VDOT Virginia Department of Transportation

ILLICIT DISCHARGE DETECTION AND ELIMINATION

Field Guide

Virginia Department of Transportation
1401 East Broad Street
Richmond, VA 23219

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ITEMS INCLUDED IN THIS GUIDE

INTRODUCTION

The Virginia Department of Transportation (VDOT) is committed to ensuring that stormwater runoff from all its roadways and facilities comply with all federal and state environmental regulatory requirements.

Stormwater run-off is rainwater and melted snow that runs off the surface of streets, lawns, farms and construction and industrial sites. In undeveloped areas, much of the stormwater run-off is absorbed into the ground. That which is not absorbed by the ground ultimately flows into streams and rivers. Developed areas contain impermeable surfaces such as pavement and buildings that prevent stormwater from being absorbed into the ground, and thus increase stormwater runoff into storm drains, storm sewer systems and drainage ditches.

Excess stormwater run-off has the potential for causing infrastructure damage, downstream flooding and stream bank erosion. Also, metals, oils and grease, bacteria and other pollutants not filtered from the runoff can contaminate streams, rivers, wetlands, etc.

The Municipal Separate Storm Sewer System (MS4) Permit requires VDOT to develop an Illicit Discharge Detection and Elimination (IDDE) program. The IDDE program must incorporate the following four elements:

- Develop an MS4 map showing the location of all outfalls: mapping to be completed by Central Office Maintenance Division;
- Develop and implement a plan to detect and address illicit discharges, including illegal dumping, to the VDOT system;
- To the extent allowable under state law, prohibit illicit discharges into the MS4; and
- Inform public employees, businesses, and the general public of the hazards.

This IDDE Field Guide is designed to assist field personnel with detection, investigation and elimination of illicit discharges to VDOT's regulated small MS4 and is designed to complement the VDOT Illicit Discharge Detection and Elimination Program Manual. This guide describes conditions in the field that field personnel may encounter and actions they need to take. A copy of this field guide has been provided to the following personnel:

- Maintenance Operations Managers
- Transportation Operations Managers
- Maintenance Supervisors
- Maintenance Team Leaders

The guide can also be accessed from the following link: https://insidevdot.cov.virginia.gov/div/env/HM/MS4%20Good%20Housekeeping%20and%20IDDE%20Documents/14047_iddeFieldGUIDE%20(2).pdf

This guide should be kept in the work vehicle for use in the field.

For additional technical guidance contact the IDDE Central Office Team at IDDEReports@vdot.virginia.gov.

EXAMPLES OF WHAT IS AN ILLICIT DISCHARGE

An illicit discharge is defined in VDOT's MS4 permit as "any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a VPDES or VSMP permit (other than the VSMP permit for discharges from the municipal separate storm sewer), discharges resulting from firefighting activities, and discharges identified by and in compliance with 9VAC25-870-400 D 2 c (3)."

Sanitary wastewater from showers, sinks, etc.

Discharge of Oil, Fuel from Vehicles and Equipment

Fertilizer, Pesticides and Herbicides - Misapplied or Overapplied

Cooking Oil and Grease

Grass Clippings and Leaves when Intentionally Blown Into Drains

Solvents

EXAMPLES OF WHAT IS AN ILLICIT DISCHARGE

Cleaning Chemicals

Paints

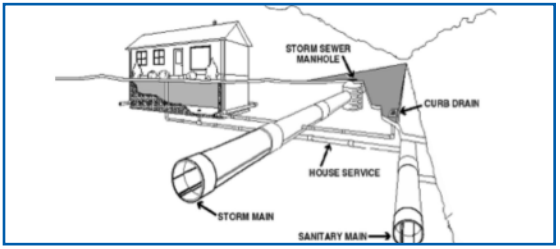
Mismanaged / Excess Road Salt

Sediment

Nonresidential Vehicle Wash Water

Improper Disposal of Radiator Fluid

Septic / Sanitary Sewer Discharges



Cross Connections between Sanitary Sewer and Storm Sewer Systems

EXAMPLES OF WHAT IS AN ILLICIT DISCHARGE

Illicit Connections

Illicit connections occur when drainage pipes or other conveyances are improperly connected to the storm drain system. These improper connections are often sources of illicit discharges. Examples include:

