

**City of Lowell**

**Illicit Discharge Detection and Elimination (IDDE) Plan**



**ADOPTED APRIL 11<sup>TH</sup>, 2023**

# Table of Contents

<b>Section 1: Introduction .....</b>	<b>1</b>
1.1 MS4 Program Background .....	1
1.2 IDDE Program Overview .....	1
1.2.1 Definitions of Illicit Discharges and Sanitary Sewer Overflows.....	1
1.2.2 Illicit Discharge and Sanitary Sewer Overflow Issues .....	3
1.2.3 Timeframe for Elimination of Illicit Discharges .....	3
1.2.4 Non-Stormwater Discharges.....	3
1.3 Statement of IDDE Program Responsibilities.....	4
1.4 Preparation of the IDDE Plan .....	4
1.5 Water Quality .....	4
1.6 IDDE Program Goals and Milestones .....	5
1.6.1 Legal Authority.....	5
1.6.2 Storm Sewer System Mapping.....	5
1.6.3 Categorization and Prioritization of Drainage Areas .....	5
1.6.4 Dry Weather Screening.....	6
1.6.5 Identification and Elimination .....	6
<b>Section 2: Legal Authority.....</b>	<b>7</b>
2.1 Overview .....	7
2.2 Existing Legal Authority .....	7
<b>Section 3: Storm Sewer System Mapping .....</b>	<b>8</b>
3.1 Mapping Requirements .....	8
3.1.1 Required Mapping Elements .....	8
3.2 Status of Existing Mapping .....	8
<b>Section 4: Categorization and Prioritization of Drainage Areas in the MS4.....</b>	<b>9</b>
4.1 Drainage Area Categorization Process (Priority Areas) .....	9
4.1.1 Minimal Risk Areas.....	9
4.1.2 High Priority Outfalls/Areas .....	10
4.1.3 Low Priority Outfalls/Areas .....	10
4.2 Criteria for Categorization of Priority Areas.....	11
4.2.1 Annual Report Content.....	11
<b>Section 5: Dry Weather Screening and Sampling .....</b>	<b>12</b>
5.1 Screening and Sampling Purpose .....	12
5.2 Screening and Sampling Process .....	12
5.2.1 Dry Weather Screening/Sampling .....	12
5.2.2 Inaccessible Outfalls.....	14
5.2.3 Sample Analysis .....	14
5.2.4 Field Equipment and Supplies.....	15
5.3 Interpretation of Results .....	16

<b>Section 6: Identification and Elimination .....</b>	<b>19</b>
6.1 Source Isolation Procedures .....	19
6.1.1 Sandbagging .....	19
6.1.2 Smoke Testing .....	20
6.1.3 Dye Testing.....	20
6.1.4 CCTV/Video Inspection .....	20
6.1.5 Optical Brightener Monitoring .....	20
6.2 Removal and Confirmation .....	21
6.2.1 Reporting Requirements.....	21
6.3 Standard procedure for Corrective Actions/Enforcement.....	21
6.2.2 General enforcement Procedure.....	21
6.4 Follow-Up Screening Process .....	22
6.5 Common Illicit Discharges and Procedures .....	22
6.5.1 Car Washing .....	23
6.5.2 Vehicle Maintenance/Oil Changes .....	23
6.5.3 Illegal Dumping.....	23
6.5.4 Sanitary Sewer Leaks/Septic Tanks .....	24
6.5.5 Construction Sediment (erosion) .....	24
6.5.6 Landscaping Runoff .....	24
 <b>Section 7: Training .....</b>	 <b>24</b>
7.1 Training Purpose.....	24
 <b>Section 8: Outreach and Education .....</b>	 <b>25</b>
8.1 Purpose of IDDE Outreach and Education.....	25
8.2.1 Stormwater Fliers.....	25
8.2.2 Stormwater Website and Social Media.....	25
8.2.3 Staff training .....	25
8.2.4 Education during enforcement/investigations .....	25
8.2.5 Water Resources Committee and Annual Water Quality Conference ....	<b>Error! Bookmark not defined.</b>
8.2.6 Stream cleanups .....	25
 <b>Section 9: Appendices.....</b>	 <b>26</b>
APPENDIX A: COMMON GENERATING SITES AND THEIR POLLUTION POTENTIAL.....	26
APPENDIX B: SCREENING PROCESS FLOWCHART (ENLARGED) .....	30
APPENDIX C: Outfall Screening Inventory Sheet.....	31
APPENDIX D: REPORT/DOCUMENTATION OF CONFIRMED OUTFALL .....	34

## Abbreviations/Terms

BMP	Best Management Practice
CCTV	Closed Circuit Television
CWA	Clean Water Act
EPA	United States Environmental Protection Agency
IDDE	Illicit Discharge Detection and Elimination
IWQR	Integrated Water Quality Report
L	liter
mg	milligrams
MS4	Municipal Separate Storm Sewer System
NCDEQ	NC Department of Environmental Quality
NPDES	National Pollutant Discharge Elimination System
*SSO	Sanitary Sewer Overflow
*SVF	System Vulnerability Factor
TMDL	Total Maximum Daily Load
UA	Urbanized Area
UV	Ultraviolet

Potential Pollution Source: A business, industrial site, facility, (etc.) that works with materials that have the potential to cause harm to nearby waters. Including but not limited to: Public works facilities, industrial sites that handle materials that could impact water quality, waste collection sites, neighborhoods with a large number of pools, areas with older sanitary or storm sewer infrastructure, areas with a high concentration of septic tanks, etc.

# Section 1: Introduction

## 1.1 MS4 Program Background

In 1990, the United States Environmental Protection Agency (EPA) promulgated Phase I of its municipal stormwater program under the authority of the Clean Water Act (CWA). Phase I utilized National Pollutant Discharge Elimination System (NPDES) permit coverage to address stormwater runoff from large municipal separate storm sewer systems (MS4s) that served urbanized areas.

The North Carolina Department of Environmental Quality (NCDEQ) administers NPDES permitting in North Carolina, and has issued a General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4). Most municipalities in the state are required to register for the MS4 permit since they have urbanized areas, including City of Lowell. The permit requires covered municipalities to develop a plan documenting the stormwater best management practices they will use to meet the six minimum control measures identified in the permit.

The permit authorizes discharge of stormwater and certain non-stormwater discharges from or associated with regulated MS4s, provided that the activity is conducted in accordance with the conditions set forth in the permit.

NCDEQ has issued a new permit, to become effective July 1, 2021 that has several significant changes from the existing permit.

## 1.2 IDDE Program Overview

The objective of the IDDE program is to systematically find and eliminate sources of illicit non-stormwater discharges to its MS4 and implement procedures to prevent such discharges.

During the development of the IDDE program, the City must continue to implement their existing IDDE program established under the 2021 permit, per the requirements of the updated MS4 permit.

### 1.2.1 Definitions of Illicit Discharges and Sanitary Sewer Overflows

The City will prohibit illicit discharges and sanitary sewer overflows (SSOs) to its MS4 and require removal of such discharges.

**Sanitary Sewer Overflow (SSO).** A SSO is a discharge of untreated sanitary wastewater from a municipal sanitary sewer.

**Illicit Discharge.** An illicit discharge is any discharge to an MS4 that is not composed entirely of stormwater, *except*:

- ▶ Discharges authorized under a separated NPDES permit that authorizes a discharge to the MS4; or
- ▶ Non-stormwater discharges allowed by Article 19 - Stormwater, Section 19 - Illicit Discharges and Connections of the City of Lowell Development Ordinance summarized below:

### Allowed Non-Stormwater Discharges

- 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
- Discharges from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual residential car washing
- Flows from riparian habitats and wetlands
- Dechlorinated swimming pool discharges
- Street wash water
- Other non-stormwater discharges for which a valid NPDES discharge permit has been approved and issued by the state of North Carolina, and provided that any such discharges to the municipal separate storm sewer system shall be authorized by Gaston County or municipality.

### **1.2.2 Illicit Discharge and Sanitary Sewer Overflow Issues**

The permit is focused on improving water quality of receiving waterbodies. Studies have shown that illicit discharges can be a significant contributor to stormwater pollution.

There are many sources of illicit discharges, intentional and unintentional in nature. Typical examples include:

- ▶ Intentional dumping of materials into catch basins
- ▶ Cross connection of sanitary sewer system to storm drainage system
- ▶ Pumping of contaminated water and/or groundwater
- ▶ Failing septic systems
- ▶ Floor drains in older buildings
- ▶ Washing machines discharging to storm drainage systems
- ▶ Sediment from unsecured areas

In the aggregate, illicit discharges are a significant contributor to poor receiving water quality.

Similarly, sanitary sewer overflows, caused by capacity issues or blockages, can also contaminate receiving waters with untreated waste.

