Illicit Discharge Detection and Elimination (IDDE) Plan

PREPARED FOR

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May 20, 2025

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Introduction

1.1 MS4 Program

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the Department of Conservation and Recreation (DCR) to address the requirements of the United States Environmental Protection Agency's (EPA) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit."

The 2016 Massachusetts MS4 Permit requires that each permittee, or regulated community, address six Minimum Control Measures. These measures include the following:

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

Under Minimum Control Measure 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE Plan has been prepared to address this requirement.

1.2 Illicit Discharges

An "illicit discharge" is any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some discharges are intentional, such as residents dumping used oil into catch basins or contractors tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service.

Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows that enter the drainage system. Sump pumps legally connected to the storm drain system may be used inappropriately, such as for the disposal of floor washwater or old household products, in many cases due to a lack of understanding on the part of the homeowner.

1.3 Allowable Non-Stormwater Discharges

The following categories of non-stormwater discharges are allowed under the 2016 MS4 Permit unless the permittee, EPA or Massachusetts Department of Environmental Protection (MassDEP) identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- Water line flushing
- Discharge from potable water sources
- Landscape irrigation or lawn watering
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Foundation drains or footing drains (not including active groundwater dewatering systems)
- Water from crawl space pumps
- Air conditioning condensation
- Springs
- Individual (non-commercial) resident car washing

- Natural riparian habitat or wetland flows
- De-chlorinated swimming pool discharges
- Fire-fighting activities
- Street wash waters
- Residential building wash waters without detergents
- Other water source not containing pollutants

If these discharges are identified as significant contributors to the MS4, they must be considered an “illicit discharge” and addressed in this IDDE Plan (i.e., control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely).

1.4 Receiving Waters and Impairments

Appendix A lists the “impaired waters” that DCR’s regulated outfalls discharge to, based on the most recent (2022) final Massachusetts Integrated List of Waters produced by MassDEP and DCR’s current permit year regulated outfall layer. Since MassDEP updates the receiving waters list periodically and DCR is continuously updating the drainage infrastructure mapping including regulated outfall designations this list is updated each permit year to reflect the current status of DCR’s system. 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.

1.5 IDDE Program Goals, Framework, and Timeline

The goals of the IDDE program are to find and eliminate illicit discharges to municipal separate storm sewer systems 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
- Wet weather screening
- Catchment investigations
- Identification/confirmation of illicit sources
- Illicit discharge removal
- Follow-up screening
- Employee training

The IDDE investigation procedure framework is shown in **Figure 1-1**. The required timeline for implementing the IDDE program is shown in **Table 1-1**.

Figure 1-1. IDDE Investigation Procedure Framework

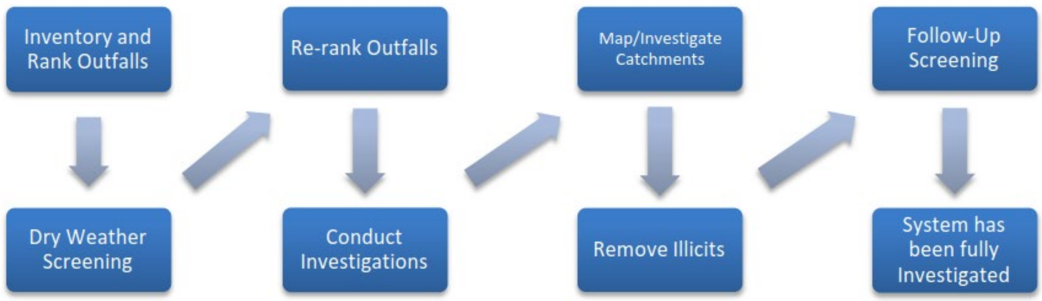

Table 1-1 DCR IDDE Program Implementation Timeline

	Completion Date from Effective Date of Permit (June 2018)					
IDDE Program Requirement	**1 Year**	**1.5 Years**	**2 Years**	**3 Years**	**7 Years**	**10 Years**
Written IDDE Program Plan	X					
Sanitary Sewer Overflow (SSO) Inventory	X					
Written Catchment Investigation Procedure		X				
Phase I Mapping			X			
Phase II Mapping						X
IDDE Regulatory Mechanism or By-law (if not already in place)				X		
Dry Weather Outfall Screening				X		
Follow-up Ranking of Outfalls and Interconnections				X		
Catchment Investigations – Problem & Highest Priority Outfalls					X	
Catchment Investigations – all Problem, Highest, High and Low Priority Outfalls						X

1.6 Work Completed to Date

The 2003 MS4 Permit required each MS4 permittee to develop a plan to detect illicit discharges using a combination of storm system mapping, adopting a regulatory mechanism to prohibit illicit discharges and enforce this prohibition, and identifying tools and methods to investigate suspected illicit discharges. Each MS4 permittee was also required to define how confirmed discharges would be eliminated and how the removal would be documented. DCR has also completed 2016 MS4 Permit requirements for the first four years of the permit.

DCR has completed the following IDDE program activities consistent with the 2003 MS4 Permit and the 2016 MS4 Permit requirements:

- Developed a map of outfalls and receiving waters;
- Developed a draft internal IDDE disconnection policy that is used for IDDE follow-up;
- Completed additional storm system mapping, including the locations of catch basins, manholes, and some pipe connectivity;
- Developed procedures for locating the source of the discharge;
- Developed procedures for removal of the source of an illicit discharge;
- Developed a written IDDE Plan in June 2019 and update annually (most recently updated in June 2025);
- Developed a written catchment investigation procedure as part of the IDDE Plan and update annually (most recently updated in June 2025);
- Completed Phase I mapping requirements;
- Updated outfall prioritization;
- Continued catchment investigations for known problem outfalls;
- Continued wet weather screening;
- Continued catchment investigations for highest priority outfalls;
- Completed dry weather screening for known outfalls;
- Continued dry weather screening for newly identified outfalls;
- Finalized IDDE procedures to enforce instances of illegal connections or flows to its system.

2

Authority and Statement of IDDE Responsibilities

2.1 Legal Authority

DCR developed an Illicit Discharge Disconnection Procedure (**Appendix B**) to provide DCR with adequate legal 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 system; and
- Implement appropriate enforcement procedures and actions.

The Illicit Discharge Disconnection Procedure is consistent with the 2016 MS4 Permit. In addition to the procedure, DCR is in the process of drafting regulations which will provide DCR further legal authority to enforce removal of illegal connections or flows to its system.

2.2 Statement of Responsibilities

The Division of Design & Engineering is the lead division within DCR responsible for implementing the IDDE program pursuant to the provisions of the Illicit Discharge Disconnection Procedure. Other agencies or departments with responsibility for aspects of the program include:

- DCR General Counsel's Office – DCR's General Counsel will contact landowners with illicit discharges to request they remove the illicit discharge and set a deadline for response.

- Massachusetts Attorney General's Office - If a landowner does not remove the illicit discharge within the set deadlines, DCR General Counsel's Office will pursue legal action with the Massachusetts Attorney General's Office.

3

Stormwater System Mapping

DCR originally developed mapping of its stormwater system to meet the mapping requirements of the 2003 MS4 Permit. The 2016 MS4 Permit requires a more detailed storm system map than was required by the 2003 MS4 Permit. The revised mapping is intended to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit discharges.

The 2016 MS4 Permit requires the storm system map to be updated in two phases as outlined below. DCR completed its Phase I mapping (see Section 3.1) as of June 30, 2020. DCR will report on the progress towards completion of the storm system map in each annual report.

DCR's most recent storm system map is available at this link: http://vhb.maps.arcgis.com/apps/webappviewer/index.html?id=1fffa8d7b9e144e793dcffb0445846e2.

3.1 Phase I Mapping

Phase I mapping was required to be completed within two (2) years of the effective date of the permit (June 30, 2020) and include the following information:

- Outfalls;
- Open channel conveyances (swales, ditches, etc.);
- Interconnections with other MS4s and other storm sewer systems;
- DCR owned stormwater treatment structures;
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report;
- Surface public drinking water supplies, watersheds, and protection zones; and

- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

DCR completed initial Phase 1 mapping in June of 2020.

DCR's drainage system includes assets statewide and often includes complex interconnections with many other parties. DCR has begun to review and identify interconnections in the field and continues to work with municipalities and other agencies to identify additional interconnections. The interconnections flagged by the field crews are reviewed by DCR and will be added to DCR's the public facing storm system map as they are confirmed. If entities are interested in determining if a drainage system includes identified interconnections, please request them from DCR Stormwater.

DCR has approximately 1,500 regulated outfalls and interconnection included in the IDDE program mapped statewide. Hand delineating draft catchments to each outfall was deemed infeasible. DCR has created draft catchments using an automated approach based on topography, however these catchments are rough and are being refined individually through desktop analysis ahead of the field component of catchment investigations. Catchment delineations are not provided in the public facing storm system map at this time. If entities are interested in receiving the draft catchments, please request them from DCR Stormwater.

3.2 Phase II Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (June 30, 2028) and include the following information:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet);
- Pipes;
- Manholes;
- Catch basins; and
- Refined catchment delineations. Catchment delineations must be updated to reflect information collected during catchment investigations.

Since DCR does not own sanitary sewer systems or combined sewer systems these elements are not included in our mapping.

DCR is in the process of updating each of these components and is actively mapping their comprehensive drainage systems with DCR crews. This has included refining catchment delineations as part of Problem and Highest Priority Outfall reviews. DCR also began refining catchment delineations as part of High Priority Outfall catchment investigations that were initiated in Permit Year 3 and additional high and low priority catchments where municipal drainage data is currently available to DCR.

4

Sanitary Sewer Overflows (SSOs)

The 2016 MS4 Permit requires permittees to prohibit illicit discharges, including sanitary sewer overflows (SSOs), to the separate storm sewer system. SSOs are discharges 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 defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

While DCR does not own sanitary sewer lines, beyond sewer laterals for their facilities, and is therefore not usually directly responsible for SSOs, DCR has completed an inventory of SSOs that have discharged from DCR laterals (**Table 4-1**) or from other entities onto DCR properties (**Table 4-2**) within the five (5) years prior to the effective date of the 2016 MS4 Permit, based on review of available documentation pertaining to SSOs and in coordination with those entities responsible for the respective sanitary sewer systems (e.g., municipalities). The inventory includes all SSOs that occurred during wet or dry weather resulting from inadequate conveyance capacities or where interconnectivity of the storm and sanitary sewer infrastructure allows for transfer of flow between systems.

Upon detection of an SSO, DCR will coordinate with those entities responsible for the sanitary sewer system to eliminate it as expeditiously as possible and take interim measures to minimize the discharge of pollutants to and from its MS4 until the SSO is eliminated. Upon becoming aware of an SSO to the MS4, DCR will provide oral notice to MassDEP, EPA and the entity responsible for the sanitary sewer system within 24 hours and written notice to the responsible entity, EPA, and MassDEP within five (5) days of becoming aware of the SSO occurrence following MassDEP's Sanitary Sewer Overflow (SSO)/Bypass notification form.

MassDEP 24-hour Emergency Line: 1-888-304-1133			
EPA New England: 1-617-918-1510 5 Post Office Square Boston, MA 02109			
DEP Northeast Region (978) 694-3215 205B Lowell Street Wilmington, MA 01887	DEP Central Region (508) 792-7650 8 New Bond Street Worcester, MA 01606	DEP Southeast Region (508) 946-2750 20 Riverside Drive Lakeville, MA 02347	DEP Western Region (413) 784-1100 436 Dwight Street Springfield, MA 01103

The inventory in **Table 4-1** will be updated by the DCR Engineering Division when new SSOs are detected. The SSO inventory will be included in the annual report, including the status of mitigation and corrective measures to address each identified SSO.

Table 4-1 SSO Inventory – DCR Owned Sewer Discharges Since 2011

Last Revision Date: May 7, 2024

SSO Location[1]	Discharge Statement[2]	Date/ Time[3]	Estimated Volume[4]	Description[5]	Mitigation Completed[6]	Mitigation Planned[7]
Union St. Hingham	Sewer discharge to Weir River	April, 2015	n/a	Force main sewer discharge – from Wompatuck State Park Campgrounds sewer lateral	Replacement of force main under Weir River	No additional mitigation needed
Pond St. – Corner of Woodland Rd. Stoneham	Sewer manhole surcharge from DCR force main servicing Stoneham Zoo & DCR Labor Yard	November, 2018	n/a	Pump Station temporarily off-line, when turned back on, sewer line overflowed gravity mainline	Sewer main inspected, water jetted & cleaned	No additional mitigation needed
695 Hillside Ave – Blue Hills Headquarters	Sewer discharge from injector pit	March 17, 2022	n/a	Blockage in 2" force main & dysfunctional back flow preventor caused minor surcharge from injector pump chamber	Jetted force main to clear blockage and replaced backflow preventer in injector chamber	No additional mitigation needed

Pond St. Corner of Woodlawn Rd. Stoneham	SMH surcharge from DCR force main servicing Stoneham Zoo & DCR Labor Yard	Feb. 20, 2024		Blockage in gravity line downstream of SMH resulting in surcharge.	Sewer main inspected, water jetted & cleaned	No additional mitigation needed
Union St. Hingham	Sewer discharge to Weir River	April 9, 2024	n/a	Utility company replacing pole broke sewer main	Utility company repaired sewer main	No additional mitigation needed
Pond St. – north of Woodlawn Rd.	SMH surcharge	April 19, 2024	n/a	Utility company replacing pole broke sewer main	Utility company repaired sewer main	No additional mitigation needed
Union St. Hingham	Sewer discharge to Weir River	April 29, 2024	40-gallons	Force main sewer discharge – from Wompatuck State Park Campgrounds	Replacement of 15′ of 6″ DI force main	No additional mitigation needed
Union St. Hingham	Sewer discharge to Weir River	April 17, 2025	30-gallons	Force main sewer discharge – from Wompatuck State Park Campgrounds sewer lateral	Repair clamp installed over crack in pipe section of force main	DCR hired a consultant to design & permit the replacement of 600′ of 6″ force main
Union St. Hingham	Sewer discharge to Weir River	March 26, 2025	50-gallons	Force main sewer discharge – from Wompatuck State Park Campgrounds sewer lateral	Repair clamp installed over crack in pipe section of force main	DCR plans to replace 600′ of force main in June 2025
Mt Sugarloaf, S. Deerfield	Sewer discharge	May 4, 2025	5-gallons	3″ force main blocked by debris	Repair made on broken clean out and pipe cleaned & jetted	No additional mitigation needed

[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] Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge)
[4] Estimated volume(s) of the occurrence, provided when available
[5] Description of the occurrence indicating known or suspected cause(s)
[6] Mitigation and corrective measures completed with dates implemented

[7] Mitigation and corrective measures planned with implementation schedules

Table 4-2 SSO Inventory – Other Entity Owned Sewer Discharges onto DCR Property Since 2011[1]

Last Revision Date: May 7, 2024

SSO Location[1]	Sewer System Owner[2]	Discharge Statement[3]	Date[4]	Estimated Volume[6]	Description[6]
Nonantum Rd. Boston	Boston Water & Sewer Department	Surcharged Manhole from Daily Rink	Feb. 2017	n/a	Blocked or clogged line in main. BWSC addressed clog and notified DCR of overflow
Storrow Dr.	MWRA	Surcharge of BMC into DCR infrastructure under Mass Ave. Bridge on Storrow Dr. prior to discharging to the Charles River.	Aug. 2019	n/a	Due to Rain Event. MWRA notified DEP of the overflow
Essex Street	City of Quincy	City staff observed the SSO from the sewer manhole entering the nearby tidal fingers owned by DCR.	Jan. 21, 2020	n/a	A formerly stubbed and capped clay pipe connected to the manhole was resulting in the discharge. This collapse has been fixed.
East Squantum Street	City of Quincy	The City suspected that there was a collapse/blockage on East Squantum Street	Jan. 21, 2020	n/a	Using their vactor/jetter, the City has been able to restore functional conditions to this sewer line, so that the bypassed flows from Aberdeen can be safely conveyed into the sewer system
Ravine Rd. Stoneham	Private owner	Sewer manhole discharge from private gravity sewer flowing into Virginia Woods	Nov. 2020	n/a	Sewer manhole discharge flowing into Virginia Woods, owned by hospital complex at 3 Woodland Rd. Stoneham. DCR and MWRA worked to clear blockage from sewer manhole discharge. Clean-up mitigation conducted by private owner.
161 Granite Ave - Neponset Park	BWSC	Surcharging SMH	Sept. 9, 2021	n/a	Bolting cover installed to control SMH surcharge
Big Blue Dr.	Town of Milton	Blockage occurred between the Milton & Boston (BWSC) connection.	Jan. 10, 2022	n/a	BWSC responded, jetted line and cleared blockage

[1] Last revision date June 30, 2023

Last Revision Date: May 7, 2024

SSO Location[1]	Sewer System Owner[2]	Discharge Statement[3]	Date[4]	Estimated Volume[6]	Description[6]
430A Canterbury St. Boston	Boston Light (City of Boston)	20-gal discharge from septic tank on property	Jan. 25, 2023	n/a	Discharge from private septic tank in a yard next to 430A Canterbury Street. BWSC crew disinfected impacted area. Property owner is responsible for getting a plumber to clean/repair the blocked/broken private septic tank. No impacts to any catch basins or waterbodies, SSO contained to private yard area.

[1] Location (approximate street crossing/address and receiving water, if any)
[2] Entity that owns or is otherwise responsible for sewer system where SSO occurred
[3] A clear statement of whether the discharge entered a surface water directly or entered the MS4
[4] Date(s) of each known SSO occurrence
[5] Estimated volume of sewage discharge, if known
[6] Description of the occurrence indicating known or suspected cause(s)

5

Assessment and Priority Ranking of Outfalls

The 2016 MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

A catchment is the area that drains to an individual outfall[2] or interconnection.[3] The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments are typically delineated based on mapped drainage infrastructure and supplemented using topographic contours as needed and where available. As described in Section 3, initial catchment delineations will be completed as part of the Phase I mapping, and refined catchment delineations will be completed as part of the Phase II mapping to reflect information collected during catchment investigations.

2 **Outfall** means a point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that connect segments of the same stream or other waters of the United States and that are used to convey waters of the United States. Culverts longer than a simple road crossing shall be included in the inventory unless the permittee can confirm that they are free of any connections and simply convey waters of the United States.

3 **Interconnection** means 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.

5.2 Outfall and Interconnection Inventory and Initial Ranking

The DCR Division of Design & Engineering completed an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information.

The outfall and interconnection inventory identifies each outfall and interconnection discharging from the MS4, records its location and condition, and provides a framework for tracking inspections, screenings and other IDDE program activities.

Outfalls and interconnections were initially classified into one of the following categories by Permit Year 1 based on the description in the permit:

1. **Problem Outfalls**: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input indicators are any of the following:
    a) Olfactory or visual evidence of sewage;
    b) Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water; or
    c) Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

    Dry weather screening and sampling, as described in **Section 6** of this IDDE Plan and Part 2.3.4.7.b of the MS4 Permit, is not required for Problem Outfalls. Instead, DCR will move right to investigating the discharge and trying to identify the source. Once the source is removed and follow up sampling indicates no potential illicit connections, the Problem Outfall shall be re-ranked as a High or Low Priority Outfall.
2. **High Priority Outfalls:** Outfalls/interconnections that have not been classified as Problem Outfalls and that are:
    a) Discharging to an area of concern to public health due to proximity of public beaches, recreational areas, surface water supplies, or shellfish beds; or
    b) Discharging to waterbodies impaired for bacteria or pathogens.
3. **Low Priority Outfalls:** Outfalls/interconnections determined by the permittee as low priority based on the ranking characteristics listed below or other available information.
4. **Excluded Outfalls:** Outfalls/interconnections with no potential for illicit discharges may be excluded from the IDDE program. The permit identifies that drainage from the following categories below can be excluded:
    a) Roadway drainage in undeveloped areas with no dwellings and no sanitary sewers;

b) Drainage for athletic fields, parks, or undeveloped green space and associated parking without services; or

c) Cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land."

DCR has identified approximately 230 outfalls to be excluded from the IDDE program as they are located away from presumed sanitary sewer systems, in undeveloped areas based on land use, and not in proximity to DCR building with restrooms. DCR will continue to refine excluded outfall status through catchment investigations.

Ranking Characteristics

Outfalls were ranked into the above priority categories based on the following characteristics of the defined initial catchment areas, where information is available. As additional information becomes available, DCR may include additional relevant characteristics, including location-specific characteristics, as part of the ranking and will document the characteristics in this IDDE Plan. The characteristics below provide an overview.

- **Previous screening results** – previous screening/sampling results indicate likely sewer input (see criteria above for Problem Outfalls).
- **Past discharge complaints and reports.**
- **Discharging to Area of Concern to Public Health** – outfalls or interconnections that discharge to public beaches, recreational areas, surface water supplies and/or shellfish beds.
- **Impaired Waterbodies** – discharges to waters impaired for bacteria according to the most recent 303(d) list.
- **TMDL Watershed** – discharges to waters with an approved TMDL where illicit discharges may contribute to the pollutant of concern.
- **Density of generating sites within catchment** – outfalls or interconnections where known high-density generating sites are present within the drainage area. For DCR, this includes all labor yards and areas where fueling operations occur.

5.3 Follow-up Ranking of Outfalls and Interconnections

An updated inventory and ranking will be provided in each annual report. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections. Based on guidance in the permit, the outfalls identified as Problem Outfalls in Permit Year 1 prioritization remain problem outfalls for the permit requirements. Outfalls/interconnections where screening information was found indicating sewer input to the MS4, or sampling results indicated sewer input, will be considered likely to contain illicit discharges from sanitary sources and will be ranked as Highest Priority Outfalls category for investigation.

Appendix C includes DCR's current outfall inventory and priority ranking matrix.

6

Dry Weather Outfall Screening and Sampling

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and Excluded Outfalls) to be inspected for the presence of dry weather flow. The Division of Engineering is responsible for conducting dry weather outfall screening, starting with Highest and High Priority outfalls, followed by Low Priority outfalls, based on the initial priority rankings described in the previous section. While DCR performed outfall screening/sampling conducted under the 2003 MS4 Permit for their whole system, the list of analytes sampled was different and the results were not logged in a database for reference. Therefore, DCR is retesting the outfalls as described in this section.

6.1 Weather Conditions

Dry weather outfall screening and sampling may occur when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring. DCR will use precipitation data from the nearest accurate weather station from the Weather Underground website[4] or similar data source for each property for determining dry weather conditions. DCR will identify at least one back-up station for each site also, as needed.

[4] https://www.wunderground.com/weatherstation/overview.asp

6.2 Dry Weather Screening/Sampling Procedure

6.2.1 General Procedure

6.2.1.1 Documents and Records

Sampling Records

All samples must be clearly labeled with a unique identifier provided for each site, the date and time of collection, and the analysis required. This information must also be listed on the chain of custody. Additionally, all samples must identify the sampler using their initials.

Field Records

Field notes will be collected using a mobile data collection application. The sampling team will record the results of the field test kit analyses for ammonia, surfactants, and chlorine and field measurements for pH, temperature, salinity, and specific conductivity. Additionally, flow velocity, approximate depth of water, water color, odor, observed floatables and sediment or debris deposits will be noted. A photo of the structure should be taken and added to the database. A chain of custody form will be filled out at the time of sampling by the field crew. A carbon copy of the chain of custody will be retained by the field crew after the samples are delivered to the laboratory.

Laboratory Records

Upon completion of laboratory analysis, the laboratory will issue a full report in an electronic format describing the results of analysis for each sample submitted. This will include; a case narrative, sample results, quality control measures taken, information on the condition of the samples upon arrival at the lab and the sampling methodologies. A copy of the chain of custody will also be included by the laboratory with the laboratory report.

All data will be evaluated to confirm that it meets the quality control goals and that it is consistent with results typical for this type of work. Additional data collection will be scheduled if multiple data points do not meet the data quality objectives.

6.2.1.2 Quality Objectives, Criteria and Control

Data quality objectives are as follows:

- Data must have sufficient detail in order to assess water quality at each of the sampling locations.
- Data should be representative of the actual conditions at the sampling location.
- Data should be generated through accepted sampling methodologies.
- Data must be duplicable and accurate.

Precision: Precision is the ability of a measurement to be consistently reproduced. The overall sampling precision will be determined by the collection and analysis of field duplicate samples that are not identified as such to the analytical laboratory. Duplicate samples will be taken every twentieth sample and are to be collected at the same time as the parent sample and will be assigned a unique identifier. Due to the living nature of bacteria they may reproduce and die after sample collection. With this in mind, a degree of disparity that remains within the established data quality objectives, between the duplicate sample and the original sample is expected and is not necessarily reflective of sample collection or laboratory error.

Accuracy: Accuracy is the degree to which the result of a measurement, calculation, or specification conforms to its "true" value. In order to provide sufficient accuracy, minimization of false positive and false negative analytical data is attempted. The potential for false positive data values will be assessed through the analysis of laboratory blanks. All samples will be analyzed with a laboratory blank. Blank samples must have results of less than the method detection limit (MDL) or instrument detection limit. Laboratory control samples and calibration standards will be used by the laboratory, as needed.

Representativeness: Sample collection is intended to provide data representative of actual conditions at particular sampling locations. To achieve representativeness, sampling is carried out so as to eliminate, as much as possible, the possibility of cross contamination between the sampled locations and non-sampled locations as well as between multiple sampling locations. However, grab samples are only representative of a snapshot of water quality conditions at a given time. As such, they may not be representative of long-term conditions. Data collected must be evaluated with this limitation in mind.

Trip Blank: One blank sample will be collected per trip to the laboratory. Before any samples are taken, a trip blank will be created, by collecting a sample of distilled water using the field sampling equipment. It will remain in the same cooler as the samples for the duration of their trip to the laboratory.

QC Criteria: QC criteria are specified in **Table 6-1**. Data not meeting the criteria will be reviewed by the Project Manager. Data that does not meet laboratory QA/QC criteria will be flagged by the laboratory.

Instrument/Equipment Testing and Maintenance: Sampling supplies will be inspected prior to mobilization to ensure that everything is in good working order and that it is properly calibrated.

The pH, temperature, and specific conductivity measurements will be collected using an Oakton Multi-Parameter PCTSTestr 50 Series or equivalent. Meters are calibrated on a monthly schedule. Calibration instructions for each parameter are below.

pH Calibration:

For best results, calibrate with certified accurate pH calibration standards (buffers). You may calibrate up to five points with the USA (1.68, 4.01, 7.00, 10.1, 12.45) or the NIST (1.68, 4.01, 6.86, 9.18, 12.45) buffer group.

1. Press ON/OFF to turn meter on and MODE ENT to select pH mode as needed.
2. Rinse the sensor with clean water. Immerse the sensor into your pH buffer and press ▲ CAL. The primary display will show the un-calibrated pH value, while the secondary display should search for and lock on the closest automatic calibration value.

