Town of Walpole
Illicit Discharge Detection and Elimination (IDDE) Plan

June 2019

Prepared by:
The Town of Walpole

With assistance from:

FUSS & O'NEILL

Thank you to the following for providing the IDDE template, SOP documents, and other technical assistance:

Massachusetts Department of Environmental Protection

Central Massachusetts Regional Stormwater Coalition

Fuss & O'Neill

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Town of Walpole, MA

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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 Walpole** 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
- Flows from riparian habitats and wetlands
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

If these discharges are identified by EPA, MassDEP, or the Town of Walpole as significant contributors of pollutants 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 the **Town of Walpole** regulated area based on the 2016 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 WatersTown of Walpole, Massachusetts

Water Body Name	Segment ID	Category	Impairment(s)	Associated Approved TMDL
School Meadow Brook	MA 73-06	4a[1]	Fecal coliform	Neponset River Bacteria
Trap hole Brook	MA 73-17	4a[1]	Fecal coliform	Neponset River Bacteria
Willet Pond	MA 73062	4a	Mercury in fish tissue	
Pettee Pond	MA 73036	4a	Mercury in fish tissue	
Spring Brook	MA 73-34	4c	Debris/Floatables/Trash	
Clarks Pond	MA 73008	4c	Non-native aquatic plants	
Turner Pond	MA 73056	4c	Non-native aquatic plants	
Stop River	MA 72-09	5	Ambient Bioassays – Chronic Aquatic Toxicity Phosphorus (Total) Dissolved Oxygen	Charles River Phosphorus
Stop River	MA 72-10	5[1]	Organic Enrichment (Sewage) Biological Indicators E. coli Phosphorus (Total) Temperature, water[2]	Charles River Phosphorus, Pathogens
Neponset River	MA 73-01	5	DDT/PCB in fish tissue Bacteria/Pathogen Phosphorus (Total) Foam/Flocs/Scum/Oil Slicks Unspecified Metals	Neponset River Bacteria
Mine Brook	MA 73-09	5[1]	Fecal Coliform Dissolved Oxygen	
Cobbs Pond	MA 73009	5	Nutrient/Eutrophication Biological Indicators Dissolved Oxygen Secchi disk transparency	
Memorial Pond	MA 73012	5	Aquatic plants (macrophytes) Turbidity	
Ganawatte Farm Pond	MA 73037	5	Aquatic plants (macrophytes) Dissolved Oxygen Secchi disk transparency	

[1] Not impaired for pathogens under Draft 2016 Integrated List of Waters

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.

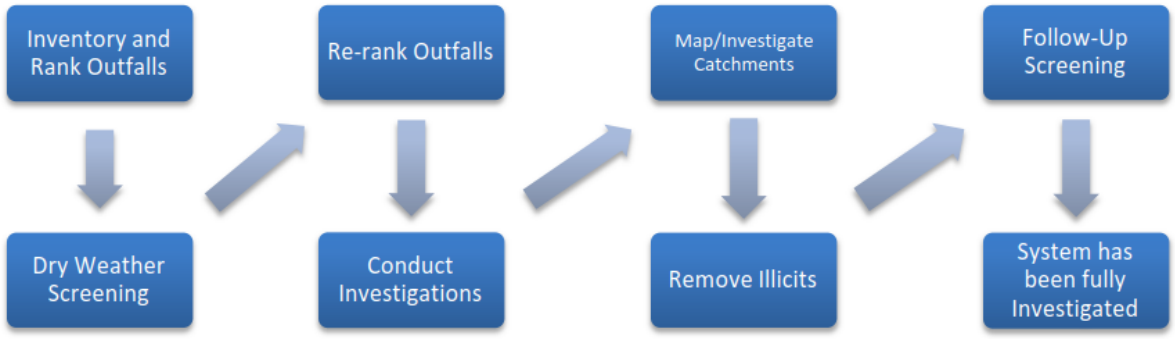
1.5 IDDE Program Goals, Framework, and Timeline

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
- Sanitary sewer overflow inventory
- 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



1.6 Required Schedule

The MS4 permit defines the required timeline for major tasks in implementing the Town's IDDE program as summarized in Table 2 below.