### **1.2.3 Timeframe for Elimination of Illicit Discharges**

The following are requirements for elimination listed in **Section 3.4: Illicit Discharge Detection and Elimination Program** of the MS4 permit:

**Eliminate illicit discharges as soon as possible.** Upon detection, the permittee shall eliminate illicit discharges as soon as possible and require the immediate cessation of such discharges upon confirmation of responsible parties in accordance with its enforceable legal authorities.

**Where illicit discharge can't be eliminated within 60 days.** Where elimination of an illicit discharge within sixty (60) days of its confirmation is not possible, the permittee shall establish a schedule for its elimination not to exceed 180 days. The permittee shall immediately commence actions necessary for elimination. The permittee shall diligently pursue elimination of all illicit discharges. In the interim, the permittee shall take all reasonable and prudent measures to minimize the discharge of pollutants to its MS4.

**No grace period provided.** The period between identification and elimination of an illicit discharge is not a grace period. Discharges from an MS4 that are mixed with an illicit discharge are not authorized by this general permit, are unlawful, and remain unlawful until eliminated.

### **1.2.4 Non-Stormwater Discharges**

Sources of non-stormwater listed in Article 19 - Stormwater, Section 19 - Illicit Discharges and Connections of the City of Lowell Development do not need to be addressed. However if any of these sources are identified as significant contributors of pollutants to their MS4, the City will implement measures to control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely through this written IDDE program.

### 1.3 Statement of IDDE Program Responsibilities

The lead individuals responsible for implementing the IDDE Program in the City of Lowell is:

#### Lowell IDDE Program

Table 1-1 Additional Roles and Responsibilities for IDDE Program	
Role/Staff position	Responsibility
Stormwater Administration	<ul style="list-style-type: none"> <li>• Assist illicit discharge investigations</li> <li>• Assist in future outfall screening after mapping is completed</li> <li>• Collect records/documentation</li> <li>• Outreach and Education Lead illicit discharge investigations</li> <li>• Enforcement of illicit discharge</li> <li>• Inspect discharges found during outfall screening,</li> <li>• Municipal facility inspections</li> </ul>
Gaston County Natural Resources	<ul style="list-style-type: none"> <li>• Post Construction review &amp; Inspections</li> <li>• Construction Site Runoff Control</li> </ul>
Public Works Department	<ul style="list-style-type: none"> <li>• Maintain municipal facilities</li> <li>• Inspect and repair stormwater conveyances</li> <li>• Document maintenance activities and send them to the Planning Department for collection</li> <li>• Wash/maintain municipal vehicles &amp; equipment</li> </ul>
GIS Analyst	<ul style="list-style-type: none"> <li>• Create/add to MS4 mapping</li> <li>• Initial outfall screening as mapping is being completed</li> </ul>

### 1.4 Preparation of the IDDE Plan

The IDDE program for the City was developed by the City staff. Actions taken as part of the IDDE Plan will be documented in the City Annual Report (Annual Assessment) as required by the MS4 General Permit.

### 1.5 Water Quality

Section 305(b) of the Federal Clean Water Act (CWA) requires each State to monitor, assess and report on the quality of its waters relative to designated uses. Section 303(d) of the CWA requires each State to list waters not meeting water quality standards and prioritize those waters for Total Maximum Daily Load (TMDL) development or other management. Reporting for these waters is submitted to EPA every two years.



**Table 1-2** identifies the impaired waterbodies in the City of Lowell based on the 2022 Integrated Water Quality Report.

Table 1-2 303(D) Impaired waters in Lowell			
Receiving Water Name	Stream Index/AU Number	Water Quality Classification	303(d) Listed Parameter(s) of Interest
South Fork Catawba River	(11-129-(15.5))	C	Turbidity (50 NTU, AL, FW miles)

NCDEQ has developed Total Maximum Daily Loads (TMDL) for waters in the City of Lowell. The TMDL identifies the capacity of a surface water to assimilate pollutants without impacting its designated uses. Please refer to **Table 1-3**.

Table 1-3 TMDL or Management strategies applicable to Lowell			
Name of TMDL or Strategy	Pollutant	Waterbody Name	Link
Lake Wylie TMDL	Nitrogen, Phosphorus		<a href="https://deq.nc.gov/media/4639/download">https://deq.nc.gov/media/4639/download</a>

## 1.6 IDDE Program Goals and Milestones

In general, the goals of the IDDE program are to detect and eliminated illicit discharges, and prevent future illicit discharges. The primary components of the program include:

- ▶ Legal authority
- ▶ Storm sewer system mapping
- ▶ Categorization and Prioritization of Catchments
- ▶ Dry Weather Screening
- ▶ Catchment Investigations
- ▶ Identification and Elimination of Illicit Discharges

### 1.6.1 Legal Authority.

In order to enforce provisions of the IDDE program, the City will review its existing legal authority to perform elements of its Written IDDE Plan. City of Lowell has already adopted an illicit discharge ordinance. Per the approved SWMP, the IDDE ordinance will be reviewed on an annual basis

### 1.6.2 Storm Sewer System Mapping.

Detailed storm sewer mapping is required to determine the extent of each outfall’s catchment and to evaluate the potential for IDDE contributions. The City of Lowell has mapped the locations of all SCMs under construction during the City’s October 2019 audit. The more detailed mapping of pipes, flow direction, inverts, open ditches, inlets, catch basins, manholes, sizes, and conditions will start in Permit Year 2 FY 22/34

### 1.6.3 Categorization and Prioritization of Drainage Areas

The City will rank and prioritize catchments for screening based upon their potential for illicit discharge contributions. Please refer to the detailed discussion in Section 4. The categorization and prioritization process will guide the screening and investigation of the outfalls, and will be updated as information becomes available.

The initial categorization and prioritization must be completed by the first permit year, and then updated annually thereafter.

#### **1.6.4 Dry Weather Screening**

The City will complete dry weather screening and sampling of required MS4 outfalls and interconnections over the 5 permit years. At least 20% of the outfalls within the MS4 boundaries will be screened per year

Progress, including outfalls screened and results, will be included in each Annual Report.

#### **1.6.5 Identification and Elimination**

Once the source of the illicit discharge has been isolated and confirmed, the City shall take measures to eliminate the illicit discharge and perform follow-up confirmatory testing as identified in Section 7. Identified illicit discharges must be removed in accordance with the time frames established in Section 1.2.3.

## **Section 2: Legal Authority**

### **2.1 Overview**

The IDDE program shall provide that the permittee has adequate legal authority (a currently effective ordinance or other regulatory mechanism) to accomplish the following tasks:

- ▶ Prohibit illicit discharges;
- ▶ Investigate suspected illicit discharges;
- ▶ Eliminate illicit discharges; and
- ▶ Implement enforcement procedures and actions.

### **2.2 Existing Legal Authority**

The City has adopted a version of the state model Phase II stormwater ordinance and within this ordinance an IDDE section was included. This functions to give the municipality legal authority to investigate, prevent, and inspect illicit discharge violations.

# Section 3: Storm Sewer System Mapping

## 3.1 Mapping Requirements

The mapping shall include, at a minimum, a depiction of the permittee's separate storm sewer system with the required elements in 3.1.1 below.

The mapping is intended to facilitate the identification of key infrastructure and factors influencing proper system operation, and the potential for illicit sanitary sewer discharges. The map shall include the required infrastructure and water resources information as indicated in Section 3.1.1 below.

### 3.1.1 Required Mapping Elements

- ▶ Municipal separate storm sewer system
  - Outfalls and receiving waters
  - Storm sewer pipes
  - Open channel conveyances (swales, ditches, etc.)
  - Catch basins/inlets/Culverts
  - Interconnections with other MS4s and other storm sewer systems
  - Municipally-owned stormwater treatment/retention structures (including but not limited to)
    - detention and retention basins
    - infiltration systems
    - bioretention areas
    - water quality swales
    - gross particle separators
    - oil/water separators
    - other proprietary systems
- ▶ Catchment delineations for use in priority rankings
  - Map of Potential Pollution sources (needed for priority ranking)
- ▶ Waterbodies identified by name and indication of all use impairments as identified on the most recent Integrated Water Quality Report pursuant to Clean Water Act section 303(d) and 305(b).