3. Allow the primary display to stabilize, then press MODE ENT to confirm the calibration value. The primary value will blink briefly before the secondary value automatically scrolls through the remaining pH buffers available for calibration.
4. Repeat steps 2 & 3 with additional buffers or press CAL to return to measurement mode.

Temperature Calibration:

The factory temperature should last for the life of the original sensor since it doesn't normally drift.

Conductivity Calibration (Automatic):

For best results, calibrate with certified accurate conductivity calibration standards. Selection of multi-point calibration will allow up to three of the following values, while single-point calibration will allow only one; choose 84 µS, 1413 µS, or 12.88 µS.

Conductivity Range	Automatic Calibration Value	Available With
0.0 – 200.0 µS	84 µS	PCS only
201 – 2000 µS	1413 µS	PC or PCS
2.01 – 20.00 mS	12.88 mS	PC or PCS

1. Press ON/OFF to turn meter on and MODE ENT to select conductivity mode as needed.
2. Rinse the sensor with clean water. Immerse the sensor into your standard and press CAL. The primary display will show the un-calibrated value, while the secondary display should search for and lock on the closest automatic calibration value.
3. Allow the primary display to stabilize, then press MODE ENT to confirm the calibration value. The primary value will blink briefly before returning to measurement mode.
4. Repeat steps 2 & 3 with additional calibrations standards if desired.

Table 6-1 Analytical References and Quality Control Goals

Parameter	Lab/Equipment	Reporting Limits	Method	Water Quality Criteria or Guidelines	Precision	Accuracy	Completeness
pH	Oakton Multi-Parameter PCTSTestr 50	0 - 14	NA	6.5 – 8.3	0.02	+/- 0.1	90%
Temperature	Oakton Multi-Parameter PCTSTestr 50	0 – 50 °C	NA	28.3	0.1 °C	+/- 0.5 °C	90%
Specific Conductivity	Oakton Multi-Parameter PCTSTestr 50	0 – 1,999 μS/cm 2.00 to 20.00 mS/cm	NA	NA	5 μS/cm	+/- 1% F.S.	90%
Salinity	Oakton Multi-Parameter PCTSTestr 50	0 – 999 ppm 1.00 – 10.00 ppt	NA	NA	30% RPD	+/- 1% F.S.	90%
Ammonia	CHEMets Kit K-1510 Hach Aquacheck Test Strips	0.02-6.0 mg/L 0 - 6.0 mg/L	NA	0.5 mg/L	0.05 mg/L Results in increments of 0, 0.25, 0.5, 1.0, 3.0, 6.0ppm	+/- 20% NA	90%
Chlorine	CHEMets Kit I-2001	0.02 mg/L	NA	NA	0.02 mg/L	+/- 20%	90%
Surfactants	CHEMets Kit K-9400	0.125 mg/L	NA	0.25 mg/L	0.125 mg/L	+/- 20%	90%
E. Coli	Laboratory	>10 CFU/ 100 mL	1,603	235 CFU/100 mL	30% RPD	NA	90%
Enterococcus	Laboratory	10 CFU / 100 mL	1,600	104 CFU/100 mL	30% RPD	NA	90%

NA = Not Applicable
CFU = Colony Forming Unit
F.S. = Full scale
mL = Milliliter
mg/L = Milligrams per Liter
NTU = Nephelometric Turbidity Units
RPD = Relative Percent Difference

Each sample collected will be stored in the appropriate container for the specific parameter being analyzed. The appropriate containers for all parameters being analyzed are shown in **Table 6-2**. Each sample will be labeled with the sample ID, date and time of collection, sampler collector's initials and the parameter to be tested.

Table 6-2 Bottle List

Parameter	Lab	Bottle	Preservation
E. coli	Laboratory	120 mL sterile	Ice
Enterococci	Laboratory	120 mL sterile	Ice

A laboratory-specific chain of custody (COC) will also be completed. Each time the samples change hands (from the sampler to the courier, courier to laboratory, etc.), the sample labels will be checked against the COC to verify that all information matches. If discrepancies are found, actions will be taken to confirm the correct information is displayed and that all samples are accounted for. The laboratory will perform QA/QC procedures consistent with the standard operating procedures (SOPs) for the sampling methodology for each parameter.

Any inaccurate or incomplete field data will be discussed and re-measured before leaving the monitoring location. Inaccurate or incomplete information will be corrected before the files are finalized.

The laboratory will follow QA/QC procedures described in the attached SOP including initial calibration, the use of duplicates and laboratory control samples. Once sampling results are distributed by the laboratory, a Project Manager will review the results to confirm that they are consistent with the quality control goals listed in **Table 6-1**. Any discrepancies will be discussed with the laboratory.

6.2.1.3 General Steps

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on initial outfall inventory and priority ranking.
    a) High and low ranked outfalls and interconnects need screening.
    b) Problem and excluded outfalls and interconnections do not need screening.
2. Acquire the necessary staff, mapping, and field equipment (see **Appendix D** for list of potential field equipment).
3. Conduct the outfall inspection during dry weather:
    a) Locate the outfall. If the outfall is not found, proceed to the next upstream structure. If an upstream structure is not found, update the database accordingly.

b) In the event that an outfall is submerged, either partially or completely, or is inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling. (Note, field staff may need to capture samples from multiple sampling points to capture a representative sample of the incoming flow.)

c) Mark and photograph the outfall or structure in the database.

d) Record the inspection information and outfall characteristics using DCR's mobile data collection. Inspectors will use ArcGIS Field Maps to gather screening and sampling data against mapped assets. Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color, turbidity, and floatable matter (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures.

4. If flow is observed, sample and test the flow following the procedures described in the following sections.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), place a sandbag if the forecast for the next 48 hours shows dry weather. If the forecast does not show dry weather, revisit the outfall when there is 48 hours of dry weather as soon as possible after the initial observation and place a sandbag or sample flow if observed.
6. Input lab results from screening and sampling into DCR's database. Data captured through the mobile ArcGIS Field Maps will be automatically saved to the database.
7. Conduct review of all data entered into the database against lab reports and field notes for quality assurance purposes.
8. Analyze whether screening and sampling results require further follow up measures or indicate no signs of illicit discharges in the flow.
9. Include all screening data in the annual report.

6.2.2 Field Equipment

Appendix D includes a checklist of field equipment commonly used for dry weather (and wet weather) outfall screening and sampling. The listed items are suggested and should be updated as needed, based on specific samples and tests to be conducted and/or conditions. At the discretion of the sampling team, additional items can be added to the list at the end, and duplicative or unnecessary items can be removed or crossed out.

6.2.3 Sample Collection and Analysis

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters[5] listed in **Table 6-1** plus pollutants of concern for the receiving water body. The general procedure for collection of outfall samples is as follows:

1. At least one day prior to sampling, coordinate with appropriate laboratory to schedule the laboratory analysis. This coordination will include the time of delivery and number of samples expected to be sent for analysis.
2. Visit the designated location(s) provided in two-person field crew.
3. Prior to the start of sampling, create a trip blank by filling a laboratory provided container with clean bottled water. The trip blank will have its own unique label and will be kept in a cooler with all other samples collected during that sampling event.
4. Upon arrival at an approved sampling location, record all pertinent observations in electronic format. Pertinent observations include but are not limited to: flow velocity, approximate depth of water, water color, odor, observed floatables, and sediment or debris deposits. Fill out comments section with any observations which cannot adequately be described using predefined categories on the field form.
5. If using bottle labels, fill out all sample information on sample bottle labels and field sheets. Make sure sample bottles are clean. If writing directly on lab sample bottle, skip to Step 6.
6. Put on protective gloves (nitrile/latex/other) before sampling. If writing directly on lab sample bottles, label sampling container. Collect sample with dipper or directly in sample containers. To sample, place a clean grab container in the approximate middle of observed flow. After the container has been filled, retrieve and swirl its contents to ensure that all surfaces of the container are covered and rinsed thoroughly and then dump out downstream of the sampling location. Follow this method a total of three times, to ensure that the grab container is fully rinsed.
7. Use grab container a fourth time to collect a final sample for analysis. If possible, collect water from the flow directly in the sample bottle. Be careful not to disturb sediments.
8. For samples requiring laboratory analyses, open a sterile container, provided by the laboratory. Use caution to ensure that only the outside of the container and its cap are handled to prevent contamination. Fill the sterile container with the sampled water and then seal. Take care to confirm that the sample container is

[5] Other potentially useful parameters, although not required by the MS4 Permit, include **fluoride** (indicator of potable water sources in areas where water supplies are fluoridated), **potassium** (high levels may indicate the presence of sanitary wastewater), and **optical brighteners** (indicative of laundry detergents).

sealed properly and does not leak. Label the container with a unique identifier, the date and time the sample was taken and the analysis that is required.

9. Place laboratory samples on ice in a cooler for analysis of bacteria and pollutants of concern.
10. Fill out chain-of-custody form for laboratory samples, including the unique identifier, date, time, sample matrix, sampler's initials, and required test information. The chain of custody form will remain with the samples at all times.
11. Conduct in-situ field tests using the remaining water in the grab container. Use test strips, test kits, and field meters (rinse similar to dipper) for most parameters (see **Table 6-3**). All results will be recorded.
12. Samples will remain on ice until they are accepted by the laboratory. Samples must be analyzed by the laboratory within 8 hours of their collection. Any violation of this hold time is required to be documented in the laboratory's final report.
13. Upon completion of all sampling, or portion of sampling as the 8 hour bacteria hold time allows, deliver the samples to the laboratory identified in the Health and Safety Plan (HASP) Appendix A: Individual Site Pre-Sampling Safety Plan. The samples must be signed over to the laboratory using the chain of custody form. Retain a carbon copy of the chain of custody from while the original remains with the samples. Follow the handling and chain of custody procedures described in the following section.
14. Dispose of used test strips and test kit ampules properly.
15. Decontaminate all testing personnel and equipment, following HASP guidance.

6.2.3.1 Field Kits

Field test kits or field instrumentation are permitted for all parameters except indicator bacteria and some pollutants of concern. Field kits need to have appropriate detection limits and ranges. **Table 6-3** lists various field test kits and field instruments that can be used for outfall sampling associated with the 2016 MS4 Permit parameters, other than indicator bacteria and any pollutants of concern. Analytic procedures and user's manuals for field test kits and field instrumentation are provided in **Appendix E**.

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

[6] 40 CFR § 136: http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5

Table 6-3 Sampling Parameters and Analysis Methods

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II Hach™ DR300 Pocket Colorimeter	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Surfactants (Detergents)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Chlorine	CHEMetrics™ V-2000, K-2513, I-2001 Hach™ Pocket Colorimeter™ II Hach™ DR300 Pocket Colorimeter	Hach™ DR300
Conductivity	CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450 Oakton PCTSTestr 50	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450 Oakton PCTSTestr 50	NA
Salinity	YSI Pro30 YSI EC300A Oakton 450 Oakton PCTSTestr 50	NA
pH	YSI Pro30 YSI EC300A Oakton 450 Oakton PCTSTestr 50	NA
Indicator Bacteria: *E. coli* (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern[7]	EPA certified laboratory procedure (40 CFR § 136) or approved field meter	NA

Table 6-4 Required Analytical Methods, Detection Limits, Hold Times, and Preservatives

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	Direct Nesslerization	0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2, No preservative required if analyzed immediately
Surfactants	Methylene Blue	0.01 mg/L	48 hours	Cool ≤6°C

7 Where the discharge is directly into a water quality limited water or a water 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.

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Chlorine	DPD	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	N/A	N/A	Immediate	None Required
Specific Conductance	N/A	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	N/A	-	28 days	Cool ≤6°C
Indicator Bacteria: *E. coli* *Enterococcus*	*E. coli* **EPA**: 1603 **SM**: 9221B, 9221F , 9223 B **Other**: Colilert ®, Colilert-18® *Enterococcus* **EPA**: 1600 **SM**: 9230 C **Other**: Enterolert®	*E. coli* **EPA**: 1 cfu/100mL **SM**: 2 MPN/100mL **Other**: 1 MPN/100mL *Enterococcus* **EPA**: 1 cfu/100mL **SM**: 1 MPN/100mL **Other**: 1 MPN/100mL	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
Total Phosphorus	**EPA**: Manual-365.3, Automated Ascorbic acid digestion-365.1 Rev. 2, ICP/AES4-200.7 Rev. 4.4 **SM**: 4500-P E-F	**EPA**: 0.01 mg/L **SM** : 0.01 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2
Total Nitrogen*	**EPA**: Cadmium reduction (automated)-353.2 Rev. 2.0, **SM**: 4500-NO_3 E-F	**EPA**: 0.05 mg/L **SM**: 0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM = Standard Methods

* - Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.

6.2.4 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers 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 the intermittent discharge. The challenge with this method can be finding appropriate durations of dry weather and the need for multiple trips to each manhole.

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. **Table 6-5** shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table 6-5 Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>0.5 mg/L
Conductivity	>2,000 µS/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the 2016 MS4 Permit)
Indicator Bacteria: *E. coli* *Enterococcus*	 E. coli: 235 cfu/100ml Enterococcus: 104 cfu/100ml

According to the 2016 MS4 Permit Part 2.3.4.7c.ii, likely sewer input indicators are any of the following:

- 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; or
- Ammonia ≥0.5 mg/L, surfactants ≥0.25 mg/L, and detectable levels of chlorine.

6.4 Follow-up Ranking of Outfalls and Interconnections

Since the dry weather screening task was completed in Permit Year 3, DCR updated and re-prioritized the initial outfall and interconnection rankings based on information gathered during dry weather screening. Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or where sampling results indicated sewer input to the MS4 were ranked as Highest Priority, at the top of the High Priority Outfalls category, for investigation.

The rankings may be updated periodically as additional outfalls are identified and dry weather screening is performed or follow up work is performed for Problem Outfalls and will be summarized in each annual report.

7

Catchment Investigations

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges. All data collected as part of the catchment investigations will be recorded and reported in each annual report.

7.1 System Vulnerability Factors

While DCR does not generally own sewer systems, where available DCR will review relevant mapping and historic plans and records to identify areas within the catchment with higher potential for illicit connections. The following information will be reviewed, if readily available:

- Plans related to the construction of the DCR drainage network;
- Plans related to the construction of the sewer drainage network on DCR property; and
- Prior work on the DCR storm drains or sewer lines on DCR property.

The presence of the following **System Vulnerability Factors (SVFs)** may be identified for each catchment, as available:

- Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system;
    - Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between

storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations shared by sanitary sewer owners/ operators and shared with DCR; or

- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs, as identified by sanitary sewer owners/ operators and shared with DCR.

DCR maintains an SVF inventory for each catchment in its database. If entities are interested in receiving the SVF inventory, please request from DCR Stormwater.

7.2 Catchment Investigations

The Division of Design & Engineering and/or subcontractors will be responsible for implementing catchment investigations and will systematically investigate each catchment associated with an outfall or interconnection within their MS4 system. All catchment investigations will be completed during dry weather and will involve systematically and progressively observing, sampling, and evaluating key junction manholes in the MS4. For outfalls/interconnections with dry weather screening results indicating sewer input, additional steps will be taken during the catchment investigation (as outlined below) to determine the approximate location of suspected illicit discharges or SSOs.

Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, where necessary. The SVF inventory will also be updated based on information obtained during catchment layer development and the field investigations, where necessary.

Important terms related to catchment investigations are defined by the MS4 Permit 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 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. Adequate implementation of the illicit discharge 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. 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.

For all catchments identified for investigation, during dry weather, field crews will systematically inspect all **key junction manholes** for evidence of illicit discharges. This program involves progressive inspection and sampling at manholes in the storm drain network to isolate and eliminate illicit discharges.

The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively up from the outfall and inspecting key junction manholes along the way; or
- By working progressively down from the upper parts of the catchment toward the outfall.

The decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system requires more advanced 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 discharges are believed to be located in the upstream portions of the catchment area. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

For most catchments, manhole inspections will proceed from the upper parts of the catchment and proceed down towards the outfall. For outfalls/interconnections with sampling results indicating sewer input, manhole inspections will typically proceed up from the outfall.

Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections.
2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Sampling and analysis will be in accordance with procedures outlined in **Section 6**. Additional indicator sampling may assist in determining potential sources (e.g., bacteria for sanitary flows, conductivity to detect tidal backwater, etc.).
   2.1. For catchment investigations DCR has adopted a more stringent criteria for potential non stormwater inputs that trigger further investigation in the catchment. This criteria is as follows:
      - Ammonia ≥ 1 mg/L
      - Ammonia ≥ 0.5 mg/L and surfactants ≥0.25 mg/L
      - Ammonia > 0 mg/L and surfactants > 0 mg/L and at least one of the following is true: E. coli/Fecal Coliform ≥ 235 CFU/100 mL, Enterococcus ≥ 104 CFU/100 mL, or Chlorine ≥ 0.2 mg/L
3. If flow is not observed, the next step will vary depending on the following:
   3.1. Manholes with visual or olfactory evidence of potential non stormwater input or with signs of potential intermittent flow: an obstruction (sandbag) will be placed in the manhole to capture intermittent flows. After at least 48 hours of dry weather, the sandbag will be checked. If flow is captured, a

sample will be collected and analyzed for the same parameters as listed in #2.

   3.2. All other catchments: proceed to the next key junction manhole without placing a sandbag.

4. Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole will be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.
   4.1. Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges or SSOs can be isolated to the shortest segment of pipe possible, ideally a single pipe between two manholes (proceed to Section 7.4).
   4.2. Should inspections proceed to the edge of the DCR system and/or a perceived municipal interconnection to the DCR MS4 without identifying the location of suspected illicit discharges or SSO source, the investigator will note the potential source and notify the municipality and/or private land owner in accordance with DCR's Illicit Drainage Disconnection Procedure for alerting the owner of the upstream system.
5. If a minimum of one (1) System Vulnerability Factor (SVF) is identified based on previous information or this catchment investigation, DCR will flag this outfall for a wet weather investigation in the database, which must occur before the catchment investigation can be considered complete.
6. If no evidence of an illicit discharge is found and there are no SVFs identified, catchment investigations will be considered complete upon finishing review/sampling of key junction manholes.

7.3 Wet Weather Outfall Sampling

Where a minimum of one (1) System Vulnerability Factor (SVF) is identified based on information previously gathered or the catchment investigation, wet weather outfall sampling must also be conducted at the associated outfall. The Division of Design & Engineering will be responsible for implementing the wet weather outfall sampling program and updating its database with wet weather sampling results.

Outfalls will be inspected and sampled under wet weather conditions, to the extent necessary, to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4.

Wet weather outfall sampling will proceed as follows:

1. At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening provided in **Section 6**.
2. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce runoff. Wet weather sampling decisions will be at the

discretion of the sampling team. Wet weather screening will be conducted if there is at least 0.25 inches of rainfall, or enough rain to induce runoff. Field crews will sample within 24 hours after the rainfall event. Field crews will strive to sample during active rain as much as possible. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.

3. If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in **Section 7.4**.
4. If wet weather outfall sampling does not identify evidence of illicit discharges, and no evidence of an illicit discharge is found during dry weather manhole inspections, catchment investigations will be considered complete.

7.4 Source Isolation and Confirmation

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges:

- Sandbagging
- Smoke Testing
- Dye Testing
- CCTV/Video Inspections
- Optical Brightener Monitoring
- IDDE Canines

These methods are described in the sections below. Instructions and Standard Operating Procedures (SOPs) will be developed as they are needed.

7.4.1 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers 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 the intermittent discharge. The challenge with this method can be finding appropriate durations of dry weather and the need for multiple trips to each manhole.

7.4.2 Smoke Testing

Smoke testing involves injecting non-toxic smoke into drain lines and noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the system itself. Typically, a smoke bomb or smoke generator is used to inject the smoke into the system at a catch basin or manhole and air is then forced through the system. Test personnel are placed in areas where there are suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection or damaged storm drain infrastructure). It is important when using this technique to make proper notifications to area residents and business owners as well as local police and fire departments.

If the initial test of the storm drain system is unsuccessful then a more thorough smoke-test of the sanitary sewer lines can also be performed. Unlike storm drain smoke tests, buildings that do not emit smoke during sanitary sewer smoke tests may have problem connections and may also have sewer gas venting inside, which is hazardous.

It should be noted that smoke may cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the area of testing altogether to ensure safety during testing.

7.4.3 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. Similar to smoke testing, it is important to inform local residents and business owners. Police, fire, and local public health staff should also be notified prior to testing in preparation of responding to citizen phone calls concerning the dye and their presence in local surface waters.

A team of two or more people is needed to perform dye testing (ideally, all with two-way communication devices, such as cell phones or radios). One person is inside the building, while the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer, recording the presence or absence of the dye.

The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

7.4.4 CCTV/Video Inspection

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive when an active flush with sewage entering into the drain is visible, it can be costly and time consuming when compared to other source isolation techniques. When an active flush is not visible, follow-up with dye testing to confirm illicit connections will be needed.

7.4.5 Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products to enhance their appearance. The presence of optical brighteners in surface waters or dry weather discharges suggests there is a possible illicit discharge or insufficient removal through adsorption in nearby septic systems or wastewater treatment. Optical brightener monitoring can be done in two ways. The most common, and least expensive, methodology involves placing a cotton pad in a wire cage and securing it in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is retrieved at a later date and placed under UV light to determine the presence/absence of brighteners during the monitoring period. A second methodology uses handheld fluorometers to detect optical brighteners in water sample collected from outfalls or ambient surface waters. Use of a fluorometer, while more quantitative, is typically more costly and is not as effective at isolating intermittent discharges as other source isolation techniques.

7.4.6 IDDE Canines

Dogs specifically trained to smell human related sewage are becoming a cost-effective way to isolate and identify sources of illicit discharges. While not widespread at the moment, the use of IDDE canines is growing as is their accuracy. The use of IDDE canines is not recommended as a standalone practice for source identification; rather it is recommended as a tool to supplement other conventional methods, such as dye testing, in order to fully verify sources of illicit discharges.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Division of Engineering will notify visitors with temporary signage in the vicinity of the testing and/or inspections.

7.5 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, DCR will exercise its authority as necessary to require its removal within 60 days. Where elimination of an illicit discharge is not possible within 60 days of its identification, DCR will create an expeditious schedule for its elimination. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- 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; and

- Estimate of the volume of flow removed.

7.5.1 Confirmatory Outfall Screening

Within one (1) year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation.

7.6 Ongoing Screening

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be re-prioritized for screening and scheduled for ongoing screening once every five (5) years. Ongoing screening will consist of dry weather screening and sampling consistent with the procedures described in **Section 6** of this plan. Ongoing wet weather screening and sampling will also be conducted at outfalls where wet weather screening was required due to System Vulnerability Factors and will be conducted in accordance with the procedures described in **Section 7.3**. All sampling results will be reported in the annual report.

8

Training

Annual IDDE training will be made available to all employees involved in the IDDE program. This training will, at a minimum, include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Training records will be maintained in **Appendix F**. The frequency and type of training will be included in the annual report.

9

Progress Reporting

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed;
- Number and percent of total outfall catchments served by the MS4 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;
- Status of on-going investigations of suspect flows and source identification;
- Estimate of the volume of sewage removed, as applicable; and
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

Appendix A – Impaired Receiving Waters and Impairments

List of Receiving Waters for Regulated Outfalls and Interconnections

Receiving Water	Waterbody IDs	Number of Regulated Outfalls and Interconnections	Impaired For:
Aberjona River	MA71-01	19	Ammonia, Un-ionized; Arsenic In Sediment; Benthic Macroinvertebrates; Chloride; Dissolved Oxygen; Fish Bioassessments; Phosphorus, Total; Physical Substrate Habitat Alterations; Sediment Bioassay [Chronic Toxicity Freshwater]; Escherichia Coli (E. Coli)
Alewife Brook	MA71-20	22	Debris; Flocculant Masses; Odor; Oil And Grease; Scum/foam; Transparency / Clarity; Trash; Pcbs In Fish Tissue; Chloride; Copper In Sediment; Dissolved Oxygen; Lead In Sediment; Phosphorus, Total; Sediment Bioassay [Chronic Toxicity Freshwater]; Water Chestnut; Enterococcus; Escherichia Coli (E. Coli)
Ashland Reservoir	MA82003	12	Mercury In Fish Tissue; Non-native Aquatic Plants
Beaver Brook	MA62-09	8	Escherichia Coli (E. Coli); Fecal Coliform
Beaver Brook	MA72-28	11	Algae; Chloride; Dissolved Oxygen; Flow Regime Modification; Organic Enrichment (Sewage) Biological Indicators; Other Anthropogenic Substrate Alterations; Phosphorus, Total; Sedimentation/siltation; Water Chestnut; Escherichia Coli (E. Coli)
Bennetts Pond Brook	MA93-48	37	Escherichia Coli (E. Coli); Fecal Coliform
Blackstone River	MA51-05	5	Algae; Aquatic Plants (Macrophytes); Non-native Aquatic Plants; Nutrient/eutrophication Biological Indicators; Odor; Phosphorus, Total; Turbidity; Benthic Macroinvertebrates; Cadmium; Copper; Flow Regime Modification; Lead; Polychlorinated Biphenyls (Pcbs); Total Suspended Solids (Tss); Escherichia Coli (E. Coli)
Blackstone River	MA51-06	1	Flow Regime Modification; Cadmium; Copper; DDT in Fish Tissue; Escherichia Coli (E. Coli); Fish Bioassessments; Lead; PCBs in Fish Tissue; Phosphorus, Total; Total Suspended Solids (TSS)
Blue Hill River	MA74-25	5	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Boston Inner Harbor	MA70-02	8	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Dissolved Oxygen; Enterococcus; Fecal Coliform
Cape Cod Canal	MA95-14	1	Fecal Coliform
Charles River	MA72-07	50	Curly-leaf Pondweed; Eurasian Water Milfoil, Myriophyllum Spicatum; Harmful Algal Blooms; Water Chestnut; Ddt In Fish Tissue; Pcbs In Fish Tissue; Benthic Macroinvertebrates; Fish Bioassessments; Fish Passage Barrier; Flow Regime Modification; Nutrient/eutrophication Biological Indicators; Phosphorus, Total; Temperature; Escherichia Coli (E. Coli)
Charles River	MA72-33	4	Nutrient/eutrophication Biological Indicators; Physical Substrate Habitat Alterations; Escherichia Coli (E. Coli)

