City of Washougal

Illicit Discharge Detection and Elimination Program Manual

February 2012

City of Washougal
Illicit Discharge Detection and Elimination Program Manual

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Abbreviations and Acronyms

AKART	All known, available, and reasonable methods of prevention, control and treatment
BMP	Best Management Practice
CFR	Code of Federal Regulations
City	City of Washougal
CWA	Clean Water Act
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
GIS	Graphic Information System
IDDE	Illicit Discharge Detection and Elimination
NPDES	National Pollutant Discharge Elimination System
ORI	Outfall Reconnaissance Inventory
Phase II Permit	State Waste Discharge General Permit for Discharges from Small Municipal Separate Storm Sewers in Western Washington
PWD	Public Works Department
SWM	Stormwater Management
Stormwater Management Manual	2005 Ecology Stormwater Management Manual for Western Washington
SWMP	Stormwater Management Program
SWPPP	Stormwater Pollution Prevention Plan
WMC	Washougal Municipal Code

Abbreviations and Acronyms

Section 1 – Introduction

1.1 Background

The City of Washougal has made a strong commitment to protect and manage Washougal's natural resources. Within the Public Works Department, the Stormwater Management (SWM) program seeks to minimize the negative effects of development and pollution, while maximizing environmental protection and conservation. Protecting and preserving the quality of the City's surface water is a key focus area of the SWM program.

According to the US EPA's 2000 National Water Quality Inventory, 39 percent of assessed river and stream miles, 46 percent of assessed lake acres, and 51 percent of assessed estuarine square miles do not meet water quality standards. The top causes of impairment include siltation, nutrients, bacteria, metals (primarily mercury), and oxygen-depleting substances. Polluted stormwater runoff, including runoff from urban/suburban areas and construction sites is a leading source of this impairment. To address this problem, EPA established the National Pollutant Discharge Elimination System (NPDES) program as part of the Clean Water Act (CWA) to regulate stormwater discharges.

In the State of Washington, EPA has delegated the NPDES program administration to the Department of Ecology. Ecology issued a Phase II Municipal Stormwater Permit to the City of Washougal in January 2007. The Phase II Permit requires the City to have a stormwater management program (SWMP) with five major conditions. One of those conditions requires that "The SWMP shall include an ongoing program to detect and remove illicit connections, discharges as defined in 40 CFR 122.26(b)(2), and improper disposal, including any spills…, into the municipal separate storm sewers owned or operated by the Permittee." (Permit Condition S5.C.3). Therefore, the overreaching program goal is to prevent, locate, and correct illicit discharges.

The City's IDDE program is managed by the Public Works Department. Maintenance staff and construction site inspectors also play an important role identifying illicit discharge problems and responding to clean-up requests. However, all Public Works (Engineering and Operations and Maintenance), Community Development, Fire and Police staff will play a role in locating, identifying and reporting potential illicit discharges.

1.2 Summary of the IDDE Program

The Phase II Permit requires permittees to develop an IDDE program encompassing the elements listed below. Each element is addressed in the sections of this IDDE Program Manual as noted below.

- Develop a municipal storm sewer system map (Section 2);
- Adopt an ordinance to prohibit non-stormwater, illegal discharges, and/or dumping into the storm sewer system (Section 3);
- Implement an on-going program to detect and address non-stormwater discharges, spills, illicit connections, and illegal dumping (Sections 4, 5 & 6);

Section 1 – Introduction

- Educate employees, businesses, and the general public about illicit discharge concerns (Section 7);
- Adopt and implement procedures for program evaluation and assessment (Section 8);
- Maintain records of all IDDE program activities (Section 8); and
- Provide IDDE training for municipal staff (Section 9).

This manual is intended to assist City staff in implementing the IDDE program. It is to be used as a guidance document for staff in their day-to-day activities related to IDDE. This document can also be used as a training tool to ensure that all staff is following the same procedures in responding to illicit discharge concerns. Acknowledgements of resources used to create this program manual are included in Section 10.

Section 2 – Storm Sewer System Map

2.1 Overview

The first major component of the City's illicit discharge program is the mapping of the municipal stormwater drainage system. Maintaining an accurate map of the stormwater drainage system will make it easier for the City to track and locate the source of suspected illicit discharges. The Phase II Permit outlines minimum information that should be included in the City's municipal storm sewer system map:

- Location of all known municipal storm sewer outfalls, receiving waters, and structural BMPs owned, operated, or maintained by the City,
- Tributary conveyances (type, material, size) leading to outfalls that are 24-inches or larger (or have an equivalent cross-sectional area),
- Drainage areas and land use for the drainage basins contributing to outfalls that are 24-inches or larger (or have an equivalent cross-sectional area),
- Locations of new connections to the City's stormwater drainage system, and
- Drainage areas within the City that do not discharge to surface water (a.k.a., closed depressions).

The Department of Ecology requires the map to be prepared in GIS format and the map must be made available to Ecology upon request.

The City's mapping efforts are primarily focused on mapping the locations of outfalls and the drainage system infrastructure (pipes, ditches, catch basins, manholes, and stormwater facilities).

2.2 Mapping Procedures

The City, in conjunction with Clark County GIS and a consultant, developed a base map utilizing as-built construction drawings of the storm system and provided a method to store field reports to specific locations. Currently the City is in the process of completing a quality assurance check along with updating the map with new developments. After the office QA is complete and as resources allow, staff will begin a field verification process to verify accuracy and document any missing storm infrastructure. Field crews will take

Stormwater Facility Maintenance

sections of the map and beginning at a downstream outfall, will trace the tributary drainage system upstream.

The City will work with Clark County GIS in developing workflow processes to ensure that new development is accurately mapped as systems come on line.

Section 3 – IDDE Ordinance

3.1 What is an Illegal Discharge?

An illegal discharge as defined by WMC Chapter 14.36.020(6) is "Any direct or indirect non-stormwater discharge to the City's storm drain system, except as expressly exempted by WMC Chapter 14.36 – Illegal Discharges to Stormwater System and Watercourses. Examples of illegal discharges include:

- A measurable flow during dry weather that contains pollutants or pathogens,
- Disposal of vehicle maintenance fluids into a storm drain;
- Hosing or washing loading areas in the vicinity of storm drain inlets;
- Leaking dumpsters flowing into a storm drain inlet; and
- Old and damaged sanitary sewer line leaking fluids into a cracked or damaged storm sewer line.

3.2 What is an Illicit Connection?

An illicit connection as defined by WMC Chapter 154.36.020(7) is "either: (a) any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the City's storm drain system, watercourse or water body, including but not limited to conveyances allowing any non-stormwater discharge such as sewage, process wastewater, and wash water to enter the storm drain system and any connections thereto from indoor drains and sinks, regardless of whether said drain or connection was previously allowed, permitted, or approved by the City of Washougal; or (b) any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by the City."

3.3 City of Washougal IDDE Ordinance

In February 2010, the City adopted Ordinance 1657 which added a new chapter (14.36) to the Washougal Municipal Code to address IDDE. The prohibited discharges portion of WMC Chapter 14.36 is included below. A copy of the full code chapter is included in Appendix A along with WMC Chapter 18.96, which addresses additional enforcement options.

City of Washougal Stormwater Badge

14.36.070 Discharge Prohibitions

(1) Prohibition of Illegal Discharges. No person shall discharge or cause to be discharged into the municipal storm drain system or any watercourse any materials (including but not

limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards) other than stormwater. Contaminants include but are not limited to the following:

(a) Trash or debris;

(b) Construction materials;

(c) Petroleum products including but not limited to oil, gasoline, grease, fuel oil and heating oil;

(d) Antifreeze and other automotive products;

(e) Metals in either particulate or dissolved form;

(f) Flammable or explosive materials;

(g) Radioactive material;

(h) Batteries;

(i) Acids, alkalis, or bases;

(j) Paints, stains, resins, lacquers, or varnishes;

(k) Degreasers and/or solvents;

(l) Drain cleaners;

(m) Pesticides, herbicides, or fertilizers;

(n) Steam cleaning wastes;

(o) Soaps, detergents, or ammonia;

(p) Swimming pool or spa filter backwash;

(q) Chlorine, bromine, or other disinfectants;

(r) Heated water;

(s) Domestic animal wastes;

(t) Sewage;

(u) Recreational vehicle waste;

(v) Animal carcasses;

(w) Food wastes;

(x) Bark and other fibrous materials;

(y) Lawn clippings, leaves, or branches;

(z) Silt, sediment, concrete, cement or gravel;

(aa) Dyes (except as described below under "permissible discharges");

(bb) Chemicals, including suspected metals, not normally found in uncontaminated water;

(cc) Any other process-associated discharge except as otherwise allowed in this section;

(dd) Any hazardous material or waste not listed above.

(2) Permissible Discharges. The following types of discharges shall not be considered illegal discharges for the purposes of this chapter unless the director determines that the type of discharge, whether singly or in combination with others, is causing or is likely to cause pollution of surface water or groundwater:

(a) Uncontaminated water from crawl space pumps or footing drains;

(b) Yard watering;

(c) Dechlorinated swimming pool water;

(d) Materials placed as part of an approved habitat restoration or bank stabilization project;

(e) Natural uncontaminated surface water, springs or groundwater;

(f) Flows from riparian habitats and wetlands;

(g) Common practices for water well disinfection;

(h) Discharges resulting from diffuse or ubiquitous sources such as atmospheric deposition;

(i) Discharges resulting from dye testing authorized by the director;

(j) Discharges which result from emergency response activities or other actions that must be undertaken immediately or within a time too short to allow full compliance with this chapter so as to avoid an imminent threat to public health or safety. The director may further define qualifying activities in administrative guidance. The person responsible for said emergency response activities shall take all necessary steps to ensure that the discharges resulting from such activities are minimized and ensure that future incidents are prevented to the greatest extent possible;

(k) Air conditioning condensation;

(l) Discharges permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the federal Environmental Protection Agency; provided, that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations; and provided, that written approval from the director has been granted for any discharge to the storm drain system;

(m) Other water sources not containing pollutants;

(n) Other types of discharges as determined in advance by the director.

