ILLICIT DISCHARGE DETECTION & ELIMINATION PLAN

FOR
TOWN OF CANTON, MASSACHUSETTS

LATEST REVISION: JULY 2013

PREPARED BY:

KLEINFELDER
Bright People. Right Solutions.

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1. INTRODUCTION

1.1 NPDES MS4 Program

This document has been prepared by Kleinfelder for the Town of Canton, Massachusetts to address certain requirements of the Town as a permittee under the EPA's National Pollutant Discharge Elimination System (NPDES), General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Discharges (hereinafter 'MS4 Permit' or 'Permit').

The Town is currently a permittee under the original 2003 MS4 Permit, which expired in 2008 and has been reissued in 2010 Draft form as a Permit for the Massachusetts North Coastal Basin watersheds (Draft 2010 Permit). The Town is required to continue to meet the 2003 Permit requirements until the new Permit is issued Final. This Illicit Discharge Detection and Elimination (IDDE) Plan has been prepared to address the requirements of the 2003 Permit, while remaining consistent with the Draft 2010 Permit.

The NPDES MS4 Permit allows permittees to discharge stormwater in compliance with the Clean Water Act, as amended (33 U.S.C. § 1251 et seq) and the Massachusetts Clean Waters Act, as amended (M.G.L. Chap. 21§§ 26-53), provided that the permit conditions are met. Permit Part B3 includes the requirement to develop and implement an Illicit Discharge Detection and Elimination Program.

1.2 Illicit Discharges

Discharges from stormwater management systems throughout urbanized areas have often included wastes and wastewater from non-stormwater sources. These flows are designated as "Illicit Discharges" because they consist of or contain materials the stormwater drainage system is not designed to treat, transport or discharge. Illicit Discharges are therefore considered by Federal regulations to be "...any discharge to an MS4 that is not composed entirely of stormwater…" There are a few particular exceptions to this definition, such as discharges from NPDES-permitted industrial sources and discharges from fire-fighting activities.

Illicit discharges enter stormwater systems through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g., infiltration from cracked sanitary systems, spills collected by drain outlets, or paint or used oil dumped directly into a drain). The untreated discharges then can contribute high levels of pollutants to receiving water bodies (for example, heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria). Specific examples of illicit discharges include sanitary wastewater, effluent from septic tanks, car wash wastewaters, improper oil disposal, radiator flushing, laundry wastewaters, spills from roadway accidents, improper disposal of auto and household toxics. Pollutant levels from these illicit discharges have been shown to be high enough to significantly degrade receiving water quality and threaten aquatic, wildlife, and human health.

Illicit dry weather discharges are often characterized as continuous, intermittent or transitory. Continuous discharges are generally the easiest to identify and can typically be observed through a routine outfall monitoring program. Intermittent discharges may only happen during specific hours, days or seasons and are more difficult to capture through routine or periodic monitoring. An intermittent discharge could be created by illicit laundry hook-ups or slop sinks that are only in use for short periods. A different type of monitoring or investigation may be required (such as upstream temporary dams). Transitory discharges are usually the result of an accident or spill that gets into the drain system. These may be virtually impossible to identify through routine monitoring. All three of these discharge types represent a significant threat to receiving water quality and an effective IDDE will address all of these different circumstances.

1.2.1 Allowable Non-Storm Water Discharges

The following non-storm water discharges are authorized provided it has been determined by the permittee that they are not significant contributors of pollutants to the MS4. If these discharges are identified as significant contributors to the MS4, they must be addressed in the Illicit Discharge Detection and Elimination Plan:

- water line flushing,
- landscape irrigation,
- diverted stream flows,
- rising ground waters,
- uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)),
- uncontaminated pumped ground water,
- 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,
- dechlorinated swimming pool discharges,
- street wash water, and
- residential building wash waters, without detergents.

Discharges or flows from firefighting activities occur during emergency situations. The permittee is not expected to evaluate firefighting discharges with regard to pollutant contributions. Therefore, these discharges are authorized as allowable non-storm water discharges, unless identified, by EPA, as significant sources of pollutants to Waters of the U.S.

1.3 Receiving Waters & Impairments

The following Impaired Waters (Massachusetts Final Year 2012 Integrated List of Waters, March 2013) are found within the boundaries of the Town of Canton, as shown on Table 1-1.

Table 1-1: Impaired Waters, Town of Canton MA

2012 Impaired Waters (Impairment Category*)	Segment ID	2012 Impairments	Associated Approved TMDL (DEP#)**
Ponkapog Brook (4a)	MA73-27	Pathogens	121.0 (EPA2592)
Ponkapog Pond (4a)	MA73-043	Non-native aquatic plants Mercury in fish	EPA 42409
Reservoir Pond (4a)	MA73-048	Non-native aquatic plants Mercury in fish	EPA 42400
Glen Echo Pond (4c)	MA73022	Non-native aquatic plants*	
Pequid Brook (5)	MA73-22	Dissolved Oxygen Fecal coliform	121.0 (2592)
Neponset River (5)	MA73-01	DDT E. Coli Total Phosphorus Sedimentation/Siltation Dissolved Oxygen TSS excess algal growuth Turbidity PCBs in fish	
Neponset River (5)	MA73-02	Other DDT Debris/Floatables/Trash Foam/flocs/scum/oil slicks Dissolved Oxygen E. Coli, Fecal Coliform PCB in fish tissue Turbidity	121 (2592)
East Branch of Neponset River (known locally as the Canton River) (5)	MA73-05	DDT Dissolved Oxygen Low flow alterations PCB in fish water Temperature Fecal coliform, E coli Aquatic macroinvert bioassess	2592
Forge Pond (5)	MA73-020	turbidity	
Beaver Meadow Brook (5)	MA73-20	Dissolved Oxygen	
Massapoag Brook (5)	MA73-21	Non-native aquatic plants* Aquatic macroinvert bioassess Total Phosphorus turbidity	
Bolivar Pond (5)	MA73-005	Turbidity Non-native aquatic plants	
+Pecunit Brook (5)	MA73-25	E. Coli	121.5 (pending)
Pequid Brook (5)	MA73-22	Dissolved oxygen	
Other Receiving Waters			
Steep Hill Brook (3)	MA73-18		

Notes:

*Category Definitions:
2- Attaining some uses; other uses not assessed
3-Insufficient information to make assessments for any use
4a –TMDL completed and approved for one or more pollutants
4c – Impairment not caused by a pollutant
5- Impaired and requiring a TMDL

**121.0	*2002 Final TMDL Bacteria Neponset River Basin*
121.5	June 2012, *Draft Addendum to the Neponset River Bacterial Final TMDL*; the Addendum would add Pecunit Brook to the Final Neponset Bacteria TMDL

Under the requirements of the 2010 Draft NC Permit Part 2.2.1: Discharge to Impaired Waters with an Approved TMDL, 'Approved TMDLs' are those that have been approved by EPA as of the effective date of the Permit. In 2002 MassDEP issued a Total Maximum Daily Load (TMDL) Report for the Neponset River Watershed to address fecal coliform bacterial impairment, as required by section 303(d) of the Clean Water Act.

Fecal coliform bacteria are found in the intestinal tract of warm-blooded animals and their presence in surface waters is an indication of fecal contamination. The Surface Water Quality Standards for the Commonwealth of Massachusetts are described in 314 CMR 4.00. Under 314 CMR 4.00, all waters within Canton are either designated as Class B (Neponset River), or undesignated, and therefore default to the Class B designation. For Class B waters (i.e. for all waters within Canton) the water quality standards in place in 2002 required that fecal coliform bacteria shall not exceed a geometric mean of 200 colonies per 100 ml in any representative set of samples, nor shall more than 10 percent of the samples exceed 400 colonies per 100 ml.

The 2002 Neponset TMDL specifies the 200 and 400 per 100 ml standards as the means to achieving the waste load reductions required by the TMDL. By implementing and enforcing its IDDE Plan to meet these levels, the Town of Canton meets the requirements of the Neponset TMDL, the existing 2003 Permit, and the NPDES MS4 (2010 Draft) Permit.

The sections of the 2010 Permit relating to TMDL Requirements for Canton (Neponset Watershed) are as follows:

2.2.1 (c),(e),(g) - Discharge to Waters with an Approved TMDL
2.3 - Increased Discharges, New Discharges, Antidegradation
2.4.2. – Public Education and Outreach –specific forms of messages required
2.4.7.1(a)(ii) – Municipal Good-Housekeeping - specific requirements for targeting pet-waste disposal and waterfowl feeding

1.4 Program Goals & Implementation Strategies

The purpose of the IDDE program is to find and fix illicit discharges where they exist, and prevent them from happening in the future. This document specifically seeks to assist the Town of Canton to:

- Prioritize areas of concern relative to illicit discharges;
- Establish protocols to optimize the Town's effectiveness during investigation and identification of actual sources of illicit discharges;
- Document the legal framework that supports the program and provides the necessary enforcement authority to administer the program ; and
- Establish metrics that provide a way to determine the long-term success of the program.

1.4.1 Mapping & Desktop Screening

The IDDE program is built upon a progression of tasks that allows the Town to most efficiently use financial and personnel resources to achieve the desired water quality protection and improvement outcomes. Canton has developed a Town-wide base map of their drainage system, consistent with Permit requirements. The map is continually being updated, modified or corrected as data is obtained and confirmed. Further information regarding the status of the Town's mapping efforts is provided in **Section 3.**

The Drainage Map has been employed in tandem with an analysis of land use, infrastructure conditions, historical operating data, topography and factors specific to Canton's built and natural environment. This data allows the Town to define the drainage catchments that are associated with each of the identified, regulated outfalls in the community and prioritize them on the basis of their *potential* to include illicit connections to the storm drain system. Further information on this process is provided in **Section 4**.

1.4.2 Isolation & Elimination of Discharges

One of the distinctions between the existing 2003 MS4 permit and the proposed new permit is the prescribed manner in which illicit discharge investigations must be implemented. Canton's program is already more pro-active than many other communities, however, to meet the standards of the permit, a more detailed investigation of the drainage system will be required. The manner in which the Town will implement the investigation program is described in detail in **Section 5**.

1.4.3 Field Screening

Between 2009 and 2012, Canton conducted an aggressive outfall inventory and dry and wet weather outfall monitoring program and investigated all 270 outfall structures within the Town. This process included many outfalls that are not jurisdictional under the MS4. This program has provided qualitative and analytical data that was used in the catchment prioritization process. This inventory constitutes the first step in a progression of field investigations that will ultimately include visual observation of a large percentage of the drainage system beyond just the outfalls. Not all discharge types lend themselves to identification through this kind of outfall monitoring effort. The data compiled to date, however, will help the Town determine the likelihood and type of discharge for a subset of outfalls that have been targeted for additional investigation. **Section 6** provides additional information on the results of previous field screening activities.

1.4.4 Education & Discharge Prevention

As part of the Town's MS4 Stormwater Management Program, Canton has implemented a public education initiative as well as a public participation program in conformance with Minimum Control Measures No. 1 and 2 of the 2003 General Permit. These are an important component of an overall effort to prevent illicit discharges at their source.

As described in **Section 3**, the Town's Consolidated Drainage By-law provides the Town with the authority to enter premises that are subject to construction and industrial stormwater permits to determine if they are operating in conformance with those permits. The Town of Canton's Consolidated Drainage By-law also provides the authority to prohibit direct sump or drainage hook-ups from residences without consent and a permit from the Department of Public Works. Requiring a permit provides an additional opportunity for public education, and provides the Town with another means of establishing inspection authority on private property.