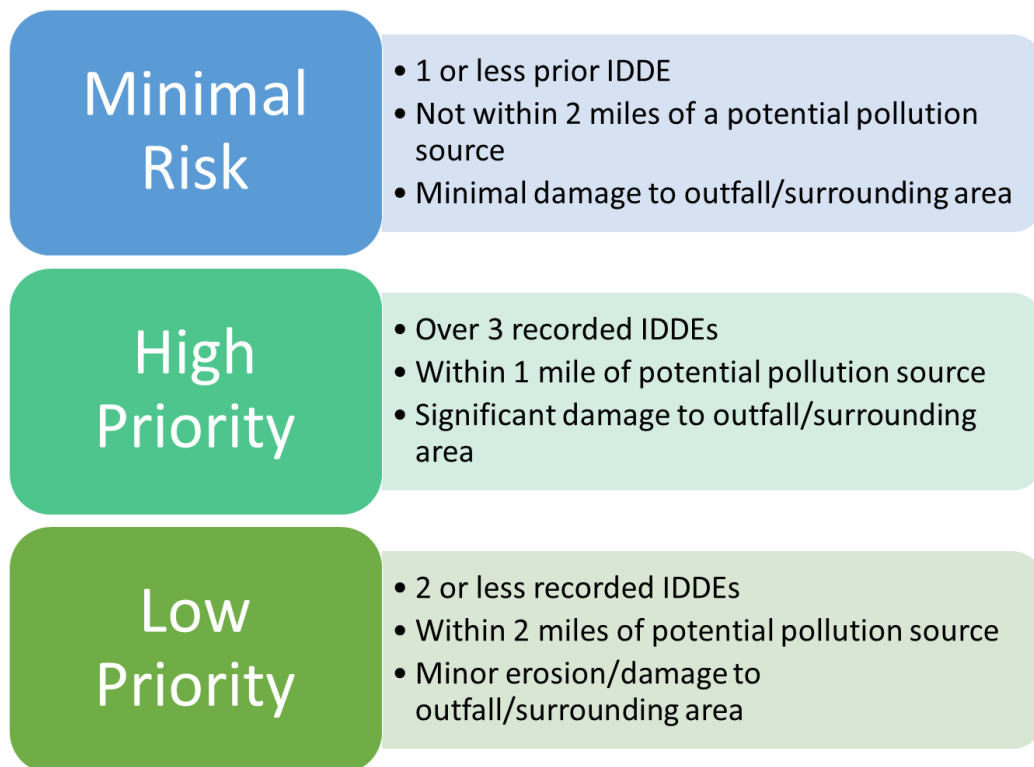
## 3.2 Status of Existing Mapping

The mapping of municipal storm sewer outfalls within the City of Lowell requires completion and some revision. Outfall mapping was done previously by the City during the previous permit cycle. The existing mapping will be used as a base (following verification) and shall be add missing required elements to bring it up to standard.

## Section 4: Categorization and Prioritization of Drainage Areas in the MS4

### 4.1 Drainage Area Categorization Process (Priority Areas)

During the first year of the permit cycle the City will classify and drainage areas based on several factors (through desktop analysis). The categories will be used for scheduling monitoring of those areas and outfalls contained within them and the following repeat inspections throughout the permit cycle. The priority areas categories will be shown on the MS4 map as the City of Lowell SWMP BMP 19 is being completed. Priority area categories will be determined by the risk of pollution potential, previously reported illicit discharges, distance from certain industrial/commercial properties, and repeat offenders. Outfalls will be inspected on an annual (accumulative, 20% per year) basis through the dry weather screening process described later in this document. The initial priority areas will be created using the MS4 map by looking at areas with those listed qualifiers. The priority areas will be further specified as outfall inspections are completed.



▶ Should a drainage area have multiple reported illicit discharges, its classification can be upgraded to a higher priority. However an outfall can only decrease its priority if no reported illicit discharges have occurred throughout an entire permit cycle.

#### 4.1.1 Minimal Risk Areas

Drainage areas (and associated outfalls) with minimal pollution risk or illicit discharge potential will be marked as "Minimal Risk". Outfalls within this category include: At maximum one recorded illicit discharge, the outfall itself is in good condition with minimal wear, and the outfall is not within proximity of a significant potential pollution source.

- ▶ No more than one recorded illicit discharge
- ▶ Not within 2 miles of a significant potential pollution source
- ▶ Minimal to no damage/wear/weathering/erosion of the outfall and surrounding

#### **4.1.2 High Priority Outfalls/Areas**

High Priority Drainage areas include: discharging to an area of concern to public health due to proximity of recreational areas, draining into drinking water supplies, proximity to high pollution potential sources, repeated illicit discharges, considerable damage to the outfall/surrounding area, frequent sanitary sewer/septic issues, or other significant risks to water quality. The outfalls within these areas will be prioritized for maintenance if issues are found.

- ▶ Over 3 recorded illicit discharges and/or incidents with dry weather screening
- ▶ Within 1 mile of a high pollution potential source
- ▶ Significant damage/weathering/wear/erosion of the outfall and surrounding area that requires repair
- ▶ Screened/inspected annually (compared to once per cycle)

#### **4.1.3 Low Priority Outfalls/Areas**

Low Priority Outfalls/Areas are ones where there is some potential risk for pollutants or other water quality impacts, but on a lesser level than High Priority. These risks include: Minor/limited damage to the outfall/drainage area, pollution potential areas are of a lesser risk (recreational areas, businesses that are unlikely to be a significant source of pollutants, neighborhoods etc.) minimal reported illicit discharges, some risk of clogging or more frequent maintenance (compared to minimal risk).

- ▶ 2 or less recorded illicit discharges
- ▶ Within 2 miles of a significant potential pollution source
- ▶ Minor erosion/damage but of lower priority

## 4.2 Criteria for Categorization of Priority Areas

The City will use the below criteria to determine the correct category to sort each area into

- ▶ **Past discharge complaints and reports.** Where past complaints and reports indicate the potential for illicit discharge connections.
- ▶ **Poor dry weather receiving water quality,** Upon inspection during dry weather screening, low quality water (turgid, abnormal plant growth, oil/grime buildup near the outfall, sediment deposits, odors, surfactants on the surface, etc.) will set an outfall into the high or low priority depending on the level of water impairments and receiving stream quality.
- ▶ **High density/proximity of generating sites.** Institutional, municipal, commercial, or industrial sites, with a historically higher potential to generate pollutants that could contribute to illicit discharges. Including but not limited to:
  - Vehicle Dealers
  - Service Stations
  - NPDES permitted sites
  - Industrial Manufacturing Areas
  - Car Washes
  - Vehicle Maintenance Facilities
  - Landscape and garden centers
  - Recycling Centers
- For further specification on facilities, see Appendix A
- ▶ **Pollutant contributor to impaired waterbodies.** Impaired waterbodies that receive a discharge from the MS4 or waters with approved TMDLs, where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment. Should an outfall drain immediately into a impaired water body, it will be classified as high priority.

### 4.2.1 Annual Report Content

The City will provide an updated listing of all catchments and the results of the ranking for each catchment in each annual report.

# **Section 5: Dry Weather Screening and Sampling**

## **5.1 Screening and Sampling Purpose**

This screening procedure is to be used for screening and sampling of outfalls within the MS4 in dry weather for evidence of illicit discharges.

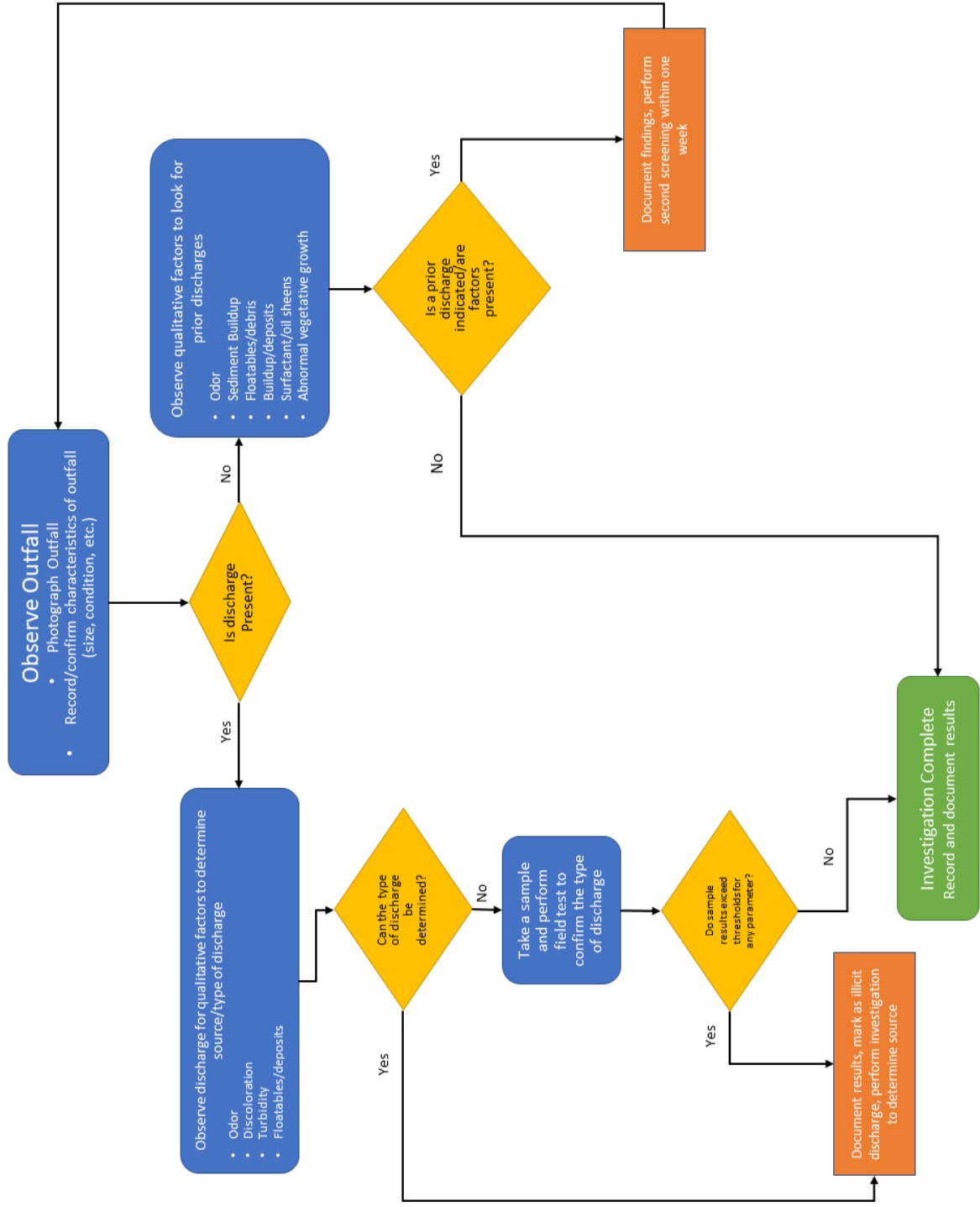
Dry weather observations are important to the IDDE protocol, because unexpected flow (or evidence of prior discharges) during dry weather is often an indication of potential illicit discharges. As this has not previously been done by City of Lowell dry weather inspections will also function as a way to verify the categories the outfalls/priority areas were sorted into as they will need to be initially determined through desktop analysis.