(3) Conditional Discharges. The following types of discharges shall not be considered illegal discharges for the purposes of this chapter if they meet the stated conditions, unless the director

determines that the type of discharge, whether singly or in combination with others, is causing or is likely to cause pollution of surface water or groundwater:

(a) Potable water, including water from water line flushing, hyperchlorinated water line flushing, fire hydrant system flushing, and pipeline hydrostatic test water. Planned discharges shall be dechlorinated to a concentration of 0.1 ppm or less, pH-adjusted if necessary and in volumes and velocities controlled to prevent resuspension of sediments in the stormwater system;

(b) Lawn watering and other irrigation runoff are permitted but shall be minimized;

(c) Dechlorinated swimming pool discharges. These discharges shall be dechlorinated to a concentration of 0.1 ppm or less, pH-adjusted if necessary and in volumes and velocities controlled to prevent resuspension of sediments in the stormwater system;

(d) Street and sidewalk wash water, water used to control dust, and routine external building wash-down that does not use detergents are permitted if the amount of street wash and dust control water used is minimized. At active construction sites, street sweeping must be performed prior to washing the street;

(e) Nonstormwater discharges covered by another NPDES permit; provided, that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations; and provided, that written approval has been granted for any discharge to the storm drain system;

(f) Other nonstormwater discharges. The discharges shall be in compliance with the requirements of a stormwater pollution prevention plan (SWPPP), reviewed and approved by the city, which addresses control of such discharges by applying AKART to prevent contaminants from entering surface or ground water.

(4) Prohibition of Illicit Connections.

(a) The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

(b) This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

(c) Anybody is considered to be in violation of this chapter if the person connects a line conveying sewage to the municipal separate storm sewer system, or allows such a connection to continue.

Section 4 – Illegal Discharge Detection Procedures

4.1 Purpose

Illegal discharges and illicit connections are identified through citizen reporting, interdepartmental or interagency referral, or through Outfall Reconnaissance Inventory (ORI) activities. The City relies on local citizens, City field staff, and inspections to detect potential problem areas quickly, so that they can be addressed before they cause significant water quality degradation

The Community Reporting Hotline (360) 835-2662 allows local citizens to contact the City when they suspect a problem. Public outreach encourages residents to participate in the reporting process and helps the City receive timely reports of obvious problems like illegal dumping, spills, or strong odors. The City's outfall inspections provide regular opportunities to document the conditions of the outfalls and identify potential problems that may not be obvious to the general public.

4.2 Citizen Reporting and Interdepartmental/Interagency Referral

4.2.1 Contact Information

A central reporting phone line has been established to handle water quality incident reports citywide. Citizens that suspect an illegal discharge, an illicit connection, or an illegal dumping action can call the Community Reporting Hotline at (360) 835-2662 to report the incident. The call will be routed to the appropriate staff for response. Citizens can also use the City's website to report spills or other water quality concerns via email at the Public Works Stormwater page: http://www.cityofwashougal.us/index.php?option=com_content&view=article&id=111&Itemid=186 under the "Contact Us" link. Calls may also be made directly to the Department of Ecology Southwest Regional Office at 360-407-6300.

After hours, emergency problems should be reported to the City's Public Works Department at 360-835-2662. Calls will be routed to the City's alarm contractor who will contact appropriate on-call City staff who will assess the severity of the incident and determine if emergency response (fire, hazmat, etc.) is needed. Residents that encounter a non-emergency incident after hours are encouraged to report the problem the next business day through the City's Community Reporting Hotline or the City's Public Works Department. If after hours messages are left on the City's Public Works voicemail, staff will follow-up with the caller during the next business day.

4.2.2 Problem Documentation

When water quality incident reports are received at Public Works, the staff person taking the call should complete the Stormwater Pollution Incident Tracking Sheet and submit it to the Public Works Department for follow up. The Stormwater Pollution Incident Tracking Sheet, Incident Response, and Outfall Inspection Report forms are located in Appendix B.

Section 4 – Illegal Discharge Detection Procedures

Once recorded, incident information is referred to the appropriate City department and/or staff person for follow-up. In most cases, IDDE problems should be referred to the Public Works Department for further investigation. Staff will either follow the investigation procedures in Section 5 to identify the source of the problem or, if the source is known, the corrective action procedures outlined in Section 6 will apply.

4.3 Outfall Inspection Procedures

The City will conduct an Outfall Reconnaissance Inventory (ORI) to visually inspect each known outfall from the City's stormwater drainage system to identify areas of obvious pollution or non-stormwater discharges. Outfall inspections locate potential problem areas without the need for in-depth laboratory analysis. Potential problem discharges can be identified by outfalls that are flowing during dry weather (potential illicit connection) or outfalls that have high turbidity, strong odors, or unusual colors.

Note: If inspection staff encounters a transitory discharge, such as a liquid or oil spill, during inspection activities, the problem should be immediately referred to the appropriate agency or response contractor for clean-up. Staff should also complete an Incident Response Form located in Appendix B.

Turbid Water in Stormwater Pond

Section 4 – Illegal Discharge Detection Procedures

4.3.1 Prioritization Schedule

The Phase II Permit requires that the City prioritize receiving waters for visual inspection to identify the area's most likely to include illegal discharges. The City of Washougal estimates that the storm drainage infrastructure includes approximately 30 outfalls within the NPDES coverage area that discharge to local waterways. A map of the City's stormwater system has been developed and will continue to be updated as systems are added and more information becomes available. A map of the stormwater system is included in Appendix C.

The Phase II Permit requires the City of Washougal to prioritize receiving waters for visual inspection to identify the areas most likely to include illicit discharges. Receiving water priorities have been set based on drainage area characteristics, Phase II Permit requirements, and the knowledge of Public Works staff. Highest priority has been given to those outfalls associated with past contamination issues, outfalls in neighborhoods of older homes served by septic systems and areas of commercial and/or industrial activity within the City. The City also considered complaint history, downstream habitat, and density of housing in prioritizing receiving waters.

The Phase II Permit requires the City of Washougal to inspect the outfalls of three high priority receiving waters by the end of 2010 and one high priority receiving water each year after. For 2010, the three priority receiving waters are:

- Columbia River
- Washougal River
- Campen Creek

The Stormwater System Map included in Appendix C shows the locations of the high priority receiving waters. Priorities in the future will be set annually based on established criteria and any additional input received through complaint calls or areas identified by field staff.

4.3.2 Responsibility

Inspections are the responsibility of the Public Works Department. Inspections may be performed by City staff or by outside consultants hired by the City. In either case, all field reports will be reviewed by the City Engineer and the Stormwater Manager.

4.3.3 Timing

Timing is important when scheduling ORI field days. The preferred conditions for outfall inspections include:

- Dry season – preferably in summer or early fall.
- Dry period - no run-off producing rainfall within last 48 hours.
- Daytime, at low tide, to access tidally influenced outfalls.
- Low vegetation (avoid late spring when access may be hindered by heavy vegetation).

Section 4 – Illegal Discharge Detection Procedures

The preferred conditions allow detection of flows when there should be none and prevent the dilution of pollutants.

4.3.4 Equipment

Prior to conducting field work, crews should assemble all required equipment (see Table 4.1) and review records from prior inspections in the same area to become familiar with the outfall locations and any potential inspection challenges. Field crews should prepare for consecutive days of field work when possible.

Table 4.1
Field Equipment for Outfall Inspections

Minimum 2 person crew	Machete/Clippers
Safety Gear – vest, hard hat, cones	Flash light or headlamp
Field Notebook/Pencils	Tool Box – hammer, tape measure, duct tape,
Outfall Inspection Report Forms	zip ties
Map or Aerial Photo of Inspection Area	Spray paint or other marker
GPS Unit	First Aid Kit
Cell phone w/ charged battery	Clear sample bottles
Digital camera w/ charged batteries	Wide mouth container
Extra batteries for camera	Watch with second hand
Compass	Chlorine sample kit

After long periods of heavy rain, field crews should allow 3 to 4 days of an antecedent dry period before starting or resuming inspections, so that rainfall runoff has a chance to clear the storm drainage system.

4.3.5 Activities

During ORI field days, field crews should visually inspect each outfall and the immediate surrounding area, photograph the current conditions, and complete the Outfall Inspection Report form located in Appendix B.

Potential problems are indicated by outfalls that are flowing in dry weather and/or foul odors or discolored water in or around the outfall pipe. If a flowing outfall is encountered during dry weather, field crews should attempt to first determine if the flow is from an approved discharge or natural ground water. If an approved flow or groundwater has been ruled out as the source of the flow, then a flowing outfall indicates a potential illegal discharge concern.

Section 4 – Illegal Discharge Detection Procedures

Stormwater System Cleaning and Maintenance Equipment

When illegal discharge problems are identified, field crews will photograph the problem area and conduct a quick visual inspection of the surrounding area to identify any obvious pollution sources. For obvious illegal discharges, field crews should consider collecting samples of the discharge, if possible, and begin filling out the Incident Response form to investigate the source of the pollutants as described in Section 5. These simple actions can give valuable direction to the upcoming IDDE inspection. Field crews should file all outfall report forms, and update the record keeping database as appropriate. Additional record keeping information is included in Section 8.

During field inspections, crews should also note whether the outfalls have maintenance issues, such as trash around the outfall or damaged infrastructure that should be brought to the attention of the Operations and Maintenance Division, Utility Supervisor. Observed spills or environmental hazards should be immediately reported to the PWD and the incident should be documented using the Incident Response Form located in Appendix B. The PWD will follow investigation procedures documented in Chapter 5 to track source, and properly dispose of the spilled material.

