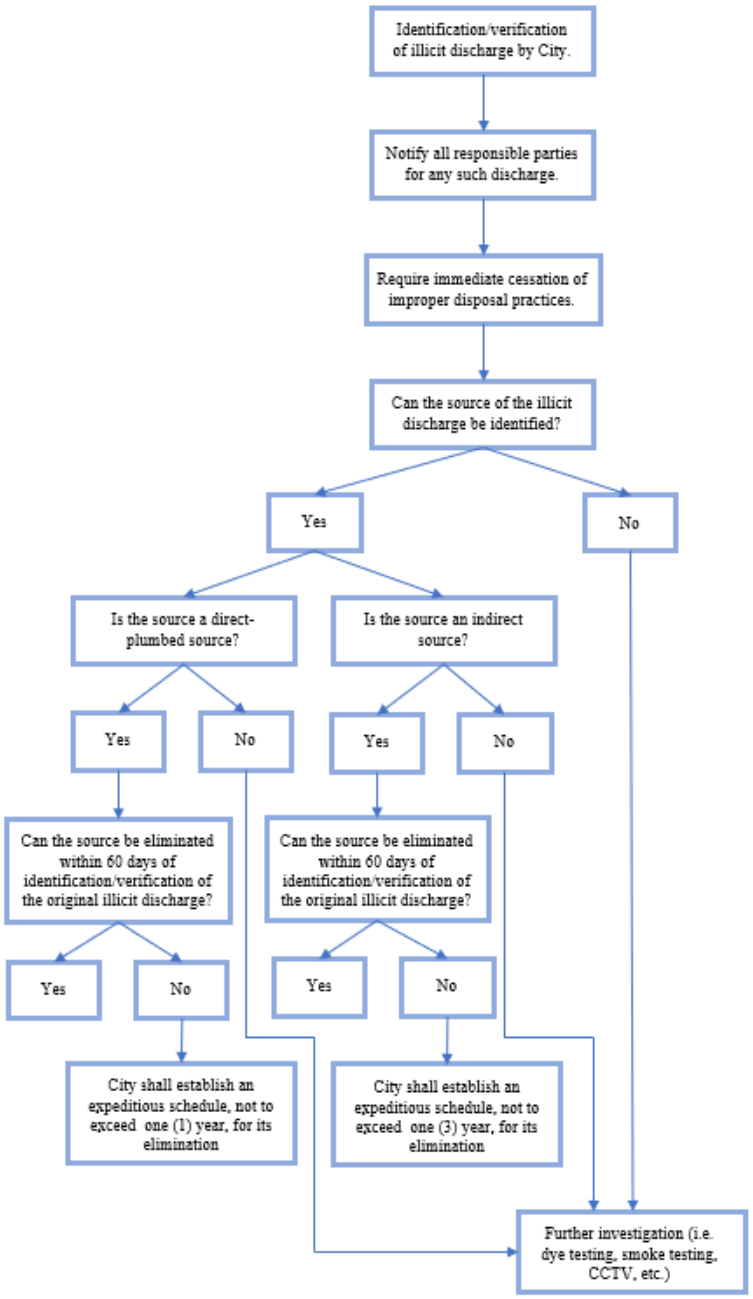

Figure 2 – Steps to Eliminate Illicit Discharge as per Consent Decree

If the source of an illicit discharge is located, proper removal ensures that it does not recur. This includes documenting any repairs, installation of new sanitary sewer connections, or any other corrective actions on an Incident Tracking Sheet (Attachment 1). This should include, but is not limited to, the following information:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal
- Estimate of the volume of flow removed

A final inspection is required to confirm the illicit connection has been removed. As per the Consent Decree, within one year following the removal of a verified illicit discharge, the City shall conduct additional dry and wet weather (see SOP's 1 and 2) monitoring to confirm that the illicit discharge has been eliminated. If confirmatory screening indicates evidence of a continued potential illicit discharge, additional investigation of the catchment shall be scheduled and removal of the illicit discharge is required.

