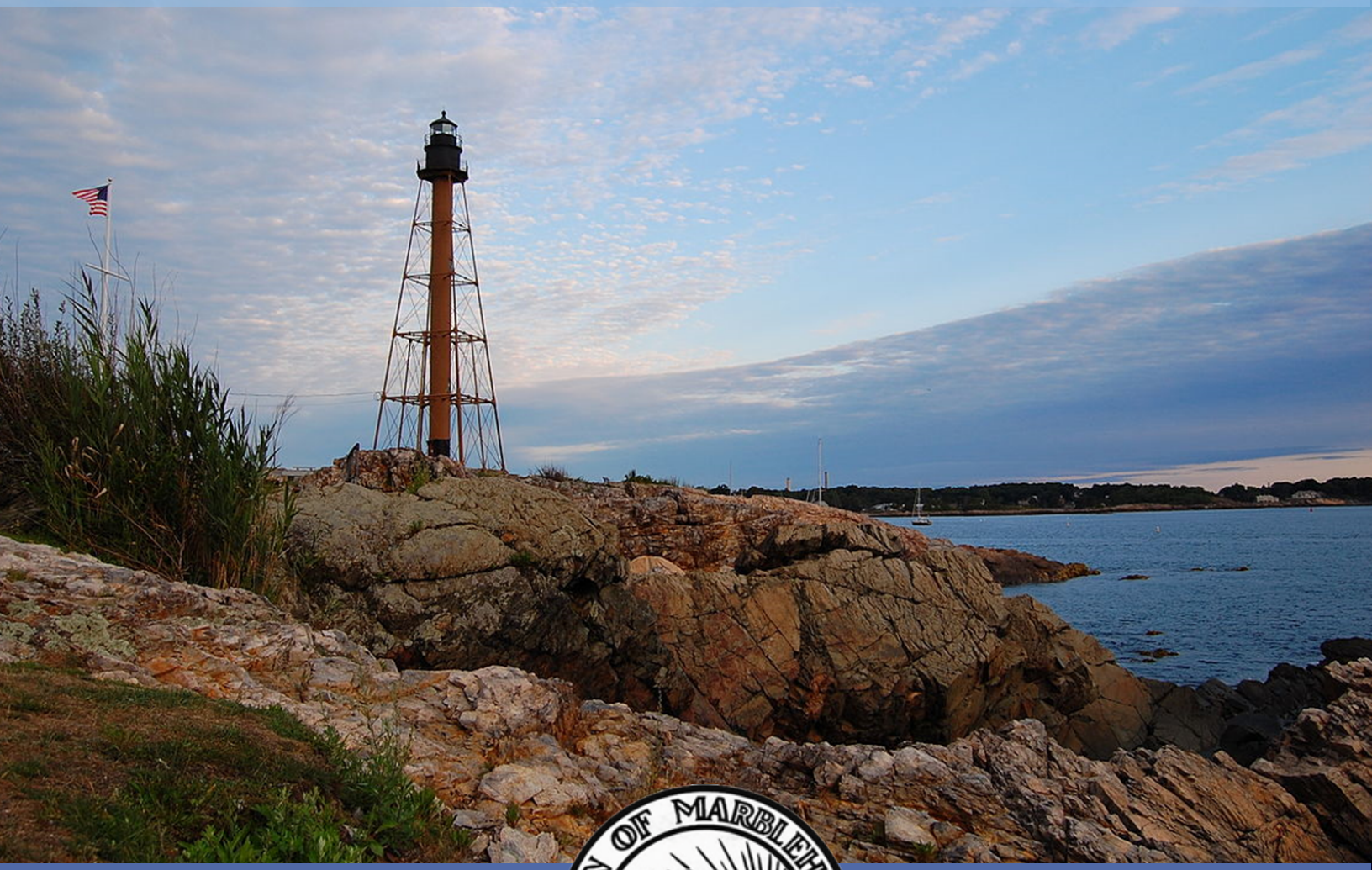
# APPENDIX IX

# ILLCIT DISCHARGE DETECTION AND ILLIMINATION PLAN

***IDDE PLAN IS CURRENTLY BEING UPDATED AS OF SEPTEMBER 2021***



# Illicit Discharge Detection and Elimination PROGRAM MANUAL

June 2019

Town of Marblehead | 100 Tower Way Building 11 | Marblehead | Massachusetts | 01945
www.marblehead.org

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# 1. INTRODUCTION

The U.S. Environmental Protection Agency (EPA) established the National Pollutant Discharge Elimination System (NPDES) program as part of the Clean Water Act (CWA) to regulate discharges to surface water. In Massachusetts, EPA and the Massachusetts Department of Environmental Protection (MassDEP) are the co-permitting authorities that regulate stormwater runoff that enters local water bodies through Municipal Separate Storm Sewer Systems (MS4s) in "Urbanized Areas." This Illicit Discharge Detection and Elimination (IDDE) Program Manual (aka the Plan) has been developed per EPA and MassDEP requirements for MS4 regulated communities to describe their program to detect and eliminate illicit discharges.

The Town of Marblehead, Massachusetts (Town) is required to obtain a permit for stormwater discharges from the EPA and MassDEP and is currently covered under a NPDES General Permit for Stormwater Discharges from Small MS4's in Massachusetts[1] (the MS4 General Permit). The MS4 General Permit authorizes the Town to discharge stormwater into waters of the U.S. if the Town maintains and implements a Stormwater Management Plan (SWMP). The MS4 General Permit includes six components called *minimum control measures* which, when implemented, will result in a reduction in pollutants discharging into receiving waters. The minimum control measures are:

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

The Plan, and subsequent implementation of the Plan, described herein will satisfy the requirements of the third minimum control measure.

The Town is committed to working with residents and state and federal environmental agencies to achieve water quality goals and protect public health. The Town has established this Plan to outline program objectives, standard operating procedures (SOPs), and workflow processes for successful and efficient implementation of illicit discharge detection, investigation, and elimination. This Plan is based on current regulatory requirements included in the 2016 MS4 General Permit published in the Federal Register on April 13, 2016. The 2016 MS4 General Permit replaced the 2003 MS4 General Permit and became effective July 1, 2018.

This Plan is a working document and will be revised as necessary. The Plan includes or references legal authority, statement of responsibilities, assessment and priority ranking of investigation areas, stormwater discharge outfall screening and sampling, removal and confirmation, follow-up screening, prevention procedures, and training.

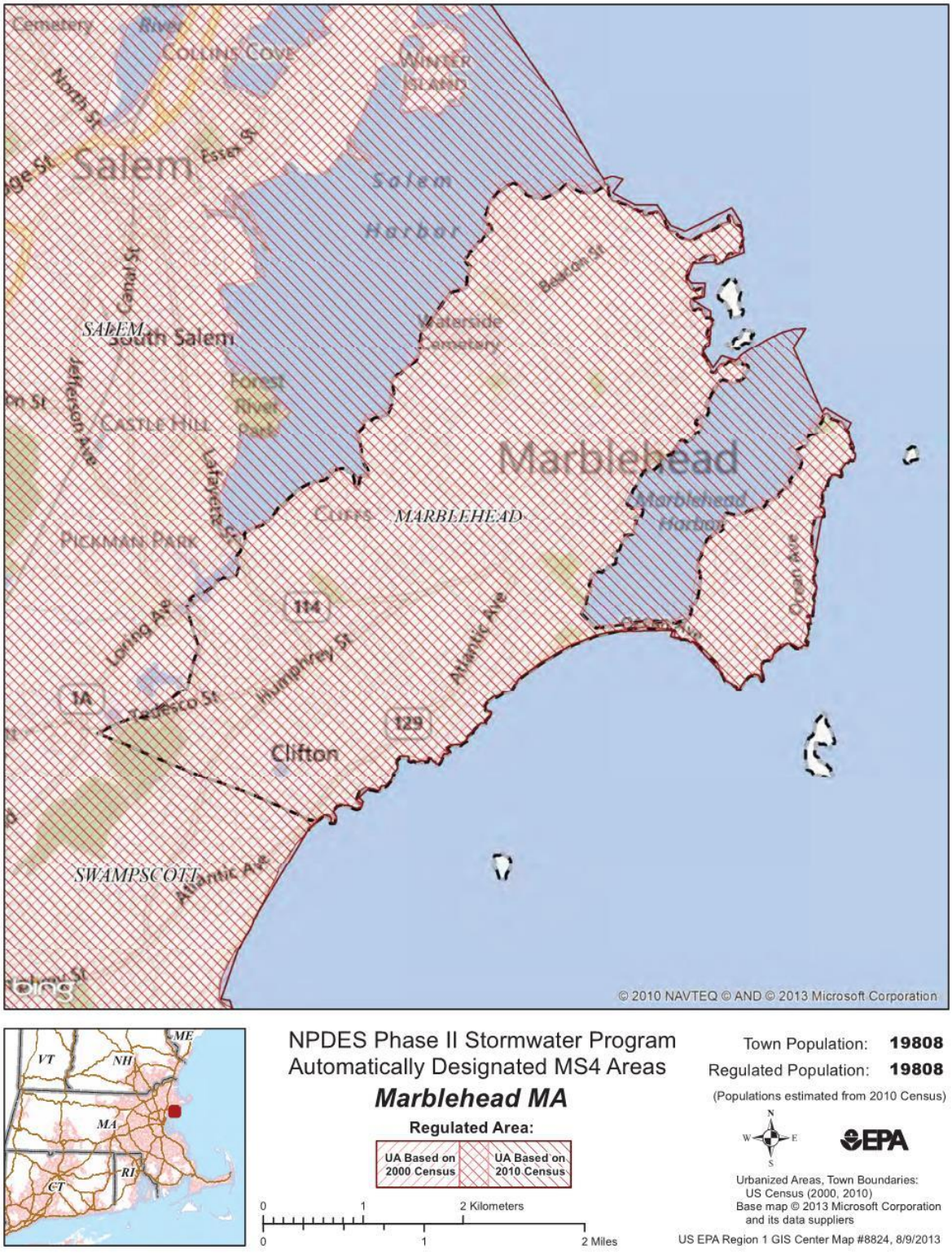
The Town of Marblehead's Water and Sewer Commission manages the Town's IDDE Plan with support from other municipal departments.

