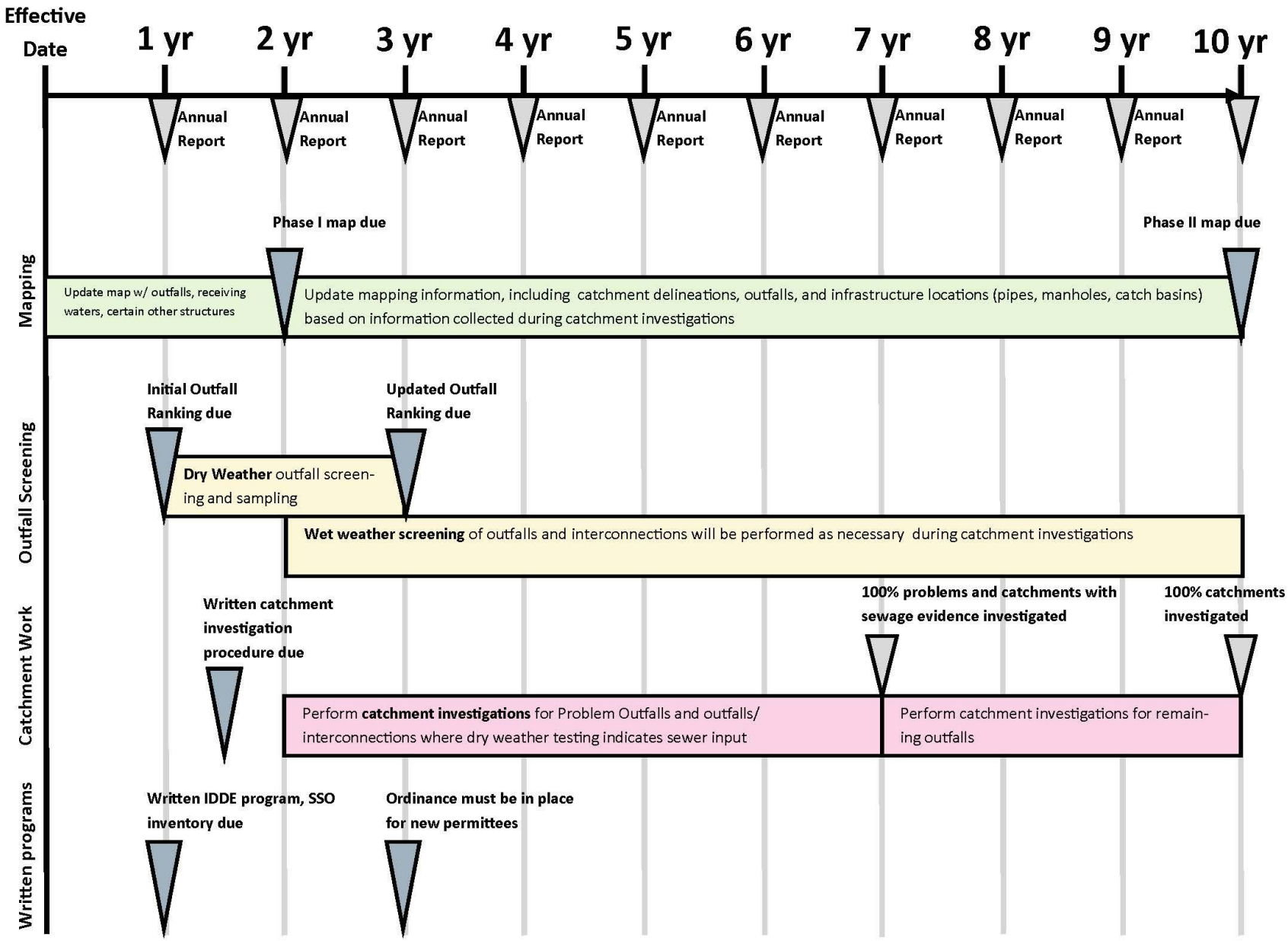
Illicit Discharge Detection and Elimination (IDDE) Plan

TOWN OF AMHERST, NEW HAMPSHIRE

Prepared By:
Seacoast Stormwater Coalition &
Manchester/Nashua Stormwater Coalition

Permit Year 1

EPA NPDES Permit Number NHR041001


Effective Date
1 yr
2 yr
3 yr
4 yr
5 yr
6 yr
7 yr
8 yr
9 yr
10 yr
Annual Report
Mapping
Phase I map due
Phase II map due
Update map w/ outfalls, receiving waters, certain other structures
Update mapping information, including catchment delineations, outfalls, and infrastructure locations (pipes, manholes, catch basins) based on information collected during catchment investigations
Outfall Screening
Initial Outfall Ranking due
Updated Outfall Ranking due
Dry Weather outfall screening and sampling
Wet weather screening of outfalls and interconnections will be performed as necessary during catchment investigations
Catchment Work
Written catchment investigation procedure due
100% problems and catchments with sewage evidence investigated
100% catchments investigated
Perform catchment investigations for Problem Outfalls and outfalls/ interconnections where dry weather testing indicates sewer input
Perform catchment investigations for remaining outfalls
Written programs
Written IDDE program, SSO inventory due
Ordinance must be in place for new permittees

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1 IDDE Program Implementation Timeline

1.1 MS4 Program

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the Town of Amherst, New Hampshire to address the requirements of the United States Environmental Protection Agency's (USEPA's) 2017 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in New Hampshire, hereafter referred to as the "2017 New Hampshire MS4 Permit" or "MS4 Permit."

The 2017 New Hampshire MS4 Permit requires that each permittee, or regulated community, address the six Minimum Control Measures (MCM's). These measures include the following:

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

Under Minimum Control Measure 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE Plan has been prepared to address this requirement.

1.2 Illicit Discharges

An "illicit discharge" is any discharge to a drainage system that is not comprised entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.

Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows that enter the drainage system. Sump pumps legally connected to the storm drain system may be used inappropriately, such as for the disposal of floor wash water or old household products, in many cases due to a lack of understanding on the part of the homeowner.

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

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

1.3 Allowable Non-Stormwater Discharges

The following categories of non-storm water discharges are allowed under the MS4 Permit unless the permittee, USEPA identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

If these discharges are identified as significant contributors to the MS4, they must be considered an "illicit discharge" and addressed in the IDDE Plan (i.e., control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely).

Figure 1-1. IDDE Investigation Procedure Framework

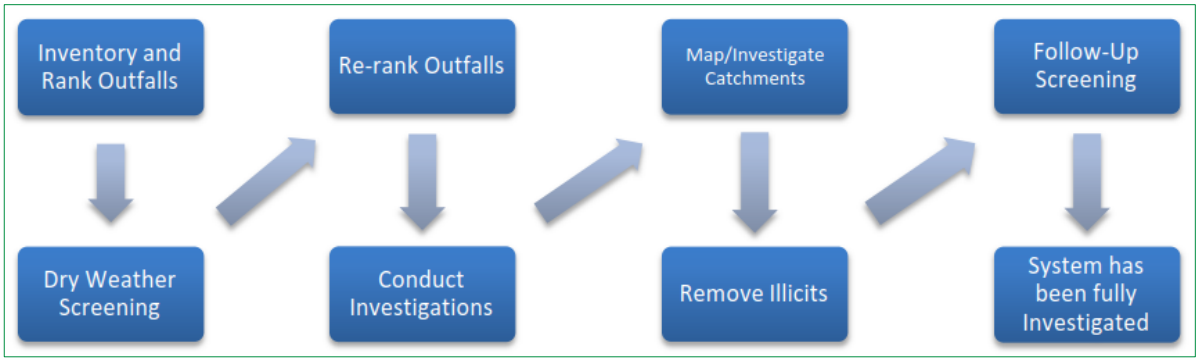


Table 1-1. IDDE Program Implementation Timeline

IDDE Program Requirement	*Completion Date from Effective Date of Permit*					
	1 Year	*1.5 Years*	*2 Years*	*3 Years*	*7 Years*	*10 Years*
Written IDDE Program Plan	*X*					
SSO Inventory	*X*					
Initial Outfall Ranking	*X*					
Written Catchment Investigation Procedure		*X*				
Phase I Mapping			*X*			
Phase II Mapping						*X*
IDDE Regulatory Mechanism or By-law (if not already in place)				*X*		
Dry Weather Outfall Screening				*X*		
Follow-up Ranking of Outfalls and Interconnections				*X*		
Catchment Investigations – Problem Outfalls					*X*	
Catchment Investigations – all Problem, High and Low Priority Outfalls						*X*

Effective date of the permit is July 1, 2018

2 Authority and Statement of IDDE Responsibilities

2.1 Legal Authority

The Town of Amherst has adopted a Stormwater Regulation (February 22, 2007) with adequate legal authority to:

- Prohibit illicit discharges;
- Investigate suspected illicit discharges;
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system;
- Implement appropriate enforcement procedures and actions.

A copy of the bylaw is included in Appendix A. The Town of Amherst will review its current Stormwater Regulation and related land use regulations and policies for consistency with the 2017 MS4 Permit.

2.2 Statement of Responsibilities

The Town of Amherst Public Works Department is the lead municipal agency or department responsible for implementing the IDDE program pursuant to the provisions of the Stormwater Regulation. Other agencies or departments with responsibility for aspects of the program include:

- Public Works – overall stormwater program management.
- Emergency Services – First response to notification of spills or discharges which may pose an immediate health or safety concern.
- Board of Health – First response to notification of spills or discharges which do not pose an immediate health or safety concern.
- Community Development Department – Webpage and promotional materials, develop procedures and adopt requirements for Public Works implementation of stormwater management BMPs.

3 Stormwater System Mapping

A copy of the existing storm system map is included in **Appendix B**. A copy will also be posted on the Town's website.

The MS4 Permit requires the storm system map to be updated in two phases as outlined below. The Town of Amherst Planning Department is responsible for updating the stormwater system mapping pursuant to the 2017 MS4 Permit. The Town of Amherst will report on the progress towards completion of the storm system map in each annual report. Updates to the stormwater mapping will be included in **Appendix B**.

3.1 Phase I Mapping

Phase I mapping must be completed within two (2) years of the effective date of the permit (July 1, 2020) and include the information per Part 2.3.4.5.a of the MS4 Permit.

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally owned stormwater treatment structures
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

3.2 Phase II Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (July 1, 2028) and include the information per Part 2.3.4.5.b of the MS4 Permit.

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

4 Sanitary Sewer Overflows (SSOs)

The Town of Amherst has no municipally owned sewers and therefore no Sanitary Sewer Overflows (SSOs).

5 Assessment and Priority Ranking of Outfalls

The MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Initial catchment delineations will be completed as part of the Phase I mapping, and refined catchment delineations will be completed as part of the Phase II mapping to reflect information collected during catchment investigations.

5.2 Outfall and Interconnection Inventory and Initial Ranking

The Town of Amherst will complete an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information. The initial inventory and ranking will be completed within one (1) year (June 30. 2019) from the effective date of the permit. An updated inventory and ranking will be provided in each annual report thereafter. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections.

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

1. **Excluded outfalls**:
   - Outfalls/interconnections with no potential for illicit discharges including roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

2. **Problem Outfalls**: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input. Problem Outfalls need not be screened pursuant to Dry Weather Outfall and Interconnection Screening and Sampling. Likely sewer input indicators are any of the following:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

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

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

4. **Low Priority Outfalls**: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.

Outfalls will be ranked into the above priority categories (<u>except for excluded outfalls, which may be excluded from the IDDE program</u>) based on the following characteristics of the defined initial catchment areas, where information is available. To prioritize initial mapping and outfall assessment work the permittee is using location-specific characteristics of water body impairments to focus initial work as included in **Appendix B** For the initial outfall ranking and catchment investigations this approach will target the worst areas first.

- **Past discharge complaints and reports.**

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

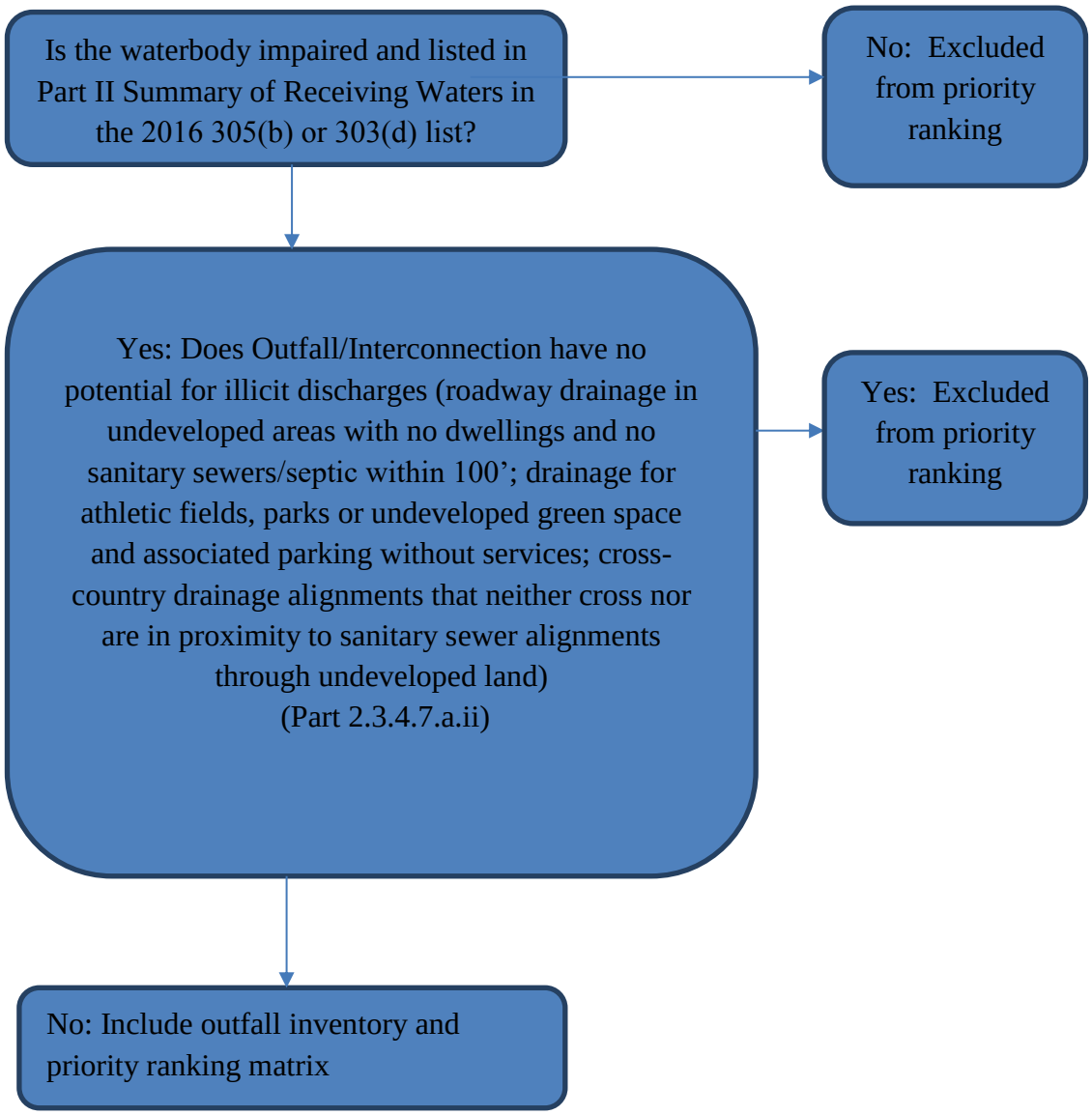
- **Density of generating sites** – Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers; car washes;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

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

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

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

The following is an initial outfall prioritization flowchart, see Appendix C for an outfall inventory and priority ranking matrix:



6 Dry Weather Outfall Screening and Sampling

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and Excluded Outfalls) to be inspected for the presence of dry weather flow. The Town of Amherst Planning Department is responsible for conducting dry weather outfall screening, starting with High Priority outfalls, followed by Low Priority outfalls, based on the initial priority rankings described in the previous section by the end of Year 3.

