# EPA Region 1 MS4 Stormwater General Permits and LID Training Clinic

Track B: Technical

**New Illicit Discharge Detection & Elimination (IDDE) and Monitoring Requirements**

**NHDES**

**Concord, NH**

**May 12, 2011**

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## Topics to cover

- What is IDDE?
- What's new in the draft permit?
- System mapping
- Written IDDE program
- Outfall catchment assessment
- Systematic procedures for locating and removing sources
- Outfall inventory
- Stormdrain investigations
- Outfall monitoring


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## What is an illicit discharge?

- Any discharge to MS4 storm sewer that is not stormwater
  - leaking sanitary sewers or water mains
  - illegal sewage connections
  - illegal floor drain connections
  - seasonal draining of swimming pools
  - break-out from failing septic systems
  - spills and dumping
- Flows can be continuous, intermittent, or transitory
- Direct or indirect entry into system

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## Section 1.4 Allowable Non-stormwater Discharges

- May include:
  - Flows from fire fighting
  - Water line flushing
  - Uncontaminated pumped groundwater
  - Flow from footing drains
  - Runoff from lawn irrigation
- 2.3.4.4 Allowable unless identified by permittees, EPA, or state as a significant pollutant
- Permittees to determine and document if these discharges are not significant

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## Common Sources of Illicit Discharges

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

*% of programs reporting confirming sources from CWP 2003 survey of IDDE programs*


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## Your IDDE program should already include:

- Regulatory authority to prohibit discharges and implement enforcement actions
- MS4 map showing all outfall locations and receiving waters
- IDDE plan with procedures to locate discharges, sources, and document removal
- Education of town employees and public

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# What's New in the Draft NH Permit

- SSO inventory
- Updates and additional detail to storm sewer map
- Detailed written IDDE program
- Outfall inventory
- Catchment prioritization & assessment
- Investigation procedures
- Annual training
- Additional reporting requirements
- Outfall monitoring


*Excerpt: EPA's summary table of major permit changes*

# 2.3.4.2 Sanitary Sewer Overflows (SSOs)

- Known SSO's discharging to MS4
  - Locations of SSOs;
  - Dates & times of known discharges;
  - Estimated discharge volume;
  - Description with known or suspected sources;
  - Mitigation & corrective measures planned, implemented, or implementation schedule established
- Complete inventory within **60 days** of effective permit
- Report new SSOs to EPA/state & fix immediately
- Report progress and update inventory annually

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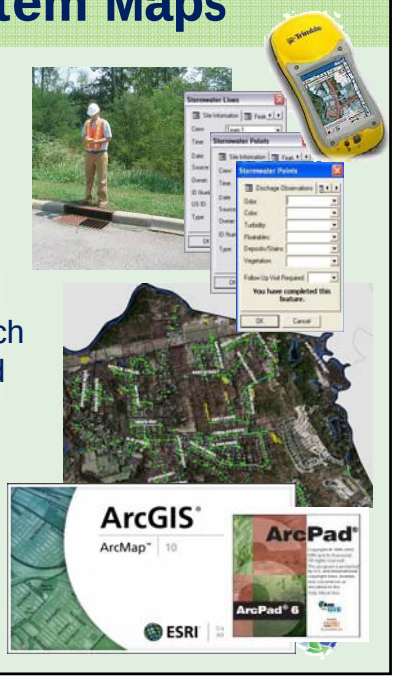
## 2.3.4.5 MS4 System Maps

- Completed by Year 2 of effective permit date
- Must include:
  - All outfalls, receiving waters, and resource waters
  - Storm drainage infrastructure (catch basins, manholes, pipes, BMPs, and interconnections to other MS4s)
  - Key sanitary sewer info including combined sewers, if any
  - Outfall catchments with land use, impervious cover
- Hard copy or GIS




## *What's Different in Massachusetts*

2.4.4.6(d) Additional mapping requirements for MS4s in the **Charles River/stormwater TMDLs Watersheds:**

