

**ARLINGTON PUBLIC SCHOOLS
ILLCIT DISCHARGE DETECTION AND
ELIMINATION PROGRAM PLAN**

Prepared for

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1.0 INTRODUCTION

Under the Virginia Pollutant Discharge Elimination System (VPDES) program, stormwater discharge permit holders (or operators) are required to implement plans to detect, isolate, and eliminate improper discharges to the municipal separate storm sewer system (MS4) that is under the operator's jurisdiction. Improper or illicit discharges to the MS4 are those discharges that do not originate as stormwater runoff. Improper discharges can be hazardous to public health, harmful to aquatic life in receiving waters, and detrimental to overall water quality. Federal regulation defines an improper discharge as any discharge to an MS4 that is not composed entirely of stormwater, except allowable discharges pursuant to a VPDES permit.

This Illicit Discharge Detection and Elimination (IDDE) Program Plan has been developed to comply with requirements of Arlington Public Schools' (APS) VPDES stormwater discharge permit ("Permit"). Specifically, the Permit requires the operator to a) locate and map MS4 outfalls, b) prohibit improper discharges to the MS4, c) develop procedures to detect, identify, and address improper discharges, d) facilitate public reporting of illicit discharges, e) implement the program plan in accordance with the schedule in the Permit, and f) prepare an annual report to document IDDE program activities. This program plan addresses each of these requirements in separate sections below. The IDDE program includes overall efforts by APS to (1) identify and map MS4 outfalls and potential sources of illicit discharge; (2) screen MS4 outfalls for dry weather discharge, the presence of pollutants, or other visible signs of an illicit connection; and (3) isolate and correct the illicit connection.

1.1 SOURCES OF ILLICIT DISCHARGES

The Virginia Code defines an illicit discharge as "any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a VPDES or state permit (other than the state permit for discharges from the municipal separate storm sewer), discharges resulting from fire fighting activities, and discharges identified by and in compliance with 9VAC25-870-400 D 2 c (3)."

Improper discharges to the MS4 may be the result of misconnection of a portion of the sanitary sewer system to the storm sewer system, failure of sewer infrastructure allowing infiltration of public drinking water or sanitary sewer effluent into the storm sewer system, inadvertent or deliberate discharges of prohibited effluent to the MS4, or other causes.

Center for Watershed Protection and USEPA have published guidance for the implementation of IDDE programs to detect and remediate improper discharges (Brown et al. 2004). Illicit discharges in storm drains consist of measureable flow and contain high concentrations of pollutants and/or pathogens. Dry weather discharges (as described by Brown et al. 2004) can include the following illicit types:

- sewage and septic flows;
- public drinking water supply breach;

- washwater flows, such as residential gray water (laundry) discharges, water from commercial car washes, fleet washing, equipment washdown activity, commercial laundries, and floor washing to shop drains; and
- liquid wastes such as oil, paint, and industrial process water that enter the storm drain system.

Dry weather flows can also be associated with cleaner discharges that would typically not be considered illicit (9VAC25-870-400 D 2 c (3)): water line flushing, landscape irrigation, diverted stream flows, rising groundwaters, uncontaminated groundwater infiltration (as defined in 40 CFR 35.2005(20)), uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water.

Notwithstanding the generally non-illicit nature of the above, all flowing water discharges from the MS4 shall be tested for presence of excessive pollution that would indicate an illicit discharge.

1.2 DETECTION OF ILLICIT DISCHARGES

IDDE programs frequently include systematic or targeted screening of storm drain outfalls in priority areas. IDDE programs may include both dry weather screening of storm drain outfalls and investigations of upland sources of pollution as it enters the storm drain system.

This plan establishes the protocol for identifying and screening outfalls draining Arlington Public Schools-administered properties. These target facilities are screened on an annual basis for presence of illicit discharge as is required by the school system's current VPDES MS4 Permit. This Plan also contains the field operations, data management, and response protocols for the IDDE program.

1.3 CORRECTION OF ILLICIT DISCHARGES

Outfalls that have been found to be discharging and that have one or more screening parameters that are outside of acceptable ranges will be investigated further to determine the source or cause of the illicit discharge. Any suspected illicit discharges are referred to Arlington County for follow-up and possible enforcement.

2.0 LOCATION AND MAPPING OF OUTFALLS

Arlington Public Schools has completed a reconnaissance of the storm drain network and site conditions of properties subject to its jurisdiction. The reconnaissance activities consisted of conducting hotspot investigations (HSIs) and verifying stormwater infrastructure whose configuration a) discharges to a channel or water body that is located on Arlington Public Schools property or b) connects to the storm drain network that is maintained by Arlington County.

Hotspot investigations (Wright et al. 2005) consist of investigations of parcels and practices that have the potential to introduce polluted runoff into the storm drain network. Source categories that HSIs examine include: vehicle operations, waste management, storage of liquid and solid materials, fueling operations, loading and unloading activities, and turf management. Hotspot data collected in the field (Appendix D) are used to assist in prioritizing outfall screening or targeted BMP implementation efforts that are required under the school system's VPDES MS4 discharge Permit.

Outfall location data will be entered into Arlington County's stormwater infrastructure GIS coverage. Outfalls will be assigned an unique identifier that will be referenced when conducting dry weather screening field work.

