Illicit Discharge Detection and Elimination (IDDE) Plan

Town of Wrentham, MA

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FUSS & O'NEILL

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Town of Wrentham

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1 Introduction

1.1 MS4 Program

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the Town of Wrentham to address the requirements of the United States Environmental Protection Agency's (USEPA's) 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 illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.
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.

Elimination of some discharges may require substantial costs and efforts, such as funding and designing a project to reconnect sanitary sewer laterals. Others, such as improving self-policing of dog waste management, can be accomplished by outreach in conjunction with the minimal additional cost of dog waste bins and the municipal commitment to disposal of collected materials on a regular basis.

Regardless of the intention, when not addressed, illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 Allowable Non-Stormwater Discharges

The following categories of non-storm water discharges are allowed under the MS4 Permit unless the permittee, USEPA 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
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

If these discharges are identified as significant contributors to the MS4, they must be considered an "illicit discharge" and addressed in the 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

Table 1-1 lists the "impaired waters" within the boundaries of Wrentham's regulated area based on the Massachusetts Integrated List of Waters produced by MassDEP every two years. 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.

Table 1-1. Impaired Waters

Wrentham, Massachusetts

Water Body Name	Segment ID	Category	Impairment(s)	Associated Approved TMDL
Lake Pearl	MA72092	4a	• Eurasian Water Milfoil, Myriophyllum spicatum • Non-native Aquatic Plants • Dissolved Oxygen	40319
Mirror Lake	MA72078	4a	• Non-native Aquatic Plants • Nutrient/Eutrophication Biological Indicators • Phosphorus (Total) • Secchi disk transparency	40319
Miscoe Lake	MA51106	4c	• Non-native Aquatic Plants	N/A
Lake Archer	MA72002	4c	• Non-native Aquatic Plants	N/A
Crocker Pond	MA62051	4c	• Non-native Aquatic Plants	N/A
Stop River	MA72-09	5	• Ambient Bioassays-Chronic Aquatic Toxicity • Dissolved Oxygen • Phosphorus (Total)	40317

Source: Massachusetts Year 2016 Integrated List of Waters (DEP, June 2017)
Category 4a Waters – impaired water bodies with a completed Total Maximum Daily Load (TMDL).
Category 4c Waters – impaired water bodies where the impairment is not caused by a pollutant. No TMDL required.
Category 5 Waters – impaired water bodies that require a TMDL.
"Approved TMDLs" are those that have been approved by EPA as of the date of issuance of the 2016 MS4 Permit.

TMDL number 40319/40317 refers to the Total Maximum Daily Load for Nutrients in the Upper/Middle Charles River. The TMDL states that illicit discharges are a substantial source of nutrient loading to the Charles River and includes a section on management and elimination of illicit discharges in applicable waterbodies. The document recommends that municipalities that are subject to the TMDL implement an IDDE program that includes dry and wet weather nutrient sampling, physical inspection and ongoing monitoring of stromwater infrastructure, a plan and schedule for illicit discharge elimination, and submission of annual progress reports. This IDDE plan includes those components and is appropriate for addressing the IDDE requirements of the TMDL for Nutrients in the Upper/Middle Charles River.

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 system and to prevent illicit discharges from happening in the future. The program consists of the following major components as outlined in the MS4 Permit:

- Legal authority and regulatory mechanism to prohibit illicit discharges and enforce this prohibition
- Storm system mapping
- Inventory and ranking of outfalls
- Dry weather outfall screening
- Catchment investigations
- Identification/confirmation of illicit sources
- Illicit discharge removal
- Follow-up screening
- 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 1-2**.

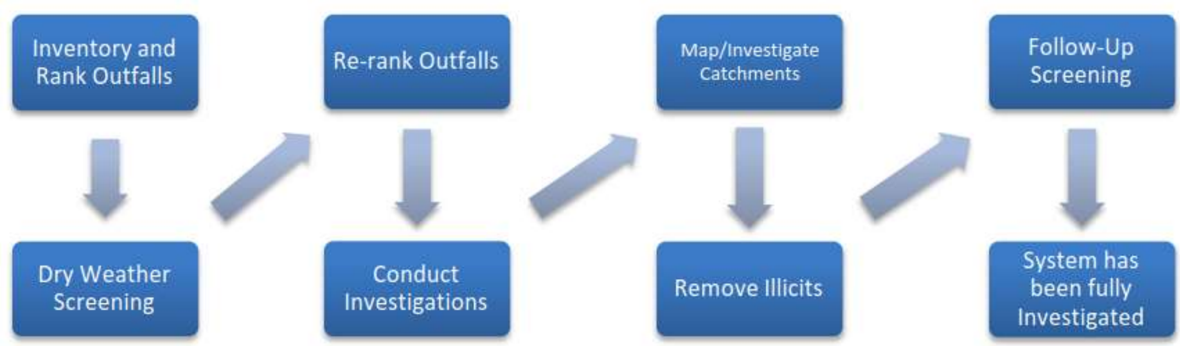

Figure 1-1. IDDE Investigation Procedure Framework

Table 1-2. IDDE Program Implementation Timeline

IDDE Program Requirement	Completion Date from Effective Date of Permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan	*X*					
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 Outfalls					*X*	
Catchment Investigations – all Problem, High and Low Priority Outfalls						*X*

1.6 Work Completed to Date

The 2003 MS4 Permit required each MS4 community 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 community was also required to define how confirmed discharges would be eliminated and how the removal would be documented.

The Town of Wrentham has completed the following IDDE program activities consistent with the 2003 MS4 Permit requirements:

- Developed a map of outfalls and receiving waters
- Developed procedures for locating illicit discharges (i.e., visual screening of outfalls for dry weather discharges, dye or smoke testing)
- Developed procedures for locating the source of the discharge
- Developed procedures for removal of the source of an illicit discharge
- Developed procedures for documenting actions and evaluating impacts on the storm sewer system subsequent to removal

In addition to the 2003 MS4 Permit requirements, other IDDE-related activities that are underway to achieve compliance with the 2016 MS4 permit include:

- SSO inventory
- Outfall sampling
- Additional storm system mapping, including the locations of catch basins, manholes and pipe connectivity

2 Authority and Statement of IDDE Responsibilities

2.1 Legal Authority

The Town of Wrentham will adopt a bylaw, ordinance, or other regulatory mechanism to provide the Town 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
- Implement appropriate enforcement procedures and actions.

The bylaw, ordinance, or other regulatory mechanism will meet the requirements of the 2016 MS4 Permit and will be in place within 3 years of the permit effective date (July 1, 2021).

2.2 Statement of Responsibilities

The Department of Public Works is the lead municipal agency or department responsible for implementing the IDDE program. **Table 2-1** outlines specific roles and responsibilities for the Town's IDDE program.

Table 2-1. IDDE Program Responsibilities

Responsible Department/Staff	IDDE Program Element
Department of Public Works	• Conduct system screening and sampling • Update stormwater system mapping as required • Maintain SSO inventory and tracking • Ensures that staff receives training in illicit discharge detection and elimination
Board of Health	• Address any public health risks associated with illicit discharges or SSOs • Assist the Department of Public Works with mitigation and corrective measures in the event of an SSO or illicit discharge as it may relate to public health • Assist the Department of Public Works with IDDE elimination and other program components as appropriate/required
Conservation Commission	• Assist the Department of Public Works with implementation of the IDDE program and SSO inventory as needed

3 Stormwater System Mapping

The Town of Wrentham originally developed mapping of its stormwater system to meet the mapping requirements of the 2003 MS4 Permit. A copy of the existing storm system map is provided in **Appendix B**. 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. The Department of Public Works is responsible for updating the stormwater system mapping pursuant to the 2016 MS4 Permit. The Town of Wrentham will report on the progress towards completion of the storm system map in each annual report. Updates to the stormwater mapping will be included in **Appendix B**.

3.1 Phase I Mapping

Phase I mapping must be completed within two (2) years of the effective date of the permit (July 1, 2020) and include the following information:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally 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
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

The Town of Wrentham has completed the following updates to its stormwater mapping to meet the Phase I requirements:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- Initial catchment delineations

The Town of Wrentham will update its stormwater mapping by July 1, 2020 to include the remaining Phase I information.

3.2 Phase II Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (July 1, 2028) and include the following information:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes

- Catch basins
- Refined catchment delineations. Catchment delineations must be updated to reflect information collected during catchment investigations.
- Municipal Sanitary Sewer system (if available)
- Municipal combined sewer system (if applicable).

Phase II mapping also requires inclusion of the municipal sanitary sewer system and combined sewer system, if applicable. The Town of Wrentham is served entirely by septic systems, therefore these factors do not apply. The Town of Wrentham has completed the following updates to its stormwater mapping to meet the Phase II requirements:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins

The Town of Wrentham will update its stormwater mapping by July 1, 2027 to include the remaining following Phase II information.

3.3 Additional Recommended Mapping Elements

Although not a requirement of the 2016 MS4 Permit, the Town of Wrentham's mapping already contains partial or complete information for the following recommended elements in its storm system mapping in the MS4-regulated area (Urbanized Area):

- Storm sewer material, size (pipe diameter), age
- Sanitary sewer system material, size (pipe diameter), age
- Privately owned stormwater treatment structures
- Where a municipal sanitary sewer system exists, properties known or suspected to be served by a septic system, especially in high density urban areas
- Area where the permittee's MS4 has received or could receive flow from septic system discharges
- Seasonal high water table elevations impacting sanitary alignments
- Topography
- Orthophotography
- Alignments, dates and representation of work completed of past illicit discharge investigations
- Locations of suspected confirmed and corrected illicit discharges with dates and flow estimates.

4 Sanitary Sewer Overflows (SSOs)

The 2016 MS4 Permit requires municipalities 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.