1.4.4.1 Illegal Dumping

The illicit discharges mentioned above are those that typically occur on a regular, or at least recurring basis. Another type of illicit discharge is illegal dumping. Specific examples of illegal dumping include:

- Used motor oil poured into a catch basin
- Paint poured into a catch basin

Because of the irregular nature of illegal dumping such as this, it is very difficult to detect during an outfall inspection program. Inspectors may see some evidence of previous illegal dumping at an outfall, but it would be very coincidental for an illegal dumping activity to be underway right at the time the downstream outfall is being inspected. In light of this, a different approach needs to be taken in detecting and addressing illegal dumping.

Canton has taken steps to prevent illegal dumping by stenciling catch basins. Because illegal dumping to the storm sewer system tends to be a very irregular occurrence, and is difficult to detect from outfall inspections, the MS4 must rely heavily on the public. If the residents are educated about the dangers and consequences of illegal dumping, they will be more likely to:

- Avoid dumping, themselves
- Urge others not to dump
- Report occurences of dumping they are aware of

In conjunction with public education and drain stencilling, Canton may consider implementing a Community Hotline, at which the public can phone to report spills, or other issues of concern such as unusual smells in the vicinity of water bodies.

1.4.5 Program Evaluation

The IDDE Program is evaluated on a continuous basis; and at the end of each annual NPDES reporting cycle. The Town of Canton has to date been implementing IDDE under the requirements of the 2003 Permit, using the guidance of the December 2008 EPA New England Illicit Discharge Detection & Elimination Protocol. As part of the process of preparing for the forthcoming new Permit, Canton's existing IDDE protocols have been reviewed. In this IDDE Plan, protocols have been formally described and modified where necessary to comply with the proposed requirements of the new Draft Permit, as described in **Section 7.**

1.5 Definitions and Acronyms

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

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

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

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

Groundwater: Water beneath the surface of the ground.

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

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

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

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

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

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

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

Pollutant: Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the Commonwealth. Pollutants shall include without limitation:
(1) paints, varnishes, and solvents;
(2) oil and other automotive fluids;
(3) non-hazardous liquid and solid wastes and yard wastes;
(4) refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnances, accumulations and floatables;
(5) pesticides, herbicides, and fertilizers;
(6) hazardous materials and wastes; sewage, fecal coliform and pathogens;
(7) dissolved and particulate metals;
(8) animal wastes;
(9) rock; sand; salt, soils;
(10) construction wastes and residues;
(11) and noxious or offensive matter of any kind.

Stormwater: Runoff from precipitation or snow melt.

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

Outfall – means a point source at the point where a municipal separate storm sewer discharges to waters of the United States. *Point source* means a discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, (also bridge drains); this term does not include return flows from irrigated agriculture or agricultural storm water runoff.

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

ACRONYMS

BMP – Best Management Practice
DWF – Dry Weather Flow
EPA – Environmental Protection Agency
GIS – Geographic Information System
GPS – Global Positioning System
IDDE – Illicit Discharge Detection and Elimination
IUP – Intended Use Plan
MADEP – Massachusetts Department of Environmental Protection
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NPDES – National Pollutant Discharge Elimination System
SRF – State Revolving Fund
SWMP – Storm Water Management Plan

2. TOWN OF CANTON LEGAL AUTHORITY & RESPONSIBILITIES

2.1 Legal Authority

The Town of Canton has adopted a Consolidated Drainage By-law, as Section 16 of its General Bylaws (Revised 2010). A copy of the Consolidated Drainage Bylaw is provided in Appendix A. As required by the Permit, the Consolidated Drainage By-law provides the Town with adequate legal authority to:

- Prohibit illicit discharges;
- investigate suspected ID;
- eliminate ID (including those not owned or controlled by the MS4 that discharge into the MS4 system) and,
- enforce the IDDE program.

The Consolidated Drainage By-law defines the following terms:

Illegal Discharge. "Any direct or indirect non-storm water discharge to the storm drain system, except as exempted in Section 8 of this by-law."

Illicit Connections. "An illicit connection is defined as either of the following: Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency or, any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency."

In addition to the Consolidated Drainage Bylaw, the Town has other legal authority pertaining to stormwater management:

- Article XXI, Stormwater Management, of the General By-laws (Revised 2010) gives the Conservation Commission authority to develop regulations and permits pertaining to post-construction stormwater management, and to adopt a stormwater credit system. It also gives the Board of Selectmen authority to adopt a Stormwater Utility.
- Article XX, Soil Erosion and Sediment Control, of the General By-laws (Revised 2010) regulates land disturbance of any area 5,000 square feet or greater and requires the filing of an application for a land disturbance permit with the Conservation Commission.

2.2 Program Responsibilities

As per the Consolidated Drainage by-law, the Department of Public Works is responsible for administering, implementing, and enforcing the provisions of the bylaw, which prohibits illicit discharges. The DPW is responsible for all aspects of the IDDE Program, including ID identification and reporting, elimination of IDs, documentation and verification of ID elimination, and tracking and reporting of program progress.

3. TOWN OF CANTON STORMWATER MAPPING

The Town of Canton originally submitted its Stormwater Map to the EPA in 2009. Kleinfelder has prepared an updated stormwater map to address the additional mapping requirements under the Draft 2010 Permit. A copy of the June 2013 Stormwater Base Map is provided in Appendix B. The 2013 Map includes the following information:

- catchbasins
- drain manholes
- MS4 outfalls
- catchment areas contributing stormwater to outfalls
- wetlands
- receiving waters (including those that are impaired)
- drainage pipes
- interconnections with other MS4 permittees
- stormwater BMP structures (oil water separators, stormceptors, detention areas)
- USGS drainage sub-basins

3.1 Mapping Updates

GIS data for the stormwater system provided by the Town originated from a 2003 study (*Stormwater Drainage Plan, December 2003, Vollmer Associates*). The Vollmer study included record drawing digitizing and data attribute editing, GPS survey, and GIS map creation. The Town has since been updating stormwater infrastructure via CAD.

Kleinfelder compiled the Town's GIS and CAD file data for stormwater into a single GIS map. Kleinfelder first reviewed the available data and found some issues of concern about the data:

- It was not possible to distinguish which structures (manholes, catchbasins, pipes, outfalls) and their associated data were derived from record drawings versus field GPS survey. The Town was not provided with the actual GPS coordinates for the structures that were field surveyed by Vollmer.
- It was not clear which attribute data were obtained from drawings vs. survey, and what level of completion those drawings were (e.g. design or as-built plans)
- It appeared that the attribute data were added in CAD and a transformation error occurred during the process used to convert from CAD to GIS. The Town had reported difficulty in projecting the Vollmer GIS data into their CAD file.

Kleinfelder used the most recent stormwater map provided by the Town in CAD, dated 12-23-2011, to create a new GIS stormwater system map for the outfall categorization task. This included the 270 outfalls that had been specifically identified as outfall structures by the Town in the CAD file. Kleinfelder numbered the outfalls in this GIS file based on the outfall numbers in the CAD file.

The GIS file created by Kleinfelder was converted to the projection system of the Town's existing GIS data for the sake of consistency. Since the Town's GIS data was in NAD83 meters, the projection system for the outfalls and the stormwater pipes derived from the Town's CAD file was therefore converted to NAD83 meters.

After applying the correct projection system, the GIS data from the CAD file was moved to the best fit right location based on property lines and street intersections as reference points. The distance between Vollmer's GIS outfalls and the Kleinfelder GIS outfalls varied in locations from less than a meter to as high as 4 meters. The updated GIS version of the Town's outfalls and corresponding stormwater pipes is more accurate and overrides the prior version based on the following:

1. This GIS file is based on the most updated stormwater system map for Canton, which the Town regularly maintains and updates.
2. This includes the list of outfall structures specifically, whereas Vollmer's file had other structures that were not outfalls indicated as such.
3. Kleinfelder's GIS file for outfalls have structure IDs that have been used in the Town's CAD file. Therefore, any updates to the Town's stormwater access database can be integrated into this GIS file.

Since there were discrepancies between Vollmer's GIS data and the updated GIS data for the Town, Kleinfelder recommended that the Town conduct a pilot survey for approximately 18 outfall locations. The surveyor was requested to use GPS control points (already established in the Town by Norde-East Survey between August 2004 and May 2006) and also report closure errors for the 18 surveyed outfall locations to estimate accuracy of surveying. Horizontal and vertical accuracy for both control points and the outfalls were specified and the surveyor was asked to collect the points in NAD83 feet for horizontal coordinates and NAVD88 for elevations. The accurately surveyed points were brought into the updated GIS. The distance between these surveyed 18 outfall locations and the corresponding outfall locations in Vollmer's GIS file varied from a minimum of 2.5 m for OUT_124 to a maximum of 54 m for OUT_237 and the average distance being 20 m. The offset distances did not follow a pattern that could allow the Vollmer GIS data to be transformed.

The existing level of accuracy for the outfalls on the maps is adequate for planning level purposes and IDDE investigation. During catchment delineations (Section 4) Kleinfelder noted in some areas drainage infrastructure may not be represented on maps. In addition to the Town-wide 2013 Stormwater Base Map, Kleinfelder created an 11x17-inch sized map book that covers the entire Town. The Map Book is broken into tiles corresponding to the Town's Assessors maps. Each tile is shown on a separate page at a scale of 1 inch equals 200 feet. The 11x17 maps show stormwater drainage, topography, catchments, parcels, and wetlands on an aerial photograph background. The DPW field staff can use the Map Book in the field to note mapping discrepancies and to add missing infrastructure, to a planning level of accuracy. The paper markups can then be used to update the GIS periodically. As funding allows, the Town should consider conducting additional survey of outfalls or other drainage infrastructure in priority catchments.

3.2 Outfall Inventory & Categorization

The Town of Canton has expended considerable effort in inventorying, inspecting, and sampling all 270 outfalls in the Town in accordance with the 2009 EPA Order. The Outfall Monitoring Program is described in further detail in Section 6. The Town of Canton had originally developed an inventory of a total of 270 outfalls. This inventory is stored in a Microsoft Access database generated by the Town

which includes street location, ease of accessibility, and structure type. The database also tracks water quality sampling data. In addition, the Town has a database of scanned PDF drawings (record drawings where available) with each clearly outfall identified as well as a photograph of each outfall.

During the update of the Stormwater Mapping, it was observed that many of the 270 outfalls appeared to fall outside of the jurisdiction of the MS4 program because they did not meet the definition of an outfall under 40 CFR 122.2. In brief, an outfall is a point source discharge to rivers and streams (including intermittent streams, provided they are hydraulically connected to a perennial stream) or to lakes and ponds. An outfall would also be jurisdictional under the MS4 if it discharged to a wetland bordering on a river, stream, pond or lake. An outfall discharging to an isolated wetland is not jurisdictional under the MS4.

Kleinfelder reviewed all of the 270 structures identified as outfalls in the Town's database, and sorted them into three categories: MS4, Non-MS4 and Unknown outfall. The categorization was based on the EPA federal regulation 40 CFR 122.2 definition for outfalls[1], the EPA's guidance for determining waters protected by the Clean Water Act (aka 'waters of the US')[2], and the definitions for lakes, ponds, rivers and streams from the Massachusetts version of the Clean Water Act , 314 CMR 4.[3]

The first round of MS4/Non-MS4 classifications were determined based on 1)review of ortho-photos to determine if an outfall was likely to represent a point or non-point source of discharge; 2) review of GIS contours to determine the flow paths of the outfalls and if they were likely to flow directly to - or create their own discrete erosional channel to - a water/wetland; and 3) review of the MassGIS hydrography layer to determine if the receiving water was likely to be defined as a water of the United States or Massachusetts. A second round of categorization review was conducted using record drawings, photographs, and inspection reports, to verify the initial categorization.