3.0 IMPLEMENTATION OF ILLICIT DISCHARGE PREVENTION PLAN

Arlington Public Schools, in coordination with Arlington County, implements the IDDE plan within its jurisdiction by conducting outreach, training, and other preventive activities that include: a) educating employees in proper housekeeping techniques on school system properties, b) informing employees of characteristics of an illicit discharge should they encounter polluting conditions, and c) providing employees with contact information to report suspected illicit discharges. Such training is required in Permit condition II B 1.

Activities conducted by Arlington Public Schools as operator include the following:

- Distribution of County statutes or other guidance in the form of flyers or bulletins to staff regarding illicit discharges,
- Identification of “at risk” sites for prioritization, based on hotspot status and prior history of complaints/issues,
- Systematic inspections of BMPs and infrastructure, and
- Systematic as well as incident-based outfall screening.

Activities conducted by Arlington County as responsible authority include the following:

- Distribution of County contact list and web link for reporting by employees, parents, or the public,
- Enlisting school participation in outreach activities such as storm drain stenciling within the school property,
- Training school system employees to prevent and recognize illicit discharges, and
- Designation of responsible personnel to investigate and remediate illicit discharges within APS.

4.0 DETECTION AND RESOLUTION PROTOCOLS

4.1 BACKGROUND

Dry weather MS4 screening programs involve monitoring both physical and chemical characteristics of dry weather flows. If flowing water is present at an outfall during dry weather, the quality of the flowing water is assessed in the field. Water quality testing for indicator pollutants such as detergents and fluoride, and characteristics such as pH, temperature, and turbidity, provides on-the-spot information to help distinguish between improper discharges and other possible sources of dry weather flow, such as groundwater infiltration. Physical indicators in flowing water include odor, color, turbidity, and the presence of floating material such as oil, sewage, or suds (Brown et al. 2004). Physical indicators of a potentially improper discharge are often evident when flow is not present; such indicators include outfall damage, deposits or stains, unfavorable colors or odors in plunge pools, deposits of material in receiving channels, and algal growth in pipes.

Field procedures for dry weather screening as well as health and safety procedures common to all components, are described in Sections 4.3 through 4.7.

4.2 INDICATOR ANALYTES

Table 4-1 shows the indicator analytes and their ability to aid in detecting various kinds of discharges. Selection was based primarily on information provided in Brown et al. (2004) and the Permit requirement that testing be able to distinguish the type of illicit discharge.

Table 4-1. Dry weather screening parameters and action criteria				
Recommended Analyte	Effluent Type Indicated	Kit or Probe	Recommended Action Criterion	Instrument Range
total chlorine*	industrial drinking water sewage	photometer	≥ 0.4 mg/l	0 to 5 mg/l
fluoride	tap water	single analyte meter	≥ 0.25 mg/l	0 to 10 mg/l
ammonia	sewage washwater industrial	photometer	≥ 1 mg/l	0.2 to 30 mg/l
surfactants (detergents)	sewage washwater	single analyte meter	≥ 0.25 mg/l	0.15 to 1 mg/l
pH	industrial washwater	sonde	≤ 5 (industrial)	0 to 14
*Exceedance criteria are based on the test range of the field kit				

Results of screening tests will be compared to the criteria presented in Table 4-1 to assist in identifying the possible source of a suspected improper discharge or illicit connection. Testing results will be presented in an annual report.

4.3 DRY WEATHER SCREENING PROCEDURE

Initial dry weather screening activities include assessing the physical characteristics of the outfall and any discharge, and performing screening chemistry tests on the discharge (if present). Field screening will not proceed unless less than 0.10 inches of rainfall has fallen in the preceding 72 hours. Field crews will verify that this dry-time criterion has been met before beginning field operations. The field staff will obtain and gather the materials listed in Appendix A prior to field work on any given day. Standard operating procedures for use, calibration, maintenance, and quality control for all field equipment are provided in Appendix B.

For the Arlington Public Schools field investigation effort, screening of outfalls consists of the following:

- Locate outfalls using GPS and infrastructure maps in the target areas.
- If the outfall is subsurface, place traffic cones and remove manhole cover.
- Inspect the selected outfalls for physical evidence of illicit discharge.
- If flowing water is present, perform water chemistry tests in the field. If the outfall is subsurface, use telescoping sampler arm and cup to obtain sample.
- Record data on electronic field data sheets.
- If the presence of suspected illicit discharge is detected, Arlington County responsible personnel will be notified within 24 hours.

To facilitate data collection and information management, data gathered during the dry weather screening field effort will be recorded in electronic datasheets running on ArcPad 10 software. In case of instrument failure, data will be recorded on pre-printed field data sheets (Appendix C). Datasheets developed by the Center for Watershed Protection (Brown et al. 2004) were used as the basis for the electronic field datasheets. Field crews will use this data entry form to record on-site information for each outfall using a series of text boxes, drop down menus, and check boxes.

Information collected at each site will be stored in a geodatabase for subsequent organization, quality control, and reporting.

The following screening information will be entered onto field data sheets:

1. Background Data: Record current date, physical location, GPS location, investigators, and other background data.
2. Outfall Description: Enter information describing the outfall, including outfall ID (if provided by County), whether closed pipe or open channel, whether subsurface or open to daylight, physical dimensions, shape, orientation, material type, etc. Indicate if water is flowing from the outfall and describe (e.g., yes, no, intermittent, stagnant).