Dry weather outfall Screening and Sampling shall be completed in accordance with Part 2.3.4.7.b of the MS4 Permit. Plans and procedures for such screening and sampling shall be incorporated into this plan.

6.1 Dry Weather Screening/Sampling Procedure

6.1.1 General Procedure

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on initial outfall inventory and priority ranking.
2. Acquire the necessary staff, mapping, and field equipment (see **Table 6-1** for list of potential field equipment).
3. Conduct the outfall inspection during dry weather:
    a. Mark and photograph the outfall.
    b. Record the inspection information and outfall characteristics (using paper forms or digital form using a tablet or similar device) (see form in **Appendix D**).
    c. Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color, turbidity, and floatable matter (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures.
4. If flow is observed, sample and test the flow following the procedures described in the following sections.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow. Other techniques can be used to detect intermittent or transitory flows including conducting inspections during evenings or weekends and using optical brighteners.
6. Input results from screening and sampling into spreadsheet/database. Include pertinent information in the outfall/interconnection inventory and priority ranking.
7. Include all screening data in the annual report.

6.1.2 Field Equipment

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

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Sheets	Field sheets for both dry weather inspection and Dry weather sampling should be available with extras
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/headlamp w/batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, safety glasses and boots at a minimum
GPS Receiver	For obtaining spatial location data
Field test kits	For sampling: surfactants, conductivity, temperature, pH, salinity, ammonia and chlorine
Water Quality Meter	Hand held meter, if available, for testing for various water quality parameters such as ammonia, surfactants and chlorine
Extra Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria requires sterile containers).
Pry Bar or Pick	For opening catch basins and manholes when necessary
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes

6.1.3 Sample Collection and Analysis

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters[1]. The general procedure for collection of outfall samples is as follows:

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

In the event that an outfall is submerged, either partially or completely, or inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling.

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

6.2 Follow-up Ranking of Outfalls and Interconnections

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

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

7 Catchment Investigations

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to: review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing.

Catchment Investigations shall be completed in accordance with Part 2.3.4.8 of the MS4 Permit. A written catchment investigation procedure shall be developed and incorporated into this plan within 18 months of the permit effective date. Investigations of catchments associated with Problem Outfalls shall begin no later than two (2) years from the permit effective date and shall be completed within seven (7) years.

7.1 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, the Town of Amherst will exercise its authority as necessary to require its removal. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s);
- A description of the discharge;
- The method of discovery;
- Date of discovery;
- Date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal;
- Estimate of the volume of flow removed.

8 Training

Annual IDDE training will be made available to employees involved in the IDDE program. This training will, at a minimum, include information on how to identify illicit discharges and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Training records will be maintained in **Appendix F**. The frequency and type of training will be included in the annual report.

9 Progress Reporting

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed;
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure;
- Number of dry weather outfall inspections/screenings;
- Number of wet weather outfall inspections/sampling events;
- All dry weather and wet weather screening and sampling results;
- Estimate of the volume of sewage removed, as applicable;
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

Appendix A

Legal Authority (IDDE Bylaw or Ordinance)

SECTION I

AMHERST STORMWATER REGULATION

Adopted February 22, 2007 by Board of Health and Board of Selectmen
Adopted February 21, 2007 by the Planning Board

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SECTION I

AMHERST STORMWATER REGULATION

ARTICLE I -- Purpose and Goals

Section 1.1 Purpose and Goals.

The purpose of this Regulation is to control runoff and soil erosion and sedimentation resulting from site construction and development and to comply with US Environmental Protection Agency (EPA) Stormwater Management legislation. This Regulation covers areas including but not limited to: Urbanized Areas, Critical Areas and the area designated by the EPA as a Municipal Separate Storm Sewer System (MS4) area. Subdivisions and site plans shall include plans for managing stormwater and controlling erosion and sedimentation as provided below. Any errors or omissions in these Regulations shall not exempt applications from complying with applicable State and Federal Statutes. In the event of conflicting requirements, pursuant to NH RSA 676:14 the stricter standard applies as stated in the Conflict and Severability and Conflicting Provisions sections of Amherst's Ordinance and Regulations. The regulation shall become effective upon adoption by the Town of Amherst Board of Health, the Board of Selectmen, and the Planning Board, in accordance with the provisions of RSA 147, 41:11, RSA 674:16 &17 and 674:36 & 44.

Section 1.2 Abbreviations/Definitions.

Best Management Practices (BMP). A proven or accepted structural, non-structural, or vegetative measure; the application of which reduces erosion sediment, or peak storm discharge, or improves the quality of Stormwater runoff.

Board of Health (BOH). Town of Amherst Board of Health (comprised of the Board of Selectmen and the Health Officer). For purposes of this regulation BOH can also mean the Health Officer, Town of Amherst Planning Board, and/or their designated agent.

Certified Soil Scientist. A person qualified in soil classification and mapping who is certified by the State of New Hampshire Board of Natural Scientists.

Critical Areas. Disturbed areas of any size within fifty (50) feet of any wetland; one hundred (100) feet of any Public Water Protection Wetland (as defined in Zoning Ordinance Section 4-11 Part C); disturbed areas exceeding two thousand (2,000) square feet in highly erodible soils; or, disturbed areas containing slope lengths exceeding twenty-five (25) feet on slopes greater than ten (10) percent.

Development. Any construction or land altering or grading activities other than for agricultural and silvicultural practices.

Disturbed Area. An area where the natural vegetation, including tree stumps, has been removed exposing the underlying soil, or vegetation has been covered.

Environmental Protection Agency (EPA). The Federal agency responsible for implementing Clean Water Act entities including the National Pollutant Discharge Elimination System (NPDES) program.

Erosion. The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

Highly Erodible Soils. Any soil with an erodibility class (K factor) greater than or equal to 0.43 in any layer as found in Table 3-1 of the "Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire."

NOI. Notice of Intent as developed by the EPA.

NOT. Notice of Termination as developed by the EPA.

NPDES. National Pollutant Discharge Elimination System, as developed by the EPA.

Project Area. The area within the subdivision or site plan boundaries plus any areas with associated off-site improvements.

Sediment. Solid Material, either mineral or organic, that is in suspension, is transported, or has been moved from its site of origin by erosion.

Stabilized. When the soil erosion rate approaches that of undisturbed soils. Soils which are disturbed will be considered stabilized when covered with a healthy, mature growth of grass, or good covering of straw mulch or other equivalent (seedless) mulch (at a rate of not less than two [2] tons/acre). Mulch is only a temporary measure; ultimately, the site needs vegetation.

Stormwater Management and Erosion Control Plan (SWMP). A plan which outlines project features, proposed temporary and permanent erosion control features, maintenance schedules and practices, and design basis used to establish both temporary and permanent design features.

Stormwater Pollution Prevention Plan (SWPPP). A plan required by the Environmental Protection Agency (EPA) that clearly describes appropriate control measures that include a description of all pollution control measures (i.e., BMPs) that will be implemented as part of the construction activity to control pollutants in stormwater discharges and describes the interim and permanent stabilization practices for the site.

Stormwater Runoff. The water from precipitation that is not absorbed, evaporated, or otherwise stored within the contributing drainage area.

Stream. Areas of flowing water occurring for sufficient time to develop and maintain defined channels; but may not flow during dry portions of the year. Includes but is not limited to all perennial and intermittent streams located on U.S. Geological Survey Maps.

Urbanized Area (UA). As defined by the Census Bureau, these are automatically designated Municipal Separate Stormwater System (MS4) areas (by the EPA), see Map 1. For the purposes of this Regulation, the UA will also include those areas currently zoned, or which are rezoned in the future, as Commercial, Limited Commercial, and General Office. The Zoning Map is on file at the Town of Amherst Community Development Office.

Section 1.3 Applicability.

A. The applicant shall design and submit a custom construction stormwater management and erosion control plan to the Board of Health, or their agent, for any tract of land being developed, redeveloped or subdivided, (and to the Planning Board for any tract of land being subdivided or developed in a manner which would be subject to site plan review), where one or more of the following conditions are proposed:

   1. A cumulative disturbed area exceeding twenty thousand (20,000) square feet.

   2. Construction or reconstruction of a street or road.

   3. A subdivision of more than three (3) building lots.

   4. Proposed work adjacent to a wetlands buffer.

   5. Disturbed critical areas (see Definitions).

B. The applicant shall design and submit a custom permanent stormwater management and erosion control plan to the Board of Health, or their agent, for any tract of land being developed, redeveloped, or subdivided as described Section 1.4. This submission shall occur: for a subdivision at the Final Review Phase, during the Non-Residential Site Review process, as part of the Building Permit review, depending upon the scale of the project proposed, or as directed by the Board of Health or their designated agent.

C. A waiver of this ordinance may only be granted by the Board of Health or their designated agent. The applicant must provide evidence to support the request for waiver due to size or character of the project or the natural conditions of the site.

Section 1.4 Design Standards.

A. Temporary/Construction Stormwater Management Design. The following standards shall be applied in planning for stormwater management and erosion control as related to construction: (Additionally, the Planning Board, by its adoption of this regulation, has incorporated the same by reference as a requirement of its subdivision and site plan regulations so that the plan and application contemplated hereunder should be presented to

the Planning Board in connection with any such application as well. Such submission to the Planning Board shall be in addition to any requirements relating to stormwater drainage system design that may also be contained in applicable subdivision and/or site plan regulations.)

1. All measures in the plan shall meet as a minimum the Best Management Practices set forth in the "Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire, Rockingham County Conservation District, NH Department of Environmental Services, Soil Conservation Service (now the Natural Resources Conservation Service), August 1992, as amended from time to time. Additional BMPs are available at the following locations:

   a. http://www.des.state.nh.us/factsheets/wqe/wqe-6.htm - NHDES Environmental Fact Sheet WD-WQE-6, (Soil Erosion and Sediment control on Construction Sites, 1996)
   b. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm - EPA National Pollution Discharge Elimination System, (NPDES) (Stormwater Menu of Best Management Practices (BMPs).
   c. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/con_site.cfm -EPA NPDES (Construction Site Stormwater Runoff Control).

2. Whenever practical, natural vegetation shall be retained, protected or supplemented. The stripping of vegetation shall be done in a manner that minimizes soil erosion.

3. Appropriate erosion and sediment control measures shall be installed prior to soil disturbance.

4. The area of disturbance shall be kept to a minimum. Disturbed areas remaining idle for more than thirty (30) days shall be stabilized.

5. Measures shall be taken to control erosion within the project area. Sediment in runoff water shall be trapped and retained within the project area using approved measures. Wetland areas and surface waters shall be protected from sediment.

6. Off-site surface water and runoff from undisturbed areas shall be diverted away from disturbed areas where feasible or carried without erosion through the project area. Integrity of downstream drainage systems shall be maintained.

7. Measures shall be taken to control the post-development peak rate of runoff so that it does not exceed pre-development runoff for the two (2) year, twenty-four (24) hour storm event and for additional storm event frequencies as specified in the design criteria of the "Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire."

8. Priority should be given to preserving natural drainage systems including perennial and intermittent streams, wetlands, swales, and drainage ditches for conveyance of runoff leaving the project area.

9. All temporary erosion and sediment control measures shall be removed after final site stabilization. Trapped sediment and other disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized within thirty (30) days unless conditions dictate otherwise.

10. Naturally occurring streams, channels, and wetlands shall be used for conveyance of runoff leaving the project area only after appropriate sedimentation control measures have been employed.

B. Permanent Stormwater Management Design Criteria. The following standards shall be applied in planning for stormwater management and erosion control as related to long-term management of municipal water quality:

1. Under One (1) Acre of Disturbance.

   a. Within the urbanized area (UA) will require a basic stormwater quality management system. At a minimum, all stormwater must pass through basic pretreatment (beyond catch basin sumps) prior to leaving the site.
   b. Outside of the UA water quality measures will be required on a case-by-case basis.

2. Over One (1) Acre of Disturbance.

   a. Within the UA requires a well thought out, systematic, permanent stormwater quality management system. Latest technology and most up-to-date performance data must be considered when selecting permanent control measures. As noted above, catch basin sumps alone are not considered a valid water quality control measure. Mechanical devices may be required to supplement any proposal. Maintenance programs and schedules will be required as part of the proposal. Off-site water quality control measures may require long-term escrow funds to cover future maintenance expenses. Sites with appropriate separation to the seasonal high groundwater table must also consider groundwater recharge. All groundwater recharge systems will require on-site test pit and percolation test data to be submitted as part of the review.
   b. Outside the UA requires a basic systematic permanent stormwater quality management system. Catch basin sumps alone are not considered a valid water quality control measure.

3. Adjacent to the Wetlands Buffer (Any Size Disturbance).

   a. Any new project adjacent to the wetlands buffer will require permanent water quality control measures.
   b. Projects involving redevelopment or expansion will be considered on a case-by-case basis.

4. Municipal Projects. All municipal projects will also consider inclusion of water quality control measures.

C. Permanent Stormwater Management Technical Design Criteria.

1. All measures in the plan shall meet as a minimum the Best Management Practices set forth in the "Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire," Rockingham County Conservation District, NH Department of Environmental Services, Soil Conservation Service (now the Natural Resources Conservation Service), August 1992, as amended from time to time.

2. The design of proposed features must consider the following:

    a. Existing and proposed methods of handling stormwater runoff so that there will be no increase in the amount of runoff that leaves the boundaries of the site. (The Board of Health may permit an increase in off-site stormwater runoff on submission of a detailed downstream study and on the recommendation of the Town.)
    b. Engineering calculations used to determine drainage requirements based upon twenty-five (25) year storm frequency, twenty-four (24) hour duration shall be provided if the project will significantly alter the existing drainage patterns due to such factors as the amount of new impervious surfaces (such as pavement and building areas) being proposed. Closed drainage features must be sized for the ten (10) year storm frequency. Culverts, major ditches, swales, and detention facilities must be sized for the twenty-five (25) year storm frequency.
    c. If the project will affect drainage flow to an existing roadway culvert, or if a detention or retention area is proposed, a minimum of a twenty-five (25) year storm shall be used to evaluate potential off-site effects. If a State owned or maintained culvert is affected by the development, State of New Hampshire Department of Transportation Guidelines shall be used for evaluation of the culvert.
    d. All temporary erosion and sediment control measures shall be removed after final site stabilization. Trapped sediment and other disturbed soil area resulting from the removal of temporary measures shall be permanently stabilized within thirty (30) days.
    e. Velocities of less than ten (10) feet per second are required prior to entering a sedimentation swale. The maximum design velocity within the swale shall be 1.0 feet per second during passage of the 10-year storm.
    f. Flows less than ten (10) cubic feet per second are required prior to entering a sedimentation swale.
    g. All slopes equal to or steeper than 2:1 adjacent to a public right-of way must have special stabilization details provided with the submission.
    h. Velocities of ten (10) feet per second or less are desirable within a closed drainage system. Higher velocities may be allowed provided special design criteria have been used.
    i. A minimum velocity of two feet per second (2 fps) is required within a closed drainage system.
    j. Proposed riprap within a public right-of-way shall be paced a minimum of twelve (12) inches deep.
    k. Seasonal high-water table elevations must be accounted for in all BMP design criteria.
    l. Drainage design should follow the guidelines presented in the "Stormwater Management and Erosion and Sediment Control Handbook for Urban and

Developing Areas in New Hampshire", as published by the New Hampshire Department of Environmental Services, Rockingham County Conservation District and the USDA Soil Conservation Service, and additional guidelines published in the "Manual on Drainage Design for Highways", as published by the State of New Hampshire Department of Transportation.