Table 3 - Illicit Discharge Enforcement Summary

Source Identified	Enforcement Authority	Procedure to Follow
One-time illicit discharge (e.g. spill, dumping, etc.)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Issue fine
Intermittent or continuous illicit discharge from legal connection	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Determine schedule for removal • Confirm removal
Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. infiltration or failed septic)	Plumbing Inspector or ordinance enforcement authority	• Notify Plumbing Inspector or ordinance enforcement authority
Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. failed sewer line)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Issue work order • Schedule removal • Remove connection • Confirm removal
Any	USEPA	• Notify exempt third party and USEPA of illicit discharge

Attachments

1. Incident Tracking Sheet

Related Standard Operating Procedures

1. SOP 1: Dry Weather Outfall Inspection
2. SOP 2: Wet Weather Outfall Inspection

APPENDIX H

Field Investigation Records

Dry Weather Outfall Screening Records

Illicit Discharge Detection Elimination (IDDE) Program

City of Holyoke, MA

June 2024

Owner	EPA Priority Category	Outfall ID	Address	MassDEP Stream Segment (AU ID)	Waterbody Name	Date Screened	Flow?	Sampled?	Ammonia (mg/L)	Chlorine (mg/L)	Surfactants (mg/L)	Salinity	Conductivity	E. coli (MPN/100mL)	Potential Illicit Discharge?
Holyoke	Problem	CA086	Jackson Street Flood Station	MA34-05	CONNECTICUT RIVER	5/20/2024	Yes	Yes	3	0	0.25	0.3	501	4343	Yes
Holyoke	Problem	CA158-A	6 Appleton St	MA34-05	CONNECTICUT RIVER	5/23/2024	Yes	Yes	0	0	0	0.4	636	411	Yes
Holyoke	Problem	CA046	14 Bobala Rd	MA34-05	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0	0.1	192	11	No
Holyoke	Problem	CA047-A	361 Whitney Ave	MA34-05	CONNECTICUT RIVER	4/24/2024	Yes	Yes	0	0	0	0	150	5	No
Holyoke	Problem	CA047-B	361 Whitney	MA34-05	CONNECTICUT RIVER	4/24/2024	Yes	Yes	0	0	0	0	150	5	No
Holyoke	Problem	CA049	59 Bobala	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	Problem	CA073	938 Main St	MA34-05	CONNECTICUT RIVER	5/22/2024	Yes	Yes	0	0	0	0.3	495	411	Yes
Holyoke	Problem	CA068	Jones Ferry PS	MA34-05	CONNECTICUT RIVER	5/13/2024	Yes	Yes	0	0	0	0.3	471	411	Yes
Holyoke	Problem	CA045	150 lower Westfield rd		TANNERY BROOK	5/11/2024	Yes	Yes	0	0	0	0	267	69	No
Holyoke	Problem	CA052	100 Bobala	MA34-43	SCHOOLHOUSE BROOK	5/3/2024	Yes	Yes	0	0	0	0.2	359	9	No
Holyoke	Problem	CA053	100 Bobala	MA34-43	SCHOOLHOUSE BROOK	5/11/2024	Yes	Yes	0	0	0	0	359	9	No
Holyoke	Problem	CA064	86 Lower Westfield Rd		TANNERY BROOK	5/15/2024	No	No	0	0	0	0	0	0	No
Holyoke	Problem	CA065	200 Whiting Farms Rd	MA34-05	CONNECTICUT RIVER	5/15/2024	No	No	0	0	0	0	0	0	No
Holyoke	Problem	CA066	6 jeane Dr	MA34-05	CONNECTICUT RIVER	4/24/2024	No	No	0	0	0	0	0	0	No
Holyoke	Problem	CA071	1030 Main St	MA34-05	CONNECTICUT RIVER	5/22/2024	Yes	Yes	0.25	0	0	0.4	575	411	Yes
Holyoke	Problem	CA132	200 Whiting Farms Rd	MA34-05	CONNECTICUT RIVER	5/15/2024	Yes	Yes	0	0	0.25	0.1	188	5	No
Holyoke	Problem	CA142	50 Bray Park Dt	MA34-05	CONNECTICUT RIVER	5/21/2024	Yes	Yes	0	0	0	0.4	634	1007	Yes
Holyoke	Problem	CA143	14 Nicholls Drive	MA34-05	CONNECTICUT RIVER	4/24/2024	Yes	Yes	0	0	0	0	310	443	Yes
Holyoke	Problem	CA039	Highland Park PS	MA34-04	CONNECTICUT RIVER	5/13/2024	Yes	Yes	0	0	0	0.6	898	483	Yes
Holyoke	High	CA158-B	138 Appleton St	MA34-05	CONNECTICUT RIVER	5/28/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA012	Sullivan school	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA016	Sullivan school	MA34-05	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0	0.1	219.1	3	No