Table 1-2: IDDE Program Required Schedule

IDDE Task	Permit Schedule
General	
Establish Adequate Legal Authority Over MS4	Due May 1, 2008
Written IDDE Program	Year 1 (June 30, 2019)
Eliminate Illicit Discharges or Make an Expeditious Plan for Elimination	Within 60 days of discovery
Training for all IDDE Staff	Annually
Tracking and Reporting IDDE Progress	Annually
SSO Inventory and Reporting	
Inventory of all SSO's that Occurred Over the Previous 5 years	Year 1 (June 30, 2019) and updated annually
Oral Notification to EPA and DEP of an SSO	24 hours from discovery
Written Notification to EPA and DEP of an SSO	5 days from discovery
System Mapping	
Phase 1 of System Mapping	Year 2 (June 30, 2020)
Phase 2 of System Mapping	Year 10 (June 30, 2028)
Outfall and Interconnection Screening	
Written Outfall and Interconnection Screening Procedure	Year 1 (June 30, 2019)
Initial Outfall and Interconnection Inventory and Ranking	Year 1 (June 30, 2019) and updated annually
Updated Outfall and Interconnection Ranking	Year 3 (June 30, 2021)
All Outfalls (High and Low Priority) Inspected During Dry Weather	Year 3 (June 30, 2021)
Revisit Outfalls With Evidence of Illicit Discharge but No Flow	Within 1 week of initial inspection
Confirmatory Outfall and Interconnection Screening	Within 1 year of Illicit Discharge Removal
Catchment Investigations	
Written Catchment Investigation Procedure	18 Months (December 31, 2019)
Begin Investigations for All Catchments Related to Problem Outfalls	Year 2 (June 30, 2020)
Complete Investigations of All Catchments Related to Problem Outfalls	Year 7 (June 30, 2025)
Complete All Catchment Investigations	Year 10 (June 30, 2028)

1.7 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 Walpole** has completed the following IDDE program activities consistent with the 2003 MS4 Permit requirements:

- Developed a map of outfalls and receiving waters
- Adopted an IDDE bylaw or regulatory mechanism (10/2006)
- 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 (10/2002)
- Developed procedures for removal of the source of an illicit discharge (10/2002)
- Developed procedures for documenting actions and evaluating impacts on the storm sewer system subsequent to removal (10/2002)

In addition to the 2003 MS4 Permit requirements, other IDDE-related activities that were completed include:

- SSO inventory
- Outfall sampling
- Outfall assessment and recommended improvements
- 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 Walpole** adopted an **Illicit Discharge Bylaw (10-16-2006 FATM)**. A copy of the **Illicit Discharge Bylaw** is provided in **Appendix A**. The Illicit Discharge Bylaw provides the **Town of Walpole** 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 Town of Walpole will review its current Illicit Discharge Bylaw and related land use regulations and policies for consistency with the 2016 MS4 Permit.

2.2 Statement of Responsibilities

The **Town Administrator** is the lead municipal agency or department responsible for implementing the IDDE program pursuant to the provisions of the **Illicit Discharge Bylaw**. Other agencies or departments with responsibility for aspects of the program include:

IDDE Implementation Role	**Responsible Authority/Individual**
IDDE enforcement Authority under Stormwater Erosion Control Bylaw	Town Administrator
Overall Supervision of IDDE Program	DPW Director
Day to Day Supervision of IDDE Program Reporting	Town Engineer DPW Director
Enforcement Authority for SSOs	Superintendent Sewer and Water
Enforcement Authority for Septic Systems and Septic System Construction	Health Director
Enforcement of State Plumbing code	Building Inspector/Commissioner
Enforcement Action	Kopelman and Paige , Town Counsel
Person Responsible for Record Keeping	Stormwater Coordinator/ Conservation Agent

3 Stormwater System Mapping

The Town of Walpole 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 **Engineering Department** is responsible for updating the stormwater system mapping pursuant to the 2016 MS4 Permit. The Town of Walpole 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 **(June 30 2020)** and include the following information:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)-Complete
- 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 Walpole has completed the following:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- 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 using available system data and implementing Metropolitan Area Planning Council' s delineation tool (described more in section 5)
- Municipally owned stormwater treatment structures
-