Charles River	MA72-36	230	Harmful Algal Blooms; Oil And Grease; Transparency / Clarity; Ddt In Fish Tissue; Pcbs In Fish Tissue; Chlorophyll-a; Dissolved Oxygen; Fish Bioassessments; Fish Passage Barrier; Flow Regime Modification; Non-native Fish/shellfish/zooplankton; Nutrient/eutrophication Biological Indicators; Ph, High; Phosphorus, Total; Sediment Bioassay [Acute Toxicity Freshwater]; Unspecified Metals In Sediment; Water Chestnut; Escherichia Coli (E. Coli)
Charles River	MA72-38	94	Harmful Algal Blooms; Odor; Oil And Grease; Transparency / Clarity; Ddt In Fish Tissue; Pcbs In Fish Tissue; Cause Unknown [Sediment Screening Value (Exceedance)]; Chlorophyll-a; Combined Biota/habitat Bioassessments; Dissolved Oxygen; Dissolved Oxygen Supersaturation; Fish Passage Barrier; Flow Regime Modification; Nutrient/eutrophication Biological Indicators; Phosphorus, Total; Salinity; Temperature; Escherichia Coli (E. Coli)
Chicopee Reservoir	MA36033	3	Non-native Aquatic Plants
Coachlace Pond	MA81019	1	Curly-leaf Pondweed; Hydrilla; Non-native Aquatic Plants
Connecticut River	MA34-04	2	Pcbs In Fish Tissue; Water Chestnut; Escherichia Coli (E. Coli)
Dark Brook	MA51-16	3	Benthic Macroinvertebrates; Chloride; Fanwort; Escherichia Coli (E. Coli)
Dorchester Bay	MA70-03	34	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Enterococcus; Fecal Coliform
Dunn Pond	MA35021	4	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Ell Pond	MA71014	4	Harmful Algal Blooms; Phosphorus, Total; Total Suspended Solids (Tss); Transparency / Clarity; Chlorophyll-a; Fecal Coliform
Fellsmere Pond	MA71016	8	Harmful Algal Blooms
Flint Pond	MA51188	3	Aquatic Plants (Macrophytes); Nutrient/eutrophication Biological Indicators; Eurasian Water Milfoil, Myriophyllum Spicatum; Fanwort; Non-native Aquatic Plants
Furnace Brook	MA74-10	55	Benthic Macroinvertebrates; Dissolved Oxygen; Escherichia Coli (E. Coli)
Gloucester Harbor	MA93-18	2	Combined Biota/habitat Bioassessments; Dissolved Oxygen; Enterococcus; Fecal Coliform
Hammond Pond	MA72044	5	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Hoosicwhisick Pond	MA74015	18	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Hull Bay	MA70-09	1	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Estuarine Bioassessments; Fecal Coliform
Jamaica Pond	MA72052	16	Dissolved Oxygen; Eurasian Water Milfoil, Myriophyllum Spicatum; Phosphorus, Total
Lake Cochituate	MA82020	1	Pcbs In Fish Tissue; Dissolved Oxygen; Eurasian Water Milfoil, Myriophyllum Spicatum

Lake Cochituate	MA82125	5	Pcbs In Fish Tissue; Asian Clam; Curly-leaf Pondweed; Dissolved Oxygen; Eurasian Water Milfoil, Myriophyllum Spicatum; Non-native Aquatic Plants
Lake Quinsigamond	MA51125	22	Algae; Curly-leaf Pondweed; Dissolved Oxygen; Eurasian Water Milfoil, Myriophyllum Spicatum; Fanwort; Non-native Aquatic Plants; Water Chestnut; Enterococcus
Lower Mystic Lake	MA71027	18	Ddt In Fish Tissue; Pcbs In Fish Tissue; Dissolved Oxygen; Hydrogen Sulfide; Salinity; Sediment Bioassay [Chronic Toxicity Freshwater]
Lower Pond	MA93044	7	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Lynn Harbor	MA93-52	30	Enterococcus; Fecal Coliform
Lynn Harbor	MA93-53	89	Fecal Coliform
Malden River	MA71-05	21	Debris; Flocculant Masses; Odor; Oil And Grease; Scum/foam; Transparency / Clarity; Trash; Chlordane In Fish Tissue; Ddt In Fish Tissue; Pcbs In Fish Tissue; Dissolved Oxygen; Dissolved Oxygen Supersaturation; Ph, High; Phosphorus, Total; Sediment Bioassay [Chronic Toxicity Freshwater]; Temperature; Total Suspended Solids (Tss); Water Chestnut; Enterococcus; Escherichia Coli (E. Coli); Fecal Coliform
Merrimack River	MA84A-01	39	Mercury In Fish Tissue; Fish Passage Barrier; Escherichia Coli (E. Coli); Fecal Coliform
Merrimack River	MA84A-03	4	Mercury In Fish Tissue; Fish Passage Barrier; Pcbs In Fish Tissue; Phosphorus, Total; Escherichia Coli (E. Coli)
Merrimack River	MA84A-06	2	Pcbs In Fish Tissue; Enterococcus; Fecal Coliform
Middle River	MA51-02	2	Debris; Trash; Turbidity; Benthic Macroinvertebrates; Non-native Aquatic Plants; Nutrient/eutrophication Biological Indicators; Physical Substrate Habitat Alterations; Escherichia Coli (E. Coli)
Mill Brook	MA71-07	1	Benthic Macroinvertebrates; Fish Bioassessments; Physical Substrate Habitat Alterations; Escherichia Coli (E. Coli)
Mill River	MA93-31	2	Turbidity; Dissolved Oxygen; Escherichia Coli (E. Coli); Fecal Coliform
Miller Brook	MA32-27	4	Escherichia Coli (E. Coli)
Mine Brook	MA72-14	2	Habitat Assessment; Temperature; Escherichia Coli (E. Coli)
Mother Brook	MA73-28	20	Color; Debris; Odor; Trash; Ddt In Fish Tissue; Mercury In Fish Tissue; Pcbs In Fish Tissue; Dissolved Oxygen; Flow Regime Modification; Phosphorus, Total; Escherichia Coli (E. Coli); Fecal Coliform
Muddy River	MA72-11	96	Odor; Oil And Grease; Turbidity; Ddt In Fish Tissue; Pcbs In Fish Tissue; Bottom Deposits; Dissolved Oxygen; Flow Regime Modification; Non-native Aquatic Plants; Phosphorus, Total; Physical Substrate Habitat Alterations; Unspecified Metals In Sediment; Escherichia Coli (E. Coli)

Mystic River	MA71-02	140	Harmful Algal Blooms; Transparency / Clarity; Water Chestnut; Chlordane In Fish Tissue; Ddt In Fish Tissue; Pcbs In Fish Tissue; Arsenic; Chlorophyll-a; Dissolved Oxygen; Dissolved Oxygen Supersaturation; Eurasian Water Milfoil, Myriophyllum Spicatum; Ph, High; Phosphorus, Total; Sediment Bioassay [Chronic Toxicity Freshwater]; Enterococcus; Escherichia Coli (E. Coli)
Mystic River	MA71-03	8	Flocculant Masses; Odor; Oil And Grease; Scum/foam; Cause Unknown [Contaminants In Fish And/or Shellfish; Sediment Screening Value (Exceedance)]; Pcbs In Fish Tissue; Ammonia, Un-ionized; Dissolved Oxygen; Nutrient/eutrophication Biological Indicators; Petroleum Hydrocarbons; Enterococcus; Fecal Coliform
Nahant Bay	MA93-24	15	Enterococcus; Fecal Coliform
Neponset River	MA73-02	47	Debris; Flocculant Masses; Oil And Grease; Scum/foam; Trash; Turbidity; Ddt In Fish Tissue; Pcbs In Fish Tissue; Dissolved Oxygen; Fish Passage Barrier; Metals; Unspecified Metals In Sediment; Escherichia Coli (E. Coli); Fecal Coliform
Neponset River	MA73-03	42	Debris; Flocculant Masses; Oil And Grease; Scum/foam; Trash; Ddt In Fish Tissue; Pcbs In Fish Tissue; Curly-leaf Pondweed; Fish Passage Barrier; Metals; Pcbs In Sediment; Polychlorinated Biphenyls (Pcbs); Unspecified Metals In Sediment; Enterococcus; Escherichia Coli (E. Coli); Fecal Coliform
Neponset River	MA73-04	29	Debris; Trash; Turbidity; Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Enterococcus; Fecal Coliform
Old Quincy Reservoir	MA74017	4	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Outer New Bedford H	MA95-63	3	Pcbs In Fish Tissue; Dissolved Oxygen; Nitrogen, Total; Enterococcus; Fecal Coliform
Pequot Pond	MA32055	1	Chlorophyll-a; Curly-leaf Pondweed; Dissolved Oxygen; Eurasian Water Milfoil, Myriophyllum Spicatum; Non-native Aquatic Plants; Phosphorus, Total; Water Chestnut; Enterococcus
Pine Tree Brook	MA73-29	22	Aquatic Plants (Macrophytes); Turbidity; Dissolved Oxygen; Physical Substrate Habitat Alterations; Escherichia Coli (E. Coli); Fecal Coliform
Pleasure Bay	MA70-11	1	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Fecal Coliform
Plymouth Harbor	MA94-16	6	Estuarine Bioassessments; Fecal Coliform
Ponkapoag Pond	MA73043	3	Mercury In Fish Tissue; Eurasian Water Milfoil, Myriophyllum Spicatum; Fanwort; Non-native Aquatic Plants
Ponkapog Brook	MA73-27	5	Escherichia Coli (E. Coli); Fecal Coliform
Quincy Bay	MA70-04	29	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Enterococcus; Fecal Coliform
Quincy Bay	MA70-05	9	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Enterococcus; Fecal Coliform
Russell Millpond	MA94132	3	Algae; Dissolved Oxygen

Sales Creek	MA71-12	9	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Saugus River	MA93-35	5	Alteration In Stream-side Or Littoral Vegetative Covers; Benthic Macroinvertebrates; Dewatering; Fish Passage Barrier; Escherichia Coli (E. Coli); Fecal Coliform
Saugus River	MA93-44	1	Oil And Grease; Flow Regime Modification; Temperature; Enterococcus; Fecal Coliform
Sawmill Brook	MA72-23	24	Organic Enrichment (Sewage) Biological Indicators; Chloride; Dissolved Oxygen; Phosphorus, Total; Escherichia Coli (E. Coli)
Shawsheen River	MA83-19	1	Benthic Macroinvertebrates; Curly-leaf Pondweed; Fish Passage Barrier; Escherichia Coli (E. Coli); Fecal Coliform
Spicket River	MA84A-10	1	Debris; Trash; Ddt In Fish Tissue; Mercury In Fish Tissue; Benthic Macroinvertebrates; Copper; Fish Passage Barrier; Nutrients; Physical Substrate Habitat Alterations; Escherichia Coli (E. Coli)
Spot Pond	MA71039	33	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Spot Pond Brook	MA71-17	14	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Stearns Pond	MA92061	3	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Stony Brook	MA72-37	40	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Taunton River	MA62-02	1	Chlorophyll-a; Nitrogen, Total; Phosphorus, Total; Enterococcus; Fecal Coliform
Taunton River	MA62-04	7	Dissolved Oxygen; Fish Bioassessments; Nitrogen, Total; Enterococcus; Fecal Coliform
Town River Bay	MA74-15	1	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Dissolved Oxygen; Enterococcus; Fecal Coliform
Unnamed Tributary	MA71-13	3	Escherichia Coli (E. Coli)
Unnamed Tributary	MA72-31	1	Bottom Deposits; Debris; Flocculant Masses; Odor; Oil And Grease; Scum/foam; Trash; Turbidity; Habitat Assessment; Petroleum Hydrocarbons; Polychlorinated Biphenyls (Pcbs); Polycyclic Aromatic Hydrocarbons (Pahs) (Aquatic Ecosystems); Sedimentation/siltation; Unspecified Metals In Sediment
Unnamed Tributary	MA72-32	5	Escherichia Coli (E. Coli)
Upper Mystic Lake	MA71043	10	Curly-leaf Pondweed; Dissolved Oxygen; Dissolved Oxygen Supersaturation; Enterococcus
Wachusett Reservoir	MA81147	5	Mercury In Fish Tissue; Brittle Naiad, Najas Minor; Eurasian Water Milfoil, Myriophyllum Spicatum; Fanwort; Non-native Aquatic Plants
Weir River	MA74-11	5	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Fecal Coliform
West Meadow Pond	MA62208	1	Non-native Aquatic Plants
Westfield River	MA32-07	14	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
Weymouth Back Rive	MA74-13	11	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Fecal Coliform

Weymouth Fore Rive	MA74-14	4	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Enterococcus; Fecal Coliform
White Brook	MA32-28	2	Escherichia Coli (E. Coli)
Winthrop Bay	MA70-10	4	Cause Unknown [Contaminants In Fish And/or Shellfish]; Pcbs In Fish Tissue; Enterococcus; Fecal Coliform
<Null>	Ocean	29	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
<Null>	ULT_MA34-27	2	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
<Null>	ULT_MA52-03	1	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments
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<Null>	ULT_MA73-02	1	Outfall Discharges to an unnamed tributary that nas not been assessed for impairments

Appendix B – Illicit Drainage Disconnection Procedure

Illicit Discharge Procedure

Date: June 30, 2022

Table of Contents

Purpose

This Ilicit Discharge Detection and Elimination (IDDE) Procedure was developed for Massachusetts Department of Conservation and Recreation's (MassDCR's) facilities, infrastructure, and other assets to:

- Protect the natural resources and infrastructure of the Commonwealth of Massachusetts from contamination in Stormwater Discharges;
- Protect the public health, safety, welfare and environment by regulating the direct and indirect Discharge of water and Pollutants to the Stormwater Drainage System;
- Prohibit, detect and eliminate Illicit Discharges and Sanitary Sewer Overflows to the Stormwater Drainage System; and
- Document the procedures for carrying out inspections, monitoring, investigations, and enforcement procedures in furtherance of maintaining clean waters and compliance with federal and Commonwealth legal requirements.

This procedure establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) General Permits for Stormwater Discharges from Small MS4s in Massachusetts process. The objectives of this procedure are:

- To regulate the contribution of pollutants to DCR's MS4 by stormwater discharges by any user
- To prohibit illicit connections and discharges to DCR's separate storm sewer system
- To establish legal authority to carry out all inspection, surveillance, and monitoring procedures necessary to ensure compliance with this procedure

Therefore, effective immediately, DCR prohibits the connection of illicit and unauthorized discharges to DCR drainage system and requires the disconnection of all such existing connections. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection. A person or other entity (e.g., municipality) is considered to be in violation of this procedure if it connects a line conveying non-stormwater dsicharges to the MS4 or allows such a connection to continue.

Definitions

The following words and phrases shall have the meanings respectively ascribed to them in this procedure, except in those instances where the context clearly indicates a different meaning or is otherwise stated. Whenever any words and phrases used in this procedure are not defined in this document, such word or phrase shall be construed according to its generally accepted meaning as noted in a dictionary of general usage.

<u>Authorized Enforcement Agency.</u> Employees or designees of the Commissioner of the Department of Conservation and Recreation designated to enforce this procedure~~.~~

<u>Best Management Practices (BMPs)</u>. Activities, practices, structures, vegetation, maintenance procedures, and other management practices to prevent or reduce the discharge of Pollutants to waters of the United States. BMPs also include, but are not limited to, treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Blind Connection. A connection to the Stormwater Drainage System without a drainage structure, such as a manhole or catch basin, that allows the Department access to the connection.

Clean Water Act. The federal Water Pollution Control Act (33 U.S.C. §1251, et seq.), and any subsequent amendments thereto.

Commissioner. The Commissioner of the Massachusetts Department of Conservation and Recreation or his or her designee.

Commonwealth. The Commonwealth of Massachusetts.

Construction Access Permit (CAP). A permit issued by the Department pursuant to 302 CMR 11.06, as such regulations may be amended from time to time.

Department. The Massachusetts Department of Conservation and Recreation.

Discharge. When used without qualification, means the "discharge of a pollutant."

Discharge of a Pollutant. Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source," or any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. This includes additions of pollutants into waters of the United States from surface runoff which is collected or channeled by man; or discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works.

Groundwater. Fresh water ~~(~~from rain or melting ice and snow that soaks into the soil and is stored between rocks and particles of soil.

Hazardous Materials and Wastes. Any material, waste or substance, 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. Hazardous materials and wastes include without limitation any synthetic organic chemical, oil, petroleum product or byproduct, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as toxic or hazardous under Massachusetts General Law chapter 21C or 21E or the Massachusetts Contingency Plan (310 CMR 40.0000).

Illicit Discharge. Any discharge to a municipal separate storm sewer that is not composed entirely of stormwater except discharges listed as allowed non-stormwater discharges in this document and those resulting from firefighting activities and other exempt activities.

Impervious Surface. Any surface that prevents or significantly impedes the infiltration of water into the underlying soil including, but not limited to, roads, driveways, parking areas and other areas created using non-porous material; buildings, rooftops, structures, artificial turf and compacted gravel or soil.

Interconnection. The point (excluding sheet flow over impervious surfaces) where an entity discharges to another storm sewer system, through which the discharge is eventually conveyed to a water of the United States. The interconnection shall include, but is not limited to, all drain pipes, conduits, culverts, structural controls, manholes, catch basins, inlet and outlet structures, improved channels, structural stormwater basins, and other appurtenances.

MA MS4 General Permit. The National Pollutant Discharge Elimination System (NPDES) General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts, issued by the United States Environmental Protection Agency (or by the Commonwealth under authority delegated pursuant to 33 U.S.C. § 1342(b)), that authorizes and regulates the discharge of pollutants to the waters of the United States from small municipal storm sewer systems in Massachusetts including DCR.

Non-Stormwater Discharge. Any discharge to the Stormwater Drainage System that is not entirely composed of stormwater. The MA MS4 General Permit includes categories of non-stormwater discharges allowed under the permit in Section 1.4 of the permit.

Owner or Operator. The owner or operator of any "facility or activity" subject to regulation under the NPDES program.

Person. An individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point Source. Any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged.

Pollutant. Any material identified in Appendix G of the MA MS4 General Permit or by any federal or state law or regulation as a pollutant. Pollutants include dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water.

Sanitary Sewer Overflow. A discharge of untreated sanitary wastewater from a municipal sanitary sewer. A Sanitary Sewer Overflow is a type of Illicit Discharge.

Stormwater. Any water resulting from rainfall, snow melt runoff, or other precipitation that runs off surfaces, including but not limited to roofs and roads, or infiltrates into the ground during or after a precipitation event.

Stormwater Drainage System. The totality of the stormwater collection system under the jurisdiction, care, custody or control of the Department, including but not limited to any pipe, conduit, drain, inlet, outlet, manhole, control, pump, equipment, works and appurtenances, parkway or other way under the care, control, custody or jurisdiction of the Department, gutter or any natural or man-made watercourse, pond, reservoir, impoundment, stream, canal, channel, swale, ditch, culvert, catch basin, detention basin or other drainage structure, to or through which Stormwater or Groundwater flows or otherwise designed for or used in the collection and/or transport of Stormwater or Groundwater and runoff.

Unpermitted Discharge. Any direct or indirect Non-Stormwater, Stormwater, or Groundwater Discharge to the Stormwater Drainage System without a Construction Access Permit, except as expressly exempted, allowed or permitted by 302 CMR 20.03(4).

Applicability

Every Person who directly or indirectly Discharges water or other matter to the Stormwater Drainage System shall ensure that such Discharge complies with this procedure.

Unauthorized Interconnections and Discharges

The Department prohibits the connection of unauthorized Interconnections and discharges to Stormwater Drainage System and requires the disconnection of all such existing Interconnections or filing for a Construction

Access Permit. This prohibition expressly includes, without limitation, connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection including having received prior written permission of the Department or its predecessor agencies for connection.

Non-Stormwater Discharges

The following Non-Stormwater Discharges are allowed by the MA MS4 permit, provided such discharges do not contain any Pollutant or Discharge, release or convey any Pollutant to the Stormwater Drainage System, and all Owners and Persons making or contributing to such discharges are otherwise in full compliance with this procedure:

- water line flushing,
- landscape irrigation,
- diverted stream flows,
- rising Groundwater,
- uncontaminated ground water infiltration, as defined by 40 CFR 35.2005(20),
- discharge from potable water sources,
- foundation drains,
- air conditioning condensation,
- irrigation water, springs,
- water from crawl space pumps,
- footing drains,
- lawn watering,
- individual car washing,
- flows from riparian habitat and wetlands,
- de-chlorinated swimming pool discharges,
- street wash waters,
- residential building wash waters without detergents, or
- firefighting activity flows or discharges (unless identified as significant sources of Pollutant to water of the United States).

Prohibited Discharges

The Department will not under any circumstances allow the connection or Discharge of drainage from a non-DCR facility or property for any of the following types of connections:

- Connections that do not fully comply with the MA MS4 General Permit or other environmental permits or state and federal regulations.
- Connections of sump pump discharges.
- Connections of building floor drains.
- Interconnection which would create a Blind Connection to the Stormwater Drainage System.
- Discharges from dewatering activities or Non-Stormwater Discharges including discharges from private construction sites and Department construction and maintenance projects, unless the Discharge is allowed under the MA MS4 Permit and the Discharge is permitted through a Construction Access Permit or the applicant is in compliance with the conditions of a NPDES permit.

- Connection or Discharge that in the opinion of the Department may have an adverse impact on the Stormwater Drainage System in terms of pipe or conveyance capacity, the ability of existing Best Management Practices (BMPs) to effectively treat the Discharge/conveyance, or that will require additional maintenance of the Department's Stormwater Drainage System.

Suspension of MS4 Access

Suspension in Emergency Situations

The Department may, without prior notice, order or cause any Discharge or access to the Stormwater Drainage System to be suspended immediately when such suspension is, in the Department's discretion, necessary to stop an actual or threatened Discharge or when there is a present or imminent danger to the environment, the health or welfare of Persons, the Stormwater Drainage System or the waters or resources of the Commonwealth or United States. If a Person fails to comply with a suspension order issued in an emergency, then the Department may take such steps as the Department deems necessary to prevent or minimize damage to the environment, the health or welfare of Persons, the Stormwater Drainage System or the waters or resources of the Commonwealth or United States.

Suspension Due to the Detection of Unpermitted Discharge

Any Person or other entity (e.g., municipality) discharging to the Stormwater Drainage System in violation of this procedure may have their drainage system access terminated if such termination would abate or reduce the violation. The Department will notify a violator of the proposed termination of its Stormwater Drainage System access. The violator may petition the Department for a reconsideration and hearing.

Inspection

The Department shall be permitted to enter all properties as often as necessary for the purposes of inspection, observation, measurement, sampling and testing to determine compliance with this procedure. To determine the presence or absence of an Interconnection and potential Illicit Discharge the Department will be permitted to perform the following:

- Access Interconnection locations by opening manholes and other portions of the storm drainage system.
- Conduct sampling of any flows entering the Department's Storm Drainage System. Sampling results indicating likely sewer input, as defined by the MA MS4 permit, will be considered to have a suspected Illicit Discharge.
- Conduct catchment investigations to pinpoint the source of the Illicit Discharge. To thoroughly inspect a catchment with a suspected Illicit Discharge, the Department will be permitted to open manholes, record observations, and sample stormwater flow from any properties discharging to the Department's Stormwater Drainage System (in accordance with DCR's Stormwater Management Plan and the MA MS4 General Permit). The Department shall also be permitted to place an obstruction (sandbag) in the manhole to

capture intermittent flows, conduct video inspection, conduct dye testing or perform other necessary measures to confirm or rule out an Illicit Discharge.

Enforcement Procedures

When Department staff become aware of an Illicit Discharge, regardless of the Construction Access Permit status, they will notify and work with the Department's Legal Department and Stormwater Section to take the necessary steps to disconnect the Illicit Discharge.

Notice of Unpermitted Discharge

When Department staff become aware of an Unpermitted Discharge, the Department shall provide the Person responsible with a written notice and require actions to be taken, including filing for a Construction Access Permit, to remedy the violation. The Department may, per such notice and without limitation, require:

- the implementation and performance of monitoring, analyses, and reporting,
- the filing of a request for Construction Access Permit within thirty (30) days of receipt of a notice of violation (unless a shorter time is specified in the notice) or submittal of a schedule to submit such a request.

Should the violator fail to remediate or restore by the established deadline, the work may be completed by the Department and expenses thereof shall be the responsibility of the violator.

Notice of Violation

Whenever any Person is found to have violated or to be violating any provision of this procedure, the Department shall provide that Person with a written notice of the nature of the violation and specify those actions to be taken to remedy any violation. Whenever the DCR Division of Engineering finds a violation of this procedure, including, but not limited an illicit connection, the DCR Stormwater Manager shall notify the landowner by formal letter that person must remove the connection. A copy of the letter shall be forwarded to DCR Chief Engineer and DCR General Counsel's Office. It shall be the responsibility of the landowner to propose a schedule for the removal of the discharge. The notice may require without limitation:

- The performance of monitoring, analyses, and reporting;
- Securing a sewer connection permit from the local authority;
- The elimination of illicit connections or discharges;
- That violating discharges, practices, or operations shall cease and desist;
- The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;
- Payment of a fine to cover administrative and remediation costs; and

- The implementation of source control or treatment BMPs.

Corrective Actions

If the landowner cannot remove the discharge within the time frame indicated in the letter (maximum of 60 days from the date of the letter), as demonstrated by evidence required in the letter and presented to DCR, the landowner must propose an expeditious plan and schedule for its elimination for DCR's review and approval within that timeframe. If the landowner does not respond within the timeframe or if DCR and the landowner cannot agree to a plan and schedule, DCR will pursue legal action with the Massachusetts Attorney General's Office.

Termination of Access to Stormwater Drainage System

Any Persons discharging to or using the Stormwater Drainage System in violation of this procedure or otherwise failing to comply with any notice from the Department may have their access and use of the Stormwater Drainage System access terminated if such termination would abate or reduce an Illicit Discharge. DCR will notify a violator of the proposed termination of its Stormwater Drainage System access. The violator may petition DCR for a reconsideration and hearing.