## **5.2 Screening and Sampling Process**

### **5.2.1 Dry Weather Screening/Sampling**

Dry weather screening and sampling shall proceed only when no more than 0.1 inches of rainfall has occurred in the previous 72-hour period. Under those conditions, when discharge is observed, the discharge will be determined by qualitative factors of the discharge itself; should the discharge be inconclusive a sample will be taken for testing to determine the severity and cause of the discharge. If no dry weather flow is observed, the City shall record the condition of the outfall and other relevant information. If no flow is observed, but evidence of dry weather flow exists, the inspectors shall revisit the outfall during dry weather within one (1) week of the initial observation, if practicable/weather allowing, to perform a second dry weather screening for any observed flow. Previous evidence of dry weather flow includes (but not limited to): Abnormal vegetation, remnants of chemicals, soap/surfactant sheens, abnormal amounts of sediment, staining, etc. The City shall record any other necessary follow-up actions to identify the source of any apparent intermittent flow not sampled. Depending on the qualitative nature of the discharge, water sampling can be done to verify the source and potential impact of the illicit flow, with high priority outfalls in particular. The specific process is defined in the below figure (enlarged in appendix B). See Appendix C for the outfall screening inventory sheet





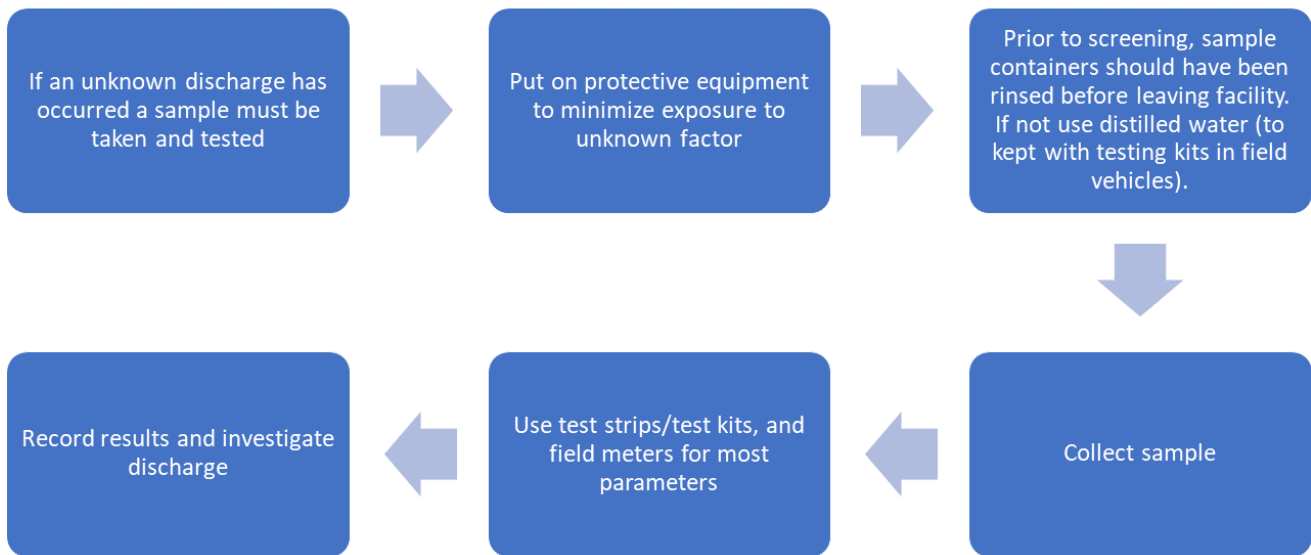
### 5.2.2 Inaccessible Outfalls

If an outfall is inaccessible or submerged, the City shall proceed to the first accessible upstream stormwater structure for the observation and sampling and report the location with the inspection results. If an interconnection is inaccessible or submerged, interconnection screening shall occur at the first accessible location within the City MS4 system up-gradient of the interconnection.

### 5.2.3 Sample Analysis

Analyses can be performed with field test kits/field instrumentation, except for fecal coliform analyses, which must be conducted by a laboratory.

Field test kits or field instrumentation are permitted for all parameters except fecal bacteria and any pollutants of concern (TMDL/impaired stream pollutants where relevant). The typical sampling process is outlined below:



### 5.2.4 Field Equipment and Supplies

**Table 5-3** indicates field equipment that may be necessary in order to carry out the dry weather screening tasks.

Table 5-3 Dry Weather Screening Field Equipment and Supplies	
Equipment/Supplies	Purpose
Clipboard	For Organization of field sheets and writing surface
Field Sheets	To record observation data
Pens/Pencils/Permanent Markers	Proper Labeling
Gloves	To protect the sampler and sample from contamination/contact
Flashlight/headlamp w/batteries	For looking into outfalls, manholes and storm drains. Cell phone can suffice if necessary
Cooler	For transporting samples for testing
Digital Camera	For documenting field conditions at time of inspection. A cell phone will suffice
Personal Protective Equipment (PPE)	Reflective vest, and boots
GPS Receiver	For taking special location data. Cell phone can suffice if necessary
Water quality Meter	Hand held meter – if available – for quickly testing samples for various water quality parameters
Test strips	Strips to quickly do field samples of suspected illicit discharges. Bring enough for multiple screenings in a day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (for example bacteria requires sterile containers)
Pry Bar or Pick	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Hammer or Mallet	Opening suck manholes/basins
Utility Knife	Multiple Uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	Safety near roads
Hand Sanitizer	Disinfectant/decontaminant
Rubber boots/waders	Accessing shallow streams/areas
Sampling Pole	For accessing hard to reach outfalls and manholes

### 5.3 Interpretation of Results

The most common standards/benchmarks are listed in the below table. The standards are taken from the 2019 NCDEQ "In-Stream Target Values for Surface Waters" document found on the [NCDEQ Classification & Standards web page](#). If a standard is excluded or has no value in the table, no water quality criteria relevant to City of Lowell is known at this time.