Holyoke	High	CA037	1 Berkshire St	MA34-05	CONNECTICUT RIVER	5/20/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA042	1 Bigelow St	MA34-05	CONNECTICUT RIVER	5/23/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA048	36 Bobala	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA050	36 Bobala	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA051	36 Bobala	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA054	400 Whitney	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA055	400 Whitney	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA057-B	Holyoke mall	MA34-05	CONNECTICUT RIVER	5/3/2024	Yes	Yes	0	0	0	0	460	0	No
Holyoke	High	CA067	1 Sullivan Rd	MA34-05	CONNECTICUT RIVER	5/15/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA072	990 Main St Paper city car wash	MA34-05	CONNECTICUT RIVER	5/22/2024	Yes	Yes	0	0	0	0.5	859	163	No
Holyoke	High	CA084	1 Main St	MA34-05	CONNECTICUT RIVER	5/23/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA085	Mosher St Pump Station	MA34-05	CONNECTICUT RIVER	5/24/2024	Yes	Yes	0	0	0	0.1	230.6	257	No
Holyoke	High	CA087	636 Main St	MA34-05	CONNECTICUT RIVER	5/24/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA003	T1 university park	MA34-04	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0	0.2	161	161	No
Holyoke	High	CA004	6 Hawthorne Ln	MA34-04	CONNECTICUT RIVER	5/24/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA005-A	29 Longfellow Rd	MA34-04	CONNECTICUT RIVER	5/20/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA005-B	29 Longfellow Rd	MA34-04	CONNECTICUT RIVER	5/20/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA005-C	29 Longfellow Rd	MA34-04	CONNECTICUT RIVER	5/20/2024	Yes	Yes	0	0	0	0.4	629	54	No
Holyoke	High	CA005-E	36 Longfellow Rd	MA34-04	CONNECTICUT RIVER	5/20/2024	Yes	Yes	0	0	0	0.4	602	41	No
Holyoke	High	CA006-A	10 Lindor Heights	MA34-05	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0	0.1	82.8	13	No
Holyoke	High	CA006-B	10 Lindor Heights	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA006-C	10 Lindor Heights	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA006-D	10 Beaudoin Ter	MA34-05	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0.25	0.1	223.5	195	No
Holyoke	High	CA007	14 Scott hollow rd	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA009	330 Jarvis ave	MA34-05	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0	0.1	233.9	13	No
Holyoke	High	CA010	27 Scotthollow	MA34-05	CONNECTICUT RIVER	2/8/2024	no	No	0	0	0	0	0	0	No
Holyoke	High	CA011	20 Wayne Court	MA34-05	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0	0.3	487	59	No
Holyoke	High	CA013	26 Jarvis way	MA34-05	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0	0.2	33.5	20	No
Holyoke	High	CA014	30 Jarvis Heights	MA34-05	CONNECTICUT RIVER	5/21/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA015	338 Jarvis ave	MA34-05	CONNECTICUT RIVER	2/8/2024	no	No	0	0	0	0	0	0	No
Holyoke	High	CA017	Sullivan school	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA018	393 cherry st	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA023-B	105 Cherry Street	MA34-04	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA023-C	105 Cherry St	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA027	14 Philip dr	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA035-A	85 Woodland St	MA34-05	CONNECTICUT RIVER	5/21/2024	Yes	Yes	1	0	0.5	0.3	515	155	No
Holyoke	High	CA070	1030 Main St	MA34-05	CONNECTICUT RIVER	5/22/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA078-A	124 Ridgewood Ave	MA34-05	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0	0.5	722	37	No
Holyoke	High	CA078-B	124 Ridgewood Ave	MA34-05	CONNECTICUT RIVER	5/11/2024	Yes	Yes	0	0	0	0.5	748	72	No
Holyoke	High	CA079	73 Madison Ave	MA34-04	CONNECTICUT RIVER	5/13/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA133-A	115 Bemis Rd	MA34-04	CONNECTICUT RIVER	5/13/2024	Yes	Yes	0	0	0	0.5	791	9	No
Holyoke	High	CA133-B	115 Bemis Rd	MA34-04	CONNECTICUT RIVER	5/13/2024	Yes	Yes	0	0	0	0.5	787	369	No
Holyoke	High	CA134	29 Claren Dr	MA34-04	CONNECTICUT RIVER	5/13/2024	Yes	Yes	0	0	0	0.5	678	67	No