3. Quantitative Characterization: If flowing water is observed, perform water chemistry tests as described in Appendix B.
4. Physical Indicators for Flowing Outfalls Only: Collect information on physical features of flowing outfalls (e.g., odor, color, turbidity, sheens, floating materials).
5. Physical Indicators for Flowing and Dry Outfalls: Collect information on physical features of both flowing and dry outfalls. Examine outfall for presence and type of algae, abnormal vegetation (if applicable), damage, stains, sheens, and condition of plunge pool (if applicable). Structural problems (e.g., cracking, holes in corrugated metal pipes, dissolved concrete) should also be noted.

4.4 TRACKING DOWN THE SOURCE OF AN IMPROPER DISCHARGE

No trackdowns will be performed for suspected illicit discharges. Any outfall that fails physical or chemical parameter screening will be reported to Arlington County Department of Environmental Services, Office of Sustainability and Environmental Management (DES OSEM) staff for followup. Arlington County will be notified by Arlington Public Schools immediately if, during field investigations, any active pollution discharge (elevated flow, discoloration) is evident.

The annual report will include, for each illicit discharge found, a discussion of trackdown steps undertaken by Arlington County to identify sources of suspected illicit discharges.

4.5 HEALTH AND SAFETY

Ensuring the health and safety of field personnel is the responsibility of every staff member of the program. The collective effort of all staff members in providing a healthy and safe work environment will minimize or eliminate the potential for accidents. The safety of field staff overrides all other considerations. In general, the following safety protocol will be followed to protect the field staff:

1. Bring mobile phone and first aid kit on all field site visits.
2. Exercise caution when encountering ants, stinging insects, ticks, snakes, raccoons, geese, mice, rats, and the like, as well as off-leash pets.
3. Many outfalls are located in remote areas that may be near gathering places for homeless or transient individuals. Do not enter a potentially hostile area.
4. Exercise caution when accessing outfall areas and encountering uneven or slippery terrain (rip rap), steep slopes, and possible sharp objects such as broken glass, gabion baskets, metal, fencing, needles, or any debris with sharp or pointed edges or corners.
5. Perform field work in teams of two whenever possible.

6. Storm sewer outfalls contain a variety of waterborne bacteria and other harmful chemicals. Wash hands or use antibacterial wipes or hand gels liberally, especially prior to lunch breaks, etc.
7. Any work in confined spaces will be performed by technicians who are appropriately trained and certified for such work.

4.6 DATA MANAGEMENT/QUALITY CONTROL

Data will be captured electronically in the field using a data entry form designed specifically for this effort that is operated with a hand-held computer. The data entry form is configured to display prompts that prevent the user from leaving key data fields blank. The template stores electronic data in a geodatabase. The data fields include those used for APS' dry weather screening efforts. If the hand-held unit fails, field crews will complete hardcopy field datasheets (Appendix C). The electronic datasheet will speed data collection and eliminate the need for in-office field data entry, thereby saving time and preventing errors introduced by data entry mistakes.

At the conclusion of each field day, data recorded on the handheld unit will be backed up to a desktop computer and uploaded to a network computer system. This daily backup will lessen the chances of losing data due to theft, breakage, loss, or other failure of the handheld computer. If hardcopy field data sheets have been used, scanned copies will be stored in a secure location, and information will be entered directly into the geodatabase via ArcPad. The list of outfall sites visited will be checked periodically against the target list of outfalls to be screened to be sure that none have been missed and no data have been lost.

5.0 SCHEDULE OF PROGRAM PLAN IMPLEMENTATION

As required in Condition II B 3 of APS' Permit, the IDDE program is implemented by APS according to the schedule presented in Table 5-1.

Table 5-1. Arlington Public Schools IDDE program implementation schedule	
Item	Implementation Date
Illicit Discharge Procedure Preparation	April 18, 2015
Public Outreach and Education	April 18, 2015
Outfall Mapping	April 18, 2016
Screening of 50 outfalls, Year 1	April 18, 2016
Screening of 50 outfalls, Year 2	April 18, 2017
Screening of 50 outfalls, Year 3	April 18, 2018

A minimum of 50 outfalls are screened per year as required in the Permit. A total of 65 outfalls were found during reconnaissance activities. Since the update of the County's infrastructure layer and assignment of identification data to the outfalls is ongoing, the schedule of outfalls to be screened does not include specific outfall numbers. The proposed, prioritized list of sites is provided in Table 5-2 and is based on conditions found during HSIs. Outfalls that discharge to surface water bodies were prioritized highest since they are a concern to Virginia Department of Environmental Quality. Outfalls were prioritized next according to the hotspot status of the sites in which they are located, with sites having higher hotspot scores (indicating greater pollution potential) proceeding first in sequence. Sites were further prioritized within hotspot scores according to number of outfalls found during the reconnaissance. The top-ranked sites will be screened in Year 1. The Year 2 screening effort will include the remaining outfalls not covered in Year 1 and then beginning again with the top ranked sites until the quota of 50 outfalls are screened. The Year 3 screening effort will be performed in a similar fashion as Year 2. Any additional outfalls that are found during the Permit cycle will be incorporated into the screening schedule. Out-of-sequence screening will occur in the case of reported potential pollution problems at a specific site. Note that three sites (Abingdon Elementary School, Barcroft Elementary School, and Patrick Henry Elementary School) did not possess accessible outfalls during the time of reconnaissance and have been eliminated from the outfall screening schedule until outfalls are located on the sites.

