Appendix C

Illicit Discharge Field Investigation Form

OUTFALL VISIT FIELD DATA SHEET

OUTFALL ID NO. ___________

1. GENERAL INFORMATION:

REASON FOR VISIT: ROUTINE MONITORING REPEAT/FOLLOW-UP VISIT HOTLINE CALL SPECIAL INVESTIGATION

OTHER ____

LOCATION (HIGHWAY AND MILEPOST AND/OR RECEIVING WATER AND CROSS STREETS):

____

____

DATE ____________________ TIME _____________AM / PM

INSPECTION TEAM: ____

QUANTITY OF PRECIPITATION WITHIN LAST 48 HOURS ____________ (IF GREATER THAN 0.10", DO NOT SAMPLE AT THIS TIME.)

(GO TO WWW.INTELLICAST.COM AND CLICK ON RADAR. THEN CLICK ON HISTORIC. SCROLL DOWN TO VIEW THE MAP OF THE UNITED STATES. CLICK ON COLORADO AND DETERMINE HOW MUCH RAIN FELL IN THE LAST 24 HOURS IN THE AREA YOU ARE SAMPLING. UNDER HISTORIC, YOU CAN ALSO CLICK ON WEEKLY PRECIPITATION TO DETERMINE QUANTITY OF PRECIPITATION IN YOUR AREA IN THE LAST WEEK.)

EVIDENCE OF SNOWMELT? YES NO (IF YES, DO NOT SAMPLE AT THIS TIME)

2. FIELD SITE DESCRIPTION:

TYPE OF SITE: OUTFALL/PIPE MANHOLE OPEN CHANNEL OTHER ____

WATERSHED LAND USES: HIGHWAY INDUSTRIAL COMMERCIAL RESIDENTIAL UNKNOWN

MIXED USE/OTHER (LIST) ____

3. FLOW ESTIMATION:

FLOW OBSERVED? YES NO

CHANNEL WIDTH, BOX CULVERT DIMENSIONS, OR PIPE DIAMETER ____

MATERIAL: CONCRETE CMP PVC GRASS CHANNEL OTHER ____

WIDTH OF WATER SURFACE: ________ FT. DEPTH OF WATER: ________ FT. FLOW VELOCITY: ________ FT./SEC.

APPROXIMATE FLOW RATE: (WIDTH OF FLOW*DEPTH OF FLOW*FLOW VELOCITY) ____ FT^3/SEC. (IF USING OTHER UNITS, PLEASE SPECIFY.)

4. VISUAL OBSERVATIONS:

PHOTO TAKEN: YES NO PHOTO ID NUMBER: ______________________

FLOW

ODOR: NONE CHLORINE GASOLINE SEWAGE ROTTEN EGGS SOUR MILK OTHER ______________________

COLOR: NONE RED YELLOW BROWN GREEN GREY OTHER ______________________

CLARITY: CLEAR CLOUDY OPAQUE SUSPENDED SOLIDS OTHER ______________________

FLOATABLES: NONE OILY SHEEN FOAM GARBAGE/SEWAGE SOAP SUDS OTHER ______________________(SUSTANTIAL, MODERATE, LIGHT)

BIOLOGICAL: NONE ALGAE MOSQUITO LARVAE/INSECTS OTHER ______________________

OUTFALL

DEPOSITS/STAINS: NONE SEDIMENTS OIL SANITARY SEWAGE ILLICIT DUMPING OTHER ______________________

VEGETATION CONDITION: NONE NORMAL OVERGROWN INHIBITED

STRUCTURAL CONDITION: NORMAL CONCRETE CRACKING/SPAULING METAL CORROSION OTHER ______________________

5. FIELD WATER ANALYSIS:

TEMPERATURE ____ ^{O}C ____ ^{O}F TOTAL CHLORINE ________ mg/L TOTAL COPPER _________mg/L pH _______

TOTAL PHENOL _______ mg/L CONDUCTIVITY ______ us/cm DETERGENTS _______ mg/L TURBIDITY ______ NTU

LABORATORY SAMPLE COLLECTED? YES NO PARAMETER(S) __________________ LAB SAMPLE ID(S)________

ILLICIT DISCHARGE SUSPECTED BASED ON FIELD INSPECTION? YES NO

GENERAL COMMENTS: ____

____

6. FILING INFORMATION:

DATE REPORT FILED: ____

REPORT FILED BY (NAME): ____

OUTFALL VISIT FIELD DATA SHEET QUICK REFERENCE INSTRUCTIONS

Please refer to the Dry Weather Screening Program Manual for detailed outfall field visit procedures and instructions.