- Infrastructure
  - sewer flow direction and type; select rim and invert elevations
  - separate storm sewer catchments; sanitary & combined sewersheds
  - sewer alignments; lift stations; etc
- O&M, Investigations/Remediation, Capital Projects
  - Sewer cleaning and repair; septic system information; planned roadway or utility projects
- Phosphorus Control Mapping Components
  - Land uses; soils; parking lots >5,000 sf; greenspace where turf is fertilized; municipal land for potential retrofits; nutrient loading locations

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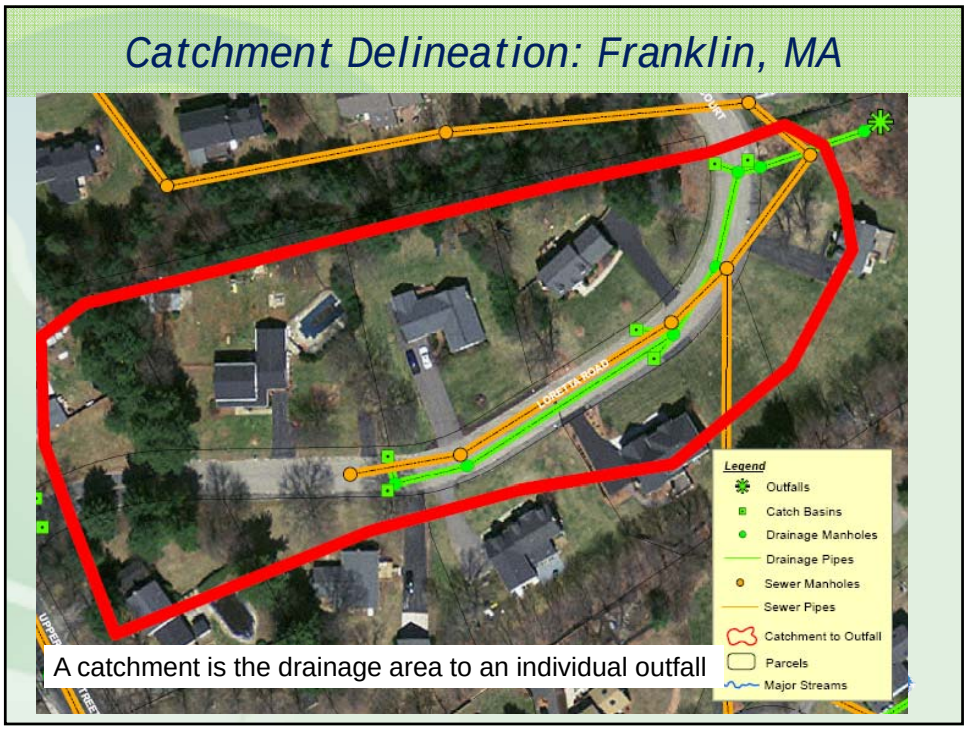
Nice, but more is required under Draft Permit!
Greenville, New Hampshire
Illicit Discharge Detection & Elimination (IDDE) Investigation
High Street
Main Street
Church
Diner
Dam
the stormwater network that drains to outfalls SGR 1825 and SGR 1840.


Catchment Delineation: Franklin, MA
A catchment is the drainage area to an individual outfall
Legend
Outfalls
Catch Basins
Drainage Manholes
Drainage Pipes
Sewer Manholes
Sewer Pipes
Catchment to Outfall
Parcels
Major Streams

## *The importance of Connectivity*


## 2.3.4.6 Written IDDE Program

- Completed no later than 2 years from permit date
- Must include:
  a) Legal authority *(should be done already)*
  b) Assessment of illicit discharge potential of all catchment (identify Priority and Problem catchments)
  c) Protocol to clearly identify responsibilities for ID elimination, confirm fix, tracking progress
  d) Systematic procedures for locating and removing illicit connections, and monitoring
  e) Illicit discharge prevention procedures
  f) Indicators of IDDE Program progress
  g) Annually employee training

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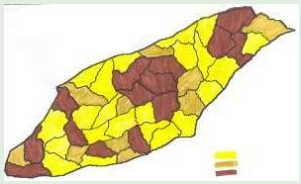
## 2.3.4.6(b) Catchment Assessments