[1] 2003 MS4 General Permit https://www3.epa.gov/region1/npdes/permits/permit_final_ms4.pdf and 2016 MS4 General Permit https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit

## 1.1 PLAN APPLICABILITY

This Plan is implemented in the Town's Urbanized Area, which encompasses the majority of the Town. Urbanized Areas are defined by the latest United States decennial census as the land area that meet minimum population density requirements as determined by the latest United States decennial census. *Figure 1-1: Marblehead's Urbanized Area* shows the Town's Urbanized Area based on the 2010 census.

**Figure 1-1: Marblehead's Urbanized Area**



## 1.2 WHAT IS AN ILLICIT DISCHARGE?

The EPA defines an illicit discharge as "any discharge to an MS4 that is not composed entirely of stormwater"; exceptions are discharges regulated by a separate NPDES permit and allowable non-stormwater discharges that do not significantly contribute pollutants to the MS4. Non-stormwater discharges considered allowable are outlined in Part 1 Section F. of the MS4 General Permit and listed below.

**Figure 1-2: Allowable Non-Stormwater Discharges**

Water line flushing
Landscape irrigation
Irrigation water, springs
Lawn watering
Dechlorinated swimming pool discharges

Diverted stream flow
Rising ground waters
Uncontaminated groundwater infiltration
Uncontaminated pumped groundwater
Flows from riparian habitats and wetlands


Foundation drains
Footing drains
Air conditioning condensation
Water from crawl space pumps

Discharge from potable water sources
Street wash water
Residential building wash water, without detergents

Illicit discharges can enter the drainage system via direct connections or indirect discharges, which are defined as follows:

- Direct Connection: any non-stormwater pipe connected to the storm drain system, such as pipe from a washing machine or floor drain, or a sewer service connection from a house. Often, these types of discharges are continuous.

- Indirect Discharge: include a wide variety of sources, such as sanitary sewer overflows (SSO's), infiltration into the drainage system from failed septic systems or leaking sewer collection system, or other waste or spills collected by catch basins. Grass clippings, leaf litter, pet waste, and other solid material dumped or otherwise deposited in the storm drain system are also considered indirect illicit discharges. These are commonly intermittent or transitory discharges.

## 1.3 SIGNIFICANCE OF ILLICIT DISCHARGE

Illicit discharges are not permitted under the MS4 General Permit or local regulations and can result in violations and fines for MS4 permittees. Additionally, illicit discharges contribute to elevated levels of pollutants to surface waterbodies and can potentially contaminate groundwater. When these pollutants enter waterbodies, they can contaminate drinking water supplies, create public safety concerns, hinder recreational activities, and harm wildlife habitats.

According to a survey implemented by the Center for Watershed Protection in 2003, the respondents indicated that the following are the most common sources of illicit discharges:

- Illegal dumping practices (95%)
- Broken sanitary sewer line (81%)
- Cross-connections (71%)
- Connection of floor drains to storm sewer (62%)
- Sanitary sewer overflows (52%)
- Inflow/infiltration (48%)
- Straight sewer pipe discharge (38%)
- Failing septic systems (33%)
- Improper RV/boat waste disposal (33%)
- Pump station failure (14%)

## 1.4 EPA'S REQUIREMENTS FOR MUNICIPALITIES

The 2016 MS4 General Permit obligates regulated dischargers to develop and maintain a written Illicit Discharge Detection and Elimination Program.

Under the MS4 General Permit, the Town is required to develop, implement, and enforce a program to detect and eliminate illicit discharges. The permit directs the Town to develop a program that includes the following:

- Develop and maintain a storm sewer system map showing all municipally-owned outfalls (see Section 2);
- Prohibit illicit discharges through regulatory mechanism and enforcement (see Section 3);
- Inform the public and municipal employees about the program (see Section 7); and
- Evaluate permitted non-stormwater discharges to determine if they are significant contributors to pollution.

Permittees are authorized under the 2016 MS4 General Permit to submit annual reports by September 30th each year pursuant to Section 4.4.a. of the permit. Annual reports must include a self-assessment of MS4 General Permit compliance, summary of newly collected information, and discussion of planned activities for the next reporting period.

### 1.4.1 Discharges to Impaired Waterways

The MS4 General Permit includes additional requirements for MS4 discharges to any impaired waterway with or without an approved Total Maximum Daily Load (TMDL). EPA establishes TMDLs to specifically limit the loading of pollutants into impaired waterways. The MS4 General Permit defines a 'water quality limited water body' as "any water body that does not meet applicable water quality standards, including but not limited to waters listed in categories 5 or 4b on the Massachusetts Integrated Report of waters." The Integrated List of Waters is typically reissued by MassDEP every

two years and must undergo EPA approval to take effect. The most recent EPA approved list is the Final Massachusetts Year 2014 Integrated List of Waters (2014 Integrated List).

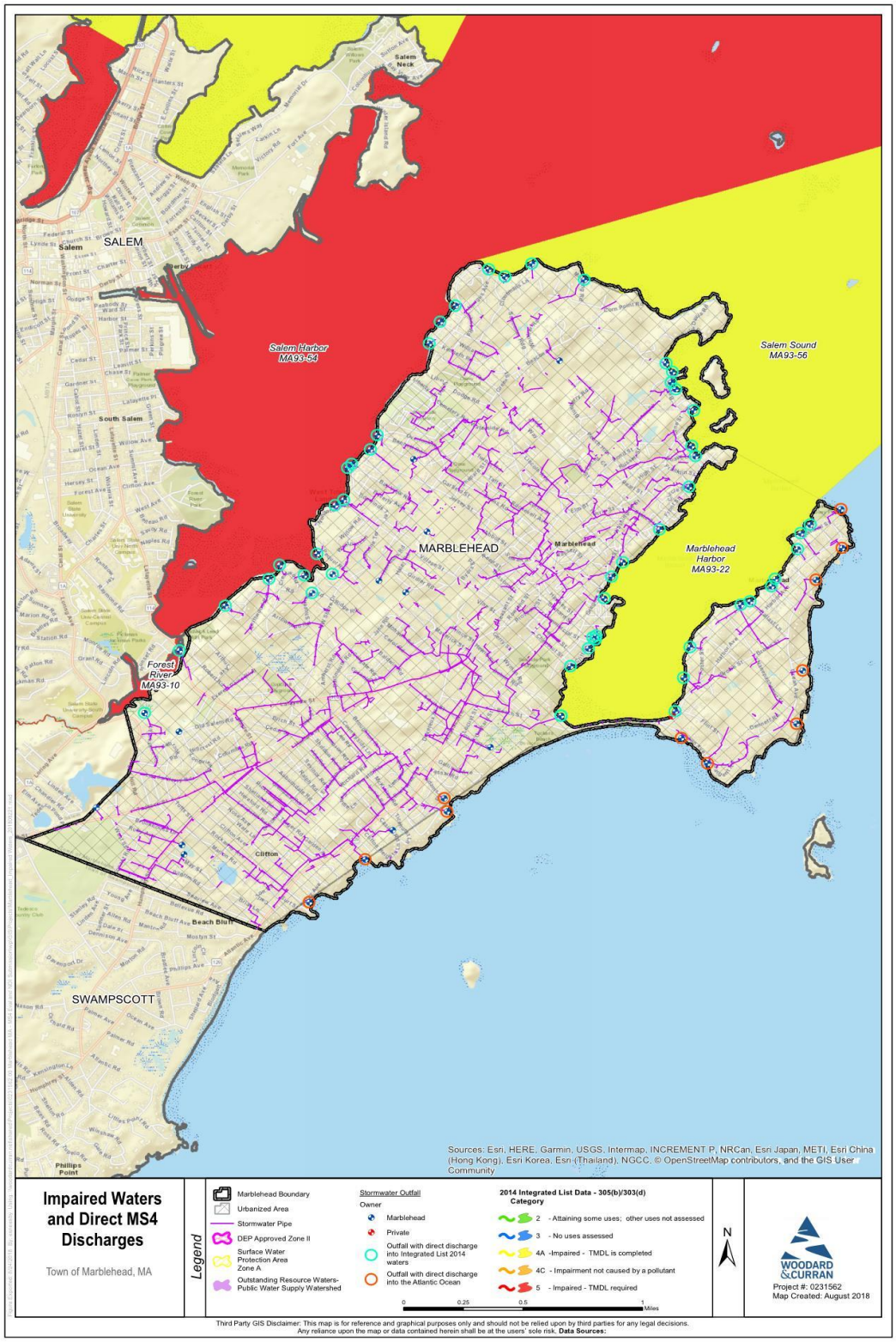
The Town is located within the North Coastal Watershed. *Table 1-1: Water Quality Impaired Waters in Marblehead, MA* outlines impaired waterbodies identified in the Final Massachusetts Year 2014 Integrated List of Waters, within the Town and outfall sampling requirements associated with direct discharges into these waterbodies. Outfall sampling requirements and the associated analytical methods are derived from Appendix G of the 2016 MS4 General Permit. *Figure 1-3: Marblehead's Impaired Waters (2014)* is a map of Marblehead's impaired waterbodies.