Dry Weather Outfall Screening Records

Illicit Discharge Detection Elimination (IDDE) Program

City of Holyoke, MA

June 2024

Owner	EPA Priority Category	Outfall ID	Address	MassDEP Stream Segment (AU ID)	Waterbody Name	Date Screened	Flow?	Sampled?	Ammonia (mg/L)	Chlorine (mg/L)	Surfactants (mg/L)	Salinity	Conductivity	E. coli (MPN/100mL)	Potential Illicit Discharge?
Holyoke	High	CA135	30 Claren Dr	MA34-04	CONNECTICUT RIVER	5/13/2024	Yes	Yes	0	0	0	0.4	623	55	No
Holyoke	High	CA144	College way	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA147	105 Cherry street	MA34-05	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA056	91 South, mile 12 before exit 11	MA34-04	CONNECTICUT RIVER	5/21/2024	Yes	Yes	0	0	0	0.2	414.3	117	No
Holyoke	High	CA060	1152 Main St	MA34-05	CONNECTICUT RIVER	5/15/2024	No	No	0	0	0	0	0	0	No
Holyoke	High	CA082	River Terrace CSO	MA34-04	CONNECTICUT RIVER	5/13/2024	Yes	Yes	0	0	0	0.4	670	119	No
Holyoke	Low	CA026	518 Wesrfield Rd		TANNERY BROOK	5/11/2024	Yes	Yes	0	0	0	0.1	235.8	68	No
Holyoke	Low	CA058	Holyoke mall		TANNERY BROOK	5/15/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA062	Mount Marie Rd		TANNERY BROOK	5/15/2024	Yes	Yes	0	0	0.25	0.4	682	95	No
Holyoke	Low	CA138	150 lower Westfield rd		TANNERY BROOK	5/11/2024	Yes	Yes	0	0	0	0	267	65	No
Holyoke	Low	CA145	518 Homestead Ave		TANNERY BROOK	4/24/2024	Yes	Yes	0	0	0	0	296	5	No
Holyoke	Low	CA088	24 Holly Meadow	MA32055	PEQUOT POND	5/14/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA089	16 Holly Meadow Rd	MA32055	PEQUOT POND	5/14/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA091-A	700 Westfield Rd	MA32055	PEQUOT POND	5/14/2024	Yes	Yes	0	0	0	0	51	7	No
Holyoke	Low	CA091-B	700 Westfield Rd	MA32055	PEQUOT POND	5/14/2024	Yes	Yes	0	0	0	0	69	9	No
Holyoke	Low	CA019	2 hickory st		TANNERY BROOK	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA034	957 Homestead Ave		TANNERY BROOK	5/11/2024	yes	Yes	0	0	0	0	139	16	No
Holyoke	Low	CA059	1256 Main St		TANNERY BROOK	5/24/2024	Yes	Yes	0	0	0	0.5	815	99	No
Holyoke	Low	CA096-A	6 hollygrape dr	MA34-18	BROAD BROOK	11/2/2023	no	No	0	0	0	0	0	0	No
Holyoke	Low	CA096-B	6 Holly Grape Cir	MA34-18	BROAD BROOK	3/19/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA098	9 winterberry cir	MA34-18	BROAD BROOK	3/19/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA099	113 County Rd Southampton	MA34-18	BROAD BROOK	5/14/2024	Yes	Yes	0	0	0	0.1	208	380	No
Holyoke	Low	CA100	3 hemlock Dr	MA34-18	BROAD BROOK	3/19/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA101-A	9 deer run	MA34-18	BROAD BROOK	3/19/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA101-B	9 deer run	MA34-18	BROAD BROOK	3/19/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA102	10 deer run	MA34-18	BROAD BROOK	3/19/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA103	2 deer run	MA34-18	BROAD BROOK	3/18/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA105	15 Lemay Dr	MA34-18	BROAD BROOK	5/14/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA122	45 Keyes Rd	MA34-18	BROAD BROOK	5/22/2024	Yes	Yes	0	0	0	0	80.8	0	No
Holyoke	Low	CA128	95 Knollwood Circle		TANNERY BROOK	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA137	71 richard eger dr	MA32002	ASHLEY POND	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA139	18 bray berry Dr	MA34-18	BROAD BROOK	3/19/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA140	26 Ross rd	MA34-18	BROAD BROOK	5/14/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA141	95 Knollwood Dr		TANNERY BROOK	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA146	967 Homestead Ave		TANNERY BROOK	5/11/2024	Yes	Yes	0	0	0	0.1	140	29	No
Holyoke	Low	CA008	100 Jarvis ave	MA34101	WHITING STREET RESERVOIR	5/11/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA094	Pilsudski Park 200 County Rd	MA34-18	BROAD BROOK	5/14/2024	No	No	0	0	0	0	0	0	No
Holyoke	Low	CA002	2 Burns Way	MA34-04	CONNECTICUT RIVER	5/11/2024	No	No	0	0	0	0	0	0	No