- A sewer pipe improperly connected to the storm sewer that is discharging raw sewage
- A shop floor drain that is connected to VDOT's storm sewer system
- A pipe from a residential household discharging gray water into VDOT's storm drainage system

Any connection of a private storm sewer pipe into VDOT's storm sewer system or a private storm sewer pipe that discharges on VDOT right of way must be in compliance with VDOT's Land Use Permit requirements.

EXAMPLES OF WHAT IS NOT AN ILLICIT DISCHARGE

Fire Fighting Activities

Foundation / Footing Drains

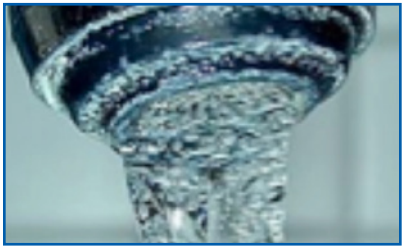
Water Line Flushing

Agricultural Irrigation Water

Landscaping Irrigation and Lawn Watering

Basement / Crawl Space Sump Pumps

EXAMPLES OF WHAT IS NOT AN ILLICIT DISCHARGE



Discharges from Potable Water Sources

Air Conditioning Condensation

Street Wash Water

Springs

Residential Car Washing

Other discharges not considered illicit discharges include:

- Uncontaminated groundwater infiltration,
- Uncontaminated pumped groundwater,
- Rising groundwaters,
- Flows from riparian habitats and wetlands, and
- Those discharges covered under a Virginia Pollution Discharge Elimination System (VPDES) or National Pollutant Discharge Elimination System (NPDES) permit;
- Fuel, oil or antifreeze spills related to a vehicular accident that is properly cleaned up through normal incident management practices are not considered an illicit discharge. Residency staff should nevertheless monitor the site during and/or after the incident to ensure that the cleanup is sufficient.
- Drums or other containers containing potentially hazardous materials that are found abandoned along the roadside are considered unknowns, or other potential hazardous materials cargo, and are not considered an illicit discharge. Do NOT open containers. Contact your Regional Hazardous Materials Manager for assistance.
- However, in the event that any of these activities are found to cause sewage, industrial wastes or other wastes to be discharged into the VDOT Stormwater system, the county or city having jurisdiction over the source shall be notified and they have the authority to order the activity to cease.

ILLICIT DISCHARGE INITIAL FIELD REVIEW

The Residency will conduct Initial Field Reviews for potential illicit discharges assigned through the AMS Work Order System. These assignments will be coded as Polluted Stormwater (IDDE).

AMS WORK ORDERS

Polluted Stormwater (IDDE) AMS work orders are typically generated from one of the following sources:

1. **A citizen observes a suspect discharge and reports it through the Call Center**
   - The Call Center will follow guidance to determine if call needs to be routed to HAZMAT or if it is considered an Illicit Discharge (ID)
   - The Call Center enters a work order with a problem type of "Polluted Stormwater (IDDE)" into the Asset Management System (AMS)
2. **Participants of Adopt-A-Highway observe suspect discharge and report it to the Residency or Central Office**
   - The Residency or Central Office will enter work order in AMS
3. **VDOT maintenance personnel observe an illicit discharge and report it to the VDOT MS4 Program**
   - Residency/AHQ enters a polluted stormwater AMS work order
4. **Citizen observes a suspect discharge and reports it to the VDOT MS4 Program through the website**
   - Central Office enters a polluted stormwater AMS work order
   - Residency/AHQ receives the work order and screening is performed to determine if the discharge is a Hazmat issue or a suspected illicit discharge

Initial Field Review requires a site visit to determine if the condition described in the work order can be verified. The citizen or other reporting party should be contacted if the site location cannot be found from the AMS work order description, and in many cases, may be advisable to meet them onsite. Many illicit discharges are intermittent and may not be present at the time of your visit, so the citizen may be capable of better isolating the time and circumstances surrounding the discharge they reported.