The following table illustrates some examples found during the categorization process:

[1] *Outfall* (40 CFR 122.2): means a point source at the point where a municipal separate storm sewer discharges to waters of the United States. ***Point source* means a discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, (also bridge drains); this term does not include return flows from irrigated agriculture or agricultural storm water runoff.**

[2] http://water.epa.gov/lawsregs/guidance/wetlands/CWAwaters_guidesum.cfm

[3] Lakes & Ponds: waterbodies having open water, in a topographical depression with a max depth of greater than 2 meters- does not include stormwater basins, ww lagoons, constructed farm ponds (no surface flow in/out). Rivers & Streams: waterbodies contained within a channel (natural or artificial) which periodically or continuously contains flowing water or forms a connecting link between two bodies of standing water

Table 3-1
MS4 Outfall Categorization Scenarios

Example Scenario	Categorization	Rationale
Outfall discharging to isolated wetland	Non-MS4	Not discharging to a water of US or MA
Outfall discharge becomes non-point flow before or is across a flow barrier from a jurisdictional water	Non-MS4	Not a point source discharge
Outfall discharging not directly to water, but discharges to top of bank or flow otherwise expected to discharge to jurisdictional water/wetland	MS4	Outfall likely to create channelized flow to water of US/MA
Outfall is actually a culvert pipe that connects water bodies	Not an Outfall	Does not discharge stormwater to a water body

The Town has record drawings and photographs for each outfall. During the mapping update, Kleinfelder created links to the outfall feature class in the GIS so that the record drawings and photographs can now be accessed by simply clicking on the outfall points.

In summary, the categorization found the following:

- 154 MS4 Outfalls in Canton
- 116 Non-MS4 Outfall structures in Canton

Town of Canton, Massachusetts

Rev. Date *6/18/2013*
Rev. By *KNR*

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PLAN
OUTFALL CATCHMENT PRIORITY RANKING MATRIX

Catchment	Recieving Water	2009-2011 Frequency of Dry Weather Flow incidents?	2010 - 2012 Dry Weather Bacteria Levels	# Reports / Complaints	Poor Dry Weather Rcvng Water Quality	Density of Generating Sites	Outfall Density	Age of Surrounding Development	Sewer Conversion from Septics	Older Industrial Operations (40+ yrs)	Aging/ Failing Sewers	Density of Aging Septics	Long reaches of culverted streams	SCORE	OVERALL ILLICIT DISCHARGE POTENTIAL	PROBLEM?	NOTES
WEIGHTING FACTOR		3	4	6	2	2	1	1	1	2	1	1	1				
OUT_001	Massapoag Brook	1	3		3	1	1	2	1	1	1	1	1	32	MEDIUM		
OUT_005	Massapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_007	Neponset River	1	3		3	1	2	2	1	1	1	1	1	33	MEDIUM		
OUT_008	Neponset River	2	2		3	1	2	2	1	1	1	1	1	32	MEDIUM		
OUT_009	East Branch Neponset River	1	0		3	1	2	2	1	1	1	1	1	21	LOW		
OUT_010	East Branch Neponset River	0	0		3	1	2	2	1	1	1	1	1	18	LOW		
OUT_011	East Branch Neponset River	0	0		3	1	2	2	1	1	1	1	1	18	LOW		
OUT_012	East Branch Neponset River	0	0		3	1	2	2	1	1	1	1	1	18	LOW		
OUT_014	Massapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_015	Massapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_016	Massapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_020	East Branch Neponset River	1	3		3	3	3	2	1	2	1	1	1	40	MEDIUM		
OUT_025	East Branch Neponset River	1			3	1	1	1	1	1	1	1	1	19	LOW		
OUT_026	Neponset River	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_029	Massapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_030	Massapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_031	Massapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_035	Massapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_043	East Branch Neponset River	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_044	East Branch Neponset River	0	0		3	3	3	2	1	1	1	1	2	24	LOW		
OUT_045	East Branch Neponset River	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_046	Forge Pond	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_048	Forge Pond	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_054	East Branch Neponset River	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_057	East Branch Neponset River	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_060	unnamed pond	0	0		1	1	1	1	1	1	1	1	1	12	LOW		
OUT_063	unnamed pond	1	0		1	1	1	1	1	1	1	1	1	15	LOW		
OUT_066	East Branch Neponset River	1			3	1	1	1	1	1	1	1	1	19	LOW		
OUT_071	East Branch Neponset River	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_088	Pecunit Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_089	Pecunit Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_092	Pecunit Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_095	Pecunit Brook	1	2		3	1	1	1	1	1	1	1	1	27	MEDIUM		
OUT_101	Bolivar Pond	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_102	Bolivar Pond	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_110	Pequid Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_112	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_113	Reservoir Pond	0	0		2	1	1	1	1	1	1	1	1	14	LOW		
OUT_116	Reservoir Pond	0	0		2	1	1	1	1	1	1	1	1	14	LOW		
OUT_117	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_118	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_119	Ponkapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_121	Ponkapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_122	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_123	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_124	Ponkapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_128	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_130	Beaver Meadow Brook	1	1		3	1	1	1	1	1	1	1	1	23	LOW		
OUT_132	Beaver Meadow Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_133	Beaver Meadow Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_134	Beaver Meadow Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_135	Beaver Meadow Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_150	Reservoir Pond	1	3		2	1	1	1	1	1	1	1	1	29	MEDIUM		
OUT_163	Ponkapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_165	Ponkapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_166	Ponkapoag Brook	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_168	Ponkapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_174	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_196	York Brook	1	0		1	3	2	2	1	2	1	1	2	24	LOW		carwash
OUT_197	Reservoir Pond	0	0		2	1	1	1	1	1	1	1	1	14	LOW		
OUT_198	Reservoir Pond	0	0		2	2	2	2	1	2	1	1	1	20	LOW		
OUT_203	Pequid Brook	0	0		3	3	3	2	1	2	1	1	1	25	MEDIUM		
OUT_204	Pequid Brook	0	0		3	3	3	2	1	2	1	1	1	25	MEDIUM		
OUT_206	Pequid Brook	1	0		3	3	3	2	1	2	1	1	1	28	MEDIUM		

Town of Canton, Massachusetts

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ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PLAN
OUTFALL CATCHMENT PRIORITY RANKING MATRIX

Catchment	Recieving Water	2009-2011 Frequency of Dry Weather Flow incidents?	2010 - 2012 Dry Weather Bacteria Levels	# Reports / Complaints	Poor Dry Weather Rcvng Water Quality	Density of Generating Sites	Outfall Density	Age of Surrounding Development	Sewer Conversion from Septics	Older Industrial Operations (40+ yrs)	Aging/ Failing Sewers	Density of Aging Septics	Long reaches of culverted streams	SCORE	OVERALL ILLICIT DISCHARGE POTENTIAL	PROBLEM?	NOTES
OUT_208	Pequid Brook	1	0		3	3	3	2	1	2	1	1	1	28	MEDIUM		
OUT_210	Pequid Brook	0	0		3	3	3	2	1	2	1	1	1	25	MEDIUM		
OUT_213	Pequid Brook	0	0		3	3	3	2	1	2	1	1	1	25	MEDIUM		
OUT_214	Pequid Brook	0	0		3	3	3	2	1	2	1	1	1	25	MEDIUM		
OUT_215	Pequid Brook	0	0		3	3	3	2	1	2	1	1	1	25	MEDIUM		
OUT_216	Pequid Brook	0	0		3	3	3	2	1	2	1	1	1	25	MEDIUM		
OUT_217	unnamed pond	0	0		1	1	1	1	1	1	1	1	1	12	LOW		
OUT_222	Beaver Meadow Brook	1	1		3	1	1	1	1	1	1	1	1	23	LOW		
OUT_225	Beaver Meadow Brook	1	3		3	3	1	2	1	2	1	1	1	38	MEDIUM		
OUT_229	Redwing Brook	1	3		3	3	2	3	1	3	2	1	2	44	MEDIUM		
OUT_231	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_232	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_233	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_236	Massapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_240	Neponset River	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_241	Neponset River	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_243	Neponset River	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_246	Neponset River	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_247	East Branch Neponset River	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_248	Pecunit Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_249	Pecunit Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_250	Ponkapoag Pond	0	0		2	1	1	1	1	1	1	1	1	14	LOW		
OUT_251	East Branch Neponset River	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_254	East Branch Wetland	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_255	East Branch Wetland	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_256	Bolivar Pond	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_259	Bolivar Pond	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_268	Pequid Brook	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_269	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_272	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_275	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_280	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_281	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_290	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_294	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_297	Pequid Brook	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_298	East Branch wetland	0	0		1	1	1	1	1	1	1	1	1	12	LOW		
OUT_299	Forge Pond	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_300	Forge Pond	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_302	Pequid Brook	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_304	York Brook	0	0		1	1	1	1	1	1	1	1	1	12	LOW		
OUT_306	Beaver Meadow Brook	0	0		3	1	1	1	1	1	1	3	1	18	LOW		septics
OUT_308	Pequid Brook	0			3	1	1	1	1	1	1	1	1	16	LOW		
OUT_401	Ponkapoag Brook	1	3		3	1	1	1	1	1	1	1	1	31	MEDIUM		
OUT_403	Bolivar Pond	0	3	3	3	2	1	2	1	1	1	1	1	49	HIGH	YES	DPW NOTES DOG WASTE IN CATCH BASINS PROBLEM
OUT_408	Pequid Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_409	Pequid Brook	1			3	1	1	1	1	1	1	1	1	19	LOW		
OUT_411	Beaver Meadow Brook	1	0		3	3	1	2	1	2	1	1	1	26	MEDIUM		
OUT_416	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_418	York Brook	0	0		1	1	1	1	1	1	1	1	1	12	LOW		
OUT_419	East Branch Neponset River	0	0		3	3	3	2	1	3	2	1	1	28	MEDIUM		
OUT_420	Pequid Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_421	unnamed pond	0			1	1	1	1	1	1	1	1	1	12	LOW		
OUT_426	Forge Pond	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_438	Pequid Brook	0			3	1	1	1	1	1	1	1	1	16	LOW		
OUT_450	Pequid Brook	0			3	1	1	1	1	1	1	1	1	16	LOW		
OUT_452	Neponset River	1			3	1	1	1	1	1	1	1	1	19	LOW		
OUT_453	Pequid Brook	0			3	1	1	1	1	1	1	1	1	16	LOW		
OUT_459	East Branch Neponset River	2	3		3	3	3	2	1	3	2	1	1	46	MEDIUM		
OUT_462	Beaver Meadow Brook	1			3	3	1	2	1	2	1	1	1	26	MEDIUM		
OUT_463	Beaver Meadow Brook	1			3	3	1	2	1	2	1	1	1	26	MEDIUM		INDUSTRIAL
OUT_464	Pequid Brook	0			3	1	1	1	1	1	1	1	1	16	LOW		
OUT_467	York Brook	0			1	1	1	1	1	1	1	1	1	12	LOW		
OUT_468	Beaver Meadow Brook	0			3	3	2	3	1	3	2	1	2	29	MEDIUM		
OUT_469	Beaver Meadow Brook	0			3	3	2	3	1	3	2	1	2	29	MEDIUM		car dealer