Appendix C – Outfall and Interconnection Inventory and Priority Ranking

Structure Type	Structure ID	Receiving Waterbody	Receiving Waterbody Name	IDDE Priority
Manhole	2476[1]	MA70-04	Quincy Bay	Problem
Manhole	666668502[2]	MA70-04	Quincy Bay	Problem
Manhole	37223.1[3]	MA70-04	Quincy Bay	Problem
Manhole	666667017[3]	MA70-05	Quincy Bay	Problem
Manhole	25416[2]	MA70-05	Quincy Bay	Problem
Manhole	34454.3[1]	MA70-05	Quincy Bay	Problem
Manhole	6002.4[4]	MA70-05	Quincy Bay	Problem
Manhole	25418[5]	MA70-05	Quincy Bay	Problem
Inlet	37193[6]	MA70-05	Quincy Bay	Problem
Outfall	37195[4]	MA70-05	Quincy Bay	Problem
Outfall	34497.3[1]	MA70-05	Quincy Bay	Problem
Outfall	34502.3[7]	MA70-05	Quincy Bay	Problem
Outfall	19379	MA72-36	Charles River	Problem
Outfall	19377	MA72-36	Charles River	Problem
Outfall	19105	MA72-36	Charles River	Problem
Outfall	17289	MA73-02	Neponset River	Problem
Outfall	18257	MA73-04	Neponset River	Problem
Outfall	21850	MA73-04	Neponset River	Problem
Manhole	25416	MA93-24	Nahant Bay	Problem
Manhole	25418	MA93-24	Nahant Bay	Problem
Inlet	666668502	MA93-24	Nahant Bay	Problem
Manhole	17701	MA70-03	Dorchester Bay	Highest
Manhole	36958	MA70-10	Winthrop Bay	Highest
Outfall	22724	MA71-02	Mystic River	Highest
Outfall	19326	MA72-38	Charles River	Highest
Inlet	2011	MA73-02	Neponset River	Highest
Manhole	17009	MA73-02	Neponset River	Highest
Manhole	17006	MA73-02	Neponset River	Highest
Manhole	17005	MA73-02	Neponset River	Highest
Manhole	17106	MA73-03	Neponset River	Highest
Inlet	4414	MA93-48	Bennetts Pond Brook	Highest
Manhole	27352	ULT_MA72-38	-	Highest
Outfall	22021	MA71-02	Mystic River	Highest
Outfall	21979	MA71-02	Mystic River	Highest
Outfall	666667734	MA71-03	Mystic River	Highest
Outfall	27645	MA71-05	Malden River	Highest
Outfall	22018	MA71-13	Unnamed Tributary	Highest
Manhole	16841	MA72-11	Muddy River	Highest
Manhole	666667147	MA73-02	Neponset River	Highest
Manhole	666667098	MA73-04	Neponset River	Highest
Outfall	666667157	MA93-52	Lynn Harbor	Highest
Outfall	24573	MA32-27	Miller Brook	High
Outfall	24583	MA32-27	Miller Brook	High
Outfall	24584	MA32-27	Miller Brook	High
Outfall	24543	MA32-28	White Brook	High
Outfall	24539	MA32-28	White Brook	High
Outfall	24503	MA34-04	Connecticut River	High
Outfall	24515	MA34-04	Connecticut River	High
Outfall	24434	MA51-05	Blackstone River	High
Outfall	24432	MA51-05	Blackstone River	High
Outfall	24431	MA51-05	Blackstone River	High
Outfall	24260	MA51-05	Blackstone River	High
Outfall	24259	MA51-05	Blackstone River	High
Manhole	24278	MA51125	Lake Quinsigamond	High
Manhole	24306	MA51125	Lake Quinsigamond	High
Outfall	24423	MA51125	Lake Quinsigamond	High
Outfall	24273	MA51125	Lake Quinsigamond	High

Outfall	24368	MA51125	Lake Quinsigamond	High
Outfall	13696	MA51125	Lake Quinsigamond	High
Outfall	24418	MA51125	Lake Quinsigamond	High
Outfall	24420	MA51125	Lake Quinsigamond	High
Outfall	24352	MA51125	Lake Quinsigamond	High
Manhole	13701	MA51125	Lake Quinsigamond	High
Outfall	24405	MA51125	Lake Quinsigamond	High
Inlet	24445	MA51-16	Dark Brook	High
Manhole	24450	MA51-16	Dark Brook	High
Outfall	24214	MA62-04	Taunton River	High
Outfall	24220	MA62-04	Taunton River	High
Outfall	24118	MA62-04	Taunton River	High
Outfall	24108	MA62-04	Taunton River	High
Outfall	24215	MA62-04	Taunton River	High
Outfall	24216	MA62-04	Taunton River	High
Outfall	24213	MA62-04	Taunton River	High
Outfall	24077	MA62-09	Beaver Brook	High
Outfall	14465	MA62-09	Beaver Brook	High
Outfall	14468	MA62-09	Beaver Brook	High
Outfall	14467	MA62-09	Beaver Brook	High
Outfall	18992	MA70-02	Boston Inner Harbor	High
Outfall	21248	MA70-02	Boston Inner Harbor	High
Outfall	18302	MA70-03	Dorchester Bay	High
Outfall	17672	MA70-03	Dorchester Bay	High
Manhole	28048	MA70-03	Dorchester Bay	High
Outfall	28109	MA70-03	Dorchester Bay	High
Manhole	30861	MA70-03	Dorchester Bay	High
Outfall	18362	MA70-03	Dorchester Bay	High
Outfall	18364	MA70-03	Dorchester Bay	High
Outfall	17671	MA70-03	Dorchester Bay	High
Manhole	36251	MA70-03	Dorchester Bay	High
Outfall	17903	MA70-03	Dorchester Bay	High
Outfall	18290	MA70-03	Dorchester Bay	High
Outfall	17881	MA70-03	Dorchester Bay	High
Outfall	17673	MA70-03	Dorchester Bay	High
Outfall	18359	MA70-03	Dorchester Bay	High
Outfall	17890	MA70-03	Dorchester Bay	High
Outfall	17674	MA70-03	Dorchester Bay	High
Manhole	18155	MA70-03	Dorchester Bay	High
Outfall	18358	MA70-03	Dorchester Bay	High
Manhole	18887	MA70-03	Dorchester Bay	High
Outfall	18300	MA70-03	Dorchester Bay	High
Outfall	18914	MA70-04	Quincy Bay	High
Outfall	18913	MA70-04	Quincy Bay	High
Outfall	38019	MA70-04	Quincy Bay	High
Outfall	13841	MA70-04	Quincy Bay	High
Outfall	18911	MA70-04	Quincy Bay	High
Outfall	21743	MA70-09	Hull Bay	High
Manhole	25329	MA70-10	Winthrop Bay	High
Manhole	16927	MA70-10	Winthrop Bay	High
Outfall	17662	MA70-11	Pleasure Bay	High
Outfall	22549	MA71-01	Aberjona River	High
Manhole	36000	MA71-01	Aberjona River	High
Outfall	14142	MA71-01	Aberjona River	High
Outfall	14319	MA71-01	Aberjona River	High
Outfall	22553	MA71-01	Aberjona River	High
Outfall	22548	MA71-01	Aberjona River	High
Outfall	22781	MA71-01	Aberjona River	High
Outfall	14364	MA71-01	Aberjona River	High
Outfall	22826	MA71-01	Aberjona River	High
Outfall	22827	MA71-01	Aberjona River	High
Manhole	30983	MA71-01	Aberjona River	High

Outfall	22828	MA71-01	Aberjona River	High
Outfall	14342	MA71-01	Aberjona River	High
Outfall	14158	MA71-01	Aberjona River	High
Outfall	14153	MA71-01	Aberjona River	High
Outfall	22779	MA71-01	Aberjona River	High
Outfall	14129	MA71-01	Aberjona River	High
Manhole	30964	MA71014	Ell Pond	High
Manhole	13753	MA71014	Ell Pond	High
Manhole	22121	MA71016	Fellsmere Pond	High
Outfall	23868	MA71-02	Mystic River	High
Outfall	22332	MA71-02	Mystic River	High
Outfall	22330	MA71-02	Mystic River	High
Outfall	22533	MA71-02	Mystic River	High
Outfall	22334	MA71-02	Mystic River	High
Outfall	22328	MA71-02	Mystic River	High
Outfall	30955	MA71-02	Mystic River	High
Outfall	14632	MA71-02	Mystic River	High
Outfall	30956	MA71-02	Mystic River	High
Outfall	14676	MA71-02	Mystic River	High
Outfall	22427	MA71-02	Mystic River	High
Outfall	22435	MA71-02	Mystic River	High
Outfall	22756	MA71-02	Mystic River	High
Outfall	22726	MA71-02	Mystic River	High
Outfall	34684	MA71-02	Mystic River	High
Outfall	14631	MA71-02	Mystic River	High
Outfall	15130	MA71-02	Mystic River	High
Outfall	16356	MA71-02	Mystic River	High
Outfall	22522	MA71-02	Mystic River	High
Outfall	21959	MA71-02	Mystic River	High
Outfall	22354	MA71-02	Mystic River	High
Outfall	34478	MA71-02	Mystic River	High
Outfall	34469	MA71-02	Mystic River	High
Outfall	22759	MA71-02	Mystic River	High
Outfall	22325	MA71-02	Mystic River	High
Outfall	22355	MA71-02	Mystic River	High
Outfall	22420	MA71-02	Mystic River	High
Outfall	23905	MA71-02	Mystic River	High
Outfall	22324	MA71-02	Mystic River	High
Outfall	23866	MA71-02	Mystic River	High
Outfall	21901	MA71-02	Mystic River	High
Manhole	30951	MA71-02	Mystic River	High
Outfall	22763	MA71-02	Mystic River	High
Outfall	34486	MA71-02	Mystic River	High
Outfall	15491	MA71-02	Mystic River	High
Outfall	22022	MA71-02	Mystic River	High
Outfall	14677	MA71-02	Mystic River	High
Outfall	22750	MA71-02	Mystic River	High
Outfall	14994	MA71-02	Mystic River	High
Outfall	14619	MA71-02	Mystic River	High
Outfall	30601	MA71-02	Mystic River	High
Outfall	35939	MA71-02	Mystic River	High
Outfall	16352	MA71-02	Mystic River	High
Outfall	22776	MA71-02	Mystic River	High
Outfall	22683	MA71-02	Mystic River	High
Outfall	14625	MA71-02	Mystic River	High
Outfall	34492	MA71-02	Mystic River	High
Manhole	14065	MA71-02	Mystic River	High
Outfall	14945	MA71-02	Mystic River	High
Outfall	22185	MA71-02	Mystic River	High
Outfall	14673	MA71-02	Mystic River	High
Outfall	22787	MA71-02	Mystic River	High
Outfall	22422	MA71-02	Mystic River	High

Outfall	22721	MA71-02	Mystic River	High
Outfall	14641	MA71-02	Mystic River	High
Outfall	22326	MA71-02	Mystic River	High
Outfall	22421	MA71-02	Mystic River	High
Outfall	37113	MA71-02	Mystic River	High
Outfall	21980	MA71-02	Mystic River	High
Outfall	22425	MA71-02	Mystic River	High
Outfall	22187	MA71-02	Mystic River	High
Outfall	22329	MA71-02	Mystic River	High
Manhole	54280	MA71-02	Mystic River	High
Outfall	21973	MA71-02	Mystic River	High
Outfall	22015	MA71-02	Mystic River	High
Outfall	22333	MA71-02	Mystic River	High
Outfall	21970	MA71-02	Mystic River	High
Outfall	15450	MA71-02	Mystic River	High
Outfall	22783	MA71-02	Mystic River	High
Outfall	22511	MA71-02	Mystic River	High
Outfall	14655	MA71-02	Mystic River	High
Outfall	22722	MA71-02	Mystic River	High
Outfall	23964	MA71-02	Mystic River	High
Outfall	22011	MA71-02	Mystic River	High
Outfall	14669	MA71-02	Mystic River	High
Inlet	21971	MA71-02	Mystic River	High
Outfall	22523	MA71-02	Mystic River	High
Outfall	14621	MA71-02	Mystic River	High
Outfall	22753	MA71-02	Mystic River	High
Outfall	22739	MA71-02	Mystic River	High
Outfall	22754	MA71-02	Mystic River	High
Outfall	22327	MA71-02	Mystic River	High
Outfall	22331	MA71-02	Mystic River	High
Outfall	23963	MA71-02	Mystic River	High
Outfall	14661	MA71-02	Mystic River	High
Outfall	23962	MA71-02	Mystic River	High
Outfall	14613	MA71-02	Mystic River	High
Outfall	22755	MA71-02	Mystic River	High
Outfall	22023	MA71-02	Mystic River	High
Outfall	22743	MA71-02	Mystic River	High
Outfall	14930	MA71027	Lower Mystic Lake	High
Outfall	23904	MA71-03	Mystic River	High
Outfall	24978	MA71-03	Mystic River	High
Outfall	14599	MA71043	Upper Mystic Lake	High
Outfall	14332	MA71043	Upper Mystic Lake	High
Outfall	34637	MA71043	Upper Mystic Lake	High
Outfall	14517	MA71043	Upper Mystic Lake	High
Outfall	34474	MA71043	Upper Mystic Lake	High
Outfall	34510	MA71043	Upper Mystic Lake	High
Outfall	14507	MA71043	Upper Mystic Lake	High
Outfall	14515	MA71043	Upper Mystic Lake	High
Outfall	23528	MA71-05	Malden River	High
Outfall	23587	MA71-05	Malden River	High
Outfall	22633	MA71-05	Malden River	High
Outfall	22784	MA71-05	Malden River	High
Outfall	5808	MA71-05	Malden River	High
Outfall	22020	MA71-13	Unnamed Tributary	High
Manhole	21904	MA71-20	Alewife Brook	High
Manhole	26493	MA72044	Hammond Pond	High
Manhole	27687	MA72052	Jamaica Pond	High
Outfall	17654	MA72052	Jamaica Pond	High
Manhole	12992	MA72052	Jamaica Pond	High
Outfall	29515	MA72052	Jamaica Pond	High
Outfall	34450	MA72052	Jamaica Pond	High
Outfall	18922	MA72052	Jamaica Pond	High

Outfall	18504	MA72052	Jamaica Pond	High
Outfall	18921	MA72052	Jamaica Pond	High
Outfall	35934	MA72-07	Charles River	High
Outfall	27553	MA72-07	Charles River	High
Outfall	26491	MA72-07	Charles River	High
Outfall	26468	MA72-07	Charles River	High
Outfall	27552	MA72-07	Charles River	High
Outfall	16417	MA72-07	Charles River	High
Outfall	10803	MA72-07	Charles River	High
Outfall	27548	MA72-07	Charles River	High
Outfall	35939	MA72-07	Charles River	High
Outfall	26467	MA72-07	Charles River	High
Outfall	21268	MA72-07	Charles River	High
Outfall	27546	MA72-07	Charles River	High
Outfall	16422	MA72-07	Charles River	High
Outfall	26871	MA72-07	Charles River	High
Outfall	26892	MA72-07	Charles River	High
Outfall	16423	MA72-07	Charles River	High
Outfall	27629	MA72-07	Charles River	High
Outfall	35284	MA72-07	Charles River	High
Outfall	35942	MA72-07	Charles River	High
Outfall	16414	MA72-07	Charles River	High
Outfall	27555	MA72-07	Charles River	High
Outfall	35937	MA72-07	Charles River	High
Outfall	26469	MA72-07	Charles River	High
Manhole	16420	MA72-07	Charles River	High
Outfall	26463	MA72-07	Charles River	High
Outfall	26885	MA72-07	Charles River	High
Outfall	26882	MA72-07	Charles River	High
Outfall	26884	MA72-07	Charles River	High
Outfall	26879	MA72-07	Charles River	High
Outfall	18932	MA72-11	Muddy River	High
Inlet	27140	MA72-11	Muddy River	High
Outfall	14188	MA72-11	Muddy River	High
Outfall	34398	MA72-11	Muddy River	High
Manhole	12974	MA72-11	Muddy River	High
Outfall	34487	MA72-11	Muddy River	High
Outfall	19154	MA72-11	Muddy River	High
Outfall	18522	MA72-11	Muddy River	High
Outfall	19152	MA72-11	Muddy River	High
Outfall	18935	MA72-11	Muddy River	High
Outfall	19352	MA72-11	Muddy River	High
Outfall	27594	MA72-11	Muddy River	High
Outfall	666666921	MA72-11	Muddy River	High
Outfall	35834	MA72-11	Muddy River	High
Manhole	18571	MA72-11	Muddy River	High
Manhole	21428	MA72-11	Muddy River	High
Inlet	13217	MA72-11	Muddy River	High
Manhole	37430	MA72-11	Muddy River	High
Outfall	21323	MA72-11	Muddy River	High
Outfall	35825	MA72-11	Muddy River	High
Outfall	27586	MA72-11	Muddy River	High
Outfall	35914	MA72-11	Muddy River	High
Outfall	19355	MA72-11	Muddy River	High
Outfall	19153	MA72-11	Muddy River	High
Manhole	37366	MA72-11	Muddy River	High
Inlet	29555	MA72-11	Muddy River	High
Manhole	27267	MA72-11	Muddy River	High
Outfall	27588	MA72-11	Muddy River	High
Outfall	3623	MA72-11	Muddy River	High
Outfall	21318	MA72-11	Muddy River	High
Outfall	19374	MA72-11	Muddy River	High

Outfall	14191	MA72-11	Muddy River	High
Outfall	27589	MA72-11	Muddy River	High
Outfall	18458	MA72-11	Muddy River	High
Outfall	27592	MA72-11	Muddy River	High
Outfall	19320	MA72-11	Muddy River	High
Manhole	21330	MA72-11	Muddy River	High
Manhole	27682	MA72-11	Muddy River	High
Outfall	13161	MA72-11	Muddy River	High
Outfall	35837	MA72-11	Muddy River	High
Outfall	19375	MA72-11	Muddy River	High
Outfall	38021	MA72-11	Muddy River	High
Manhole	18246	MA72-11	Muddy River	High
Outfall	27841	MA72-11	Muddy River	High
Outfall	38009	MA72-11	Muddy River	High
Outfall	35838	MA72-11	Muddy River	High
Outfall	27591	MA72-11	Muddy River	High
Outfall	34485	MA72-11	Muddy River	High
Outfall	27587	MA72-11	Muddy River	High
Outfall	27595	MA72-11	Muddy River	High
Outfall	34599	MA72-11	Muddy River	High
Outfall	19373	MA72-11	Muddy River	High
Outfall	35822	MA72-11	Muddy River	High
Outfall	13238	MA72-11	Muddy River	High
Outfall	19338	MA72-11	Muddy River	High
Outfall	24202	MA72-14	Mine Brook	High
Outfall	26937	MA72-23	Sawmill Brook	High
Outfall	34562	MA72-23	Sawmill Brook	High
Outfall	35932	MA72-23	Sawmill Brook	High
Outfall	26965	MA72-23	Sawmill Brook	High
Outfall	26935	MA72-23	Sawmill Brook	High
Manhole	27455	MA72-23	Sawmill Brook	High
Outfall	26934	MA72-23	Sawmill Brook	High
Outfall	34763	MA72-28	Beaver Brook	High
Outfall	23907	MA72-28	Beaver Brook	High
Outfall	23900	MA72-28	Beaver Brook	High
Outfall	23899	MA72-28	Beaver Brook	High
Outfall	23902	MA72-28	Beaver Brook	High
Outfall	19066	MA72-32	Unnamed Tributary	High
Outfall	21433	MA72-32	Unnamed Tributary	High
Outfall	21443	MA72-32	Unnamed Tributary	High
Outfall	34484	MA72-32	Unnamed Tributary	High
Outfall	21445	MA72-32	Unnamed Tributary	High
Outfall	24196	MA72-33	Charles River	High
Outfall	24191	MA72-33	Charles River	High
Outfall	24192	MA72-33	Charles River	High
Outfall	24194	MA72-33	Charles River	High
Outfall	19366	MA72-36	Charles River	High
Outfall	18963	MA72-36	Charles River	High
Outfall	35761	MA72-36	Charles River	High
Outfall	19351	MA72-36	Charles River	High
Outfall	19149	MA72-36	Charles River	High
Outfall	34464	MA72-36	Charles River	High
Outfall	19433	MA72-36	Charles River	High
Outfall	16622	MA72-36	Charles River	High
Outfall	34603	MA72-36	Charles River	High
Outfall	34304	MA72-36	Charles River	High
Outfall	19118	MA72-36	Charles River	High
Outfall	19067	MA72-36	Charles River	High
Outfall	34632	MA72-36	Charles River	High
Manhole	20077	MA72-36	Charles River	High
Outfall	19144	MA72-36	Charles River	High
Outfall	34537	MA72-36	Charles River	High

Outfall	19430	MA72-36	Charles River	High
Manhole	34327	MA72-36	Charles River	High
Outfall	19405	MA72-36	Charles River	High
Outfall	19117	MA72-36	Charles River	High
Outfall	19045	MA72-36	Charles River	High
Outfall	19038	MA72-36	Charles River	High
Outfall	21714	MA72-36	Charles River	High
Outfall	19287	MA72-36	Charles River	High
Outfall	19421	MA72-36	Charles River	High
Outfall	34280	MA72-36	Charles River	High
Outfall	19138	MA72-36	Charles River	High
Outfall	21629	MA72-36	Charles River	High
Outfall	19074	MA72-36	Charles River	High
Outfall	19262	MA72-36	Charles River	High
Outfall	19124	MA72-36	Charles River	High
Outfall	19135	MA72-36	Charles River	High
Outfall	19404	MA72-36	Charles River	High
Outfall	34624	MA72-36	Charles River	High
Manhole	21726	MA72-36	Charles River	High
Outfall	34476	MA72-36	Charles River	High
Outfall	21627	MA72-36	Charles River	High
Outfall	19394	MA72-36	Charles River	High
Outfall	19361	MA72-36	Charles River	High
Outfall	19163	MA72-36	Charles River	High
Outfall	19171	MA72-36	Charles River	High
Outfall	19126	MA72-36	Charles River	High
Outfall	16497	MA72-36	Charles River	High
Outfall	19044	MA72-36	Charles River	High
Outfall	19418	MA72-36	Charles River	High
Outfall	18974	MA72-36	Charles River	High
Outfall	19290	MA72-36	Charles River	High
Outfall	19127	MA72-36	Charles River	High
Outfall	19062	MA72-36	Charles River	High
Outfall	11904	MA72-36	Charles River	High
Outfall	19034	MA72-36	Charles River	High
Outfall	19424	MA72-36	Charles River	High
Outfall	34302	MA72-36	Charles River	High
Outfall	18960	MA72-36	Charles River	High
Outfall	19075	MA72-36	Charles River	High
Outfall	35762	MA72-36	Charles River	High
Outfall	19284	MA72-36	Charles River	High
Outfall	19139	MA72-36	Charles River	High
Outfall	19031	MA72-36	Charles River	High
Outfall	19381	MA72-36	Charles River	High
Outfall	19321	MA72-36	Charles River	High
Manhole	20036	MA72-36	Charles River	High
Outfall	19436	MA72-36	Charles River	High
Outfall	35319	MA72-36	Charles River	High
Outfall	19061	MA72-36	Charles River	High
Outfall	19289	MA72-36	Charles River	High
Outfall	19376	MA72-36	Charles River	High
Outfall	19397	MA72-36	Charles River	High
Outfall	19168	MA72-36	Charles River	High
Outfall	19382	MA72-36	Charles River	High
Outfall	19380	MA72-36	Charles River	High
Outfall	19288	MA72-36	Charles River	High
Outfall	18948	MA72-36	Charles River	High
Outfall	21720	MA72-36	Charles River	High
Outfall	19073	MA72-36	Charles River	High
Outfall	19282	MA72-36	Charles River	High
Outfall	34337	MA72-36	Charles River	High
Inlet	21727	MA72-36	Charles River	High

Outfall	34466	MA72-36	Charles River	High
Outfall	11960	MA72-36	Charles River	High
Outfall	18959	MA72-36	Charles River	High
Outfall	11902	MA72-36	Charles River	High
Outfall	19291	MA72-36	Charles River	High
Outfall	19161	MA72-36	Charles River	High
Outfall	19133	MA72-36	Charles River	High
Outfall	19314	MA72-36	Charles River	High
Outfall	19438	MA72-36	Charles River	High
Outfall	18973	MA72-36	Charles River	High
Outfall	19283	MA72-36	Charles River	High
Outfall	21250	MA72-36	Charles River	High
Outfall	11912	MA72-36	Charles River	High
Outfall	18956	MA72-36	Charles River	High
Outfall	19341	MA72-36	Charles River	High
Outfall	21736	MA72-36	Charles River	High
Outfall	19342	MA72-36	Charles River	High
Outfall	19297	MA72-36	Charles River	High
Outfall	30832	MA72-36	Charles River	High
Outfall	34414	MA72-36	Charles River	High
Outfall	36345	MA72-36	Charles River	High
Outfall	19435	MA72-36	Charles River	High
Outfall	18949	MA72-36	Charles River	High
Outfall	19400	MA72-36	Charles River	High
Outfall	2721	MA72-36	Charles River	High
Outfall	19104	MA72-36	Charles River	High
Outfall	19364	MA72-36	Charles River	High
Outfall	19140	MA72-36	Charles River	High
Manhole	21541	MA72-36	Charles River	High
Inlet	12362	MA72-36	Charles River	High
Outfall	11905	MA72-36	Charles River	High
Outfall	35697	MA72-36	Charles River	High
Manhole	34297	MA72-36	Charles River	High
Outfall	19413	MA72-36	Charles River	High
Outfall	19360	MA72-36	Charles River	High
Outfall	34353	MA72-36	Charles River	High
Outfall	19110	MA72-36	Charles River	High
Outfall	19390	MA72-36	Charles River	High
Outfall	19028	MA72-36	Charles River	High
Outfall	19238	MA72-36	Charles River	High
Outfall	21625	MA72-36	Charles River	High
Outfall	16771	MA72-36	Charles River	High
Outfall	19000	MA72-36	Charles River	High
Outfall	35293	MA72-36	Charles River	High
Manhole	31715	MA72-36	Charles River	High
Outfall	11942	MA72-36	Charles River	High
Manhole	34356	MA72-36	Charles River	High
Outfall	21261	MA72-36	Charles River	High
Outfall	12522	MA72-36	Charles River	High
Inlet	957	MA72-36	Charles River	High
Outfall	18957	MA72-36	Charles River	High
Outfall	19077	MA72-36	Charles River	High
Outfall	19125	MA72-36	Charles River	High
Outfall	19145	MA72-36	Charles River	High
Outfall	19240	MA72-36	Charles River	High
Outfall	19129	MA72-36	Charles River	High
Outfall	18952	MA72-36	Charles River	High
Outfall	19136	MA72-36	Charles River	High
Outfall	19150	MA72-36	Charles River	High
Outfall	35310	MA72-36	Charles River	High
Outfall	16765	MA72-36	Charles River	High
Outfall	19170	MA72-36	Charles River	High

Outfall	18965	MA72-36	Charles River	High
Outfall	19071	MA72-36	Charles River	High
Outfall	19130	MA72-36	Charles River	High
Outfall	18962	MA72-36	Charles River	High
Outfall	16506	MA72-36	Charles River	High
Outfall	21626	MA72-36	Charles River	High
Outfall	11920	MA72-36	Charles River	High
Manhole	666666843	MA72-36	Charles River	High
Inlet	21722	MA72-36	Charles River	High
Outfall	11916	MA72-36	Charles River	High
Outfall	19384	MA72-36	Charles River	High
Outfall	35427	MA72-36	Charles River	High
Outfall	19428	MA72-36	Charles River	High
Outfall	27668	MA72-37	Stony Brook	High
Outfall	10745	MA72-37	Stony Brook	High
Outfall	19309	MA72-38	Charles River	High
Outfall	19011	MA72-38	Charles River	High
Outfall	19345	MA72-38	Charles River	High
Outfall	18941	MA72-38	Charles River	High
Outfall	18977	MA72-38	Charles River	High
Outfall	15748	MA72-38	Charles River	High
Outfall	19302	MA72-38	Charles River	High
Outfall	15736	MA72-38	Charles River	High
Outfall	19386	MA72-38	Charles River	High
Outfall	19235	MA72-38	Charles River	High
Outfall	15742	MA72-38	Charles River	High
Outfall	21303	MA72-38	Charles River	High
Outfall	19308	MA72-38	Charles River	High
Outfall	18976	MA72-38	Charles River	High
Outfall	19330	MA72-38	Charles River	High
Outfall	19134	MA72-38	Charles River	High
Outfall	18937	MA72-38	Charles River	High
Outfall	19348	MA72-38	Charles River	High
Outfall	15766	MA72-38	Charles River	High
Outfall	19370	MA72-38	Charles River	High
Outfall	19310	MA72-38	Charles River	High
Outfall	19228	MA72-38	Charles River	High
Outfall	19347	MA72-38	Charles River	High
Outfall	15763	MA72-38	Charles River	High
Outfall	19008	MA72-38	Charles River	High
Outfall	21300	MA72-38	Charles River	High
Outfall	18983	MA72-38	Charles River	High
Outfall	15745	MA72-38	Charles River	High
Outfall	19111	MA72-38	Charles River	High
Outfall	19012	MA72-38	Charles River	High
Outfall	19336	MA72-38	Charles River	High
Outfall	15769	MA72-38	Charles River	High
Outfall	19346	MA72-38	Charles River	High
Outfall	18939	MA72-38	Charles River	High
Outfall	21299	MA72-38	Charles River	High
Outfall	19013	MA72-38	Charles River	High
Outfall	18940	MA72-38	Charles River	High
Outfall	18954	MA72-38	Charles River	High
Outfall	19387	MA72-38	Charles River	High
Manhole	20747	MA72-38	Charles River	High
Outfall	19329	MA72-38	Charles River	High
Outfall	19389	MA72-38	Charles River	High
Outfall	38016	MA72-38	Charles River	High
Manhole	35719	MA72-38	Charles River	High
Outfall	21633	MA72-38	Charles River	High
Outfall	19232	MA72-38	Charles River	High
Outfall	15749	MA72-38	Charles River	High