The Town of Wrentham has completed an inventory of SSOs that have discharged to the MS4 within the five (5) years prior to the effective date of the 2016 MS4 Permit, based on review of available documentation pertaining to SSOs (**Table 4-1**). The majority of the Town of Wrentham is served by septic systems. There have been no SSOs that have discharged to the MS4 within the five years prior to the effective date of the 2016 MS4 Permit in the area of Town serviced by sewer. The Town will continue to maintain an inventory of any SSOs that occur in the area of Town serviced by sewers. The inventory will include 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, the Town of Wrentham will 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, the Town will provide oral notice to EPA within 24 hours and written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence.

The inventory in **Table 4-1** will be updated by the Department of Public Works 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

Wrentham, Massachusetts
Revision Date: June 30, 2019

SSO Location[1]	Discharge Statement[2]	Date[3]	Time Start[3]	Time End[3]	Estimated Volume[4]	Description[5]	Mitigation Completed[6]	Mitigation Planned[7]

[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
[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

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[1] or interconnection.[2] 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 topographic contours and mapped drainage infrastructure, 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

5.2 Outfall and Interconnection Inventory and Initial Ranking

The Department of Public Works will complete an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information. The initial inventory and ranking will be completed within one (1) year from the effective date of the permit. An updated inventory and ranking will be provided in each annual report thereafter. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections. A copy of the outfall inventory and priority ranking is provided as **Appendix G**.

The outfall and interconnection inventory will identify each outfall and interconnection discharging from the MS4, record its location and condition, and provide a framework for tracking inspections, screenings and other IDDE program activities.

Outfalls and interconnections will be classified into one of the following categories:

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:

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[1] **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.

[2] **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.

- 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.

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.

2. **High Priority Outfalls**: Outfalls/interconnections that have not been classified as Problem Outfalls and that are:

   - Discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds
   - Determined by the permittee as high priority based on the characteristics listed below or other available information.

3. **Low Priority Outfalls**: Outfalls/interconnections determined by the permittee as low priority based on the 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. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

Outfalls will be ranked into the above priority categories (<u>except for excluded outfalls, which may be excluded from the IDDE program</u>) based on the following characteristics of the defined initial catchment areas, where information is available. Additional relevant characteristics, including location-specific characteristics, may be considered but must be documented in this IDDE Plan.

- **Previous screening results –** previous screening/sampling results indicate likely sewer input (see criteria above for Problem Outfalls).

- **Past discharge complaints and reports.**

- **Poor receiving water quality –** the following guidelines are recommended to identify waters as having a high illicit discharge potential:
  - Exceeding water quality standards for bacteria
  - Ammonia levels above 0.5 mg/l
  - Surfactants levels greater than or equal to 0.25 mg/l

- **Density of generating sites –** Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers; car washes; gas stations; garden centers; and industrial manufacturing areas.

- **Age of development and infrastructure** – Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low illicit discharge potential.

- **Sewer conversion** – Contributing catchment areas that were once serviced by septic systems, but have been converted to sewer connections may have a high illicit discharge potential.

- **Historic combined sewer systems** – Contributing areas that were once serviced by a combined sewer system, but have been separated may have a high illicit discharge potential.

- **Surrounding density of aging septic systems** – Septic systems thirty years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential.

- **Culverted streams** – Any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential.

- **Water quality limited waterbodies** that receive a discharge from the MS4 or waters with approved TMDLs applicable to the permittee, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.

Table 5-1 provides a sample format for an outfall inventory and priority ranking matrix.

Table 5-1. Outfall Inventory and Priority Ranking Matrix

Wrentham, Massachusetts
Revision Date:

Outfall ID	Receiving Water	Previous Screening Results Indicate Likely Sewer Input? [1]	Discharging to Area of Concern to Public Health? [2]	Frequency of Past Discharge Complaints	Receiving Water Quality [3]	Density of Generating Sites [4]	Age of Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic? [7]	Culverted Streams? [8]	Additional Characteristics	Score	Priority Ranking
Information Source		Outfall inspections and sample results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Town Staff, GIS Maps	Land Use, Town Staff	GIS and Storm System Maps	Other		
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occasional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0	TBD		
Sample 1	XYZ River	3	0	2	0	2	1	0	0	3	None	11	Problem
Sample 2	XYZ Lake	0	3	0	3	1	2	0	3	3	None	15	High Priority
Sample 3	XYZ Stream	0	0	2	0	1	1	0	0	0	None	4	Low Priority

Scoring Criteria:

[1] Previous screening results indicate likely sewer input if any of the following are true:

- 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

[2] Outfalls/interconnections that discharge to or in the vicinity of any of the following areas: public beaches, recreational areas, drinking water supplies, or shellfish beds

[3] Receiving water quality based on latest version of MassDEP Integrated List of Waters.

- Poor = Waters with approved TMDLs (Category 4a Waters) where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment
- Fair = Water quality limited waterbodies that receive a discharge from the MS4 (Category 5 Waters)
- Good = No water quality impairments

[4] Generating sites are institutional, municipal, commercial, or industrial sites with a potential to contribute to illicit discharges (e.g., car dealers, car washes, gas stations, garden centers, industrial manufacturing, etc.)

[5] Age of development and infrastructure:

- High = Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old
- Medium = Developments 20-40 years old
- Low = Developments less than 20 years old

[6] Areas once served by combined sewers and but have been separated, or areas once served by septic systems but have been converted to sanitary sewers.

[7] Aging septic systems are septic systems 30 years or older in residential areas.

[8] Any river or stream that is culverted for distance greater than a simple roadway crossing.

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 Department of Public Works is responsible for conducting dry weather outfall screening, starting with High Priority outfalls, followed by Low Priority outfalls, based on the initial priority rankings described in the previous 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. For purposes of determining dry weather conditions, program staff will use precipitation data from Norwood Memorial Airport. If Norwood Memorial Airport is not available or not reporting current weather data, then data from a local weather station provided by Weather Underground (wunderground.com) will be used as a back-up.

6.2 Dry Weather Screening/Sampling Procedure

6.2.1 General Procedure

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
2. Acquire the necessary staff, mapping, and field equipment (see **Table 6-1** for list of potential field equipment)
3. Conduct the outfall inspection during dry weather:
    a. Mark and photograph the outfall
    b. Record the inspection information and outfall characteristics (using paper forms or digital form using a tablet or similar device) (see form in **Appendix C**)
    c. 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), revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow. Other techniques can be used to detect intermittent or transitory flows including conducting inspections during evenings or weekends and using optical brighteners.
6. Input results from screening and sampling into spreadsheet/database. Include pertinent information in the outfall/interconnection inventory and priority ranking.

7. Include all screening data in the annual report.

Previous outfall screening/sampling conducted under the 2003 MS4 Permit may be used to satisfy the dry weather outfall/screening requirements of the 2016 MS4 Permit only if the previous screening and sampling was substantially equivalent to that required by the 2016 MS4 Permit, including the list of analytes outlined in Section 2.3.4.7.b.iii.4 of the 2016 permit.

6.2.2 Field Equipment

Table 6-1 lists field equipment commonly used for dry weather outfall screening and sampling.

Table 6-1. Field Equipment – Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Sheets	Field sheets for both dry weather inspection and Dry weather sampling should be available with extras
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/headlamp w/batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, Safety glasses and boots at a minimum
GPS Receiver	For taking spatial location data
Water Quality Sonde	If needed, for sampling conductivity, temperature, pH
Water Quality Meter	Hand held meter, if available, for testing for various water quality parameters such as ammonia, surfactants and chlorine
Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean. 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).
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
Measuring Tape	Measuring distances and depth of flow
Safety Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Zip Ties/Duct Tape	For making field repairs

Equipment	Use/Notes
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes

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[3] listed in **Table 6-2**. The general procedure for collection of outfall samples is as follows:

1. Fill out all sample information on sample bottles and field sheets (see **Appendix C** for Sample Labels and Field Sheets)
2. Put on protective gloves (nitrile/latex/other) before sampling
3. Collect sample with dipper or directly in sample containers. If possible, collect water from the flow directly in the sample bottle. Be careful not to disturb sediments.
4. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled (not for bacteria sampling)
5. Use test strips, test kits, and field meters (rinse similar to dipper) for most parameters (see **Table 6-2**)
6. Place laboratory samples on ice for analysis of bacteria and pollutants of concern
7. Fill out chain-of-custody form (**Appendix C**) for laboratory samples
8. Deliver samples to a contract laboratory
9. Dispose of used test strips and test kit ampules properly
10. Decontaminate all testing personnel and equipment

In the event that an outfall is submerged, either partially or completely, or 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.

Field test kits or field instrumentation are permitted for all parameters except indicator bacteria and any pollutants of concern. Field kits need to have appropriate detection limits and ranges. **Table 6-2** 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 D**.

[3] 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).

Table 6-2. 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	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 Hach™ Pocket Colorimeter™ II	NA
Conductivity	CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Salinity	YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Indicator Bacteria: *E. coli* (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern[1]	EPA certified laboratory procedure (40 CFR § 136)	NA

[1] 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.