Section 4 – Illegal Discharge Detection Procedures

4.4 Follow-up Actions

When potential problem areas are identified, field crews should report the observations to the PWD. Based on the severity of the problem, PWD will direct staff to open a case log and begin the investigation procedures outlined in Section 5. The PWD will also determine if other City departments or outside agencies need to be involved.

Section 5 – Investigation Procedures

5.1 Purpose

Potential illegal discharge problems can be revealed through outfall inspections, reports from staff, tenants, or the public, as described in Section 4. When a complaint is reported, the Phase II Permit requires that a follow-up investigation be initiated within seven (7) days, on average. The follow-up investigation could include a site visit to look at the problem area, review of mapping information, review of past complaints or investigations at the location, or other data collection and review. Once a problem has been verified (either through a routine outfall inspection or follow-up to a called-in complaint) the City will begin an official illegal discharge investigation, following the procedures outlined in this section. Figure 5.1 illustrates the steps that lead to an illegal discharge investigation.

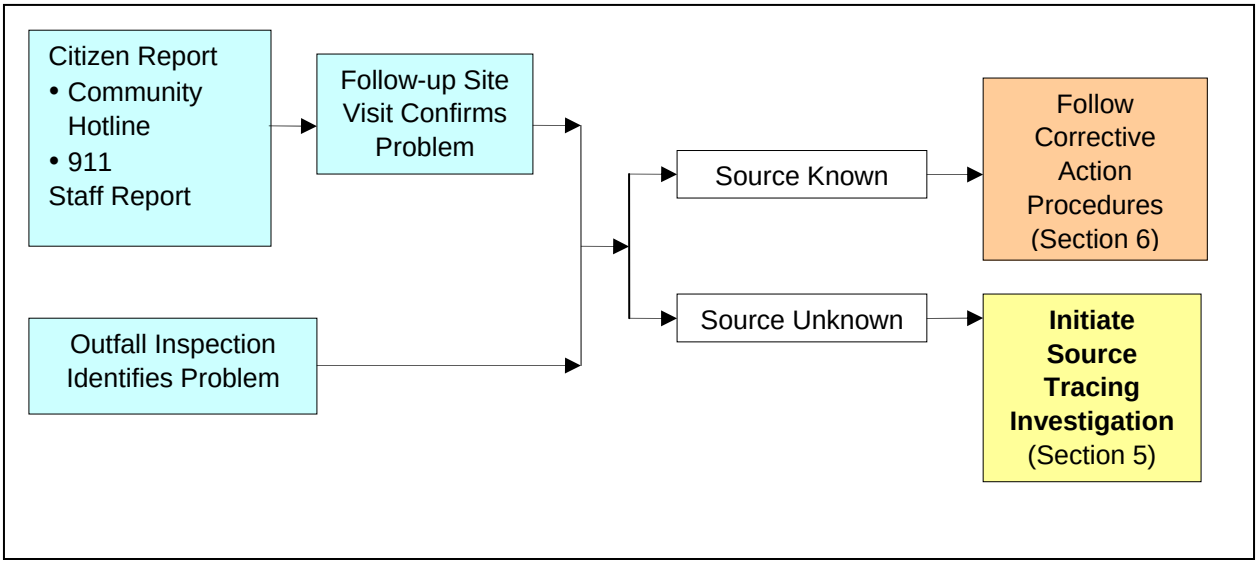

Figure 5.1 Routes to an Illegal Discharge Investigation

When an illegal dumping or illegal discharge problem is directly observed by a member of the City staff, it is generally not necessary to follow these investigation procedures. In those scenarios, the source of the problem discharge is already known. Problems revealed through direct observation are referred directly to the corrective action information in Section 6. In the event that a reported problem does not have a defined source, the procedures in this section should be followed to trace the sources of the illegal discharge.

5.2 Source Investigation Priority Levels

Table 5.1 outlines the priority levels to assist City staff in determining the appropriate response time for initiating a source investigation after a problem is identified in the field. Priority levels are based on the suspected pollutant source(s) of a reported problem. According to the Phase II Permit, illegal discharge investigations should begin within seven (7) days of identifying a problem. In most cases, the City of Washougal strives to respond faster than the required timeline.

Table 5.1
Source Investigation Priority Levels

Priority Level	Suspected Pollutants		Response Time (Work Days)
1	• Alkalis • Automotive products • Bases • Cleaning products • Degreaser or solvent • Drain cleaner • Fertilizer • Flammable/explosive materials	• Herbicide • Metals • Painting products • Pesticide • Petroleum • Process Wastewater • Sewage • Unknown chemicals	1-2
2	• Ammonia • Construction runoff (silt, sediment, gravel)	• Detergents • Food waste (fats, oils, grease) • Soap	3-5
3	• Car washing • Pressure washing waste • Spa or pool water	• Steam cleaning waste • Yard waste	5-7
4	• Animal carcasses • Bacteria • Construction materials • Debris	• Foam • Rust • Trash • Other	Within 10 days

Priority levels were determined based on the potential public health and/or water quality threat posed by a given pollutant. The response time indicates a target time frame for opening a case log and initiating a source investigation as described in Section 5.3. *Contact Emergency Services (911) and Department of Ecology Spill response immediately if discharge poses severe threat to human health or the environment.*

5.3 Tracing the Source

This section outlines the basic tools that can be used to trace the source of a suspected illegal discharge. Source tracing begins when a suspected problem area is identified through the ORI, field assessment/testing, or a complaint call. When the source of the non-stormwater discharge is not known, one of two primary methods can be used to locate the source of an illegal discharge:

- Method A – Storm Drain Network Investigations
- Method B – Drainage Area Investigations

The method used will depend on the type of information collected or reported, level of understanding of the drainage network, and existing knowledge of operations and activities on the surrounding properties. All source tracing investigations should be documented and recorded on the Incident Response report form provided Appendix B.

5.3.1 Open a Case Log

When problems are identified, a case log is opened assigning a case number, creation date, case description and the primary staff contact/investigator. The investigator assigned to the case shall keep an accurate log of labor, materials and costs associated with the investigation for invoicing the responsible party. The case log should be opened prior to completing any additional field work unless the nature of the discharge necessitates immediate response. The file should include copies of the following, if applicable:

- Incident Report Form;
- Copy of Outfall Inspection Report;
- Incident Response field forms;
- Photographs;
- Additional field notes;
- Lab testing results;
- Compliance letters sent and responses received;
- Correspondence (mail, email, telephone logs);
- Proof of corrected problems (contract and invoice or clean field investigation report).

Any field investigations, photographs, corrective actions, or other activities associated with the suspected problem area should be documented in the case log. This becomes the City's official record of the IDDE investigation. Additional record keeping information is included in Section 8.

5.3.2 Method A – Storm Drain Network Investigations

The source of some illicit connections or illegal discharges can be located by systematically isolating the area from which the polluted discharge originates. This method involves progressive investigation at manholes in the storm drain network to narrow down the location where the illegal discharge is entering the drainage system. This method is best used to identify constant or frequent discharge sources such as an illicit connection from a sewer system or sink drain into the storm drainage network. One-time illegal discharges

Latex Paint Residue on Catch Basin

(such as a surface spill or intentional dumping into the storm drain system) should be investigated using Method B described later in this section.

Field crews should work progressively upstream from the outfall and inspect manholes until indicators reveal that the discharge is no longer present. Manhole observations can be time-consuming, but they are generally a necessary step before conducting other tests. In particularly large storm drain systems, it may be helpful to first identify major branches of the system and test one manhole at the downstream end of each branch. This can help to reduce the area that must be investigated.

Storm drain network investigations include the following steps:

1. Consult the drainage system map (if available) and identify the major branches. If a drainage system map is not available or major branches cannot be identified, then manhole observations and probe readings must be done at each successive upstream manhole to map the drainage system and isolate the location of the polluted discharge entry. In such a case, field crews should also use the GPS unit to locate each observed manhole and add the location readings to the City's drainage system map.
2. Starting from the outfall, observe and take probe readings at the next upstream manhole or junction to see if there is evidence of polluted discharge. As with the outfall inspections, field crews are looking for the presence of flow during dry weather, foul odors, colors or stained deposits, oily sheen, floatable materials, and/or unusual probe readings.
3. Repeat observations and probe readings at each upstream manhole or junction until a junction is found with no evidence of discharge; the discharge source is likely located between the junction with no evidence of discharge and the next downstream junction.
4. Work downstream from the "clean" manhole or junction to isolate the location where the polluted discharge is entering the storm drain system.
5. If discharge is evident from private property, initiate private property site entry procedures.
6. Document all findings on the Incident Response Report Form and record all information in the database case log.

Figure 5.2 shows the observation steps to isolate the location where an illegal discharge is entering the storm drainage network.