Outfall	35681	MA72-38	Charles River	High
Outfall	32634	MA72-38	Charles River	High
Outfall	15733	MA72-38	Charles River	High
Outfall	19234	MA72-38	Charles River	High
Outfall	21236	MA72-38	Charles River	High
Outfall	15756	MA72-38	Charles River	High
Outfall	19010	MA72-38	Charles River	High
Outfall	18938	MA72-38	Charles River	High
Outfall	19005	MA72-38	Charles River	High
Outfall	34362	MA72-38	Charles River	High
Outfall	19388	MA72-38	Charles River	High
Outfall	19385	MA72-38	Charles River	High
Outfall	18993	MA72-38	Charles River	High
Outfall	19300	MA72-38	Charles River	High
Outfall	18955	MA72-38	Charles River	High
Outfall	19395	MA72-38	Charles River	High
Inlet	1779	MA72-38	Charles River	High
Outfall	19231	MA72-38	Charles River	High
Outfall	19276	MA72-38	Charles River	High
Manhole	777	MA72-38	Charles River	High
Outfall	19340	MA72-38	Charles River	High
Outfall	31264	MA72-38	Charles River	High
Inlet	18942	MA72-38	Charles River	High
Outfall	19307	MA72-38	Charles River	High
Outfall	19304	MA72-38	Charles River	High
Outfall	17035	MA73-02	Neponset River	High
Outfall	17301	MA73-02	Neponset River	High
Outfall	17034	MA73-02	Neponset River	High
Outfall	17298	MA73-02	Neponset River	High
Outfall	16993	MA73-02	Neponset River	High
Outfall	16996	MA73-02	Neponset River	High
Manhole	17001	MA73-02	Neponset River	High
Manhole	26854	MA73-02	Neponset River	High
Manhole	17017	MA73-02	Neponset River	High
Outfall	17011	MA73-02	Neponset River	High
Manhole	17016	MA73-02	Neponset River	High
Outfall	12	MA73-02	Neponset River	High
Outfall	17300	MA73-02	Neponset River	High
Outfall	17030	MA73-02	Neponset River	High
Outfall	17299	MA73-02	Neponset River	High
Outfall	17032	MA73-02	Neponset River	High
Manhole	27813	MA73-02	Neponset River	High
Manhole	26814	MA73-02	Neponset River	High
Outfall	17037	MA73-02	Neponset River	High
Inlet	2958	MA73-02	Neponset River	High
Manhole	36026	MA73-02	Neponset River	High
Outfall	38006	MA73-02	Neponset River	High
Outfall	17029	MA73-02	Neponset River	High
Outfall	17012	MA73-02	Neponset River	High
Outfall	17031	MA73-02	Neponset River	High
Outfall	17689	MA73-03	Neponset River	High
Outfall	17296	MA73-03	Neponset River	High
Outfall	17638	MA73-03	Neponset River	High
Manhole	27875	MA73-03	Neponset River	High
Outfall	17690	MA73-03	Neponset River	High
Outfall	17691	MA73-03	Neponset River	High
Outfall	17133	MA73-03	Neponset River	High
Outfall	17698	MA73-03	Neponset River	High
Outfall	17696	MA73-03	Neponset River	High
Manhole	17087	MA73-03	Neponset River	High
Outfall	17699	MA73-03	Neponset River	High
Manhole	17088	MA73-03	Neponset River	High

Outfall	17692	MA73-03	Neponset River	High
Outfall	17893	MA73-03	Neponset River	High
Manhole	17071	MA73-03	Neponset River	High
Outfall	17892	MA73-03	Neponset River	High
Manhole	17105	MA73-03	Neponset River	High
Outfall	17695	MA73-03	Neponset River	High
Outfall	17694	MA73-03	Neponset River	High
Outfall	18459	MA73-03	Neponset River	High
Outfall	17136	MA73-03	Neponset River	High
Outfall	17895	MA73-03	Neponset River	High
Outfall	17693	MA73-03	Neponset River	High
Manhole	17089	MA73-03	Neponset River	High
Outfall	17697	MA73-03	Neponset River	High
Outfall	17898	MA73-03	Neponset River	High
Manhole	17954	MA73-04	Neponset River	High
Manhole	17989	MA73-04	Neponset River	High
Manhole	17756	MA73-04	Neponset River	High
Manhole	36031	MA73-04	Neponset River	High
Manhole	28132	MA73-04	Neponset River	High
Manhole	666666990	MA73-04	Neponset River	High
Outfall	37130	MA73043	Ponkapoag Pond	High
Outfall	27564	MA73-28	Mother Brook	High
Outfall	27562	MA73-28	Mother Brook	High
Outfall	27631	MA73-28	Mother Brook	High
Outfall	26848	MA73-28	Mother Brook	High
Outfall	14048	MA73-28	Mother Brook	High
Inlet	27221	MA73-28	Mother Brook	High
Outfall	27609	MA73-28	Mother Brook	High
Outfall	27610	MA73-28	Mother Brook	High
Outfall	14046	MA73-28	Mother Brook	High
Outfall	27612	MA73-28	Mother Brook	High
Outfall	27613	MA73-28	Mother Brook	High
Outfall	26841	MA73-28	Mother Brook	High
Outfall	35245	MA73-28	Mother Brook	High
Outfall	17128	MA73-29	Pine Tree Brook	High
Outfall	17190	MA73-29	Pine Tree Brook	High
Outfall	17636	MA74015	Hoosicwhisick Pond	High
Outfall	17062	MA74-10	Furnace Brook	High
Manhole	36294	MA74-10	Furnace Brook	High
Outfall	13673	MA74-10	Furnace Brook	High
Inlet	2929	MA74-10	Furnace Brook	High
Inlet	2930	MA74-10	Furnace Brook	High
Inlet	17028	MA74-10	Furnace Brook	High
Outfall	27660	MA74-10	Furnace Brook	High
Outfall	21763	MA74-11	Weir River	High
Outfall	27787	MA74-11	Weir River	High
Outfall	21818	MA74-11	Weir River	High
Outfall	21817	MA74-11	Weir River	High
Outfall	27831	MA74-13	Weymouth Back River	High
Outfall	21741	MA74-13	Weymouth Back River	High
Outfall	21830	MA74-13	Weymouth Back River	High
Outfall	21833	MA74-13	Weymouth Back River	High
Outfall	27834	MA74-14	Weymouth Fore River	High
Outfall	21742	MA74-14	Weymouth Fore River	High
Outfall	27835	MA74-14	Weymouth Fore River	High
Outfall	27837	MA74-14	Weymouth Fore River	High
Manhole	18108	MA74-15	Town River Bay	High
Outfall	24955	MA81019	Coachlace Pond	High
Outfall	26248	MA82125	Lake Cochituate	High
Outfall	35950	MA82125	Lake Cochituate	High
Outfall	26342	MA82125	Lake Cochituate	High
Outfall	35947	MA82125	Lake Cochituate	High

Outfall	25672	MA83-19	Shawsheen River	High
Outfall	26259	MA84A-01	Merrimack River	High
Outfall	26215	MA84A-01	Merrimack River	High
Outfall	25977	MA84A-01	Merrimack River	High
Outfall	25964	MA84A-01	Merrimack River	High
Outfall	14246	MA84A-01	Merrimack River	High
Outfall	25966	MA84A-01	Merrimack River	High
Outfall	26283	MA84A-01	Merrimack River	High
Outfall	26263	MA84A-01	Merrimack River	High
Outfall	26294	MA84A-01	Merrimack River	High
Outfall	26275	MA84A-01	Merrimack River	High
Outfall	26197	MA84A-01	Merrimack River	High
Outfall	26207	MA84A-01	Merrimack River	High
Outfall	26269	MA84A-01	Merrimack River	High
Outfall	26290	MA84A-01	Merrimack River	High
Outfall	26249	MA84A-01	Merrimack River	High
Outfall	14237	MA84A-01	Merrimack River	High
Outfall	25963	MA84A-01	Merrimack River	High
Outfall	26216	MA84A-01	Merrimack River	High
Outfall	25967	MA84A-01	Merrimack River	High
Outfall	25965	MA84A-01	Merrimack River	High
Outfall	25668	MA84A-03	Merrimack River	High
Outfall	25667	MA84A-03	Merrimack River	High
Outfall	25687	MA84A-06	Merrimack River	High
Outfall	25688	MA84A-06	Merrimack River	High
Outfall	26241	MA84A-10	Spicket River	High
Outfall	25666	MA93-18	Gloucester Harbor	High
Outfall	25665	MA93-18	Gloucester Harbor	High
Outfall	23876	MA93-48	Bennetts Pond Brook	High
Outfall	13623	MA93-48	Bennetts Pond Brook	High
Outfall	22554	MA93-48	Bennetts Pond Brook	High
Outfall	23909	MA93-48	Bennetts Pond Brook	High
Manhole	30966	MA93-48	Bennetts Pond Brook	High
Outfall	23911	MA93-48	Bennetts Pond Brook	High
Outfall	23946	MA93-48	Bennetts Pond Brook	High
Outfall	23879	MA93-48	Bennetts Pond Brook	High
Outfall	23845	MA93-48	Bennetts Pond Brook	High
Outfall	22735	MA93-48	Bennetts Pond Brook	High
Outfall	13851	MA93-48	Bennetts Pond Brook	High
Manhole	13591	MA93-48	Bennetts Pond Brook	High
Outfall	34854	MA93-48	Bennetts Pond Brook	High
Outfall	22733	MA93-48	Bennetts Pond Brook	High
Outfall	34720	MA93-48	Bennetts Pond Brook	High
Outfall	34742	MA93-48	Bennetts Pond Brook	High
Manhole	22931	MA93-48	Bennetts Pond Brook	High
Outfall	13619	MA93-48	Bennetts Pond Brook	High
Manhole	13588	MA93-48	Bennetts Pond Brook	High
Manhole	30967	MA93-48	Bennetts Pond Brook	High
Outfall	13627	MA93-48	Bennetts Pond Brook	High
Outfall	22734	MA93-48	Bennetts Pond Brook	High
Outfall	36097	MA93-52	Lynn Harbor	High
Outfall	36096	MA93-52	Lynn Harbor	High
Outfall	24963	MA93-52	Lynn Harbor	High
Outfall	36082	MA93-52	Lynn Harbor	High
Outfall	24964	MA93-52	Lynn Harbor	High
Outfall	25059	MA93-52	Lynn Harbor	High
Outfall	15055	MA93-52	Lynn Harbor	High
Outfall	24979	MA93-52	Lynn Harbor	High
Outfall	36081	MA93-52	Lynn Harbor	High
Outfall	25064	MA93-52	Lynn Harbor	High
Outfall	24993	MA93-53	Lynn Harbor	High
Outfall	11999	MA93-53	Lynn Harbor	High

Outfall	10948	MA93-53	Lynn Harbor	High
Outfall	25010	MA93-53	Lynn Harbor	High
Outfall	11424	MA93-53	Lynn Harbor	High
Outfall	24991	MA93-53	Lynn Harbor	High
Inlet	4627	MA93-53	Lynn Harbor	High
Outfall	24986	MA93-53	Lynn Harbor	High
Outfall	24988	MA93-53	Lynn Harbor	High
Outfall	11971	MA93-53	Lynn Harbor	High
Outfall	25076	MA93-53	Lynn Harbor	High
Outfall	25428	MA93-53	Lynn Harbor	High
Outfall	25003	MA93-53	Lynn Harbor	High
Outfall	24985	MA93-53	Lynn Harbor	High
Outfall	24995	MA93-53	Lynn Harbor	High
Outfall	24984	MA93-53	Lynn Harbor	High
Outfall	11167	MA93-53	Lynn Harbor	High
Outfall	25434	MA93-53	Lynn Harbor	High
Outfall	25011	MA93-53	Lynn Harbor	High
Outfall	25009	MA93-53	Lynn Harbor	High
Outfall	24990	MA93-53	Lynn Harbor	High
Outfall	25426	MA93-53	Lynn Harbor	High
Outfall	24992	MA93-53	Lynn Harbor	High
Outfall	25006	MA93-53	Lynn Harbor	High
Outfall	12000	MA93-53	Lynn Harbor	High
Outfall	24987	MA93-53	Lynn Harbor	High
Outfall	25005	MA93-53	Lynn Harbor	High
Outfall	25007	MA93-53	Lynn Harbor	High
Outfall	38018	MA93-53	Lynn Harbor	High
Inlet	37091	MA93-53	Lynn Harbor	High
Outfall	25001	MA93-53	Lynn Harbor	High
Outfall	24989	MA93-53	Lynn Harbor	High
Outfall	25008	MA93-53	Lynn Harbor	High
Outfall	37141	MA93-53	Lynn Harbor	High
Outfall	24994	MA93-53	Lynn Harbor	High
Outfall	25077	MA93-53	Lynn Harbor	High
Outfall	10943	MA93-53	Lynn Harbor	High
Outfall	25060	MA93-53	Lynn Harbor	High
Outfall	10946	MA93-53	Lynn Harbor	High
Outfall	24094	MA94132	Russell Millpond	High
Outfall	24093	MA94132	Russell Millpond	High
Outfall	23991	MA94-16	Plymouth Harbor	High
Outfall	24066	MA94-16	Plymouth Harbor	High
Outfall	24069	MA94-16	Plymouth Harbor	High
Outfall	24115	MA95-63	Outer New Bedford Harbor	High
Outfall	24234	MA95-63	Outer New Bedford Harbor	High
Outfall	27796	Ocean	-	High
Outfall	12455	Ocean	-	High
Manhole	30925	ULT_MA71-02	-	High
Inlet	35901	ULT_MA72-07	-	High
Manhole	26514	ULT_MA72-23	-	High
Manhole	34770	ULT_MA72-28	-	High
Inlet	3286	ULT_MA72-36	-	High
Manhole	666666980	ULT_MA72-36	-	High
Manhole	18139	ULT_MA72-36	-	High
Manhole	18126	ULT_MA72-36	-	High
Manhole	27680	ULT_MA72-38	-	High
Manhole	35995	ULT_MA72-38	-	High
Inlet	34516	ULT_MA72-38	-	High
Inlet	3802	ULT_MA72-38	-	High
Manhole	27135	ULT_MA72-38	-	High
Manhole	35994	ULT_MA72-38	-	High
Manhole	35924	ULT_MA72-38	-	High
Manhole	35992	ULT_MA72-38	-	High

Manhole	27135	ULT_MA72-38	-	High
Manhole	27083	ULT_MA72-38	-	High
Manhole	27598	ULT_MA72-38	-	High
Manhole	35898	ULT_MA72-38	-	High
Manhole	2133	ULT_MA72-38	-	High
Inlet	3797	ULT_MA72-38	-	High
Manhole	27585	ULT_MA72-38	-	High
Manhole	20378	ULT_MA72-38	-	High
Manhole	666667855	MA32055	Pequot Pond	High
Outfall	37284	MA32-27	Miller Brook	High
Outfall	666667299	MA51-02	Middle River	High
Outfall	666667298	MA51-02	Middle River	High
Outfall	666668031	MA51-06	Blackstone River	High
Outfall	24406	MA51125	Lake Quinsigamond	High
Outfall	24451	MA51125	Lake Quinsigamond	High
Outfall	666667297	MA51125	Lake Quinsigamond	High
Outfall	666667896	MA51-16	Dark Brook	High
Manhole	666668818	MA62-02	Taunton River	High
Outfall	666667987	MA70-02	Boston Inner Harbor	High
Inlet	666669018	MA70-02	Boston Inner Harbor	High
Manhole	666668590	MA70-02	Boston Inner Harbor	High
Outfall	666667958	MA70-02	Boston Inner Harbor	High
Manhole	666668591	MA70-02	Boston Inner Harbor	High
Manhole	666668246	MA70-02	Boston Inner Harbor	High
Outfall	666668118	MA70-03	Dorchester Bay	High
Manhole	666667915	MA70-03	Dorchester Bay	High
Manhole	666668209	MA70-03	Dorchester Bay	High
Inlet	666668550	MA70-03	Dorchester Bay	High
Manhole	666668225	MA70-03	Dorchester Bay	High
Manhole	666668244	MA70-03	Dorchester Bay	High
Manhole	666668806	MA70-03	Dorchester Bay	High
Outfall	666667869	MA70-03	Dorchester Bay	High
Inlet	666668554	MA70-03	Dorchester Bay	High
Outfall	666668119	MA70-03	Dorchester Bay	High
Inlet	666668557	MA70-03	Dorchester Bay	High
Inlet	666668552	MA70-03	Dorchester Bay	High
Outfall	37217	MA70-04	Quincy Bay	High
Outfall	17669	MA70-04	Quincy Bay	High
Outfall	13833	MA70-04	Quincy Bay	High
Outfall	17668	MA70-04	Quincy Bay	High
Outfall	666666838	MA70-04	Quincy Bay	High
Outfall	17900	MA70-04	Quincy Bay	High
Outfall	17885	MA70-04	Quincy Bay	High
Outfall	13844	MA70-04	Quincy Bay	High
Outfall	17665	MA70-04	Quincy Bay	High
Outfall	13837	MA70-04	Quincy Bay	High
Outfall	32261	MA70-04	Quincy Bay	High
Outfall	17664	MA70-04	Quincy Bay	High
Outfall	13839	MA70-04	Quincy Bay	High
Outfall	13835	MA70-04	Quincy Bay	High
Outfall	13846	MA70-04	Quincy Bay	High
Manhole	666669024	MA70-10	Winthrop Bay	High
Outfall	666667178	MA71-01	Aberjona River	High
Inlet	666668989	MA71-01	Aberjona River	High
Outfall	34695	MA71014	Ell Pond	High
Outfall	666667013	MA71-02	Mystic River	High
Outfall	23869	MA71-02	Mystic River	High
Outfall	22025	MA71-02	Mystic River	High
Outfall	22723	MA71-02	Mystic River	High
Outfall	15507	MA71-02	Mystic River	High
Outfall	666666973	MA71-02	Mystic River	High
Outfall	22742	MA71-02	Mystic River	High

Outfall	22747	MA71-02	Mystic River	High
Outfall	14620	MA71-02	Mystic River	High
Outfall	666667218	MA71-02	Mystic River	High
Outfall	21966	MA71-02	Mystic River	High
Outfall	666667155	MA71-02	Mystic River	High
Outfall	666667006	MA71-02	Mystic River	High
Outfall	22188	MA71-02	Mystic River	High
Outfall	666667014	MA71-02	Mystic River	High
Outfall	15503	MA71-02	Mystic River	High
Outfall	14482	MA71-02	Mystic River	High
Outfall	30342	MA71-02	Mystic River	High
Outfall	666667005	MA71-02	Mystic River	High
Outfall	666667147	MA71-02	Mystic River	High
Outfall	14591	MA71-02	Mystic River	High
Outfall	22766	MA71-02	Mystic River	High
Outfall	666667012	MA71-02	Mystic River	High
Outfall	666667004	MA71-02	Mystic River	High
Outfall	666667322	MA71-02	Mystic River	High
Outfall	14041	MA71-02	Mystic River	High
Outfall	666667154	MA71-02	Mystic River	High
Outfall	22336	MA71-02	Mystic River	High
Outfall	666666993	MA71027	Lower Mystic Lake	High
Outfall	666667145	MA71039	Spot Pond	High
Outfall	666667121	MA71043	Upper Mystic Lake	High
Outfall	23961	MA71043	Upper Mystic Lake	High
Outfall	666667142	MA71-05	Malden River	High
Outfall	21917	MA71-05	Malden River	High
Outfall	22824	MA71-05	Malden River	High
Outfall	22825	MA71-05	Malden River	High
Outfall	22802	MA71-05	Malden River	High
Outfall	15562	MA71-05	Malden River	High
Outfall	22801	MA71-05	Malden River	High
Outfall	13508	MA71-05	Malden River	High
Outfall	666667215	MA71-05	Malden River	High
Outfall	666667143	MA71-05	Malden River	High
Outfall	666667214	MA71-07	Mill Brook	High
Outfall	666667632	MA71-12	Sales Creek	High
Outfall	22290	MA71-13	Unnamed Tributary	High
Outfall	666667983	MA71-17	Spot Pond Brook	High
Outfall	666667985	MA71-17	Spot Pond Brook	High
Outfall	666667981	MA71-17	Spot Pond Brook	High
Outfall	666667944	MA71-17	Spot Pond Brook	High
Outfall	666667984	MA71-17	Spot Pond Brook	High
Outfall	666667976	MA71-17	Spot Pond Brook	High
Outfall	666667945	MA71-17	Spot Pond Brook	High
Outfall	666667975	MA71-17	Spot Pond Brook	High
Outfall	666667747	MA71-17	Spot Pond Brook	High
Outfall	666667978	MA71-17	Spot Pond Brook	High
Outfall	666667982	MA71-17	Spot Pond Brook	High
Outfall	666667977	MA71-17	Spot Pond Brook	High
Outfall	666667114	MA72052	Jamaica Pond	High
Outfall	666667113	MA72052	Jamaica Pond	High
Outfall	666667228	MA72-07	Charles River	High
Outfall	35264	MA72-07	Charles River	High
Outfall	666667138	MA72-07	Charles River	High
Outfall	26930	MA72-07	Charles River	High
Outfall	26895	MA72-07	Charles River	High
Outfall	666667126	MA72-07	Charles River	High
Outfall	666667139	MA72-07	Charles River	High
Outfall	26929	MA72-07	Charles River	High
Outfall	19157	MA72-07	Charles River	High
Outfall	666667124	MA72-07	Charles River	High

Outfall	26916	MA72-07	Charles River	High
Outfall	666667122	MA72-07	Charles River	High
Outfall	666667752	MA72-07	Charles River	High
Outfall	26898	MA72-07	Charles River	High
Outfall	666667755	MA72-07	Charles River	High
Manhole	666668080	MA72-07	Charles River	High
Outfall	26897	MA72-07	Charles River	High
Outfall	26917	MA72-07	Charles River	High
Manhole	666668619	MA72-11	Muddy River	High
Outfall	27590	MA72-11	Muddy River	High
Outfall	666668106	MA72-11	Muddy River	High
Outfall	666667079	MA72-11	Muddy River	High
Outfall	666667795	MA72-11	Muddy River	High
Manhole	666667419	MA72-11	Muddy River	High
Outfall	35836	MA72-11	Muddy River	High
Outfall	666667149	MA72-11	Muddy River	High
Manhole	666667397	MA72-11	Muddy River	High
Outfall	666667729	MA72-11	Muddy River	High
Manhole	666667540	MA72-11	Muddy River	High
Outfall	666667019	MA72-11	Muddy River	High
Outfall	666667131	MA72-11	Muddy River	High
Outfall	34389	MA72-11	Muddy River	High
Outfall	666667092	MA72-11	Muddy River	High
Outfall	21413	MA72-11	Muddy River	High
Outfall	666667137	MA72-11	Muddy River	High
Manhole	666667418	MA72-11	Muddy River	High
Outfall	666667151	MA72-11	Muddy River	High
Outfall	19353	MA72-11	Muddy River	High
Outfall	666668107	MA72-11	Muddy River	High
Outfall	666666924	MA72-11	Muddy River	High
Outfall	666667150	MA72-11	Muddy River	High
Outfall	18933	MA72-11	Muddy River	High
Outfall	666667573	MA72-11	Muddy River	High
Outfall	29552	MA72-11	Muddy River	High
Outfall	666667283	MA72-11	Muddy River	High
Outfall	666667284	MA72-11	Muddy River	High
Inlet	666667582	MA72-11	Muddy River	High
Outfall	666667793	MA72-11	Muddy River	High
Outfall	14200	MA72-11	Muddy River	High
Outfall	666667115	MA72-11	Muddy River	High
Outfall	666667866	MA72-11	Muddy River	High
Outfall	18556	MA72-11	Muddy River	High
Outfall	14208	MA72-11	Muddy River	High
Outfall	666667282	MA72-11	Muddy River	High
Outfall	666667118	MA72-11	Muddy River	High
Outfall	666667572	MA72-11	Muddy River	High
Outfall	666666923	MA72-11	Muddy River	High
Outfall	666667579	MA72-11	Muddy River	High
Outfall	666667075	MA72-23	Sawmill Brook	High
Outfall	666667076	MA72-23	Sawmill Brook	High
Outfall	26477	MA72-23	Sawmill Brook	High
Outfall	4697	MA72-23	Sawmill Brook	High
Outfall	26962	MA72-23	Sawmill Brook	High
Outfall	4699	MA72-23	Sawmill Brook	High
Outfall	666666940	MA72-23	Sawmill Brook	High
Outfall	26921	MA72-23	Sawmill Brook	High
Outfall	4698	MA72-23	Sawmill Brook	High
Outfall	26480	MA72-23	Sawmill Brook	High
Outfall	35933	MA72-23	Sawmill Brook	High
Outfall	26936	MA72-23	Sawmill Brook	High
Outfall	666667078	MA72-23	Sawmill Brook	High
Outfall	26923	MA72-23	Sawmill Brook	High