Testing for indicator bacteria and any pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR § 136.[4] Samples for laboratory analysis must also be stored and preserved in accordance with procedures found in 40 CFR § 136. **Table 6-3** lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

[4] 40 CFR § 136: http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5

Table 6-3. Required Analytical Methods, Detection Limits, Hold Times, and Preservatives[4]

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	**EPA**: 350.2, **SM**: 4500-NH3C	0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2, No preservative required if analyzed immediately
Surfactants	**SM**: 5540-C	0.01 mg/L	48 hours	Cool ≤6°C
Chlorine	**SM**: 4500-Cl G	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	**SM**: 2550B	*NA*	Immediate	None Required
Specific Conductance	**EPA**: 120.1, **SM**: 2510B	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	**SM**: 2520	-	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 (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.)	**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

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 6-4** 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 6-4. 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[5]: *E.coli* *Enterococcus*	*E.coli*: the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml *Enterococcus:* the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 33 colonies per 100 ml and no single sample taken during the bathing season shall exceed 61 colonies per 100 ml

6.4 Follow-up Ranking of Outfalls and Interconnections

The Town of Wrentham will update and re-prioritize the initial outfall and interconnection rankings based on information gathered during dry weather screening. The rankings will be updated periodically as dry weather screening information becomes available, but will be completed within three (3) years of the effective date of the permit (July 1, 2021).

Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input are highly likely to contain illicit discharges from sanitary sources. Such outfalls/interconnections will be ranked at the top of the High Priority Outfalls category for investigation. Other outfalls and interconnections may be re-ranked based on any new information from the dry weather screening.

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

[5] Massachusetts Water Quality Standards: http://www.mass.gov/eea/docs/dep/service/regulations/314cmr04.pdf

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

The Department of Public Works or their designated consultant 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:

- Plans related to the construction of the drainage network
- Plans related to the construction of the sewer drainage network
- Prior work on storm drains or sewer lines
- Board of Health or other municipal data on septic systems
- Complaint records related to SSOs
- Septic system breakouts.

Based on the review of this information, the presence of any of the following required **System Vulnerability Factors (SVFs)** will be identified for each catchment:

<u>Required</u>
- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
- Common or twin-invert manholes serving storm and sanitary sewer alignments
- Common trench construction serving both storm and sanitary sewer alignments
- Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
- Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
- Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
- Areas formerly served by combined sewer systems
- 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

<u>Recommended</u>
- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
- Any sanitary sewer and storm drain infrastructure greater than 40 years old
- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)

- History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).

A SVF inventory will be documented for each catchment (see **Table 7-1**), retained as part of this IDDE Plan, and included in the annual report.

Table 7-1. Outfall Catchment System Vulnerability Factor (SVF) Inventory

Wrentham, Massachusetts
Revision Date:

Outfall ID	Receiving Water	1 History of SSOs	2 Common or Twin Invert Manholes	3 Common Trench Construction	4 Storm/Sanitary Crossings (Sanitary Above)	5 Sanitary Lines with Underdrains	6 Inadequate Sanitary Level of Service	7 Areas Formerly Served by Combined Sewers	8 Sanitary Infrastructure Defects	9 SSO Potential In Event of System Failures	10 Sanitary and Storm Drain Infrastructure >40 years Old	11 Septic with Poor Soils or Water Table Separation	12 History of BOH Actions Addressing Septic Failure
Sample 1	XYZ River	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Presence/Absence Evaluation Criteria:

1. History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
2. Common or twin-invert manholes serving storm and sanitary sewer alignments
3. Common trench construction serving both storm and sanitary sewer alignments
4. Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
5. Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
6. Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
7. Areas formerly served by combined sewer systems
8. 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
9. Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
10. Any sanitary sewer and storm drain infrastructure greater than 40 years old
11. Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)
12. History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)

7.2 Dry Weather Manhole Inspections

The Town of Wrentham will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs.

The Department of Public Works will be responsible for implementing the dry weather manhole inspection program and making updates as necessary. 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 the field investigations, where necessary.

Several important terms related to the dry weather manhole inspection program 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 **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.

For most catchments, manhole inspections will proceed from the outfall moving up into the system. However, 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 advance preparation and reliable drainage system information on the upstream segments of the storm drain system, but may be more efficient if the sources of illicit 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.

Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections. A sample field inspection form is provided in **Appendix C**.

2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Field kits can be used for these analyses. 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, etc.).

3. 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. Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes.

5. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

7.3 Wet Weather Outfall Sampling

Where a minimum of one (1) System Vulnerability Factor (SVF) is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. The Department of Public Works will be responsible for implementing the wet weather outfall sampling program and making updates as necessary.

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.

2. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. There is no specific rainfall amount that will trigger sampling, although minimum storm event intensities that are likely to trigger sanitary sewer interconnections are preferred. 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) for these and other IDDE methods are provided in **Appendix F**.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Department of Public Works will notify property owners in the affected area.

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. Finding appropriate durations of dry weather and the need for multiple trips to each manhole makes this method both time-consuming and somewhat limiting.

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 place 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 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 and sanitary 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, it can be costly and time consuming when compared to other source isolation techniques.

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.

7.5 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, the Town of Wrentham will exercise its authority as necessary to require its removal. 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
- 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 E**. 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
- Estimate of the volume of sewage removed, as applicable
- 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

Legal Authority (IDDE Bylaw or Ordinance)

Legal Authority (IDDE Bylaw or Ordinance)

The Town of Wrentham has formed a stormwater committee that is currently in the process of developing a bylaw/ordinance to provide legal authority to address illicit discharges as required in the permit. Once the ordinance has been formally adopted, this IDDE Plan will be updated to include a copy of the bylaw/ordinance.

Appendix B

Storm System Mapping

Appendix C

Field Forms, Sample Bottle Labels, and Chain of Custody Forms

Outfall/Catchment Screening Form

Catchment ID: ______________ **Town:** ____________________

Inspector: ______________ **Date:** ____________________

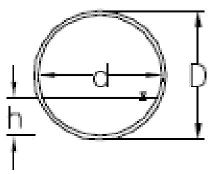
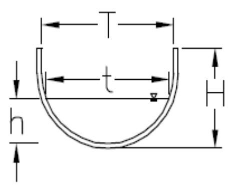
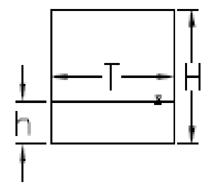
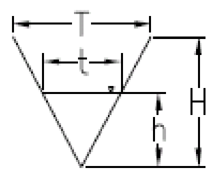
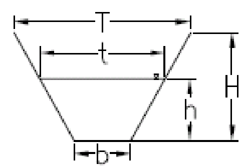
Street Name: ____

Last rainfall event (date and amount): ____

Type of Sampling Event ☐ Dry Weather Screening
☐ Wet Weather Sampling

Location: ☐ Outfall
☐ Manhole
☐ Catch Basin
☐ Interconnection

Is outfall submerged/inundated ? ☐ Yes ☐ No If YES screen/sample at 1st non-influenced structure: ☐ MH ☐ CB		
Location ID:	**Latitude:**	**Longitude:**

Shape of Pipe/Swale (check one)				
 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe	**Rounded Swale**	**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Outfall Material:	**Pipe Measurements:**	**Swale Measurements:**
☐Concrete ☐HDPE ☐Corrugated Metal Pipe (CMP) ☐ Ductile Iron ☐ Clay ☐ PVC ☐ Other **Outfall/Manhole/Catchbasin Condition:** ☐ Good ☐ Fair ☐ Poor ☐Crumbling	Inner Dia. (in): d = Outer Dia. (in.): D = Pipe Width (in.): W = Pipe Height (in.): H = Flow Depth (in.): h =	Swale Width (in): T = Flow Width (in.): t = Swale Height (in.): H = Flow Depth (in.): h = Bottom Width (in.): b =

Evidence of Flow: ☐ Yes ☐ No **If Yes, Description of Flow:** ☐ Damp ☐ Trickle ☐ Moderate ☐ High

Visual Evidence of Illicit Discharge
Visual Inspection: ☐ None ☐ Floatables ☐ Pet Waste ☐Oily Sheen ☐ Sanitary Waste ☐ Algae ☐ Foam

Olfactory Evidence of Illicit Discharge
Olfactory Inspection: ☐ None ☐ Sewage Smell ☐ Musty ☐ Rotten Eggs ☐ Ammonia ☐ Petroleum

Samples Taken and Sampling Results			
Temp.	Conductivity	Salinity	Chlorine
Ammonia	Surfactants	Bacteria	Pollutant of Concern

Manhole Inspection Form

Catchment ID	**Date**
Manhole ID	**Rain Last 48 Hours**
Street Location	
Inspector	

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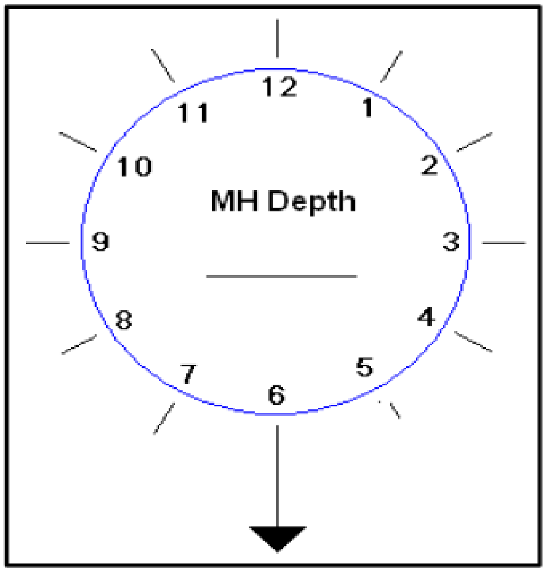


Sketch direction(s) of incoming flow

Clock Position (1-12) Pipe Material (Concrete, HDPE, PVC, Ductile Iron, CMP)	Pipe Diameter (in.)	Invert Elevation (ft)	Upgradient Structure/Source (MH ID, CB, Priv, Unk)	Flow (Damp, Trickle, Moderate, High)

Cover Conditions: Diameter of clear opening (in.) Buried: ☐ Cannot Inspect: ☐ Cannot Locate: ☐

Evidence of Flow: ☐ Yes ☐ No **If Yes, Description of Flow:** ☐ Damp ☐ Trickle ☐ Moderate ☐ High