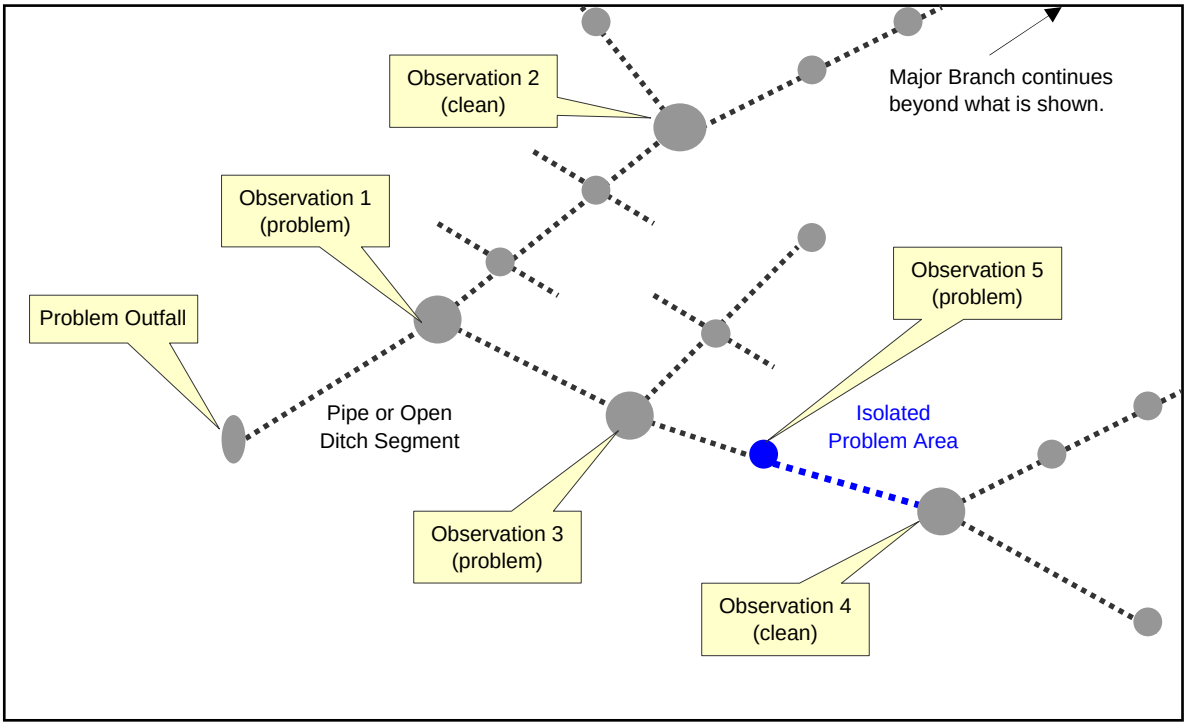

Figure 5.2 Storm Drain Network Observation Steps

When visual inspections are not enough to isolate the source of the illegal discharge, a number of additional field tests can be performed. These include:

- Dye testing,
- Video Testing/Camera-ing/TVing,
- Smoke testing.

The Center for Watershed Protection's *Illicit Discharge Detection and Elimination: A Guidance Manual* provides instructions for employing these testing techniques. The relevant pages from that manual are included in Appendix D.

Confirmed illegal discharge sources should be referred to the follow-up actions and corrective action procedures described at the end of this section and in Section 6.

5.3.3 Method B – Drainage Area Investigations

The source of some illegal discharges can be determined through a survey or analysis of the drainage area of the problem outfall. Drainage area investigations are particularly useful when the discharge observed at the outfall has a distinct or unique characteristic that can allow field crews to quickly determine the type of activity or non-point source that is generating the discharge. However, drainage area investigations are generally not helpful in tracing sewage discharges, since they are not related to a specific land use.

Section 5 – Investigation Procedures

Drainage area investigations should begin with a discussion between the field crews, PWD, and other knowledgeable City staff to identify the type of site most likely to produce the observed discharge. Table 5.2 shows some of the activities or land uses most likely associated with specific discharge problems.

Table 5.2
Common Discharges and Potential Sources

Observed Discharge	Potential Causes
Clogging Sediment	Construction activity without proper erosion and sediment controls Roadway sanding operations Outdoor work areas or material storage areas
Thick Algae Growth	Fertilizer Leak or Spill Landscaping operations Hydroseeding following Construction Failing or leaking septic system
Oil	Refueling operations Vehicle or machinery maintenance activities
Sudsy discharge	Power washing of buildings Vehicle or equipment washing operations Mobile cleaning crew dumping Laundry or Cleaner Household grey water discharge
Clogged Grease	Restaurant sink drain connection to stormwater system
Sewage	Failing septic systems or broken sewer main

Staff should make a list of likely discharge sources and consult City land use and drainage system maps to identify areas of likely pollution sources near the storm drain network. Field crews should then conduct a windshield survey of the drainage area to confirm and identify potential sources of the discharge. Once potential discharge sites are identified, City staff should conduct individual site inspections to locate the specific source of the illegal discharge. In some cases, dye testing (See Appendix D) may be needed to confirm that a suspected activity is actually draining into the storm drain network.

All drainage area investigations should be documented on the Incident Response Report Form and recorded with the database case log.

5.3.4 Equipment

Prior to conducting field work, crews should assemble all required equipment (see Table 5.3) and review the outfall inspection records or incident reports from the area to become familiar with the background information and potential pollution sources.

Table 5.3
Field Equipment for Source Investigations

Minimum 2 person crew	Machete/Clippers
Safety Gear –vest, hard hat, cones	Flash light or headlamp
Field Notebook/Pencils	Tool Box – hammer, tape measure, duct tape, zip ties
Incident Response Forms	
Map or Aerial Photo of Area	Pick or CB grate/cover remover
GPS Unit	Spray paint or other marker
Cell phone w/ charged battery	First Aid Kit
Digital camera w/ charged batteries	Field Test Kit (see Appendix E)
Extra batteries for camera	Chlorine Test Kit
Compass	

5.3.5 Analytical Sampling (if needed)

If illegal discharge sources cannot be identified based on a storm drain network investigation and/or drainage area investigation, the PWD may request that water samples be collected from potential problem discharges and sent to the lab for analytical testing. The results of lab tests may isolate the source or type of illegal discharge. Lab tests may also be important for documentation in the event that an enforcement action must be taken against a tenant or property operator. Table 5.4 shows the recommended water quality testing parameters. Appendix D includes additional information regarding indicator parameters in water quality testing.

Stormwater Facility Maintenance

Table 5-4
Water Quality Test Parameters and Uses

Water Quality Test	Type of Test	Use of Water Quality Test
Conductivity	Field	Used as an indicator of dissolved solids. Used to distinguish between seawater and stormwater.
pH	Field	Extreme pH values (high or low) may indicate commercial or industrial flows. Not useful in determining the presence of sanitary wastewater (tends to have a neutral pH like uncontaminated base flows).
Temperature	Field	Sanitary wastewater and industrial cooling water can substantially influence outfall discharge temperatures.
Ammonia	Lab	High levels can be an indicator of the presence of sanitary wastewater
Surfactants	Lab	Indicate the presence of detergent (e.g. laundry, car washing)
Total Chlorine	Field	Used to indicate inflow from potable water sources. Not a good indicator of sanitary wastewater because chlorine will not exist in a "free" state in water for long (it will combine with organic compounds).
Potassium	Lab	High levels may indicate the presence of sanitary wastewater.
Bacteria	Lab	Sanitary wastewater or septic systems.

Source: *Illicit Discharge Detection and Elimination Manual* (New England Interstate Water Pollution Control Board, January 2003)

Results of any analytical testing should be recorded on the Incident Response Report Form and reported to the Public Works Director. Testing results may lead to another round of field investigations using either Method A or B. All data shall be recorded in the database case log.

5.4 Follow-Up Actions

Once the source of an illegal discharge has been identified, the field crews should initiate private property site entry procedures (if needed), notify the property owner or operator of the problem, and provide the appropriate educational materials and/or a copy of WMC 14.36. This is an important first step in the corrective action process. Field crews should also notify the PWD, complete the Incident Response report form, and enter all information in the case log to document the findings. The PWD and Code Enforcement Officer can then begin working through the corrective action steps outlined in Section 6.

Section 6 – Corrective Action

6.1 Purpose

The City will respond to identified illegal discharges, illicit connections, or illegal dumping activities using progressive enforcement actions. Corrective actions will focus first on education to promote voluntary compliance and escalate to increasingly severe enforcement actions if voluntary compliance is not obtained. The PWD and Code Enforcement Officer should use judgment in exercising the right mix of compliance assistance and enforcement to correct identified problems. The City Attorney may levy fines if the violation is found to be willful, intentional or egregious.

6.2 Compliance

1.2.1 Voluntary Compliance

The preferred method of achieving compliance when addressing an illegal discharge problem is to pursue 'voluntary' compliance through education of the property owner or responsible party. Often, business operators and property owners are not aware of the existence of illicit connections or activities on their properties that may constitute an illegal discharge. In these cases, providing the responsible party with information about the connection or operation, the environmental consequences, and suggestions on how to remedy the problem may be enough to secure voluntary compliance.

Education begins during the site investigation when the operation or connection is first confirmed. Property owners and operators should be notified that the problems must be corrected in a timely manner and that the City will be conducting a follow-up site visit to verify compliance. Field staff should also provide the property operator with an educational brochure describing illegal discharge violations and a copy of CMC 14.04. Field staff should also remind property owners of their obligation to report discharges to the proper agencies. The severity of the violation will govern the timeframe granted, by the PWD, to institute the remedy.

6.2.2 Compliance by Permit Holders

Permit holders of the Construction Stormwater General Permit (regulates stormwater discharges from construction sites one acre or larger) or the Industrial General Stormwater Permit (authorizes stormwater discharges associated with industrial activities) are expected to be knowledgeable of the measures required to be in compliance with their permit. Failure to eliminate an illegal discharge by these permit holders shall result in a shorter timeframe to remedy the violation before fines are levied.

6.2.3 Operational Problems

Property owners are responsible for correcting operational problems that are leading to illegal discharges to the storm drainage system. This could include moving washing activities indoor or undercover, covering material storage areas, locating an appropriate discharge location for liquid wastes, or other operational modifications. Through site visits and education, the City can provide

technical assistance to aid property owners in identifying the required modifications.

6.2.4 Structural Problems

Most illicit connection problems will require a structural modification to correct the problem. Structural repairs can be used to redirect discharges such as sewage, industrial, and commercial cross-connections. Such cross-connections must be re-routed to an approved sanitary sewer system. Correcting structural problems is the responsibility of the property owner, though the city may provide technical assistance throughout the process.

6.3 Enforcement Actions

When voluntary compliance does not produce the desired result, the City is required to pursue follow-up enforcement action. All enforcement actions will be the responsibility of the PWD and the Code Enforcement Officer. Table 6.1 and Figure 6.1 outline the detailed enforcement steps. More serious violations or continued non-compliance may warrant a more aggressive, enforcement-oriented approach.