In-Progress:

- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems

The Town of Walpole will update its stormwater mapping by **June 1, 2020** to include the remaining Phase I information. Recommended mapping elements will be completed as resources allow. The Town will update and correct mapping on an on-going basis as new information becomes available and a status report on the mapping will be included within each annual report

3.2 Phase II Mapping

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

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

The Town of Walpole has completed the following updates to its stormwater mapping to meet the Phase II requirements. The Town of Walpole will continue to update and add new information as information becomes available.

- Pipes
- Manholes
- Catch basins
- Municipal sanitary sewer system

The Town of Walpole will update its stormwater mapping **by June 30, 2028** to include the remaining following Phase II information.

- Refined catchment delineations. Catchment delineations shall be updated to reflect information collected during catchment investigations.
- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Catch basins, pipes and manholes as added to system

3.3 Additional Recommended Mapping Elements

Although not a requirement of the 2016 MS4 Permit, the Town of Walpole will add the following recommended elements as resources become available:

- 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 Walpole 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 inventory includes all SSOs that occurred during wet or dry weather resulting from inadequate conveyance capacities or where interconnectivity of the storm and sanitary sewer infrastructure allows for transfer of flow between systems.

Upon detection of an SSO, the Town of Walpole 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 of Walpole 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, including all information required by the permit and in Table 4-1.

The inventory in **Table 4-1** will be updated by the **Water and Sewer Department** 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

Town of Walpole, Massachusetts
Revision Date: January 9, 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]
36 Rose Court	Ground surface and direct discharge to Neponset River	6/11/15	10:15 am	12:15 pm	<1000gallons	Pipeline obstruction	Area treated with lime-6/11/15 clear with jet truck	Regular inspections
Stone Street, near #217	Backed up to basement. No discharge to waterbody	10/15/15	10:45 am	1:10 pm	8,750 gallons	Occurred during pipe line I and I project. Unexpected surge caused overload.	Catch Basins cleaned with vac truck	None
2130 Boston-Providence Highway	Catch basin Discharged to adjacent wetlands	9/26/2018	10:00 am	11:00 am	Unknown	Private property sewer pump malfunction	Cleaned up by private environmental company	Private property owner instructed to file SSO notification.

[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 were 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 were 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

Methods
The Town provided Fuss and O'Neill with a geodatabase of its stormwater system, consisting of 413 regulated outfalls and associated catch basins, drainage manholes and pipes. Catchments were initially delineated using an automated procedure based on methods developed by the Metropolitan Area Planning Council[3]. The results of the automated methods were manually refined based on recent high-resolution aerial imagery, Google Streetview, and a 1-meter resolution digital elevation model. Catchments were labelled with the Outfall ID to which it drains.

While the Town's stormwater mapping is already largely in compliance with the 2016 permit requirements, in some cases, the pipe connectivity or discharge points were uncertain, limiting the accuracy of the catchment delineations without additional field investigation. These are referred to as "draft" catchments. Since catchments should have a unique identifier, in these instances catchments were labelled "Unresolved123" where 123 is a number unique to the draft catchment. This allows the Town to proceed with other related permit requirements (e.g.,

[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.

3. Reference: MAPC 2017 MS4 Outfall Catchment Calculator. Last updated December 2017.

catchment priority ranking) while resolving the draft catchments through future system mapping updates required under phase II of Section 2.3.4.5.

Results and Recommendations
Catchments were delineated for the 413 mapped outfalls in the Town of Walpole. A total of 44 outfalls, from the original 413 identified by the Town, received draft delineations based on the fact that there was missing information associated with that catchment. For example, some of the outfalls in the GIS data were not associated with catch basins or pipes. Draft delineations were produced for these outfalls based on Fuss & O'Neill's interpretation of existing conditions.