Use screening factors to prioritize catchments by illicit potential:

- Past discharge complaints/reports
- Poor dry weather water quality
- Density of generating sites
- Outfall density
- Age of surrounding development
- Past sewer conversions (from septic)
- Former combined sewers
- Density of older industrial operations
- Density of aging or failing sewers or septic systems
- Presence of culverted streams
- Water resource priorities



Key:
Low IDP risk
Medium IDP risk
High IDP risk

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## 2.3.4.6(b) Catchment Assessments

- Prioritize for field investigations
- Early ID of Problem Catchments
  - Where there are known or suspected illicits
  - Continue and/or initiate isolation and removal procedures
- High, medium, low risk catchments
  - Conduct outfall inventories and catchment investigations of drainage network starting in high risk catchments
- Completed by end of Year 1

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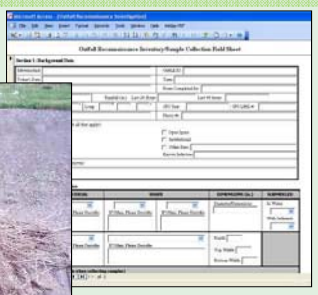
## 2.3.4.6(d) Locating Illicits

- Inventory of all MS4 outfalls
  - Location, condition, dimensions, shape, material, sensory observations
  - labeled with a unique identifier; and
  - 25% of all outfalls inventoried each year starting Yr 2 in priority catchments;
- Sampling of dry weather flows at outfalls-Conductivity, turbidity, pH, chlorine, temp, surfactants, potassium, ammonia, bacteria *(fresh or marine sp.)*
- Tracking & Source Identification
  - Systematic stormdrain investigation from top or bottom of catchment
  - Open all junction manholes
  - Start within 27 months from date of permit


## *Key Outfall Indicators*

- Outfall Damage
- Deposits/Stains
- Abnormal Vegetation
- Poor Pool Quality
- Pipe Benthic Growth
- Floatables
- Turbidity
- Odor
- Color
- Flow rate
- Oil sheen




## Sampling Dry Weather Flows

- Field kits
- Pool sampling
- Outfall damming (caulk dams)
- Optical brightener monitoring
- Toxicity testing
- Odd hour sampling
- Automatic samplers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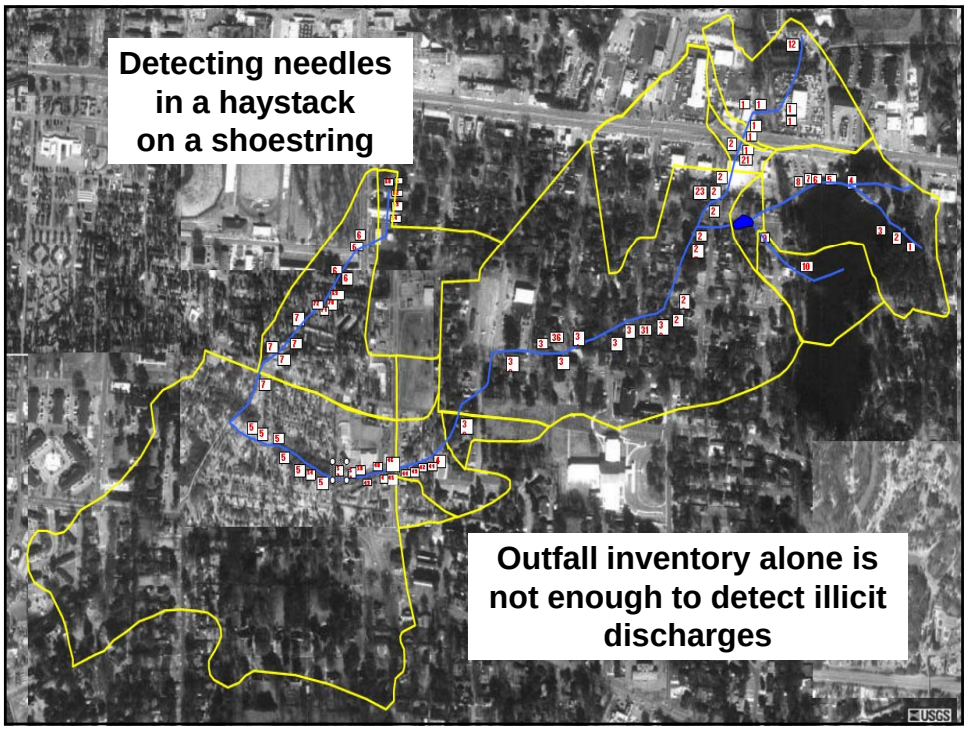