Section 1.5 Application Submission.

A. The following minimum requirements apply to all projects, regardless of size. Additional requirements may be found in this Regulation and sections of the Site Plan Review and Subdivision Regulations.

1. Site drawing of existing and proposed conditions:

    a. Locus map showing property boundaries.
    b. North arrow, scale, date.
    c. Property lines.
    d. Easements.
    e. Structures, utilities, roads (including names), and other paved areas.
    f. Topographic contours.
    g. Critical areas.
    h. Surface water and wetlands, drainage patterns, and watershed boundaries.
    i. Vegetation.

2. Soils information for design purposes or for determining highly erodible soils shall be determined from a National Cooperative Soil Survey (NCSS) soil series map. A High Intensity Soil Map of the site, prepared in accordance with the Society of Soil Scientists of Northern New England (SSSNNE) Special Publication No. 1, can only be used for design purposes and not for determining highly erodible soils.

3. Temporary and permanent stormwater management and erosion and sediment control BMPs.

4. Areas and timing of soil disturbance.

5. Schedule and procedures for the inspection and maintenance of all BMPs, during and after construction.

6. Narrative section including discussion of each measure, its purpose, construction sequence, and installation timing as they apply to the site.

7. If infiltration or exfiltration is proposed as part of the drainage solution, test pit information regarding estimated seasonal high water table shall be provided at the elevation of the proposed infiltrating or exfiltrating device.

8. Calculations for the infiltration or exfiltration system. These calculations should account for frozen ground conditions, when the devices may not function at their optimal design.

9. Any other specific study, calculation, or investigation as requested by the Town.

10. The drainage plans and report shall be certified by a Licensed Professional Engineer, registered in the State of New Hampshire.

11. Stormwater and Erosion Control Permit Application, see Section 4.1 for sample.

Section 1.6 Completed Application Requirements.

A. The following shall be required in the final plan unless the project is deemed of sufficiently minimal impact to qualify for the minimum requirements specified in Section 1.4 (Design Standards) of this Regulation:

1. Construction Drawings/Supporting Documents.

2. Locus map showing property boundaries.

3. North arrow, scale, date.

4. Property lines.

5. Structures, roads, utilities, earth stockpiles, equipment storage, and plan for stump and debris removal.

6. Topographic contours at two (2) foot intervals.

7. Critical areas.

8. Within the project area and within two hundred (200) feet of project boundary surface waters, wetlands, and drainage patterns and watershed boundaries.

9. Vegetation.

10. Extent of one hundred (100) year flood plain boundaries if published or determined.

11. Soils information for design purposes from a National Cooperative Soil Survey (NCSS) soil series map or a High Intensity Soil Map of the site, prepared in accordance with SSSNNE Special Publication No. 1. Highly erodible soils shall be determined by soil series.

12. Easements, existing and proposed.

13. Areas of soil disturbance, including calculation of square footage disturbed.

14. Areas of cut and fill, including existing and proposed elevations.

15. Locations of earth stockpiles.

16. Locations of equipment storage and staging.

17. Stump disposal.

18. Highlighted areas of poorly and very poorly drained soils.

19. Highlighted areas of poorly and/or very poorly drained soils proposed to be filled.

20. Locations, descriptions, details, and design calculations for all structural, non-structural, permanent, and temporary erosion and sedimentation control measures and BMPs.

21. Identification of all permanent control measures.

22. Identification of permanent snow storage areas.

23. Identification of snow management measures during construction.

24. Construction schedule.

25. Earth movement schedule.

26. Temporary (additional) detention and/or sediment control facilities may be designed to accommodate the storm most likely to occur during the anticipated duration of construction (e.g., construction duration of two years requires a two-year frequency storm evaluation).

27. A proposed schedule for the inspection and maintenance of all measures.

28. Identification of all permanent control measures and responsibility for continued maintenance.

B. <u>Stormwater Management Report Section Including:</u>

1. Design calculations for all temporary and permanent structural control BMP measures.

2. A proposed schedule and procedural details for the inspection and maintenance of all BMPs, during and after construction.

3. Identification of all permanent control measures and responsibility for continued maintenance.

4. Drainage report with calculations showing volume, peak discharge, and velocity of present and future runoff for the ten (10) year, twenty-four (24) hour storm event.

5. Plans showing the entire drainage area affecting or being affected by the development of the site. Proposed lot boundaries and drainage areas shall be clearly shown on the plan.

6. The direction of flow of runoff through the use of arrows shall clearly be shown on the plan.

7. The location, elevation, and size of all existing and proposed catch basins, drywells, drainage ditches, swales, retention basins, and storm sewers shall be shown on the plan.

8. When detention structures are planned to reduce future condition peak discharge, the soil cover complex method shall be used to compute the runoff volume and peak discharge for designing the structure. The design will conform to the criteria outlined for those types of structures given in the "Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire".

9. Copies of pertinent State and Federal Permits.

10. An example Stormwater Management Plan table of contents follows:

    a. Project Overview
    b. Owner.
    c. Address of development.
    d. Location of the site.
    e. Description of receiving waters.
    f. Nature and purpose of the land disturbing activity.
    g. Limits of disturbance.
    h. Construction schedule.
    i. Existing conditions summary.
    j. Define topography, drainage patterns, soils, ground cover, critical areas adjacent areas, upstream areas draining through site, existing development, existing stormwater facilities, on- and off-site utilities, construction limitations, buffers, wetlands, streams, sensitive areas, and other pertinent features.
    k. Include an existing conditions plan (drawing) showing the above existing conditions and labeled per the narrative above.
    l. Off-site analysis.
    m. Describe the tributary area (include at least one-quarter (¼) mile downstream), drainage channels, conveyance systems, and downstream receiving waters.
    n. Review existing or potential problems resulting from the development including, but not limited to, sedimentation, erosion, water quality issues, chemical spills.
    o. Demonstrate that development of the site will not affect the downstream systems negatively.
    p. Demonstrate adequate capacity of the downstream system to handle flow conditions after development.
    q. As applicable, include an off-site drainage plan (the plan may be part of the existing conditions plan)

r. Special reports, studies, maintenance information.
s. As applicable, include test pit log forms, soil conditions data, and wetland delineation information.
t. As applicable, include information regarding long-range maintenance of any closed drainage systems, detention/retention facilities, etc.

u. Appendix (include copies of all tables, graphs, and charts, test pit and percolation test data used in any of the above calculations).

Section 1.7 Responsibility for Installation/Construction.

A. The applicant and the applicant's engineer (or technical representative) shall schedule and attend a mandatory preconstruction meeting with the Town at least two (2) weeks prior to commencement of construction. Two (2) copies of the SWPPP (if required), SWMP, associated construction documents, and Notice of Intent (if required) must be provided at that time. All documents must bear the seal and signature of the registered Professional Engineer preparing the documents. Prior to commencement of construction, the Board of Health will confirm that the documents submitted meet the conditions of plan approval. An appropriate notation will be made on the "official" construction set used by the Health Officer.

B. The Town reserves the right to prepare and request the applicant's acknowledgement of a preconstruction checklist.

C. The applicant shall bear final responsibility for the installation, construction, inspection, and disposition of all stormwater management and erosion control measures required by the provisions of this Regulation.

D. The Board of Health shall require a bond or other security in an amount and with surety conditions satisfactory to the Board, providing for the actual construction and installation of such measures within a period specified by the Board of Health and expressed in the bond or the surety.

E. The Town may require the owner or his authorized agent to deposit in escrow with the Town an amount of money sufficient to cover the costs for inspection and any professional assistance required for compliance site monitoring.

F. Site development shall not begin before the stormwater management and erosion control plan receives conditional approval from the BOH or their designated agent. Best Management Practices shall be installed as designed and scheduled as a condition of final approval of the plan.

G. Commercial and Industrial Development and/or Redevelopment.

1. The applicant, owner, and owner's legally designated representative (if any) shall all hold responsibility for implementing the stormwater management and erosion control plan.

H. Residential Development and Redevelopment.

1. The applicant is responsible for implementing the stormwater management and erosion control plan. There are two (2) ways for the applicant to be removed from the responsible party (in the Town's jurisdiction):

   a. The applicant completes the project in a satisfactory manner and files a Notice of Termination (NOT) with the EPA in accordance with the terms of the Federal requirements.
   b. The applicant passes legal responsibility of the plan to another competent party. In the case of a new subdivision where lots may be transferred to a different entity for construction of the buildings, it is the applicant's responsibility to ensure that the applicant has a legal basis to require compliance by the new entity.

I. Individual Homeowner Development.

1. Once the homeowner has taken control of a subdivided property, the homeowner bears responsibility for compliance with the approved stormwater management and erosion control plan. If the homeowner is contracting building services to another person or entity, the homeowner may choose to pass legal responsibility of compliance to the contracted entity. If the responsibility is not passed, the homeowner remains the responsible party and must comply with the terms of the original plan.

Section 1.8 Plan Approval and Review.

A. The Board of Health, Health Officer or their designated agent shall indicate approval of the stormwater management and erosion control plan, as filed, if it complies with the requirements and objectives of this regulation. If applicable, such approval shall be a component of subdivision or site plan approval, but shall not relieve the applicant of the need to comply with requirements relating to stormwater drainage systems design that may also be contained in other applicable subdivision and/or site plan regulations.

B. Final approval shall be contingent upon collection of any required fees or escrow amounts related to technical review of any stormwater management and erosion control plan prepared under this Regulation.

Section 1.9 Maintenance Inspection and Maintenance Security.

A. A narrative description of ongoing construction and operational maintenance requirements for water quality measures required by stormwater management and erosion and sediment

control plans after final Board of Health approval shall be recorded on the deed, and any accompanying development agreements or covenants, to the property on which such measures are located. The narrative shall be in the form of a typical site plan management, development agreement, or as otherwise set forth by the Board of Health. The description so prepared shall comply with the requirements of RSA 478:4-a, as detailed below:

1. The Registry of Deeds shall not accept a deed or instrument for filing and recording unless it recites the following information:

    a. The latest mailing address of the grantees named in the deed or instrument;

    b. In the first sentence of the first description paragraph, the names of all municipalities in which the property is located;
    c. The name of each person signing the deed or instrument as a party to the transaction printed or typewritten under the signature.

2. All documents shall be suitable for reproduction as determined by the Hillsborough County Registry of Deeds, which shall provide document standards as amended and adopted by the New Hampshire registers of deeds. The standards and any amendments thereto shall include a statement of their effective date, and shall be posted in and distributed by all registries of deeds for at least sixty (60) days prior to such effective date.

3. In the event of any changes in Registry procedure or requirements, RSA 478:4-a shall supersede the above requirements, and the applicant shall fulfill those requirements.

B. There shall further be a copy of the maintenance requirements on site during construction activity. During the time of construction, a log and report must be submitted to the Town twice each month, and within forty-eight (48) hours of any storm event with greater than one (1) inch of rainfall. This report shall detail all inspections; any actions taken per the construction stormwater management and erosion control plan, including the reasons for doing so, dates of action, and follow up action required. After construction, this copy of the maintenance requirements shall be given to a responsible party, either at the maintenance/management company, or in the Homeowners' Association. This party will be responsible for preparing a yearly log and report, to be submitted to the Town no later than the close of business on the last business day in January. This report shall contain all of the information required in the bi-weekly reports.

C. If the applicant, manager or owner is unable to adequately provide the required maintenance activities, the Town may require additional escrow funding to be used by either the applicant or the Town solely to repair, replace, and/or maintain the required measures.

D. The Board of Health may require inspections to verify ongoing maintenance of water quality protection measures. Such inspections shall be performed by the Board of Health or their designee at reasonable times to the landowner. The applicant, manager, or owner shall bear the cost of these inspections, and shall pay in a manner acceptable to the Town.

E. If permission to inspect is denied by the landowner, the Board of Health or their designee shall secure an administrative inspection warrant from the district or superior court under RSA 595-B.

Section 1.10 Enforcement and Penalties.

A. The purpose of this article is to enact locally the administrative and enforcement procedures set forth in RSA Title LXIV, specifically RSA 676:15, 16, 17, 17-a and 17-b, of the existing planning and land use statutes.

B. RSA Title LXIV, (64), specifically RSA 676:15, 16, 17, 17-a and 17-b, authorizes the following penalties and remedies for enforcement of the provisions of this regulation:

1. Injunctive relief in accordance with RSA 676:15.

2. Fines and penalties in accordance with RSA 676:17.

3. Issuance of a cease and desist order in accordance with RSA 676:17-a.

4. Pleas by mail for local land use citations in accordance with RSA 676:17-b.

C. Any violation of the requirements of this Regulation shall be subject to enforcement by the Health or Zoning Code enforcement officer, or their designated agent for the Town of Amherst, who shall be empowered to take any action authorized by the provisions of RSA Title LXIV, or any other applicable law or regulation.

D. Prior to taking any other action, the Town shall issue a Notice of Violation (see Section 4.2).

Section 1.11 Other Required Permits.

In addition to local approval, copies of the following permits shall be required if applicable:

A. RSA 485-A:17 requires a permit from the New Hampshire Water Supply and Pollution Control Division for "…any person proposing to significantly alter the characteristic of the terrain, in such a manner as to impede natural runoff or create an unnatural runoff …". Regulations require this permit for any project involving more than 100,000 contiguous square feet of disturbance or if such activity occurs in or on the border of the surface waters of the state.

B. National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit. A permit issued by the EPA or by the State under authority delegated pursuant to 33 USC, section 1342 (b) that authorizes the discharge of pollutants to waters of the United States.

C. For a cumulative disturbance of one (1) acre of land that EPA considers "construction activity," which includes, but is not limited to clearing, grading, excavation, and other activities that expose soil typically related to landscaping, demolition, and construction of structures and roads, a federal permit will be required. Consult EPA for specific rules. This EPA permit is in addition to any state or local permit required. To apply, the entity or individual responsible for construction site operations shall file a Notice of Intent (NOI) with the EPA postmarked at least 24 hours prior to work beginning. EPA will respond within two (2) weeks with a written permit, provided the NOI meets their criteria. A sample NOI is provided in Section 4.3.

Section 1.12 Post-Construction Operation.

A. Stormwater Discharges Associated with Commercial/Industrial Activities.

1. Each commercial and industrial facility approved under this Regulation is required to perform annual site inspections (at a minimum). The site inspection must be documented and at a minimum should include: review of stormwater flow paths, condition of any sediment or contaminant control devices, water quality notations, corrective actions and time frames if unacceptable water quality runoff is noted, and the name and position of the inspector. All records of the inspections must be made available to the Town of their designee upon request.