Table 5-2. Prioritized list of sites						
Site Name	Address	H.S.I. status	No. outfalls	Year 1	Year 2	Year 3
Claremont ES*	4700 S Chesterfield Rd	Not a hotspot	5	X	X	X
Campbell ES*	737 S Carlin Springs Rd	Not a hotspot	3	X	X	X
Key ES	2300 Key Blvd	Confirmed	2	X	X	X
Long Branch ES	33 N Fillmore St	Confirmed	1	X	X	X
Wakefield High School	1325 S Dinwiddie St	Potential	5	X	X	X
Kenmore Middle School	200 S. Carlin Springs Rd	Potential	4	X	X	X
Gunston MS	2700 S Lang St	Potential	3	X	X	X
Career Center	816 S. Walter Reed Dr	Potential	3	X	X	X
Traditional	855 N Edison St	Potential	2	X	X	
Yorktown High School	5201 28th St N	Potential	2	X	X	
Oakridge ES	1414 24th St S	Potential	1	X	X	
Thomas Jefferson Middle School	125 S Old Glebe Rd	Potential	1	X	X	
Carlin Springs ES	5995 5th Rd S	Potential	1	X	X	
Schools Admin. Center	1426 N. Quincy St	Potential	1	X	X	
Wilson	1601 N Wilson Blvd	Potential	1	X	X	
Stratford JHS / HB Woodlawn School	4100 N Vacation Ln	Not a hotspot	6	X	X	
Jamestown MS	3700 N Delaware St	Not a hotspot	3	X		X
Washington-Lee High School	1301 N Stafford St	Not a hotspot	3	X		X
Randolph ES	1306 S Quincy St	Not a hotspot	2	X		X
Drew Model School	3500 S 23rd St	Not a hotspot	2	X		X
Nottingham ES	5900 Little Falls Rd	Not a hotspot	2		X	X
Langston-Brown Community Center	2121 North Culpeper	Not a hotspot	2		X	X
Taylor ES	2600 N Stuart St	Not a hotspot	2		X	X
Hoffman-Boston ES	1415 S Queen St	Not a hotspot	1		X	X
Barrett ES	4401 N Henderson Rd	Not a hotspot	1		X	X
Swanson Middle School	5800 Washington Blvd	Not a hotspot	1		X	X

Site Name	Address	H.S.I. status	No. outfalls	Year 1	Year 2	Year 3
Reed	1644 N. McKinley Road	Not a hotspot	1		X	X
Tuckahoe ES	6550 26th St N	Not a hotspot	1		X	X
Williamsburg Middle School	3600 N Harrison St	Not a hotspot	1		X	X
Glebe ES	1770 N Glebe Rd	Not a hotspot	1		X	X
Arlington Science Focus School	1501 N Lincoln St	Not a hotspot	1		X	X
Abingdon ES	3035 S Abingdon St	Not a hotspot	0			
Patrick Henry ES	701 S Highland St	Not a hotspot	0			
Barcroft ES	625 S Wakefield St	Not a hotspot	0			

* Site includes outfalls that discharge to surface water

6.0 ANNUAL REPORT AND PROGRAM EVALUATION

As required in Condition II B 3 f of the Permit, APS will include reporting on the IDDE program as a portion of its annual report. The IDDE program report will include, at a minimum:

- The total number of outfalls screened during the reporting period, the screening results, and number and nature of follow up actions,
- A summary of each investigation conducted by APS of any suspected illicit discharge. Each summary must include: (i) the date that the suspected discharge was observed, reported, or both, (ii) how the investigation was resolved, including any follow-up, and (iii) resolution of the investigation and the date the investigation was closed, and
- A list of any written notifications of physical interconnection given by APS to other MS4 jurisdictions.

Each annual report will include an evaluation and assessment of IDDE program compliance as required in Condition II E 1. The IDDE program report will include evaluations of a) overall compliance with Permit terms and b) effectiveness of illicit discharge remediation activities carried out during the year.

7.0 REFERENCES

- Brown, E., D. Caraco, and R. Pitt. 2004. Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments. Center for Watershed Protection, Ellicott City, MD. October.
- Chemetrics. 2013. Fluoride SAM and Fluoride MDL+ Kit user manuals. Catalog numbers I-2021 and K-4009. Chemetrics, Inc., Midland, VA. September-October.
- Pitt, R., M. Lalor, R. Field, D. Adrian, and D. Barbé. 1993. A User's Guide for the Assessment of Non-Stormwater Dischargers into Separate Storm Drainage Systems. EPA/600-R-92-238. Risk Reduction Engineering Laboratory, U.S.EPA. Cincinnati, OH.
- Wright, T., C. Swann, K. Cappiella, and T. Schueler. 2005. Unified Subwatershed and Site Reconnaissance: A User's Manual, Version 2.0. Center for Watershed Protection, Ellicott City, MD. February.