Outfall	666667077	MA72-23	Sawmill Brook	High
Outfall	666667082	MA72-23	Sawmill Brook	High
Outfall	666667947	MA72-28	Beaver Brook	High
Outfall	666667837	MA72-28	Beaver Brook	High
Outfall	666667830	MA72-28	Beaver Brook	High
Outfall	666667834	MA72-28	Beaver Brook	High
Outfall	666667833	MA72-28	Beaver Brook	High
Outfall	14326	MA72-36	Charles River	High
Outfall	19087	MA72-36	Charles River	High
Outfall	35757	MA72-36	Charles River	High
Outfall	19041	MA72-36	Charles River	High
Manhole	666668145	MA72-36	Charles River	High
Outfall	19155	MA72-36	Charles River	High
Outfall	21630	MA72-36	Charles River	High
Outfall	666666999	MA72-36	Charles River	High
Outfall	19119	MA72-36	Charles River	High
Outfall	19401	MA72-36	Charles River	High
Outfall	19393	MA72-36	Charles River	High
Outfall	19356	MA72-36	Charles River	High
Outfall	18985	MA72-36	Charles River	High
Outfall	16754	MA72-36	Charles River	High
Outfall	7490	MA72-36	Charles River	High
Outfall	34281	MA72-36	Charles River	High
Outfall	19410	MA72-36	Charles River	High
Outfall	666667103	MA72-36	Charles River	High
Outfall	19409	MA72-36	Charles River	High
Outfall	19414	MA72-36	Charles River	High
Outfall	19083	MA72-36	Charles River	High
Outfall	19415	MA72-36	Charles River	High
Outfall	19432	MA72-36	Charles River	High
Outfall	666667008	MA72-36	Charles River	High
Outfall	19426	MA72-36	Charles River	High
Outfall	19122	MA72-36	Charles River	High
Outfall	666666997	MA72-36	Charles River	High
Outfall	18996	MA72-36	Charles River	High
Outfall	19411	MA72-36	Charles River	High
Outfall	38010	MA72-36	Charles River	High
Outfall	666667001	MA72-36	Charles River	High
Outfall	666667002	MA72-36	Charles River	High
Inlet	666668683	MA72-36	Charles River	High
Outfall	666667638	MA72-36	Charles River	High
Outfall	19091	MA72-36	Charles River	High
Outfall	19313	MA72-36	Charles River	High
Outfall	18984	MA72-36	Charles River	High
Outfall	19402	MA72-36	Charles River	High
Outfall	34523	MA72-36	Charles River	High
Outfall	19343	MA72-36	Charles River	High
Outfall	666667776	MA72-36	Charles River	High
Outfall	666667988	MA72-36	Charles River	High
Manhole	666668861	MA72-36	Charles River	High
Outfall	19417	MA72-36	Charles River	High
Outfall	19115	MA72-36	Charles River	High
Outfall	19292	MA72-36	Charles River	High
Outfall	19392	MA72-36	Charles River	High
Outfall	19096	MA72-36	Charles River	High
Outfall	19437	MA72-36	Charles River	High
Outfall	19081	MA72-36	Charles River	High
Outfall	19266	MA72-36	Charles River	High
Outfall	19264	MA72-36	Charles River	High
Outfall	19403	MA72-36	Charles River	High
Outfall	666667133	MA72-36	Charles River	High
Outfall	3173	MA72-36	Charles River	High

Outfall	666666962	MA72-36	Charles River	High
Outfall	18997	MA72-36	Charles River	High
Outfall	666667007	MA72-36	Charles River	High
Outfall	19098	MA72-36	Charles River	High
Outfall	19114	MA72-36	Charles River	High
Outfall	666667112	MA72-36	Charles River	High
Outfall	19408	MA72-36	Charles River	High
Outfall	34473	MA72-36	Charles River	High
Outfall	19082	MA72-36	Charles River	High
Outfall	19113	MA72-36	Charles River	High
Outfall	16669	MA72-36	Charles River	High
Outfall	19322	MA72-36	Charles River	High
Outfall	19167	MA72-36	Charles River	High
Outfall	666667003	MA72-36	Charles River	High
Outfall	666667798	MA72-38	Charles River	High
Outfall	666667788	MA72-38	Charles River	High
Outfall	666667349	MA72-38	Charles River	High
Outfall	666667787	MA72-38	Charles River	High
Outfall	666667873	MA72-38	Charles River	High
Outfall	19634	MA72-38	Charles River	High
Outfall	666667487	MA72-38	Charles River	High
Outfall	666668014	MA72-38	Charles River	High
Outfall	666666986	MA72-38	Charles River	High
Outfall	666667728	MA72-38	Charles River	High
Outfall	19349	MA72-38	Charles River	High
Outfall	666668015	MA72-38	Charles River	High
Outfall	666667888	MA72-38	Charles River	High
Manhole	666667772	MA72-38	Charles River	High
Manhole	666669028	MA72-38	Charles River	High
Manhole	666667142	MA73-02	Neponset River	High
Outfall	666666989	MA73-02	Neponset River	High
Outfall	666666969	MA73-02	Neponset River	High
Outfall	666667757	MA73-02	Neponset River	High
Outfall	17033	MA73-02	Neponset River	High
Manhole	666668851	MA73-02	Neponset River	High
Manhole	666667140	MA73-02	Neponset River	High
Outfall	666666970	MA73-02	Neponset River	High
Outfall	16983	MA73-02	Neponset River	High
Outfall	52156	MA73-02	Neponset River	High
Manhole	666668843	MA73-02	Neponset River	High
Outfall	17018	MA73-02	Neponset River	High
Outfall	666667226	MA73-02	Neponset River	High
Outfall	666667321	MA73-03	Neponset River	High
Outfall	17688	MA73-03	Neponset River	High
Outfall	666666995	MA73-03	Neponset River	High
Outfall	17687	MA73-03	Neponset River	High
Outfall	17125	MA73-03	Neponset River	High
Outfall	17290	MA73-03	Neponset River	High
Manhole	666668848	MA73-03	Neponset River	High
Outfall	666666992	MA73-03	Neponset River	High
Outfall	17113	MA73-03	Neponset River	High
Outfall	17135	MA73-03	Neponset River	High
Outfall	666667140	MA73-03	Neponset River	High
Outfall	17110	MA73-03	Neponset River	High
Outfall	17291	MA73-03	Neponset River	High
Outfall	17681	MA73-03	Neponset River	High
Outfall	17294	MA73-03	Neponset River	High
Manhole	666667946	MA73-04	Neponset River	High
Manhole	666667274	MA73-04	Neponset River	High
Manhole	666668442	MA73-04	Neponset River	High
Manhole	666668059	MA73-04	Neponset River	High
Outfall	17707	MA73-04	Neponset River	High

Outfall	18173	MA73-04	Neponset River	High
Manhole	666667073	MA73-04	Neponset River	High
Manhole	666668455	MA73-04	Neponset River	High
Outfall	27761	MA73-04	Neponset River	High
Manhole	666667097	MA73-04	Neponset River	High
Manhole	666667272	MA73-04	Neponset River	High
Manhole	666668452	MA73-04	Neponset River	High
Manhole	666667936	MA73-04	Neponset River	High
Outfall	18175	MA73-04	Neponset River	High
Manhole	666667273	MA73-04	Neponset River	High
Manhole	666668451	MA73-04	Neponset River	High
Manhole	666668453	MA73-04	Neponset River	High
Manhole	666668444	MA73-04	Neponset River	High
Inlet	666668856	MA73-04	Neponset River	High
Outfall	666667171	MA73-27	Ponkapog Brook	High
Outfall	666666974	MA73-28	Mother Brook	High
Outfall	666666913	MA73-28	Mother Brook	High
Manhole	666667131	MA73-28	Mother Brook	High
Inlet	666668073	MA73-28	Mother Brook	High
Manhole	666667136	MA73-28	Mother Brook	High
Outfall	666666912	MA73-28	Mother Brook	High
Outfall	27881	MA73-29	Pine Tree Brook	High
Outfall	666666966	MA73-29	Pine Tree Brook	High
Outfall	666667971	MA73-29	Pine Tree Brook	High
Outfall	666667346	MA73-29	Pine Tree Brook	High
Outfall	17288	MA73-29	Pine Tree Brook	High
Outfall	34377	MA73-29	Pine Tree Brook	High
Outfall	17305	MA74015	Hoosicwhisick Pond	High
Outfall	666667317	MA74015	Hoosicwhisick Pond	High
Outfall	17054	MA74015	Hoosicwhisick Pond	High
Outfall	666666933	MA74015	Hoosicwhisick Pond	High
Outfall	17302	MA74015	Hoosicwhisick Pond	High
Outfall	34482	MA74015	Hoosicwhisick Pond	High
Outfall	17303	MA74015	Hoosicwhisick Pond	High
Outfall	17051	MA74015	Hoosicwhisick Pond	High
Outfall	17304	MA74015	Hoosicwhisick Pond	High
Manhole	666667697	MA74-10	Furnace Brook	High
Outfall	13819	MA74-10	Furnace Brook	High
Outfall	666667088	MA74-10	Furnace Brook	High
Outfall	13807	MA74-10	Furnace Brook	High
Outfall	666667099	MA74-10	Furnace Brook	High
Outfall	13532	MA74-10	Furnace Brook	High
Outfall	666667096	MA74-10	Furnace Brook	High
Outfall	666667185	MA74-10	Furnace Brook	High
Outfall	17655	MA74-10	Furnace Brook	High
Outfall	4107	MA74-10	Furnace Brook	High
Manhole	666667282	MA74-10	Furnace Brook	High
Outfall	17656	MA74-10	Furnace Brook	High
Manhole	666667334	MA74-10	Furnace Brook	High
Outfall	666667309	MA74-10	Furnace Brook	High
Outfall	666667089	MA74-10	Furnace Brook	High
Outfall	13812	MA74-10	Furnace Brook	High
Outfall	17891	MA74-10	Furnace Brook	High
Outfall	666667093	MA74-10	Furnace Brook	High
Outfall	666667288	MA74-10	Furnace Brook	High
Outfall	13814	MA74-10	Furnace Brook	High
Outfall	13671	MA74-10	Furnace Brook	High
Outfall	666667184	MA74-10	Furnace Brook	High
Outfall	13810	MA74-10	Furnace Brook	High
Outfall	666667094	MA74-10	Furnace Brook	High
Outfall	666667174	MA74-10	Furnace Brook	High
Outfall	18903	MA74-10	Furnace Brook	High

Outfall	666667087	MA74-10	Furnace Brook	High
Outfall	666667183	MA74-10	Furnace Brook	High
Outfall	17884	MA74-10	Furnace Brook	High
Outfall	666667090	MA74-10	Furnace Brook	High
Outfall	17883	MA74-10	Furnace Brook	High
Manhole	666667926	MA74-10	Furnace Brook	High
Outfall	666667097	MA74-10	Furnace Brook	High
Outfall	666667091	MA74-10	Furnace Brook	High
Outfall	666667253	MA74-11	Weir River	High
Outfall	17218	MA74-25	Blue Hill River	High
Outfall	17050	MA74-25	Blue Hill River	High
Outfall	12777	MA81147	Wachusett Reservoir	High
Outfall	12870	MA81147	Wachusett Reservoir	High
Outfall	21781	MA81147	Wachusett Reservoir	High
Outfall	25975	MA84A-01	Merrimack River	High
Outfall	666666984	MA92061	Stearns Pond	High
Outfall	666666983	MA92061	Stearns Pond	High
Outfall	24959	MA93-24	Nahant Bay	High
Outfall	24961	MA93-24	Nahant Bay	High
Outfall	37093	MA93-24	Nahant Bay	High
Outfall	25387	MA93-24	Nahant Bay	High
Outfall	25380	MA93-24	Nahant Bay	High
Outfall	37120	MA93-24	Nahant Bay	High
Outfall	25377	MA93-24	Nahant Bay	High
Outfall	24960	MA93-24	Nahant Bay	High
Outfall	24958	MA93-24	Nahant Bay	High
Outfall	25409	MA93-24	Nahant Bay	High
Outfall	25411	MA93-24	Nahant Bay	High
Outfall	25391	MA93-24	Nahant Bay	High
Outfall	666667751	MA93-31	Mill River	High
Outfall	666667750	MA93-31	Mill River	High
Outfall	666667204	MA93-35	Saugus River	High
Outfall	32808	MA93-44	Saugus River	High
Outfall	666667193	MA93-48	Bennetts Pond Brook	High
Outfall	34740	MA93-48	Bennetts Pond Brook	High
Outfall	666667199	MA93-48	Bennetts Pond Brook	High
Outfall	666667304	MA93-48	Bennetts Pond Brook	High
Manhole	666667740	MA93-48	Bennetts Pond Brook	High
Outfall	666667303	MA93-48	Bennetts Pond Brook	High
Outfall	666667302	MA93-48	Bennetts Pond Brook	High
Outfall	666667300	MA93-48	Bennetts Pond Brook	High
Outfall	666667198	MA93-48	Bennetts Pond Brook	High
Outfall	666666847	MA93-48	Bennetts Pond Brook	High
Manhole	666668994	MA93-48	Bennetts Pond Brook	High
Outfall	666666845	MA93-48	Bennetts Pond Brook	High
Outfall	666667301	MA93-48	Bennetts Pond Brook	High
Outfall	23910	MA93-48	Bennetts Pond Brook	High
Outfall	666667156	MA93-52	Lynn Harbor	High
Outfall	25063	MA93-52	Lynn Harbor	High
Outfall	24965	MA93-52	Lynn Harbor	High
Outfall	666667686	MA93-52	Lynn Harbor	High
Outfall	666667259	MA93-53	Lynn Harbor	High
Outfall	666667278	MA93-53	Lynn Harbor	High
Outfall	666667266	MA93-53	Lynn Harbor	High
Outfall	24972	MA93-53	Lynn Harbor	High
Outfall	10645	MA93-53	Lynn Harbor	High
Outfall	4624	MA93-53	Lynn Harbor	High
Outfall	25429	MA93-53	Lynn Harbor	High
Outfall	666667267	MA93-53	Lynn Harbor	High
Outfall	666667281	MA93-53	Lynn Harbor	High
Outfall	666667050	MA93-53	Lynn Harbor	High
Outfall	666667055	MA93-53	Lynn Harbor	High

Outfall	666667054	MA93-53	Lynn Harbor	High
Outfall	666667049	MA93-53	Lynn Harbor	High
Outfall	666667276	MA93-53	Lynn Harbor	High
Outfall	24973	MA93-53	Lynn Harbor	High
Outfall	666667275	MA93-53	Lynn Harbor	High
Outfall	666667053	MA93-53	Lynn Harbor	High
Outfall	666667261	MA93-53	Lynn Harbor	High
Outfall	666667273	MA93-53	Lynn Harbor	High
Outfall	666667274	MA93-53	Lynn Harbor	High
Outfall	38008	MA93-53	Lynn Harbor	High
Outfall	666667272	MA93-53	Lynn Harbor	High
Outfall	666667048	MA93-53	Lynn Harbor	High
Outfall	666667279	MA93-53	Lynn Harbor	High
Outfall	666667280	MA93-53	Lynn Harbor	High
Outfall	666667260	MA93-53	Lynn Harbor	High
Outfall	24970	MA93-53	Lynn Harbor	High
Outfall	666667052	MA93-53	Lynn Harbor	High
Outfall	666667258	MA93-53	Lynn Harbor	High
Outfall	666667057	MA93-53	Lynn Harbor	High
Outfall	666667263	MA93-53	Lynn Harbor	High
Outfall	666667051	MA93-53	Lynn Harbor	High
Outfall	666667265	MA93-53	Lynn Harbor	High
Outfall	666667264	MA93-53	Lynn Harbor	High
Outfall	666667056	MA93-53	Lynn Harbor	High
Outfall	25072	MA93-53	Lynn Harbor	High
Outfall	666667257	MA93-53	Lynn Harbor	High
Outfall	666667059	MA93-53	Lynn Harbor	High
Outfall	666667270	MA93-53	Lynn Harbor	High
Outfall	666667269	MA93-53	Lynn Harbor	High
Outfall	666667060	MA93-53	Lynn Harbor	High
Outfall	666667262	MA93-53	Lynn Harbor	High
Outfall	666666922	MA93-53	Lynn Harbor	High
Outfall	666667047	MA93-53	Lynn Harbor	High
Outfall	24971	MA93-53	Lynn Harbor	High
Outfall	666667268	MA93-53	Lynn Harbor	High
Outfall	37168	MA93-53	Lynn Harbor	High
Outfall	666667111	MA93-53	Lynn Harbor	High
Outfall	666667058	MA93-53	Lynn Harbor	High
Outfall	25002	MA93-53	Lynn Harbor	High
Outfall	24096	MA94132	Russell Millpond	High
Outfall	666667624	MA95-14	Cape Cod Canal	High
Outfall	666667342	MA95-63	Outer New Bedford Harbor	High
Outfall	666667045	Ocean	-	High
Outfall	666667029	Ocean	-	High
Outfall	666667044	Ocean	-	High
Outfall	666667039	Ocean	-	High
Outfall	666667022	Ocean	-	High
Outfall	666667046	Ocean	-	High
Outfall	666667024	Ocean	-	High
Outfall	666667023	Ocean	-	High
Outfall	666667028	Ocean	-	High
Outfall	666667026	Ocean	-	High
Outfall	666667036	Ocean	-	High
Outfall	666667034	Ocean	-	High
Outfall	666667025	Ocean	-	High
Outfall	666667033	Ocean	-	High
Outfall	666667040	Ocean	-	High
Outfall	666667038	Ocean	-	High
Outfall	666667030	Ocean	-	High
Outfall	666667020	Ocean	-	High
Outfall	666667021	Ocean	-	High
Outfall	666667041	Ocean	-	High

Outfall	666667042	Ocean	-	High
Outfall	666667037	Ocean	-	High
Outfall	666667032	Ocean	-	High
Outfall	666667027	Ocean	-	High
Outfall	666667043	Ocean	-	High
Outfall	666667035	Ocean	-	High
Outfall	666667031	Ocean	-	High
Outfall	666667808	ULT_MA34-27	-	High
Outfall	666667809	ULT_MA34-27	-	High
Outfall	666667895	ULT_MA62-47	-	High
Outfall	666667894	ULT_MA62-47	-	High
Outfall	666667814	ULT_MA72-11	-	High
Manhole	666667277	ULT_MA72-23	-	High
Manhole	666668260	ULT_MA72-23	-	High
Manhole	666669018	ULT_MA72-28	-	High
Outfall	666667970	ULT_MA72-28	-	High
Manhole	666667208	ULT_MA72-38	-	High
Manhole	666667325	ULT_MA72-38	-	High
Manhole	666667369	ULT_MA72-38	-	High
Manhole	666668683	ULT_MA72-38	-	High
Manhole	666667227	ULT_MA72-38	-	High
Manhole	666667027	ULT_MA72-38	-	High
Manhole	666667088	ULT_MA72-38	-	High
Manhole	666667091	ULT_MA72-38	-	High
Manhole	666668684	ULT_MA72-38	-	High
Manhole	666667313	ULT_MA72-38	-	High
Manhole	666667226	ULT_MA72-38	-	High
Manhole	666667291	ULT_MA72-38	-	High
Manhole	666668699	ULT_MA72-38	-	High
Manhole	666667119	ULT_MA72-38	-	High
Manhole	666667263	ULT_MA72-38	-	High
Manhole	666668809	ULT_MA93-39	-	High
Outfall	24549	MA32-07	Westfield River	Low
Outfall	24550	MA32-07	Westfield River	Low
Outfall	24589	MA32-07	Westfield River	Low
Outfall	24596	MA32-07	Westfield River	Low
Outfall	24602	MA32-07	Westfield River	Low
Outfall	24595	MA32-07	Westfield River	Low
Outfall	24599	MA32-07	Westfield River	Low
Outfall	24598	MA32-07	Westfield River	Low
Outfall	24585	MA32-07	Westfield River	Low
Outfall	24882	MA35021	Dunn Pond	Low
Outfall	34546	MA36033	Chicopee Reservoir	Low
Outfall	34541	MA36033	Chicopee Reservoir	Low
Outfall	24397	MA51188	Flint Pond	Low
Outfall	24395	MA51188	Flint Pond	Low
Outfall	24396	MA51188	Flint Pond	Low
Outfall	14926	MA71027	Lower Mystic Lake	Low
Outfall	34494	MA71027	Lower Mystic Lake	Low
Outfall	14493	MA71027	Lower Mystic Lake	Low
Outfall	34467	MA71027	Lower Mystic Lake	Low
Outfall	22495	MA71027	Lower Mystic Lake	Low
Outfall	14596	MA71027	Lower Mystic Lake	Low
Outfall	14922	MA71027	Lower Mystic Lake	Low
Outfall	14628	MA71027	Lower Mystic Lake	Low
Outfall	22527	MA71027	Lower Mystic Lake	Low
Outfall	22195	MA71027	Lower Mystic Lake	Low
Outfall	14526	MA71027	Lower Mystic Lake	Low
Outfall	21913	MA71027	Lower Mystic Lake	Low
Outfall	14533	MA71027	Lower Mystic Lake	Low
Outfall	14490	MA71027	Lower Mystic Lake	Low
Manhole	25555	MA71-12	Sales Creek	Low

Inlet	25219	MA71-12	Sales Creek	Low
Manhole	12111	MA71-12	Sales Creek	Low
Manhole	25222	MA71-12	Sales Creek	Low
Inlet	5393	MA71-12	Sales Creek	Low
Outfall	22775	MA71-20	Alewife Brook	Low
Outfall	22531	MA71-20	Alewife Brook	Low
Outfall	34663	MA71-20	Alewife Brook	Low
Outfall	23968	MA71-20	Alewife Brook	Low
Outfall	21906	MA71-20	Alewife Brook	Low
Outfall	23955	MA71-20	Alewife Brook	Low
Outfall	22035	MA71-20	Alewife Brook	Low
Outfall	18584	MA72052	Jamaica Pond	Low
Outfall	16340	MA72052	Jamaica Pond	Low
Outfall	18564	MA72052	Jamaica Pond	Low
Outfall	18507	MA72052	Jamaica Pond	Low
Outfall	27803	MA72052	Jamaica Pond	Low
Outfall	27246	MA72-37	Stony Brook	Low
Outfall	26485	MA72-37	Stony Brook	Low
Outfall	35276	MA72-37	Stony Brook	Low
Outfall	26876	MA72-37	Stony Brook	Low
Outfall	34527	MA72-37	Stony Brook	Low
Outfall	26481	MA72-37	Stony Brook	Low
Outfall	35273	MA72-37	Stony Brook	Low
Outfall	27089	MA72-37	Stony Brook	Low
Outfall	26875	MA72-37	Stony Brook	Low
Outfall	35259	MA72-37	Stony Brook	Low
Outfall	30188	MA72-37	Stony Brook	Low
Outfall	26783	MA72-37	Stony Brook	Low
Outfall	37122	MA72-37	Stony Brook	Low
Outfall	35258	MA72-37	Stony Brook	Low
Outfall	35247	MA72-37	Stony Brook	Low
Outfall	27616	MA72-37	Stony Brook	Low
Outfall	26227	MA82003	Ashland Reservoir	Low
Outfall	26232	MA82003	Ashland Reservoir	Low
Outfall	26420	MA82003	Ashland Reservoir	Low
Outfall	26231	MA82003	Ashland Reservoir	Low
Outfall	26416	MA82003	Ashland Reservoir	Low
Outfall	26417	MA82003	Ashland Reservoir	Low
Outfall	26423	MA82003	Ashland Reservoir	Low
Outfall	26233	MA82003	Ashland Reservoir	Low
Outfall	26230	MA82003	Ashland Reservoir	Low
Outfall	26418	MA82003	Ashland Reservoir	Low
Outfall	37301	MA82020	Lake Cochituate	Low
Manhole	666667782	MA35021	Dunn Pond	Low
Outfall	24883	MA35021	Dunn Pond	Low
Outfall	34549	MA36033	Chicopee Reservoir	Low
Outfall	666667136	MA62208	West Meadow Pond	Low
Outfall	22837	MA71016	Fellsmere Pond	Low
Outfall	22836	MA71016	Fellsmere Pond	Low
Outfall	30948	MA71016	Fellsmere Pond	Low
Outfall	666667239	MA71016	Fellsmere Pond	Low
Outfall	30947	MA71016	Fellsmere Pond	Low
Outfall	666667152	MA71016	Fellsmere Pond	Low
Outfall	666667567	MA71-02	Mystic River	Low
Outfall	666667010	MA71027	Lower Mystic Lake	Low
Outfall	14589	MA71027	Lower Mystic Lake	Low
Outfall	15594	MA71039	Spot Pond	Low
Outfall	23574	MA71039	Spot Pond	Low
Outfall	666667176	MA71039	Spot Pond	Low
Outfall	666667704	MA71-05	Malden River	Low
Outfall	38015	MA71-12	Sales Creek	Low
Outfall	25363	MA71-12	Sales Creek	Low

Manhole	666668199	MA71-12	Sales Creek	Low
Outfall	666667015	MA71-20	Alewife Brook	Low
Outfall	22768	MA71-20	Alewife Brook	Low
Outfall	666667141	MA71-20	Alewife Brook	Low
Outfall	666667397	MA71-20	Alewife Brook	Low
Outfall	22769	MA71-20	Alewife Brook	Low
Outfall	23958	MA71-20	Alewife Brook	Low
Outfall	23956	MA71-20	Alewife Brook	Low
Outfall	23960	MA71-20	Alewife Brook	Low
Outfall	23959	MA71-20	Alewife Brook	Low
Outfall	22532	MA71-20	Alewife Brook	Low
Outfall	23957	MA71-20	Alewife Brook	Low
Outfall	22530	MA71-20	Alewife Brook	Low
Outfall	666667333	MA71-20	Alewife Brook	Low
Outfall	22772	MA71-20	Alewife Brook	Low
Outfall	26933	MA72044	Hammond Pond	Low
Outfall	26926	MA72044	Hammond Pond	Low
Outfall	26931	MA72044	Hammond Pond	Low
Outfall	26932	MA72044	Hammond Pond	Low
Outfall	666667107	MA72052	Jamaica Pond	Low
Outfall	666667687	MA72-23	Sawmill Brook	Low
Outfall	666667790	MA72-31	Unnamed Tributary	Low
Outfall	3	MA72-37	Stony Brook	Low
Outfall	666667681	MA72-37	Stony Brook	Low
Outfall	666667555	MA73-28	Mother Brook	Low
Outfall	666667605	MA73-29	Pine Tree Brook	Low
Outfall	666667671	MA74-10	Furnace Brook	Low
Outfall	17129	MA74-10	Furnace Brook	Low
Outfall	26436	MA82003	Ashland Reservoir	Low
Inlet	666669246	ULT_MA52-03	-	Low
Manhole	8888	ULT_MA72-38	-	Low
Outfall	666668013	ULT_MA73-02	-	Low
Outfall	24622	MA32-07	Westfield River	Excluded
Outfall	24588	MA32-07	Westfield River	Excluded
Outfall	24623	MA32-07	Westfield River	Excluded
Outfall	24568	MA32-07	Westfield River	Excluded
Outfall	24529	MA32-07	Westfield River	Excluded
Outfall	24272	MA51125	Lake Quinsigamond	Excluded
Manhole	24286	MA51125	Lake Quinsigamond	Excluded
Outfall	24084	MA62-09	Beaver Brook	Excluded
Outfall	37216	MA70-04	Quincy Bay	Excluded
Outfall	34466	MA70-04	Quincy Bay	Excluded
Outfall	37215	MA70-04	Quincy Bay	Excluded
Outfall	32250	MA70-04	Quincy Bay	Excluded
Outfall	30091	MA70-04	Quincy Bay	Excluded
Outfall	23110	MA71-02	Mystic River	Excluded
Outfall	14099	MA71-02	Mystic River	Excluded
Outfall	22719	MA71-02	Mystic River	Excluded
Outfall	22528	MA71-02	Mystic River	Excluded
Outfall	22762	MA71-02	Mystic River	Excluded
Outfall	22516	MA71-02	Mystic River	Excluded
Outfall	22791	MA71-02	Mystic River	Excluded
Outfall	22529	MA71-02	Mystic River	Excluded
Outfall	30936	MA71-02	Mystic River	Excluded
Outfall	22542	MA71-02	Mystic River	Excluded
Outfall	22977	MA71039	Spot Pond	Excluded
Outfall	22966	MA71039	Spot Pond	Excluded
Outfall	22740	MA71039	Spot Pond	Excluded
Outfall	34581	MA71039	Spot Pond	Excluded
Outfall	22741	MA71039	Spot Pond	Excluded
Outfall	22796	MA71039	Spot Pond	Excluded
Outfall	22543	MA71039	Spot Pond	Excluded