**Table 1-1: Water Quality Impaired Waters in Marblehead, MA**

| Waterbody | MassDEP Segment ID | TMDL | Category | Impairment Cause | Analytical Method as required under Appendix G of the 2016 MS4 General Permit |
|---|---|---|---|---|---|
| Forest River | MA93-10 | No | 5 | Dissolved Oxygen Saturation | 365.1; 365.2; 365.3 (or hand held meter – contact EPA) |
| Salem Harbor | MA93-54 | Yes | 4A/5 | Estuarine Bioassessments | Contact MassDEP |
| | | | | Fecal Coliform | SM9222D |
| Marblehead Harbor | MA93-22 | Yes | 4A | Fecal Coliform | SM9222D |
| Salem Sound | MA93-56 | Yes | 4A | Fecal Coliform | SM9222D |

Note: Reissuance and/or approval of the Massachusetts Integrated List of Waters may necessitate modifications to this Plan to maintain compliance with applicable requirements.

## Figure 1-3: Marblehead's Impaired Waters (2014)



Three of Marblehead's impaired waters are currently subject to an approved TMDL: Marblehead Harbor, Salem Sound, and Salem Harbor under the Final Pathogen TMDL for the North Coastal Watershed (March 2012). Any impaired waters in the Town (including TMDL waters) are subject to additional requirements under the MS4 General Permit for the known outfalls (and their contributing drainage areas) that discharge into these waters. Where the MS4 discharge is directly into an impaired water or water subject to an approved TMDL, the Town must sample these discharges for pollutants of concern shown in *Table 1-1: Water Quality Impaired Waters in Marblehead, MA*. While these additional sampling parameters may not be associated with illicit discharges, they are listed in this plan as outfall screening and sampling is undertaken as a part of the Illicit Discharge Detection and Elimination program and will be considered during implementation of outfall screening. For the purposes of this plan, outfalls discharging within 350' of impaired waters segments are considered direct discharges and are shown on *Figure 1-3: Marblehead's Impaired Waters (2014)*. Particularly the presence of bacteria and mixed pathogen impairments has implications on IDDE program catchment prioritization, which is further discussed in Section 4.

Note: Reissuance of the Massachusetts Integrated List of Waters may necessitate modifications to this Plan to maintain compliance with applicable requirements.

## 1.5 PURPOSE OF THIS PLAN

The purpose of this Plan is to establish a strategic, written program to address illicit discharges to the MS4 or to waters of the state in accordance with the requirements of the MS4 General Permit.

The IDDE Program contained herein builds upon activities conducted under the 2003 MS4 General Permit and incorporates an approach to address future MS4 General Permit requirements. The Plan has outlined a four-year implementation period, beginning in 2019.

This Plan is intended to assist the Town in implementing the IDDE Program in a prioritized and strategic way to detect and eliminate illicit discharges. The Plan will also provide a basis for identifying labor and operations budgeting each year; it is to be used as a guide for IDDE activities and can also be used as a training tool for staff.

# 2. STORM SEWER SYSTEM MAP

The Town has undergone initial efforts to map its outfalls and drainage system structures (catch basins, manholes, culverts, open channels, etc.) in a Geographic Information System (GIS). The Town of Marblehead continues to refine and add to the storm sewer system GIS data that shows the location of all stormwater catch basins and connecting surface and subsurface infrastructure. The Town plans to complete the buildout of the database, and thereafter update the information regularly to reflect the results of condition evaluations. The database will include infrastructure attribute information (e.g. size, type, etc.) and, where possible, depict the direction of in-flow and out-flow pipes and the locations of all stormwater outfalls discharging to receiving waters or to an interconnected MS4 within the Urbanized Area, as stipulated in the MS4 General Permit. Figures in **Appendix D** depicts the Marblehead MS4 system.

**PROPOSED PLAN: System Mapping**

| | |
|---|---|
| **1. Update map (as needed)** | **Throughout General Permit term**, the Town will continue to update and improve the map as necessary to reflect attribute information, corrections or modifications, and progress made. |

# 3. LEGAL AUTHORITY

## 3.1 ILLICIT DISCHARGE & DEVELOPMENT ORDINANCES

The Town of Marblehead currently has a chapter of their Town bylaws in affect that addresses stormwater management, and which prohibits illicit discharges:

- **Chapter 195: Stormwater Management and Erosion Control** of the Town's bylaws was adopted to help with Stormwater related areas such as to protect water resources, regulate development in regards to stormwater runoff, comply with state and federal regulations, and to prevent pollutants and illicit discharges into the Town of Marblehead's MS4 by outlining regulatory authority.

## 3.2 RESPONSIBLE PARTIES

The Marblehead Water and Sewer Commission (or designee) is designated to administer the IDDE program. The Water and Sewer Commission Superintendent is considered the designee and Authorized Agent for purposes of this program. The Water and Sewer Commission Superintendent is the primary manager of the IDDE program with support and collaboration from the Marblehead Health Department, Building Inspection Department, and Engineering Department. Additional responsible parties are listed in *Table 3-1: Responsible Parties for Implementing IDDE Program*.

**Table 3-1: Responsible Parties for Implementing IDDE Program**

| Primary Responsible Party | Responsibilities |
|---|---|
| Health Department | - Collaborates on Water Quality Monitoring (Beaches)<br>- Collaborates on enforcement (as needed) |
| Water and Sewer Commission | - Coordinates with the Health and Building Department<br>- Conducts investigations, screening, and sampling<br>- Reviews screening results and citizen complaints<br>- Conducts training<br>- Compiles annual documentation<br>- Coordinates and monitors abatement activities<br>- Conducts opportunistic inspections |
| Building Inspection Department | - Manages building inspections and code enforcement<br>- Collaborates on abatement activities (as needed) |
| Engineering Department | - Provides field inspection and investigation support<br>- Provides abatement support (as needed) |

# 4. ILLICIT DISCHARGE INSPECTION PROCEDURES

The following inspection procedures have been based on prior efforts in the Town and inspection requirements as outlined in the 2016 MS4 General Permit. The inspection procedures outlined below, focuses on the detection of direct and indirect illicit discharges into the Town's MS4, and ultimately the waters of the United States.

The Town will utilize the following illicit discharge inspection strategies:

1. Utilize Town drainage and sanitary sewer system maintenance to conduct opportunistic inspections for illicit discharges. During drainage system and sanitary sewer cleaning and maintenance, opportunistic inspections for illicit discharges will be conducted in accordance with the protocol outlined in Section 4.1.2 and the SOP in **Appendix A**.
2. Continue to rely on the Town of Marblehead Building Inspection Department to conduct private property investigations and maintain compliance with Massachusetts plumbing code as outlined in Section 4.1.3.
3. Utilize outfall screening and sampling assessments, described in Section 4.2, during wet-weather and dry-weather sampling to identify drainage areas with illicit discharge indicators and/or to verify that illicit discharges previously abated have been eliminated.

This section also describes the prioritization process for inspection program implementation and further describes prioritization factors in Section 4.3. Within three (3) years of the effective date of the new MS4 permit, catchment areas will be reassessed to refine prioritization based on inspection results. Classification of all catchment areas will be reevaluated based on new field information to identify appropriate next steps and updates to this Plan.