Pollutant or Parameter	All waters (Class C) (NC 02B Standards)
Chlorine, Total Residual	17ug/l
Coliform Bacteria, Fecal	<200/100 mL
Hardness	100 mg/l
Nitrate Nitrogen	10000 ug/l
pH	6.0-9.0

Based upon the results of the screening, the categorization and prioritization results will be adjusted accordingly and documented in the Annual Report. Where illicit discharges are suspected based on the screening results, those outfalls will be reevaluated to ensure they are in the appropriate risk category as listed in Section 4.2

If sampling is not required and a discharge can be determined by qualitative factors, the below table can be used to assist in determining the source/type of Illicit Discharge that is occurring/has occurred

Qualitative Factor		Likely Cause
Odor	Sulfur/sewage smell	Likely a sewage leak. Investigate for upstream dumping, broken sewage lines, unmaintained septic tanks/surfacing
	Feint waste smell with nearby deposits	Possible dumping or runoff of pet waste or other types of waste/chemicals. Look for floatables or near by waste. Can be accompanied with abnormal vegetation and residues
Color	Clayish red/brown	Indication of sediment buildup. Likely from construction, or an unstable yard.
	Grey/Milky	Surfactants or other pollutants. Nearby car washing or direct piping/dumping of greywater (washing machines, dishwashers, etc)

	Unnatural/vibrant colors	Usually from dyes or some specific types of chemicals used in manufacturing or other processes. Indicative of dumping or facility maintenance needed upgradient.
Sediment Deposits	Built up piles of sediment along dry/shallow areas	Typical of an erosion upgradient. Likely from construction or an unstable yard
Abnormal Vegetation	Algae buildup on outfall or in receiving waters	Likely from fertilizers (or other N & P sources) reaching the outfall. Typically from dumping or runoff from nearby landscaping
	Abnormally high/healthy grass and other vegetation. (or growing inside pipes/similar abnormal places)	Typical of fertilizer runoff or dumping of pet waste. Can be indicative of sewage leaking, but not the best qualitative measure to use for that determination.
Floatables/Debris/Litter	Dead fish/organisms	If a large amount of dead organisms are in the water (particularly fish), it could be a fish kill due to severe chemical dumping or other contributing factors. Sampling will need to be done and will likely need to be reported. This is a severe (and fairly rare) indicator.
	Yard debris/grass	Most likely runoff from nearby residential landscaping. Dumping yard waste near outfalls (or into their yards drainage swales) is common.
	General small litter (cigarette butts, bottles, wrappers, etc.)	Runoff from the drainage area can carry smaller/lighter pollutants into the outfall. Depends on the amount present. Can indicate dumping, but is more likely to be incidental
	Large debris (tires, concrete blocks, construction waste, etc.)	Waste that is too heavy for typical runoff to carry is indicative of dumping. The source depends on the type of waste present. Concrete bags, construction wrappers, and similar indicate it comes from a construction site. General large waste such as tires or house waste indicates residential dumping.

Deposits/Sludge Buildup	Milky/grey viscous sludge	Can be several things, most likely is cooking grease buildup. Common near restaurants with poorly maintained grease traps or nearby dumping
	Dark rings on outfall structure	Can be several things. If a oil sheen can be seen, it is likely oil runoff. Can come from residential car maintenance, general dumping, or from nearby maintenance facilities

# Section 6: Identification and Elimination

## 6.1 Source Isolation Procedures

When the source of a suspected illicit discharge cannot be confined between two manholes, more detailed investigation methodologies shall be used to isolate the source of the illicit discharge.

The more detailed methodologies may include one or more of the following:

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

It is important to note that public notification is an important aspect of these investigations, particularly where such methods are visible to the public. Prior to smoke testing, dye testing, or TV inspections, the City shall notify property owners in the affected area.

The below table is comparative "Fingerprints" (mean values) of flow types to help determine the cause of a illicit discharge is a sample is taken. These are rough/average values that can be returned from testing if the type/source of illicit discharge is unknown, the data is approximate and should be used for investigations, not for standards testing. Some natural/local factors can impact the expected numbers and should be accounted for. (source: Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, 2004 Center for Watershed Protection).

Flow Type	Hardness (mg/L as CaCO <sub>3</sub> )	NH <sub>3</sub> (mg/L)	Potassium (mg/L)	Conductivity (µS/cm)	Fluoride (mg/L)	Detergents(mg/L)
Sewage	50	25	12	1215	0.7	9.7
Septage	57	87	19	502	.93	3.3
Laundry Wash Water	45	3.2	6.5	463.5	.85	758
Car Wash Water	71	0.9	3.6	274	1.2	140
Tap Water	52	<0.06	1.3	140	.94	0
Groundwater	38	0.06	3.1	149	0.13	0
Landscape Irrigation	53	1.3	5.6	180	.61	0

### 6.1.1 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. This technique will be used in the cases of dumping investigations to ensure

### **6.1.2 Smoke Testing**

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

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

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

### **6.1.3 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.

### **6.1.4 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. In situations where the outfall is exposed (ex. ditch conveyances) that are abnormally large or difficult to access – a video drone can be used to investigate issues in outfalls. This option will be utilized for pinpointing suspicious factors, give scale of the issue, or help determine the source of a discharge.

### **6.1.5 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 fluorimeters 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.

## 6.2 Removal and Confirmation

When the source of an illicit discharge is identified and confirmed, the City will exercise its authority as necessary (see Section 2: Legal Authority) to require its removal.

### 6.2.1 Reporting Requirements

For each confirmed source, the permittee shall record the following information. The Lowell stormwater program will investigate, record, and collect data on illicit discharges. This is the primary method that IDDE data will be input with, however a template offline form is included in Appendix D

- ▶ Location of the discharge and its source(s);
- ▶ Description of the discharge;
- ▶ Method of discovery;
- ▶ Date of discovery;
- ▶ Date of elimination;
- ▶ Date of follow-up investigation (typically 2 weeks after)
- ▶ Mitigation or enforcement action taken; and

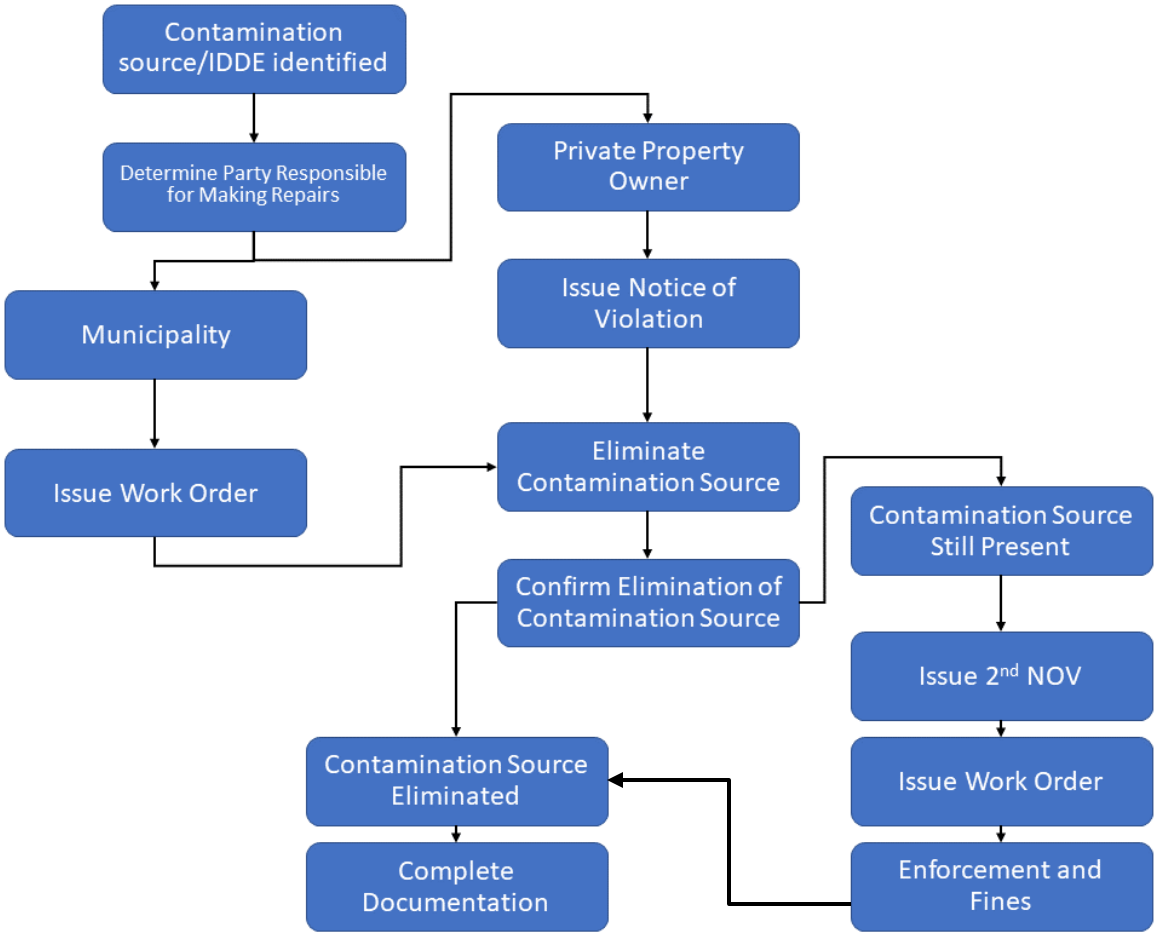
## 6.3 Standard procedure for Corrective Actions/Enforcement

### 6.3.1 General enforcement Procedure

Most illicit discharge investigations should follow the same standard for enforcement procedures as most fall into similar categories/types of discharges. The below flowchart and figure define some of the standard procedures that will be followed (with modification depending on the discretion of the IDDE officer).