Town of Canton, Massachusetts

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PLAN

Rev. Date *6/18/2013*

OUTFALL CATCHMENT PRIORITY RANKING MATRIX

Rev. By *KNR*

Catchment	Recieving Water	2009-2011 Frequency of Dry Weather Flow incidents?	2010 - 2012 Dry Weather Bacteria Levels	# Reports / Complaints	Poor Dry Weather Rcvng Water Quality	Density of Generating Sites	Outfall Density	Age of Surrounding Development	Sewer Conversion from Septics	Older Industrial Operations (40+ yrs)	Aging/ Failing Sewers	Density of Aging Septics	Long reaches of culverted streams	SCORE	OVERALL ILLICIT DISCHARGE POTENTIAL	PROBLEM?	NOTES
OUT_470	Beaver Meadow Brook	0			3	3	2	3	1	3	2	1	2	29	MEDIUM		car dealer
OUT_471	Pequid Brook	0			3	1	1	1	1	1	1	1	1	16	LOW		
OUT_472	Pequid Brook	0			3	1	1	1	1	1	1	1	1	16	LOW		
OUT_474	Beaver Meadow Brook	1			3	1	1	1	1	1	1	1	1	19	LOW		
OUT_475	York Brook	0		3	1	3	2	2	1	2	1	1	1	38	MEDIUM		DPW MENTIONED ODOR COMPLAINT
OUT_477	York Brook	0			1	3	2	2	1	2	1	1	1	20	LOW		
OUT_480	Neponset River	1	3	3	3	3	2	2	1	2	1	1	2	58	HIGH	YES	Del Monte Produce; may have MS4 Ind Permit?
OUT_481	York Brook	0			1	1	1	1	1	1	1	1	1	12	LOW		
OUT_482	Pequid Brook	0			3	1	1	1	1	1	1	1	1	16	LOW		
OUT_499	York Brook	0			1	1	1	1	1	1	1	1	1	12	LOW		
OUT_504	Beaver Meadow Brook	0			3	3	3	2	1	1	1	1	2	24	LOW		industrial park area mentioned by DPW
OUT_505	Beaver Meadow Brook	1	3		3	3	3	2	1	1	1	1	2	39	MEDIUM		
OUT_506	Beaver Meadow Brook	0	0		3	3	3	2	1	1	1	1	2	24	LOW		
OUT_507	Beaver Meadow Brook	0	0		3	3	3	2	1	1	1	1	2	24	LOW		
OUT_508	Beaver Meadow Brook	1	0		3	3	3	2	1	1	1	1	2	27	MEDIUM		
OUT_510	Reservoir Pond	0	0		2	3	2	2	1	1	1	1	1	20	LOW		
OUT_513	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_517	Pecunit Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_519	Pecunit Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_520	Neponset River	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_522	East Branch Neponset River	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_530	Ponkapoag Brook	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
OUT_532	Ponkapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_533	Ponkapoag Brook	1	0		3	1	1	1	1	1	1	1	1	19	LOW		
OUT_534	East Branch Neponset River	0	0		3	1	1	1	1	1	1	1	1	16	LOW		
		Sampling Database	*Sampling Database*	*Town staff*	*Impaired Waters List*	*(car dealers, car washes, gas stations, industrial mfg, dumping areas)*	*Maps*			*Interview w/ staff*			*maps*				
		INDIVIDUAL FACTOR SCORE ASSIGNMENTS												SCORE RANKING AND SUMMARY			
		3 - 3	3 - E3-4	3- Frequent	3- impaired	3 - H	3 - H	3 - H	3 - H	3 - H	3 - H	3 - H	3 - H	RANK	SCORE RANGE		QUANTITY
		2 - 2	2 - E2	2- Some	2- impaired exotics or mercury	2 - M	2 - M	2 - M	2 - M	2 - M	2 - M	2 - M	2 - M	HIGH=	49	73	
		1 - 1	1 - E1	0- None	1 not impaired	1 - L	1 - L	1 - L	1 - L	1 - L	1 - L	1 - L	1 - L	MED=	25	48	HIGH / PROBLEM 2
		0- None	0 - ND or NA											LOW=	0	24	MEDIUM 39
	NOTES:	blank - not inspected												Maximum score:	73		LOW 113
																	TOTAL 154

1-Each outfall was assigned a score of High, Medium, or Low for each Factor
2 - Catchments with known/ suspected illicit discharges were automatically designated 'PROBLEM' in accordance with 2010 Draft Permit requirements

4. OUTFALL CATCHMENT DELINEATION & PRIORITIZATION

As was described above in Section 3, 154 outfalls were identified as jurisdictional under the MS4 Permit ('MS4 Outfalls'). The 154 MS4 Outfalls were identified on the Stormwater Base Map (Appendix B). The stormwater catchment areas for each of the MS4 outfalls were delineated and prioritized for future IDDE investigation, as described below.

4.1 Catchment Delineation Procedure

The purpose of delineating MS4 outfall catchments under the MS4 Permit is to define contributing areas for investigation of potential sources of illicit discharges, if any, within the catchment. As such, the catchment delineations are a planning and investigation tool. They are not intended to be at the rigorous level of detail that would be used for determining the volume of stormwater contributing for sizing and designing stormwater treatment, for example. The approach to delineation was to use the topographic contours as the governing parameter, and where available, use mapped drainage infrastructure to adjust delineations. The approach used is conservative because it includes areas that contribute overland flow, in addition to piped stormwater, towards the outfall location. In some cases, this may help identify non-point sources of pollution to receiving waters, such as waterfowl or pet waste in parks- which can be addressed in other portions of the MS4 Permit required elements (e.g. Education and Public Participation).

Kleinfelder used Light Detection and Ranging (LiDAR) terrain files downloaded from MassGIS to generate 2-foot topographic contours that were incorporated to the GIS Drainage Base Map. Catchment area boundaries were drawn by defining the line perpendicular to contours up to the topographic high points. Where the boundary intersected roadways, the pitch of the roadway was used to find the breakpoint. Once delineated, the catchments were prioritized for IDDE investigation as described below.

4.2 Catchment Prioritization

The Draft 2010 Permit, Part 2.4.4.8.c, specifies the following factors that must be considered (although not all may apply) when prioritizing outfall catchments for the IDDE Program:

- Past discharge complaints or reports
- Poor dry weather receiving water quality
- Density of institutional, municipal, commercial, or industrial sites with potential to generate pollutants that could contribute to illicit discharges- for example: car dealers, car washes, garage/gas stations, garden centers, industrial manufacturing, residential areas with swimming pools
- Stormwater outfall density
- Age of surrounding development
- Sewer conversion from septic areas
- Historic combined sewer areas
- Presence of older industrial operations

- Aging/failing sewer infrastructure areas
- Density of aging septic systems
- Long stretches of culverted streams

With input from DPW staff, Kleinfelder used the Town's existing outfall database, interviews, and base mapping to gather information regarding the above factors to develop a Prioritization Matrix. The Matrix was used to rank each relevant factor as High, Medium or Low potential for illicit discharges for each of the 154 MS4 outfall catchments. Different factors were assigned different weights to add higher weight to better sources of data and/or areas of importance. Then the sum of the factor scores multiplied by the factor weights was used to generate an overall ranking score of High, Medium, or Low for each catchment. For example, greater weight was given to the actual complaints/reports of discharge and to observations of high total bacteria counts in dry weather samples. The ranking Matrix is shown in Table 4-2, attached. The results of the ranking are discussed below.

4.2.1 Catchment Priority Ranking

A total of 154 catchments were evaluated in the Priority Ranking Matrix (Table 4-2) as described above. Based on the ranking system, a maximum score of 73 was possible. This was broken into 3 scoring bands as shown in Table 4-1:

Table 4-1: Catchment Priority Ranking

Rank (Risk)	Description	Score Range	Quantity of Catchments in Category
PROBLEM	Known illicit discharge	any	2
HIGH	High potential for illicit discharge	49 - 73	2 (same as the Problem)
MEDIUM	Medium potential for illicit discharge	25 - 48	39
LOW	Low potential for illicit discharge	0 - 24	113

Under the 2010 Draft Permit requirements, once effective, Canton would be required to complete the following minimum actions:

- By the end of Year 3, complete IDDE investigations in at least half of Problem, High, and Medium Catchments
- By the end of Year 5, remove all illicit discharges in Problem catchments
- By the end of Year 7, Complete investigations in low risk catchments

Table 4-2: Catchment IDDE Ranking Matrix

INSERT MATRIX, Discard Page

4.2.1.1 Problem Catchments

In accordance with the 2010 Draft Permit, catchments shall be categorized as Problem if there are known illicit discharges associated with them. There are two outfall catchments for which the Town identified known problems with non stormwater discharges: Outfall 480 and Outfall 403. These catchments also received the only scores with a "High" potential for ID ranking. Outfall 480 is adjacent to the Del Monte Produce plant and has been noted visually as potentially receiving discharge from the plant's fruit processing operations. Outfall 403 is located in the Waterfall Drive residential area. DPW staff members have observed dog waste being disposed of in catch basins in this area.

Both of these Problem outfalls should be investigated expeditiously. Although the Draft Permit specifies the timelines above for investigation, it also requires illicit discharges to be eliminated within 30 days of confirmation, if possible. Unlike other types of illicit connections, in these cases the source of the ID seems to be readily apparent. In the case of #480, the Town plans to contact the business owner and ask to inspect the facility to determine the source of the ID and require the owner to eliminate the source. In the case of #403, the Town plans to conduct an outreach activity to the neighborhood using mailings and/or signs located near the problem areas. *UPDATE: To date, the Town has contacted Del Monte by letter twice and has also contacted the homeowners association for Waterfall Drive.*

Although the Draft Permit specifies the timelines above for investigation, it also requires illicit discharges to be eliminated within 30 days of confirmation, if possible:

> **2010 Draft Permit, Part 2.4.4.2:** *Upon detection of an illicit discharge, the permittee shall eliminate an ID as expeditiously as possible. The MS4 shall identify all responsible parties and notify them in writing to require immediate cessation of improper disposal practices in accordance with legal authorities. Where elimination within 30 days is not possible, an expeditious schedule shall be established; with enforcement action taken within 6 months of notifying responsible parties, if the ID has not been eliminated.*

4.2.1.2 Medium Risk Catchments

Thirty-nine catchments were identified as Medium risk for illicit discharges. Most of these catchment outfalls had one or more dry weather flow observations, often with moderate to high bacterial levels, and moderate to high risks in two of the other factors. For example, a number of the Medium risk catchments are located along Turnpike Street, which is a dense industrial/commercial area with multiple potential ID generating sites (garages, car dealers, manufacturing, etc.). The Town will complete investigations in Medium risk catchments in accordance with the schedule set by the new Permit requirements, when issued final.

4.2.1.3 Low Risk Catchments

The remaining 113 catchments were ranked Low risk for potential illicit connections. These catchments will be investigated in accordance with the schedule set by the new Permit requirements, when final.

5. ILLICIT DISCHARGE DETECTION & ELIMINATION PROCEDURES

The 2003 MS4 Permit requirement relating to IDDE was generalized and allowed Permittees significant leeway in the interpretation and development of their IDDE Plans. The 2003 Permit allowed permittees to determine methods used to isolate suspected illicit connections; however the Draft 2010 Permit explicitly stipulates minimum procedures to be followed. The locating of illicit connections requires a systematic inspection of junction manholes (manholes with two or more inflow pipes), starting at either the upstream or downstream end of the drainage network.

To date, the Town of Canton has been using an IDDE protocol based on the December 2008 Draft EPA New England Illicit Discharge Detection & Elimination Protocol guidance, and the Illicit Discharge Detection and Elimination guidance document from the Center for Watershed Protection. The procedures described below, to be used going forward, are based on the requirements outlined in the Draft 2010 Permit, and may differ from the 2008 guidance. If the Final Permit differs significantly from the Draft, this IDDE Plan will be modified accordingly.