Outfall	38001	MA71039	Spot Pond	Excluded
Outfall	22745	MA71039	Spot Pond	Excluded
Outfall	22746	MA71039	Spot Pond	Excluded
Outfall	22509	MA71039	Spot Pond	Excluded
Outfall	16155	MA71039	Spot Pond	Excluded
Outfall	16174	MA71039	Spot Pond	Excluded
Outfall	16176	MA71039	Spot Pond	Excluded
Outfall	22795	MA71039	Spot Pond	Excluded
Outfall	22546	MA71039	Spot Pond	Excluded
Outfall	22979	MA71039	Spot Pond	Excluded
Outfall	22793	MA71039	Spot Pond	Excluded
Outfall	22965	MA71039	Spot Pond	Excluded
Outfall	13481	MA71039	Spot Pond	Excluded
Outfall	22978	MA71039	Spot Pond	Excluded
Outfall	13485	MA71039	Spot Pond	Excluded
Outfall	22967	MA71039	Spot Pond	Excluded
Outfall	36288	MA71-05	Malden River	Excluded
Outfall	22054	MA71-05	Malden River	Excluded
Outfall	26492	MA72-07	Charles River	Excluded
Outfall	26462	MA72-07	Charles River	Excluded
Outfall	17641	MA72-07	Charles River	Excluded
Outfall	18986	MA72-36	Charles River	Excluded
Outfall	19298	MA72-36	Charles River	Excluded
Outfall	19094	MA72-36	Charles River	Excluded
Outfall	35269	MA72-37	Stony Brook	Excluded
Outfall	27092	MA72-37	Stony Brook	Excluded
Outfall	27275	MA72-37	Stony Brook	Excluded
Outfall	35267	MA72-37	Stony Brook	Excluded
Outfall	27618	MA72-37	Stony Brook	Excluded
Outfall	35271	MA72-37	Stony Brook	Excluded
Outfall	27619	MA72-37	Stony Brook	Excluded
Outfall	36268	MA72-37	Stony Brook	Excluded
Outfall	27098	MA72-37	Stony Brook	Excluded
Outfall	21298	MA72-38	Charles River	Excluded
Outfall	17120	MA73-02	Neponset River	Excluded
Outfall	17514	MA73-02	Neponset River	Excluded
Outfall	27852	MA73-04	Neponset River	Excluded
Outfall	37132	MA73043	Ponkapoag Pond	Excluded
Outfall	37134	MA73043	Ponkapoag Pond	Excluded
Outfall	17637	MA73-29	Pine Tree Brook	Excluded
Outfall	17210	MA74015	Hoosicwhisick Pond	Excluded
Outfall	17307	MA74015	Hoosicwhisick Pond	Excluded
Outfall	16968	MA74017	Old Quincy Reservoir	Excluded
Outfall	16972	MA74-10	Furnace Brook	Excluded
Outfall	3315	MA74-10	Furnace Brook	Excluded
Outfall	16973	MA74-10	Furnace Brook	Excluded
Outfall	16970	MA74-10	Furnace Brook	Excluded
Outfall	16969	MA74-10	Furnace Brook	Excluded
Outfall	4109	MA74-10	Furnace Brook	Excluded
Outfall	21846	MA74-13	Weymouth Back River	Excluded
Outfall	21847	MA74-13	Weymouth Back River	Excluded
Outfall	21844	MA74-13	Weymouth Back River	Excluded
Outfall	21838	MA74-13	Weymouth Back River	Excluded
Outfall	21841	MA74-13	Weymouth Back River	Excluded
Outfall	21837	MA74-13	Weymouth Back River	Excluded
Outfall	21820	MA74-13	Weymouth Back River	Excluded
Outfall	26428	MA82003	Ashland Reservoir	Excluded
Outfall	26430	MA82125	Lake Cochituate	Excluded
Outfall	26191	MA84A-01	Merrimack River	Excluded
Outfall	26194	MA84A-01	Merrimack River	Excluded
Outfall	26187	MA84A-01	Merrimack River	Excluded
Outfall	25968	MA84A-01	Merrimack River	Excluded

Outfall	26188	MA84A-01	Merrimack River	Excluded
Outfall	26195	MA84A-01	Merrimack River	Excluded
Outfall	25970	MA84A-01	Merrimack River	Excluded
Outfall	26190	MA84A-01	Merrimack River	Excluded
Outfall	37273	MA84A-01	Merrimack River	Excluded
Outfall	26202	MA84A-01	Merrimack River	Excluded
Outfall	26193	MA84A-01	Merrimack River	Excluded
Outfall	26184	MA84A-01	Merrimack River	Excluded
Outfall	26185	MA84A-01	Merrimack River	Excluded
Outfall	26200	MA84A-01	Merrimack River	Excluded
Outfall	26192	MA84A-01	Merrimack River	Excluded
Outfall	25971	MA84A-01	Merrimack River	Excluded
Outfall	26186	MA84A-01	Merrimack River	Excluded
Outfall	26189	MA84A-01	Merrimack River	Excluded
Outfall	38004	MA93044	Lower Pond	Excluded
Outfall	34591	MA93044	Lower Pond	Excluded
Outfall	34594	MA93044	Lower Pond	Excluded
Outfall	37098	MA93044	Lower Pond	Excluded
Outfall	23890	MA93044	Lower Pond	Excluded
Outfall	34595	MA93044	Lower Pond	Excluded
Outfall	34589	MA93044	Lower Pond	Excluded
Outfall	38005	MA93-35	Saugus River	Excluded
Outfall	23891	MA93-35	Saugus River	Excluded
Outfall	38003	MA93-35	Saugus River	Excluded
Outfall	37096	MA93-35	Saugus River	Excluded
Outfall	36073	MA93-52	Lynn Harbor	Excluded
Outfall	25061	MA93-52	Lynn Harbor	Excluded
Outfall	36062	MA93-52	Lynn Harbor	Excluded
Outfall	36084	MA93-52	Lynn Harbor	Excluded
Outfall	36077	MA93-52	Lynn Harbor	Excluded
Outfall	36080	MA93-52	Lynn Harbor	Excluded
Outfall	24962	MA93-52	Lynn Harbor	Excluded
Outfall	25625	MA93-52	Lynn Harbor	Excluded
Outfall	36083	MA93-52	Lynn Harbor	Excluded
Outfall	24982	MA93-52	Lynn Harbor	Excluded
Outfall	36065	MA93-52	Lynn Harbor	Excluded
Outfall	36075	MA93-52	Lynn Harbor	Excluded
Outfall	36071	MA93-52	Lynn Harbor	Excluded
Outfall	36064	MA93-52	Lynn Harbor	Excluded
Outfall	36076	MA93-52	Lynn Harbor	Excluded
Outfall	24012	MA94-16	Plymouth Harbor	Excluded
Outfall	23993	MA94-16	Plymouth Harbor	Excluded
Outfall	23979	MA94-16	Plymouth Harbor	Excluded
Outfall	666667820	MA35021	Dunn Pond	Excluded
Manhole	666667854	MA51125	Lake Quinsigamond	Excluded
Outfall	666667291	MA51125	Lake Quinsigamond	Excluded
Outfall	666667290	MA51125	Lake Quinsigamond	Excluded
Manhole	666667853	MA51125	Lake Quinsigamond	Excluded
Outfall	666667289	MA51125	Lake Quinsigamond	Excluded
Outfall	666667221	MA51125	Lake Quinsigamond	Excluded
Outfall	14463	MA62-09	Beaver Brook	Excluded
Outfall	24071	MA62-09	Beaver Brook	Excluded
Outfall	24073	MA62-09	Beaver Brook	Excluded
Outfall	666666837	MA70-04	Quincy Bay	Excluded
Outfall	666667188	MA71014	Ell Pond	Excluded
Outfall	666667242	MA71016	Fellsmere Pond	Excluded
Outfall	23940	MA71-02	Mystic River	Excluded
Outfall	23942	MA71-02	Mystic River	Excluded
Outfall	23938	MA71-02	Mystic River	Excluded
Outfall	666667159	MA71-02	Mystic River	Excluded
Outfall	23941	MA71-02	Mystic River	Excluded
Outfall	666667816	MA71-02	Mystic River	Excluded

Outfall	666667153	MA71-02	Mystic River	Excluded
Outfall	666667244	MA71-02	Mystic River	Excluded
Outfall	23945	MA71-03	Mystic River	Excluded
Outfall	36883	MA71-03	Mystic River	Excluded
Outfall	23943	MA71-03	Mystic River	Excluded
Outfall	666667339	MA71-03	Mystic River	Excluded
Outfall	23944	MA71-03	Mystic River	Excluded
Outfall	666667146	MA71039	Spot Pond	Excluded
Outfall	666667545	MA71039	Spot Pond	Excluded
Outfall	666667144	MA71039	Spot Pond	Excluded
Outfall	666667702	MA71039	Spot Pond	Excluded
Outfall	666667759	MA71039	Spot Pond	Excluded
Outfall	666667210	MA71-05	Malden River	Excluded
Outfall	666667216	MA71-05	Malden River	Excluded
Outfall	666667741	MA71-17	Spot Pond Brook	Excluded
Outfall	666667742	MA71-17	Spot Pond Brook	Excluded
Outfall	24236	MA72-14	Mine Brook	Excluded
Outfall	666667829	MA72-28	Beaver Brook	Excluded
Outfall	666667236	MA72-36	Charles River	Excluded
Outfall	666666927	MA72-36	Charles River	Excluded
Outfall	666667548	MA72-37	Stony Brook	Excluded
Outfall	666667549	MA72-37	Stony Brook	Excluded
Outfall	666667556	MA72-37	Stony Brook	Excluded
Outfall	666667554	MA72-37	Stony Brook	Excluded
Outfall	666667557	MA72-37	Stony Brook	Excluded
Outfall	666667373	MA72-37	Stony Brook	Excluded
Outfall	666667546	MA72-37	Stony Brook	Excluded
Outfall	666667312	MA72-37	Stony Brook	Excluded
Outfall	666667551	MA72-37	Stony Brook	Excluded
Outfall	666667550	MA72-37	Stony Brook	Excluded
Outfall	666667395	MA72-38	Charles River	Excluded
Outfall	666667394	MA72-38	Charles River	Excluded
Outfall	666667396	MA72-38	Charles River	Excluded
Inlet	666669025	MA72-38	Charles River	Excluded
Outfall	666666994	MA72-38	Charles River	Excluded
Outfall	666667227	MA73-02	Neponset River	Excluded
Outfall	666666844	MA73-27	Ponkapog Brook	Excluded
Outfall	666666841	MA73-27	Ponkapog Brook	Excluded

Outfall	666666842	MA73-27	Ponkapog Brook	Excluded
Outfall	666666843	MA73-27	Ponkapog Brook	Excluded
Outfall	666667601	MA73-29	Pine Tree Brook	Excluded
Outfall	666667593	MA73-29	Pine Tree Brook	Excluded
Outfall	666667602	MA73-29	Pine Tree Brook	Excluded
Outfall	666667604	MA73-29	Pine Tree Brook	Excluded
Outfall	666667588	MA73-29	Pine Tree Brook	Excluded
Outfall	666667586	MA73-29	Pine Tree Brook	Excluded
Outfall	666667583	MA73-29	Pine Tree Brook	Excluded
Outfall	666667589	MA73-29	Pine Tree Brook	Excluded
Outfall	666667595	MA73-29	Pine Tree Brook	Excluded
Outfall	666667591	MA73-29	Pine Tree Brook	Excluded
Outfall	666667582	MA73-29	Pine Tree Brook	Excluded
Outfall	666667594	MA73-29	Pine Tree Brook	Excluded
Outfall	17057	MA74015	Hoosicwhisick Pond	Excluded
Outfall	17059	MA74015	Hoosicwhisick Pond	Excluded
Outfall	17058	MA74015	Hoosicwhisick Pond	Excluded
Outfall	666667105	MA74015	Hoosicwhisick Pond	Excluded
Outfall	34384	MA74015	Hoosicwhisick Pond	Excluded
Outfall	666667083	MA74015	Hoosicwhisick Pond	Excluded
Outfall	666667677	MA74017	Old Quincy Reservoir	Excluded
Outfall	666667674	MA74017	Old Quincy Reservoir	Excluded
Outfall	666667675	MA74017	Old Quincy Reservoir	Excluded
Outfall	666667252	MA74-10	Furnace Brook	Excluded
Outfall	666667070	MA74-10	Furnace Brook	Excluded
Outfall	666667287	MA74-10	Furnace Brook	Excluded
Outfall	666666849	MA74-10	Furnace Brook	Excluded
Outfall	666667062	MA74-10	Furnace Brook	Excluded
Outfall	666667061	MA74-10	Furnace Brook	Excluded
Outfall	666667085	MA74-25	Blue Hill River	Excluded
Outfall	666667084	MA74-25	Blue Hill River	Excluded
Outfall	666667080	MA74-25	Blue Hill River	Excluded
Outfall	12930	MA81147	Wachusett Reservoir	Excluded
Outfall	21783	MA81147	Wachusett Reservoir	Excluded
Outfall	25686	MA84A-03	Merrimack River	Excluded
Outfall	25685	MA84A-03	Merrimack River	Excluded
Outfall	666667872	MA92061	Stearns Pond	Excluded
Outfall	666668109	ULT_MA72-28	-	Excluded

[1] This interconnection is upstream of municipal outfall 34500.3, which was previously designated as a problem outfall in DCR's database. Since the original designation ownership and mapping have been changed and upstream DCR interconnections have been assigned an IDDE priority.

[2] This interconnection is upstream of municipal outfall 38017, which was previously designated as a problem outfall in DCR's database. Since the original designation ownership and mapping have been changed and upstream DCR interconnections have been assigned an IDDE priority.

[3] This interconnection is upstream of municipal outfall 38020, which was previously designated as a problem outfall in DCR's database. Since the original designation ownership and mapping have been changed and upstream DCR interconnections have been assigned an IDDE priority.

[4] This interconnection is upstream of municipal outfall 9000.1, which was previously designated as a problem outfall in DCR's database. Since the original designation ownership and mapping have been changed and upstream DCR interconnections have been assigned an IDDE priority.

[5] 3This interconnection is upstream of municipal outfall 37114.1, which was previously designated as a problem outfall in DCR's database. Since the original designation ownership and mapping have been changed and upstream DCR interconnections have been assigned an IDDE priority.

[6] This interconnection is upstream of municipal outfall 37221.1, which was previously designated as a problem outfall in DCR's database. Since the original designation ownership and mapping have been changed and upstream DCR interconnections have been assigned an IDDE priority.

[7] This interconnection is upstream of municipal outfall 17661, which was previously designated as a problem outfall in DCR's database. Since the original designation ownership and mapping have been changed and upstream DCR interconnections have been assigned an IDDE priority.

Appendix D – Field Equipment Checklist

Field staff can use the following checklist to ensure adequate equipment before field sampling. Items can be added or removed at the discretion of the field sampling team.

Testing Equipment Checklist		
Check	**Equipment**	**Use/Notes**
	Ammonia test strips (or kits)	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
	Chlorine test strips (or kits)	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
	Surfactants test kit	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
	Photometer	For chlorine test kit, as needed
	Conductivity, salinity, pH and temperature meter	Handheld meter, if available, for testing for various water quality parameters such as ammonia, surfactants and chlorine and if needed, for sampling conductivity, temperature, pH

Sampling Equipment Checklist		
Check	**Equipment**	**Use/Notes**
	Mobile data collector (tablet)	Collect dry weather inspection and dry weather sampling results
	Map with sampling location and Facility ID's (if not using tablet)	For orientation
	GPS receiver (tablet or handheld GPS)	For taking spatial location data
	Clipboard (if not using tablet)	For organization of field sheets and writing surface
	100 ml pre-labeled laboratory bacteria sample bottles (bacteria)	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 requires sterile containers).
	500 ml pre-labeled laboratory bacteria sample bottles (other laboratory analysis)	
	125 ml pre-labeled laboratory sample bottles (for on-site testing and BBAC off-site testing)	
	Additional sample containers as needed	
	Data sheet and chain of custody forms	Field sheets for both dry weather inspection and dry weather sampling should be available with extras. Chain of custody form is needed to

Sampling Equipment Checklist		
Check	**Equipment**	**Use/Notes**
		ensure proper handling of all samples
	De-ionized water or laboratory purified water and extra bottles as necessary	For sample procedures
	Pens, pencils, and/or permanent markers	For proper labeling
	Label tape	For labeling sample containers
	Sampling pole, dipper, sampling cage, and/or hand-held vacuum pump	For accessing hard to reach outfalls and manholes
	Disinfecting (wet) wipes and/or hand sanitizer	Disinfectant/decontaminant

Sample Transport Checklist		
Check	**Equipment**	**Use/Notes**
	Coolers	For transporting samples to the laboratory
	Frozen blue ice, ice, and/or cold packs	

Tools Checklist		
Check	**Equipment**	**Use/Notes**
	Flashlight and/or headlamp with extra batteries	For looking in outfalls or manholes, helpful in early mornings as well
	Manhole hook (from local DPW)	For opening manholes
	Measuring tape and/or carpenters' ruler	Measuring distances and depth of flow
	Shovel (from local DPW)	For opening, propping, prying as needed
	Pry bar or pick	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
	Zip ties and/or duct tape	Field repairs
	Safety glasses	Personal Protective Equipment (PPE). Staff should review the project-specific Health and Safety Plan (HASP) for a complete list of PPE.
	Safety vests	
	Rubber knee boots and/or waders for accessing shallow streams/areas	
	Steel toed boots for opening structures	
	Safety (traffic) cones	Safety

Other Checklist		
Check	**Equipment**	**Use/Notes**
	Bug spray (the CDC recommends products with: DEET (exposed skin and clothing) or Permethrin (on clothing)	Protection
	Sunscreen	Protection
	Poison ivy wash (e.g., Tecnu, Zanfel)	Protection (especially if allergic to poison ivy)
	Water (drinking water quality)	For drinking, washing as needed
	Digital camera (smartphone or tablet)	For documenting field conditions at time of inspection
	Field log books	Documentation
	Nitrile gloves	To protect the sampler as well as the sample from contamination
	Paper towels	Cleaning
	Sealable bags	Miscellaneous storage, organization

Additional Equipment (as needed)		
Check	**Equipment**	**Use/Notes**
	Safety equipment, such as a face covering, for compliance with State of Massachusetts COVID-19 guidelines	Staff should review the project-specific Health and Safety Plan (HASP) for a complete guidance on COVID-19 guidelines.

Appendix E – Water Quality Sampling Equipment User Manuals

Ammonia CHEMets® Kit

K-1510/R-1501: 0 - 1 & 1 - 10 ppm N

Safety Information

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

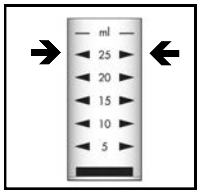

Figure 1

Non-Seawater Test Procedure

1. Fill the sample cup to the 25 mL mark with the sample to be tested (fig. 1).
2. Add 2 drops of A-1500 Stabilizer Solution (fig. 2). Stir to mix the contents of the cup.
3. Place the CHEMet ampoule, tip first, into the sample cup. Snap the tip. The ampoule will fill leaving a bubble for mixing (fig. 3).
4. To mix the ampoule, invert it several times, allowing the bubble to travel from end to end.
5. Dry the ampoule and wait **1 minute** for color development.
6. Obtain a test result using the appropriate comparator.
   a. **Low Range Comparator (fig. 4):** Place 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.
   b. **High Range Comparator (fig. 5):** Place the ampoule between the color standards until the best color match is found.


Figure 2

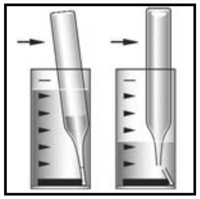
Figure 3


Figure 4

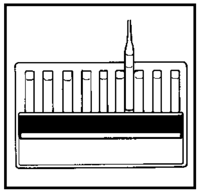
Figure 5

Seawater Test Procedure

1. Using the syringe, add 1.0 mL of A-1501 Stabilizer Solution to the sample cup.
2. Fill the sample cup to the 25 mL mark with the seawater sample to be tested (fig 1).
3. Perform the Test Procedure above, beginning with Step 3.

Test Method

The Ammonia CHEMets®[1] test kit employs direct nesslerization.[2,3] In a strongly alkaline solution, ammonia reacts with Nessler Reagent (K_2HgI_4) to produce a yellow-colored complex in direct proportion to the ammonia concentration.

This method is applicable to drinking water, clean surface water, good quality nitrified wastewater effluent and seawater. Other types of samples may require a preliminary distillation step. Ketones, alcohols, and aldehydes may cause off-color test results. Glycine and hydrazine will cause high test results. Aromatic and aliphatic amines, iron, sulfide, calcium and magnesium may cause turbidity.

1. CHEMets is a registered trademark of CHEMetrics, Inc. U.S. Patent No. 3,634,038
2. APHA Standard Methods, 18th ed., Method 4500-NH_3 C - 1988
3. ASTM D 1426 - 08, Ammonia Nitrogen in Water, Test Method A

Visit www.chemetrics.com to view product demonstration videos.
Always follow the test procedure above to perform a test.

CHEMetrics
Simplicity in Water Analysis

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Feb. 18, Rev. 13

Chlorine SAM

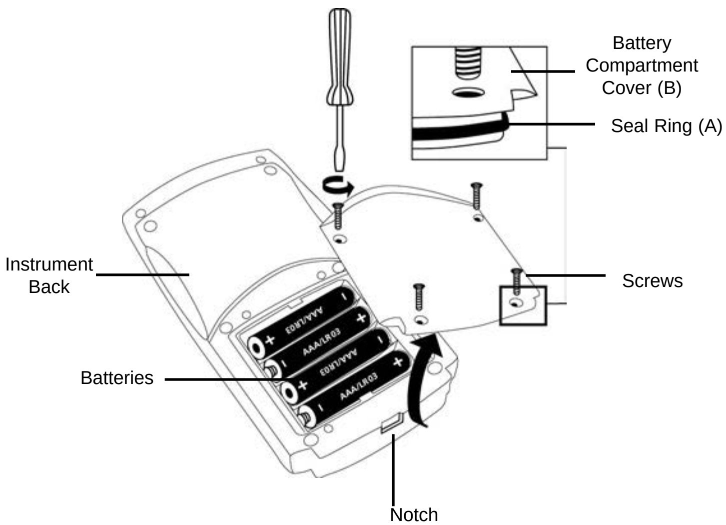
I-2001

0 to 5.00
PPM (mg/Liter)

CHEMetrics

Simplicity in Water Analysis

Battery Replacement



To ensure that the instrument is waterproof:
- seal ring (A) must be in position
- battery compartment cover (B) must be fixed with the four screws

To Set Zero

1. Press the Power key.
2. The display will show "CL".
3. Insert the ZERO ampoule (supplied in Vacu-vials® kit), flat end first, into the sample cell compartment (with mild downward pressure), making sure that it is fully seated.
4. Place the light shield over the ZERO ampoule.
5. Press the Zero/Test key. The "CL" symbol will flash for approximately 8 seconds, then the display will show "0.0.0".

To Make a Measurement

1. Follow the Test Procedure in the Chlorine Vacu-vials test kit (Cat. # K-2513).
2. Insert the resulting Chlorine Vacu-vial ampoule, flat end first, into the sample cell compartment (with mild downward pressure), making sure that it is fully seated.
3. Place the light shield over the test ampoule.
4. Press the Zero/Test key. The "CL" symbol will flash for approximately 3 seconds, then the sample test result will appear in the display as ppm (mg/Liter).

Operating Tips

- Upon startup, the photometer automatically proceeds to the zeroing process. Every time the photometer powers on, it must be re-zeroed.
- To re-zero the photometer, it must be turned off and back on again.
- A series of readings can be taken without re-zeroing, as long as the photometer stays on during the series.
- Protect photometer from extreme humidity, corrosive fumes and dusty areas. Store in a cool, dry place.
- Remove the batteries when photometer is not in use.
- Press the **!** key to turn the display back light on or off.
- When moving the photometer from one temperature extreme to another, wait at least 10 minutes before use to allow photometer to come to temperature equilibrium.
- Contamination of the optics in the sample chamber will result in incorrect measurements. The windows in the sample chamber should be checked at regular intervals and cleaned as necessary. Use a soft moist cloth or cotton swab for cleaning purposes.
- If the sample cell adapter has been removed, it must be replaced with proper orientation, aligning the triangle on the adapter with the triangle on the photometer.
- The SAM calibration is factory set and the LED should not change under normal use conditions. However, it is good quality protocol to routinely verify the performance of any LED photometer. A verification kit (Cat. No I-0003) that can be used to verify the performance of this photometer is sold separately.

Displays and Troubleshooting

E01: Light absorption too great (dirty optics)
E20/E21: Too much light reaching detector
E22 or Battery Icon: Battery should be replaced
E27/E28/E29: Instrument zeroed incorrectly, misaligned adapter, vial not properly seated, dirty optics or failing light source.
Hi/E03: Measuring range exceeded or excessive turbidity
Lo: Test result has a negative value (less than 0 ppm)

Specifications

Auto Shutoff: After 15 minutes of non-use
Optics: 530 nm LED/interference filter and photosensor in transparent sample chamber
Operating Temp.: 5 to 40°C (41 to 104°F)
Battery: 4 AAA batteries (approx. 5,000 tests or 17 hours)
Waterproof: Floating, IP68 (1 hour at 0.1 meter)
Wavelength Accuracy: ± 1 nm
Photometric Accuracy: 3% full scale (T = 20 - 25° C / 68 - 77° F)
Photometric Resolution: 0.01 A
Ambient Conditions: Temperature 5 - 40° C / 41 - 104° F
Rel. humidity 30 - 90 % (non-condensing)
CE: Certificate of Declaration of CE-Conformity available upon request.