General/Standard Methods to Fix Illicit Discharges		
Sewage	Break in right-of way	Repair by municipality
	Commercial or Industrial Direct Connection	Enforcement
	Residential direct connection	Enforcement; Incentive or aid
	Infrequent discharge (e.g. RV dumping)	Enforcement; Spill response
	Straight pipes/septic	Enforcement; Incentive or aid
Wash Water	Commercial or industrial direct connection	Enforcement; Incentive or aid
	Residential direct connection	Enforcement; Incentive or aid
	Power wash/Car wash (commercial)	Enforcement
	Commercial wash down	Enforcement
	Residential car wash or household maintenance activities	Education
	Professional oil change/car maintenance	Enforcement; Spill response

Liquid Wastes	Heating oil/solvent dumping	Enforcement; Spill response
	Homeowner oil change and other liquid waste disposal (eg., paint)	Warning; education; Fines
	Spill (trucking)	Spill Response
	Other industrial wastes	Enforcement; Spill responses



**6.4 Follow-Up Screening Process**

Upon completion of the catchment investigation and illicit discharge removal and confirmation, if necessary, the catchment outfall or interconnection will be scheduled for follow-up screening within five years.

The City may elect to conduct follow-up screening sooner based on the catchment’s illicit discharge priority.

Follow-up screening will consist of dry weather screening and sampling; wet weather screening and sampling will also be required in catchments where wet weather screening is required due to SVFs.

**6.5 Common Illicit Discharges and Procedures**

There are a variety of residential and commercial illicit discharges that can be frequently run into. Typically, these are handled by the City of Lowell. However, these discharges are frequent enough that standard procedure should be written as a ‘fall-back’ , for informational purposes, for training, and consistency.

### **6.5.1 Car Washing**

Residential car washing is a frequent source of stormwater pollutants. The soaps/detergents used to clean the vehicle often end up flowing into storm drains. The larger concern comes from unregulated charity carwashes that can happen repeatedly. Ideally residential car washing should be done on their lawn to allow for natural filtering processes to take place, and our educational materials on the topic follow this recommendation.

Enforcement on this is tricky as it is not ideal to discourage charity or community efforts either. The City of Lowell Phase II Stormwater Ordinance allows for one charity car wash at a given location per month. The requirement is to prevent the soap from reaching storm drains. The procedure for this type of discharge is to inspect the storm drains during the event to ensure some type of blocking or redirecting is occurring to minimize surfactant and road pollution – and to enforce the once per month limitation. Record should be made of when and where the car wash is occurring to track their frequency. Finding commercial car wash IDDE incidents would like occur during outfall screening, from reports, or blatant wash water overflows.

### **6.5.2 Vehicle Maintenance/Oil Changes**

Vehicle maintenance can be a stormwater concern from the municipal, commercial, industrial, and residential sectors. Most maintenance activities have the potential to leave some residue behind and the oils/fluids used can harm stream quality if not handled properly. Municipal facilities will have the handling of potential pollutants included in their facility O&M plans, but the other 3 rely on reports, outfall screenings, or in field investigations of other matters.

Should an outfall have indicators of oil pollutants during its screening, an investigation will take place. The source of the oil will be dependent on the surrounding areas and where the outfalls drainage area is located.

If the oil is believed to come from a residential neighborhood, it is likely due to either a mismanaged oil change or intentional dumping. A 'warning notice' letter will be sent to the nearby homes reporting that oil pollution was found as an outreach effort or in hopes of a report being made if the dumping was witnessed. If the oil is located near a business (such as a oil change shop, general repair shop, tire dealer, etc.) then the business will be investigated. Any oil catches should be looked at, storm drains on and near the property will be investigated to look for residual oil or evidence of the source of discharge, any barrels or dumpsters should be sealed with no leaks, and parts should be properly disposed of. Should the business be found responsible, the illicit discharge officer has the discretion to determine if the oil was dumped intentionally/grossly mismanaged or if it was a one time incidental event (depending on severity and amount of oil spilt and if spill procedure was followed/in place) – and enforcement will follow that decision. Finding vehicle maintenance IDDE cases is usually from reports, outfall screenings, and

### **6.5.3 Illegal Dumping**

One of the more common types of illicit discharges is illegal dumping. This term can range from paint/other chemicals being poured into a storm drain to debris/litter being dumped near an outfall. The severity and frequency of this type of discharge varies widely. Investigation and enforcement on this type of discharge can be challenging as it is difficult to determine where the dumping comes from in many cases.

The procedure for investigating these discharges is typically in response to a report or from outfall screenings. If the dumping is physical litter/debris the first step is trying to find some sort of identifying feature. Mailing tags, construction logos, unique or odd litter. If an exact source cant be determined through investigation or from the report itself, a general notice will be sent out to nearby businesses/residential areas and further monitoring will occur.

If the dumping discharge is liquid in nature the first step of the investigation will be following residuals or evidence of the origin of the discharge. If it is from containers remaining on site of the investigation they shall be investigated for any similar identifying features. If a source is determined a notice of violation and attached fine shall be sent to the offending party if significant evidence is found. If not, a general notice requesting reports and educating on the

action will be sent to the nearby area as well as more strict monitoring of that site to prevent additional discharges in the future.

#### **6.5.4 Sanitary Sewer Leaks/Septic Tanks**

Wastewater (sewage) discharges are typically of an incidental nature due to a lack of maintenance. If left unchecked a sewage leak can lead to impairment of receiving streams due to the bacteria and other substances that get released. Septic tanks are rarely maintained due the cost and "out of sight out of mind" nature of them.

As the cost for repairing leaking sewer lines and septic tanks can be considerable, the investigation and repair of the tank takes initial priority over enforcement for incidental leaks. To determine if a reported discharge is from sewage there are several indicators. An odor of 'waste' or sulfur can be the initial tell indicator that somewhere on the property has a wastewater leak, if strong enough it can help determine the location of the leak as well. Visual indicators of a wastewater leak include ground swelling in some areas (typical of larger/more significant leaks), deposits/staining of rain runoff on driveways or elsewhere on the property, abnormal vegetative growth in a patch/small area, and an 'oily sheen' can be used. If the leak can not be easily determined, dye testing can be used (particularly on properties using septic tanks) as an attempt to locate the leak.

Intentional sewage IDDE incidents (direct piping of wastewater, electing to disconnect from sewage or their own septic tank, using wastewater to impact neighboring properties, and similar) would fall under the enforcement category. Typically, these will be in response to reports generated regarding the site

#### **6.5.5 Construction Sediment (erosion)**

Construction sites (and similar) create conditions where erosion is more likely to occur. To combat this all construction sites are required to have sediment and erosion control plans in place to limit runoff pollution and removing soil from the property. Despite that, many construction sites can produce turbid runoff if the erosion control methods are not kept up to standard. Sediment runoff increases the turbidity of receiving streams, leaves sediment deposits in outfalls/drainage structures, and increases erosion from the generating site. Typically construction sediment can be rectified by replacing fallen sediment fences which is usually accomplished by notifying the builder – this happens more frequently on residential projects. To determine where sediment runoff is coming from, typically a trail of sediment deposits or red clay staining can be followed – or going to the nearest construction site up gradient of the project. If it occurs more then once, enforcement following the standard procedure in 7.3 will take place.

#### **6.5.6 Landscaping Runoff**

Runoff from landscaping activities can carry a variety of pollutants along with it. Animal waste, unsecured sediment, fertilizers, pesticides, yard waste/grass clippings, etc. Many of the pollutants from this type of runoff can impact receiving water quality in different ways. Animal waste, fertilizers, and yard clippings carry the limiting nutrients (nitrogen and phosphorus) that can lead to algal blooms. Sediment can build up in outfalls, make waters more turbid, and impact stream/lake beds once it settles. Pesticides are toxic to most forms of aquatic life as well. Identifying landscaping runoff can vary as the pollutants themselves can vary greatly.

Landscaping runoff from residential sources (homes and neighborhoods) should be enforced with an educational approach (if incidental). For commercial landscaping (most businesses, golf courses, etc.) the standard enforcement procedure should be followed.

## **Section 7: Training**

### **7.1 Training Purpose**

Annual IDDE training will be made available to all employees involved in the IDDE program. This training will at a minimum include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. The frequency and type of training will be documented and reported.