5.1 Systematic Procedure Overview

The Town will use a systematic procedure for locating and removing illicit connections. The procedure is summarized as follows:

Table 5-1: Systematic IDDE Procedure Overview

Action	Procedure	Frequency
DETECT	- Investigate catchments (see Section 4) - Conduct outfall dry weather screening (see Section 6) - Conduct outfall wet weather monitoring (see Section 6)	- per Section 4 -1 dry and 1 wet for each outfall over the Permit term (see Section 6)
IDENTIFY	- Determine possible source for discharge based on visual, olfactory and sample results - Determine if illicit or allowable discharge	As needed based on results of screening & sampling
TRACE	- Systematically trace discharge to source, (see Section 5.4)	As needed, per Section 5.4
ELIMINATE	- Take enforcement actions to eliminate discharge (see Sections 5.5 & 2.1)	As needed, per schedule in Section 5.5.
DOCUMENT	- Document actions and results of enforcement	Continuously (see 5.6)
REPORT	- Report results and progress annually	Annually (see 5.6)

The details of the procedure are provided in the following sections. An overview of the process is shown in the following flow chart:

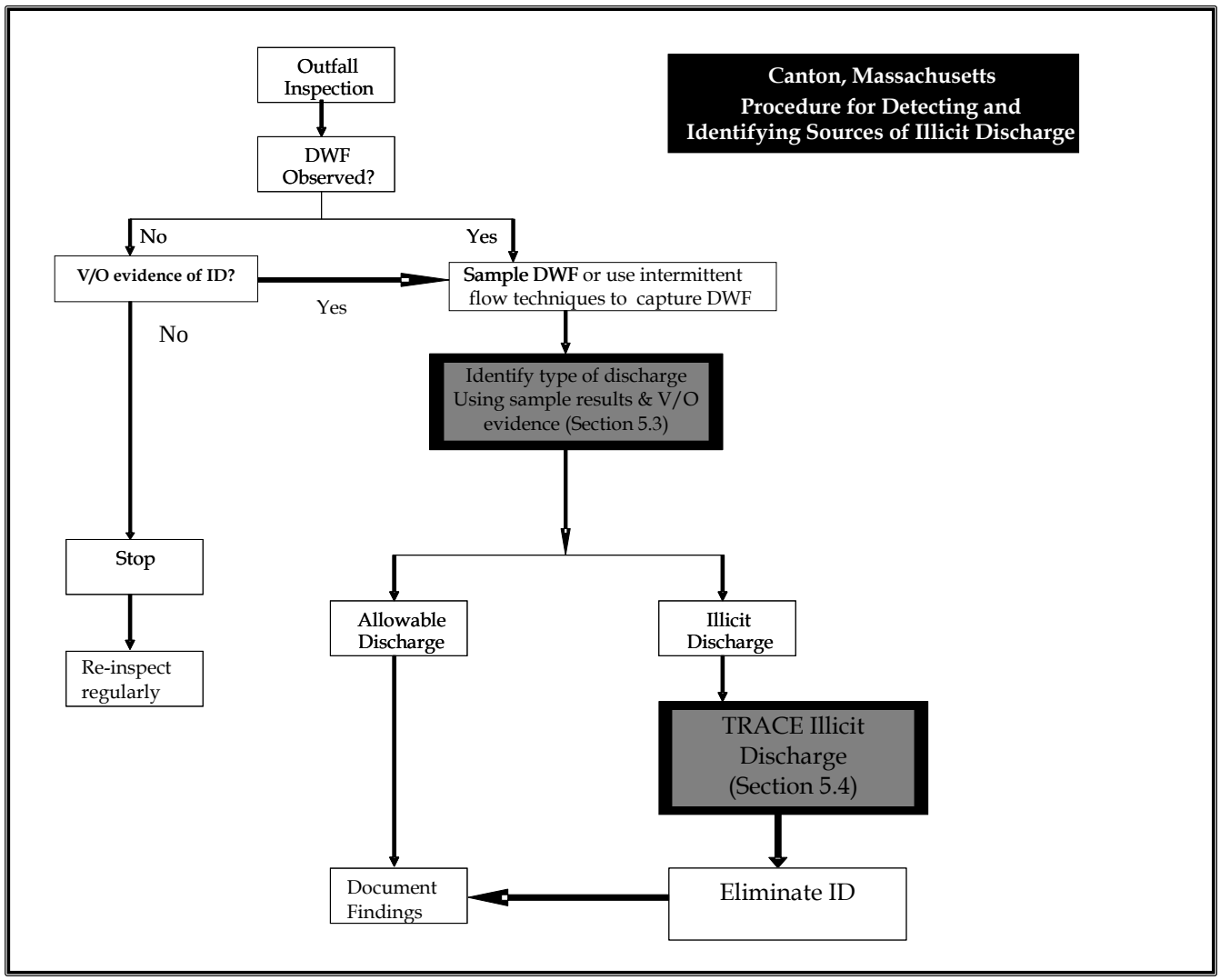


Figure 5-1: Overview Flow Chart of IDDE Procedure

5.2 Detect Illicit Discharges

Detection is achieved via catchment investigations and dry and wet weather screening and sampling.

Dry weather flow (DWF) is one of the most obvious red flags indicating a possible illicit connection. The outfall inventory and dry weather screening and sampling is the tool by which possible IDs are identified and confirmed. The protocols for dry weather screening are described in more detail in Section 6. During inventory and screening, Canton DPW field staff fills out an Inspection Form (see Appendix C for a copy of the Town of Canton, MA Storm Water Sample Collection Field Sheet) that prompt the inspector to look for evidence of pollutants in flowing outfalls. If no dry weather flow is observed, but visual / olfactory (V/O) indicators of prior illicit discharge flow are seen, then the outfall should be revisited to check for flows.

Possible Illicit Discharges and some V/O Indicators are as follows:

Sanitary sewer discharge	Odors, excrement, indications of toilet paper or sanitary products, white or gray plaques of filamentious bacteria
Slop / laundry sink wash waters	Grey water, suds or bubbles
Car washes	Suds or bubbles
Industrial discharges	Colored water, chemical odors

If observed, dry weather flow will be tested. Required analytes and methods are described in **Section 6.** Wet weather monitoring is required under the Permit. Wet weather testing requirements are described in **Section 6**.

Continuously flowing illicit discharges are much easier to detect than intermittent or transitory flows. However, transitory often comprise the majority of illicit discharges. If no dry weather flow is observed, but other V/O evidence suggests illicit discharge, the following techniques can be used for detecting intermittent or transitory flows:

- Odd hours monitoring: Conduct inspections of manholes / outfalls in Problem or High Risk catchments during evenings and/or weekends
- Optical brightener monitoring traps: Secure an unbleached absorbent cotton pad to the invert of the pipe and leave in place for a period of time. Viewed under a black light, the pad will phosphoresce if detergents have been absorbed by the pad.
- Caulk dams: Using plumbers putty or other materials, create a 2-inch (+/-) high berm to trap a portion of intermittent flow. Use a hand-pump sampler or large syringe to obtain a water sample for testing.
- Pool sampling: If a plunge pool exists at an outfall, use it as a water sample source (note this may provide results that are biased high, as the pool likely will contain stagnant water that has accumulated pollution.

5.3 Identify the Discharge

The results of field parameter and analytical testing can help identify the type of discharge. The Flow Chart method (Center for Watershed Protection, IDDE Guidance Manual) shown below will be used. The flow chart is particularly applicable for residential watersheds. In addition, industrial discharges will be assumed for pH levels below 5 or above 8 and for potassium levels above 20 mg/L

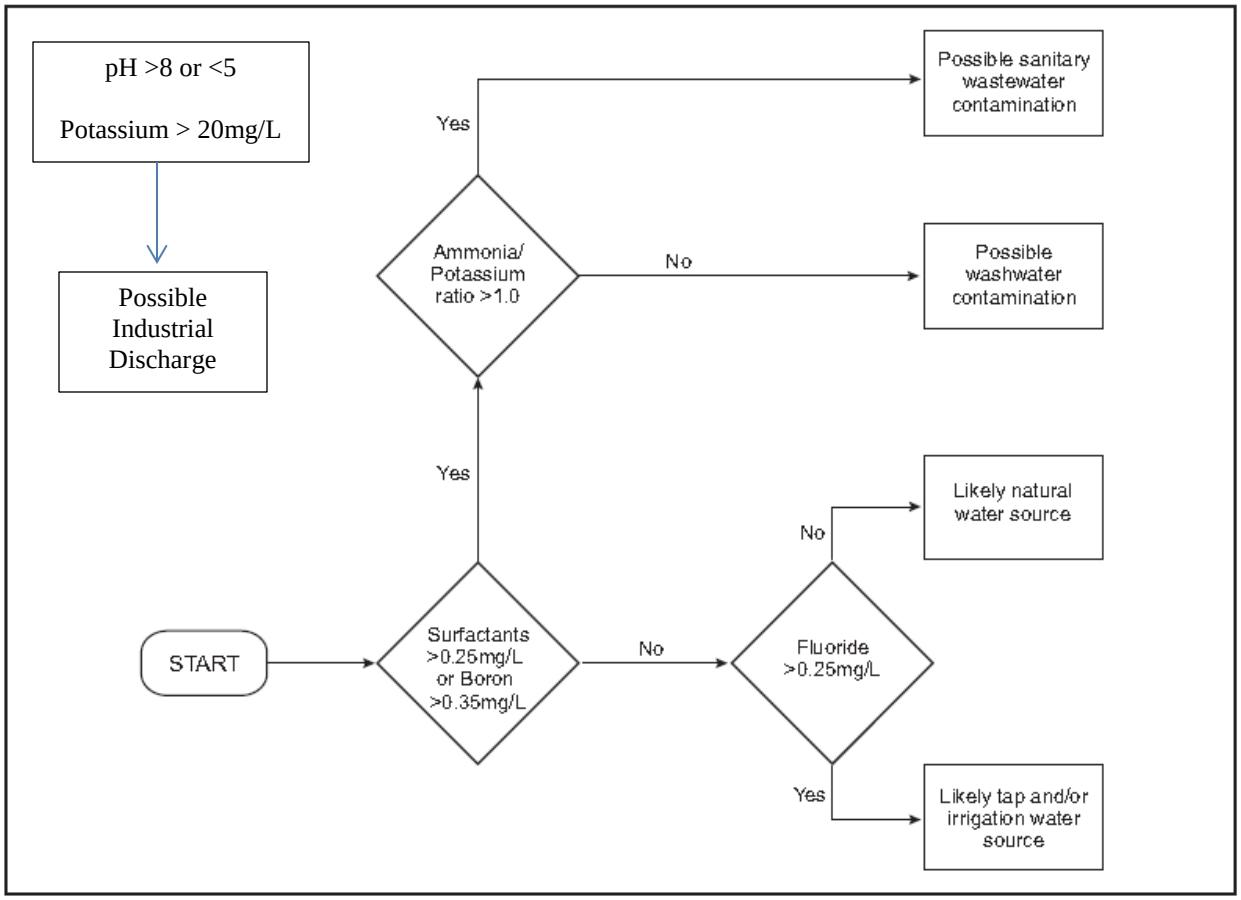


Figure 5-2: Flow Chart for Determining Possible Illicit Discharge Sources (Modifed from Pitt, 2004)

5.4 Trace the Discharge

This section is intended to guide Canton's MS4 authority through the process of **tracing** the source of an illicit discharge. If the existence of an illicit discharge is confirmed at an outfall or a junction manhole, the specific source of the discharge must be traced (located), and eliminated. The procedure proposed to trace the source of the discharge is a two-phase process:

Phase I – Working upstream from the outfall, use system maps (the paper map booklet or the GIS) and inspection of manholes, junction manholes, and catch basins to determine the approximate location of the source of the illicit discharge. Catchment delineations on the maps show the approximate limit of area contributing to each outfall.

Phase II – If necessary, use more advanced techniques, such as dye testing, smoke testing or TV inspection to locate the specific source of the discharge.

The tracing process should take place during dry weather conditions (less than 0.1 inch of rain in the prior 24 hours).