In addition to these 413 catchments identified by the Town, an additional 55 draft catchments were delineated that were not associated with a regulated outfall. Typically, this occurred when the Town's GIS drainage system data indicated the presence of stormwater structures without an associated outfall. For example, catch basins and/or pipes were mapped and confirmed via aerial imagery or Google Streetview, but no outfall was mapped nearby. Draft catchments were delineated for these areas when the topography, confirmed structures, or other visual evidence from aerial imagery or Google Streetview indicated that an outfall likely exists but is missing from the GIS database.

A review and gap analysis of the Town's GIS stormwater infrastructure data and paper mapping, and subsequent confirmatory field reconnaissance, will help resolve the draft catchment delineations for the remaining 44 Town-identified outfalls and to verify the existence of suspected outfalls for the additional 55 suspected-outfall catchments. This gap analysis will also help focus the Town's compliance efforts with the Phase II mapping, as outlined in Section 2.3.4.5 of the permit.

5.2 Outfall and Interconnection Inventory and Initial Ranking

The **Department of Public Works** and **Engineering Department** with assistance from the Town's consultant, Fuss and O'Neill, completed an initial outfall and interconnection inventory and priority ranking. This assessed the illicit discharge potential for each outfall/catchment based on existing information in compliance with 2.3.4.7.a.iii of the 2016 Massachusetts Small MS4 General Permit as part of part of the IDDE program... The initial inventory and ranking was completed in May 2019.

An updated inventory and ranking will be provided in **each annual report**. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections.

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

Outfalls and interconnections are 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:

    - 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.

Screening Factors

The MS4 permit requires the following screening factors be included in developing the initial catchment priority rankings. Where these factors are present in a catchment, they indicate an increased likelihood that an illicit discharge will be detected.

1. <u>Past Discharge Screening Reports and Complaints</u>
   Past outfall screening results previously collected under the Town's ongoing IDDE program were considered in the ranking process. These results were provided by the Town in the outfall GIS attribute table. Screening completed under the previous permit, where requirements were less stringent than under the current permit, were not used in assessing Problem catchments but were scored according to likelihood of finding an illicit discharge as defined by the current permit. Catchments previously identified as having evidence of

illicit discharge was given the highest score for this category while catchments that were previously screened with no evidence of illicit discharge were given the lowest score.

2. Receiving Water Quality

This category includes receiving water bodies with 'poor receiving water quality' and 'water quality limited water bodies'. Including both as separate screening factors would double count these outfalls, which for TMDL outfalls were all identified as High Priority. Factor scores were otherwise based on the 2016 Massachusetts Integrated List of Waters. Catchments with receiving waterbodies that have a current TMDL or designated as impaired were given higher scores, while those assessed waterbodies meeting water quality standards or those receiving waters not yet assessed received lower scores. Outfalls and associated catchments that discharge directly to waterbodies identified in Appendix F, Section A.III.1.a.i.2 of the MS4 Permit (**Table 5-1**) were automatically placed in the "High" category.

The Receiving Water Quality factor reflects these TMDL segments and other impaired segments where illicit discharges may contain the pollutant of concern associated with the water quality impairment. In Walpole, these impairments are related to pathogens (fecal indicator bacteria – fecal coliform and E. coli). Pathogen Total Maximum Daily Loads (TMDLs) have been developed for the Neponset River (segments 73-01, -06, -09, -17) and Charles River (segment 72-10) watersheds (**Table 5-1**). Both TMDLs specify illicit discharges to storm drains and stormwater discharges as potential sources of the bacteria.

Table 5-1: Waterbodies in Walpole subject to a bacteria or pathogen TMDL

Waterbody Name	Waterbody Identifier	Impairment	No. of Outfalls Directly Discharging
Stop River	MA72-10	Pathogens	0
Neponset River	MA73-01	Fecal Coliform	42
School Meadow Brook	MA73-06	Fecal Coliform	1
Mine Brook	MA73-09	Fecal Coliform	4
Traphole Brook	MA73-17	Fecal Coliform	12

3. Land Use/Generator Density

Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Pollutant generator density was estimated qualitatively for each catchment using land use data, aerial imagery, and Google maps/streetview to identify potential locations 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. Walpole has variable levels of land use development intensity, ranging from undeveloped and low density residential to commercial and industrial uses. Because data to calculate a numeric density was limited and disparate and based on factors such as average parcel size, which may not necessarily reflect illicit discharge potential, generator density reflects a consistent, qualitative estimate of development intensity.