# Section 8: Outreach and Education

## 8.1 Purpose of IDDE Outreach and Education

Educating the citizens plays a major role in reducing illicit discharges within the City. Most illicit discharges from residential sources are due to common misunderstandings about the storm sewer system – primarily the misconception about stormwater being treated. Through outreach efforts we plan to educate the citizens of Lowell to reduce the amount illicit discharge incidents. Efforts will focus on community events, handing out materials, and public involvement activities

### 8.2.1 Stormwater Fliers

Distributing fliers is a powerful tool for environmental education outreach programs. They can be quickly handed out at booths/events, are visually interesting, and can carry a lot of information in a small package. The Lowell stormwater program already utilizes educational flyers covering both general stormwater as well as specific IDDE flyers. Most of the flyers cover several IDDE topics and explain why they are bad for water quality. More IDDE specific flyers will be created per the SWMP and to ensure a more varied coverage of informational materials and topics. The flyers will be left at municipal buildings (such as town hall), distributed during IDDE investigations, and will primarily be distributed at events such as farmers markets, City specific festivals/events, and community events such as litter pickups and stream cleanups. The materials also include the contact information for reporting illicit discharges.

### 8.2.2 Stormwater Website and Social Media

The Lowell municipal stormwater website has educational information about stormwater and illicit discharges. The site has the digital versions of the fliers posted to allow for a broader access to help extend outreach efforts. The website also provides contact information to report illicit discharges. The municipal social media pages are also used to promote public involvement events and share educational materials.

### 8.2.3 Staff training

Staff training for detecting illicit discharges is a key part to an illicit discharge program that responds to illicit discharges as fast as possible. By training staff who are often in the field who would be more likely to see an illicit discharge, it is more likely to be reported. In addition, staff who can identify an illicit discharge and know who to report the discharge will ensure illicit discharges do not go unnoticed.

### 8.2.4 Education during enforcement/investigations

As previously stated, most residential illicit discharges are incidental/non-malicious from a lack of general knowledge of stormwater pollution.

### 8.2.5 Stream cleanups

Stream cleanup activities are a threefold approach to outreach. The stream cleanups themselves help improve streams that have debris/litter in them. They also provide an activity for citizens to take part in (public involvement/participation) in a way that feels local to them and rewarding since it is directly helping the environment they are part of. Personal attachment to an activity like that tends to make it “hold” better in their memory and make it more impactful to them. The stream cleanups also provide an opportunity to talk about stormwater and distribute educational materials.

## Section 9: Appendices

### APPENDIX A: COMMON GENERATING SITES AND THEIR POLLUTION POTENTIAL

Land Use/Generating site Description	Associated SIC Code(s)	Regulated Stormwater Hotspot	Unregulated Stormwater Hotspot	Illicit Discharge potential	
				Direct	Indirect
<b>COMMERCIAL</b>					
Animal Care Services	0742, 0752		X	L	L
Auto Repair	7532-7539, 7549		X	M	M
Automobile Parking	7521			L	M
Building Materials	5211-5251		X	L	L
Campgrounds/Rv Parks	7033		X	L	M
Car Dealers	5511-5599,		X	M	M
Car Washes	7542		X	L	L
Commercial Laundry/Dry Cleaning	7211-7219		X	L	L
Convenience Stores	5399		X	L	L
Food Stores And Wholesale Food And Beverage	5141-5149 5411-5499		X	L	M
Equipment Repair	7622-7699		X	M	m
Gasoline Stations	5541		X	M	M
Heavy Construction Equipment Rental And Leasing	7353	X		L	H
Building And Heavy Construction (For Land Disturbing Activities)	1521-1542 1611-1629	X		L	M
Marinas	4493	x		L	m
Nurseries And Garden Centers	5261		X	L	M
Oil Change Shops	7549		X	M	M
Restaurants	5812,5813,701 1		X	M	L
Swimming Pools	7997, 7999		X	L	L
Warehouses	4221-4226	X		L	L

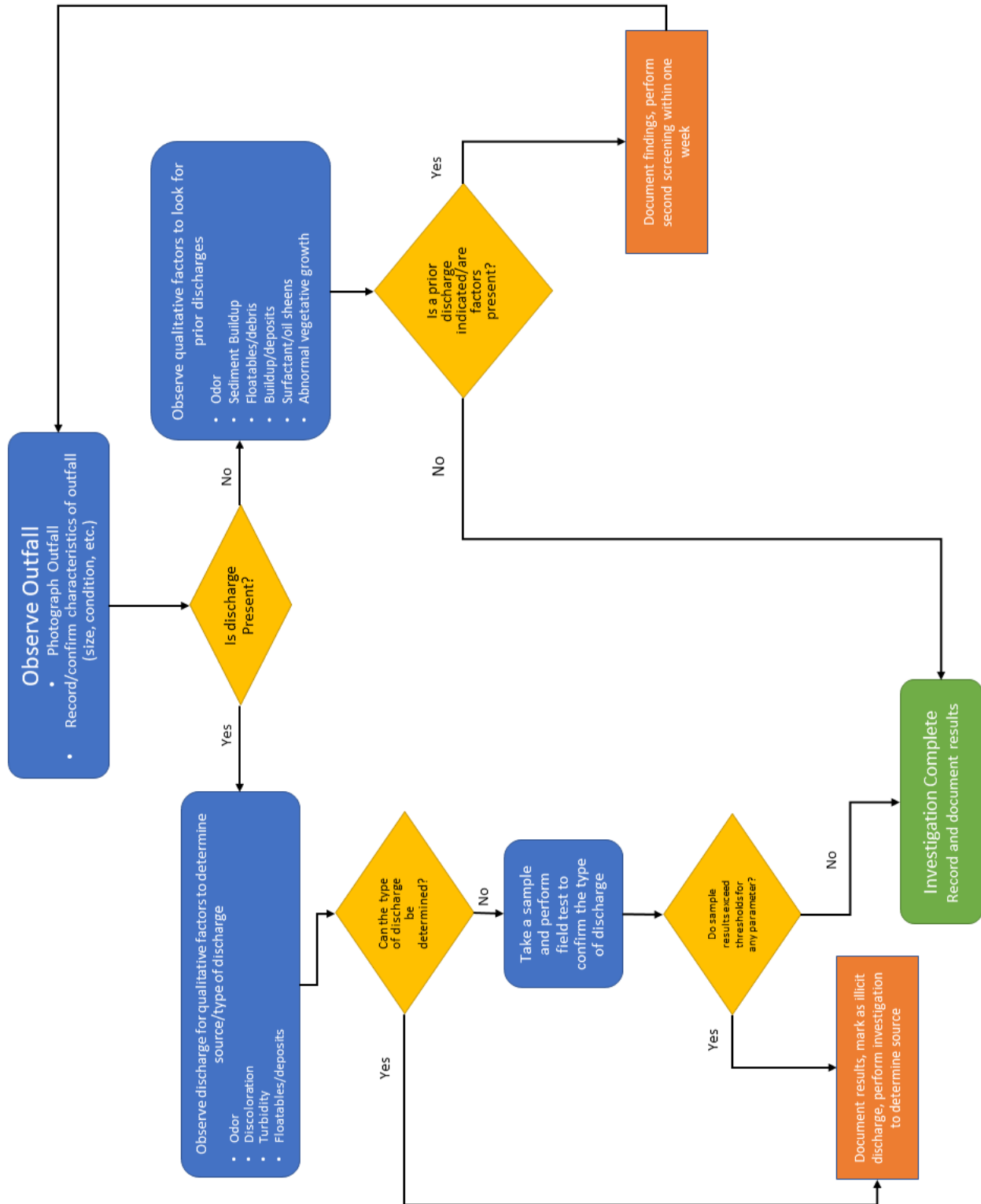
Wholesalers Of Chemical Petroleum	5162- 5169,5172		X	I	L
<b>INDUSTRIAL</b>					
Apparel And Other Fabrics	2311-2399 3131-3199	X		L H	L M
Auto Recyclers And Scrap Yards	5015, 5093	X		L	H
Beverages And Brewing	2082-2087	X		L	L
Boat Building And Repair	3731,3732	X		L	H
Chemical Products	2812-2899	X (2830, 2850)		2810 H 2820 H 2840 H 2860 M 2830 L 2850 L 2870 L 2890 L	2810 L 2820 L 2840 L 2860 L 2830 L 2850 L 2870 L 2890 L
Food Processing	2011-2141	X		2010 H 2020 H 2030 H 2040 H 2050 L. 2060 L 2070 M 2090 L 2110 M	2010 L 2020 L 2030 L 2040 L 2050 L. 2060 L 2070 L 2090 L 2110 L
Garbage Truck Washout Activities	4212		X	L	H
Industrial Or Commercial Machinery, Electronic Equipment	3511-3599 3612-3699	X		L	L
Instruments, Photographic And Optical Goods, Watches And Clocks, And Other Miscellaneous Manufacturing	3812-3873 3933-3999	X		L	L
Leather Tanners	3411	X		H	M
Metal Production, Plating, And Engraving Operations	2514, 2522, 2542, 3312- 3399, 3411- 3499, 3590	X** (2514,252 2, 2542, 3411-		H	L