B. Notification for Spills or Other Non-Stormwater Discharges.

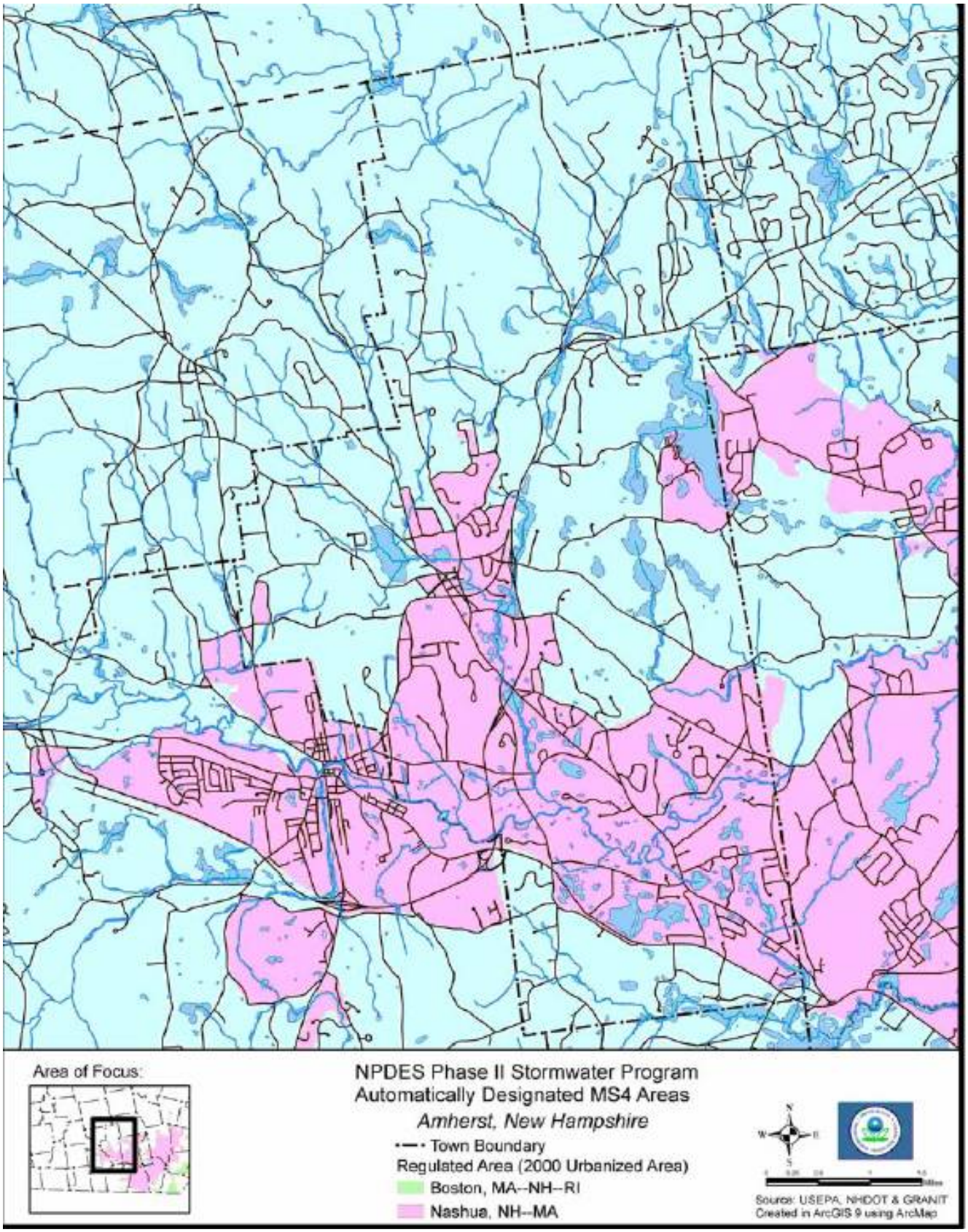
1. As soon as any person responsible for a facility, site, activity, or operation has information of any known or suspected release of pollutants or non-stormwater discharges which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the Town of Amherst's municipal storm system, state waters, or waters of the United States, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release as to minimize the effects of the discharge. (If said individual is not competent to assess, contain, or clean-up, that person shall immediately notify another competent individual or firm.) If the substance poses an immediate health or safety concern, the Town of Amherst Emergency Services must immediately be notified. If the substance does not pose an immediate concern, the Town of Amherst Board of Health should be notified. This notification should be made as soon as possible, however, no later than twenty-four (24) hours post event. This notification does not preclude and must be made in addition to any Federal or State required notifications. The site operator/owner must be aware that discharges such as treated swimming pool water are not allowed discharges unless appropriate measures have been taken to reduce the treatment chemical concentrations in the water.

ARTICLE II -- MAPS

Section 2.1 Mandatory Regulated MS4s in Urbanized Areas – Map.

Municipal Separate Storm Sewer Systems (MS4s) within "urbanized areas" (UA), as defined by the Bureau of Census, fall under mandatory regulation under EPA Phase II Stormwater Management Regulations: Within the UA's, all roads and streets and associated drainage systems, both open and closed, fall under regulation. Map 1 depicts the two (2) urbanized areas in Amherst. The northern area is within the Nashua, New Hampshire UA and the southern area is within the Boston, Massachusetts, New Hampshire, and Rhode Island UA. All land in Amherst shall comply with this Regulation.

Map 1: Town of Amherst "Urbanized Areas"


Area of Focus:
NPDES Phase II Stormwater Program
Automatically Designated MS4 Areas
Amherst, New Hampshire
Town Boundary
Regulated Area (2000 Urbanized Area)
Boston, MA--NH--RI
Nashua, NH--MA
Source: USEPA, NHDOT & GRANIT
Created in ArcGIS 9 using ArcMap

ARTICLE III

ARTICLE III -- CERTIFICATION OF ADOPTION

Section 3.1 Certification of Adoption:

1. We, the undersigned do hereby attest that this amendment to the (Subdivision Regulations and Non-Residential Site Plan Review Regulations) was adopted by a majority vote of the Amherst Planning Board at their duly noticed public meeting on:

Date _____

Chairperson, Planning Board _____

---

2. This Regulation was recorded with the Amherst Town Clerk on:

Date _____

3. A summary of this Regulation was published in the Milford Cabinet on _____ (date), with a notice of where the Regulation was posted in Town.

4. This Regulation was posted at _____ and _____ (two Public Places) as of _____ (date).

Town Clerk

5. Effective Date: _____

Signature (Town Clerk) _____

ARTICLE IV -- APPLICATIONS

Section 4.1 Sample Stormwater Permit Application:

Failure to provide all required materials and information could result in the review of this application being delayed for consideration. The applicant certifies to the truth of the following facts as part of his/her application.

Name of Applicant: _____

Address: _____

Telephone/Fax Numbers: _____

Name of Engineer/Surveyor/Agent: _____

Company: _____

Address: _____

Telephone/Fax Numbers: _____

Address (including Map & Lot) of Property for which permit is requested:

_____

Type of Request: ☐ Commercial/Industrial ☐ Subdivision

☐ Single Lot Development ☐ Municipality/Utility

Name(s) and address(es) of Owner(s) if different from Applicant:

_____

_____

Description of the project for which a Stormwater and Erosion Control Permit is requested. Include development name, type, start date, and total square footage of land to be altered/cleared. Attach additional sheets as necessary.

_____

_____

Required forms (submit ten copies of all supporting materials):

☐ Legal Description ☐ Drainage & Erosion Control Plan

☐ Stormwater Management Plan Calculations & Drawings

I have reviewed Section XXXX of the Town of Amherst Zoning Ordinance regarding Stormwater and Erosion Control. For residential construction, the Town of Amherst Community Development Office must be contacted for inspection within one business day of rough grading completion.

I further grant the right-of-entry onto this property, as described above, to the designated personnel of the Town for the purpose of inspecting and monitoring for compliance with the aforesaid ordinance.

Signature of Applicant _____

Date of Submission _____

Section 4.2 Town of Amherst Notice of Violation:

TOWN OF AMHERST
NOTICE OF VIOLATION

Dear Property Owner: _____

You are hereby informed that based on an inspection performed by the local administrator on _____ (date), your property does not comply with the requirements of the Town of Amherst Subdivision Regulations (Zoning Ordinance Article IX Section B) / Non-Residential Site Plan Review Regulations (Zoning Ordinance Article IX Section C) or plans approved thereunder. You are hereby served written notice and instructed to correct the violations listed below:

A copy of the inspection report, which details the nature of the violation at hand, is enclosed.

Actions or conditions which violate the requirements of this Regulation or plans approved under this Regulation:

_____
_____
_____
_____

b. The minimum that needs to be done to correct the violation(s):

_____
_____
_____
_____

c. The violation must be corrected by: _____ (date)

d. The property owner was forwarded a copy of this report on _____ (date).

e. The original has been filed in the _____ Department on _____ (date).

f. A copy of the inspection report is attached: Yes:____No:____

Sincerely, _____
Amherst Health Officer

Section 4.3 Sample Notice of Intent (As Amended)

EPA

Suggested Format for Submitting Modifications to a Notice of Intent (NOI) for EPA's 2012 National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities

Instructions for Completing a Modification to Your NOI Under EPA's 2012 CGP

You may use this form to modify a paper NOI that you submitted to EPA for coverage under EPA's Construction General Permit. Note that if you submitted your NOI through EPA's electronic Notice of Intent (eNOI) system, you should modify your NOI electronically at www.epa.gov/npdes/stormwater/cgpenoi

In Part I of this form, please copy over the information exactly as it appeared on your original NOI form. In Part II of this form, only enter in information that you wish to update or correct from your original NOI form.

Refer to this website for mailing instructions: www.epa.gov/npdes/stormwater/application_coverage

Note: If you modify your NOI form to increase your original disturbed acreage by one or more acres, your coverage under this permit for the new disturbed acreage will take effect 14 days after EPA has acknowledged receipt of your modified NOI on the Agency's website (www.epa.gov/npdes/stormwater/cgpnoisearch), unless EPA notifies you that your authorization has been delayed or denied. During the 14-day waiting period, your permit coverage will continue for the original disturbed acreage indicated on your original NOI, but you must wait until your coverage under this permit for the new acreage has become "active." You can determine when your permit coverage becomes active by checking EPA's website (www.epa.gov/npdes/stormwater/cgpnoisearch).

Part I. Provide the following information from your current NOI:

A. Permit Tracking Number:

B. Operator Information (as it appears on your NOI)

Name:

Phone: - - Ext. Fax (optional): - -

E-mail:

IRS Employer Identification Number (EIN): -

Point of Contact:

First Name, Middle Initial, Last Name:

Mailing Address:

Street:

City: State: Zip Code: -

C. Project/Site Information (as it appears on your NOI):

Project/Site Name:

Project/Site Address:

Street/Location:

City: State: Zip Code: -

County or similar government subdivision:

Page 1 of 4

Part II. For the following, only enter information that you need to correct or update from your original NOI form. Please see the original NOI form for instructions on filling out the following fields.

A. Updated Operator Information

Name:

Phone: - - Ext. Fax (optional): - -

E-mail:

IRS Employer Identification Number (EIN): –

Point of Contact:

First Name, Middle Initial, Last Name:

Mailing Address:

Street:

City: State: Zip Code: -

B. Updated Project/Site Information

Project/Site Name:

Project/Site Address:

Street/Location:

City: State: Zip Code: -

County or similar government subdivision:

For the project/site for you are seeking permit coverage, provide the following information:

Latitude/Longitude (Use one of three possible formats, and specify method)

Latitude 1. ___°___'___" N (degrees, minutes, seconds)
2. ___°___.___' N (degrees, minutes, decimal)
3. ___.___° N (degrees decimal)

Longitude 1. ___°___'___" W (degrees, minutes, seconds)
2. ___°___.___' W (degrees, minutes, decimal)
3. ___.___° W (degrees decimal)

Latitude/Longitude Data Source: ☐ U.S.G.S. topographic map ☐ EPA web site ☐ GPS ☐ Other: _____

If you used a U.S.G.S. topographic map, what was the scale? _____

Horizontal Reference Datum: ☐ NAD 27 ☐ NAD 83 or WGS 84 ☐ Unknown

Is your project/site located in Indian Country lands, or located on a property of religious or cultural significance to an Indian tribe? ☐ YES ☐ NO

If yes, provide the name of the Indian tribe associated with the area of Indian country (including name of Indian reservation, if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property: _____

Are you requesting coverage under this NOI as a "federal operator" as defined in Appendix A? ☐ YES ☐ NO

Estimated Project Start Date: / / Estimated Project Completion Date: / /

Estimated Area to be Disturbed (to the nearest quarter acre): .

Have earth-disturbing activities commenced on your project/site? ☐ YES ☐ NO

If yes, is your project an "emergency-related project? ☐ YES ☐ NO

Page 2 of 4

Have stormwater discharges from your project/site been covered previously under an NPDES permit? ☐ YES ☐ NO

If yes, provide the Tracking Number if you had coverage under EPA's CGP or the NPDES permit number if you had coverage under an EPA individual permit:

C. Updated Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? ☐ YES ☐ NO

Are there any surface waters within 50 feet of your project's earth disturbances? ☐ YES ☐ NO

Receiving Waters and Wetlands Information: (Attach a separate list if necessary)

Provide the name(s) of the first surface water that received stormwater directly from your site and/or from the MS4:	Provide the names of any impaired waters to which you discharge and the pollutant(s) for which they are impaired		Provide the names of any waters to which you discharge for which there is an EPA approved or established TMDL, the name of the TMDL, and the pollutant(s) for which there is a TMDL		
	Surface water name:	Pollutant(s) causing the impairment:	Surface water name:	TMDL name:	Pollutant(s) for which there is a TMDL:

Impaired Waters

Describe the methods you used to complete the above table:

Are any of the surface waters to which you discharge designated by the state or tribal authority under its antidegradation policy as a Tier 2 (or Tier 2.5) water (water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water) or as a Tier 3 water (Outstanding Natural Resource Water)? (See Appendix F).

☐ YES ☐ NO

If yes, name(s) of receiving water(s) and its designation (Tier 2, Tier 2.5 or Tier 3): _____

D. Updated Chemical Treatment Information

Will you use polymers, flocculants, or other treatment chemicals at your construction site? ☐ YES ☐ NO

If yes, will you use cationic treatment chemicals* at your construction site? ☐ YES ☐ NO

If yes, have you been authorized to use cationic treatment chemicals by your applicable EPA Regional Office in advance of filing your NOI*? ☐ YES ☐ NO

If you have been authorized to use cationic treatment chemicals by your applicable EPA Regional Office, attach a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

Please indicate the treatment chemicals that you will use:

_____

*Note: You are ineligible for coverage under this permit unless you notify your applicable EPA Regional Office in advance and the EPA office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

E. Updated Stormwater Pollution Prevention Plan (SWPPP) Information

Has the SWPPP been prepared in advance of filing this NOI? ☐ YES ☐ NO

SWPPP Contact Information:

First Name, Middle Initial Last Name:

Organization Name:

Phone: - - Ext. Fax (optional): - -

E-mail:

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F. Updated Endangered Species Protection Information

Using the instructions in Appendix D of the CGP, under which criterion listed in Appendix D are you eligible for coverage under this permit?
☐ A ☐ B ☐ C ☐ D ☐ E ☐ F

Provide a brief summary of the basis for criterion selection listed in Appendix D (e.g., communication with U.S. Fish and Wildlife Service or National Marine Fisheries Service, specific study):

If you select criterion B, provide the Tracking Number from the other operator's notification of authorization under this permit: ☐☐☐☐☐☐☐☐☐

If you select criterion C, you must attached copies of your site map (see Part 7.2.6 of the permit), and you must answer the following questions:

What federally-listed species or federally-designated critical habitat are located in your "action area":

What is the distance between your site and the listed species or critical habitat (miles):

If you select criterion D, E, or F, attach copies of any letters or other communications between you and the U.S. Fish and Wildlife Service or National Marine Fisheries Service.

G. Updated Historic Preservation Information

Are you installing any stormwater controls as described in Appendix E that require subsurface earth disturbance? ☐ YES ☐ NO

If yes, have prior surveys or evaluations conducted on the site have already determined historic properties do not exist, or that prior disturbances have precluded the existence of historic properties? (Appendix E, Step 2) ☐ YES ☐ NO

If no, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties (Appendix E, Step 3)? ☐ YES ☐ NO

If no, did the SHPO, THPO, or other tribal representative (whichever applies) respond to you within the 30 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties? ☐ YES ☐ NO

If yes, describe the nature of their response:

- ☐ Written indication that no historic properties will be affected by the installation of stormwater controls on the site
- ☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions
- ☐ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls
- ☐ Other:

H. Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

First Name, Middle Initial, Last Name: ☐☐☐☐☐☐☐☐☐☐☐☐ ☐ ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Title: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signature: _____ Date: ☐☐/☐☐/☐☐☐☐

Email: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

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ARTICLE V -- REFERENCES

Section 5.1 References.