Table 6.1
Illegal Discharge Enforcement Steps

Enforcement Step	Details	Responsibility
Step 1 – Initial Actions	• Provide educational materials (i.e. brochure and copy of WMC 14.36) • Encourage voluntary compliance • Provide summary letter* setting expected compliance date • Additional staff support or technical assistance • Request evidence of corrected problem (if applicable) • Site visit to verify compliance	PWD or assigned staff
Step 2 – Follow-up Actions	• Send "notice of violation" letter* to property owner regarding unresolved issues • Set second compliance date (determined on individual incident basis) • Site visit to verify compliance	PWD; Code Enforcement Officer, City Attorney
Step 3 – Final Actions	• Send second "notice of violation" letter* indicating that unresolved issues will be referred to prosecutor • City may correct problems and send bill to property owner • Levy fines following WMC 18.96	PWD, Code Enforcement Officer, City Attorney

* Keep copies of all letters within the case log database

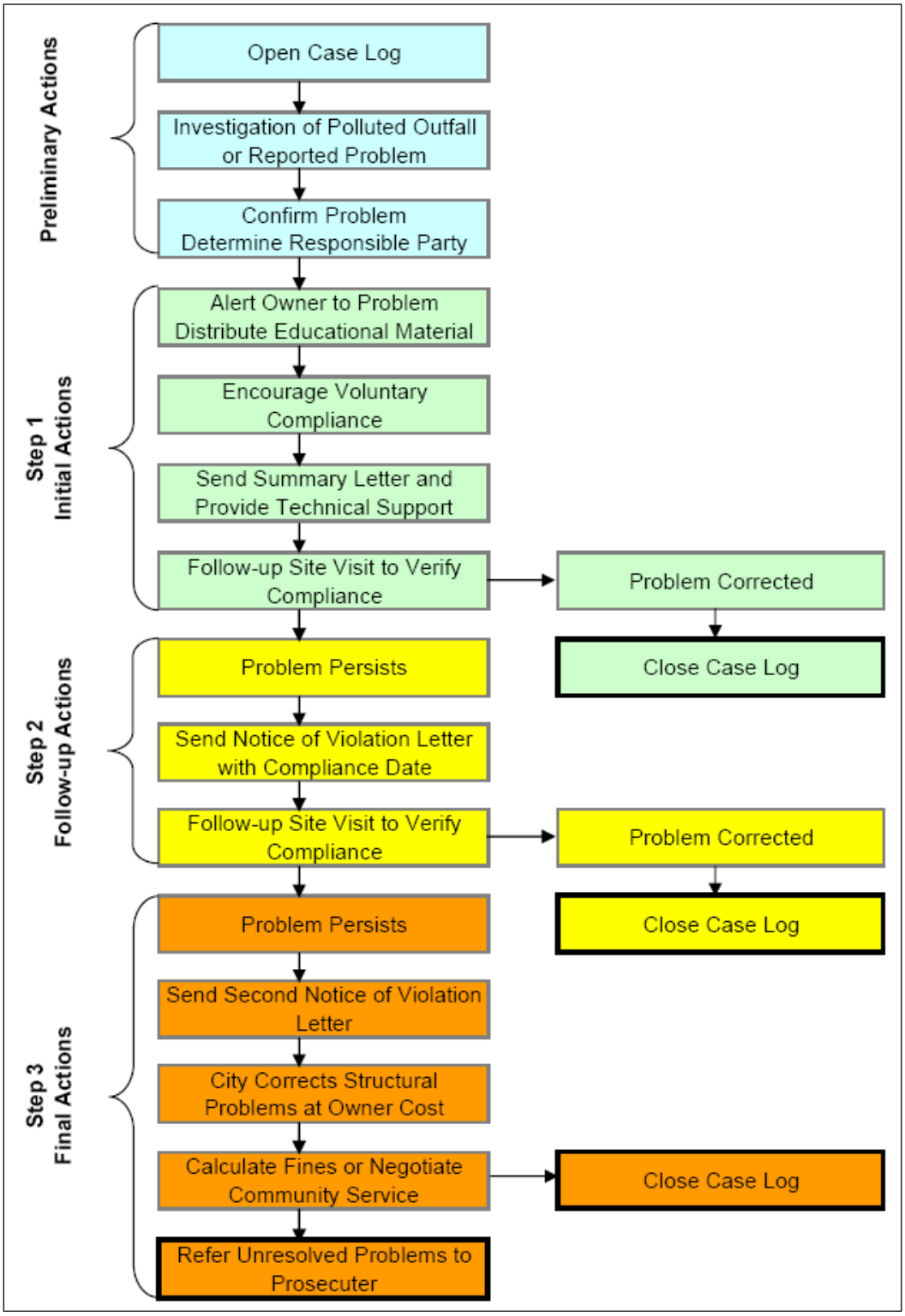

Figure 6.1: City of Washougal IDDE Enforcement Steps

Section 6 – Corrective Action

6.3.1 Enforcement Timeline

The timeline of corrective action procedures is highly dependent on the nature of the violation and the responsiveness and cooperation from the person(s) responsible. The urgency of addressing identified problems will be based on the nature of the pollutant in question and potential impacts to downstream waters. Compliance dates should be included in all violation notices

The Phase II Permit requires identified problems to be corrected and illicit connections removed within 180 days of identifying the source. If property owners are not addressing problems in a timely manner, the City may step in and perform the repairs necessary to remove an illicit connection, eliminate an illegal discharge, and/or clean-up a dumping incident. Property owners will also be responsible for reimbursing the City for any costs occurred in correcting IDDE problems.

6.3.2 Potential Fines and Penalties

Illegal discharge violations are subject to fines and penalties under WMC 14.36 and WMC 18.96. Under WMC 14.36, penalties can include suspension of water service, sanitary sewer service, and municipal separate storm sewer system access. Under WMC 18.96, civil penalties range from $250 per day for a first violation offense to $1,000 per day for a third violation offense. Each calendar day may constitute a new violation. In addition to civil penalties, the City may issue an abatement order or citation.

6.3.3 Record Keeping

Effective enforcement procedures require comprehensive recordkeeping and documentation to show that all program steps have been followed. Throughout the problem investigation and corrective action activities, all information related to the incident or property in question should be documented in the case log. Section 8 discusses illegal discharge record keeping in greater detail.

Stormwater System Cleaning and Maintenance Equipment

Section 7 – Public Education

The NPDES Phase II Permit requires the City to conduct outreach activities to educate the public and business community about water quality protection. Outreach activities focus on reducing pollutants at the source by educating the public and businesses about their ultimate impact on the natural environment. Many members of the community are apt to modify behaviors once they understand the potential negative consequences.

To date, the City has conducted outreach activities aimed at educating local residents about car washing, pet waste, grasscyling and lawn and garden maintenance, household hazardous waste, private stormwater facility maintenance, and personal impact on the natural environment. These programs have been well received by the general public.

Section 7 – Public Education

Section 8 – Record Keeping

The NPDES Phase II Permit requires the City to keep records of all stormwater program activities. Thorough record keeping is particularly important for a successful IDDE program. Records of past problems can help focus an investigation in the right direction or identify repeat offenders. Thorough record keeping is also critical to the enforcement process. Examples of the different types of information to be retained are included below:

Citizen Complaints – retain Incident Report Forms

Outfall Inspections – maintain Outfall Inspection forms, catalog and organize photographs, enter open case logs for suspected problem areas.

Investigations – retain Incident Response forms, photographs, conversation records, and lab testing results.

Corrective Action – in addition to the information collected during the investigation process, retain copies of compliance letters, correspondence with property owners, and proof of corrected problems (contract and invoice for completed work or clean field investigation report)

8.1 Data Sources

Outfall Inspections – ORI data is captured using a GPS or by confirming latitude/longitude using Google earth.

Investigations – Illegal discharge investigation records utilize a paper file system. A case log file is created for each individual complaint call. The system tracks actions completed by the Investigator including: education opportunities, technical assistance, communications, sample collected and enforcement.

Financial Records – Financial records are stored in the case log file. The investigator is responsible to track costs including equipment, materials and labor until the case is closed.

8.2 Record Storage

A central location for filing of case logs is an important component to the record keeping process. Paper copies of case logs will be kept in a file designated for illegal discharges and located in Community Development. Yearly, the case logs shall be scanned into an electronic folder that shall be accessible by various designated staff.

8.2.1 Long Term Record Storage

The NPDES permit requires that all IDDE program records be retained for a minimum of five (5) years. However, longer term record storage will be helpful in building a library of data that describes pollutant problems in Washougal. To facilitate this process the City will maintain the files as long as data storage availability allows past the required five (5) years.

Section 8 – Record Keeping

Section 9 – Staff Training

The City has developed a comprehensive training schedule to meet the requirements of the NPDES Phase II Permit. Two primary trainings have been identified related to IDDE:

- Training for all staff members, that are routinely in the field, to educate them on what constitutes an illegal discharge problem and how to report suspected problems.
- Training for illegal discharge responders on proper identification, investigation, clean-up, disposal, and reporting techniques for illegal discharges.

Trainings are generally conducted by Public Works staff. The first training was conducted through the use of an EPA Webinar on IDDE in early 2010 and secondly an IDDE component was added to the O&M Good Housekeeping training conducted in 2010.

Training for illegal discharge responders will primarily include distribution and review of this procedures manual as well as a refresher on City spill response procedures. Follow-up trainings for illegal discharge responders may take the form of debriefings following significant IDDE incidents. Debriefings allow staff to review the actions that were taken and identify what worked well and what should be modified for future responses.

Section 9 – Staff Training

Section 10 – References

City of Washougal Municipal Code

Illicit Discharge Detection and Elimination: a Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection and Robert Pitt (University of Alabama), October 2004.