		3433, 3442- 3499, 3590)			
Paper And Wood Products	2411-2499, 2511, 2512, 2517, 2519, 2521, 2541, 2611-2679	X** (2434, 2652- 2657, 2671- 2679)		2400 L 2500 L 2600 H	2400 H 2500 L 2600 H
Petroleum Storage And Refining	2911	X		2911 H	H
Printing	2711-2796	X		M	L
Rubber And Plastics	3011-3089	X		L	L
Stone, Glass, Clay, Cement, Concrete, And Gypsum Product	3211-3299	X (3233)		L	L
Textile Mills	2211-2299	X		h	L
Transportation Equipment	3711-3728, 3743-3799	X		H	M
<b>INSTITUTIONAL</b>					
Cemeteries	6553		X	L	L
Churches	8661		X	L	L
Colleges And Universities	8221-8222		X	L	M
Corporate Office Parks			X	L	L
Hospitals	8062-8069 8071-8072		X	L	L
Private Golf Courses	7997		X	L	L
Private Schools	8211		X	L	L
<b>MUNICIPAL</b>					
Composting Facilities	2875	X		L	L
Public Golf Courses	7992		X	L	L
Landfills And Hazardous Waste Material Disposal	4953, HZ, LF	X		L	H
Local Streets		MS4	X	L	H
Maintenance Depots	4173	MS4		M	H
Municipal Fleet Washing	4100	MS4		L	M



Public Works Yards		MS4		M	H
Steam Electric Plants	SE	X		L	L
Treatment Works	TW	X		L	L
Transport Related (NPDES regulation is for the portion of the facility dedicated to vehicle maintenance shops, equipment-cleaning operations, and airport deicing operations).					
Airports	4581	X		L	M
Streets And Highways Construction	1611, 1622	X		L	H
Ports	4449, 4499	X		L	H
Railroads	4011, 4013	x		L	H
Rental Car Lots	7513-7519	X		L	M
Us Postal Service	4311	X		L	M
Trucking Companies And Distribution Centers	4212-4215, 4231	X		L	M
Petroleum Bulk Stations Or Terminals	5171	X		L	H

# APPENDIX B: SCREENING PROCESS FLOWCHART (ENLARGED)



## APPENDIX C: Outfall Screening Inventory Sheet

### SECTION 1: BACKGROUND DATA

Sub-Watershed:		Outfall ID:	
Date of Inspection:		Time of Inspection:	
Inspectors:			
Temperature(F):	72-Hour Rainfall (In):		
Latitude:	Longitude:	#of Photos taken:	
Land Use in Drainage Area (Check All that Apply): <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">                     Industrial <input type="checkbox"/>                      Urban Residential <input type="checkbox"/>                      Suburban Residential <input type="checkbox"/>                      Known Industries:                 </div> <div style="width: 45%;">                     Open Space: <input type="checkbox"/>                      Institutional: <input type="checkbox"/>                      Commercial: <input type="checkbox"/>                      Other: _____                 </div> </div>			

### SECTION 2: OUTFALL DESCRIPTION

LOCATION	MATERIAL	SHAPE	DIMENSIONS	SUBMERGED	
Closed Pipe <input type="checkbox"/>	PVC <input type="checkbox"/> STEEL <input type="checkbox"/> HDPE <input type="checkbox"/> CON. <input type="checkbox"/> Other:	Circular <input type="checkbox"/> Elliptical <input type="checkbox"/> Box <input type="checkbox"/> Other:	Single <input type="checkbox"/> Double <input type="checkbox"/> Triple <input type="checkbox"/> Other:	Diameter/ Dimensions: _____  _____  _____	Water: No <input type="checkbox"/> Partially <input type="checkbox"/> Fully <input type="checkbox"/>  Sediment: No Partially Fully
Open Channel <input type="checkbox"/>	Concrete <input type="checkbox"/> Earthen <input type="checkbox"/> Rip-Rap <input type="checkbox"/> Other:	Trapezoid <input type="checkbox"/> Parabolic <input type="checkbox"/> Other:	Depth _____ Top Width _____ Bottom Width _____		
In-Stream <input type="checkbox"/>	(Applicable when collecting samples)				
Flow present?	Yes <input type="checkbox"/> No: <input type="checkbox"/> If no, skip to section 5				
Flow description (if present)	Trickle <input type="checkbox"/> Moderate <input type="checkbox"/> Substantial <input type="checkbox"/>				

**SECTION 3: QUANTITATIVE CHARACTERIZATION**

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
Flow #1	Volume		Liter	Bottle
	Time to Fill		Seconds	
Flow #2	Flow Depth		In	Tape Measure
	Flow Width		Ft,In	Tape Measure
	Measured Length		Ft,In	Tape Measure
	Time of Travel		Seconds	
	Temperature		F	Thermometer/Probe
	pH		pH Units	Test Strip/probe
	Ammonia		mg/L	Test Strips

**SECTION 4: PHYSICAL INDICATORS FOR FLOWING OUTFALLS ONLY**

Are any Physical Indicators Present in the flow Yes  No

INDICATOR	CHECK IF PRESENT	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	<input type="checkbox"/>	Sewage <input type="checkbox"/> Rancid/sour <input type="checkbox"/> Petrol <input type="checkbox"/> Sulfide <input type="checkbox"/> Other:	<input type="checkbox"/> Faint	<input type="checkbox"/> Easily Detected	<input type="checkbox"/> Noticeable from distance
Color	<input type="checkbox"/>	Clear <input type="checkbox"/> Brown <input type="checkbox"/> Gray <input type="checkbox"/> Yellow <input type="checkbox"/> Green <input type="checkbox"/> Orange <input type="checkbox"/> Red <input type="checkbox"/> Other:	<input type="checkbox"/> Faint colors in sample bottle	<input type="checkbox"/> Clearly visible in sample bottle	<input type="checkbox"/> Clearly visible in outfall flow
Turbidity	<input type="checkbox"/>		<input type="checkbox"/> Slight Cloudiness	<input type="checkbox"/> Cloudy (color showing)	<input type="checkbox"/> Opaque
Floatables (Does not include trash)	<input type="checkbox"/>	<input type="checkbox"/> Sewage (toilet paper, etc.) <input type="checkbox"/> Suds <input type="checkbox"/> Petroleum Other: _____	<input type="checkbox"/> Few/slight; Origin not obvious	<input type="checkbox"/> Some; Indications of origins (eg., possible suds or oil sheen)	<input type="checkbox"/> Some; Origin clear (eg., Obvious oil sheen, suds, floating sanitary materials)

**SECTION 5: PHYSICAL INDICATORS FOR BOTH FLOWING AND NON-FLOWING OUTFALLS**

INDICATOR	CHECK IF PRESENT	DESCRIPTION	COMMENTS
Outfall Damage	<input type="checkbox"/>	<input type="checkbox"/> Spalling, Cracking or Chipping <input type="checkbox"/> Peeling Paint <input type="checkbox"/> Corrosion	
Deposits/Stains	<input type="checkbox"/>	<input type="checkbox"/> Oily <input type="checkbox"/> Flow Line <input type="checkbox"/> Paint Other:	
Abnormal Vegetation	<input type="checkbox"/>	<input type="checkbox"/> Excessive <input type="checkbox"/> Inhibited	
Poor Pool quality	<input type="checkbox"/>	<input type="checkbox"/> Odors <input type="checkbox"/> Colors <input type="checkbox"/> Floatables <input type="checkbox"/> Oil sheen <input type="checkbox"/> Suds <input type="checkbox"/> Excessive Algae Other:	
Pipe Benthic Growth	<input type="checkbox"/>	<input type="checkbox"/> Brown <input type="checkbox"/> Orange <input type="checkbox"/> Green Other	

**SECTION 6: OVERALL OUTFALL CHARACTERIZATION**

Unlikely/Minimal risk (no major indicators, issues, or severities) <input type="checkbox"/>	Potential risk (presence of 2 or more indicators/issues) <input type="checkbox"/>	Suspect (one or more indicators with a severity of 3+) <input type="checkbox"/>	High Risk (3+ severe indicators) <input type="checkbox"/>
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## APPENDIX D: REPORT/DOCUMENTATION OF CONFIRMED OUTFALL

### Report/Documentation of Confirmed Illicit Discharge

Location of Discharge and Source	Description of Discharge	Method of Discovery	Date of discovery/Date of Elimination/Follow up date (2 weeks typical)	Mitigation or enforcement action taken
			Discovery: _____  Elimination: _____  Follow up: _____	
			Discovery: _____  Elimination: _____  Follow up: _____	
			Discovery: _____  Elimination: _____  Follow up: _____	
			Discovery: _____  Elimination: _____  Follow up: _____	