## Storm Drain Network Investigations

2.4.8.8 (d)Draft permit explicitly stipulates minimum procedures:

- Systematic inspection of junction manholes in continuous upstream or downstream manner
- junction manholes must be opened and visual/olfactory inspections performed
- If flow is observed, sample must be taken for ammonia and surfactants, at minimum
- Inspect more manholes, as necessary
- Isolate to a single pipe between two manholes

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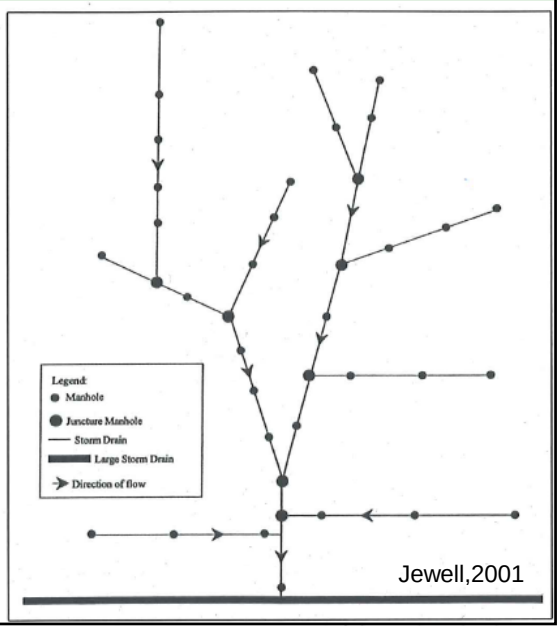
## Storm Drain Network Investigations

- Junction manhole a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments
- Timeframe for completing investigations in all catchments?




Jewell,2001

## *What's Different in Massachusetts*

- Open key junction manholes
- For MS4s in the Charles River/TMDL Watersheds:
  - Determine if storm drains must be cleaned prior to investigations;
  - Where no dry-weather flow is observed in a suspected junction manholes, dam inflow pipes for 48 hours to capture intermittent flows; and
  - Where dry-weather flow is observed, samples taken
    - Under dry weather criteria (< 0.1 inches rain within 24 hour period)
    - May require additional parameter analysis if below surfactant threshold

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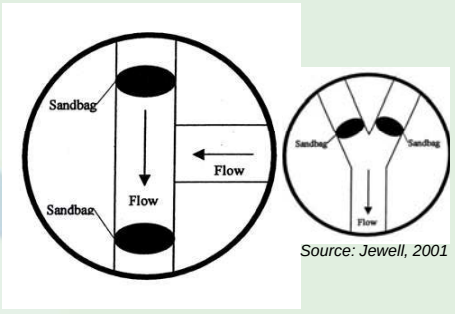
## *Isolating transitory flows in the stormdrain network:*

In suspect manholes

- Preferred: Placement of sandbags within key junction manholes to temporarily dam flows (48 hours)
- Anchor OBM absorbent pads in storm drains to capture dry weather flows and determine presence of flow and/or detergents