Wet Weather Outfall Screening Records

Illicit Discharge Detection Elimination (IDDE) Program

City of Holyoke, MA

June 2024

Owner	EPA Priority Category	Outfall ID	Address	MassDEP Stream Segment (AU ID)	Waterbody Name	Date Screened	Flow?	Sampled?	Ammonia (mg/L)	Chlorine (mg/L)	Surfactants (mg/L)	Salinity	Conductivity	E. coli (MPN/100mL)	Potential Illicit Discharge?
Holyoke	Problem	CA053	100 Bobala	MA34-43	SCHOOLHOUSE BROOK	5/16/2024	Yes	Yes	0	0	0.75	0.2	274.1	967	Yes
Holyoke	Problem	CA047-A	361 Whitney Ave	MA34-05	CONNECTICUT RIVER	5/16/2024	Yes	Yes	0	0	0	0.1	158.2	411	Yes
Holyoke	Problem	CA046	14 Bobala Rd	MA34-05	CONNECTICUT RIVER	5/16/2024	Yes	Yes	0	0	0.25	0.1	91	411	Yes
Holyoke	Problem	CA047-B	361 Whitney	MA34-05	CONNECTICUT RIVER	5/16/2024	Yes	Yes	0	0	0.25	0	44.2	411	Yes
Holyoke	Problem	CA064	86 Lower Westfield Rd		TANNERY BROOK	5/16/2024	Yes	Yes	0	0	0.25	0	35.2	411	Yes
Holyoke	Problem	CA052	100 Bobala	MA34-43	SCHOOLHOUSE BROOK	5/16/2024	Yes	Yes	0	0	0.25	0.2	280	700	Yes
Holyoke	Problem	CA045	150 lower Westfield rd		TANNERY BROOK	5/16/2024	Yes	Yes	0	0	0	0	31.7	411	Yes
Holyoke	Problem	CA065	200 Whiting Farms Rd	MA34-05	CONNECTICUT RIVER	5/16/2024	Yes	Yes	0	0	0	0	14.6	411	Yes
Holyoke	Problem	CA132	200 Whiting Farms Rd	MA34-05	CONNECTICUT RIVER	5/16/2024	Yes	Yes	0	0	0	0	48.4	411	Yes
Holyoke	Problem	CA049	59 Bobala	MA34-05	CONNECTICUT RIVER	5/16/2024	Yes	Yes	0	0	0.25	0.1	86	411	Yes
Holyoke	Problem	CA068	Jones Ferry PS	MA34-05	CONNECTICUT RIVER	5/16/2024	Yes	Yes	0	0	0.25	0.1	216.1	411	Yes
Holyoke	Problem	CA066	6 jeane Dr	MA34-05	CONNECTICUT RIVER	5/16/2024	Yes	Yes	0	0	0.25	0	9.3	411	Yes