Visual Evidence of Illicit Discharge

Visual Inspection: ☐ None ☐ Floatables ☐ Pet Waste ☐Oily Sheen ☐ Sanitary Waste ☐ Algae ☐ Foam

Olfactory Evidence of Illicit Discharge

Olfactory Inspection: ☐ None ☐ Sewage Smell ☐ Musty ☐ Rotten Eggs ☐ Ammonia ☐ Petroleum

Samples Taken and Sampling Results

Temp.	Conductivity	Salinity	Chlorine
Ammonia	Surfactants	Bacteria	Pollutant of Concern

COMMENTS:

Further investigation needed? ☐ Yes ☐ No

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

Address:

Date: Time:
Preservative: ICE/HCl/H_2O/MeOH/F/HNO^3/H_2SO^4/NaOH
Project: Location:
Project #:
Sampler:
Sample ID:

ADDRESS:

CHAIN-OF-CUSTODY RECORD   NO. ____________

[illegible]

☐ 24-Hour* ☐ 72-Hour* ☐ Other ______ (days)
☐ 48-Hour* ☐ Standard (____ days) *Surcharge Applies

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY

REPORT TO:

INVOICE TO:

P.O. NO.:

Sampler's Signature: Date:

Source Codes:
MW=Monitoring Well PW=Potable Water T=Treatment Facility S=Soil B=Sediment
SW=Surface Water ST=Stormwater W=Waste A=Air C=Concrete
X=Other ______________________________

Analysis Request

Containers

Item No.	Transfer Check 1	2	3	4	Sample Number	Source Code	Date Sampled	Time Sampled									Soil VOA Vial, ☐ methanol	Soil VOA Vial, ☐ water ☐ $Na(SO_4)_2$	Glass Soil Container ( ) oz	Other:	Other:	Water VOA Vial, ☐ As is ☐ HCl	Glass Amber ( ) ml, ☐ As is ☐ H_2SO_4	Plastic - As is, ☐ 250 ml ☐ 500 ☐ 1000 ml	Plastic - H_2SO_4, ☐ 250 ml ☐ 500 ml	Plastic - HNO_3, 250 ml ☐ Filtered ☐ 0.45μ ☐ 10μ	Plastic - NaOH, 250 ml	Comments

Transfer Number	Relinquished By	Accepted By	Date	Time
1				
2				
3				
4				

Charge Exceptions: ☐ CT Tax Exempt ☐ QA/QC ☐ Other ______________
____ Duplicates ____ Blanks (Item Nos:)

Reporting and Detection Limit Requirements: ☐ RCP Deliverables ☐ MCP CAM Cert.

Additional Comments:

Appendix D

Water Quality Analysis Instructions, User's Manuals and Standard Operating Procedures

INTRODUCTION

This Standard Operating Procedure (SOP) applies to the collection of water quality samples at in-stream locations and stormwater outfalls, for the purposes of compliance with the MS4 General Permit, including chemical and bacteriological sampling.

FIELD PERSONNEL PROTECTION

Field personnel will protect themselves from potential exposure to pathogens and other contaminants. Precautions against exposure include the use of nitrile gloves and protective eyewear while collecting samples. Face shields will be worn if samples are collected from CSO regulator box and CSO outfall/intermediate manhole locations. Safety glasses with side shields will be worn by the sampler at all other sample locations.

Some work will be performed in flowing water. A personal flotation device will be worn while wearing chest or hip waders. Additionally, sampling will not be conducted alone. For work performed in roadways, samplers are required to wear a high visibility vest or clothing and use traffic cones for visibility. An escort vehicle/traffic detail will be provided when necessary to enhance visibility at road locations and provide additional eyes to look for potential safety issues.

COOLER PREPARATION

Before sampling begins, all coolers to be used for sample transport will be prepared with ice/water mixtures to ensure uniformity and that appropriate sample preservation temperatures (<4°C) are met.

1. Add ice to each cooler until the cooler is approximately half full. Once ice has been added to the cooler, add distilled water until the water level is at or near the ice surface. At this point the cooler is ready to accept samples and should be kept closed and shaded.

2. Periodically monitor water and ice levels in the coolers during the sampling event to ensure an appropriate amount of ice such that sample temperatures remain at or below 4°C. If additional ice needs to be added, first drain a portion of the water, not to exceed half of the water level, and add ice as necessary to ensure proper temperatures.

3. Samples should not rest on top of the ice/water mixture; rather they should be submerged or nearly submerged at all times. Be sure that all caps are tightened and undamaged. To avoid possible cross-contamination, sample bottles should be placed in unused colorless plastic zip-type bags by sample location.

4. Store the sample on wet ice in a clean cooler until it is delivered to the lab. Each cooler must contain a temperature blank, used to measure cooler temperature upon arrival at the lab. Unless samples were collected within 2 hours of delivery to the lab, chemical samples warmer than 6°C will be flagged, and bacteriological samples warmer than 10°C will be flagged.

SAMPLE BOTTLES AND ORDER OF FILLING

Table 1 lists the sampling parameters and bottles, in the order they should be collected, which is generally in order of decreasing volatility. Sample preservatives will be included in the appropriate bottles provided by the laboratory. Field sampling personnel should double-check via visual inspection prior to sampling to make sure the bottles have the appropriate preservative. Care should be taken not to displace preservative during filling of the sample bottle. Unfilled sample bottles should be kept cool, and potentially on ice, during extremely hot weather to prevent volatilization of any acid preservatives.

Table 1. Sample parameters, bottle size, preservative, headspace recommendation, and holding time.

Parameter	Sampling Technique	Sample Volume	Sample Preservation	Maximum Holding Time	Quality Control Procedure	Headspace
Volatile Organic Compounds	grab sample	40 ml	Hydrochloric acid; 4°C	14 days	Collect 1 duplicate field sample per team, per event	None
Semi-volatile Organic Compounds	grab sample	1000 ml	4°C; protect from light	40 days	Collect 1 duplicate field sample per team, per event	None
E. coli	grab sample	120 ml	Sterile container (sodium thiosulfate); 4°C	6 hours	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder (or fill indicator line)
Chemical Oxygen Demand	grab sample	500 ml	Sulfuric acid to pH <2	28 days	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder
Oil & Grease	grab sample	1000 ml	Sulfuric acid to pH <2; 4°C	28 days	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder
Phosphorus	grab sample	500 ml	Sulfuric acid to pH <2; 4°C	28 days	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder
Total Kjeldahl Nitrogen	grab sample	500 ml	Sulfuric acid to pH 1.5-2; 4°C	28 days	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder

Parameter	Sampling Technique	Sample Volume	Sample Preservation	Maximum Holding Time	Quality Control Procedure	Headspace
Total Metals	grab sample	250 ml	Nitric acid to pH <2; 4°C	6 months	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder
Hardness	grab sample	250 ml	Nitric acid to pH <2; 4°C	6 months	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder
Dissolved Metals	grab sample	250 ml	4°C	6 months	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder
Total Suspended Solids	grab sample	500 ml	4°C	7 days	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder
Turbidity	grab sample	500 ml	4°C	48 hours	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder
Pesticides	grab sample	1000 ml	4°C	40 days	Collect 1 duplicate field sample per team, per event	Fill to bottle shoulder

SAMPLING METHODS

Sample collection methods will differ depending on location type and based on site-specific factors such as water level, discharge velocity, water depth, and safety. The technique used for sample collection should be selected in the following order of priority, considering site access and safety (sampling should be conducted in the safest manner possible):

1. Direct Collection – preferred whenever possible
2. Pole Sampling – when direct collection is not feasible or cannot be done safely

In-Stream Locations (Dry and Wet Weather)

For in-stream sampling locations, water samples will be collected from flowing water, and mid-stream to ensure that the water is not stagnant. The sample will be collected upstream of the sampler, so as not to have interference from disturbed sediments during collection and to minimize the potential for the sampler to contaminate the sample. If more than one sample is needed at a particular location or two sampling sites are in close proximity, the downstream samples will be collected before upstream samples. For direct sample collection, the sampler should use waders or hip boots to access the mid-stream sampling location. If water depths or water velocity prevent direct collection, a sample should be collected using a sampling pole.

Stormwater Outfalls (Dry Weather if flowing, and Wet Weather)

Stormwater outfall samples will be collected from the outlet of the outfall and by direct collection where possible. In situations where water depth or velocity prevents direct collection, samples will be taken using a sampling pole where appropriate. Samples should be collected from the direct flow emanating from the outfall and care should be taken not to touch the lip of the sample bottle to the outfall or otherwise contaminate the sample. In instances where outfalls are inundated due to elevated river levels, samples will be collected at the nearest accessible upstream manhole.

SAMPLING TECHNIQUES AND METHODS

In general, when the sample location is easily accessible by foot, grab samples will be collected by submerging the sample container directly into the surface water (direct collection). In areas where access is limited or difficult, sampling may be conducted with a long-handled pole. This is often the case at large streams where sampling away from the bank or from a bridge is necessary to obtain representative surface water samples. When such a sampling device is utilized, sample bottles will be attached to the device in an appropriate manner and equipment blanks will be used to ensure sample integrity.

Clean Sampling Techniques

In all cases, the following clean sampling techniques will be used, regardless of sample collection technique:

1. Never re-use sample bottles.
2. Wear powder-free nitrile gloves when collecting metal samples to avoid contamination of the sample. Either powder-free nitrile or latex gloves can be used for other sampling.
3. Change gloves if they are soiled or if there is potential for cross-contamination.
4. When collecting the sample, do not touch the inside of the bottle or cap. Do not put the cap on the ground.
5. When collecting the sample, do not breathe in the direction of the container.
6. No eating, drinking, or smoking or chewing tobacco during sample collection.
7. Do not park vehicles in the immediate sample collection area.
8. After each sample is collected, record the sample time and immediately place the bottles on ice in a cooler prepared as described above.