4. Age of Development and Infrastructure
   Development age was determined from the Massachusetts Level 3 parcels database, which included a Year Built attribute. The average of the Year Built attribute for all parcels in a catchment was used to assign the catchment to one of three categories: 1990s to present, 1970 to 1990, and pre-1970. Catchments that fell into the "pre-1970" category were given the highest score.

   In cases where development of a catchment occurred over more than a few years, the age range with the greatest number of individual parcels was selected. For example, if most parcels were developed in the 1950s and remaining parcels in the 1970s, the catchment received a "pre-1970" development age. Alternatively, if a few houses were built in the 1950s and build-out occurred mostly in the 1970s, the catchment received a "1970-1990" development age.

5. Density of Aging Septic Systems
   Parcel-level septic system data does not exist for Walpole, which prevented density calculations. In catchments serviced by septic systems, septic age was assumed to correspond to development age. Catchments in the "pre-1970" were assumed to have septic systems more than 40 years old and were given the highest score. This scoring method reflects characteristics of septic systems, their installation, and both current and past regulations governing them. It was assumed that parcels with a year-built attribute of 1920 or earlier had received a septic upgrade or sewer connection prior to 1970. Catchments serviced by sanitary sewer were assigned a score of zero for this factor.

6. Sewer Conversion
   Town GIS data included locations of sewer pipes and manholes, which was used to assess sewer utility coverage. Catchments that were serviced by sewers were assumed to have experienced conversion from septic at some point in time. Since conversion from septic to sewer has a high potential for illicit discharges, all catchments serviced by sewers were assigned the highest score. Catchments serviced by septic systems were given a score of zero for this factor.

7. Culverted Streams
   Catchments with buried streams were given the highest score. Few streams in the Town of Walpole appeared to have been culverted for more than a simple road crossing and the majority of catchments in Walpole were given the lowest score.

8. Public Health Area
   There are no catchments in the Town of Walpole that discharge to a drinking water supply or public bathing beach or other recreation area. All catchments were assigned the lowest score for the Public Health Area factor.

9. Historic Combined Sewer Systems
   Walpole does not have any existing or historic combined sewer systems. Therefore this screening factor was removed from the matrix.

Catchment Scoring and Ranking

To facilitate ranking of catchments into categories, Fuss & O'Neill developed a ranking matrix where scores were assigned to reflect catchment-specific information. Further detail on the assignment of scores is available in **Table 5-2**. Assigned scores were summed and then scaled to fall between 0 and 10, where a score of zero indicates the lowest relative likelihood of the presence of illicit discharge. Rankings were assigned manually and reflect the assigned scores, as well as drainage to impaired waters, specifically those in **Table 5-1**.

Table 5-2: Outfall catchment screening factors required for consideration by the 2016 MS4 permit

Screening Factor	Permit Description	Scoring Method	Data source
Past Discharge Screening Reports and/or Complaints	Results of past IDDE outfall screening conducted by Town and Reports to Town of odors or discharge from outfalls.	Screened, No flow: 0 Unscreened: 1 Flow, no IDDE evidence: 2 IDDE evidence: 3	Town of Walpole Department of Public Works
Public Health Area	Outfall discharges to waterbody containing a public bathing area or drinking water source	**Public Health Area** No: 0 Yes: 3	Town of Walpole
Receiving Water Quality	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	**Receiving Water Quality** Good or Unassessed: 0 Non-TMDL impairment (e.g. non-native plants): 1 Impaired: 2 TMDL: 3	MassDEP Integrated List of Waters 2014 (latest available final version)
Land Use / Generator Density	Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges.	**Generator Density** Excluded: -3 Low: 1 Medium: 2 High: 3	MassGIS Land Use (2005), Aerial imagery, Google Maps and Streetview