Source: Jewell, 2001

Source: R. Pitt

Source: Sargent and Castonguay, 1998

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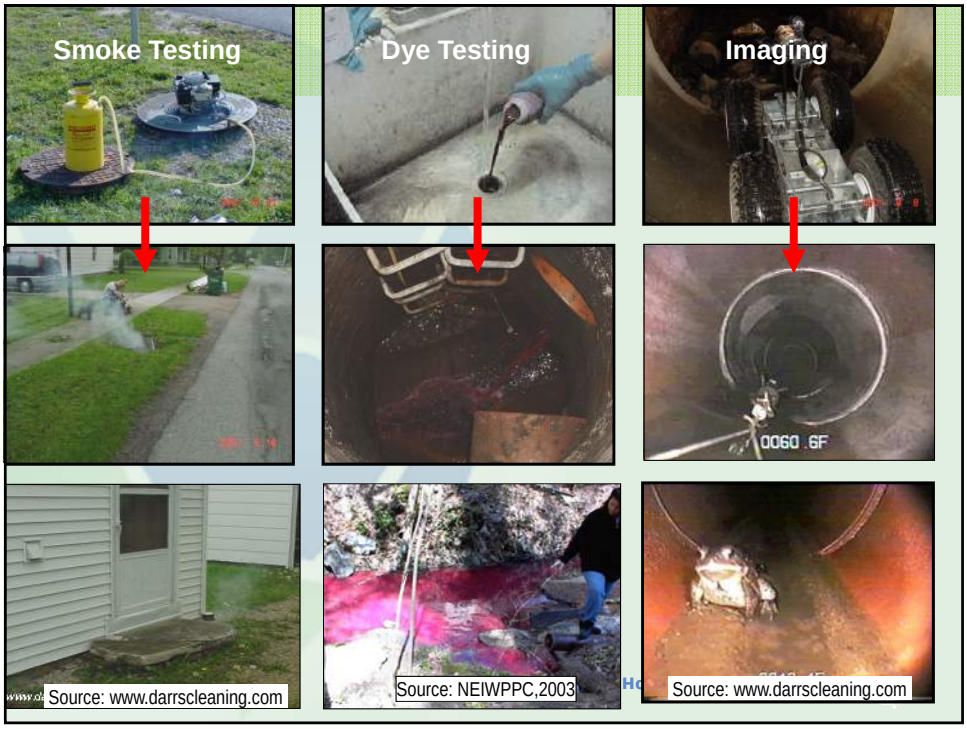
Smoke Testing
Dye Testing
Imaging
Source: www.darrscleaning.com
Source: NEIWPPC,2003
Source: www.darrscleaning.com


Obstruction
Cross-Connection
Illicit Discharge
Groundwater Infiltration

## *Additional Upland Analysis*

- Use MS4 mapping to pinpoint likely generating sources
- Infrared Photography with gray or color scales representing differences in temperature and emissivity of objects used to locate sewage discharge

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## *"Lucky IDDE" (Tom Lawrence, City of Memphis, TN)*

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## *Discharge Removal*

- When source is identified and confirmed document:
  - location
  - Description of discharge
  - Method and date of discovery
  - Date of removal, repair, or enforcement action
  - Estimated flow removed
- Eliminate discharge within 30 days of detection *(2.3.4.2)*
  - *No longer than 6 months*
- Report annually

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## *Methods to Fix and Confirm?*

Fixing:

- Varies depending on type and location
- Develop a pre-approved list of certified/licensed contractors
- Use in-house contractors/staff to repair as part of routine maintenance activities

Confirming:

- At source
- Downstream (sampling or sand bagging to ensure only local discharge present)
- Dye testing if internal plumbing or lateral connection

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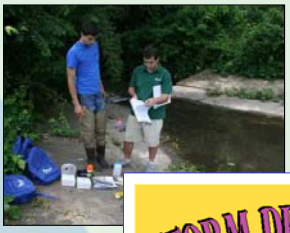
## Education and Prevention

- 2.3.4.6(g) develop procedures to prevent discharges:
  - –spill prevention;
  - –public awareness and education;
  - –reporting hotlines
- 2.3.4.6 (g) conduct annual employee training on how to recognize illicit discharges and SSOs




Source: City of Phoenix, AZ

## 2.3.4.6(f) Indicators for Tracking Program Success

At minimum, include measures that demonstrate:

- An elimination of pollutant sources (e.g., volume of sewage removed)
- Improvement of water quality
- The # of illicit connections found/removed