Surface water samples can be collected from flowing water by direct bottle submersion or by attaching sample bottles to an extendable swing-arm sampling pole or a weighted sampling vessel attached to a rope to sample from a distance, in a manhole or from a bridge.

Direct Collection (Bottle Immersion Technique)

The protocol for collecting surface water samples from flowing water using direct bottle submersion is as follows:

1. Label the sample bottles prior to sampling. Wet labels are difficult to write on. Use permanent marker or waterproof pen for labeling.

2. Collect samples in order of decreasing volatility. Sample preservatives should be included in the laboratory-supplied sample bottles. Double check via visual inspection that any required preservative is in the bottle prior to sampling.

3. Uncap the sample bottle. Do not touch the inside of the bottle or cap. Do not put the cap on the ground.

4. Collect samples upstream of the sampler at mid-stream. Care should be taken not to disturb bottom sediments during sample collection to prevent particles from becoming suspended in the water column.

5. Holding the bottle upside down, push the bottle below the water surface. Turn the bottle forward and scoop it forward and up and out of the water. Do this in one sweeping motion. Make sure you sample forward and away from you so that there is no chance that you will contaminate the sample with bacteria from your arm.

6. If the bottle contains a preservative, do not displace it while filling the container and leave adequate space in the sample bottle for mixing the preservative and the sample. If the sample bottle is completely filled, pour some of the sample out to provide adequate head space.

7. After filling the bottle, carefully replace the lid and shake the bottle to assure adequate mixing of the preservative and the sample.

8. <u>When filling sample containers for volatile and semi-volatile organic compounds</u>, do not agitate the sample during collection in the sample container. Tip the sample container so that a slow, laminar flow of water enters the sample container. The stream of water will be directed to the sides of the sample container to prevent aeration of the sample due to turbulence. Vials will be sealed with no headspace to prevent any further volatilization of the sample once it has been collected. Before it is sealed the VOA vial will be filled to overflowing such that a meniscus will form at the lip of the vial. The lid will be placed over the meniscus and tightened so that no air bubbles are present. After the lid is screwed on, the VOA vial will be turned over and tapped on a hard surface and checked for bubbles. If bubbles are observed in the VOA vial, empty the contents and follow step 8 until no head space is achieved.

9. Place sample(s) into unused colorless plastic zip-type bags (only with sample bottles from the same site) and in an iced cooler. Deliver samples to the laboratory within 6 hours of collection to meet bacteria sample hold times.

10. Perform sampling equipment decontamination procedures, as necessary, before leaving the site (see Decontamination Procedures, below).

Pole Sampling Technique

The protocol for collecting a water sample using an extendable pole sampler is outlined below.

1. Label the sample bottles prior to sampling. Wet labels are difficult to write on. Use permanent marker or waterproof pen for labeling.

2. Collect samples in order of decreasing volatility. Sample preservatives should be included in the laboratory-supplied sample bottles. Double check via visual inspection that any required preservative is in the bottle prior to sampling.

3. Affix the sample bottle to the swing arm of the pole sampler using cable ties. Make sure that the bottle is sufficiently secure so as not to be pulled away from the swing arm during sampling.

4. Uncap the sample bottle. Do not touch the inside of the bottle or cap. Do not put the cap on the ground.

5. Reach the pole, with sample bottle attached, out above the location to be sampled. Lower the lip of the sample bottle so that water begins to fill the vessel or just below the water surface. Take care to not touch the lip of the sample bottle to adjacent surfaces such as the bottom of the stream or outfall pipe to avoid disturbing/collecting sediment, algae, or other debris.

6. If the bottle contains a preservative, do not displace it while filling the container and leave adequate space in the sample bottle for mixing the preservative and the sample. If the sample bottle is completely filled, pour some of the sample out to provide adequate head space.

7. After filling the bottle, carefully replace the lid and shake the bottle to assure adequate mixing of the preservative and the sample.

8. <u>When filling sample containers for volatile and semi-volatile organic compounds</u>, do not agitate the sample during collection in the sample container. Tip the sample container so that a slow, laminar flow of water enters the sample container. The stream of water will be directed to the sides of the sample container to prevent aeration of the sample due to turbulence. Vials will be sealed with no headspace to prevent any further volatilization of the sample once it has been collected. Before it is sealed the VOA vial will be filled to overflowing such that a meniscus will form at the lip of the vial. The lid will be placed over the meniscus and tightened so that no air bubbles are present. After the lid is screwed on, the VOA vial will be turned over and tapped on a hard surface and checked for bubbles. If bubbles are observed in the VOA vial, empty the contents and follow step 8 until no head space is achieved.

9. Place sample(s) into unused colorless plastic zip-type bags (only with sample bottles from the same site) and in an iced cooler. Deliver samples to the laboratory within 6 hours of collection to meet bacteria sample hold times.

10. Perform sampling equipment decontamination procedures, as necessary, before leaving the site (see Decontamination Procedures, below).

QUALITY CONTROL SAMPLES – FIELD DUPLICATES

Duplicate samples should be collected at the frequency detailed in the sampling plan. Sampling techniques will be identical to those outlined for direct, pole and weighted vessel sampling. Duplicate samples will be collected immediately after the primary sample for the same parameter.

FIELD MEASUREMENTS

Instantaneous water quality measurements using field instruments will be collected prior to samples collected for laboratory analysis. Ammonia, surfactants, chlorine, water temperature, salinity, and conductivity will be measured in the field using a water quality meter and/or field test kit at the time of sample collection. Water quality field measurements will be taken with the approved meter(s)/probe(s) at half (1/2) the water depth where overall stream depth is greater than one (1) foot. Otherwise, the probe will be sufficiently submerged to collect water quality measurements. If water depth is not sufficient to fully submerge the probe, then water will be collected in a clean, spare, sample bottle or graduated cylinder such that the probe can be submerged. The water quality field parameters will be measured immediately after filling the container. Equipment decontamination procedures outlined in the Decontamination Procedure SOP will be followed, as necessary, between samples and sites.

DECONTAMINATION PROCEDURES: GENERAL REQUIREMENTS

- Before using any equipment, clean/decontaminate all sampling equipment that is exposed to the sample.
- At the start of a sampling event transport all equipment to the field pre-cleaned and ready to use, unless otherwise justified.
- Rinse all equipment with water after use, even if it is to be field-cleaned for other sites.
- Segregate equipment that is only used once (i.e., not cleaned in the field) from clean equipment and return to the in-house cleaning facility to be cleaned in a controlled environment.
- Protect decontaminated field equipment from environmental contamination by securely wrapping and sealing with one of the following:
    - Aluminum foil (commercial grade is acceptable);
    - Untreated butcher paper; or
    - Clean, untreated, disposable plastic bags. Plastic bags may be used:
        - For all analyte groups except volatile and extractable organics;
        - For volatile and extractable organics, if the equipment is first wrapped in foil or butcher paper or if the equipment is completely dry.
- Containerize all solvent rinsing wastes, detergent wastes and other chemical wastes requiring off-site or regulated disposal. Dispose of all wastes in conformance with applicable regulations.

CLEANING REAGENTS

Detergents:
Luminox (or a non-phosphate solvent based equivalent) and Liqui-Nox (or a non-phosphate equivalent). Note that Alconox cannot be used if Total Phosphorus is an analyte. EPA recommends Luminox (or equivalent) since solvent rinses can be eliminated from the cleaning process. Liquinox (or equivalent) may be substituted (solvent rinses, when applicable, must be performed).

Solvents:
Pesticide grade solvents must be used and must be purchased from a laboratory supply vendor.

- Properly dispose of all wastes according to applicable regulations. Containerize all solvents (including rinsates) for on-site remediation or off-site disposal, as required.
- Store all solvents away from potential sources of contamination (gas, copier supplies, etc.).

Analyte-free Water:
Analyte-free water is water in which all analytes of interest and all interferences are below method detection limits.

- Maintain documentation (such as results from equipment blanks) to demonstrate the reliability and purity of analyte-free water sources.
- The source of the water must meet the requirements of the analytical method and must be free from the analytes of interest. In general, the following water types are associated with specific analyte groups:
    - Milli-Q (or equivalent polished water): suitable for all analyses.
    - Organic-free: suitable for volatile and extractable organics.
    - Deionized water: not suitable for volatile and extractable organics if the analytes of interest are present in concentrations that affect the result.
    - Distilled water: not suitable for volatile and extractable organics, metals or ultra-trace metals.
- Use analyte-free water for blank preparation and the final decontamination water rinse.
- In order to minimize long-term storage and potential leaching problems, obtain or purchase analyte-free water just prior to the sampling event. If obtained from a source (such as a laboratory), fill the transport containers and use the contents for a single sampling event. Empty the transport container(s) at the end of the sampling event.
- Discard any analyte-free water that is transferred to a dispensing container (such as a wash bottle) at the end of each sampling day.

Acids:

- Reagent Grade Nitric Acid: 10 - 15% (one volume concentrated nitric acid and five volumes deionized water).
    - Use for the acid rinse unless nitrogen components (e.g., nitrate, nitrite, etc.) are to be sampled.
    - If sampling for ultra-trace levels of metals, use an ultra-pure grade acid.
- Reagent Grade Hydrochloric Acid: 10% hydrochloric acid (one volume concentrated hydrochloric and three volumes deionized water).
    - Use when nitrogen components are to be sampled.
- **If samples for both metals and the nitrogen-containing components are collected with the equipment, use the hydrochloric acid rinse, or thoroughly rinse with hydrochloric acid after a nitric acid rinse.**
- If sampling for ultra trace levels of metals, use an ultra-pure grade acid.
- Freshly prepared acid solutions may be recycled during the sampling event or cleaning process. Dispose appropriately at the end of the sampling event, cleaning process or if acid is discolored or appears otherwise contaminated (e.g., floating particulates).
    - Transport only the quantity necessary to complete the sampling event.
- Dispose of any unused acids properly.