General Information

Outfall Identification Number – If the outfall identification number is known it should be entered on the form. If it is not known, a detailed location description, or GPS location, should be attached to the Outfall Visit Field Data Sheet.
Reason for Visit – Circle the reason for the visit, either routine monitoring, repeat/follow-up visit, hotline call, special investigation, or other. If "other," specify reason for visit (write-in).
Location – The location description should include the CDOT highway, mile post, and/or distance and direction from the nearest cross streets or specified landmarks. GPS coordinates may also be entered.
Date – Enter date of visit in MM/DD/YY format.
Time – Enter time of visit in HH:MM format.
Inspection Team – Identify the team leader. This person will be responsible for answering questions pertaining to the form.
Precipitation Within Last 48 hours – The exact time and date of previous precipitation is NOT required. Enter Yes or No based on knowledge of the area and physical evidence (i.e., rain, snow, etc.). The website www.intellicast.com provides historical precipitation data and is a useful tool to determine the precipitation history at a specific location.
Quantity of Last Rainfall – Estimate whether the amount of the last rainfall was less than or more than 0.1 inch. If it is more than 0.1 inch, stop work and return when conditions are drier.
Evidence of Snowmelt – Applies only if surface runoff appears to be contributing to the storm water discharge. Circle Yes or No. If there is evidence of snowmelt, stop work and return when conditions are drier.

Field Site Description

Type of Site – Indicate the type of drainage structure where the samples are being collected by circling outfall, pipe, manhole, open channel, or other. If "other," describe in the space provided.
Predominant Watershed Land Use – Indicate if the dominant land use of the drainage area is industrial, commercial, residential, unknown, or other. If "other," describe in the space provided (i.e., rural use, forest, rangeland, farmland).

Flow Estimation

Flow Observed? Circle Yes or No. If No, stop here and go to another site. If Yes, continue work at this site.
Channel Width, Box Culvert Dimensions, or Pipe Diameter – Record the size of the drainage structure, for example, the diameter of the outfall pipe.
Material – Identify whether outfall is predominantly concrete, CMP, PVC, grass channel, or other. If "other," describe in the space provided.
Width of Water Surface – Enter measurement in feet.
Depth of Water – Enter measurement in feet.
Flow Velocity – Enter measurement in feet per second (fps).
Approximate Flow Rate – Flow rate will be estimated for channel flow (i.e., open channels or large pipes) and free-falling flow (i.e., free falling discharges).

Note: Obtain three 1-liter well-mixed samples of the discharge water for use in the following tests before entering water for flow measurement tests. Be careful to obtain a representative sample with minimal bottom sediment/debris and an adequate volume for all tests.

Suggested Procedure for Channel Flow (including partial flow in pipe):

1. Locate the hydraulic control for flow measurement. The hydraulic control is defined as a location or point in a pipe or channel where dry weather flows can be measured with reasonable accuracy. In most cases, the hydraulic control also will be the sampling point. The hydraulic control should consist of a 10-foot-long section of the channel or pipe where flow appears to be smooth and the cross section is as free from irregularities as possible. Do not enter any pipes in order to measure flow as that may pose a possible health hazard.
2. If possible, mark off a 10-ft longitudinal segment in the channel or pipe.
3. Clock the time required for a light-weight floatable object to travel the marked-off distance. (Use corks, fishing bobbers, wood matches, sticks, or other floatable objects. Partial submergence is desired, especially in windy conditions.) Place the floating object in the water upstream of the starting point and begin timing as it passes the upstream mark.
4. Repeat Step 3 three times and calculate the average velocity (v) of the floating object in feet per second (fps).
5. If a current meter is available, direct stream measurements should be taken at the point that the cross-sectional flow area is measured in lieu of steps 1-4.
6. Estimate cross-sectional flow area.