Environmental Protection Agency (EPA). 2007. *Developing Your Stormwater Pollution Prevention Plan, A Guide for Construction Sites (Interim).* www.epa.gov/npdes/swpppguide

Environmental Protection Agency (EPA). www.epa.gov/npdes/stormwater

New Hampshire Department of Agriculture, Markets, and Food. 2008. *Manual of Best Management Practices (BMP's) for Agriculture in New Hampshire.* (As Amended.)

Appendix B

List of Impaired Waters
Storm System Mapping
& SSO Inventory

Receiving Waters

The following table lists all receiving waters, impairments and number of outfalls discharging to each waterbody segment.

OR

The information can be found in the following document or at the following web address:

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
HARTSHORN BROOK (NHRIV700060906-05)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
UNNAMED TRIB. TO THE SOUHEGAN RIVER (NHRIV700060906-45)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
HONEY POT POND (NHLAK700060906-01)		☐	☒	☐	☐	☐	☐	☐	☐	☐	pH, Mercury
STUMP POND (NHLAK700061001-03)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
SOUHEGAN RIVER (NHRIV700060906-18)	3	☐	☐	☒	☐	☐	☐	☐	☒	☐	pH, Mercury, Aluminum
BEAVER BROOK - WOOLFORD DAM (NHIMP700060906-10)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
UNNAMED BROOK (NHRIV700060905-24)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
BABOOSIC LAKE (NHLAK700060905-01-01)	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Cyanobacteria hepatotoxic microcystins, Mercury, pH
BABOOSIC LAKE - TOWN BEACH (NHLAK700060905-01-02)	1	☐	☐	☐	☐	☐	☐	☐	☒	☐	Excess Algal Growth, Cyanobacteria hepatotoxic microcystins, Mercury
BABOOSIC LAKE - YOUNG JUDAEA BEACH (NHLAK700060905-01-03)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Cyanobacteria hepatotoxic microcystins, Mercury

PAVILLON BROOK (NHRIV700060905-25)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury, pH
UNNAMED BROOK - BETWEEN LITTLE BABOOSIC LAKE AND WASHER COVE BABOOSIC LAKE (NHRIV700060905-09)	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury, pH
BABOOSIC BROOK (NHRIV700060905-10)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
SOUHEGAN RIVER (NHRIV700060906-16)		☐	☐	☐	☐	☐	☐	☒	☒	☐	Mercury, Copper
SOUHEGAN RIVER (NHRIV700060906-14)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
BEAVER BROOK (NHRIV700060906-01)		☐	☐	☐	☐	☐	☐	☐	☒	☐	Mercury, pH, Aluminum
Waterbody segment that receives flow from the MS4	**Number of outfalls into receiving water segment**	**Chloride**	**Chlorophyll-a**	**Dissolved Oxygen/ DO Saturation**	**Nitrogen**	**Oil & Grease/ PAH**	**Phosphorus**	**Solids/ TSS/ Turbidity**	**E. coli**	**Enterococcus**	**Other pollutant(s) causing impairments**
BEAVER BROOK (NHRIV700060906-03)	3	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
BEAVER BROOK (NHRIV700060906-02)	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
UNNAMED BROOK - TO SOUHEGAN RIVER (NHRIV700060906-17)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
UNNAMED BROOK (NHRIV700060906-39)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
UNNAMED BROOK (NHRIV700060906-38)	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
UNNAMED BROOK - TO SOUHEGAN RIVER (NHRIV700060906-06)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
UNNAMED BROOK (NHRIV700060906-37)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
WITCHES BROOK (NHRIV700061001-02)	1	☐	☐	☒	☐	☐	☐	☐	☒	☐	Mercury, pH
UNNAMED BROOK - FROM CARRIAGE PLACE POND TO STUMP POND (NHRIV700061001-04)		☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury
PENNICHUCK BROOK - WITCHES BROOK (NHRIV700061001-07)		☐	☐	☒	☐	☐	☐	☐	☒	☐	Mercury, pH

TABLE 2-1:
LAND USES, LIKELY SOURCE LOCATIONS AND ACTIVITIES THAT CAN PRODUCE TRANSITORY OR INTERMITTENT ILLICIT DISCHARGES

Land Use	Likely Source Locations	Condition or Activity that Produces Discharge
Residential	• Apartments • Multi-family • Single family detached	• Driveway cleaning • Dumping/spills (e.g., leaf litter and RV/boat holding tank effluent) • Equipment/vehicle wash-downs • Septic system maintenance • Swimming pool discharges
Commercial	• Campgrounds/RV parks • Car dealers/rental car companies • Car washes • Commercial laundry/dry cleaning • Gas stations/auto repair shops • Marinas • Nurseries and garden centers • Oil change shops • Restaurants • Swimming pools	• Building maintenance (power washing) • Dumping/spills • Landscaping/grounds care • Outdoor fluid storage • Parking lot maintenance (power washing) • Vehicle fueling • Vehicle maintenance/repair • Vehicle washing • Wash-down of greasy equipment and grease traps
Industrial	• Auto recyclers • Beverages and brewing • Construction vehicle washouts • Distribution centers • Food processing • Garbage truck washouts • Marinas, boat building and repair • Metal plating operations • Paper and wood products • Petroleum storage and refining • Printing	• Industrial process water or rinse water • Loading and un-loading area wash-downs • Outdoor material storage
Municipal	• Airports • Landfills • Maintenance depots • Municipal fleet storage areas • Ports • Public works yards • Streets and highways • Golf courses • Schools	• Building maintenance (power washing) • Dumping/spills • Landscaping/grounds care • Outdoor fluid storage • Parking lot maintenance (power washing) • Road maintenance • Emergency response • Vehicle fueling • Vehicle maintenance/repair • Vehicle washing • Aircraft deicing

Example

Standard Operating Procedure for:	
A.1 IDDE: Inspections During Mapping	
Purpose of SOP:	This SOP provides a basic checklist for managers and field crews conducting illicit discharge inspections during mapping.

Always:

- Characterize the outfall by recording information on the Storm Drain Characteristic Form.
- Conduct inspections during dry weather periods using the Dry Weather Outfall Inspection Form.
- Follow procedure below if an illicit discharge is encountered (such as raw sewage, paint, etc.).
- Conduct inspections with at least two staff per crew.
- Carry a list of emergency phone numbers.

Dry Weather Discharge

The CWP defines **dry weather** as a 48 hour period with no runoff-producing rainfall. NEIWPCC defines dry weather as a 48-72 hour period with less than 1/10-inch rainfall.

Whenever Possible:

- Conduct inspections during low groundwater and leaf off conditions.
- Photograph the outfall with a digital camera (use dry erase or chalk board to identify outfall).
- Identify and label the outfall with a unique identifier. For example "SWO-013".
- If dry weather flow is present at the outfall, and the flow does not appear to be an illicit discharge attempt to identify the source of the flow (intermittent stream etc.), then document the discharge for future comparison.
- Carry an authorization letter.
- Collect samples of flowing discharges before and after source removal. (Contact NHDES for technical assistance.)

Equipment list for mapping:

1. Existing paper maps
2. Field sheets
3. Camera (preferably digital) on pole
4. GPS Unit
5. Spray paint (or other marker)
6. Cell phones or hand-held radios
7. Clip boards and pencils
8. First aid kit
9. Flash light or head lamp
10. Surgical gloves
11. Tape measure
12. Temperature probe
13. Waders
14. Watch with a second hand
15. Five 1-liter sample bottles
16. Dry erase board (for photos)
17. Hand sanitizer
18. Sampling pole
19. Mirror (for light)
20. Safety vests

Never:

- Never put yourself in danger.
- Never enter private property without permission

Procedures to follow if illicit discharge is detected:

- ☐ Call dispatch / supervisor.
- ☐ Use the Dry Weather Outfall Inspection Form to document observations.
- ☐ Visually inspect general area for possible sources.
- ☐ Take photos.
- ☐ Estimate flow/collect samples if instructed to do so.

Example

OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

Section 1: Background Data

Subwatershed:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Latitutde:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential
- ☐ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ Closed Pipe	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Eliptical ☐ Box ☐ Other: ____	☐ Single ☐ Double ☐ Triple ☐ Other: ____	Diameter/Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: ____	☐ Trapezoid ☐ Parabolic ☐ Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
☐ In-Stream	(applicable when collecting samples)				
Flow Present?	☐ Yes ☐ No *If No, Skip to Section 5*				
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°F	Thermometer
pH			pH Units	Test strip/Probe
Ammonia			mg/L	Test strip

Example

Outfall Reconnaissance Inventory Field Sheet

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If No, Skip to Section 6)*

INDICATOR	CHECK If Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization

☐ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a severity of 3) ☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	☐ No		
2. If yes, collected from:	☐ Flow	☐ Pool		
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type: ☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Example

Storm Drain Outfall Characteristics Form

Location Information

Date: _____ **Inspector:** _____

Time: _____

Outfall ID: _____

Outfall Location: _____

Receiving Waterbody: _____

Photo Taken: Yes No **Photo ID:** _____

Weather Clear Cloudy **Approximate Temp:** _____ **Wind Present:** Yes No

Precipitation in the past 3 days: No Yes _____ inches _____

Dry Weather Inspection Form Used: Yes No - No Discharge No – No Dry Weather No - Other

Pipe Flow: None Trickle Steady 1/4 pipe flow or more

Seepage Flow: None Trickle Steady 1/4 pipe flow or more

Outfall Description *Select all that are applicable, fill in as necessary*

Submerged in water- no partially fully _____

Type:	RCP	CMP	Dimension (inches) _____
Open Pipe-	PVC	HDPE	Circular Box
	Steel	Other _____	Elliptical Other _____

Open Drainage-	Concrete	Trapezoidal	Depth (inches)_____
	Earthen	Parabolic	Top width (inches)_____
	Riprap	Other _____	Bottom width (inches)_____
	Other _____		

Additional Information

Sediment Condition:	Open	¼ Full	½ Full	¾ Full	Plugged
Structure Condition:	Excellent	Good	Fair	Poor	
Trash/litter present:	Yes	No			
Yard waste observed:	Yes	No			

N↑

General Comments: _____

Actions Taken: _____

Follow-up Required: Yes No

Example

Standard Operating Procedure for:	
A.2 IDDE: Long-Term Inspections	
Purpose of SOP:	To provide supervisor and field crew with a punch list of things to remember during regularly scheduled inspections.

Always:

- Conduct inspections during dry weather periods.
- Check the outfall's dimensions, shape, and component material using the Storm Drain Characteristic Form.
- Characterize and record observations on basic sensory and physical indicators (e.g., odor, color, oil sheen).
- If an illicit discharge is encountered (such as raw sewage, paint, etc.), follow the procedure below.

Whenever Possible:

- Perform inspections of all the outfalls at least once per permit cycle (long term).
- Photograph the outfall with a digital camera (use dry erase board to identify outfall).
- Identify and label the outfall with a unique identifier. For example "SWO-013".
- Carry a letter of authorization with you during inspections that outline who you are and what you are doing.
- If dry weather flow is present at the outfall, and the flow does not appear to be an obvious illicit discharge (e.g., flow is clear, odorless, etc.), attempt to identify the source of the flow (intermittent stream, etc.) then document the discharge for future comparison.
- Collect samples before and after source removal. Contact NHDES for technical assistance.

Never:

- Never put yourself in danger.
- Never enter private property without permission.

Procedures to follow if illicit discharge is detected:

- ☐ Call dispatch / supervisor.
- ☐ Document observations using the Dry Weather Outfall Inspection Form.
- ☐ Visually inspect general area for possible sources.
- ☐ Take photos.
- ☐ Estimate flow/collect samples if instructed to do so.

Example

Standard Operating Procedure for:	
A.3 IDDE: Opportunistic Inspections	
Purpose of SOP:	This SOP provides field personnel with a quick checklist of proper procedures to follow if they observe illicit discharges while conducting their regular duties.

Always:

- Call dispatcher, supervisor, or code enforcement if you see evidence of an illicit discharge.
- Assess the general area of the illicit discharge to see if you can identify its source.

Whenever Possible:

- Use the Incident Tracking Sheet to document observations.
- Take photographs of the illicit discharge.
- Carry a Dry Weather Outfall Inspection Form.
- Use the Catch Basin Cleaning Form to document observations during cleaning.

Never:

- Never enter private property without permission.
- Never put yourself in danger.

Example

Standard Operating Procedure for:	
A.4 IDDE: Citizen Call-in Inspections	
Purpose of SOP:	To collect appropriate information from a citizen reporting a potential illicit discharge to increase the chances of identifying and removing its source.

Always:

- Use the Incident Tracking Sheet to collect the appropriate information.
- Promptly investigate reported incidents.
- Document any further action taken.

Whenever Possible:

- Train Dispatch Personnel in the use and importance of the Incident Tracking Sheet.
- Document and review incidents reported by citizens on an annual basis to look for patterns of illicit discharges and to evaluate the call-in inspection program.

Never:

- Never enter private property without permission.
- Never put yourself in danger.

Example

Standard Operating Procedure for:	
A.5 IDDE: Septic System Inspections	
Purpose of SOP:	Failed septic systems can adversely impact water quality. This SOP provides a quick reference list to supervisors and field crews that are conducting an initial screening for failures in areas that are identified in the full IDDE program.

Always:

- Refer potential septic system failures to the local Health Officer for enforcement.

Whenever Possible:

- Screen high risk areas (older areas or areas near lakes or impaired waterbodies).
- Look for indicators of failures, such as wet areas or disagreeable odors near the leach field.
- Document septic system inspections in a summary report for future reference.
- Refer troublesome enforcement actions to NHDES.

Never:

- Never enter private property without permission.
- Never put yourself in danger.

Example

Related Guidance:	
	• NHDES Health Officer's Manual ENV-Ws 1000 Subdivision and Individual Sewage Disposal System Design rules

ILLICIT DISCHARGE HOTLINE INCIDENT TRACKING SHEET

Copied with permission from: *Illicit Discharge Detection and Elimination-A Guidance Manual for Program Development and Technical Assessments*, CWP, 2004

Incident ID:

Responder Information	
Call taken by:	Call date:
Call time:	Precipitation (inches) in past 24-48 hrs:
Reporter Information	
Incident time:	Incident date:
Caller contact information (*optional*):	

Incident Location *(complete one or more below)*

Latitude and longitude: Or other coordinate system	
Stream address or outfall #:	
Closest street address:	
Nearby landmark:	

Primary Location Description	**Secondary Location Description:**		
☐ Stream corridor *(In or adjacent to stream)*	☐ Outfall	☐ In-stream flow	☐ Along banks
☐ Upland area *(Land not adjacent to stream)*	☐ Near storm drain	☐ Near other water source (storm water pond, wetland, etc.):	
Narrative description of location:			

Upland Problem Indicator Description

☐ Dumping	☐ Oil/solvents/chemicals	☐ Sewage
☐ Wash water, suds, etc.	☐ Other: _____	

Stream Corridor Problem Indicator Description

Odor	☐ None	☐ Sewage	☐ Rancid/Sour	☐ Petroleum (gas)
	☐ Sulfide (rotten eggs); natural gas	☐ Other: Describe in "Narrative" section		
Appearance	☐ "Normal"	☐ Oil sheen	☐ Cloudy	☐ Suds
	☐ Other: Describe in "Narrative" section			
Floatables	☐ None:	☐ Sewage (toilet paper, etc)	☐ Algae	☐ Dead fish
	☐ Other: Describe in "Narrative" section			

Narrative description of problem indicators:
Suspected Violator (name, personal or vehicle description, license plate #, address, etc.):

Example

---SAMPLE---

NOTICE OF VIOLATION

Town of _____ , New Hampshire
Planning and Permitting
Services
Planning~Building~Electrical~Plumbing~Code Enforcement

Address here, New Hampshire 03210
TELEPHONE (603) XXX-XXXX FAX (603) XXX-XXXX

September 1, 2005

Citizen
22 Main Street
Town, NH 03210

RE: Tax Map #_____

Dear Citizen:

On August 30, 2004, _____, Planning Inspector and I responded to a report of a discharge to the storm drain system on property owned by you at _____ Street in _____, NH.