Other:

- Efforts to locate discharges (e.g., # junction manholes inspected,
- % of area in MS4 evaluated using systematic procedures

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## *Summary of IDDE Reporting Req.*

- Update on SSO inventory/elimination. Upon discovery, additional SSOs to be reported, in writing, to EPA/MassDEP
- Update on status of mapping
- Update on completion of outfall inventory and catchments investigations;
- Update on status of Protocol & Responsibilities and Systematic Procedure for Locating & Removing Illicit Connections;
- Details of elimination of IDs
- Evaluation of overall effectiveness of the IDDE Program

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## 3.0 Outfall Monitoring Program

- Implement starting no later than 1 year from permit date
- Begin with highest priority catchments
- Can link with outfall inventory
- Conduct at least 1 dry weather screening/analytical monitoring 1 wet weather analytical monitoring at each outfall within 5 years of effective permit date
- Also must screening/analytical monitoring at interconnections between MS4s

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## *Dry weather monitoring (Section 3.2)*

- Conduct when <0.1 inches of rain in 24 hr period
- Complete 25% of outfalls/yr starting in YR 2
- If flowing, sample:
  - temperature, conductivity,
  - turbidity, pH
  - chlorine, surfactants,
  - potassium, and ammonia
  - E. coli (freshwater) or enterococcus (salt water)
- Monitor for pollutants causing impairments and undertake efforts to fix if source is found

- If suspicious but no flow, revisit within a week
- Document efforts

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## *Fingerprints of Major Sources*

Sewage
- E. Coli
- Detergents (various)
- High Ammonia/ Potassium Ratio

Wash Water
- Detergents (various)

Shallow Groundwater
- Hardness, pH

Tap Water
- Fluoride
- Sometimes Hardness

Septage
- E. Coli
- Fluorescence
- High Ammonia/Potassium

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## *Wet weather monitoring (Section 3.3)*

- Performed after/during any rain event that produces a discharge
- 25% of outfalls/year starting in Yr 2 Complete within 5 years
- Sample same outfalls and parameters as dry weather sampling
- Sample for pollutants of concern in impaired waters if analytical method exists in 40 CFR 136 for that pollutant
  - Undertake efforts to identify and remove source

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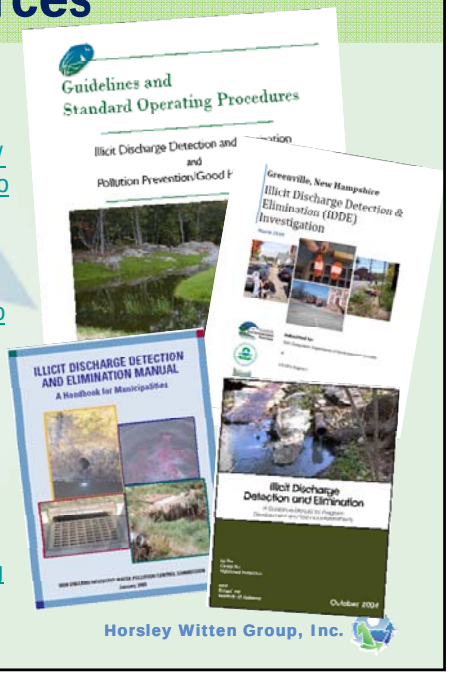
# Resources

- NH Seacoast Stormwater Coalition. 2006. IDDE Guidelines and SOP http://des.nh.gov/organization/divisions/water/stormwater/documents/nh_idde_sop.pdf
- FB Environmental. 2010. Greenville, NH IDDE Investigation www.des.state.**nh**.us/organization/divisions/.../appx-r-greenville-report.pdf
- NEIWPCC. 2003. IDDE Manual www.neiwpcc.org/iddemanual.asp
- CWP. 2004. IDDE Manual www.cwp.org/categoryblog/99-idde-and-septics.html
- EPA NPDES IDDE Training Webinar cfpub2.epa.gov/npdes/outreach.cfm?program_id=0&otype=1

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