TECHNIQUES FOR CONDUCTING A FIELD INVESTIGATION

During field investigations, suspect discharges should be evaluated based on:

Odor
Odors may indicate an illicit discharge has occurred. The presence of sewage, sulfide, or rancid/sour odors may indicate the presence of wastewater in the system. Petroleum and chemical odors may indicate a possible spill has occurred nearby.

Do not enter confined areas such as culverts, drop inlets, manholes, etc. to investigate the origin of odors. Gases may accumulate in these areas that can overcome the entrant.

Color
Certain water colors may also indicate the presence of an illicit discharge. Brown, gray, yellow, green, orange or red water should be noted. Water that is tinted brown may be due to the presence of naturally occurring tannins in the surrounding environment and may not be an illicit discharge. Turbid, cloudy water may indicate the presence of excessive siltation or other pollutants entering the stormwater.

Staining/Discoloration
The presence of stains or discoloration in or around an outfall may be signs that an illicit discharge is occurring or has occurred. Stains or discoloration often originate from natural sources, including water with high concentrations of iron or other minerals, lichen/fungi, and mineral deposits on stone or concrete.

Stressed/Dead Fish
Stressed or dead fish are a possible indication that an illicit discharge has occurred. A fish kill may be caused by naturally low dissolved oxygen levels during summer, or from lakes or streams freezing over during the winter. They can also be caused by diseases, overpopulation, or polluted runoff. Nevertheless, if multiple dead or stressed fish are observed, refer to the IDDE Central Office Team for further evaluation.

Other Observations

Containers, including drums and buckets may be found abandoned along the roadside. These containers may contain hazardous materials and should be avoided. Do **NOT** open containers. Contact your Regional Hazardous Materials Manager and/or the Transportation Operations Center for assistance.

Foam may be observed while performing an initial field review. Many instances of foam are natural; foam is produced when air is introduced to the water through stream turbulence, waterfalls or waves breaking on the shore. It can also occur from the natural breakdown of algae or other plant material. This natural foam may appear white at first, but will generally turn brown over time.

Foam that is white in color and has a sweet or scented odor is likely to be manmade. Examples of these include detergents, soaps and shampoos. Always check the surrounding area for possible sources when foam is observed.

White foam in ditch - this is manmade in origin and would be considered an illicit discharge

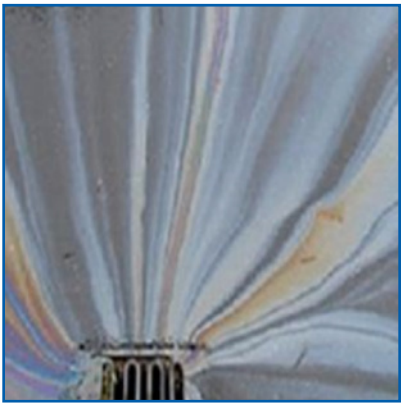
Natural foam in creek - not and illicit discharge

Sheen

The appearance of a sheen can result from the presence of naturally occurring bacteria or petroleum contamination. The sheen's origin can be determined by touching it with a stick or other object. If the sheen breaks up into platelets or clumps, then it is due to the presence of naturally occurring bacteria in the water. If the sheen swirls (separates) and reforms (re- adheres), petroleum is present in the water. The pictures below are examples of a bacterial and petroleum sheen.

The presence of a bacterial sheen does not necessarily indicate an illicit discharge. Petroleum sheens are signs that petroleum has leaked or spilled, which indicates a discharge has occurred or is occurring.

When disturbed, an organic sheen will crack and break into many small platelets



When disturbed, a petroleum sheen swirls and reforms

Iron Bacteria

In areas throughout the state, an orange brown benthic growth may be observed in pipes, outfalls, and streams. This growth may appear as an orange, brown, red, yellow or grayish gelatinous slime. It can also appear as stains or as a "feathery" filamentous growth. A rainbow sheen may also be present. While unsightly, this growth is from iron bacteria that are naturally occurring in the soil and oxidize dissolved iron or manganese. The presence of iron bacteria does not typically indicate an illicit discharge.