We did confirm the presence of _____. This is to confirm the conversation I had with you. You are in the process of _____ and we agreed you would have the correction completed by _____. We discussed you will _____.

This discharge is in violation of the Town of _____'s Non-Storm Water Discharge Ordinance, which is required by the Clean Water Act. Please keep me informed of how the correction is proceeding. Enclosed is a copy of the Ordinance for your review.

If I can be of further assistance please do not hesitate to contact my office. We are open Mondays from 7:00 a.m. to 5:30 p.m. and Tuesday through Friday, from 8:00 a.m. to 4:30 p.m. I can be reached at 555-5555, extension ___.

Sincerely,

Joe Inspector
Code Enforcement Officer

Example

Appendix C

Outfall Inventory and
Priority Ranking Matrix

				Problem Outfalls				High Priority Outfalls																					Excluded					
														Density of Generating Sites					Age of development and infrastructure															
Outfall ID	Map No.	Receiving Water Impairment		Known or suspected contributions of I&E discharges	Olfactory or visual evidence of sewage	Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, AND bacteria > WQ criteria	Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, AND dark state level of chlorine	Discharge to/near public beach	Discharge to/near public area	Discharge to/near public water supply	Discharge to/near shellfish beds	Past Discharge Complaints	Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, AND bacteria > WQ criteria	car dealers	car washes	gas stations	industrial-complex	industrial-manufacturing	Other	educational areas 40 years old	sewer area > 50 years old	Catchment area serviced by septic systems converted to sewer	Historic combined sewer system that has been separated	Density of septic systems ≥ 30 years old in residential land use	Connected streets in the greater than a single roadway crossing	Discharge to impaired water & potential history of pesticide use	Presence of older industrial operations	Roadway drainage in undeveloped areas with no dwellings and no sanitary sewers	Outfall is drainage for athletic fields, parks or undeveloped green space and associated parking without services	Cross-country drainage alignments through undeveloped land	Overall Ranking (Problem, High, Low, Excluded)	Ranking Score (Number of Boxes Checked)	Notes
BL 01	Baboosic Lake	NHLAK70060905-01-01	Chlorophyll-A, Cyanobacteria Hepatoxic Microcystins, E. Coli, Mercury	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	High Priority	
BL 02	Baboosic Lake	NHLAK70060905-01-01	Chlorophyll-A, Cyanobacteria Hepatoxic Microcystins, E. Coli, Mercury	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	High Priority	
BL 03	Baboosic Lake	NHLAK70060905-01-01	Chlorophyll-A, Cyanobacteria Hepatoxic Microcystins, E. Coli, Mercury	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	High Priority	
BL 04	Baboosic Lake	NHLAK70060905-01-01	Chlorophyll-A, Cyanobacteria Hepatoxic Microcystins, E. Coli, Mercury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low Priority	
BL 05	Baboosic Lake	NHLAK70060905-01-01	Chlorophyll-A, Cyanobacteria Hepatoxic Microcystins, E. Coli, Mercury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low Priority	
BB 01	Beaver Brook	NHRIV70060906-03	Mercury	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	High Priority	
BB 02	Beaver Brook	NHRIV70060906-03	Mercury	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	Low Priority	
BB 03	Beaver Brook	NHRIV70060906-03	Mercury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	Low Priority	
BB 04	Beaver Brook	NHRIV70060906-03	Mercury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low Priority	
BB 05	Beaver Brook	NHRIV70060906-03	Mercury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low Priority	
BB 06	Beaver Brook	NHRIV70060906-03	Mercury	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	Excluded	
BB 07	Beaver Brook	NHRIV70060906-03	Mercury	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	Excluded	
SH 01	Souhegan River	NHRIV70060906-18	Dissolved Oxygen, E. Coli, Mercury	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	High Priority	
SH 02	Souhegan River	NHRIV70060906-18	Dissolved Oxygen, E. Coli, Mercury	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	High Priority	
SH 03	Souhegan River	NHRIV70060906-18	Dissolved Oxygen, E. Coli, Mercury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low Priority	
SH 04	Souhegan River	NHRIV70060906-18	Dissolved Oxygen, E. Coli, Mercury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low Priority	
S 01	Souhegan River	NHRIV70060906-18	Dissolved Oxygen, E. Coli, Mercury	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	20	High Priority	Does not discharge to or near a waterbody
S 02	Souhegan River	NHRIV70060906-18	Dissolved Oxygen, E. Coli, Mercury	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	20	High Priority	Does not discharge to or near a waterbody
S 03	Souhegan River	NHRIV70060906-18	Dissolved Oxygen, E. Coli, Mercury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low Priority	
S 04	Honey Pot Pond	NHLAK70060906-01	Chlorophyll-A, pH, Mercury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Low Priority	Not an impaired water
S 05	Witches Brook	NHRIV70061001-02	Dissolved Oxygen. E.Coli. Mercury. pH	0	0	0	0	0	10	0	0	0	0	10	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	30	High Priority	

Problem Outfalls: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input.* Problem Outfalls need not be screened pursuant to Part 2.3.4.7.b.

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

- discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds;
- determined by the permittee as high priority based on the characteristics listed in the table with scores ≥11

Low Priority Outfalls: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed the table with scores ≤10

Excluded outfalls: Outfalls/interconnections with no potential for illicit discharges may be excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas; with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

Appendix D

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

Appendix to include copies of the following field sampling documents once fully developed in accordance with the 2017 MS4 Permit:

- Dry weather outfall inspection/sampling form
- Wet weather outfall inspection/sampling form
- Manhole inspection form
- Example sample labels (provided by laboratory)
- Example chain-of-custody form(s) (provided by laboratory(s))

EXAMPLES ONLY HAVE BEEN INCLUDED IN THIS APPENDIX; THESE HAVE NOT BEEN FINALIZED BUT ARE ONLY EXAMPLES TO BE FURTHER EVALUATED AND THE SPECIFIC STANDARD OPPERATING PROCEDURES & FORMS FOR NEW HAMPSHIRE COMMUNITIES WILL BE DEVELOPED PER THE APPROVED SCHEDULE.

To be edited & Re-written

SOP 1: DRY WEATHER OUTFALL INSPECTION

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality from these outfalls under both dry weather and wet weather conditions. SOP 2, "Wet Weather Outfall Inspection", covers the objectives of that type of inspection. This SOP discusses the dry weather inspection objectives, and how they differ from wet weather inspection objectives.

During a dry weather period, it is anticipated that minimal flow from stormwater outfalls will be observed. Therefore, dry weather inspections aim to characterize any/all flow observed during a dry weather period and identify potential source(s) of an illicit discharge through qualitative testing; further described in SOP 13, "Water Quality Screening in the Field".

Objectives of Dry Weather Inspections

A dry weather period is a time interval during which less than 0.1 inch of rain is observed across a minimum of 72 hours. Unlike wet weather sampling, dry weather inspections are not intended to capture a "first flush" of stormwater discharge, rather they are intended to identify any/all discharges from a stormwater outfall during a period without recorded rainfall. The objective of inspections during a dry weather period is to characterize observed discharges and facilitate detection of illicit discharges.

Visual Condition Assessment

The attached Dry Weather Outfall Inspection Survey is a tool to assist in documenting observations related to the both quantitative and qualitative characteristics of any/all flows conveyed by the structure during a dry period.

For any visual observation of pollution in a stormwater outfall discharge, an investigation into the pollution source should occur, but the following are often true:

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

Example

Many of these observations are indicators of an illicit discharge. Examples of illicit discharges include: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Additional guidelines for illicit discharge investigations are included in SOP 10, "Locating Illicit Discharges".

The Wet Weather Outfall Inspection Survey includes fields where these and other specific observations can be noted. The inspector shall indicate the presence of a specific water quality indicator or parameter by marking "Yes". If "Yes" is marked, provide additional details in the comments section. If the indictor in question is not present mark "No".

Within the comments section, provide additional information with regard to recorded precipitation totals, or more detailed descriptions of observations made during the inspection and corrective actions taken.

Conditional and Qualitative Considerations

Although many of the parameters listed above are considered to be indicators of illicit discharge, the presence of a parameter is not absolute evidence of an illicit discharge.

Some of these indicators may occur naturally. Orange staining may be the result of naturally occurring iron, and therefore unrelated to pollution. Foam can be formed when the physical characteristics of water are altered by the presence of organic materials. Foam is typically found in waters with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. To determine the difference between natural foam and foam cause by pollution, consider the following:

1. Wind direction or turbulence: natural foam occurrences on the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
2. Proximity to a potential pollution source: some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. Also, the presence of silt in water, such as from a construction site can cause foam.
3. Feeling: natural foam is typically persistent, light, not slimy to the touch.
4. Presence of decomposing plants or organic material in the water.

Some of the indicators can have multiple causes or sources. For example, both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial or naturally occurring sheens are usually silver or relatively dull in color and will break up into a number of small patches of sheen. The cause may be

Example

presence of iron, decomposition of organic material or presence of certain bacteria. Bacterial sheen is not a pollutant but should be noted.

Optical enhancers at high concentrations are sometimes visible to the naked eye as a bluish-purple haze in the water. However, due to physiological variation of the human eye, not all inspectors may be able to identify the presence of these materials, and quantitative testing is the preferred method to confirm the presence of these compounds. Optical enhancers are typically detected through the use of clean, white cotton pads placed within the discharge for several days, dried, and viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to correlate the concentration of optical enhancers in water to other samples collected locally.

Measuring Water Quality

Based on the results of the Visual Condition Assessment, it may be necessary to collect additional data about water quality. Water quality samples can be in the form of screening using field test kits and instrumentation, or by discrete analytical samples processed by a laboratory.

Information on selecting and using field test kits and instrumentation is included in SOP 13, "Water Quality Screening in the Field." The Inspection Survey also provides values for what can be considered an appropriate benchmark for a variety of parameters that can be evaluated in the field.

If the results of screening using field test kits indicate that the outfall's water quality exceeds the benchmarks provided, collection of discrete analytical samples should be considered.

Analytical Sample Collection

Sample collection methods may vary based on specific outfall limitations, but shall follow test procedures outlined in 40 CFR 136. A discrete manual or grab sample can classify water at a distinct point in time. These samples are easily collected and used primarily when the water quality of the discharge is expected to be homogeneous, or unchanging, in nature. A flow-weighted composite sample will classify water quality over a measured period of time. These samples are used when the water quality of the discharge is expected to be heterogeneous, or fluctuating, in nature. Grab samples are more common for dry weather outfall inspections due to the time-sensitive nature of the process.

Protocols for collecting a grab sample shall include the following:

1. Do not eat, drink or smoke during sample collection and processing.
2. Do not collect or process samples near a running vehicle.
3. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
4. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
5. Never touch the inside surface of a sample container or lid, even with gloved hands.

Example

6. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
7. Collect samples while facing upstream and so as not to disturb water or sediments in the outfall pipe or ditch.
8. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
9. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
10. Do not allow any object or material to fall into or contact the collected water sample.
11. Do not allow rainwater to drip from rain gear or other surfaces into sample containers.
12. Replace and tighten sample container lids immediately after sample collection.
13. Accurately label the sample with the time and location.
14. Document on the Wet Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on the Inspection Survey. This creates a reference point for samples.

Analytical Sample Quality Control and Assurance

Upon completion of successful sample collection, the samples must be sent or delivered to a MassDEP-approved laboratory for analytical testing. Quality control and assurance are important to ensuring accurate analytical test results.

Sample preservation is required to prevent contaminate degradation between sampling and analysis, and should be completed in accordance with 40 CFR 136.3.

Maximum acceptable holding times are also specified for each analytical method in 40 CFR 136.3. Holding time is defined as the period of time between sample collection and extraction for analysis of the sample at the laboratory. Holding time is important because prompt laboratory analysis allows the laboratory to review the data and if analytical problems are found, re-analyze the affected samples within the holding times.

Chain of custody forms are designed to provide sample submittal information and document transfers of sample custody. The forms are typically provided by the laboratory and must be completed by the field sampling personnel for each sample submitted to the lab for analysis. The document must be signed by both the person releasing the sample and the person receiving the sample every time the sample changes hands. The sampling personnel shall keep one copy of the form and send the remaining copies to the laboratory with the samples. Custody seals, which are dated, signed and affixed to the sample container, may be used if the samples are shipped in a cooler via courier or commercial overnight shipping.

Attachments

1. Dry Weather Outfall Inspection Survey

Example

Related Standard Operating Procedures

1. SOP 2, Wet Weather Outfall Inspection
2. SOP 10, Locating Illicit Discharges
3. SOP 13, Water Quality Screening in the Field

Example

Outfall ID: _____ **Town:** _____

Inspector: _____ **Date:** _____

Street Name _____

Last rainfall event _____

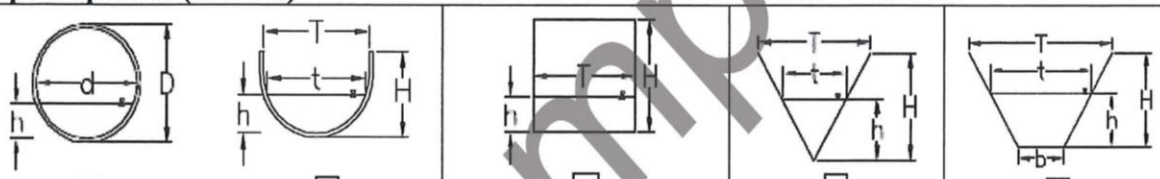
CMRSWC

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☐	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☐	**Ground Inset** ☐ **Sign** ☐	**None** ☐ **Other**_____

Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☐ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)



Rounded Pipe/Swale		Rectangular Pipe/Swale	Triangular Swale	Trapezoidal Swale
☐	☐	☐	☐	☐

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= _____	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☐

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Odor:	Yes ☐	No ☐
Optical enhancers suspected?	Yes ☐	No ☐
Has channelization occurred?	Yes ☐	No ☐
Has scouring occurred below the outlet?	Yes ☐	No ☐

Required Maintenance: Tree Work, Ditch Work, Structural Corrosion, N/A, Remove Trash/Debris, Blocked Pipe, Erosion at Structure, Other

Comments:

Circle All Materials Present:

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	Excessive Vegetation

July 2013

Example

SOP 2: WET WEATHER OUTFALL INSPECTION

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality from these outfalls under both dry weather and wet weather conditions. SOP 1, "Dry Weather Outfall Inspection", covers the objectives of that type of inspection. This SOP discusses wet weather inspection objectives and how they differ from dry weather inspection objectives. The primary difference is that wet weather inspection aims to describe and evaluate the first flush of stormwater discharged from an outfall during a storm, representing the maximum pollutant load managed by receiving water.

Definition of Wet Weather

A storm is considered a representative wet weather event if greater than 0.1 inch of rain falls and occurs at least 72 hours after the previously measurable (greater than 0.1 inch of rainfall) storm event. In some watersheds, based on the amount of impervious surface present, increased discharge from an outfall may not result from 0.1 inch of rain. An understanding of how outfalls respond to different events will develop as the inspection process proceeds over several months, allowing the inspectors to refine an approach for inspections.

Ideally, the evaluation and any samples collected should occur within the first 30 minutes of discharge to reflect the first flush or maximum pollutant load.