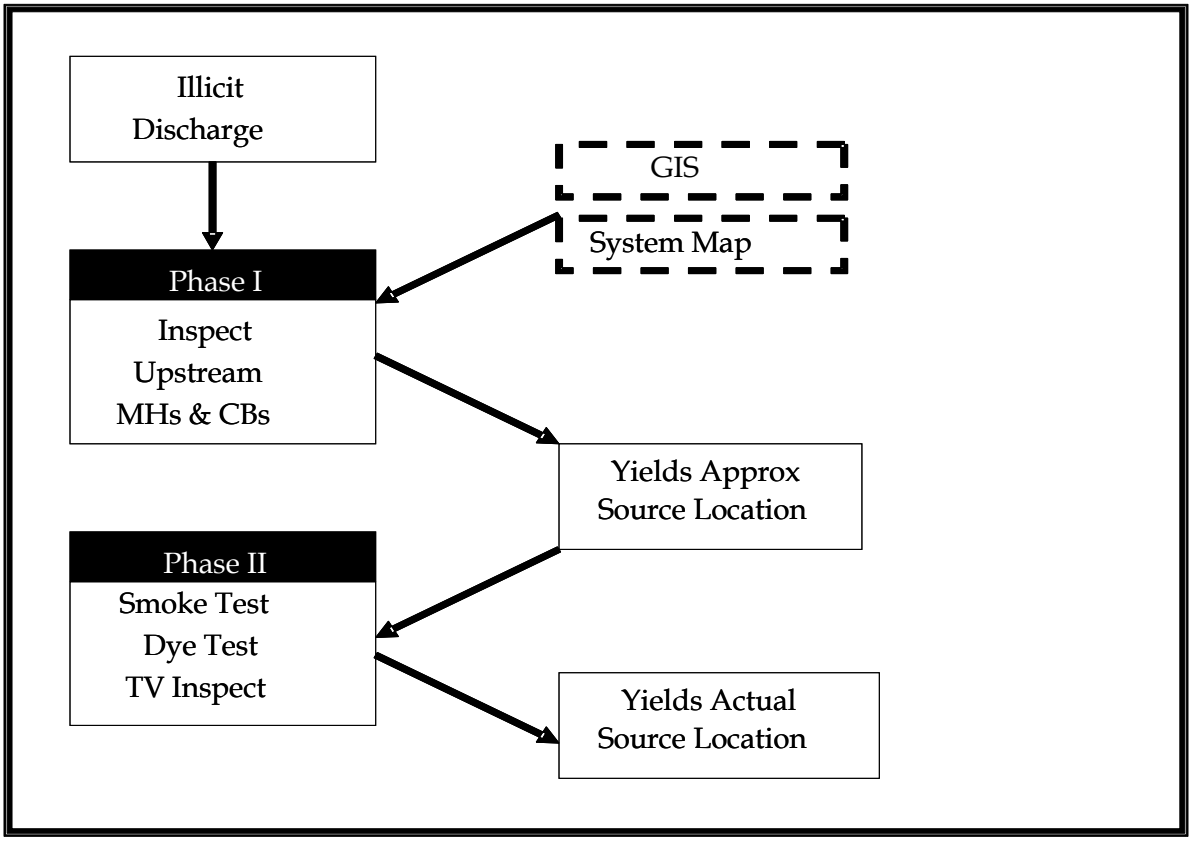


Figure 5-3: Flow Chart of ID Tracing Procedure

5.4.1 Dry Weather Flow Tracing – Locating Illicit Discharge Sources – Phase I

This section will describe in detail steps recommended to locate the approximate location (between two manholes) of a dry weather flow.

As described above, Phase I of the illicit discharge source location procedure is to locate the approximate location of the source. Following the steps described in this section will result in locating the source of an illicit discharge, with an accuracy of 'between two manholes'. This is done using the following tools/methods:

- **Storm sewer Map Book & GIS** – Find the appropriate Map Book Tile or tiles corresponding to the outfall to be inspected. If the outfall catchment area is broken up over several map tiles, ArcMap users can open the GIS map file, recenter the view on the catchment, and re-print a map.

  Using the map developed in the step above, the user can begin to study the catchment area upstream of the selected outfall. Having an understanding of the land use of the area is an important tool in locating the source of the illicit discharge. For example, the lab analysis of the dry weather flow sampled at the outfall might show that there is oil in the flow. This could point to the potential of the source being a local garage.

- **Inspection of manholes and catch basins upstream of the outfall** – Having a map of the upstream storm sewer network, and an understanding of the catchment area, the user should then

begin to inspect storm sewer manholes and catch basins – moving step by step, upstream from the outfall. Inspection should show that manholes downstream of a source show the same type of discharge as observed at the outfall, and manholes upstream of the source do not. Using this logic, by inspecting upstream into the system, an inspector will be able to flag the manhole where the evidence of the illicit discharge begins to be observed. A manhole upstream of this manhole should show no such evidence.

The figure below shows a graphical representation of a typical 'Phase I' illicit discharge source location.

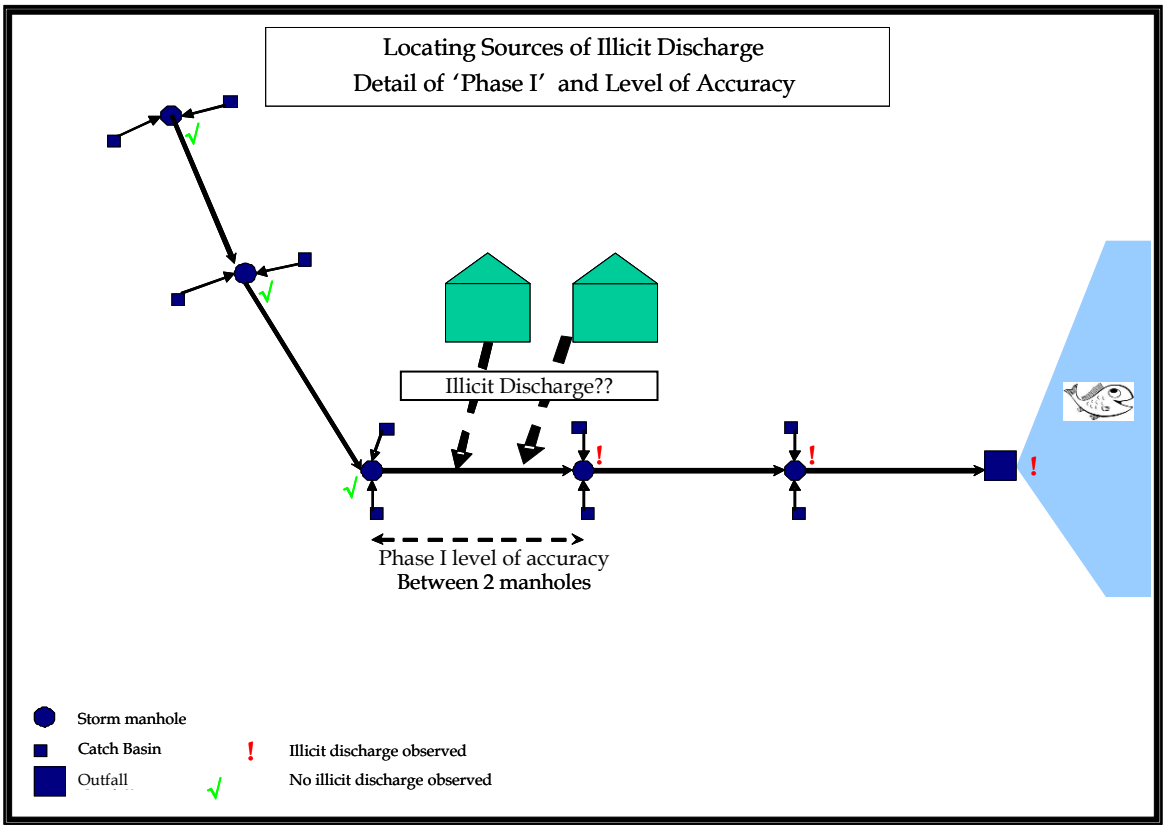


Figure 5-4: Tracing Procedure – Phase I Level of Accuracy

PHASE I ILLICIT DISCHARGE TRACING PROCEDURES

Step 1

Use the MS4 storm sewer system mapping to get a clear map of the outfall and the pipes, manholes and catch basins that are upstream from it. Find the appropriate Map Book Tile or tiles corresponding to the outfall to be inspected. If the outfall catchment area is broken up over several map tiles, ArcMap users can open the GIS map file, recenter the view on the catchment, and re-print a map.

Step 2

Revisit outfall and confirm that dry weather flow is still running. Illicit discharges may be intermittent and a flow observed one day may not necessarily be observed the following day or at a different time. An illicit discharge will be most easily traceable if it is active during the follow up procedures.

(Revisiting the outfall is not necessary if follow up procedures are already being undertaken due to signs of previous illicit discharge at the outfall, but it can often be useful to allow the inspector get a better 'lay of the land'.)

Step 3

Begin inspecting manholes and catch basins moving upstream and away from the outfall. Inspect each structure, specifically looking out for similar characteristics as were observed at the outfall.

If there is no evidence of those characteristics at the first set of manholes and catch basins upstream of a flowing outfall, it is likely that the source of the illicit discharge is located somewhere between the outfall and these structures. >>>Skip Step 4, Move to Phase II.

If there is evidence in the first upstream manhole/catch basins of those characteristics observed at the outfall, it is likely that the source of the illicit discharge is located somewhere upstream of this point.

Step 4

Repeat Step 3, continuing to move upstream and away from the outfall, to inspect manholes and catch basins for the same flow characteristics that were observed at the outfall.

Junction Manholes (JMHs)- A junction manhole is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both, are not considered junction manholes. Key JMHs shall be opened an inspected for visual/olfactory evidence of ID. If visual/olfactory evidence is present, it shall be recorded. If flow is present, it shall be sampled for ammonia and surfactants (at a minimum).

As soon as the inspection process yields a set of manholes/catch basins where the outfall characteristics are not observed, stop the inspection process. At this stage, it can be reasonably determined that the source of the illicit discharge is somewhere between this set of manholes/catch basins, and the set of structures immediately downstream of there.

Move directly to Phase II procedures, if necessary.

On completion of Phase I source location activities, the inspection team should know, with an accuracy of 'between two manholes' where the illicit discharge is entering the storm sewer system.

Additional notes on source location

- **Notification** - It is important for the inspection team to notify local MS4 authorities, and the local police department regarding the location and times of inspections. This is important for the safety of the inspection team and for the information of the general public. Based on the potential

locations (busy roads) the police department may determine that it is appropriate to have a police detail accompany the inspection team to safeguard the safety of the team and to direct traffic on busy roads. Public notification is also a key factor in a successful tracing program – see Section 5 for full details of public notification procedures.

- **Multiple Discharges** - In some instances, multiple illicit discharges may be flowing to one outfall. In cases such as these a manhole inspection might show a reduction in, but not absence of flow compared with a downstream manhole. This likely means that there is one illicit source downstream of the manhole, and an additional source or sources upstream of the manhole. In a case such as this the inspection team should take detailed notes and inspection records and continue inspecting upstream storm structures until no flow is observed. The inspection team will then know that there are multiple sources between that point and the outfall, and Phase II activities should be implemented on that portion of the system.

5.4.2 Dry Weather Flow Tracing – Locating Illicit Discharge Sources – Phase II

The Phase I source location procedures will give the inspection team a length of storm sewer system, (between two consecutive manholes for a single source, a longer stretch of storm system for multiple sources). At this point, simple inspections of storm system structures may not be sufficient for locating specific sources. The following set of phase II procedures will assist the inspection team in locating specific sources. The following illicit discharge detection methods are described and discussed below:

- Smoke testing
- Dye testing
- Television inspection

Public notification is an important part of all of these Phase II procedures. Property owners should be notified in advance that activities such as smoke testing, dye testing or TV inspection are planned for their street/area, and a specific DPW contact name should be made available to them so that they can discuss any concerns they might have. See Section 5 for additional details. Sample notifications are included in Appendix D.