APPENDIX A

FIELD EQUIPMENT CHECKLIST

ARLINGTON PUBLIC SCHOOLS EQUIPMENT CHECKLIST

Table A-1. Checklist of field equipment and supplies for dry weather screening	
Item	
Field maps (large and small scale) of study area	
GPS antenna	
GPS display	
Spare GPS Batteries	
Field data sheets (spare) on waterproof paper	
Pencils	
Measuring tape	
Flashlight	
Insect repellent	
Knee boots	
First-aid kit	
Outfall water quality screening kit(s) and procedure manuals	
Calibrated sonde and display	
Backpack	
Orange/reflective vests	
Work gloves	
APS letter of introduction	
Digital camera	
Spare batteries for digital camera	
Swing sampler and telescoping pole	
Confined spaces entry tripod, harness, and oxygen meter	
Manhole cover lifters	
Traffic cones	
Polypropylene bottles for sharps/waste	
250-mL plastic cup	
500-mL wash bottle containing distilled water	
Gallon cubitainer (or equivalent) containing distilled water	

APPENDIX B

**STANDARD OPERATING PROCEDURES
FOR DRY WEATHER SCREENING**

B-1. Procedures for Pollutant Indicator Testing

Water chemistry and water quality measurements of outfall effluent (if present) will be obtained by the use of a single analyte meter (detergents, fluoride) and portable photometers (all others), and multiparameter sondes, respectively. The photometer and single analyte meter will measure concentrations of targeted, specific analytes that will be used to assess whether a possible illicit discharge exists. The multiparameter sonde measures water quality parameters such as specific conductivity, pH, and temperature as a secondary assessment of illicit discharge potential.

Photometer (or equivalent)

The water chemistry testing equipment to be used during the field screening will consist of an economical, portable, battery powered photometer. Such photometers are versatile and can be configured to screen for a variety of indicators (*e.g.*, ammonia and chlorine) of illicit discharge. The detection range is appropriate to the screening criteria that are being employed. Dedicated single-analyte comparator kits will be used for analytes for which photometric analysis is not available.

Calibration – Initial calibration of the photometer is achieved by inserting the zeroing ampoule from the appropriate test kit. Photometric solutions and ampoules that are expired shall not be used for field screening. There are no specific QC requirements for field photometers except for practicing proper technique in the field in accordance with the manufacturer's instructions. The portable photometer will be maintained according to the manufacturer's specifications.

Preparing sample – Depending on the test, the sample is prepared by pouring a measured amount of effluent into a sample cup. An appropriate chemical is added to the sample in the cup. A testing ampoule from the appropriate kit is inverted into the sample and the tip snapped off against the side of the cup, allowing the sample to flow into the ampoule.

Reading sample – The sample is read by wiping the exterior of the ampoule completely dry and inserting it into the sample cell adaptor. The mark on the ampoule is lined up with the arrow on the bottom of the adaptor. The ampoule is covered with a light shield, and the photometer is instructed to measure the sample. The photometer automatically waits the specified development time, then displays the result in parts per million (ppm) of the particular analyte.

The following steps are specific to Chemetrics test kits for chlorine and ammonia. If other kits are used, follow manufacturer instructions.

Total Chlorine

1. Rinse sample cup from Chlorine Test Kit three times. Fill to **25 ml** mark with sample.
2. Add **5 drops** Activator Solution, stir briefly with ampoule tip, wait **1 minute**.
3. Place ampoule in sample cup and snap tip by pressing on side of cup. Allow ampoule to fill (it will leave a small bubble, which facilitates mixing).
4. Invert ampoule several times to mix, allowing bubble to travel from end to end each time. Tap ampoule on hard surface to cause any small bubbles to rise to top of liquid.
5. Wipe ampoule completely dry. Continue with directions under **Reading Sample**.
 - Use program number **32**
 - There will be a **1 minute** automatic wait for color development

Ammonia

1. Rinse sample cup from Ammonia Test Kit three times.
2. Add **5 drops** of Stabilizer Solution to the empty sample cup.
3. Fill to **25 ml** mark with sample.
4. Add **2 drops** Catalyzer Solution, stir briefly with ampoule tip.
5. Add **2 drops** Activator Solution, stir briefly with ampoule tip.
6. Immediately place ampoule in sample cup and snap tip by pressing on side of cup. Allow ampoule to fill (it will leave a small bubble, which facilitates mixing).
7. Invert ampoule several times to mix, allowing bubble to travel from end to end each time. Tap ampoule on hard surface to cause any small bubbles to rise to top of liquid.
8. Wipe ampoule completely dry and wait **15 minutes** for color development. Continue with directions under **Reading Sample**.

Detergents

Fill zero test tube (in detergents test kit) with **distilled water** and wipe dry. Insert into sample cell compartment. Press and hold button until display reads “---” then “0.00.”

1. Rinse red-tipped dropper bottle with sample 3 times, then fill to line with sample.
2. While holding ampoule in vertical position, **snap upper tip** using tip-breaking tool.
3. **Invert** ampoule and position open end over open dropper bottle. **Snap upper tip** and allow to drain into dropper bottle.
4. Cap dropper bottle and shake vigorously with thumb on red cap for **30 seconds**.
5. Loosen and re-tighten cap and then allow to stand undisturbed for **1 minute**. Layers should separate.

6. Remove red cap and slowly invert over a clean test tube. Squeeze bottle until all of the clear chloroform layer is in test tube. Remaining blue liquid should be disposed of and dropper bottle thoroughly cleaned before next sample.
7. Wipe dry and insert into meter. Allow test tube to stand undisturbed for 4 minutes.
8. Press and release button; reading will appear immediately (Do NOT hold down button, or you will re-zero meter).