Typical practice is to prepare for a wet weather inspection event when weather forecasts show a 40% chance of rain or greater. If the inspector intends to collect analytical samples, coordination with the laboratory for bottleware and for sample drop-off needs to occur in advance.

Visual Condition Assessment

The attached Wet Weather Outfall Inspection Survey should be used to document observations related to the quality of stormwater conveyed by the structure. Observations such as the following can indicate sources of pollution within the storm drain system:

- Oil sheen
- Discoloration
- Trash and debris

For any visual observation of pollution in a stormwater outfall discharge, an investigation into the pollution source should occur, but the following are often true:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.

Example

3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator or disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent and some toilet paper): indicators of illicit discharge.
7. Orange staining: indicator of high mineral concentrations.

Many of these observations are indicators of an illicit discharge. Examples of illicit discharges include: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Additional guidelines for illicit discharge investigations are included in SOP 10, "Locating Illicit Discharges".

The Wet Weather Outfall Inspection Survey includes fields where these and other specific observations can be noted. The inspector shall indicate the presence of a specific water quality indicator or parameter by marking "Yes". If "Yes" is marked, provide additional details in the comments section. If the indictor in question is not present mark "No".

Within the comments section, provide additional information with regard to recorded precipitation totals, or more detailed descriptions of observations made during the inspection and corrective actions taken.

Conditional and Qualitative Considerations

Although many of the parameters listed above are considered to be indicators of illicit discharge, the presence of a parameter is not absolute evidence of an illicit discharge.

Some of these indicators may occur naturally. Orange staining may be the result of naturally occurring iron, and therefore unrelated to pollution. Foam can be formed when the physical characteristics of water are altered by the presence of organic materials. Foam is typically found in waters with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. To determine the difference between natural foam and foam cause by pollution, consider the following:

1. Wind direction or turbulence: natural foam occurrences on the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
2. Proximity to a potential pollution source: some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. Also, the presence of silt in water, such as from a construction site can cause foam.
3. Feeling: natural foam is typically persistent, light, not slimy to the touch.

Example

4. Presence of decomposing plants or organic material in the water.

Some of the indicators can have multiple causes or sources. For example, both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial or naturally occurring sheens are usually silver or relatively dull in color and will break up into a number of small patches of sheen. The cause may be presence of iron, decomposition of organic material or presence of certain bacteria. Bacterial sheen is not a pollutant but should be noted.

Optical enhancers at high concentrations are sometimes visible to the naked eye as a bluish-purple haze in the water. However, due to physiological variation of the human eye, not all inspectors may be able to identify the presence of these materials, and quantitative testing is the preferred method to confirm the presence of these compounds. Optical enhancers are typically detected through the use of clean, white cotton pads placed within the discharge for several days, dried, and viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to correlate the concentration of optical enhancers in water to other samples collected locally.

Measuring Water Quality

Based on the results of the Visual Condition Assessment, it may be necessary to collect additional data about water quality. Water quality samples can be in the form of screening using field test kits or by discrete analytical samples processed by a laboratory.

Information on how to use field test kits is included in SOP 13, "Water Quality Screening with Field Test Kits", and the Wet Weather Outfall Inspection Survey includes fields to document the results of such screening. The Inspection Survey also provides values for what can be considered an appropriate benchmark for a variety of parameters that can be evaluated with field test kits.

If the results of screening using field test kits indicate that the outfall's water quality exceeds the benchmarks provided, collection of discrete analytical samples should be considered.

Analytical Sample Collection

Sample collection methods may vary based on specific outfall limitations but shall follow test procedures outlined in 40 CFR 136. A discrete manual or grab sample can classify water at a distinct point in time. These samples are easily collected and used primarily when the water quality of the discharge is expected to be homogeneous, or unchanging, in nature. A flow-weighted composite sample will classify water quality over a measured period of time. These samples are used when the water quality of the discharge is expected to be heterogeneous, or fluctuating, in nature. Grab samples are more common for wet weather outfall inspections due to the time-sensitive nature of the process.

Protocols for collecting a grab sample shall include the following:

Example

1. Do not eat, drink or smoke during sample collection and processing.
2. Do not collect or process samples near a running vehicle.
3. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
4. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
5. Never touch the inside surface of a sample container or lid, even with gloved hands.
6. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
7. Collect samples while facing upstream and so as not to disturb water or sediments in the outfall pipe or ditch.
8. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
9. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
10. Do not allow any object or material to fall into or contact the collected water sample.
11. Do not allow rainwater to drip from rain gear or other surfaces into sample containers.
12. Replace and tighten sample container lids immediately after sample collection.
13. Accurately label the sample with the time and location.
14. Document on the Wet Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on the Inspection Survey. This creates a reference point for samples.

Analytical Sample Quality Control and Assurance

Upon completion of successful sample collection, the samples must be sent or delivered to a MassDEP-approved laboratory for analytical testing. Quality control and assurance are important to ensuring accurate analytical test results.

Sample preservation is required to prevent contaminant degradation between sampling and analysis and should be completed in accordance with 40 CFR 136.3.

Maximum acceptable holding times are also specified for each analytical method in 40 CFR 136.3. Holding time is defined as the period of time between sample collection and extraction for analysis of the sample at the laboratory. Holding time is important because prompt laboratory analysis allows the laboratory to review the data and if analytical problems are found, re-analyze the affected samples within the holding times.

Chain of custody forms are designed to provide sample submittal information and document transfers of sample custody. The forms are typically provided by the laboratory and must be completed by the field sampling personnel for each sample submitted to the lab for analysis. The document must be signed by both the person releasing the sample and the person receiving the sample every time the sample changes hands. The sampling personnel shall keep one copy of the form and send the remaining copies to the

Example

laboratory with the samples. Custody seals, which are dated, signed and affixed to the sample container, may be used if the samples are shipped in a cooler via courier or commercial overnight shipping.

Attachments

1. Wet Weather Outfall Inspection Survey

Related Standard Operating Procedures

1. SOP 1, Dry Weather Outfall Inspection
2. SOP 10, Locating Illicit Discharges
3. SOP 13, Water Quality Screening in the Field

Example

Outfall I.D.: _____ **Date:** _____

Inspector: _____

Time of Inspection: _____

Street Name _____

Last rainfall event _____

CMRSWC

WET WEATHER OUTFALL INSPECTION SURVEY

Visual Inspection:	Yes	No	Comments (Include probable source of observed contamination):
Color	☐	☐	
Odor	☐	☐	
Turbidity	☐	☐	
Excessive Sediment	☐	☐	
Sanitary Waste	☐	☐	
Pet Waste	☐	☐	
Floatable Solids	☐	☐	
Oil Sheen	☐	☐	
Bacterial Sheen	☐	☐	
Foam	☐	☐	
Algae	☐	☐	
Orange Staining	☐	☐	
Excessive Vegetation	☐	☐	
Optical Enhancers	☐	☐	
Other _____			

Sample Parameters	Analytical Test Method	Benchmark*	Field Screening Result	Full Analytical?
Ammonia[1]	EPA 350.2/SM4500-NH3C	>50.0 mg/L		☐ Yes ☐ No
Specific Conductance[1]	SM 2510B	>2,000		☐ Yes ☐ No
Detergents & Surfactants[2]	EPA 425.1/SM5540C	> 0.25 mg/L		☐ Yes ☐ No
Fluoride[2]	EPA 300.0	>0.25 mg/L		☐ Yes ☐ No
pH[1]	EPA 150.1/SM 4500H	<5		☐ Yes ☐ No
Potassium[1]	EPA 200.7	>20 mg/L		☐ Yes ☐ No

Comments:

[1] – *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] – *Appendix I – Field Measurements, Benchmarks and Instrumentation*, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

Example

SOP 3: CATCH BASIN INSPECTION AND CLEANING

Introduction

Catch basins help minimize flooding and protect water quality by removing trash, sediment, decaying debris, and other solids from stormwater runoff. These materials are retained in a sump below the invert of the outlet pipe. Catch basin cleaning reduces foul odors, prevents clogs in the storm drain system, and reduces the loading of suspended solids, nutrients, and bacteria to receiving waters.

During regular cleaning and inspection procedures, data can be gathered related to the condition of the physical basin structure and its frame and grate and the quality of stormwater conveyed by the structure. Observations such as the following can indicate sources of pollution within the storm drain system:

- Oil sheen
- Discoloration
- Trash and debris

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

Observations such as the following can indicate a potential connection of a sanitary sewer to the storm drain system, which is an illicit discharge.

- Indications of sanitary sewage, including fecal matter or sewage odors
- Foaming, such as from detergent
- Optical enhancers, fluorescent dye added to laundry detergent

Each catch basin should be cleaned and inspected at least annually. Catch basins in high-use areas may require more frequent cleaning. Performing street sweeping on an appropriate schedule will reduce the amount of sediment, debris, and organic matter entering the catch basins, which will in turn reduce the frequency with which structures need to be cleaned.

Example

Cleaning Procedure

Catch basin inspection cleaning procedures should address both the grate opening and the basin's sump. Document any and all observations about the condition of the catch basin structure and water quality on the Catch Basin Inspection Form (attached).

Catch basin inspection and cleaning procedures include the following:

1. Work upstream to downstream.
2. Clean sediment and trash off grate.
3. Visually inspect the outside of the grate.

4. Visually inspect the inside of the catch basin to determine cleaning needs.
5. Inspect catch basin for structural integrity.
6. Determine the most appropriate equipment and method for cleaning each catch basin.
    a. Manually use a shovel to remove accumulated sediments, or
    b. Use a bucket loader to remove accumulated sediments, or
    c. Use a high pressure washer to clean any remaining material out of catch basin while capturing the slurry with a vacuum.
    d. If necessary, after the catch basin is clean, use the rodder of the vacuum truck to clean downstream pipe and pull back sediment that might have entered downstream pipe.
7. If contamination is suspected, chemical analysis will be required to determine if the materials comply with the Massachusetts DEP Hazardous Waste Regulations, 310 CMR 30.000 (http://www.mass.gov/dep/service/regulations/310cmr30.pdf). Chemical analysis required will depend on suspected contaminants. Note the identification number of the catch basin on the sample label, and note sample collection on the Catch Basin Inspection Form.
8. Properly dispose of collected sediments. See following section for guidance.
9. If fluids collected during catch basin cleaning are not being handled and disposed of by a third party, dispose of these fluids to a sanitary sewer system, with permission of the system operator.
10. If illicit discharges are observed or suspected, notify the appropriate Department (see "SOP 10: Addressing Illicit Discharges").
11. At the end of each day, document location and number of catch basins cleaned, amount of waste collected, and disposal method for all screenings.
12. Report additional maintenance or repair needs to the appropriate Department.

Disposal of Screenings

Catch basin cleanings from storm water-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste. MassDEP does not routinely require stormwater-only catch basin cleanings to be tested before disposal, unless there is evidence that they have been contaminated by a spill or some other means.

Screenings may need to be placed in a drying bed to allow water to evaporate before proper disposal. In this case, ensure that the screenings are managed to prevent pollution.

Attachments

1. Catch Basin Inspection Form

Related Standard Operating Procedures

1. SOP 10, Addressing Illicit Discharges
2. SOP 13, Water Quality Screening in the Field

Example

Job No.: _____ **Town:** _____

Inspector: _____ **Date:** _____

CMRSWC

CATCH BASIN INSPECTION FORM

Catch Basin I.D.	_____	**Final Discharge from Structure?** Yes ☐ No ☐ **If Yes, Discharge to Outfall No:**_____	
Catch Basin Label:	**Stencil** ☐ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Basin Material:	Concrete ☐ Corrugated metal ☐ Stone ☐ Brick ☐ Other: _____ ☐	**Catch Basin Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐
Pipe Material:	Concrete ☐ HDPE ☐ PVC ☐ Clay Tile ☐ Other:_____	**Pipe Measurements:**	Inlet Dia. (in): d= ____ Outlet Dia. (in): D= ____

Required Maintenance/ Problems (check all that apply):

- ☐ Tree Work Required
- ☐ New Grate is Required
- ☐ Pipe is Blocked
- ☐ Frame Maintenance is Required
- ☐ Remove Accumulated Sediment
- ☐ Pipe Maintenance is Required
- ☐ Basin Undermined or Bypassed
- ☐ Cannot Remove Cover
- ☐ Ditch Work
- ☐ Corrosion at Structure
- ☐ Erosion Around Structure
- ☐ Remove Trash & Debris
- ☐ Need Cement Around Grate

Other: _____

Catch Basin Grate Type :	**Sediment Buildup Depth :**	**Description of Flow:**	**Street Name/ Structure Location:**
Bar: ☐ Cascade: ☐ Other:_____ Properly Aligned: Yes ☐ No ☐	0-6 (in): ____ 6-12(in): ____ 12-18 (in): ____ 18-24 (in): ____ 24 + (in): ____	Heavy ☐ Moderate ☐ Slight ☐ Trickling ☐	

***If the outlet is submerged check yes and indicate approximate height of water above the outlet invert.** h above invert (in):___ Yes ☐ No ☐

☐ **Flow** ☐ **Standing Water** **(check one or both)**	**Observations:**		**Circle those present:**
	Color:		Foam / Oil Sheen
	Odor:		Sanitary Waste / Bacterial Sheen
Weather Conditions :	Dry > 24 hours ☐	Wet ☐	Orange Staining / Floatables
Sample of Screenings Collected for Analysis? Yes ☐ No ☐			Excessive sediment / Pet Waste
Comments:			Other:_____ / Optical Enhancers

Example

Dry Weather Outfall Inspection Form

Location Information

Date: _____ **Inspector:** _____

Time: _____

Outfall ID: _____

Outfall Location: _____

Receiving Waterbody: _____

Photo Taken: Yes No **Photo ID:** _____

Weather: Clear Cloudy **Approximate Temp:** _____ **Wind Present:** Yes No

Precipitation in the past 3 days: No Yes _____ inches

Pipe Flow: None Trickle Steady 1/4 pipe flow or more

Seepage Flow: None Trickle Steady 1/4 pipe flow or more

Color (if flow is present): _____

Inspection Information *Select all that are applicable*

Obvious Debris/Pollution:		**Odor:**		**Water Clarity:**	
None	0	None/Natural	0	Clear	0
Foam	3	Musty	5	Cloudy	5
Staining	5	Sewage/septic	10		
Floating Green Scum	8	Petroleum	10	Opaque	10
Oil / Film	9				
Vegetative Mat/or Gray Mat	9				
Sewage Solids	10				
TOTAL		**TOTAL**		**TOTAL**	

GRAND TOTAL SCORE = _____

Additional Information

Sediment Condition: Open 1/4 Full 1/2 Full 3/4 Full Plugged

Structure Condition: Excellent Good Fair Poor

Trash/litter present: Yes No **Yard waste observed:** Yes No

General Comments:

Potential Sources / Actions Taken:

Sample collected? Yes No

By whom? _____

Parameters:	Results:

Follow up required: Yes No

NOTE: Sketch site map/note on back.

Example

NOTE: This information is to accompany the Dry Weather Outfall Inspection Form.

Odor – Most strong odors, especially gasoline, oils, and solvents are likely associated with high responses on the toxicity screening test.

Stale sanitary wastewater: sewage
Detergent, perfume: Laundromat or household laundry
Sulfur ("rotten eggs"): industries that discharge sulfide compounds or organics (meat packers, canneries, dairies)
Oil and gas: facilities associated with vehicle maintenance or petroleum product storage (gas stations) or petroleum refineries
Rancid-sour: food preparation facilities (restaurants, hotels)

Color – Important indicator of inappropriate industrial sources. Dark colors, such as brown, gray, or black are the most common.