Illicit Discharge Detection and Elimination Manual: A Handbook for Municipalities, New England Interstate Water Pollution Control Commission, January 2003.

Illicit Connection/Illegal Discharge (IC/ID) Detection and Elimination Model Program Guidance, San Diego Stormwater Co-Permittees Jurisdictional Urban Runoff Management Program (URMP), November 13, 2001.

Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems: A User's Guide, Robert Pitt, et al, EOA publication 600/R-92/238, January 1993

City of Bainbridge Island Illicit Discharge Detection and Elimination Program Manual;
Illicit Discharge Detection and Elimination Guidance Manual, Otak, Inc., April 2010.

City of Camas Illicit Discharge Detection and Elimination Program Manual, October 2011

Section 10 – References

Appendix A — City of Washougal IDDE Code

- WMC Chapter 14.36 Illegal Discharges to Stormwater System and Watercourses
- WMC Chapter 18.96 Enforcement

Chapter 14.36

ILLEGAL DISCHARGES TO STORMWATER SYSTEM AND WATERCOURSES

Sections:

14.36.010 Purpose and intent.

The purposes of this chapter are:

(1) To provide for the health, safety, and general welfare of the citizens of the city of Washougal, Washington, through the regulation of nonstormwater discharges to the storm drainage system to the maximum extent practicable as required by federal and state law.

(2) To establish methods for controlling the introduction of pollutants into the municipal separate storm sewer system in order to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) permit process. Specifically:

(a) To regulate the contribution of pollutants to the municipal separate storm sewer system by stormwater discharges from any user.

(b) To prohibit illicit connections and illegal discharges to the city's municipal separate storm sewer system.

(c) To define the city's legal authority to carry out all inspection, surveillance and monitoring necessary to effectuate said purposes.

(3) To protect and enhance water quality and aquatic wildlife and its habitat by preventing harmful discharges to local watercourses. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.020 Definitions.

For the purposes of this chapter, the following shall mean:

(1) "Best management practices (BMPs)" means schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

(2) "City" means the city of Washougal, Washington.

(3) "Clean Water Act" means the federal Water Pollution Control Act (33 USC 1251 et seq.), and any subsequent amendments thereto.

(4) "Director" means the city of Washougal public works director and/or designees.

(5) "Hazardous materials" means any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

(6) "Illegal discharge" means any direct or indirect nonstormwater discharge to the city's storm drain system, except as expressly exempted by this chapter.

(7) "Illicit connections" means either: (a) any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the city's storm drain system, watercourse or waterbody, including but not limited to conveyances allowing any nonstormwater discharge such as sewage, process wastewater, and wash water to enter the storm drain system and any connections thereto from indoor drains and sinks, regardless of whether said drain or connection was previously allowed, permitted, or approved by the city of Washougal; or (b) any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by the city.

(8) "Industrial activity" means activities subject to NPDES industrial permits as defined in 40 CFR 122.26(b)(14).

(9) "Municipal separate storm sewer system" means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(a) Owned or operated by a municipal corporation or other public entity with jurisdiction over management and discharge of stormwater and which discharges to surface waters of the state;

(b) Designed or used for collecting or conveying stormwater;

(c) Which is not part of a publicly owned treatment works (POTW). "POTW" means any device or system used in treatment of municipal sewage or industrial wastes of a liquid nature which is publicly owned; and

(d) Which is not a combined sewer. "Combined sewer" means a system that collects sanitary sewage, industrial wastewater and stormwater in a single sewer system.

(10) "National Pollutant Discharge Elimination System (NPDES) stormwater discharge permit" means a permit issued by the Environmental Protection Agency (EPA) (or by the state under authority delegated pursuant to 33 USC 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

(11) "Nonstormwater discharge" means any discharge to the storm drain system that is not composed entirely of stormwater.

(12) "Person" means any individual, association, organization, partnership, firm, corporation or other entity recognized by law and acting as either the owner of a premises or as the owner's agent.

(13) "Pollutant" means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; nonhazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

(14) "Premises" means any building, lot, parcel of land, or portion of land, whether improved or unimproved, including adjacent sidewalks and parking strips.

(15) "Storm drainage system" means publicly owned facilities, including the city's municipal separate storm sewer system, by which stormwater is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

(16) "Stormwater" means any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.

(17) "Stormwater facility" means a constructed component of a stormwater drainage system, designed or constructed to perform a particular function or multiple functions. Stormwater facilities include but are not limited to swales, detention ponds, retention ponds, constructed wetlands, infiltration devices, oil/water separators, biofiltration swales and LID facilities as defined in the Washougal Engineering Standards.

(18) "Stormwater pollution prevention plan" means a document which describes the best management practices and activities to be implemented by a person to identify sources of pollution or contamination at a premises and the actions to eliminate or reduce pollutant discharges to stormwater, stormwater conveyance systems, and/or receiving waters to the maximum extent practicable.

(19) "Wastewater" means any water or other liquid, other than uncontaminated stormwater, discharged from a premises.

(20) "Waterbody" means any landscape feature comprising any body of water, whether standing or flowing, including, but not limited to, Puget Sound, lakes, ponds, rivers, streams or creeks.

(21) "Watercourse" means a waterbody consisting of a natural or artificial channel through which water flows. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.030 Applicability.

This chapter shall apply to all nonstormwater discharges entering the storm drain system generated on any developed or undeveloped lands, unless explicitly exempted by the city. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.040 Responsibility for administration.

The public works director shall administer, implement, and enforce the provisions of this chapter. Any powers granted or duties imposed upon the director may be delegated in writing by the

director to persons or entities acting in the beneficial interest of or in the employ of the city. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.050 Severability.

The provisions of this chapter are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this chapter or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this chapter. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.060 Ultimate responsibility.

The standards set forth herein and promulgated pursuant to this chapter represent minimum standards. Compliance by any person with the standards established under this chapter does not relieve any person from any responsibility or obligation imposed pursuant to any other local, state or federal regulation. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.070 Discharge prohibitions.

(1) Prohibition of Illegal Discharges. No person shall discharge or cause to be discharged into the municipal storm drain system or any watercourse any materials (including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards) other than stormwater. Contaminants include but are not limited to the following:

(a) Trash or debris;

(b) Construction materials;

(c) Petroleum products including but not limited to oil, gasoline, grease, fuel oil and heating oil;

(d) Antifreeze and other automotive products;

(e) Metals in either particulate or dissolved form;

(f) Flammable or explosive materials;

(g) Radioactive material;

(h) Batteries;

(i) Acids, alkalis, or bases;

(j) Paints, stains, resins, lacquers, or varnishes;

(k) Degreasers and/or solvents;

(l) Drain cleaners;

(m) Pesticides, herbicides, or fertilizers;

(n) Steam cleaning wastes;

(o) Soaps, detergents, or ammonia;

(p) Swimming pool or spa filter backwash;

(q) Chlorine, bromine, or other disinfectants;

(r) Heated water;

(s) Domestic animal wastes;

(t) Sewage;

(u) Recreational vehicle waste;

(v) Animal carcasses;

(w) Food wastes;

(x) Bark and other fibrous materials;

(y) Lawn clippings, leaves, or branches;

(z) Silt, sediment, concrete, cement or gravel;

(aa) Dyes (except as described below under "permissible discharges");

(bb) Chemicals, including suspected metals, not normally found in uncontaminated water;

(cc) Any other process-associated discharge except as otherwise allowed in this section;

(dd) Any hazardous material or waste not listed above.

(2) Permissible Discharges. The following types of discharges shall not be considered illegal discharges for the purposes of this chapter unless the director determines that the type of discharge, whether singly or in combination with others, is causing or is likely to cause pollution of surface water or groundwater:

(a) Uncontaminated water from crawl space pumps or footing drains;

(b) Yard watering;

(c) Dechlorinated swimming pool water;

(d) Materials placed as part of an approved habitat restoration or bank stabilization project;

(e) Natural uncontaminated surface water, springs or groundwater;

(f) Flows from riparian habitats and wetlands;

(g) Common practices for water well disinfection;

(h) Discharges resulting from diffuse or ubiquitous sources such as atmospheric deposition;

(i) Discharges resulting from dye testing authorized by the director;

(j) Discharges which result from emergency response activities or other actions that must be undertaken immediately or within a time too short to allow full compliance with this chapter so as to avoid an imminent threat to public health or safety. The director may further define qualifying activities in administrative guidance. The person responsible for said emergency response activities shall take all necessary steps to ensure that the discharges resulting from such activities are minimized and ensure that future incidents are prevented to the greatest extent possible;

(k) Air conditioning condensation;

(l) Discharges permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the federal Environmental Protection Agency; provided, that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations; and provided, that written approval from the director has been granted for any discharge to the storm drain system;

(m) Other water sources not containing pollutants;

(n) Other types of discharges as determined in advance by the director.

(3) Conditional Discharges. The following types of discharges shall not be considered illegal discharges for the purposes of this chapter if they meet the stated conditions, unless the director determines that the type of discharge, whether singly or in combination with others, is causing or is likely to cause pollution of surface water or groundwater:

(a) Potable water, including water from water line flushing, hyperchlorinated water line flushing, fire hydrant system flushing, and pipeline hydrostatic test water. Planned discharges shall be dechlorinated to a concentration of 0.1 ppm or less, pH-adjusted if necessary and in volumes and velocities controlled to prevent resuspension of sediments in the stormwater system;

(b) Lawn watering and other irrigation runoff are permitted but shall be minimized;

(c) Dechlorinated swimming pool discharges. These discharges shall be dechlorinated to a concentration of 0.1 ppm or less, pH-adjusted if necessary and in volumes and velocities controlled to prevent resuspension of sediments in the stormwater system;

(d) Street and sidewalk wash water, water used to control dust, and routine external building wash-down that does not use detergents are permitted if the amount of street wash and dust control water used is minimized. At active construction sites, street sweeping must be performed prior to washing the street;

(e) Nonstormwater discharges covered by another NPDES permit; provided, that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations; and provided, that written approval has been granted for any discharge to the storm drain system;

(f) Other nonstormwater discharges. The discharges shall be in compliance with the requirements of a stormwater pollution prevention plan (SWPPP), reviewed and approved by the city, which addresses control of such discharges by applying AKART to prevent contaminants from entering surface or ground water.