Fluoride (Reference: Chemetrics 2013)

Prior to measuring fluoride in samples, a blank is required to zero the instrument. A blank must be generated for each series of tests. To generate a blank, follow steps 1 through 6 below and using distilled water.

1. Fill the sample cup to the “fill” mark with distilled water.
2. Add 1 level scoop of reducer powder. Screw cap on the sample cup and shake the cup for 10 seconds to dissolve the powder. Remove the cap.
3. Immediately place either end of the MDL+ ampoule in the sample cup so that the submerged tip touches the bottom of the cup and rests against the side of the raised snapping platform.
4. Snap the tip by pulling the body of the ampoule toward the side of the cup. The ampoule will fill, leaving a bubble for mixing.
5. To mix the contents of the ampoule, invert it several times allowing the bubble to travel from end to end. Wait 1 minute for color development.
6. While waiting for color development, hold the MDL+ ampoule, with the unsnapped tip pointing upward, over the sample cell that will be used in the photometer. Snap the upper tip using the blue tip-breaking tool. The ampoule contents will drain into the sample cell. Wipe all liquid from the exterior of the cell.
7. Press the power key on the instrument. The display will show “F”.
8. Insert the reagent blank cell into the sample chamber (with mild downward pressure), making sure that it is fully seated.
9. Press the Zero/Test key. The “F” symbol will flash for approximately 8 seconds, then the display will show “0.0.0”.

To measure fluoride in a sample, follow steps 1 through 6 above, substituting sample water for distilled water.

1. Insert the sample cell into the sample chamber.
2. Press the Zero/Test key. The “F” symbol will flash for approximately 3 seconds, then the sample results will display as mg/L.

Waste Disposal – Waste containers containing sharps from the field (typically 1-liter polypropylene bottle) will be capped, marked clearly as “glass” and placed in ordinary trash at the office. Waste containers containing liquid waste from screening tests (typically 4-liter glass jugs) will be stored in a secure location at the office until a licensed hauler is contracted to remove them. A written report of the detailed contents of the waste will be provided to the hauler.

APPENDIX C

DATA SHEETS

FOR DRY WEATHER SCREENING

Arlington Public Schools – Dry Weather Screening

SECTION 1: BACKGROUND DATA

Watershed:	Outfall ID:	
Date (MM/DD/YY): ____/____/20____	Time (Military): ____:____	
Investigators:	Form completed by:	
Rainfall: Last 24 hours: <input type="checkbox"/> < 0.1 inches <input type="checkbox"/> > 0.1 inches Last 72 hours: <input type="checkbox"/> < 0.1 inches <input type="checkbox"/> > 0.1 inches		
Latitude (dd.dddd): ____° N	Longitude (dd.dddd): ____° W	GPS Unit:
Camera:	Photo #s:	
Notes/Comments (e.g., origin of outfall, if known):		

SECTION 2: OUTFALL DESCRIPTION

Location	Material	Shape	Dimensions (In.)
<input type="checkbox"/> Closed Daylight Pipe	<input type="checkbox"/> RCP <input type="checkbox"/> CMP <input type="checkbox"/> PVC <input type="checkbox"/> HDPE <input type="checkbox"/> Steel <input type="checkbox"/> Terra-cotta <input type="checkbox"/> Other: _____	<input type="checkbox"/> Circular <input type="checkbox"/> Box <input type="checkbox"/> Single <input type="checkbox"/> Triple <input type="checkbox"/> Elliptical <input type="checkbox"/> Arch <input type="checkbox"/> Double <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____	Dimensions: Height: _____ Width: _____
<input type="checkbox"/> Closed Subsurface Pipe			
<input type="checkbox"/> Open Drainage	<input type="checkbox"/> Concrete <input type="checkbox"/> Rip-Rap <input type="checkbox"/> Earthen <input type="checkbox"/> Other: _____	<input type="checkbox"/> Trapezoid <input type="checkbox"/> Parabolic <input type="checkbox"/> Other: _____	Depth: _____ Top Width: _____ Bottom Width: _____
Outfall Elevation: Suspended Height (ft): _____ / Submerged Depth: In Water (ft): _____ In Sediment (ft): _____			
Outfall Cover: <input type="checkbox"/> Steel Grate <input type="checkbox"/> Cage <input type="checkbox"/> None <input type="checkbox"/> Other: _____			
Outfall Protection: <input type="checkbox"/> Rip-Rap <input type="checkbox"/> Gabion Basket <input type="checkbox"/> Concrete <input type="checkbox"/> None <input type="checkbox"/> Other: _____			
Outlet Erosion: <input type="checkbox"/> None <input type="checkbox"/> Minimal Erosion <input type="checkbox"/> Moderate Erosion <input type="checkbox"/> Heavy Erosion <input type="checkbox"/> Silted			
Erosion Source:			
Headwall Condition: <input type="checkbox"/> No Headwall <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor			
Flow Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Intermittent <input type="checkbox"/> Stagnant If No, Skip to Section 5			
Flow Depth (In.):			

SECTION 3: QUANTITATIVE CHARACTERIZATION

FIELD DATA FOR FLOWING OUTFALLS					
PARAMETER	RESULT	UNITS	PARAMETER	RESULT	UNITS
Chlorine	__ . __	mg/L	Detergents	__ . __	mg/L
Fluoride	__ . __	mg/L	pH	__ . __	pH Units
Ammonia	__ . __	mg/L			