Two examples of iron bacteria. Note the raindow sheen.

Presence of iron bacteria in culvert, as well as in stream. Note the orange-brown color.

DETERMINING THE SOURCE OF THE ILLICIT DISCHARGE

If the discharge is found in the VDOT drainage system, the source of the discharge should be investigated by:

1) Tracking the illicit discharge to its point of entry into the VDOT storm sewer system.

2) At the point of entry look to see if the source can be identified; examples include a leaking drum used to store used oil or a PVC pipe from a residence that is discharging gray water. **Do not enter private property to do this.**

3) Take pictures and notes on observations and exact location where the pollutant enters VDOT's Right of Way.

At times, it may be difficult to determine the source of a discharge. The area around the discharge location should be visually surveyed to determine the:

- Location of outfalls and drainage pathways
- Upstream connections
- Potential upstream impacts (such as failing septic systems, etc.)
- Origins of pipes/culverts

If a reported illicit discharge is located in an area where the storm sewer system is complex and the source is difficult to locate, the site should be referred to the Central Office IDDE team at IDDEReports@vdot.virginia.gov.

In highly developed areas, there are often multiple outfalls which must be surveyed. By surveying the area upstream of a suspect discharge, the upstream connections as well as potential sources of discharges may be located.

An example of a source is a leaking septic system upstream impacting water quality downstream. Determining the origin of pipes and culverts can reveal unauthorized connections to VDOT's stormwater system as well. Unauthorized connections are often sources of illicit discharges as well as cases of trespassing on VDOT's Right-of-Way.

A reminder about safety: At no time should anyone violate VDOT safety rules in the investigation of a polluted stormwater complaint, including entering confined spaces.

DOCUMENTATION OF SUSPECTED ILLICIT DISCHARGES

All reports of illicit discharges and any field investigations must be documented in the work order system and IDDE database.

For suspected illicit discharges observed during daily operations, the AHQ should complete an investigation and enter the information into the AMS system with a Problem Type of "Polluted Stormwater (IDDE)".

PHOTOGRAPHS

Photographs should be taken during the investigation to support information in the Illicit Discharge Incident Tracking Sheet.

(1) provide a visual record of conditions observed,

(2) provide information to staff when further investigation is required, and

(3) document changes in the outfall conditions over time.

In addition to close-up detailed photos, also take photos that capture the outfall and surrounding area ("Big Picture"). A "Big Picture" photo provides a frame of reference for anyone who has to perform a follow up investigation at the site.

"Close up" of discharge of oily substance from pipe

"Big Picture" photo showing pipe and surrounding layout

The close-up photo by itself provides good detail of the discharge; however it is difficult to determine the true scale or location of the issue through viewing this photo alone. The "Big Picture" photo gives the investigator perspective as to the nature and severity of the discharge.

The photos below provide another example of close-up and "Big Picture" photos.

The source of this illicit discharge was determined by following the smell and excessive vegetation in the ditch line to a sewer manhole. The two pictures were taken in the spring. The grass in the yard had not yet come out of winter dormancy, but the grass in the ditch line was three times as tall, and was much greener than the yard.

"Close up" of ditch where a sewage smell was repoted

"Big Picture" of ditch line

COORDINATION OF ACTIONS FOLLOWING INITIAL FIELD REVIEW

Suspect illicit discharges discovered during routine Residency operations or reported to the Residency, are coordinated differently depending on the issue. A few examples are noted below:

- Gray water issues that are discovered during ditching or cross pipe replacements that are referred to the locality,
- An equipment repair shop that has had an oil spill and traffic from the lot is tracking the spill onto the VDOT maintained roadway; the owner is contacted and requested to request a roadway cleanup and the spill is referred to the locality;
- A logging or construction site that is tracking mud and debris onto the roadway and the responsible party is contacted to request a cleanup.
- An emergency response to a tractor trailer accident; the fuel tank is ruptured and leaking fuel into the ditch. 911 and the Transportation Operation Center (TOC) are contacted.