(4) Prohibition of Illicit Connections.

(a) The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

(b) This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

(c) Anybody is considered to be in violation of this chapter if the person connects a line conveying sewage to the municipal separate storm sewer system, or allows such a connection to continue. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.080 Suspension of water service, sanitary sewer service and municipal separate storm sewer system access.

(1) Suspension Due to Illegal Discharges in Emergency Situations. The director may, without prior notice, suspend water service, sanitary sewer service and/or municipal separate storm sewer system discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the municipal separate storm sewer system or waters of the state of Washington. If the violator fails to comply with an emergency suspension order, the director may take such steps as deemed necessary to prevent or minimize damage to the municipal separate storm sewer system or waters of the state of Washington, or to minimize danger to persons.

(2) Suspension Due to the Detection of Illegal Discharge. Any person discharging to the municipal separate storm sewer system in violation of this chapter may have his/her water service, sanitary sewer service and/or municipal separate storm sewer system access terminated if such termination would abate or reduce an illegal discharge. The director will notify a violator of the proposed termination of its municipal separate storm sewer system access. The violator may petition the director for a reconsideration and hearing as provided in this chapter.

(3) Unauthorized Reinstatement. Anybody commits an offense and violates this chapter if the

person reinstates municipal separate storm sewer system access to premises terminated pursuant to this section, without the prior approval of the director. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.090 Industrial or construction activity discharges.

Any person or activity subject to an NPDES stormwater discharge permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the federal Environmental Protection Agency shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the city prior to allowing discharges to the municipal separate storm sewer system. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.100 Monitoring of discharges.

(1) Applicability. This section applies to all facilities that have stormwater discharges associated with industrial or commercial activity, including but not limited to construction activity.

(2) Access to Facilities.

(a) The city shall be permitted to enter and inspect facilities subject to regulation under this chapter as often as may be necessary to determine compliance with this chapter. If a discharger has security measures in force which require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to representatives of the director.

(b) Premises owners, occupiers and their agents shall allow the city ready access to all parts of the premises for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge stormwater, and the performance of any additional duties as defined by state and federal law.

(c) The city shall have the right to install on any permitted premises such devices as are necessary in the opinion of the director to conduct monitoring and/or sampling of the premises' stormwater discharge.

(d) The city has the right to require the discharger to install monitoring equipment as necessary. The premises' sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense. All devices used to measure stormwater flow and quality shall be calibrated to ensure their accuracy.

(e) Any temporary or permanent obstruction to safe and easy access to the premises to be inspected and/or sampled shall be promptly removed by the operator at the written or oral request of the director. The costs of clearing such access shall be borne by the operator.

(f) Unreasonable delays in allowing the city access to a permitted premises are violations of a stormwater discharge permit and of this chapter. A person who is the owner or operator of a premises with an NPDES permit to discharge stormwater associated with industrial activity commits an offense and violates this chapter if the person denies the city reasonable access to the permitted premises for the purpose of conducting any activity authorized or required by this chapter.

(g) If the director has been refused access to any part of the premises from which stormwater is discharged, and is able to demonstrate probable cause to believe that there may be a violation of this chapter, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this chapter or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the director may seek issuance of a search warrant from any court of competent jurisdiction.

(h) In addition, the director may suspend water, sanitary sewer and/or storm drain access or access to any party refusing to provide or delaying access. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.110 Requirement to prevent, control, and reduce stormwater pollutants by the use of BMPs.

The city has adopted requirements identifying best management practices for any activity, operation, or facility which may cause or contribute to pollution or contamination of stormwater, the storm drain system, or waters of the United States.

The owner or operator of a commercial or industrial establishment shall provide, at its own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses through the use of these structural and nonstructural BMPs. Further, any person responsible for a premises which is, or may be, the source of an illegal discharge, may be required to implement, at said person's expense, additional structural and nonstructural BMPs to prevent the further discharge of pollutants to the municipal separate storm sewer system. Compliance with all terms

and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity shall be deemed compliance with the provisions of this section. These BMPs shall be part of a stormwater pollution prevention plan (SWPPP) as necessary for compliance with requirements of the NPDES permit.

The owner or operator of a stormwater facility shall maintain, at its own expense, all facility functions in accordance with the maintenance manual associated with said facility. If no maintenance manual is known to exist, the latest version of Clark County's "Stormwater Facility Maintenance Manual" shall be utilized. Any discharges from an unmaintained stormwater facility shall be considered illegal discharges and punishable in accordance with this chapter. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.120 Watercourse protection.

Every person owning property through which a watercourse passes, or such person's lessee, shall not pollute, contaminate, introduce new vegetation into, or significantly retard the flow of water through the watercourse, and must comply with all critical areas protection requirements established in Chapter 16.04 WMC. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, in a manner that such structures will not become a hazard to the use, function, or physical integrity of the watercourse. (Ord. 1657 § 1 (Exh. A), 2010)

14.36.130 Notification of spills.

Notwithstanding other requirements of law, as soon as any person responsible for a premises or operation, or responsible for emergency response for a premises or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into stormwater, the storm drain system, or watercourses, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials, said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the director in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the city of Washougal within three business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years. (Ord. 1657 § 1 (Exh. A), 2010)

18.94.170 Completion of public improvements.

If public improvements are not fully complete and accepted by the city, an acceptable security guaranteeing the construction of such improvements shall be submitted in a form acceptable to the community development director and in an amount and with sureties commensurate with improvements to be completed plus an additional 25 percent for administrative costs, securing to the city the construction and installation of the required improvements within a time fixed by the community development director which shall include a reasonable amount of time to complete said improvements but shall not exceed 18 months or as extended by the community development director. Such guarantee shall be in the form of an escrow account, letter of credit or other form acceptable to the community development director that provides the city with the necessary funds to complete the improvements should they not be constructed within the required timeframe. (Ord. 1613 § 1 (Exh. A), 2008)

Chapter 18.96

ENFORCEMENT*

Sections:

* Prior history: Ords. 1193 § 1 (Exh. E), and 1167 § 1.

18.96.010 Applicability.

This chapter shall apply to enforcement of Chapter 14.36 WMC, Illegal Discharges to Stormwater System and Watercourses, WMC Title 15, Buildings and Construction; Title 16, Environmental Regulations; Title 17, Land Divisions; Title 18, Zoning; Washougal Engineering Standards; and any conditions of a subdivision or short subdivision plat, site plan, master plan, environmental, and shoreline permit. (Ord. 1658 § 1 (Exh. A), 2010; Ord. 1421 § 1, 2001)

18.96.020 Intent and purpose.

The city recognizes it and its citizens are to fulfill the responsibilities of each generation as trustee

of the environment for succeeding generations, that each person or agency has a fundamental and inalienable right to a healthful environment and that each person and public agency has a responsibility to contribute to the preservation and enhancement of the city, assure for all people of the city safe, healthful, productive, and aesthetically and culturally pleasing surroundings, attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences, preserve important historic, cultural, and natural aspects of our national heritage, maintain, whenever possible, an environment which supports diversity and variety of individual choice, enhance the quality of renewable resources.

All violations of this chapter are determined to be detrimental to the public health, safety and welfare of the city. All conditions which are determined by the director to be in violation of this chapter shall be subject to the provisions of WMC Titles 15, 16, 17, 18, Washougal Engineering Standards, and conditions of a subdivision or short subdivision plat, site plan, master plan, or shoreline permit and shall be corrected by any reasonable and lawful means as provided herein.

The director shall have the responsibility to render interpretations in order to clarify the application of provisions of the code. Such interpretations shall be in conformity with the intent and purpose of this code. (Ord. 1421 § 1, 2001)

18.96.030 Definitions.

(1) "Abatement" as used in this title shall have the following meaning: the act of elimination or annulment; to become void.

(2) "Commercial/noncommercial ventures" as used in this title shall have the following meanings: any person engaged in the development, management, sale, rental or use of property solely for the purpose of residential occupancy by such person or such person's immediate family shall be deemed to be engaged in a noncommercial venture. All other persons shall be deemed to be engaged in commercial ventures.

(3) "Director" as used in this title means the community development director, or such other person as the city council shall by ordinance authorize to utilize the provisions of this ordinance and shall also include any duly authorized representative of such director.

(4) "Hearing examiner" as used in this title means the person or board appointed by the city council to hear appeals or any appeal under this title or his duly authorized representative.

(5) "Land disturbing activity" as used in this title means any activity that results in a change to the existing soil cover, both vegetative and nonvegetative, or existing soil topography. Land disturbing activities include, but are not limited to demolition, construction, clearing, grading, dumping, filling, or excavation.

(6) "Building, environmental, land division, zoning ordinance" as used in this title means and includes this title and any other existing or future ordinances or resolutions of the city which regulates the use and development of land or buildings, including but not limited to zoning regulations, environmental regulations, subdivision regulations, short subdivision regulations, land disturbing activity, erosion control and water quality regulations and building, fire and construction codes. It shall also include any existing or future law of the State Legislature which regulates the use of and development of land, including but not limited to the State Subdivision Law, Chapter 58.17 RCW, and the Shorelines Management Act, Chapter 43.51 RCW. This title shall be construed as, and is intended to be enacted as, a regulation adopted pursuant to any such state law and pursuant to Article II, Section 11, Washington State Constitution.