Phase II procedures will target more specific sections of the storm system, and will typically end up highlighting specific properties. In many cases, the owners of those properties may not be aware that there is an illicit discharge source on or close to their property. This may cause some concern to the property owners. The inspection teams and should communicate clearly and openly with the owners so that the sources are identified. If sources are identified, the DPW will work with the owners, within the parameters of local bylaws and regulations, to remove the source(s) of the illicit discharge.

The figure below shows a graphical representation of a typical ‘Phase II’ illicit discharge source location.

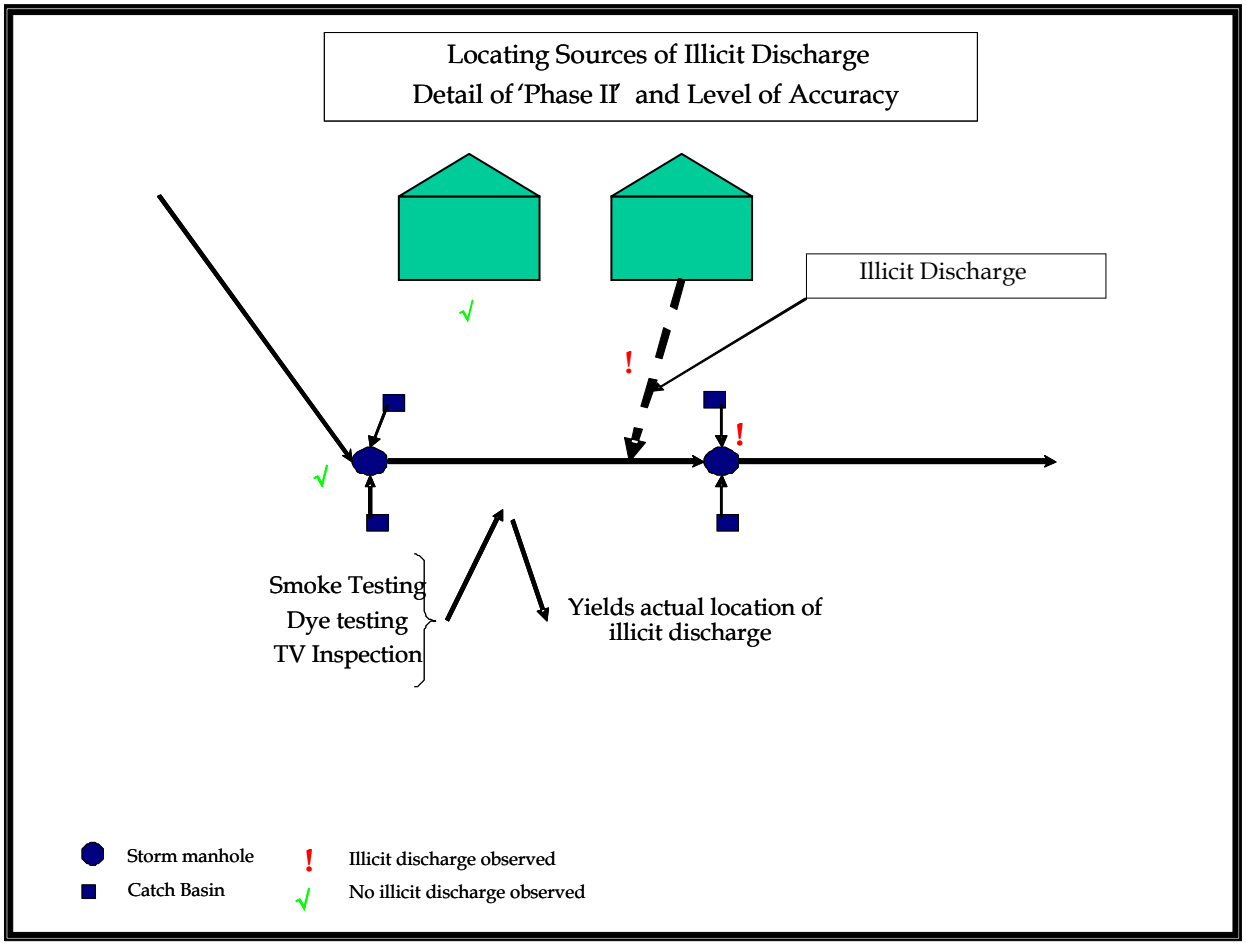


Figure 5-5: Phase II Source Location

5.4.2.1 Smoke Testing

Description – Blowing smoke, under pressure, into an isolated section of storm sewer system that has been plugged (by sand bags, beach balls, or other types of plug) at all ends. The pressurized smoke will not be able to exit via the plugged manholes/catch basins, and will therefore seek the path of least resistance to exit the system. If there are other connections to the system, such as roof leaders or floor drains, the smoke will flow up these connections and exit the system this way. Inspector should look out for smoke coming out of roof leaders or basements for a positive test. A dye test (see below) is typically used to confirm the results of a positive smoke test.

Smoke testing is useful for determining inflow sources such as roof leaders, cellar, yard, and area drains, foundation drains, abandoned building sewers, faulty connections, illegal connections, and cross connections with the sanitary sewers. **Smoke testing does require specific equipment (mechanical blowers etc) and training.** If it is determined that smoke testing is the most appropriate tracing method to be used, a local contractor should be contacted to undertake the work, unless the MS4 has the appropriate equipment and personnel.

Smoke testing is a multiple source method – one setup of smoke testing may flag up multiple potential sources.

Appropriate uses – smoke testing is most appropriately used when there are multiple potential sources between consecutive manholes or along a stretch of several manholes.

Notes – Because of the use of smoke, coordination with the public is particularly important when undertaking smoke testing. The local fire department should be alerted about where and when the testing will take place, as they will likely get calls from residents who see smoke and believe there is a fire emergency. In some communities, the local fire department will send a detail to attend the smoke testing. The smokes used are generally harmless, but may in some cases cause aggravation to those with previously existing breathing difficulties.

5.4.2.2 Dye Testing

Description – Pouring dyed water into a suspected source (roof leader, floor drain) and monitoring the downstream manhole for appearance of the dye. If the dye poured into a suspected source is observed in a downstream manhole or catch basin shortly after, this will confirm that the source is connected into the storm system.

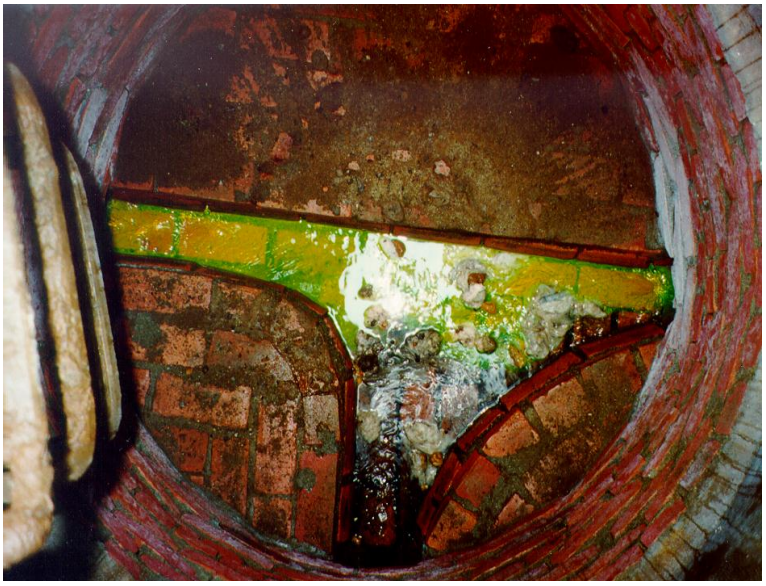
Dye testing is a single source method – each dye test setup will confirm only one source.

Appropriate uses – Dye testing is best used on a source that is strongly suspected of being connected to the system, because it is part of the only property contributing flow to a suspected portion of storm system, or because it is a high-risk property.

If there are multiple properties along a suspected section of storm system, it may be more efficient to conduct smoke testing, as multiple dye tests along a single section of storm system can be time consuming and can yield confusing results.

Notes –Dye testing **does not require** specific training or equipment, and can typically be undertaken by DPW employees. The dye that is used in this process is generally made of vegetable dyes, and is harmless. Ultimately, dye that is introduced into the storm sewer system will flow out of the outfall, and will likely cause discoloration of the water in the vicinity of the outfall. This can cause concern to local residents, and the Town should notify the appropriate departments so that these concerns can be put to rest.

Dye Testing – positive dye test result.



5.4.2.3 Television Inspection

Description – Television inspection consists of a robotic TV camera that is mounted on wheels and is placed within the suspect pipe. The camera has an odometer on it to measure distance. The camera travels down the pipe and records the pipe condition while being watched by a technician from above. The technician can adjust the focus and camera direction from up top. If an illicit discharge source is found, the technician can then stop the travel of the camera and focus in on the source. TV inspection is used to follow a trunk line to determine the location of an illicit discharge from within the pipe itself. TV inspection will also yield a measurement from the camera entry point to the illicit source, making it easier to locate the source on street level when it is time to eliminate the illicit connection. The TV inspection method will also yield the direction of the illicit connection entering the pipe (left or right of the robot), which can be very useful to determine the source of the flow.

Appropriate uses - TV inspection is most appropriately used when there are multiple potential sources between consecutive manholes or along a stretch of several manholes. The camera can pinpoint a connection and still see if there is any flow upstream of that connection telling the camera operator to continue upstream until there are no dry weather flows in the pipe.

TV inspection is also useful within areas sensitive to public concern. The TV inspection method does not produce any visual effects on the water bodies, such as dye testing. TV inspection also does not produce any visual effects within the air space of a sensitive property like a nursing home or hospital, such as smoke testing. It is also useful when a property owner will not allow access to their property to confirm a suspected source of inflow.

Notes - Because of the need to have access to the storm sewers and the need to park a TV inspection vehicle in the street to conduct the inspection it is necessary to coordinate all activities with the DPW inspector and the local police department. Having a parked vehicle in the road while conducting an inspection may require a police detail to direct traffic. Alerting local residents of these activities will also reduce the phone calls to Town departments from concerned residents.

5.4.3 Safety Considerations

Safety of personnel is of the utmost importance, so a discussion summary of safety issues is provided below:

MANHOLE / CATCH BASIN INSPECTION: IMPORTANT SAFETY INFORMATION
The underground structures that form a stormwater collection network (catch basins, manholes etc) are part of a dangerous environment, and it is vital that all appropriate safety precautions are taken. Some examples of the safety issues that can occur when working with a storm sewer network are: ❑ Inhaling poisonous gases that can accumulate inside the piping system. ❑ Falling into a manhole and being swept down a storm drain pipe. ❑ Being struck by traffic while inspecting catch basins or manholes on the street. ❑ Falling while accessing outfalls with unstable banks. ❑ Infection from raw sewage or chemicals.

MANHOLE / CATCH BASIN INSPECTION: IMPORTANT SAFETY INFORMATION

- Poison ivy.

In most cases, any of the activities that are necessary as part of an inspection of a catch basin or manhole, undertaken as part of dry weather flow follow up, can be performed from the street or ground level. For example:

- Flow depths can be measured using long sticks
- Samples can be taken by bottles held by extension holders
- Visual inspections can be performed using flashlights or mirrors

If for some reason entry into the system is deemed necessary, it is extremely important to note the following

NO INDIVIDUAL, UNDER ANY CIRCUMSTANCE, SHOULD ENTER INTO ANY PART OF THE STORM SEWER SYSTEM, UNLESS THAT INDIVIDUAL HAS RECEIVED COMPLETE OSHA CONFINED-SPACE-ENTRY TRAINING, AND IS FULLY QUALIFIED TO OPERATE IN A CONFINED SPACE ENVIRONMENT. NO INDIVIDUAL, TRAINED OR NOT, SHOULD ENTER CONFINED SPACE WITHOUT ADEQUATE SUPPORT FROM ADDITIONAL PERSONNEL AND APPROPRIATE EQUIPMENT.