Holyoke	Problem	CA143	14 Nicholls Drive	MA34-05	CONNECTICUT RIVER	5/8/2024	Yes	Yes	1	0	0.25	0	48	443	Yes
Holyoke	High	CA003	T1 university park	MA34-04	CONNECTICUT RIVER	5/30/2024	Yes	Yes	0	0	0.25	0	20.8	0	No
Holyoke	High	CA006-A	10 Lindor Heights	MA34-05	CONNECTICUT RIVER	5/30/2024	Yes	Yes	0	0	0.25	0	21.5	0	No
Holyoke	High	CA006-B	10 Lindor Heights	MA34-05	CONNECTICUT RIVER	5/30/2024	Yes	Yes	0	0	0.25	0	61.3	0	No
Holyoke	High	CA006-C	10 Lindor Heights	MA34-05	CONNECTICUT RIVER	5/30/2024	Yes	Yes	0	0	0.25	0	39.3	0	No
Holyoke	High	CA005-E	36 Longfellow Rd	MA34-04	CONNECTICUT RIVER	5/30/2024	Yes	Yes	0	0	0	0.2	285.7	0	No
Holyoke	High	CA004	6 Hawthorne Ln	MA34-04	CONNECTICUT RIVER	5/30/2024	Yes	Yes	0	0	0.25	0	55.9	0	No
Holyoke	High	CA006-D	10 Beaudoin Ter	MA34-05	CONNECTICUT RIVER	5/30/2024	Yes	Yes	0	0	0	0	11.8	0	No
Holyoke	High	CA002	2 Burns Way	MA34-04	CONNECTICUT RIVER	5/30/2024	Yes	Yes	0	0	0.25	0	43.5	0	No
Holyoke	Low	CA138	150 lower Westfield rd		TANNERY BROOK	5/16/2024	Yes	Yes	0	0	0	0	31.7	411	Yes
Holyoke	Low	CA145	518 Homestead Ave		TANNERY BROOK	5/8/2024	Yes	Yes	0.5	0	0	0.5	198.6	5	No

APPENDIX I

IDDE Employee Training Record

TRAINING ATTENDANCE SHEET

DO NOT ALTER THIS FORM - DO NOT SUBMIT AS PDF

COURSE TITLE: IDDE Training

COURSE CODE: N/A

INSTRUCTOR: Ajay Sharma

(Kleinfelder)

TRAINING COORDINATOR FOR VENDOR INSTRUCTORS:

PROJECT LOCATION: Holyoke, MA

BU/OU: 00401

TAILGATE TRAINING: YES or **NO**

START TIME: 8:00 am **FINISH TIME: 3:00 pm**

DATE: 11/2/2023 **DURATION (HOURS): 7**

TRAINING MATERIALS UTILIZED: Agenda/ Hands on/ Open Discussion

PRINTED NAME	VEOLIA EMAIL ADDRESS *Must be typed in	SIGNATURE	SCORE
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