(Form adapted from Brown, *et al.* 2004)

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Outfall ID:

Today's date:

SECTION 4: PHYSICAL INDICATORS FOR FLOWING OUTFALLS ONLY

INDICATOR	CHECK if Present	DESCRIPTION
Odor	<input type="checkbox"/>	<input type="checkbox"/> Sewage <input type="checkbox"/> Rancid/sour <input type="checkbox"/> Petroleum/gas <input type="checkbox"/> Sulfide <input type="checkbox"/> Chemical <input type="checkbox"/> Other: _____
	<i>Relative Severity</i>	<input type="checkbox"/> 1 – Faint <input type="checkbox"/> 2 – Easily detected <input type="checkbox"/> 3 – Noticeable from a distance
Color	<input type="checkbox"/>	<input type="checkbox"/> Clear <input type="checkbox"/> Brown <input type="checkbox"/> Gray <input type="checkbox"/> Yellow <input type="checkbox"/> Green <input type="checkbox"/> Orange <input type="checkbox"/> Red <input type="checkbox"/> Other: _____
	<i>Relative Severity</i>	<input type="checkbox"/> 1 – Faint colors in sample bottle <input type="checkbox"/> 2 – Clearly visible in sample bottle <input type="checkbox"/> 3 – Clearly visible in outfall flow
Turbidity	<input type="checkbox"/>	See severity
	<i>Relative Severity</i>	<input type="checkbox"/> 1 – Slight cloudiness <input type="checkbox"/> 2 – Cloudy <input type="checkbox"/> 3 – Opaque
Floatables	<input type="checkbox"/>	<input type="checkbox"/> Sewage (Toilet Paper, etc.) <input type="checkbox"/> Suds <input type="checkbox"/> Petroleum (oil sheen) <input type="checkbox"/> Other: _____
	<i>Relative Severity</i>	<input type="checkbox"/> 1 – Few/slight <input type="checkbox"/> 2 – Some <input type="checkbox"/> 3 – Widespread

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

INDICATOR	CHECK if Present	DESCRIPTION COMMENTS
Outfall Damage	<input type="checkbox"/>	<input type="checkbox"/> Spalling, Cracking or Chipping <input type="checkbox"/> Peeling Paint <input type="checkbox"/> Corrosion
	Comments	
Deposits/Stains	<input type="checkbox"/>	<input type="checkbox"/> Oily <input type="checkbox"/> Flow Line <input type="checkbox"/> Paint <input type="checkbox"/> Other: _____
	Comments	
Abnormal Vegetation	<input type="checkbox"/>	<input type="checkbox"/> Excessive <input type="checkbox"/> Partially Inhibited <input type="checkbox"/> Totally Inhibited
	Comments	
Poor pool quality	<input type="checkbox"/>	<input type="checkbox"/> Odors <input type="checkbox"/> Colors <input type="checkbox"/> Floatables <input type="checkbox"/> Oil Sheen <input type="checkbox"/> Suds <input type="checkbox"/> Excessive Algae <input type="checkbox"/> Other: _____
	Comments	
Pipe algae growth	<input type="checkbox"/>	<input type="checkbox"/> Brown <input type="checkbox"/> Orange <input type="checkbox"/> Green <input type="checkbox"/> Other: _____
	Comments	
Trash	<input type="checkbox"/>	<input type="checkbox"/> Aluminum <input type="checkbox"/> Glass bottles <input type="checkbox"/> Plastic bottles <input type="checkbox"/> Paper <input type="checkbox"/> Styrofoam <input type="checkbox"/> Other: _____
	Comments	

SECTION 6: OVERALL OUTFALL CHARACTERIZATION OF ILLICIT DISCHARGE POTENTIAL

<input type="checkbox"/> Unlikely	<input type="checkbox"/> Suspect (≥1 Section 4 indicator with a severity of 3)
<input type="checkbox"/> Potential (presence of ≥2 Section 5 indicators)	<input type="checkbox"/> Obvious (≥1 WQ indicator)