Menu Selection

Setting Date and Time

Upon initial start-up, the SAM will display "Set", "dAtE", and "YYYY", then a 4 digit number. Proceed to Step 4 in the procedure below to set the date and time, or power the instrument off and on again to bypass this process. At any time that the time and/or data need to be reset, follow steps 1-6 of the procedure below.

1. Press the Mode key and hold. Turn the instrument on by pressing and releasing the Power key. Once three decimal points appear in the display, release the Mode key. The display will show "di 5".
2. Press and release the ! key until the display shows arrows in the upper right and lower left corners of the display, pointing to "Time" and "Date".
3. Press the Mode key. "Set", "dAtE" will briefly appear in the display.
4. Date and time settings are displayed in the following order: Year ("YYYY"), Month ("MM"), Day ("dd"), Hour ("hh"), Minutes ("mm"). Increase the displayed value for each setting by pressing the Mode key or decrease the value by pressing the Zero/Test key until the desired value is displayed.
5. Press the ! key to save the displayed value and to proceed to the next setting.
6. After setting the minutes, press the ! key. The display will flash "iS" "SEt" and then will return to the measurement mode.

Recall of Stored Data

The SAM photometer automatically stores the last 15 data sets. To recall stored data:

1. Press the Mode key and hold. Turn the instrument on by pressing and releasing the Power key. Once three decimal points appear in the display, release the Mode key. The display will show "di 5".
   Note: If the instrument is already on, press and hold the ! key for at least 4 seconds and release to access the stored data.
2. Press the Mode key. The photometer will display the stored data sets in the following format:
   a. Sample Number: nXX (e.g. n15, n14, … n1)
   b. Year: XXXX (e.g. 2017)
   c. Date: mm.dd (e.g. 03.15)
   d. Time: hh.mm (e.g. 12:05)
   e. Analyte
   f. Result
3. Press the Zero/Test key to repeat the current data set.
4. Press the Mode key to proceed to the next data set.
5. Press the ! key to return to the measurement mode.

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Feb. 18, Rev. 9

Chlorine Vacu-vials® Kit

K-2513: 0 - 5.00 ppm (Prog. # 32)

K-2523: 0 - 5.00 ppm (Prog. # 32 or 33)

Instrument Set-up

For CHEMetrics photometers, follow the **Setup and Measurement Procedures** in the operator's manual.

For spectrophotometers, follow the manufacturer's instructions to set the wavelength to 515 nm and to zero the instrument using the ZERO ampoule supplied.

Safety Information

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

Free Chlorine Procedure

1. Fill the sample cup to the 25 mL mark with the sample to be tested (fig 1).
2. Place the Vacu-vial ampoule, tip first, into the sample cup. Snap the tip. The ampoule will fill leaving a bubble for mixing (fig 2).
3. To mix the ampoule, invert it several times, allowing the bubble to travel from end to end. Tap the bottom of the ampoule on a hard surface to cause any tiny bubbles that have collected on the ampoule wall to rise to the top of the liquid in the ampoule.
4. Dry the ampoule and wait **1 minute** for color development.
5. Insert the Vacu-vial ampoule into the photometer, flat end first, and obtain a reading in ppm (mg/Liter) chlorine (Cl_2).

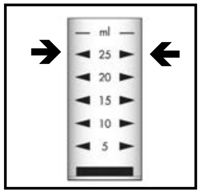

Figure 1

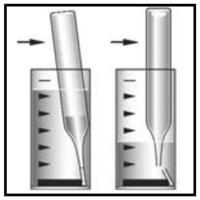

Figure 2

NOTE: **If using a spectrophotometer** that is not pre-calibrated for CHEMetrics products, then use the **equation below** or the **Concentration Calculator** found under the Support tab at *www.chemetrics.com*.

$$ppm = 0.50\,(abs)^2 + 3.54\,(abs) - 0.02$$

Total Chlorine Procedure (K-2513 only)

1. Add 5 drops of A-2500 Activator Solution to the empty sample cup.
2. Fill the sample cup to the 25 mL mark with the sample to be tested.
3. Immediately perform the **Free Chlorine Procedure** starting with Step 2.

Test Method

The Chlorine Vacu-vials®[1] test kit employs the DPD chemistry.[2,3] Free chlorine oxidizes DPD (N,N-diethyl-p-phenylenediamine) to form a pink colored species in direct proportion to the chlorine concentration. Other halogens, ozone and halogenating agents will produce high test results. Chlorine at concentrations significantly above the test range may prevent proper color development causing low test results.

K-2513 only: Total chlorine, the sum of free and combined chlorine, is determined by adding an excess of potassium iodide to the sample. Chloramines (combined chlorine) oxidize the iodide to iodine. The iodine then oxidizes DPD to the pink colored species.

1. Vacu-vials is a registered trademark of CHEMetrics, Inc. U.S. Patent No. 3,634,038
2. APHA Standard Methods, 22nd ed., Method 4500-Cl G - 2000
3. EPA Methods for Chemical Analysis of Water and Wastes, Method 330.5 (1983)

Visit www.chemetrics.com to view product demonstration videos.
Always follow the test procedure above to perform a test.

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Feb. 18, Rev. 23

Operating Instructions

OAKTON®

PCTSTestr™ 50 Pocket Tester

CE

Applications

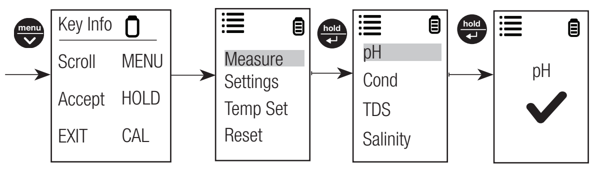
• Agriculture	• Drinking water	• Printing industry
• Aquaculture	• Ecology	• Swimming pools
• Aquariums and fish farms	• Electroplating rinse tanks	• Verification of reverse osmosis system operation
• Boiler blow-down	• Food sectors	• Water and waste-water treatment
• Car washes	• Hydroponics	
	• Labs	

Getting Started

The PCTSTestr 50 Pocket Tester has been factory calibrated and usually works well out of the box. However, after extended periods of non-use, it is best to remove the sensor cap and soak the sensor in warm tap water for 10 minutes or so. Prior to taking the measurements, periodic calibration with certified standards is recommended for best accuracy.

Measurement Parameter Setting

1. Press ON/OFF (⏻) to power on the tester.
2. Press MENU/∨ to enter setup window. Press HOLD/↵ to select Measure. The display shows pH, Cond, TDS and Salinity.
3. Scroll down by pressing MENU/∨ to toggle between pH, Cond, TDS and Salinity. Press HOLD/↵ to select pH.
4. The display shows the selected parameter with a ✔.

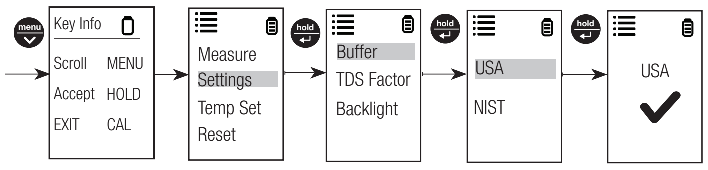


pH Buffer Set Selection

PCTSTestr 50 Pocket Tester features USA (pH 4.01, pH 7.00 and pH 10.01) or NIST (pH 4.01, pH 6.86, and pH 9.18) standards. Select either one to suit your requirements.

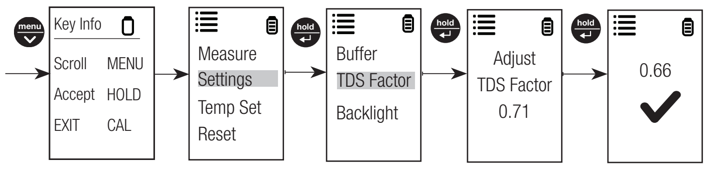
1. Press MENU/∨ to enter setup window. Press HOLD/↵ to select Settings. The display shows Buffer, TDS Factor and Backlight.

2. Press HOLD/↵ to select Buffer. Display shows USA and NIST.
3. Press HOLD/↵ to select USA or scroll down by pressing MENU/∨ to toggle between the two buffer standards.
4. The display shows the selected buffer standard with a ✔.



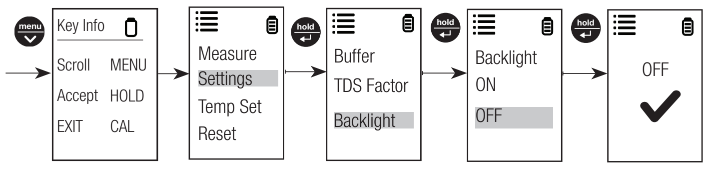
TDS Factor Setting

1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Settings.
2. Press HOLD/↵ to select Settings. The display shows Buffer, TDS Factor and Backlight.
3. Scroll down by pressing MENU/∨ to toggle between the Buffer, TDS Factor and Backlight. Press HOLD/↵ to select the TDS Factor.
4. Press HOLD/↵ to select the default TDS factory setting or MENU/∨ to adjust the setting.
5. Press HOLD/↵ to confirm the selection of the setting. The display shows the selected value (TDS factor) with a ✔.



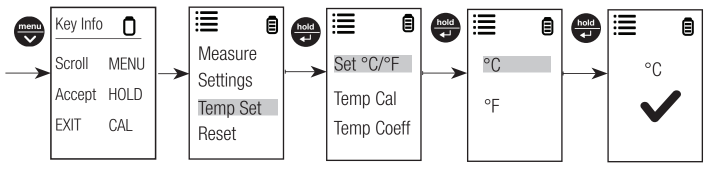
Backlight Settings

1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Settings.
2. Press HOLD/↵ to select Settings. The display shows Buffer, TDS Factor and Backlight.
3. Scroll down by pressing MENU/∨ to toggle between Buffer, TDS Factor and Backlight. Press HOLD/↵ to select Backlight.
4. The display shows ON and OFF. Scroll down by pressing MENU/∨ to toggle between ON and OFF. Backlight ON increases readability in low-light conditions.
5. Press HOLD/↵ to select the desired backlight option. The display shows the selected backlight option with a ✔.



Temperature Settings

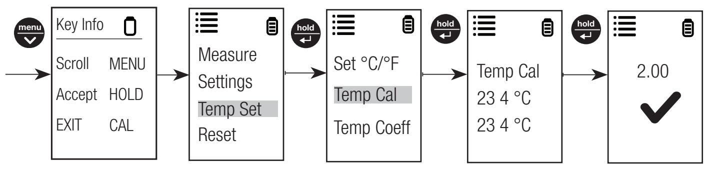
1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Temp Set. Press HOLD/↵ to select Temp Set. The display shows Set °C/°F, Temp Cal and Temp Coeff.
2. Press HOLD/↵ to select Set °C/°F. Scroll down by pressing MENU/∨ to toggle between °C and °F.
3. Press HOLD/↵ to select temperature unit. The display shows the selected temperature setting with a ✔.



Temperature Calibration

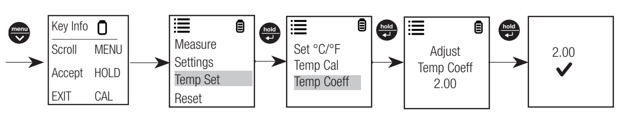
1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Temp Set.
2. Press HOLD/↵ to select Temp Set. The display shows Set °C/°F, Temp Cal and Temp Coeff.
3. Scroll down by pressing MENU/∨ to toggle between Set °C/°F, Temp Cal and Temp Coeff. Press HOLD/↵ to select Temp Cal.
4. The lower display shows the current measured temperature reading based on the last set offset and the upper display shows the current measured temperature reading based on factory default calibration.
5. Dip the tester into a solution of known temperature and allow time for the built-in temperature sensor to stabilize.
6. Press MENU/∨ to adjust the temperature value or press the HOLD/↵ to confirm the calibrated value as the new temperature value of the solution.

Note: To exit this program without confirming the calibration, press CAL/ESC.



Temperature Coefficient

1. Pres MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Temp Set.
2. Press HOLD/↵ to select Temp Set. The display shows Set °C/°F, Temp Cal and Temp Coeff.
3. Scroll down by pressing MENU/∨ to toggle between Set °C/°F, Temp Cal and Temp Coeff.
4. Press HOLD/↵ to select Temp Coeff or MENU/∨ to adjust the Temp Coeff.
5. Press HOLD/↵ to confirm the Temp Coeff value. The new value is automatically confirmed with a ✔.



pH Calibration

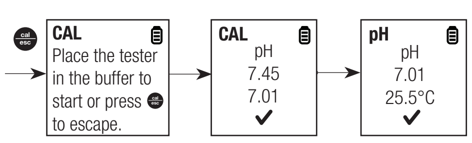
Calibration should be done regularly, recommended once a week. Calibrate up to three points using either the USA or the NIST buffer set standards.

1. Press ON/OFF (⏻) to power on the tester if needed.
2. Dip electrode about 2 cm to 3 cm into the pH standard buffer solution.
3. Stir gently and press CAL/ESC to enter calibration mode. The CAL indicator will be displayed. The upper display will show the measured reading based on the last calibration while the lower display will indicate the pH standard buffer solution.

Note: To abort calibration, press CAL/ESC to escape.

4. Allow about 2 minutes for the tester reading to stabilize. The timer icon blinks during this time. Once the reading is stabilized, the timer stops blinking. Automatic confirmation happens when the buffer is found and the display returned to measurement window with reading calibrated to pH standard buffer solution.
5. Repeat with other buffers if necessary. Rinse electrode before dipping into next buffer.

Note: The calibration mode allows you to perform up to three calibration points. Calibration is automatically confirmed with the buffer identification. No user interaction is required after starting the calibration by pressing CAL/ESC.

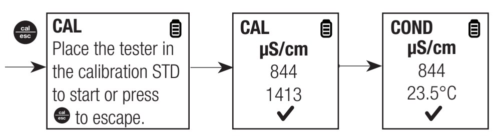


Calibration for Conductivity, TDS, or Salinity

For best results, periodic calibration with an accurate standard is recommended prior to measurement. Use the calibration standard value that is close to your intended sample value. The tester will retain one calibration value in each mode (conductivity, TDS, salinity) when the instrument is powered off. The conductivity value can be calibrated automatically or manually, while the TDS & salinity values require manual calibration. The tester will begin in the measurement mode that was used when it was powered off. See "Measurement Parameter Setting" to change the desired parameter.

Automatic Calibration for Conductivity

1. Remove the cap and press ON/OFF (⏻) to power on.
2. Dip the sensor in at least 30 mm of calibration standard.
3. Stir gently and press CAL/ESC to begin the calibration.
4. The display will show CAL followed by the default value. CAL is indicated on the display during calibration mode.
5. If the reading is within the calibration range of the automatically recognized standards; 80 (84 µS/cm), 1410 (1413 µS/cm), or 12.90 (12.88 mS/cm), the ✔ icon is displayed when the automatic calibration standard value has been detected.
6. Press HOLD/↵ to accept the auto conductivity standard and finish the calibration.
7. Display returns to Measurement window.



Manual Calibration

When the conductivity reading is outside calibration range of the automatic conductivity standards or when TDS or salinity is used, the tester will require manual adjustment.

1. Repeat steps 1 to 4 from "Automatic Calibration for Conductivity".
2. Press MENU/∨ to manually adjust the value to the desired reading.

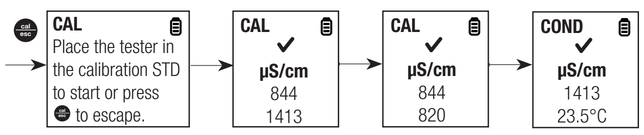
Note: The adjustment will decrease only, however the adjustment will eventually cycle to the highest available value after decreasing by 40% of the initial value.

3. Press HOLD/↵ to accept and finish the calibration when the desired value is selected.

Note: To abort calibration, press CAL/ESC to escape.

4. Once the calibration is finished and user has accepted the changes, measurement window will now show the calibrated reading.

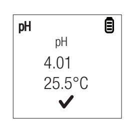
Note: The auto conductivity standards are 84 µS/cm, 1413 µS/cm & 12.88 mS/cm.



Measurement

1. Press ON/OFF (⏻) to power on the tester if needed.
2. Dip the electrode in about 2 cm to 3 cm into the test solution. Stir and let the reading stabilize. The timer icon will blink during this time. Once the reading is stabilized, the timer stops blinking and ✔ will appear to indicate the stability of the reading.

CAUTION: Testing dry samples is not accurate and can lead to sensor damage or breakage. Soils must be wet and free of particulates that may scratch the glass sensor. Excessive force into dry samples can cause glass breakage.

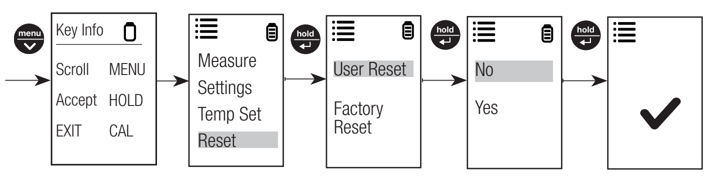


3. Note the value or press HOLD/↵ to freeze the reading. To release the reading, press HOLD/↵ again.
4. Press ON/OFF (⏻) for 3 seconds to turn off tester. If you do not press a button for 8.5 minutes, the tester will automatically shut off to conserve batteries.

User Reset

Reset to the user's default settings by using the User Reset function. Buffer selection and user temperature calibration are not affected by the user reset function.

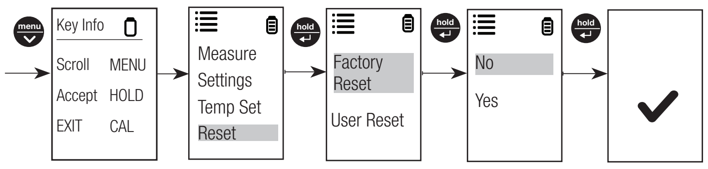
1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Reset. Press HOLD/↵ to select Reset. The display shows User Reset and Factory Reset.
2. Press HOLD/↵ to select User Reset.
3. The display automatically shows No and Yes. Scroll down by pressing MENU/∨ to toggle between No and Yes.
4. Press HOLD/↵ to confirm either No or Yes. The display shows the User Reset option with a ✔.



Factory Reset

Reset to the Factory Default Settings by using the Factory Reset function.

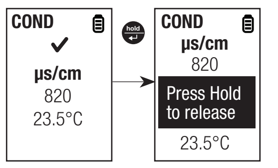
1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Reset. Press HOLD/↵ to select Reset. The display shows User Reset and Factory Reset.
2. Scroll down by pressing MENU/∨ to toggle between the resets. Press HOLD/↵ to select Factory Reset.
3. The display automatically shows No and Yes. Scroll down by pressing MENU/∨ to toggle between No and Yes.
4. Press HOLD/↵ to confirm either No or Yes. The display shows the Factory Reset option with a ✔.



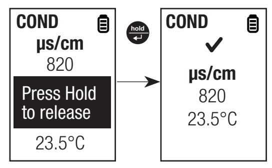
HOLD Function

This feature lets you freeze the display for a delayed observation.

1. Press HOLD/↵ button to freeze the measurement.



2. Press HOLD/↵ again to release the measurement.



Sensor Maintenance

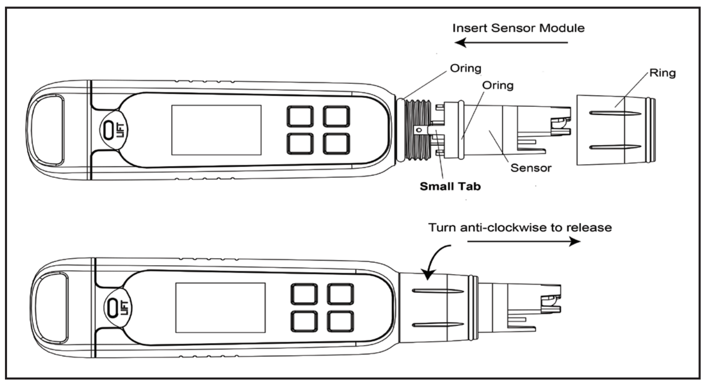
1. Always keep the sensor electrodes clean. Rinse the electrodes with de-ionized water and wipe them dry with clean cloth before storing with its protective cap. For cup type electrodes, remove the white plastic cup and insert to thoroughly clean viscous solutions. **Note:** Never scratch electrodes with a hard substance.
2. For better performance, soak the electrode in alcohol for 10 to 15 minutes and rinse with de-ionized water before starting any measurement process. This is to remove dirt and oil stains on the electrode, which may affect the accuracy of the measurements.

Sensor Replacement

You can replace the sensor module at a fraction of the cost of a new tester. When the tester fails to calibrate or gives fluctuating readings in calibration standards, you need to change the electrode.

1. With dry hands, grip the ring with sensor facing you. Twist the ring counterclockwise. Save the ring for later use.
2. Pull the old sensor module away from the tester.
3. Align the four tabs on the new module so that they match the four slots on the tester.
4. Gently push the module onto the slots to sit it in position. Push the smaller O-ring fully onto the new sensor module. Push the other O-ring over the module and thread it into place by firmly twisting clockwise.

Note: It is necessary that you recalibrate your tester prior to measurement after a sensor replacement.



Replacing the Batteries

The PCTSTestr 50 Pocket Tester uses four AAA 1.5 V batteries.

1. To remove the battery cover, see Figure 1. Clear the front catch and then the back catch, before sliding the cover off.
2. To remove the battery plate, push the center tab towards the front of the tester as shown in Figure 2. Once unlocked, remove the plate to access the batteries.
3. Invert the tester upside down to remove the batteries. Each side uses two AAA batteries. Orient each battery with positive terminal facing downward.
4. To lock the battery place, align the small tabs (Figure 3) into the guide ribs on the housing and then press down. See Figure 4.

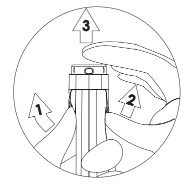


Fig. 1: Removing battery cover

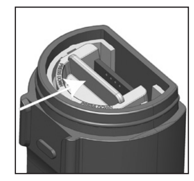


Fig. 2: Push to unlock

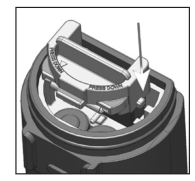


Fig. 3: Align tabs


Fig. 4: Push down to lock

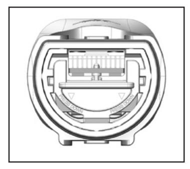


Fig. 5: Battery plate unlocked

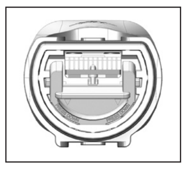


Fig. 6: Battery plate locked

Warranty

This instrument is supplied with a warranty against manufacturing defects for a period of one year from the date of purchase.

Return of Items

Authorization must be obtained from your distributor before returning items for any reason. When applying for authorization, please include information regarding the reason the item(s) are to be returned.

We reserve the right to make improvements in design, construction and appearance of products without notice. Prices are subject to change without notice.

Self-Diagnostic Messages

(battery icon)	Batteries are weak and need replacement soon.
stable error	Appears when calibration is attempted but the reading is not yet stable. Wait for the reading to stabilize or manually confirm the calibration by pressing enter.
buffer error	The buffer is outside of the calibration range.
slope error	The 2nd and 3rd calibration point is not within 80% to 120% slope range.
over range	The reading is above the measuring range of tester.
under range	The reading is below the measuring range of tester.

Specifications

Specifications	PCTSTestr 50
pH	
pH range	–1.00 to 15.00 pH
Resolution	0.01 pH
Relative accuracy	±0.01 pH
Calibration points	Up to 3 points
Buffer set standard selection	USA: 4.01/7.00/10.01 NIST: 4.01/6.86/9.18
Calibration window	±1.00 pH
Calibration type	Point to point
Conductivity	
Conductivity range	0.0 to 200.0 µS, 200 to 2000 µS, 2.00 to 20.00 mS
Resolution	0.1 µS, 1 µS, 0.01 mS
Relative accuracy	±1% full scale
Normalization temperature	25.0ºC (77ºF)
Temperature co-efficient	0.0% to 10.0%
Calibration points	Up to 3 points
TDS	
TDS range	0.0 to 100.0 ppm, 100 to 1000 ppm, 0.10 to 10.00 ppt (TDS factor 0.5)
Resolution	0.1 ppm, 1 ppm, 0.01 ppt
Relative accuracy	±1% full scale
Calibration points	Up to 3 points
TDS factor	0.40 to 1.00 (selectable)
Salinity	
Salinity range	0.00 to 10.00 ppt
Resolution	0.10 ppt
Relative accuracy	±1% full scale
Calibration points	1

Specifications (cont.)	PCTSTestr 50
Temperature	
Temperature range	0 to 60°C (32.0 to 140.0°F)
Temperature resolution	0.1°C / 0.1°F
Temperature accuracy	From 0 to 50ºC (±0.5°C / ±0.9°F + 1 LSD); from 50 to 60°C (±1.0ºC / ±1.8°F + 1 LSD)
Temperature compensation	Yes (Automatic Temperature Compensation)
General	
Display	Graphics, dot matrix 80 x 100 pixel
Backlight	Yes, selectable (30 sec from last key press)
Auto off	8.5 minutes (from last key press)
Reset	User / Factory
Power requirement	Four AAA 1.5 V batteries
Battery life	>150 hours
Water proofing	IP67
Regulatory certifications	CE, FCC
Environmental Operating Conditions	
Ambient operating temperature	5 to 45°C / 41 to 113°F
Relative humidity	5% to 85% noncondensing
Storage temperature	–20 to 60°C / –4 to 140°F
Storage humidity	5% to 85% noncondensing

Accessories

Ordering Code	Product Description
35634-35	PCTSTestr 50 pocket tester with case, lanyard, and batteries
35634-37	Replacement sensor module for PCTSTestr 50
35634-09	Replacement sensor cap
09376-00	Replacement alkaline batteries; AAA, 1.5 V. Pack of 12
17101-45	NIST-traceable calibration with data for pocket testers

OAKTON® INSTRUMENTS

www.4oakton.com

1065O100_MAN_35634-35 August, 2017

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.
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.

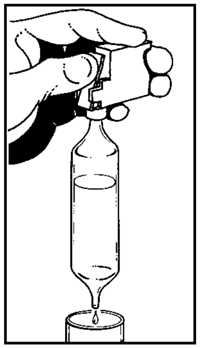


Figure 1

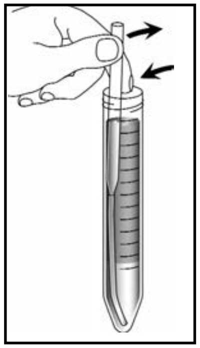


Figure 2

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

Appendix F – IDDE Employee Training Record

Illicit Discharge Detection and Elimination (IDDE)

Employee Training Record

Training dates for each employee are listed in the table below.

Name	Title	Training Date
Sarina Guerrero	Resident Engineer	4/28/2025
Gail Mazzio	Engineering Aide	4/28/2025
Alan Pulisciano	Engineering Aide	4/28/2025
Franklin Mateo	Engineering Aide	4/28/2025