Yellow: chemical plants, textile, and tanning plants
Brown: meat packers, printing plants, metal works, stone and concrete, fertilizers, and petroleum refining facilities [note: can be from natural organic acids if a wetland is upstream]
Green: chemical plants, textile facilities
Red: meat packers [note: can be from organic acids if a wetland is upstream]
Gray: dairies

Turbidity – The cloudy appearance of water caused by the presence of suspended or colloidal matter. In dry weather, high turbidity is often a characteristic of undiluted industrial discharges.

Cloudy: sanitary wastewater, concrete or stone operations, fertilizer facilities, automotive dealers
Opaque: food processors, lumber mills, metal operations, pigment plants

Floatable matter – a contaminated flow may contain floating solids or liquids directly related to industrial or sanitary wastewater pollution. Floatables of industrial origin may include animal fats, spoiled food, oils, solvents, sawdust, foams, packing materials, or fuel.

Oil sheen: petroleum refiners or storage facilities and vehicle service facilities. [note: there is a type of bacteria that looks like an oil sheen. If you take a stick and swirl around the sheen, it will break up into blocky pieces if it is the bacteria. A true oil sheen will quickly re-form and not look blocky.]
Toilet paper bits, fecal bits, food particles: sanitary wastewater
Soap suds: if white or a clear sheen, laundry discharge (check odor) [note: can also occur from natural surfactants; usually off-white or tan with an earthy-fishy odor.]

Deposits and Stains – Any type of coating near the outfall, usually a dark color. Deposits and stains will often contain fragments of floatable substances.

Lots of sediment: construction site erosion, sand and gravel pits, winter road applications
Oil stain: petroleum storage, vehicle service facilities, petroleum refineries
Rusty: precipitates from iron-rich water (natural or industrial) [note: if slimey and clumpy, it could be iron bacteria]
Grayish-black deposits and hair: leather tanneries
White crystalline powder: nitrogenous fertilizer waste

Vegetation – Vegetation surrounding an outfall may show the effects of industrial pollutants. Decaying organic materials coming from various food product wastes would cause an increase in plant life, while the discharge of chemical dyes and inorganic pigments from textile mills could noticeably decrease vegetation. It is important not to confuse the adverse effects on high storm water flows on vegetation with highly toxic dry-weather intermittent flows.

Excessive growth: food product facilities, fertilizer runoff (lawns, golf courses, and farms)
Inhibited growth: high storm water flows, beverage facilities, printing plants, metal product facilities, drug manufacturing, petroleum facilities, vehicle service facilities, and automobile dealers

Damage to Outfall Structures – Outfall damage can be caused by severely contaminated discharges that are very acidic or basic in nature. Primary metal industries have a strong potential to cause outfall structure damage because their batch dumps are highly acidic. Poor construction, hydraulic scour, and old age can also negatively affect the condition of al outfall structure.

Concrete or spalling (breaking off into chips or layers): industrial flows
Peeling paint: industrial flows
Metal corrosion: industrial flows

This sheet was courtesy of the NHDES (modified from Pitt et al., 1993 Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems: a User's Guide. EPA Office of research and Development, EPA/600/R-92/238).

Example

Appendix E

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

Appendix to include copies of water quality analysis instructions, procedures, and SOPs for all sample parameters and all meters or field test kits that are used for analysis once fully developed in accordance with the 2017 MS4 Permit. This includes the manufacturer's instructions for how to use field test kits as well as the manufacturer's instructions or user's manual for any field instrumentation.

EXAMPLES ONLY HAVE BEEN INCLUDED IN THIS APPENDIX; THESE HAVE NOT BEEN FINALIZED BUT ARE ONLY EXAMPLES TO BE FURTHER EVALUATED AND THE SPECIFIC STANDARD OPPERATING PROCEDURES & FORMS FOR NEW HAMPSHIRE COMMUNITIES WILL BE DEVELOPED PER THE APPROVED SCHEDULE.

To Be edited or Re-written

SOP 13: WATER QUALITY SCREENING IN THE FIELD

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality within the MS4 system under both dry weather and wet weather conditions. SOP 1, "Dry Weather Outfall Inspection" and SOP 2, "Wet Weather Outfall Inspection", cover the objectives of these activities and how water quality parameters can be collected during both types of inspections. SOP 3, "Catch Basin Inspection and Cleaning", describes how this operations and maintenance activity can serve as an additional opportunity to collect water quality data.

SOP 2 included detailed information on how to collect discrete analytical samples to be processed by a laboratory. In contrast, this SOP addresses screening-level measurements than can be collected at outfalls, catch basins, receiving waters, or other water bodies. The measurements can be collected with field test kits or with portable meters.

Water quality screening data collected in this manner can feed into an illicit discharge detection and elimination investigation, like the process described in SOP 10, "Locating Illicit Discharges".

Visual Condition Assessment

SOP 1, SOP 2, and SOP 3 describe a Visual Condition Assessment to collect observations related to the quality of stormwater conveyed by an engineered storm drain system. These observations may include such visual evidence and/or potential pollutants as:

- Foaming (detergents)
- Discoloration
- Evidence of sanitary waste
- Optical enhancers (fluorescent dyes added to laundry detergent); and
- Turbidity

If a Visual Condition Assessment indicates the presence of these pollutants, it may be necessary to quantify the extent of each, and gather data on other parameters that cannot be visually observed but can be measured using field kits or meters. These parameters include:

- Ammonia
- Chloride (present in treated drinking water but not groundwater)
- Conductivity
- Fluoride
- Hardness
- pH
- Potassium

Example

Field Kits and Sampling Methods Available

In recent drafts of new MS4 Permits, U.S. EPA Region 1 has identified several test kits that are acceptable for use in the field, and other regulatory agencies have also completed similar reviews. The following table shows field test kits and portable meters that can be used for screening parameters.

Table SOP 13-1
Field Measurements, Test Kits, and Instrumentation

Analyte or Parameter	Instrumentation (Portable meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Bacteria	Bacteria field test kits require 24-hour window	
Boron	N/A	Hanna™ HI 38074 Taylor™ K-1541
Chloride	CHEMetrics™ V-2000 Colorimeter Hach™ Pocket Colorimeter™ II LaMotte™ DC1200 Colorimeter	CHEMetrics™ K-2002 through K-2070 Hach™ CDS-DT Hach™ Chloride QuanTab® Test Strips
Color		Hach™ ColorDisc
Conductivity	CHEMetrics™ I-1200	N/A
Detergents (Surfactants)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Fluoride	CHEMetrics™ V-2000 Colorimeter Hach™ Pocket Colorimeter™ II	N/A
Hardness	N/A	CHEMetrics™ K-1705 and K-1710 CHEMetrics™ K-4502 through K-4530 Hach™ HA-DT Hach™ Hardness Test Strips
Optical enhancers	Field tests still under development	
pH	CHEMetrics™ I-1000	Hach™ 17J through 17N Hach™ pH Test Strips
Potassium	Horiba™ Cardy C-131	LaMotte™ 3138 KIW
Turbidity	CHEMetrics™ I-1300	N/A

Example

Each field test kit will include instructions specific to that test kit, and most kits are available in configurations that detect different ranges of the parameter. For example, the CHEMetrics™ detergents kit K-9400 shown above detects concentrations of 0 to 3 milligrams per liter (mg/L) while the K-9404 kit detects concentrations of 0 to 1,400 mg/L.

The table below shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table SOP 13-2
Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>50.0 mg/L
Conductivity	>2,000
Detergents (Surfactants)	> 0.25 mg/L
Fluoride	>0.25 mg/L
pH	<5
Potassium	>20 mg/L

Example

If and when water quality screening samples, whether using field test kits or portable meters, exceed these benchmark concentrations, the inspector should consider collecting analytical samples for laboratory analysis.

Advantages and Disadvantages of Field Testing

Field test kits can be convenient for use as a screening tool, initial purchase costs are low (typically $0.50 to $5.00 for the kits included in Table SOP 13-1), and the costs are far less than full analyses at a laboratory. However, some disadvantages of this screening method include:

- Limited shelf life
- Labor cost associated with inspector's time
- Generation of wastes, including glass vials and used reagent
- Steps and processes for each kit can vary widely, resulting in errors
- Trained staff are required in order to effectively utilize kits
- Not all kits are accepted by all regulatory agencies
- Limited useful detection range

Portable instrumentation such as the colorimeters shown in Table SOP 13-1 have the benefit of providing accurate readings, measure to low detection limits, and can be purchased pre-programmed to measure concentrations of most parameters required. Disadvantages of portable instrumentation include:

- High initial purchase cost
- Requirement for ongoing calibration and maintenance
- Individual probes require periodic replacement
- Specific storage requirements to maintain calibration
- Trained staff are required in order to effectively utilize meters

Related Standard Operating Procedures

1. SOP 1, Dry Weather Outfall Inspection
2. SOP 2, Wet Weather Outfall Inspection
3. SOP 3, Catch Basin Cleaning and Inspection
4. SOP 10, Locating Illicit Discharges

Example

WATER QUALITY SCREENING FORM

Outfall I.D.			
Outfall Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Most Recent Storm Event			

FIELD WATER QUALITY SCREENING RESULTS

Sample Parameter	Field Test Kit or Portable Instrument Meter	Benchmark	Field Screening Result	Full Analytical Required?
Ammonia[1]		> 50.0 mg/L		☐ Yes ☐ No
Boron[1]		> 0.35 mg/L		☐ Yes ☐ No
Chloride[2]		230 mg/L		☐ Yes ☐ No
Color[1]		> 500 units		☐ Yes ☐ No
Specific Conductance[1]		> 2,000 µS/cm		☐ Yes ☐ No
Detergents & Surfactants[3]		> 0.25 mg/L		☐ Yes ☐ No
Fluoride[3]		> 0.25 mg/L		☐ Yes ☐ No
Hardness[1]		< 10 mg/L or > 2,000 mg/L		☐ Yes ☐ No
pH[1]		< 5		☐ Yes ☐ No
Potassium[1]		> 20 mg/L		☐ Yes ☐ No
Turbidity[1]		> 1,000 NTU		☐ Yes ☐ No

[1] – *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] –*Env-Ws 1703.21 Water Quality Criteria for Toxic Substances*, State of New Hampshire Department Surface Water Quality Regulations.

[3] – *Appendix I – Field Measurements, Benchmarks and Instrumentation*, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

Example

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FULL ANALYTICAL TESTING WATER QUALITY RESULTS

Sample Parameter	Analytical Test Method	Sample Collection (Time/Date)	Testing Lab	Analytical Testing Result
Ammonia	EPA 350.2/SM4500-NH3C			
Bacteria	E coli: 1103.1; 1603 Enterococcus: 1106.1; 1600			
Boron	EPA 212.3			
Chloride	EPA 9251			
Color	EPA 110.2			
Specific Conductance	SM 2510B			
Detergents & Surfactants	EPA 425.1/SM5540C			
Fluoride	EPA 300.0			
Hardness	EPA 130.1/SM 2340B			
Optical Enhancers	N/A*			
pH	EPA 150.1/SM 4500H			
Potassium	EPA 200.7			
Turbidity	SM 2130B			

*- There is presently no USEPA Standard Method for analysis of optical enhancers. Typically, sample pads are described as with "Present" or "Not Present" for fluorescing dye when exposed to UV light or a fluorometer.

Example

Appendix F

IDDE Employee Training Record

STORMWATER EMPLOYEE TRAINING

NO.	NAME	DEPARTMENT	DATE OF MEETING
1	Richard Keyes	Public Works Department	June 20, 2019
2	Eric Slosek	Public Works Department	June 20, 2019
3	Jeff Chancey	Public Works Department	June 20, 2019
4	Drew Pollio	Public Works Department	June 20, 2019
5	Palmer Belowski	Public Works Department	June 20, 2019
6	Rich Rac	Public Works Department	June 20, 2019
7	Scott Brown	Public Works Department	June 20, 2019
8	Justin Moshauses	Public Works Department	June 20, 2019
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			

Appendix G

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

Appendix to provide manufacturer instructions, manuals and procedures and any in-house SOPs used to perform source isolation and confirmation for illicit discharges once fully developed in accordance with the 2017 MS4 Permit.

EXAMPLES ONLY HAVE BEEN INCLUDED IN THIS APPENDIX; THESE HAVE NOT BEEN FINALIZED BUT ARE ONLY EXAMPLES TO BE FURTHER EVALUATED AND THE SPECIFIC STANDARD OPPERATING PROCEDURES & FORMS FOR NEW HAMPSHIRE COMMUNITIES WILL BE DEVELOPED PER THE APPROVED SCHEDULE.

Standard Operating Procedure for:	
A.6 IDDE: Tracing Illicit Discharges	
Purpose of SOP:	To provide a quick reference list of items to keep in mind during tracing activities to efficiently and systematically identify the source of an illicit discharge.

Always:

- Review / consider information collected when illicit discharge was initially identified (Incident Tracking Sheet or Dry Weather Outfall Inspection Form).
- Survey the general area / surrounding properties to identify potential sources of the illicit discharge as a first step.
- Trace illicit discharges using visual inspections of upstream points as a second step.
- Document tracing results for future reference.

Whenever Possible:

- Use weirs, sandbags, dams, or optical brightener monitoring traps to collect or pool intermittent discharges during dry weather.
- Smoke test or televise the storm drain system to trace high priority, difficult to detect illicit discharges.
- Dye test individual discharge points within suspected buildings.
- If the source cannot be found, add the location to a future inspection program.
- Collect bacterial samples of flowing discharges to confirm/refute illicit discharge.

Never:

- Never enter private property without permission.
- Never put yourself in danger.

Example

Standard Operating Procedure for:	
A.7 IDDE: Removing Illicit Discharges	
Purpose of SOP:	Proper removal of an illicit discharge will ensure it does not recur. Using legal methods for the removal will minimize the municipality's liability. This SOP provides an overview of illicit discharge removal procedures.

Always:

- Determine who is financially responsible; and follow associated procedures on Table 2-9.
- Suspend access to storm drain if threats of death or serious physical harm to humans or the environment are possible.
- If the discharge is from an exempt facility (see Table 2-9) notify the facility operator and the appropriate enforcement authority.
- Repair/correct cause of discharge if municipality is responsible.
- Collect a confirmatory sample after the removal. Seek technical assistance from NHDES, if needed.

Whenever Possible:

- Issue a Notice of Violation for violations of the municipal ordinance.

Never:

- Never repair/correct cause of discharge on private property until directed to do so by the appropriate municipal authority (storm water program manager, etc.)

Example

TABLE 2-9:
NOTIFICATION AND REMOVAL PROCEDURES FOR ILLICIT DISCHARGES INTO THE MUNICIPAL SEPARATE STORM SEWER SYSTEM

Financially Responsible Party	Source Identified	Enforcement Authority	Procedure to Follow
Private Property Owner	One-time illicit discharge (e.g., spill, dumping, etc.)	Ordinance enforcement authority (e.g.., Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Issue fine
Private Property Owner	Intermittent or continuous illicit discharge from legal connection	Ordinance enforcement authority (e.g.., Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Determine schedule for removal • Confirm removal
Private Property Owner	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g., infiltration or failed septic)	Plumbing Inspector	• Notify plumbing inspector
Municipal	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g., failed sewer line)	Ordinance enforcement authority (e.g., Code Enforcement Officer)	• Issue work order • Schedule removal • Remove connection • Confirm removal
Exempt 3rd Party • New Hampshire Department of Transportation (NHDOT) (in selected urbanized areas) • University of New Hampshire (UNH) (Durham) • Youth Development Center (Manchester) • Stafford County Complex (Dover) • Industrial Facilities with selected SIC codes	Any	USEPA	• Notify exempt third party and USEPA of illicit discharge

Example

any questions regarding this permit please contact Suzanne Warner at warner.suzanne@epa.gov or (617) 918-1383.

Sincerely,

Thelma Murphy, Chief
Stormwater and Construction Permits Section
Office of Ecosystem Protection
United States Environmental Protection Agency, Region 1