

**SOP ID-4: WATER QUALITY SCREENING IN THE FIELD***Introduction*

Outfalls from an engineered storm drain system can be in the form of pipes or swales/ditches. Under current regulations, it is important to inspect and document water quality within the MS4 system under both dry weather and wet weather conditions as required. SOP ID-1, "*Dry Weather Outfall Inspection*" and SOP ID-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 HW-1, "*Catch Basin Inspection and Cleaning*", also describes how this operations and maintenance activity can serve as an additional opportunity to collect water quality data.

SOP ID-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 assist in the illicit discharge detection and elimination investigations, as described in SOP ID-5, "*Locating Illicit Discharges*".

*Visual Condition Assessment*

SOPs ID-1 through ID-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/staining;
- odor;
- evidence of sanitary waste;
- optical enhancers (fluorescent dyes added to laundry detergent); and
- turbidity.

If a *Visual Condition Assessment* indicates the presence of these potential 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;
- chlorine;
- conductivity;
- salinity;
- bacteria (E. coli);
- surfactants;
- temperature; and
- total nitrogen (TKN)\*.

\*nitrogen testing is only required for outfalls that discharge directly to a waterbody with a nitrogen impairment.

*Field Kits and Sampling Methods Available*

The Table 1 shows field test kits and portable meters that can be used for field screening parameters. Each field test kit should include instructions specific to that test kit, and most kits are available in configurations that detect different ranges of the parameter.

**Table 1  
Field Measurements, Test Kits, and Instrumentation**

Analyte or Parameter	Field Test Kit	Field Test Consumables*
Ammonia	Hanna Instruments H1700 Freshwater Low Range Ammonia Colorimeter-Checker HC	Hanna Instruments Ammonia Reagent H1700-25 (25 tests) and H1700-11 Calibration set (1/100 tests) AND/OR Hach #2755325 Ammonia (Nitrogen) Test Strips 0-6.0 mg/L (25 tests)
Total Chlorine	Hanna Instruments H1761 Ultra-Low Range Total Chlorine Colorimeter-Checker HC	Hanna Instruments Total Chlorine Ultra-Low Range Reagent H1761-25 (25 tests) and H1761-11 Calibration set (1/100 tests) AND/OR LaMotte 2963LR-G Insta-Test Analytic Total Chlorine Test Strips (25 tests)
Surfactants (Detergents)	CHEMetrics Detergents CHEMets Visual Kit K-9400 AND/OR UV Light	CHEMetrics Detergents Refill R-9400 (20 tests) AND/OR absorbent material placed in flow
Conductivity	YSI PROplus (or other device capable of these measurements)	N/A
Salinity		
Temperature		
Bacteria	Bacteria field test kits require 24-hour window for Laboratory analysis field samples must be to lab within 6-hours of collection.	
Total Nitrogen (TKN)	YSI PROplus AND/OR Grab Sample for Lab Analysis	Hach # 2745425 Nitrate and Nitrite Test Strips (25 tests) AND/OR

\* waste products from some tests may be considered hazardous materials and must be disposed in accordance with all regulations.

The Table 2 shows benchmark values identified in the Permit and other related guidance. These represent the concentration (or value) of each parameter where when found or exceeded in stormwater, may be indicative of pollution and/or illicit discharges and requires further sampling and catchment investigation.

**Table 2**  
**Benchmark Field Measurements for Select Parameters**

Analyte or Parameter	Benchmark
Ammonia	< 0.5 mg/L
Total Chlorine	detectable range < 0.02 mg/L
Surfactants (Detergents)	< 0.25 mg/L
Conductivity	< 100 mS/cm
Salinity	< 72.6 g/L
E. coli (bacteria)	TMDL < 406/100mL (non-beach) TMDL < 88/100mL (beach)
Total Nitrogen (TKN)	< 0.32 mg/L

Whether using laboratory analyses, field test kits, or portable meters, if and when water quality screening samples exceed benchmark concentrations, the inspector may also consider collecting analytical samples for laboratory analysis depending on severity.

#### *Advantages and Disadvantages of Field Testing*

Field test kits can be convenient for use as a screening tool, initial purchase costs are lower, and the costs are far less than full analyses at a laboratory. However, some disadvantages of this screening method include:

- generation of wastes, including glass vials and used reagent;
- some spent kits may require hazardous waste handling;
- labor cost associated with inspector's time;
- steps and processes for each kit can vary widely, and can result in errors;
- limited detection ranges.
- not all kits are accepted by all regulatory agencies; and
- limited shelf life;

Portable instrumentation such as the colorimeters shown in Table 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:

- higher initial purchase costs;
- requirement for ongoing calibration and maintenance;
- individual probes require periodic replacement;
- specific storage requirements to maintain calibration; and
- trained staff are required in order to effectively utilize.

*Attachments*

1. Attachment 1 Field Sampling Kits
2. Sample Bottle Labels
3. Chain-of-Custody Record Example
4. SOP ID-4 *Water Quality Screening Form*

*Related Standard Operating Procedures*

1. SOP ID-0 *Stormwater Sampling Quality Assurance Project Plan*
2. SOP ID-1 *Dry Weather Outfall Inspection*
3. SOP ID-2 *Wet Weather Outfall Inspection*
4. SOP ID-3 *Catchment Investigations*
5. SOP ID-5 *Locating Illicit Discharges*

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*Revisions:*

*Source: Central Massachusetts Regional Stormwater Coalition, NH Stormwater Coalitions, EPA 2017 New Hampshire Small MS4 General Permit, 2020 NPDES Great Bay Total Nitrogen General Permit for Wastewater Treatment Facilities In New Hampshire (NHG58A000), EPA New England Bacterial Source Tracking Protocol 2014, New Hampshire Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters, 2010.*