   For rectangular sections:

   $$Area(A) = AverageWidth(W) \times Average\ Depth(D)$$

   For a trapezoidal section:

   $$Area(A) = \frac{Top\ of\ Water\ Width\ +\ Bottom\ Width}{2} \times Average\ Depth$$

7. Compute flow rate.

   $$Flowrate(Q) = AverageVelocity(v) \times Area(A)$$

   Units:

   Flow rate = cubic feet per second (cfs)
   Velocity = feet per second (fps)
   Area = square feet (ft^2)

Note: The flow rate (discharge) calculated by this method will be reasonably accurate (± 25%) where very smooth, tranquil flow exists in a concrete-lined channel with a consistent cross section for the 10-ft-long measuring section and at least 10 ft upstream and downstream of the section. However, where flow is not smooth and tranquil and/or the cross section is irregular or has impediments to flow such as rocks in it, the accuracy of the method can be poor. If a reliable method is required in such a location, a current meter, weir, or other reliable method should be used.

Suggested Procedure for Free-Falling Flow:

1. Place a container calibrated in gallon units beneath the free-falling discharge. Carry several containers of different volumes and shapes so that you have one that best fits the site.
2. Use a stop watch to clock the time required to fill a known volume in the container.
3. Repeat Steps 1 and 2 two or three times. Calculate the average time required to fill the container.
4. Compute flow rate.

$$Flowrate(Q) = \frac{Volume(V)}{Time(t)}$$

Units:

Flowrate = gallons per minute(gpm)
Volume = gallons
Time = minutes

5. Convert gallons per minute to cubic feet per second. If the container is in other than gallon units, use an appropriate conversion factor (for example, 1 liter equals 0.2642 gallons):

   Flow in cubic feet per second = Flow in gallons per minute x 0.0022
6. Record the Calculated Flow on the Data sheet. Enter to the nearest two significant figures only. (Examples: 0.024 cfs, or 2.1 cfs, or 15 cfs).

Visual Observations

Photo Taken? – Take a picture of the sample site to document discharge and condition. Record the Photo ID Number on the form for all pictures taken of the sampling site and dry weather discharge.

Flow

For the following tests, use one of the large samples collected before the discharge measurements were made. The suggested procedure is to grab a sample from the bank without disturbing the water and to use a clear glass bottle in order to observe the color and clarity of the sample.

Odor – Document the presence of observed odors, such as chlorine, gasoline, rotten eggs, septic odor, sour milk, or other. If “other,” provide a description. (A suggested procedure for detecting odors is to collect a sample, fan over the open container toward your nose with your hand, and document the smell.)

Color – Document the color of the discharge, whether it is clear, red, yellow, brown, green, grey, or another color. (Place a piece of white paper behind the glass sample bottle to aid in color determination.)

Clarity – Document if the discharge is clear, cloudy, opaque, or has suspended solids. (Place a piece of white paper behind the glass sample bottle to aid in clarity determination.)

Floatables – Identify the presence of floating matter such as foam, oily sheen, trash, soap suds, or other uncharacteristic debris within the discharge. Also indicate whether the occurrence is substantial (S), moderate (M), or light (L).

Biological – Document if there is algae, insects (including mosquito larvae), or other biological matter in the discharge. If “other,” provide a description.

Outfall

Deposits/Stains – Document if there are any sediments, stains, oily residues, or other deposits at the sampling location. If “other,” provide a description.

Sanitary Sewage – Document the presence of sanitary sewer discharges and identify the evidence on the form as corn, coffee grounds, egg shells, feces, toilet paper, or other. If “other,” provide a description.

Vegetation Condition – Indicate whether vegetation at the site is normal, overgrown, inhibited, or lacking.

Structural Condition – Note the condition of the drainage structure, such as concrete cracking/spauling, metal corrosion, or other. If “other,” provide a description.

Illicit Dumping – Document the presence of illicit trash dumping, such as inorganics (cans, jars, etc.), organics (food wastes), chemicals, or other. If “other,” provide a description. (Observe trash in and around the outfall. Look for trash that matches an upstream source, i.e., oil bottles from a gas station.)