## 4.1 COLLECTION SYSTEM INSPECTION

### 4.1.1 Illicit Potential

The Town's sewer system consists of approximately 100 miles of collection system pipe, over 3,000 structures and 28 pump stations. The Town of Marblehead sends its wastewater to the South Essex Sewage District Treatment Plant, originally constructed in 1978. The Town of Marblehead is responsible for operation and maintenance of the sewer collection system within the Town. Several on-site septic systems may still be in use within the Town of Marblehead.

### 4.1.2 Opportunistic Inspections

The Town's ongoing drainage and sanitary sewer system inspection and maintenance activities provide a useful initial inspection opportunity to identify potential illicit discharges on an ongoing basis. The Town currently conducts catch basin cleaning and drainage pipe inspection and cleaning throughout the year, except during winter months. These activities allow trained staff and/or contractors to visually inspect numerous drainage structures for illicit connections.

Sewer system evaluations also provide an opportunity to detect potential illicit connections. Closed-circuit television (CCTV) pipeline inspections can reveal damaged sewer lines with a high potential for indirect discharge into the stormwater system. Manhole inspections and dye testing can locate piped services or other direct interconnections between the sewer and stormwater systems.

Town staff and/or contractors will utilize the SOP for Illicit Discharge Opportunistic Inspections, as appended (**Appendix A**) and conduct olfactory (odor) and visual inspections (color, turbidity, floatables, staining, and pipe benthic growth) consistent with Chapter 11 of the Center for Watershed Protection's Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments (2004). Training related to illicit discharge detection procedures is provided as outlined in Section 7.

**PROPOSED PLAN: Implement SOP for Opportunistic Inspections**

| | | |
|---|---|---|
| **1.** | **Detect Illicit Discharges** | The Town staff will continue to conduct opportunistic inspections to detect illicit discharges. **Appendix A** contains a copy of the Town's SOP for the Illicit Discharge Opportunistic Inspection Program. Town staff and/or contractors who conduct drainage system or sanitary sewer system operations and maintenance are trained in olfactory and visual detection of illicit discharges in accordance with Chapter 11 of the Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments (2004).<br><br>Sewer malfunctions, which are investigated by the Water and Sewer Commission, may also lead to the discovery of illicit discharges. |
| **2.** | **Record Keeping** | If an illicit discharge is identified during opportunistic inspections, Town staff and/or contractors will alert the Authorized Agent via email such that the illicit discharge can be targeted for further investigation. This correspondence will be traceable by location and calendar year. |
| **3.** | **Identify Additional Problem Areas** | Problem Areas for indirect illicit discharges, and specifically illegal dumping, will be identified during drainage system maintenance activities. Problem areas will be noted using paper or a digital data collection system and will be targeted for further investigation, landowner outreach, potential enforcement activities, and/or catch basin stenciling in subsequent years. |

### 4.1.3 Private Property Inspections

The Town's IDDE Program also relies on opportunistic private property inspections to detect and eliminate potential illicit discharges into the MS4. The Marblehead Building Inspection Department is the primary authority for building and plumbing code compliance and identifying potential illicit discharges during building inspections.

## 4.2 OUTFALL AND INTERCONNECTION INSPECTION

The Town's primary method for detecting illicit discharges, not identified via opportunistic or private property inspection, will be through outfall inspection (i.e. screening and sampling). For the purposes of this Plan, the term outfall may also refer to locations that discharge into neighboring communities or into adjacent MS4s (e.g. Massachusetts Department of Transportation [MassDOT]) and are called interconnections.

### 4.2.1 Screening

Screening includes a visual and olfactory inspection consistent with Chapter 11 of the Center for Watershed Protection's Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments (2004). Screening inspections will be conducted by Town staff and/or with assistance of a third-party contractor and are documented through digital data collection tools or paper forms. Outfall screening documentation will include the data collection fields shown in the Outfall Inspection Form, provided in **Appendix B**.

Both dry-weather and wet-weather screening may be necessary to identify outfalls and interconnections with illicit discharges. For the purposes of this Plan, dry-weather conditions consist of no more than 0.1 inches of rainfall in the previous 24-hour period and no significant snowmelt. Wet-weather conditions should consist of a precipitation event that consists of sufficient flow to produce a stormwater discharge.

Base flow in storm drain systems is common and can be present at any time of year due to shallow groundwater infiltration; therefore, it is essential to conduct dry-weather outfall and interconnection screening investigations during periods when groundwater infiltration is minimal. Coordination with the Marblehead Water Department will be necessary to confirm that dry weather flows present are not the result of hydrant flushing.

### 4.2.2 Sampling

If flow is observed during screening, two (2) samples are collected from the outfall (or if the outfall is inaccessible, the nearest accessible upstream drainage structure) in accordance with EPA's Draft Bacterial Source Tracking Protocol (2012). It should be noted that not all sections of the Draft Bacterial Source Tracking Protocol are applicable to this Plan. One (1) sample is analyzed in the field for ammonia, chlorine, surfactants, conductivity, and temperature; the other sample is submitted to a MA-certified laboratory to be analyzed for enterococci (or e.coli in inland discharge locations as needed). Sampling results shall be maintained in a database format for annual reporting. An example database format is included in **Appendix C**. For specific outfalls identified in the table in **Appendix D** that discharge directly to impaired waters, additional laboratory or field test kit parameters may also be required.

Benchmark concentrations, instrumentation, and analytical methods used for stormwater sampling are included in *Table 4-2: Sampling Guidelines for Water Quality Indicator Parameters*. It should be noted that instrumentation and analytical method may change as products are developed or refined. The instrumentation and method can be modified as allowed by EPA. If flow is not observed during screening, the non-flowing condition is noted on the Outfall Inspection Form and no sample is collected. All sampling shall be conducted under a Water Quality Sampling Plan detailing sample collection, preservation, and quality control requirements. A summary of the outfall monitoring workflow is shown in *Figure 4-1: Outfall Monitoring - Workflow Process.*

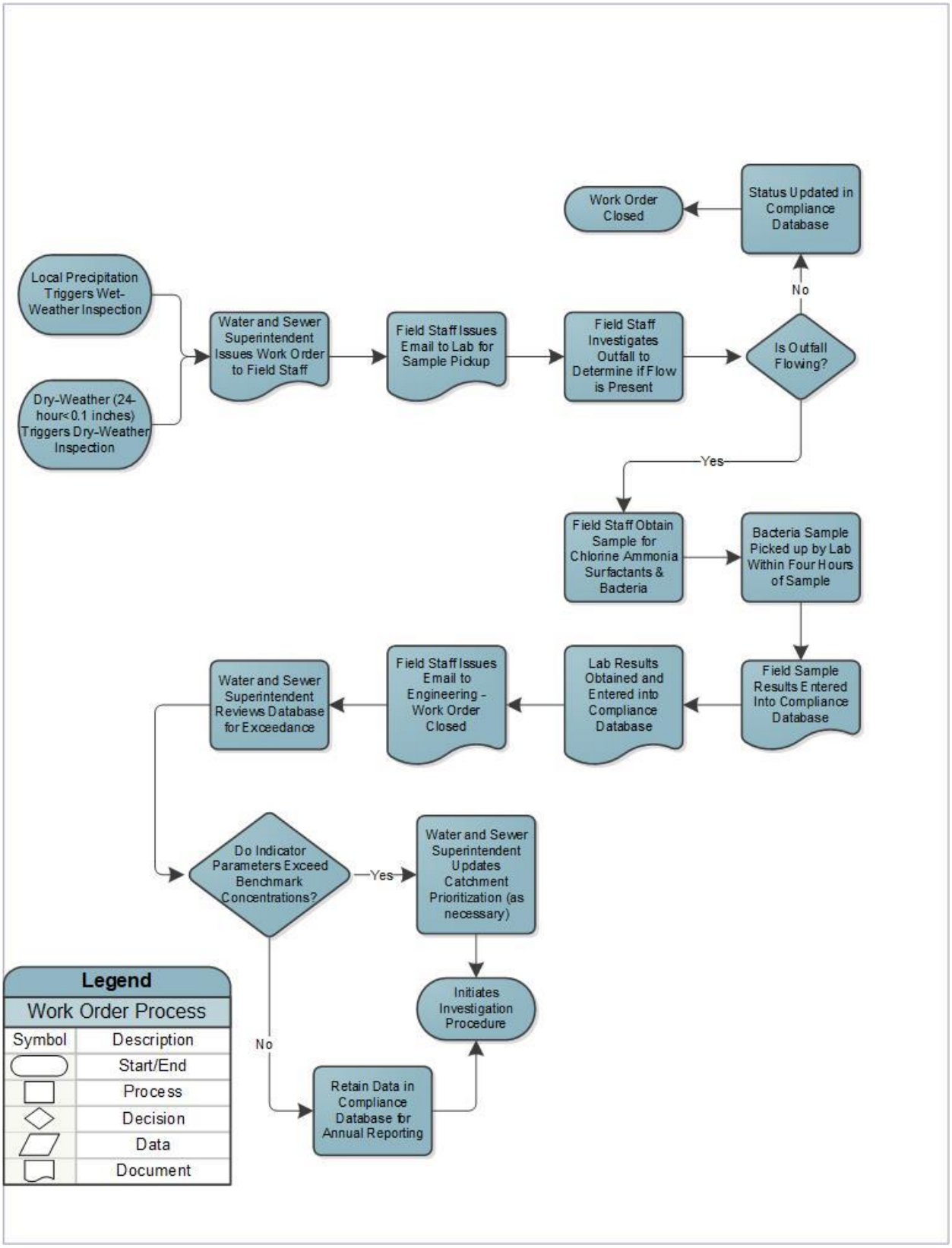
**Table 4-2: Sampling Guidelines for Water Quality Indicator Parameters**