REAGENT STORAGE CONTAINERS

The contents of all containers must be clearly marked.

- Detergents:
  - Store in the original container or in a high density polyethylene (HDPE) or polypropylene (PP) container.
- Solvents:
  - Store solvents to be used for cleaning or decontamination in the original container until use in the field. If transferred to another container for field use, the container must be either glass or Teflon.
  - Use dispensing containers constructed of glass, Teflon, or stainless steel. Note: if stainless steel sprayers are used, any components (including gaskets and transfer lines) that contact the solvents must be constructed of inert materials.
- Analyte-free Water: Transport in containers appropriate to the type of water to be stored. If the water is commercially purchased (e.g., grocery store), use the original containers when transporting the water to the field. Containers made of glass, Teflon, polypropylene, or Polyethylene (PE) are acceptable.
  - Use glass, Teflon, polypropylene or PE to transport organic-free sources of water on-site.
  - Dispense water from containers made of glass, Teflon, PE or polypropylene.
  - Do not store water in transport containers before beginning a sampling event, unless satisfactory long-term storage of analyte-free water for a specified maximum storage time has been documented for the analytes of interest. The water should be replaced and the maximum storage time shortened if it is determined that the analyte-free water has been contaminated, e.g., by the analysis of field-QC blanks or other QC blanks that have been composed using the water stored in the container.
  - Store and dispense acids using containers made of glass, Teflon, PE or polypropylene.

FIELD DECONTAMINATION OF PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment which comes into contact with the sampling matrix (i.e., stream water or outfall or CSO discharge) will be replaced or decontaminated in the field between sampling locations.

In most cases, only gloves will need to be replaced between sampling locations to prevent the inadvertent cross-contamination of samples. If waders or boots require decontamination between locations, decontamination will follow the procedure described below for sampling equipment.

FIELD DECONTAMINATION OF SAMPLING EQUIPMENT

Flow measuring equipment such as staff gages, velocity meters, and other stream gauging equipment may be cleaned with tap water between measuring locations, if necessary. No further field decontamination is necessary.

The following must be done prior to field decontamination:

1. Wear clean nitrile gloves & safety glasses.
2. No eating, smoking, drinking, chewing, or any hand to mouth contact shall be permitted during decontamination operations.
3. If stream sampling, rinse equipment in stream to remove any mud or debris.
4. Disassemble equipment (unscrew plastic bottle holder from pole sampler).

Preferred Method of Decontamination

The following procedure for field decontamination is taken from SESDPROC-205-R3, Field Equipment Cleaning and Decontamination (EPA SESD, 2015) and is the preferred method to be used for field decontamination of sampling equipment or components of equipment that come in contact with the sample:

1. An optional Liquinox® detergent wash step may be useful to remove gross dirt and soil, if present
2. Clean with tap water and Luminox® detergent using a brush, if necessary, to remove particulate matter and surface films.
3. Rinse thoroughly with tap water.
4. Rinse thoroughly with analyte-free water (deionized or better) and place on a clean foil-wrapped surface to air-dry.
5. Wrap the dry equipment with aluminum foil. If the equipment is to be stored overnight before it is wrapped in foil, it should be covered and secured with clean, unused plastic sheeting.
6. Upon arrival at next sampling location, rinse several times with sample water from the next sampling location.

Properly dispose of any analyte-free water that is transferred to a dispensing container (such as a wash bottle) at the end of each sampling day.

Alternative Method of Decontamination

The historical solvent rinse method of cleaning equipment for trace contaminant sampling remains an acceptable method, but should be used only if equipment blanks obtained using the field decontamination method above show evidence of cross-contamination due to sampling. Use of solvents and acids in the field in not preferred due to increased health and safety and disposal concerns. The procedure for field decontamination using

1. Clean with tap water and Liquinox® detergent using a brush, if necessary, to remove particulate matter and surface films.
2. Rinse thoroughly with tap water.
3. Rinse thoroughly with deionized water.
4. Rinse with 10% hydrochloric acid solution (Nitric acid cannot be used when sample analysis includes nutrients).
5. Rinse with analyte-free water (deionized or better).
6. Place on a clean foil-wrapped surface to air dry.
7. Wrap the dry equipment with aluminum foil. If the equipment is to be stored overnight before it is wrapped in foil, it should be covered and secured with clean, unused plastic sheeting.
8. Upon arrival at next sampling location, rinse several times with sample water from the next sampling location.

All rinsate from field decontamination will be collected in 5 gallon buckets, containerized with a lid, and neutralized to approximately pH 7 before off-site disposal. Equipment will be allowed to air dry before wrapping in aluminum foil.

The outside surface of containers is often covered with the matrix from which the sample was taken and/or corrosive preservatives. Consequently, sealed sample containers must be rinsed (with tap or deionized water) or wiped free of excess gross media/debris to the extent possible prior to its placement into the cooler. This measure will reduce the possibility that subsequent handlers will be exposed to analytes of interest and/or hazardous preservatives.

In addition, all equipment, instruments and containers must be cleaned of obvious mud, leaves, and debris prior to leaving the site.

FIELD DECONTAMINATION OF FIELD INSTRUMENTS (TAPES, METERS, ETC.)

Follow manufacturer's recommendations for cleaning instruments. At a minimum:

- Wipe down equipment body and cables with lab-grade detergent solution (Liqui-nox). Probes shall be well rinsed. Check manufacturer's instructions for recommendations and/or restrictions on cleaning.
- Rinse thoroughly with tap water.
- Rinse thoroughly with analyte-free water (deionized or better).
- Store equipment according to the manufacturer's recommendation or wrap equipment in aluminum foil, untreated butcher paper or untreated plastic bags to eliminate potential environmental contamination.

FIELD DECONTAMINATION SUPPLIES

Required solutions and equipment for field decontamination using the procedures described above:

- 5 gallon buckets with lid to containerize decontamination wastes
- Scrub brush
- Nitrile gloves
- Safety glasses
- Paper towels
- Cube of tap water (minimum 10 L) and squeeze bottle
- Cube of deionized water (minimum 10 L) and Teflon squeeze bottle
- Organic-free water and Teflon squeeze bottle,
- Non-phosphate detergent (Liquinox and Luminox) solutions in Teflon squeeze bottle
- +/- 10% hydrochloric acid solution in Teflon squeeze bottle

DECONTAMINATION OF OTHER SAMPLING-RELATED EQUIPMENT

Analyte-Free Water Containers

This section pertains to containers that are purchased to transport, store and dispense analyte-free water. It does not apply to water that has been purchased in containers.

New Containers:

- Wash containers and caps according to the instructions above for sampling equipment, omitting the solvent rinse if plastic (polyethylene or polypropylene) containers are being cleaned.
- Cap with Teflon film or the bottle cap. The bottle cap must be composed of the same material as the container and cannot be lined.

Reused Containers:

- Immediately after emptying, cap with aluminum foil, Teflon film or the container cap.
- Wash the exterior of the container with lab-grade detergent solution (Luminox) and rinse with analyte-free water.
- Rinse the interior thoroughly with analyte-free water.
- Invert and allow to drain and dry.

Ice Chests and Shipping Containers

- Wash the exterior and interior of all ice chests with laboratory detergent (Luminox) after each use.

- Rinse with tap water and air dry before storing.
- If the ice chest becomes severely contaminated, clean as thoroughly as possible, render unusable, and properly dispose.

REFERENCES

1. U.S. Environmental Protection Agency, Region IV, Science and Ecosystem Support Division, Field Equipment Cleaning and Decontamination, December 2015, (SESDPROC-205-R3).

2. Florida Department of Environmental Protection, FC 1000 Cleaning / Decontamination Procedures, March 1, 2014 (DEP-SOP-001/01).

Appendix E

IDDE Employee Training Record

Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Wrentham, Massachusetts

Date of Training: ____________________________

Duration of Training: ________________________

Name	Title	Signature

Appendix F

Source Isolation and Confirmation Methods: Instructions, Manuals, and SOPs

SOP 10: LOCATING ILLICIT DISCHARGES

Introduction

An "illicit discharge" is any discharge to an engineered storm drain system that is not composed entirely of stormwater unless the discharge is defined as an allowable non-stormwater discharge under the 2003 Massachusetts MS4 Permit. Illicit discharges may enter the engineered storm drain system through direct or indirect connections, such as: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to receiving streams.

Illicit discharges can be located by several methods, including routine dry weather outfall inspections and catch basin inspections, which are described in detail in SOP 1, "Dry Weather Outfall Inspection" and SOP 3, "Catch Basin Inspection and Cleaning", respectively, as well as from citizen reports.

This SOP assumes that the municipality has legal authority (i.e., a bylaw or ordinance) in place, per the requirements of the 2003 Massachusetts MS4 Permit, to prohibit the connection of non-stormwater discharges into the storm drain system. The authority or department for addressing illicit discharge reports would be clearly identified in the municipality's legal authority. In Massachusetts, this is typically a combination of the Board of Health, the Department of Public Works (or Highway Department), and the local sanitary sewer department or commission. In some communities, the Conservation Commission may also play a role. This SOP refers to "appropriate authority" generically to reflect differences in how municipalities have identified these roles.

Identifying Illicit Discharges

The following are often indicators of an illicit discharge from stormwater outfall:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.
3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator of disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent): indicator of the cross-connection of a sewer service.
7. Orange staining: indicator of high mineral concentrations.

Both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial sheen is not a pollutant but should be noted.