SECTION 7: NON-ILLICIT DISCHARGE CONCERNS

APPENDIX D

DATA SHEET

FOR HOTSPOT INVESTIGATIONS

Hotspot Site Investigation

HSI

WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID:	
DATE: ____/____/____		ASSESSED BY: _____		CAMERA ID: _____	
MAP GRID:		LAT ____° ____' ____" LONG ____° ____' ____"		LMK # _____	
A. SITE DATA AND BASIC CLASSIFICATION					
Name and Address: _____		Category: <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Institutional <input type="checkbox"/> Municipal <input type="checkbox"/> Golf Course <input type="checkbox"/> Transport-Related <input type="checkbox"/> Marina <input type="checkbox"/> Animal Facility			
SIC code (if available): _____		Basic Description of Operation: _____			
NPDES Status: <input type="checkbox"/> Regulated <input type="checkbox"/> Unregulated <input type="checkbox"/> Unknown		INDEX*			
B. VEHICLE OPERATIONS <input type="checkbox"/> N/A (Skip to part C)				Observed Pollution Source? <input type="checkbox"/>	
B1. Types of vehicles: <input type="checkbox"/> Fleet vehicles <input type="checkbox"/> School buses <input type="checkbox"/> Other: _____					
B2. Approximate number of vehicles: _____					
B3. Vehicle activities (circle all that apply): Maintained Repaired Recycled Fueled Washed Stored ○					
B4. Are vehicles stored and/or repaired outside? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
Are these vehicles lacking runoff diversion methods? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
B5. Is there evidence of spills/leakage from vehicles? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
B6. Are uncovered outdoor fueling areas present? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
B7. Are fueling areas directly connected to storm drains? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
B8. Are vehicles washed outdoors? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
Does the area where vehicles are washed discharge to the storm drain? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
C. OUTDOOR MATERIALS <input type="checkbox"/> N/A (Skip to part D)				Observed Pollution Source? <input type="checkbox"/>	
C1. Are loading/unloading operations present? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
If yes, are they uncovered and draining towards a storm drain inlet? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
C2. Are materials stored outside? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell If yes, are they <input type="checkbox"/> Liquid <input type="checkbox"/> Solid Description: _____ ○					
Where are they stored? <input type="checkbox"/> grass/dirt area <input type="checkbox"/> concrete/asphalt <input type="checkbox"/> bermed area					
C3. Is the storage area directly or indirectly connected to storm drain (circle one)? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
C4. Is staining or discoloration around the area visible? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
C5. Does outdoor storage area lack a cover? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
C6. Are liquid materials stored without secondary containment? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
C7. Are storage containers missing labels or in poor condition (rusting)? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
D. WASTE MANAGEMENT <input type="checkbox"/> N/A (Skip to part E)				Observed Pollution Source? <input type="checkbox"/>	
D1. Type of waste (check all that apply): <input type="checkbox"/> Garbage <input type="checkbox"/> Construction materials <input type="checkbox"/> Hazardous materials ○					
D2. Dumpster condition (check all that apply): <input type="checkbox"/> No cover/Lid is open <input type="checkbox"/> Damaged/poor condition <input type="checkbox"/> Leaking or evidence of leakage (stains on ground) <input type="checkbox"/> Overflowing ○					
D3. Is the dumpster located near a storm drain inlet? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
If yes, are runoff diversion methods (berms, curbs) lacking? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell ○					
E. PHYSICAL PLANT <input type="checkbox"/> N/A (Skip to part F)				Observed Pollution Source? <input type="checkbox"/>	
E1. Building: Approximate age: _____ yrs. Condition of surfaces: <input type="checkbox"/> Clean <input type="checkbox"/> Stained <input type="checkbox"/> Dirty <input type="checkbox"/> Damaged ○					
Evidence that maintenance results in discharge to storm drains (staining/discoloration)? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Don't know ○					

*Index: ○ denotes potential pollution source; ☐ denotes confirmed polluter (evidence was seen)

Hotspot Site Investigation

HSI

WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID:	
DATE: ____/____/____		ASSESSED BY:		CAMERA ID:	
MAP GRID:		LAT ____° ____' ____" LONG ____° ____' ____"		LMK #	
A. SITE DATA AND BASIC CLASSIFICATION					
Name and Address: _____		Category: <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Miscellaneous			
		<input type="checkbox"/> Institutional <input type="checkbox"/> Municipal <input type="checkbox"/> Golf Course			
		<input type="checkbox"/> Transport-Related <input type="checkbox"/> Marina <input type="checkbox"/> Animal Facility			
SIC code (if available): _____		Basic Description of Operation: _____			
NPDES Status: <input type="checkbox"/> Regulated <input type="checkbox"/> Unregulated <input type="checkbox"/> Unknown				INDEX*	
B. VEHICLE OPERATIONS <input type="checkbox"/> N/A (Skip to part C)				Observed Pollution Source? <input type="checkbox"/>	
B1. Types of vehicles: <input type="checkbox"/> Fleet vehicles <input type="checkbox"/> School buses <input type="checkbox"/> Other: _____					
B2. Approximate number of vehicles: _____					
B3. Vehicle activities (circle all that apply): Maintained <input type="checkbox"/> Repaired <input type="checkbox"/> Recycled <input type="checkbox"/> Fueled <input type="checkbox"/> Washed <input type="checkbox"/> Stored <input type="checkbox"/>					
B4. Are vehicles stored and/or repaired outside? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
Are these vehicles lacking runoff diversion methods? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
B5. Is there evidence of spills/leakage from vehicles? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
B6. Are uncovered outdoor fueling areas present? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
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B8. Are vehicles washed outdoors? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
Does the area where vehicles are washed discharge to the storm drain? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
C. OUTDOOR MATERIALS <input type="checkbox"/> N/A (Skip to part D)				Observed Pollution Source? <input type="checkbox"/>	
C1. Are loading/unloading operations present? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
If yes, are they uncovered and draining towards a storm drain inlet? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
C2. Are materials stored outside? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell If yes, are they <input type="checkbox"/> Liquid <input type="checkbox"/> Solid Description: _____					
Where are they stored? <input type="checkbox"/> grass/dirt area <input type="checkbox"/> concrete/asphalt <input type="checkbox"/> bermed area					
C3. Is the storage area directly or indirectly connected to storm drain (circle one)? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
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D. WASTE MANAGEMENT <input type="checkbox"/> N/A (Skip to part E)				Observed Pollution Source? <input type="checkbox"/>	
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If yes, are runoff diversion methods (berms, curbs) lacking? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
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