| Indicator Parameter | Benchmark Concentration | Instrumentation | Analytical Method |
|---|---|---|---|
| Enterococcus | 61 cfu/100 mL | via MA-certified laboratory | 1106.1, 1600, Enterolert 12 22 |
| Surfactants (as MBAS) | ≥ 0.25 mg/L | CHEMetrics K-9400 Field Kit | Methylene Blue |
| Ammonia ($NH_3$) | ≥ 0.5 mg/L | CHEMetrics K-1510 Field Kit, CHEMetrics K-1420 or Test Strip | Direct Nesslerization, Hydroxybenzyl Alcohol or Test Strip |
| Total Chlorine | > 0.05 mg/L - method detection limit | CHEMetrics K-2504 Field Kit | DPD |

**PROPOSED PLAN: Conduct Targeted Outfall Inspections**

| | | |
|---|---|---|
| **1.** | **Conduct Dry-Weather and Wet-Weather Outfall and Interconnection Inspections** | Dry-weather and wet-weather outfall and interconnection inspections will be conducted by Town staff with the assistance of a third party contractor as necessary. Outfall data collection should be consistent with data fields shown on the example Outfall Inspection Form included in **Appendix B**. |
| **2.** | **Record Keeping** | If a potential illicit discharge is identified by Town staff or a third-party contractor, the field staff will alert the Authorized Agent via e-mail, who will compile findings in an IDDE compliance database and will identify drainage areas for further investigation. These e-mails and compliance database updates will be traceable by location and calendar year. |
| **3.** | **Identify Additional Problem Areas** | Areas identified with consistent illegal dumping near the outfall will be identified during outfall inspection. Problem areas will be noted using paper outfall forms or other digital data collection tools and will be targeted for catch basin stenciling, public outreach, further investigation, or enforcement depending on the nature of the illicit discharge. During field inspections, crews should also note whether the outfalls have maintenance or structural issues, such as trash around the outfall or damaged infrastructure that should be considered for repair. Observed spills or environmental hazards should be immediately reported to the Authorized Agent and the incident should be documented using outfall inspection forms or other digital data collection tools. |

## Figure 4-1: Outfall Monitoring – Workflow Process



## 4.3 IDDE PROGRAM PRIORITIZATION

The Town has developed the following prioritization to allow outfall inspection resources to be focused in areas with the most significant potential for illicit discharges. In Marblehead, IDDE priority areas have been developed based on preliminary catchment boundary delineations and previous outfall screening and investigation results in three watershed areas previously identified by MassDEP and EPA as Problems. These Problem watershed areas are locally referred to as Riverhead (Outfall 10398), Stramski (Outfall 2031 and 2562) and Grace Oliver (Outfall 2677).

These hydrologic units provide an initial prioritization structure as pipe network connectivity is refined during IDDE investigation and as catchments can be more accurately defined. Consistent with the 2016 MS4 General Permit, all investigations will follow standard catchment-based investigation procedures as described in Section 5. Hydrologic units (aka Catchments) have been prioritized and classified as one of the following, consistent with the 2016 MS4 General Permit: Problem Catchments, High Priority Catchments/Outfalls, Low Priority Catchments/Outfalls, and Excluded Catchments.

The following are EPA definitions for each of the above categories:

**Excluded**

- Catchments with no potential for illicit discharges, and 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. Based on the hydrologic unit prioritization methodology – the Town of Marblehead has not excluded any catchments under this Plan.

**Low Priority**

- Catchments determined by the Town as low priority based on outfall/interconnection screening and/or catchment characteristics, and are not classified as High Priority, Problem, or Excluded.

**High Priority**

- Outfalls that are discharging to an area of concern for public health due to proximity of discharges to public swimming areas; or catchments determined by the Town as high priority based on the following:
  - 2014 Integrated List Waterbody segments defined by MassDEP as bacteria impaired waters
  - Outfalls that discharge into proximity of public swimming areas

**Problem**

- Catchments with outfalls/interconnections with known or suspected illicit discharges based on existing information. Includes areas where screening indicates sewer input (olfactory/visual evidence of sewage, Ammonia ≥0.5 mg/L, surfactants ≥0.25 mg/L, bacteria ≥61 colony forming units/100mL, detectable chlorine. At this time, the Town has identified four catchment areas that are considered problem catchments based on previous test results. These are Outfall 10398, 2031, 2562, and 2677. Problem catchments will be reconsidered upon completion of initial outfall inspections.

Hydrologic units or outfalls that were not Problem outfalls or do not discharge directly to public swimming areas or bacteria impaired waters were ranked into High or Low Priority catchments. During the prioritization process, individual stormwater pipe segments were prioritized according to the following:

- Land use
- Parcel density
- Sewer pipe average age
- Sewer pipe/stormwater drainage pipe crossing

The prioritization matrix and scoring criteria used for catchment ranking are shown on the table in **Appendix D** and with associated figure exhibiting catchment priority**.** Outfall inspections will commence in High Priority catchments initially. Catchment prioritization will be reevaluated after additional interconnections and other inspection results have been evaluated.

## 4.4 RECORD KEEPING

All records from outfall inspections should be well documented utilizing work orders, email correspondence, field collection data summary forms, and compliance database updates. Summaries of inspection activities will be included in each MS4 Annual Report. Records should include:

- Recommended investigation and/or abatement plan for immediate response to verified illicit discharge observed at outfalls;
- Laboratory data and field screening results;
- Dates and times screening and sampling events were conducted;
- Weather conditions both during each sample event, and in the twenty-four (24) and forty-eight (48) hours prior to each sampling event;
- An updated priority ranking of all catchment areas based on new field information (if applicable); and
- An updated map showing boundaries of all MS4 catchment areas (if modified).

# 5. ILLICIT DISCHARGE INVESTIGATION PROCEDURES

This section outlines procedures utilized to isolate the source(s) of illicit discharges through systematic investigation of catchment areas consistent with the MS4 General Permit. Catchments are defined as the land area that conveys stormwater runoff to a discrete pipe network that outlets at a discrete outfall. Investigation procedures may vary depending on the nature of the illicit discharge potential identified during opportunistic inspection, outfall inspection, or citizen complaint. The following section outlines the general components of investigation within the Town, which are also illustrated in the workflow diagram in *Figure 5-1: Illicit Discharge Investigation - Workflow Process*. Note that when an obvious direct connection (toilet paper in stormwater drainage system manholes/catch basins) is verified during opportunistic inspection or outfall inspection, several investigation steps will be bypassed to quickly verify location and eliminate the discharge. Consistent with the 2016 MS4 General Permit, all catchment investigations shall be completed within 10 years of the effective date of the permit. It should be noted that four catchment areas are currently under investigation in the Town of Marblehead and are further described in Section 4.

## 5.1 CATCHMENT INVESTIGATION PROCEDURE

The Town will implement the following Catchment Investigation Procedure in Problem, High, and Low Priority Catchments, as defined in Section 4.3, and proceed systematically from highest to lowest priority catchments. The potential for an illicit connection is evaluated based on a Weight of Evidence (WoE) assessment that incorporates both olfactory/visual evidence and sampling results. See *Figure 5-2: Flow Chart to Identify Possible Illicit Discharges* for an overview of the use of sampling data for identification of potential sources of illicit discharges. For the purposes of this Plan, an individual catchment investigation will be considered complete once all potential sources of wastewater (or other illicit discharges) have been identified. Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall will be reprioritized for dry-weather and wet-weather inspection and scheduled for ongoing inspection once every five years.