Citizen Call in Reports

Reports by residents and other users of a water body can be effective tools in identifying the presence of illicit discharges. Many communities have set up phone hotlines for this purpose, or have provided guidance to local police departments and dispatch centers to manage data reported in this manner. Municipal employees and the general public should receive education to help identify the signs of illicit discharges and should be informed how to report such incidents.

When a call is received about a suspected illicit discharge, the attached IDDE Incident Tracking Sheet shall be used to document appropriate information. Subsequent steps for taking action to trace, document, and eliminate the illicit discharge are described in the following sections.

Potential illicit discharges reported by citizens should be reviewed on an annual basis to locate patterns of illicit discharges, identify high-priority catchments, and evaluate the call-in inspection program.

Tracing Illicit Discharges

Whenever an illicit discharge is suspected, regardless of how it was identified, the attached IDDE Incident Tracking Sheet should be utilized. The Incident Tracking Sheet shall be provided to the appropriate authority (i.e., Board of Health, Department of Public Works, etc.), which shall promptly investigate the reported incident.

If the presence of an illicit discharge is confirmed by the authority, but its source is unidentified, additional procedures to determine the source of the illicit discharge should be completed.

1. Review and consider information collected when illicit discharge was initially identified, for example, the time of day and the weather conditions for the previous 72 hours. Also consider and review past reports or investigations of similar illicit discharges in the area.
2. Obtain storm drain mapping for the area of the reported illicit discharge. If possible, use a tracking system that can be linked to your system map, such as GIS.
3. Document current conditions at the location of the observed illicit discharge point, including odors, water appearance, estimated flow, presence of floatables, and other pertinent information. Photograph relevant evidence.
4. If there continues to be evidence of the illicit discharge, collect water quality data using the methods described in SOP 13, "Water Quality Screening in the Field". This may include using field test kits or instrumentation, or collecting analytical samples for full laboratory analysis.
5. Move upstream from the point of observation to identify the source of the discharge, using the system mapping to determine infrastructure, tributary pipes, and drainage areas that contribute. At each point, survey the general area and surrounding properties to identify potential sources of the illicit discharge. Document observations at each point on the IDDE Incident Tracking Sheet as well as with photographs.
6. Continue this process until the illicit discharge is no longer observed, which will define the boundaries of the likely source. For example if the illicit discharge is present in catch basin 137

but not the next upstream catch basin, 138, the source of the illicit discharge is between these two structures.

If the source of the illicit discharge could not be determined by this survey, consider using dye testing, smoke testing, or closed-circuit television inspection (CCTV) to locate the illicit discharge.

Dye Testing

Dye testing is used to confirm a suspected illicit connection to a storm drain system. Prior to testing, permission to access the site should be obtained. Dye is discharged into the suspected fixture, and nearby storm drain structures and sanitary sewer manholes observed for presence of the dye. Each fixture, such as sinks, toilets, and sump pumps, should be tested separately. A third-party contractor may be required to perform this testing activity.

Smoke Testing

Smoke testing is a useful method of locating the source of illicit discharges when there is no obvious potential source. Smoke testing is an appropriate tracing technique for short sections of pipe and for pipes with small diameters. Smoke added to the storm drain system will emerge in connected locations. A third-party contractor may be required to perform this testing activity.

Closed Circuit Television Inspection (CCTV)

Televised video inspection can be used to locate illicit connections and infiltration from sanitary sewers. In CCTV, cameras are used to record the interior of the storm drain pipes. They can be manually pushed with a stiff cable or guided remotely on treads or wheels. A third-party contractor may be required to perform this testing activity.

If the source is located, follow steps for removing the illicit discharge. Document repairs, new sanitary sewer connections, and other corrective actions required to accomplish this objective. If the source still cannot be located, add the pipe segment to a future inspection program.

This process is demonstrated visually on the last page of this SOP.

Removing Illicit Discharges

Proper removal of an illicit discharge will ensure it does not recur. Refer to Table SOP 10-1, attached for, for examples of the notification process.

In any scenario, conduct a follow up inspection to confirm that the illicit discharge has been removed. Suspend access to the storm drain system if an “imminent and substantial danger” exists or if there is a threat of serious physical harm to humans or the environment.

Attachments

1. Illicit Discharge Incident Tracking Sheet

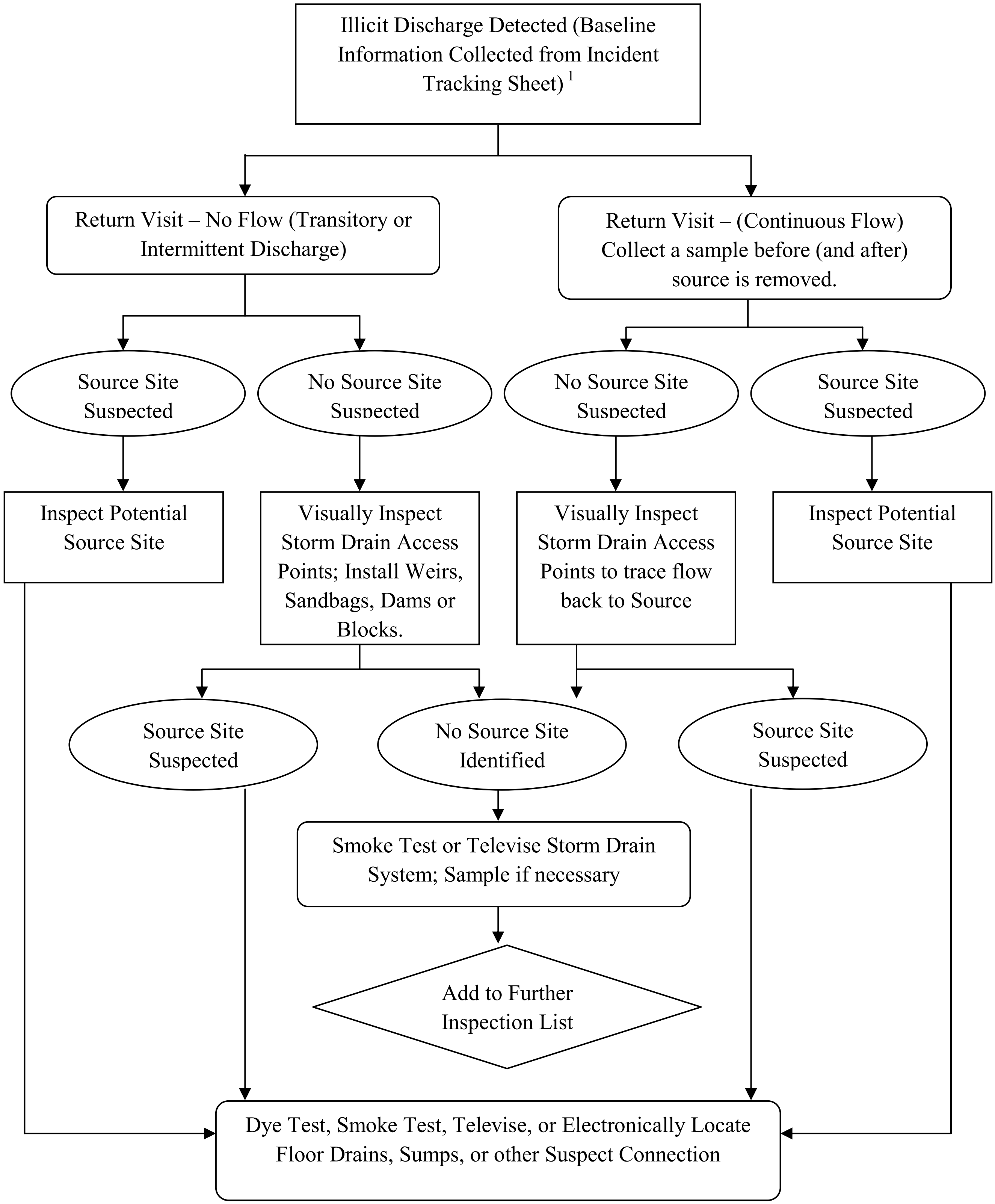
Related Standard Operating Procedures

1. SOP 1: Dry Weather Outfall Inspection
2. SOP 2: Wet Weather Outfall Inspection
3. SOP 3: Catch Basin Inspection
4. SOP 13: Using Field Test Kits For Outfall Screening
5. SOP 15: Private Drainage Connections

Table SOP 10-1

Notification and Removal Procedures for Illicit Discharges into the Municipal Separate Storm Sewer System

Financially Responsible	Source Identified	Enforcement Authority	Procedure to Follow
Private Property Owner	One-time illicit discharge (e.g. spill, dumping, etc.)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Issue fine
Private Property Owner	Intermittent or continuous illicit discharge from legal connection	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Determine schedule for removal • Confirm removal
Private Property Owner	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. infiltration or failed septic)	Plumbing Inspector or ordinance enforcement authority	• Notify Plumbing Inspector or ordinance enforcement authority
Municipal	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. failed sewer line)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Issue work order • Schedule removal • Remove connection • Confirm removal
Exempt 3rd Party	Any	USEPA	• Notify exempt third party and USEPA of illicit discharge


Illicit Discharge Detected (Baseline Information Collected from Incident Tracking Sheet) [1]
Return Visit – No Flow (Transitory or Intermittent Discharge)
Return Visit – (Continuous Flow) Collect a sample before (and after) source is removed.
Source Site Suspected
No Source Site Suspected
No Source Site Suspected
Source Site Suspected
Inspect Potential Source Site
Visually Inspect Storm Drain Access Points; Install Weirs, Sandbags, Dams or Blocks.
Visually Inspect Storm Drain Access Points to trace flow back to Source
Inspect Potential Source Site
Source Site Suspected
No Source Site Identified
Source Site Suspected
Smoke Test or Televise Storm Drain System; Sample if necessary
Add to Further Inspection List
Dye Test, Smoke Test, Televise, or Electronically Locate Floor Drains, Sumps, or other Suspect Connection

[1] – *Guidelines and Standard Operating Procedures: Illicit Discharge Detection and Elimination and Pollution Prevention/Good Housekeeping for Stormwater Phase II Communities in New Hampshire,* New Hampshire Estuary Project, 2006, p. 25, Figure 2-1.