Screening Factor	Permit Description	Scoring Method	Data source
Development Age	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	**Development Age:** 1990 - present: 1 1970 – 1990: 2 Pre-1970: 3	MassGIS Level 3 Parcel Data
Septic Age	Septic systems thirty years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential	**Septic Age:** < 20 years: 0 20-40 years: 1 40+ years: 3 Sewered: 0	MassGIS Level 3 Parcel Data
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	**Sewer Conversion** No: 0 Yes: 3	Town of Walpole GIS data
Culverted Stream	Any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential	**Stream Crossings** Road crossings only: 0 Limited Potential: 1 High Potential: 3	MassDEP Hydrography
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	**Past CSO Separation** No: 0 Yes: 3	Not applicable to Walpole

Results

In the Town of Walpole, Development Age, Receiving Water Quality, and Past Screening Results emerged as the primary drivers of IDDE potential and therefore of priority ranking. Most screening factors were uniform and varied little across the MS4-regulated area.

Of the 519 delineated catchments in Walpole, 108 were ranked as High Priority catchments. These 108 catchments typically discharge to the bacteria-impaired Neponset River and contain older commercial or industrial areas. The remaining 411 catchments were designated Low Priority. These primarily residential catchments fall into this category due in part to more recent construction or discharge to unimpaired tributaries of the Neponset or Charles Rivers or waterbodies without illicit discharge TMDLs. No Problem catchments or Excluded catchments were identified.

The Town has contracted with Fuss & O'Neill to conduct dry-weather screening of all regulated outfalls, focusing particularly on High Priority catchments. As this work continues, the Town will use results from the initial dry-weather outfall screening to update these initial rankings.

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 within 3 years of the effective date of the permit. The **Department of Public Works** or their designated consultant 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 will be conducted 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 Airport. If Norwood Airport (http://www.norwoodma.gov/departments/airport/index.php) is not available or not reporting current weather data, then Blue Hills 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 2013 MS4 Permit will be reviewed to determine if it satisfies the dry weather outfall/screening requirements of the 2016 MS4 Permit. The previous screening and sampling must be 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; this will be reviewed prior to the dry weather screening

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/Dry Erase Board/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 collecting 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/Paper	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 or Magnetic Lifter	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

Equipment	Use/Notes
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/Attaching Sample Bottles
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. Because bacteria sample bottles are single-use and sterilized, this procedure will not occur for bacteria sample collection.
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 RIA (Rhode Island Analytical (s)
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

[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).

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**.

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.

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	6 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
Total Phosphorus	**EPA**: Manual-365.3, Automated Ascorbic acid digestion-365.1	**EPA**: 0.01 mg/L **SM** : 0.01 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2

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

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
	Rev. 2, ICP/AES4-200.7 Rev. 4.4 **SM**: 4500-P E-F			
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*: no single sample taken during the bathing season shall exceed 235 colonies per 100 ml *Enterococcus:* no single sample taken during the bathing season shall exceed 61 colonies per 100 ml

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

6.4 Follow-up Ranking of Outfalls and Interconnections

The Town of Walpole 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 (**June 30, 2020**).

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 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

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

Walpole, Massachusetts

Revision Date: ##DATE OF LAST UPDATE

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 Walpole** 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 or their designated consultant** 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 or their designated consultant** 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. Smoke testing notification will include **robocall notifications and posted notices** for single family homes, businesses and building lobbies for multi-family dwellings.

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 Walpole 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 and who may encounter illicit discharges. 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)

Links to these sections of the General Bylaw can be found on the Town of Walpole website:
Stormwater and Erosion Control Bylaw (499-1) and
Illicit Discharge Detection and Elimination Bylaw (499-29)

https://www.walpole-ma.gov/home/pages/bylaws-and-regulations

Appendix B

Storm System Mapping

Map can be found on the Stormwater website:

https://www.walpole-ma.gov/sites/walpolema/files/pages/walpole_layout24x36_20180910.pdf

Appendix C

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

Out/fall catchment Screening Field Form

Manhole Inspection Field Form

Chain of Custody Record Form

Appendix D

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

Water Quality SOP #13

Appendix E

IDDE Employee Training Record

Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Town of Walpole, Massachusetts

Date of Training: _____

Duration of Training: _____

Name	Title	Signature

Appendix F

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