The investigation procedure is initiated by the Authorized Agent and is conducted by trained Town staff with the assistance of a third-party subcontractor as needed. The investigation of an illicit discharge may also be initiated by a public complaint received via the Town's website or phone. The investigation procedure includes the following implementation steps:

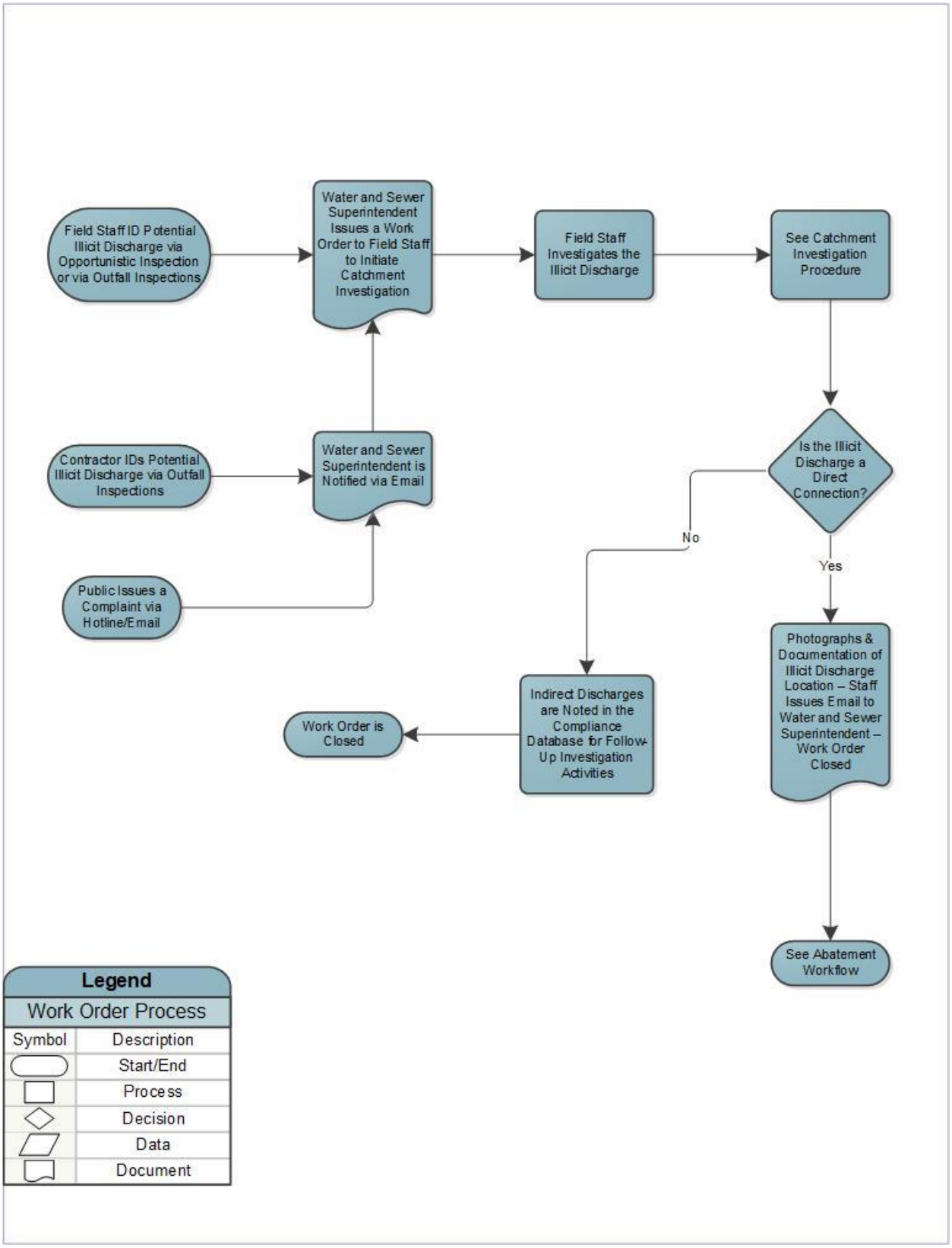
1. Conduct a preliminary review of drainage plans, GIS mapping, and record plans to define the specific catchment area for the catchment to be investigated. Once an approximate catchment area is defined, identify known System Vulnerability Factors within the Catchment as defined by the MS4 General Permit. System Vulnerability Factors include at least the following and will obligate additional wet-weather screening prior to or during investigation. The Town of Acton has identified the following as System Vulnerability Factors that, when known, will obligate further wet weather sampling and targeted investigation:

    - Repetitive SSOs;
    - Common or twin-invert manholes serving both storm and sanitary sewer;
    - Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures have resulted in SSOs;
    - Sanitary sewer alignments known or suspected to have been constructed with an underdrain system;
    - Extensive and documented sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure; and

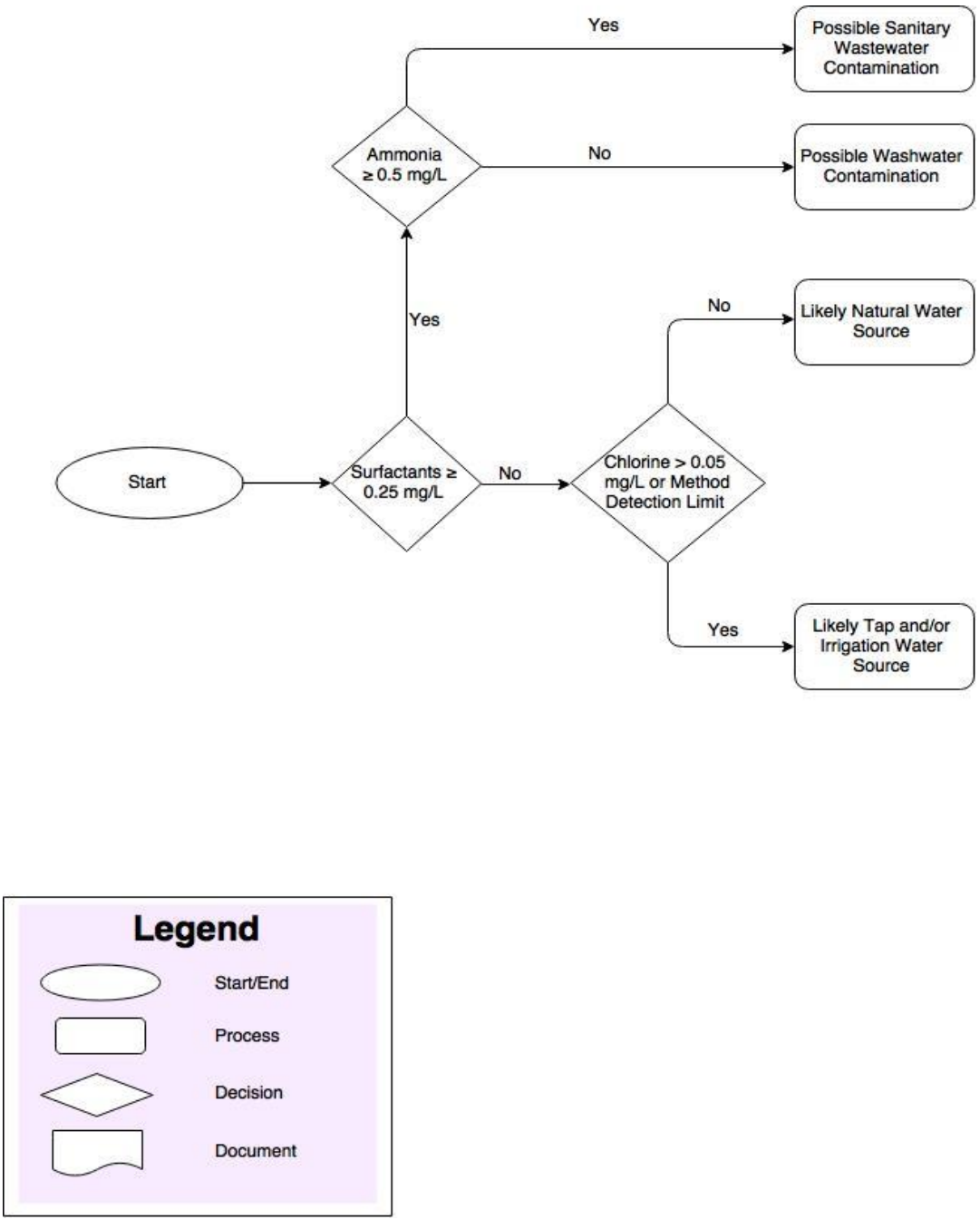
- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance).