Table 1 is a general guide showing how different illicit discharge issues are coordinated after information is collected through the initial field review performed by the Residency.

Table 1. Post Initial Field Review Coordinators

DESCRIPTION OF POSSIBLE IDDE	RESPONSIBLE VDOT COORDINATOR
Automobile fluids *(gas, motor oil, diesel, antifreeze)*	Environmental
Cooking Oil and Grease	Maintenance
Solvents	Environmental
Paint	Environmental
Chemical Cleaners *(Acid/alkaline-based detergents, soaps, etc.)*	Environmental
Pesticides and Herbicides	Environmental
Salt from VDOT Application	Maintenance
Landscape Waste *(Grass Clippings / Leaves)*	Maintenance
Fertilizer	Maintenance
Sediment	Maintenance and Construction* *(Depending on sediment source)*
Gray Water *(e.g. Clothes washing, dishwater)*	Maintenance
Septic / Sewer Wastewater	Maintenance
Chlorinated Swimming Pool Discharge	Environmental
Discharge from Unpermitted Pipe Connection	District LUP Section
Unpermitted Pipe Connection - No Discharge	District LUP Section
Other	Maintenance and Environmental

The following table shows the enforcement authority for eliminating confirmed illicit discharges. Any referrals to DEQ should be coordinated through the District Environmental Section. The Residency will make referrals to Localities, Health Departments and the District LUP Section for confirmed illicit discharges.

Table 2. IDDE Enforcement Referral Authority

DESCRIPTION OF IDENTIFIED IDDE	RESPONSIBLE ENFORCEMENT AUTHORITY
Automobile fluids *(gas, motor oil, diesel, antifreeze)*	DEQ
Cooking Oil and Grease	Locality
Solvents	DEQ
Paint	Locality
Chemical Cleaners *(Acid/alkaline-based detergents, soaps, etc.)*	Locality
Pesticides and Herbicides	DEQ
Salt from VDOT Application	VDOT Residency
Landscape Waste *(Grass Clippings / Leaves)*	Locality
Fertilizer	Locality
Sediment	VDOT Residency
Gray Water *(e.g. Clothes washing, dishwater)*	Locality
Septic / Sewer Wastewater	Health Dept (County)
Chlorinated Swimming Pool Discharge	Locality
Discharge from Unpermitted Pipe Connection	VDOT LUP Section
Unpermitted Pipe Connection - No Discharge	VDOT LUP Section
Other	DEQ

AMS WORK ORDER CLOSURE FOR SUSPECT ILLICIT DISCHARGES

After all field investigations are complete, the work order can be closed in one of the following ways:

1. Once the illicit discharge is verified and the information is referred to the appropriate local or state official for action, the work order can be closed. Please include the name of the local official and the date of the contact in the work order system at the time of contact. The local official should be contacted by telephone, followed up by an e-mail for documentation purposes.

2. If the illicit discharge is verified but the source or type of discharge cannot be determined, please enter the information related to the investigation into the work order system. If the discharge cannot be determined after 6 months, the work order can be closed after an e-mail is sent to IDDEReports@vdot.virginia.gov listing the work order number and attaching any photos taken.

3. If the illicit discharge is intermittent (*), the site must be visited a minimum of three times to attempt to observe the discharge. If the discharge is not observed during any of these visits, note the attempts and close the work order.

4. If, after consultation with the citizen making the complaint, the evidence of an illicit discharge cannot be found, the information related to the investigation should be entered into the work order system and then the complaint referred to the Environmental Division at the VDOT Central Office. These incidents will be recorded in the IDDE tracking system and the investigation will be closed in accordance with established procedure.

*- An intermittent discharge is described in the permit as a discharge that is not continuous over time and that may stop or cease during dry weather or other low flow conditions.

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