If an inspector is unsure whether he/she is qualified to enter into a confined space, it is likely they are not qualified. Review the following website for additional information, or speak with the MS4 authority to clarify any safety issues. http://www.osha.gov/SLTC/confinedspaces/

Other common-sense safety issues to be aware of include, but are not limited to:

- **Danger from passing traffic** – check with local police department to determine if a police detail is needed on streets where the storm system may be inspected.
- **Communication** – Inspectors should ensure that they carry walkie-talkies or cell-phones to enable them to stay in contact with the MS4 authority. No inspector should go into the field without letting the MS4 authority where they will be and when they expect to be finished.

Inspectors should plan carefully for field work and should make themselves fully aware of any site-specific condition they may encounter.

- **Weather Conditions –** As in conducting outfall inspections, it is important to conduct dry-weather-flow source location tracing activities during dry weather flow conditions.

Seasonally, the best times of year are late spring and early fall when there is little vegetation to camouflage the outfalls and the ground water tables are low prohibiting infiltration into the system. Tracing should be conducted at least 48 hours after any significant rainfall event to minimize the impact of delayed storm flow on inspections.

5.5 Eliminate the Discharge

2010 Draft Permit, Part 2.4.4.2: Upon detection of an illicit discharge, the permittee shall eliminate an ID as expeditiously as possible. The MS4 shall identify all responsible parties and notify them in writing to require immediate cessation of improper disposal practices in accordance with legal authorities. Where

elimination within 30 days is not possible, an expeditious schedule shall be established; with enforcement action taken within 6 months of notifying responsible parties, if the ID has not been eliminated.

5.6 Document & Report

The Town will document and report all aspects of the IDDE Program, as required by the Permit.

Once an illicit discharge source is confirmed, the Inspector will record:

- Location and source
- Description
- Method and date of discovery
- Date of removal, repair, or enforcement
- Date and estimated volume of flow removed

The existing Access database, or a new Access database using the same unique identifier for the Outfalls will be used to track the additional ID investigation information.

The Annual Report will include a report on the status of IDDE investigation and removal activities. The indicators of IDDE progress are discussed in Section 7.2.

6. OUTFALL MONITORING PROGRAM

Between November of 2008 and November 2012, Canton inspected and tested (if flowing) all of the Town's 270 outfalls. As was described in Section 4, this included many outfalls that are not jurisdictional to the MS4 program.

The inspections and testing conducted to up to November 2012 were described in detail in Annual submittals provided to EPA under the 2009 Order (Docket 09-029). The methods used were in accordance with the 2008 EPA New England Draft IDDE Guidance, and the Center for Watershed Protection IDDE guidance manual.

The following table summarizes the results of the Town's monitoring program through November 2012:

Table 6-1: Outfall Monitoring Results, 2009 - 2012

	2008	2009	2010	2011	2012
Total Outfall Inspections	133	42	206	2	100
# Outfalls Inspected Dry Weather		10	99	108	75
# Outfalls with Dry Weather flow		10	49	14	7
# Outfalls Inspected Wet Weather		0	107	111	78
# Sampled with surfactants > 0.25 mg/L		3	12	1	0
# Sampled with Ammonia / K ratio > 1		0	0	0	0
# Sampled with Fluoride >0.25 mg/L		0	8	1	2

The Draft 2010 Permit, Part 3.0 describes the following requirements of the Outfall Monitoring Program, which will be adopted by the Town from this point forward.

6.1 Dry Weather Screening Procedures

- Dry Weather Screening (DWS) shall proceed only when no more than 0.1 inch of rainfall has occurred in the previous 24 hour period.
- During inventory and screening, Canton DPW field staff will fill out the Inspection Form (see Appendix C) which prompts the inspector to look for visual / olfactory evidence of pollutants in flowing outfalls.
- DWS must be conducted on at least 25% of the outfalls each year, beginning in Year 2 and all outfalls completed by Year 5.
- If flow is observed, it will be sampled and tested for the following minimum parameters:

❑ temperature	❑ Surfactants (as MBAS)
❑ Conductivity	❑ Potassium
❑ Turbidity	❑ Ammonia
❑ pH	❑ E. coli (if discharging to fresh water)

❑ Chlorine	❑ Note V/O presence of: odor, water color, sheen, turbidity

- ❑ **If the discharge is directly into an impaired water (see Table 1-1), then the flow must also be tested for the pollutants identified as causing the impairment for that water body (e.g., metals, nitrogen, phosphorus, oil and grease, etc.)- see Appendix E for requirements for Impaired Water testing.**
- ❑ If pollutants are present in discharge consistent with adjacent impaired waters, the Town will take measures to minimize or eliminate the source of pollution
- ❑ Document those measures in the SWMP and Annual Reports
- ❑ Analytical Method procedures and guidance are listed in Appendix F.

6.2 Wet Weather Screening Procedures

- ❑ There is a provision in the 2010 Permit that if the Town has completed wet weather sampling at all outfalls under the 2003 Permit, including at MS4 Interconnections, and documented it in the SWMP, then it is not required to conduct wet weather sampling under the new Permit.

Otherwise, the following requirements apply:

- ❑ There is no minimum rainfall amount; any intensity sufficient to produce a discharge.
- ❑ 25% of outfalls per year must be tested; they should be the same as the dry weather screened outfalls
- ❑ Outfalls must be tested for the same minimum parameters as for Dry Weather Screening
- ❑ If pollutants are present consistent with adjacent impaired waters, the Town will take measures to minimize or eliminate the source of pollution
- ❑ Document those measures in SWMP and Annual Reports
- ❑ Analytical Method procedures and guidance are listed in Appendix E.

6.3 Follow up Monitoring

If no dry weather flow is observed, but visual / olfactory (V/O) indicators of prior illicit discharge flow are seen, then the outfall should be revisited to check for flows.

6.4 MS4 Interconnection Monitoring

There is one other MS4 permit holder in the Town of Canton: the Massachusetts State Hospital School. The Town will investigate its drainage system near the MSHS to determine if there is a physical connection with Canton's MS4. If there is, Canton will conduct dry weather screening and wet weather sampling at those point(s) of interconnection.

6.5 Data Tracking

The Outfall Monitoring Program data will continue to be tracked in the DPW's Outfall Database. The database will be linked into the Town's GIS.

6.6 Sampling Procedures

Sampling procedures are described in Appendix C. Sampling analytical method guidance is presented in Appendix F.

7. PROGRAM EVALUATION

7.1 Program Requirements Summary

Table 7-1
Illicit Discharge Detection & Elimination Plan Requirements

2003 Permit Requirements in bold; *2010 Draft Year 1 in Italics*

Permit Parts	Canton Requirements	Canton Status	Action Needed	Due By (time from issuance of new Permit)
2.4.4	**Prohibit SSOs and illicit non-stormwater discharges via bylaw**	**Prohibited by Section 16 of General Bylaws**	**None**	**COMPLETED**
2.4.4.1, 2	*Eliminate known illicit discharges as quickly as possible and require immediate cessation of improper practices upon confirmation of responsible party.*	*Two noted:* *Outfall # 480 (industrial process-food discharge)* *Outfall 403 – dog waste disposal in catchbasins*	*Continue to implement IDDE inspections & follow up in accordance with 2012 IDDE Plan*	*Eliminate known illicit discharges within 30 days. If not possible, establish schedule (maximum 6 months).*
2.4.4.4 Non-stormwater	• *Evaluate non-stormwater discharges to the MS4 for significance & Document in SWMP*	*Non-stormwater discharges not known to be significant pollution sources*	*Desktop assessment of non-stormwater sources; describe in SWMP Update. If significant, implement control measures*	*120d (Document in SWMP Update)*
2.4.4.5 SSOs	• *Develop/maintain inventory or known SSOs* • *Document in SWMP* • *Eliminate SSOs immediately / mitigate until eliminated* • *Notify EPA, DEP upon detection of any new SSO* • *Report mitigation/corrective measures annually*	*None known*	*Discuss in SWMP* *Discuss in Year 1 Annual Report & annually thereafter*	*60 days* *120 days* *End year 1*

Permit Parts	Canton Requirements	Canton Status	Action Needed	Due By (time from issuance of new Permit)
2.4.4.6 System Map	• System mapping to be completed by end Year 2, report on progress in Yr 1 Annual report • Required- Pipes, catch basins, interconnections, treatment structures, outfalls, rcving waters, catchment delineations • Recommended- sewer condition, poor septic conditions, topo, o+m remediation, suspected discharges	All required 2010 elements have been included on the updated Storm-water Map in Appendix B. In addition, a 1" =250 ft map book has been created to include aerial photographs, topography, parcels, buildings to allow for field-scale location and revision of drainage or other features. Also, record drawings, sampling data and photographs have been linked to features in the GIS.	Periodically update GIS and paper maps based on new and improved information.	End Year 2 **COMPLETED**
2.4.4.7 *Outfall Inventory*	• *Outfall Mapping & Inventory – GPS locate all outfalls; document condition (min 25% per year)-dimensions, shape, material, flow, field label; if flowing collect sample for minimum parameters. Some effort may count toward 3.0- Outfall Monitoring Program, dry weather screening*	*Ahead of compliance. All outfalls inspected, condition documented, and dry weather screened between 2009 and 2012.*	*Discuss in SWMP* *Include in Year 1 Annual Report* ; Report in future Annual Reports	**Inventory COMPLETED** *Document in SWMP, Annual Reports*
2.4.4.8 IDDE Plan	• *Written IDDE Plan documenting authority, catchment delineation & prioritization, inventory of problem catchments, responsibilities, systematic procedures for locating and removing illicit discharges, indicators of success* • Begin implementing IDDE procedure at IDDE Plan completion.	*This document provides compliance with requirement.* *Implementation has been ongoing and will continue in accordance with this document*	Begin implementing IDDE procedure at IDDE Plan completion.	*End Year 1 or sooner***.** **Written Plan COMPLETED**

Permit Parts	Canton Requirements	Canton Status	Action Needed	Due By (time from issuance of new Permit)
	• At minimum, complete investigations of ½ of Problem Catchments and high and medium risk catchments.		2 Problem Catchments, 34 Medium Catchments total	End Year 3
	• Remove all illicit discharges in Problem Catchments		See requirements	End Year 5
	• Complete investigations in low risk catchments		Total of 95 Low Risk catchments	End year 7
	• When illicit source confirmed, take action and document (location, sources, method discovery, dates, actions, est. volume of flow) in Annual Report		*Include in Year 1 Annual Report,* See requirements	*Report Annually*
	• *Define/describe indicators of success; report on effectiveness annually*		*Include in Year 1 Annual Report;* Report in future Annual Reports	*End Year 1 (annually)*
	• *Annually train all employees involved in the IDDE program; document in SWMP.*	*A training session will be held upon Finalization of this Document*	*Discuss in SWMP Report in future Annual Reports*	*120 days (SWMP) End Year 1 (annually)*

7.2 Progress Reporting

Canton will report on the following indicators of IDDE Program progress in the SWMP update and in the Annual Reports:

- # of catchments investigated per year in relation to required milestones
- # of dry weather outfall inspections
- # of wet weather outfall monitoring
- # of illicit discharges identified
- # of enforcement notices issued
- # of illicit discharges eliminated and time from confirmation to elimination
- % of MS4 catchment area investigated
- # of employees trained annually

Metrics for success of the IDDE Program will be: 1) all illicit discharges action steps taken per the Permit required timelines, 2) prioritized catchments investigated within Permit required timelines.