2. Distribute notifications to residents and property owners within the investigation area to inform them of the potential need to gain access to private property to inspect municipal drainage infrastructure, internal plumbing, and/or conduct dye testing.
3. Conduct field investigations during dry weather only to reduce the effect of stormwater flows on the MS4. Conduct a visual and olfactory inspection of key junction manholes in the drainage area to attempt to identify obvious source(s) of illicit cross-connection, inflow, or infiltration. A key junction manhole is a location that allows effective assessment of upstream drainage. Begin investigation in the upper portion of each catchment working downstream. If visual evidence of a direct discharge is identified and the segment of pipe can be isolated, skip to Step 5.
    - When flow is observed in a junction manhole, use field kits to analyze samples for ammonia, chlorine, and surfactants and record results. Use a WoE approach to compare with the sampling thresholds shown in *Table 4-2: Sampling Guidelines for Water Quality Indicator Parameters* to identify the likely source of potential illicit connection(s). Junction manholes with obvious signs of contamination (e.g. toilet paper) do not need to be sampled.
    - When flow is not observed in a junction manhole, partially block each inlet of the manhole using sandbags or other barriers for a forty-eight (48) hour dry period (i.e. when no precipitation or significant snowmelt is expected). Re-inspect the junction manhole after forty-eight (48) hours for intermittent flows, and then sample any captured flow for standard sampling parameters.
4. Isolate the pipe or open drainage segment thought to contain illicit discharge(s) using "bracketed" field sample collection for standard sampling parameters.
5. Conduct additional investigations, as needed, before or after "bracketed" field sampling to verify the source(s) of pollutants. These investigations can include laboratory water quality testing (e.g. Enterococci) wet-weather and/or high groundwater investigation monitoring, CCTV pipe inspections, targeted internal plumbing inspections via lateral tests using dye flushing and/or sanitary sewer collection system dye flooding. Locations will be prioritized for further investigation based on a WoE determination of the likelihood of illicit discharge.
6. When illicit discharge locations are verified in association with a physical address or indirect interconnection with the sanitary sewer, field staff will photograph the problem area at ground level, identify any other indicators of location, summarize likely remedy to the problem, sampling results and forward this information to the Authorized Agent. The Authorized Agent will initiate the corrective action process described in Section 6.
7. The Authorized Agent shall order compliance by the property owner and/or responsible party via a written notice. See Section 6 for discussion of the corrective action process.

**Figure 5-1: Illicit Discharge Investigation – Workflow Process**



## Figure 5-2: Flow Chart to Identify Possible Illicit Discharges[1]




Adapted from Chapter 12 of the Center for Watershed Protection's Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments (2004): Figure 47, pg. 131.

## 5.2 FOLLOW-UP INSPECTIONS

Illicit discharges should be removed in accordance with the Illicit Discharge Abatement Plan outlined in Section 6. Within sixty (60) days of an illicit discharge abatement, dry-weather follow-up sampling will be conducted just upstream and downstream in the nearest manholes to the abated illicit discharge to confirm removal. Field sample follows similar procedures for "bracket" sampling outlined in Section 5.1.

## 5.3 CONFIRMATORY INSPECTIONS AND ONGOING OUTFALL/INTERCONNECTION MONITORING

Within one (1) year of the removal of all identified illicit discharges within a catchment area, dry-weather and wet-weather confirmatory outfall or interconnection screening and sampling will be conducted following the procedures described in Section 4.2. Post-abatement screening results will be used to reprioritize the catchment and refine the catchment categorization to ensure that resources are focused in areas with the most significant potential for illicit discharges. The priority ranking of all known catchment areas will be updated regularly.

If confirmatory screening indicates the presence of more sources of illicit discharge, the catchment will be scheduled for additional investigation following the priority ranking from highest to lowest priority catchments. If confirmatory screening does not indicate the presence of additional sources of illicit discharge, the catchment will be reprioritized and scheduled for ongoing outfall inspections once every five years.

## 5.4 ADDITIONAL DRAINAGE INFRASTRUCTURE MAPPING

Unmapped stormwater infrastructure and MS4 interconnections discovered during field activities will be GPS-located and added to the Town's GIS database and inspected following the procedures described in Section 4.2.

## 5.5 RECORD KEEPING

All records from catchment investigations should be well documented utilizing digital data collection technologies and compliance database updates. As with inspection activities, summaries of investigation activities will be included in each MS4 Annual Report. Records should contain a summary of each catchment under investigation and any evidence of known or suspected illicit discharges. A sample Catchment Investigation Summary reporting template is provided in **Appendix E**.

# 6. ILLICIT DISCHARGE ABATEMENT PROCEDURES

Upon confirmation of a verified illicit discharge (via CCTV and/or dye), the Authorized Agent will send an email notification to the Director of Public Health and the Building Commissioner (as applicable) indicating that field staff have verified an illicit discharge and that the 60-day window for remediation has been triggered. The Authorized Agent will initiate the abatement workflow process as shown in *Figure 6-1: Illicit Discharge Abatement - Workflow Process*.

Connections from private properties are common sources of direct and indirect illicit discharges, and therefore this section is focused on the procedures to follow if the Town finds that the property owner is the responsible party. If the Town is responsible for removal of the illicit discharge, such as in cases of exfiltration from broken sewer mains, the Town will follow a 60-day corrective action timeline (as possible). The Town will structure its abatement activities based on flow volume, impacts to human health, etc. Any deviation from the 60-day corrective action timeline will be explained, an updated timeline outlined and included during MS4 General Permit annual reporting.

## 6.1 VOLUNTARY COMPLIANCE

The preferred approach to address illicit discharges is to pursue voluntary compliance from the property owner and/or responsible party using education further described in Section 7. Often, business operators and residential property owners are not aware of the existence of illicit connections or activities on their properties that may constitute an illicit discharge. In these cases, providing information about the connection or operation, the environmental consequences, and suggestions on how to remedy the problem may be enough to secure voluntary compliance from the property owner and/or responsible party.

## 6.2 OPERATIONAL PROBLEMS

Property owners and/or responsible parties are responsible for correcting operational problems that are resulting in illicit discharges to the municipal storm drain system. Operation modifications could include sewer lateral maintenance to repair defects or eliminate blockages, moving washing activities indoor or undercover, locating an appropriate discharge location for liquid wastes, or other appropriate measures. Through site visits and education, the Authorized Agent or other program partners may provide technical assistance to aid property owners in identifying and addressing operational problems.

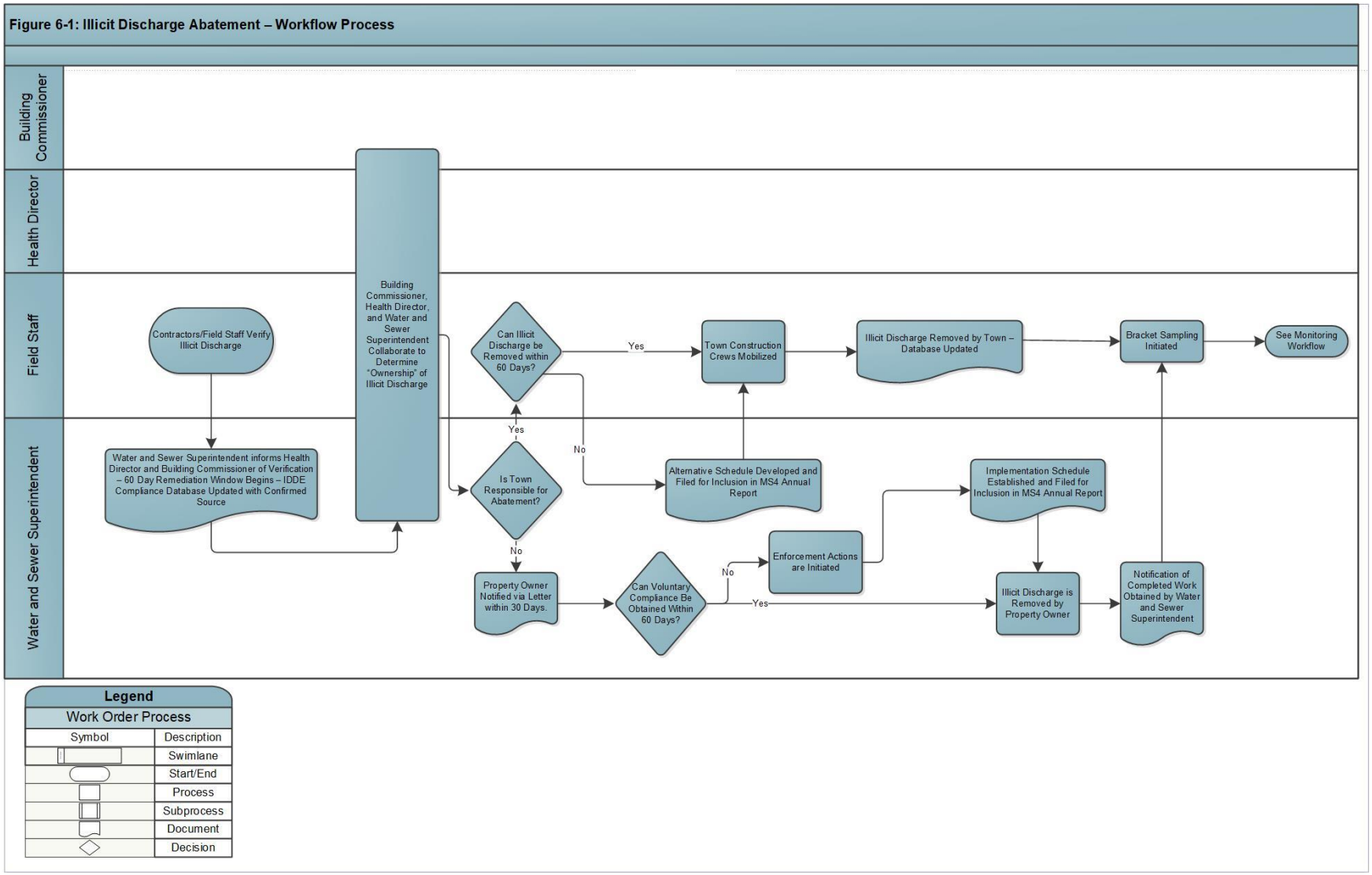
## 6.3 STRUCTURAL PROBLEMS

Many illicit discharges will require a structural modification to correct the problem. Structural modifications are used to redirect illicit discharges from private properties to a sanitary wastewater collection, on-site disposal system, or other appropriate location. Structural repairs to defective sanitary sewer collection infrastructure may also be necessary. Correcting structural problems is the responsibility of the property owner and/or responsible party, though the Authorized Agent may provide technical assistance during the process.