Illicit Discharge Incident Tracking Sheet

Incident ID:				
Responder Information (for Citizen-Reported issues)				
Call Taken By:		Call Date:		
Call Time:		Precipitation (inches) in past 24-48 hours:		
Observer Information				
Date and Time of Observation:		Observed During Regular Maintenance or Inspections? ☐ Yes ☐ No		
Caller Contact Information (optional) or Municipal Employee Information:				
Observation Location: (complete one or more below)				
Latitude and Longitude:				
Stream Address or Outfall #:				
Closest Street Address:				
Nearby Landmark:				
Primary Location Description	**Secondary Location Description:**			
☐Stream Corridor (In or adjacent to stream)	☐Outfall	☐In-stream Flow	☐Along Banks	
☐Upland Area (Land not adjacent to stream)	☐Near Storm Drain	☐Near other water source (stormwater pond, wetland, ect.):		
Narrative description of location:				
Upland Problem Indicator Description				
☐Dumping	☐Oil/Solvents/Chemicals		☐Sewage	
☐Detergent, suds, etc.	☐Other:____________________			
Stream Corridor Problem Indicator Description				
Odor	☐None	☐Sewage	☐Rancid/Sour	☐Petroleum (gas)
	☐Sulfide (rotten eggs); natural gas	☐Other: Describe in "Narrative" section		
Appearance	☐"Normal"	☐Oil Sheen	☐Cloudy	☐Foam
	☐Optical enhancers	☐ Discolored		
	☐Other: Describe in "Narrative" section			
Floatables	☐None	☐Sewage (toilet paper, etc)	☐Algae	☐Trash or debris
	☐Other: Describe in "Narrative" section			
Narrative description of problem indicators:				
Suspected Source (name, personal or vehicle description, license plate #, address, etc.):				

CMRSWC

Appendix G

Outfall Inventory and Priority Ranking

Town of Wrentham
Initial Outfall Catchment Ranking

Catchment ID	Past Discharge Reports	Receiving Water Quality	Density of Generating Sites	Age of Development and Infrastructure	Septic Age	Culverted Streams	Public Health Area	Total	Score (0-10)	Priority
OF_111	Unscreened	TMDL	Low	Pre-1970	40+	No	Yes	14	10.0	High
OF_117	Unscreened	TMDL	Low	Pre-1970	40+	No	Yes	14	10.0	High
OF_146	Unscreened	TMDL	Low	Pre-1970	40+	No	Yes	14	10.0	High
OF_147	Unscreened	TMDL	Low	Pre-1970	40+	No	Yes	14	10.0	High
OF_148	Unscreened	TMDL	Low	Pre-1970	40+	No	Yes	14	10.0	High
OF_59	Unscreened	TMDL	Low	Pre-1970	40+	No	Yes	14	10.0	High
OF_306	Unscreened	TMDL	Medium	Pre-1970	40+	No	No	12	8.2	High
CB_578	Unscreened	TMDL	Low	Pre-1970	40+	No	No	11	7.3	High
MH_1069	Unscreened	NonTMDL	High	Pre-1970	40+	No	No	11	7.3	High
OF_160	Unscreened	TMDL	Low	Pre-1970	40+	No	No	11	7.3	High
OF_161	Unscreened	TMDL	Low	Pre-1970	40+	No	No	11	7.3	High
OF_192	Unscreened	TMDL	Low	Pre-1970	40+	No	No	11	7.3	High
OF_242	Unscreened	TMDL	Low	Pre-1970	40+	No	No	11	7.3	High
OF_271	Unscreened	TMDL	Low	Pre-1970	40+	No	No	11	7.3	High
OF_307	Unscreened	NonTMDL	High	Pre-1970	40+	No	No	11	7.3	High
OF_377	Unscreened	TMDL	Low	Pre-1970	40+	No	No	11	7.3	High
OF_378	Unscreened	TMDL	Low	Pre-1970	40+	No	No	11	7.3	High
CB_1874	Unscreened	Unassessed	High	Pre-1970	40+	No	No	10	6.4	High
CB_962	Unscreened	Unassessed	High	Pre-1970	40+	No	No	10	6.4	High
MH_1147	Unscreened	Unassessed	High	Pre-1970	40+	No	No	10	6.4	High
MH_970	Unscreened	Unassessed	High	Pre-1970	40+	No	No	10	6.4	High
OF_211	Unscreened	Unassessed	High	Pre-1970	40+	No	No	10	6.4	High
OF_259	Unscreened	Unassessed	High	Pre-1970	40+	No	No	10	6.4	High
OF_288	Unscreened	Unassessed	High	Pre-1970	40+	No	No	10	6.4	High
OF_297	Unscreened	Unassessed	High	Pre-1970	40+	No	No	10	6.4	High
OF_116	Unscreened	TMDL	Low	1990-Present	<20	No	Yes	9	5.5	High
OF_126	Unscreened	TMDL	Low	1990-Present	<20	No	Yes	9	5.5	High
OF_127	Unscreened	TMDL	Low	1990-Present	<20	No	Yes	9	5.5	High
OF_128	Unscreened	TMDL	Low	1990-Present	<20	No	Yes	9	5.5	High
OF_129	Unscreened	TMDL	Low	1990-Present	<20	No	Yes	9	5.5	High
OF_398	Unscreened	TMDL	Low	1990-Present	<20	No	Yes	9	5.5	High
CB_800	Unscreened	NonTMDL	Low	Pre-1970	40+	No	No	9	5.5	Low
OF_158	Unscreened	NonTMDL	Low	Pre-1970	40+	No	No	9	5.5	Low
OF_159	Unscreened	NonTMDL	Low	Pre-1970	40+	No	No	9	5.5	Low
OF_238	Unscreened	NonTMDL	Low	Pre-1970	40+	No	No	9	5.5	Low
CB_1771	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
CB_1923	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
CB_464	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
CB_483	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
CB_568	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MF_116	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_1135	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_230	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_341	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_439	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_440	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_532	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_538	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_761	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_825	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_865	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_115	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_119	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_134	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_145	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_151	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_198	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_203	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_210	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_215	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_230	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_240	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_25	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_250	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_251	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_266	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_267	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_268	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_270	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_276	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_290	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_291	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_309	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_325	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	10	4.5	Low
OF_334	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_339	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_341	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_342	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_354	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_356	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_362	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_364	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_365	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_373	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_374	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_375	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_376	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low

Catchment ID	Past Discharge Reports	Receiving Water Quality	Density of Generating Sites	Age of Development and Infrastructure	Septic Age	Culverted Streams	Public Health Area	Total	Score (0-10)	Priority
OF_379	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_39	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_402	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_403	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_404	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_405	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_41	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_46	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_58	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_60	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_63	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_72	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
OF_80	Unscreened	Unassessed	Low	Pre-1970	40+	No	No	8	4.5	Low
MH_486	Unscreened	Unassessed	High	1970-1990	20-40	No	No	7	3.6	Low
OF_110	Unscreened	Unassessed	High	1970-1990	20-40	No	No	7	3.6	Low
OF_193	Unscreened	Unassessed	High	1970-1990	20-40	No	No	7	3.6	Low
OF_219	Unscreened	TMDL	Low	1990-Present	<20	No	No	6	2.7	Low
OF_220	Unscreened	TMDL	Low	1990-Present	<20	No	No	6	2.7	Low
CB_1253	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
MH_1014	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
MH_1023	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
MH_117	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
MH_540	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_123	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_130	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_131	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_132	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_138	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_139	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_140	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_155	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_18	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_199	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_207	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_208	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_21	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_214	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_216	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_217	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_218	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_224	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_225	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_226	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_227	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_273	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_292	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_293	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_31	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_317	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_32	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_328	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_336	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_344	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_345	Unscreened	Unassessed	High	1990-Present	<20	No	No	5	1.8	Low
OF_347	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_348	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_369	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_370	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_371	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_372	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_381	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
OF_382	Unscreened	Unassessed	Low	1970-1990	20-40	No	No	5	1.8	Low
MH_584	Unscreened	NonTMDL	Low	1990-Present	<20	No	No	4	0.9	Low
OF_156	Unscreened	NonTMDL	Low	1990-Present	<20	No	No	4	0.9	Low
OF_157	Unscreened	NonTMDL	Low	1990-Present	<20	No	No	4	0.9	Low
OF_366	Unscreened	Unassessed	Excluded	Pre-1970	40+	No	No	4	0.9	Low
MH_250	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
MH_644	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_118	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_120	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_125	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_133	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_135	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_137	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_141	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_142	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_143	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_200	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_201	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_206	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_228	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_234	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_235	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_241	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_26	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_272	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_275	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low

Town of Wrentham
Initial Outfall Catchment Ranking

Catchment ID	Past Discharge Reports	Receiving Water Quality	Density of Generating Sites	Age of Development and Infrastructure	Septic Age	Culverted Streams	Public Health Area	Total	Score (0-10)	Priority
OF_308	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_312	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_313	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_314	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_315	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_318	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_327	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_330	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_331	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_340	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_357	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_36	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_360	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_363	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_397	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_401	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_408	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_42	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_45	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_83	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_84	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_86	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low
OF_97	Unscreened	Unassessed	Low	1990-Present	<20	No	No	3	0.0	Low