## 6.4 ENFORCEMENT ACTIONS

When voluntary compliance cannot be obtained, or does not produce the desired result, the Authorized Agent will pursue follow-up enforcement action. Enforcement actions will be the responsibility of the Water and Sewer Commission (or its assigns). A sample Notice of Violation is provided in **Appendix F**. *Table 6-1*: *Enforcement Timeline* outlines detailed enforcement steps.

## Figure 6-1: Illicit Discharge Abatement – Workflow Process



### 6.4.1 Enforcement Timeline

The timeline for corrective action procedures of an illicit direct connection is determined by the Authorized Agent. If property owners are not addressing problems in a timely manner (i.e. within sixty (60) days of verification), this may warrant a more aggressive enforcement approach, if an "imminent and substantial danger" exists. Consistent with the Stormwater Management and Erosion Control Bylaw, the Town may step in and perform the repairs necessary to remove an illicit connection, eliminate an illicit discharge, and/or clean-up a dumping incident. Property owners will also be responsible for reimbursing the Town for any costs incurred in correcting illicit discharge problems.

**Table 6-1: Enforcement Timeline**

| Illicit Discharge Elimination Step | Details |
|---|---|
| Step 1 – Initial Actions (0 to 60 Days) | - Provide landowner Notice of Violation letter*. Notify landowner in writing within thirty (30) days of verification to remove illicit discharge.<br>- Encourage voluntary compliance.<br>- Set compliance date (determined on individual incident basis).<br>- Provide staff support and/or technical assistance (as applicable).<br>- Request evidence of corrected problem.<br>- Conduct site visit to verify compliance and completion of work. |
| Step 2 – Follow-up Actions (60 to 90 Days) | - Request evidence of corrected problem.<br>- Conduct site visit to verify compliance and completion of work.<br>- If unresolved, send 2nd Notice of Violation letter*, indicating that unresolved issues and fines will be referred to prosecutor. |
| Step 3 – Final Actions (90+ Days) | - Send final Notice of Violation letter*.<br>- Prosecutor to commence fines in accordance with the Stormwater Management and Erosion Control Bylaw. |

*Document copies of all letters

## 6.5 FOLLOW-UP SCREENING

Within sixty (60) days of the illicit discharge abatement, dry-weather confirmatory sampling should be conducted just "upstream" and "downstream" in nearest manholes to the abated illicit discharge to confirm removal. Field sample collection includes ammonia, chlorine, and surfactants; follow similar procedures for "bracket" sampling as described in Section 5.1.

## 6.6 RECORD KEEPING

Throughout the investigation and corrective action activities, all information related to the incident or property in question should be well documented utilizing a series of work orders, email correspondence, and compliance database updates. Along with monitoring and investigation activities, summaries of corrective action will be included in each MS4 Annual Report. Records for each verified illicit discharge removed from the Town's MS4 should include:

- Location of discharge and source;
- Description of discharge;

- Method/date of discovery;
- Date of elimination;
- Mitigation action and associated costs; and
- Estimated volume of flow removed.

Additional records should be maintained for each illicit discharge that is not removed within sixty (60) days of verification, including:

- Justification for delayed corrective action;
- Schedule for removal of illicit discharge;
- Explanation of why schedule is as expeditious as possible; and
- Description of legal actions against landowner (if applicable).

# 7. TRAINING, EDUCATION AND VOLUNTARY REPORTING PLAN

## 7.1 ANNUAL EMPLOYEE TRAINING

Employee training is an important component of the Town's stormwater program. Town staff are trained in the opportunistic inspection SOP via the training module provided in **Appendix G**. Town staff involved with the IDDE Program must be able to recognize and identify illicit discharges through standard drainage and sanitary sewer system maintenance operations.

| **PROPOSED PLAN: Annual Employee Training** | |
|---|---|
| **1. Conduct IDDE Training Annually** | Town staff responsible for stormwater and sewer collection system maintenance, in addition to those that specifically conduct site visits and inspections, will be trained to identify illicit discharges. Topics may vary each year based on staff education needs. |

## 7.2 PUBLIC EDUCATION

Under the MS4 General Permit, the Town must inform public employees, businesses, and the general public of the hazards of illicit discharges. Targeted mailing of educational brochures and fact sheets in neighborhoods with consistent indirect illicit discharges are a component of the IDDE Program (see **Appendix H** for sample outreach letter). General awareness on illicit discharges will also be continued through educational materials through the Town website.

## 7.3 VOLUNTARY REPORTING

### 7.3.1 Incidental Detection

The Town has a general complaint reporting phone line that residents, field personnel, and outside agencies can call to report illicit discharges. This service encourages residents to participate in the reporting process and helps the Town to receive timely information about problems like illegal dumping, spills, or strong odors associated with septic or sewer outbreaks or failures. In the event of a release of hazardous materials, emergency services should be contacted immediately.

### 7.3.2 Contact Information

Marblehead residents, other Town departments, or outside agencies reporting incidents that have occurred within the Town limits can call the Town of Marblehead Water and Sewer Commission at 781-631-0102.

# 8. PROGRAM TIMELINE AND MILESTONES

The Town will implement the IDDE Program outlined in this Plan on the schedule as follows:

| IDDE PROGRAM SCHEDULE (2019-2020) | 2019 | | | | 2020 | | | |
|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Baseline Dry-Weather and Wet-Weather Outfall Inspections | | | ■ | ■ | ■ | ■ | ■ | ■ |
| Additional Outfall and Interconnection Inspections | | | ■ | ■ | | | | |
| Preliminary Prioritization of Catchments | | | | | | | | |
| Conduct Staff Training | | | | | ■ | | | |
| Conduct Opportunistic Inspections | | ■ | ■ | ■ | | ■ | ■ | ■ |
| Conduct Catchment Investigations | | | | | | | ■ | ■ |
| Summarize Previous Year Results for MS4 Annual Report | | | ■ | | | | ■ | |

| IDDE PROGRAM SCHEDULE (2021-2022) | 2021 | | | | 2022 | | | |
|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Conduct Staff Training | ■ | | | | ■ | | | |
| Conduct Opportunistic Inspections | ■ | ■ | | | | | | |
| Conduct Catchment Investigations | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Summarize Previous Year Results for MS4 Report | | | ■ | | | | ■ | |
| Review Program, Refine Priority of Catchments, and Update IDDE Manual | | | ■ | | ■ | ■ | | |

Note: Indirect discharges shall be noted and additional investigation (e.g. dye testing, CCTV inspection, internal plumbing inspection) will be conducted as needed throughout the Program period.

Program success is based on trainings conducted, catchment prioritization, dry-weather and wet-weather outfall inspections, investigations, number of discharges removed, and percent and area of catchments investigated. The Town will evaluate and report overall effectiveness in the MS4 General Permit Annual Report.

# 9. REFERENCES


Center for Watershed Protection and Robert Pitt University of Alabama, 2004. *Illicit Discharge Detection and Elimination: A Guidance Document for Program Development and Technical Assessments*; October.

Massachusetts Department of Environmental Protection, 2014. *Massachusetts Year 2014 Integrated List of Waters;* July.

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U.S. Environmental Protection Agency, 2012. Draft *EPA New England Bacterial Source Tracking Protocol;* January.

U.S. Environmental Protection Agency, 2016. *National Pollutant Discharge Elimination System (NPDES) General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts.*

# APPENDIX A: OPPORTUNISTIC INSPECTION SOP

# APPENDIX B: OUTFALL INSPECTION FORM

# APPENDIX C: EXAMPLE BASELINE SCREENING RESULTS TABLE

# APPENDIX D: STORMWATER SYSTEM OVERVIEW AND PRIORITIZATION

# APPENDIX E: SAMPLE CATCHMENT INVESTIGATION SUMMARY FORM

# APPENDIX F: SAMPLE NOTICE OF VIOLATION FORM

# APPENDIX G: TRAINING MODULE

# APPENDIX H: SAMPLE OUTREACH LETTER