(7) "Person" as used in this title shall include any natural person, organization, corporation or partnership and their agents or assigns. (Ord. 1613 § 1 (Exh. A), 2008; Ord. 1421 § 1, 2001)

18.96.040 Administration.

The director is authorized to utilize the procedure of this title in order to enforce any ordinance related to WMC Titles 15, 16, 17 and 18, Chapter 14.36 WMC, Washougal Engineering Standards, and conditions of a subdivision or short subdivision plat, site plan, master plan, or shoreline permit. (Ord. 1658 § 1 (Exh. A), 2010; Ord. 1421 § 1, 2001)

18.96.050 Right of entry.

Whenever necessary to make an inspection to enforce the provisions of this chapter, or whenever the director has reasonable cause to believe that any building, structure, property or portion thereof is being used in violation of this chapter, the director may seek permission to enter such building, structure, property or portion thereof at all reasonable times to inspect the same. If permission to inspect is denied by the owner or person in possession of property, or reasonable attempts to contact

the owners or persons in possession are unavailing, the director may apply to the court for an order authorizing entry upon the land for the performance of the inspection.

If the director issues an order of abatement and no appeal is taken from that order or the director prevails on appeal, the director may seek permission to enter the land and undertake abatement. If, however, permission to enter is denied, the director may apply to a court of competent jurisdiction for authority to enter the property in order to perform the abatement as provided in the director's order. (Ord. 1421 § 1, 2001)

18.96.060 Civil penalty.

In addition to or as an alternative to any other judicial or administrative remedy provided herein or by law, any person who violates this chapter, or rules and regulations adopted thereunder, or by each act of commission or omission procures, aids or abets such violation, shall be subject to a civil penalty of $250.00 for the first violation offense, $500.00 for the second violation offense, and $1,000 for the third violation offense. Each calendar day may constitute a new violation. All civil penalties assessed will be enforced and collected in accordance with the lien, personal obligation, and other procedures specified in this title or as authorized by law. (Ord. 1421 § 1, 2001)

18.96.070 Abatement order.

In addition to or as an alternative to any other judicial or administrative remedy provided herein or by law, the director may order a violation to be abated.

The director may order any person who creates or maintains a violation of this chapter, or rules and regulations adopted thereunder, to commence corrective work and to complete the work within such time as the director determines reasonable under the circumstances. The person, subject to the director's abatement order, shall either complete the corrective work or timely file an appeal pursuant to WMC 18.96.110.

If the required corrective work is not commenced or completed within the time specified, the director may proceed to:

(1) Abate the violation and cause the work to be done, upon receipt, by a court of competent jurisdiction, of an abatement order authorizing the same. The director or designee is expressly authorized to enter the property of the person committing the violation for the purpose of abatement of said violation.

(a) The actual cost of abatement, including incidental costs such as staff time, legal costs, costs of postage and other reasonable costs shall be included as abatement costs.

(b) The finance director will charge the costs thereof as a lien against the property and as both a joint and separate personal obligation of any person who is in violation. All challenges to the reasonableness of the cost charged may be raised at such time as the city of Washougal undertakes a lien foreclosure.

(2) Issue a citation as described in WMC 18.96.150. (Ord. 1421 § 1, 2001)

18.96.080 Commencement of abatement notice and order proceedings.

(1) Whenever a director has reason to believe that a use or condition exists in violation of WMC Title 15, 16, 17 or 18, Chapter 14.36 WMC, Washougal Engineering Standards, conditions of a subdivision or short subdivision, site plan, master plan, shoreline permit, or rules and regulations adopted thereunder, the director is authorized to initiate enforcement action pursuant to this section and/or, at the director's option, may commence an abatement notice and order under this chapter to cause the enforcement and correction of each violation.

(2) Pending commencement and completion of the abatement notice and order procedure provided for in this chapter, a director may cause a "stop work order" to be posted on the subject property or served on persons engaged in any work or activity in violation of this chapter. The effect of such a "stop work order" shall be to require the immediate cessation of such work or activity until authorized by a director to resume the work or activity. (Ord. 1658 § 1 (Exh. A), 2010; Ord. 1421 § 1, 2001)

18.96.090 Abatement notice and order.

Whenever the director has reason to believe that a violation of WMC Title 15, 16, 17 or 18, Chapter 14.36 WMC, Washougal Engineering Standards, conditions of a subdivision or short subdivision plat, site plan, master plan, shoreline permit, or rules and regulations adopted thereunder will be most promptly and equitably terminated by an abatement notice and order proceeding, the director may issue a written abatement notice and order directed either to the owner or operator of the source of the violation, the person in possession of the property where the violation originates, or the person otherwise causing or responsible for the violation. The abatement notice and order should

be issued first against the violator where the violator is not the property owner, e.g., tenant, unless the seriousness of violation demands filing against the property owner. Such abatement notice and order may be issued by any director alone, or, where violations of more than one city ordinance, rule or regulation exists, in conjunction with a notice and order issued by another director. The abatement notice and order shall be posted on the property and shall contain:

(1) The street address when available and a legal description of real property and/or description of personal property sufficient for identification of where the violation occurred or is located;

(2) A statement that a director has found the person to be in violation of WMC Title 15, 16, 17 or 18, Chapter 14.36 WMC, Washougal Engineering Standards, conditions of a subdivision or short subdivision, site plan, master plan, shoreline permit, or public health or that a violation exists on the property, with a brief and concise description of the conditions found to be in violation;

(3) A statement of the corrective action required to be taken. If a director has determined that corrective action is required, the order shall require that all required permits be secured and the work physically commenced within such time and be completed within such time as the director shall determine is reasonable under the circumstances;

(4) A statement specifying the amount of any civil penalty assessed on account of the violation and, if applicable, the conditions on which assessment of such civil penalty are contingent;

(5) Statement advising that:

(a) If any required work is not commenced or completed within the time specified above, a director may proceed to abate the violation as authorized by WMC 18.96.140 and cause the work to be done and charge the costs thereof as a lien against the property and as a joint and separate personal obligation of any person in violation or responsible person who has filed to abate the violation; and

(b) If any assessed civil penalty is not paid, a director will charge the amount of the penalty, and any costs of abatement undertaken pursuant to WMC 18.96.140, as a lien against the property and as a joint and separate personal obligation of any person in violation or failing to abate a violation; and

(6) A statement advising that the order shall become final unless, not later than 10 calendar days after the abatement notice and order are served, any person aggrieved by the order requests in writing an appeal before the hearing examiner or board of adjustment. (Ord. 1658 § 1 (Exh. A), 2010; Ord. 1421 § 1, 2001)

18.96.100 Method of service.

Service of the abatement notice and order shall be made upon all persons identified in the abatement notice and order either personally or by mailing a copy of such notice and order by certified mail, postage prepaid, return receipt requested or if the address of any such person cannot reasonably be ascertained, then a copy of the abatement notice and order shall be mailed to such person at the address of the location of the violation and the notice will be posted on the property. The failure of any such person to receive such notice shall not affect the validity of any proceedings taken under this chapter. Service by certified mail in the manner herein provided shall be effective on the date of mailing. (Ord. 1421 § 1, 2001)

18.96.110 Appeals – Abatement notice and order.

(1) Any person aggrieved by the abatement notice and order of a director may request in writing within 10 calendar days of the service of the abatement notice and order an appeal hearing before the city's hearing examiner or board of adjustment. The request shall cite the abatement notice and order appealed from and contain a brief statement of the reasons for seeking the appeal hearing. The method of appeal as provided in this resolution shall be sole and exclusive.

(2) The appeal hearing shall be conducted on the record and the hearing examiner or board of adjustment shall have such rulemaking and other powers as were available to the director originally. Such appeal hearing shall be conducted within 60 calendar days after receipt of the request for appeal. Written notice of the time and place of the hearing shall be given at least 10 calendar days prior to the date of the hearing to each appealing party, to the director whose order is being appealed, and to other interested persons who have requested in writing that they be so notified.

(3) All appeals shall be conducted in accordance with Chapter 1-08 WAC, Uniform Procedural Rules; provided, however, that WAC 1-08-590 shall be excluded. Should any conflict arise between the provisions of this ordinance and the applicable sections of Chapter 1-08 WAC, the provisions of this ordinance shall prevail.

(4) For the purposes of this chapter, all references in the WAC to "agency" shall mean hearing

examiner or board of adjustment. In addition, the hearing examiner may promulgate and adopt such additional rules as are necessary for the conduct of a hearing.

(5) Each party shall have the following rights, among others:

(a) To call and examine witnesses on any matter relevant to the issues of the hearing;

(b) To introduce documentary and physical evidence;

(c) To cross-examine opposing witnesses on any matter relevant to the issues of the hearing;

(d) To impeach any witness regardless of which party first called him to testify;

(e) To rebut evidence against him;

(f) To represent himself or to be represented by anyone of his choice who is lawfully permitted to do so.

(6) Following review of the evidence submitted the hearing examiner or board of adjustment shall make written findings and conclusions, and shall affirm or modify the order previously issued if it finds that a violation has occurred. The written decision of the hearing examiner or board of adjustment shall be mailed by certified mail, postage prepaid, return receipt requested, to all the parties.

(7) The appeal hearing before the city of Washougal hearing examiner or board of adjustment shall occur within 60 calendar days following receipt of the written notice of appeal unless the matter is continued at the discretion of the hearing examiner or board of adjustment.

(8) Whenever possible, the appeal from a director's abatement order shall be combined with any other appeal from city enforcement actions relating to the same subject matter and falling within the jurisdiction of the hearing examiner or board of adjustment. (Ord. 1421 § 1, 2001)

18.96.120 Final abatement order.

(1) Any abatement order duly issued by a director pursuant to the procedures contained in this title shall become final 10 calendar days after service of the abatement notice and order unless a written request for hearing is received by the hearing examiner or board of adjustment within the 10-calendar-day period.

(2) An order which is subjected to the appeal procedure shall become final 20 calendar days after a mailing of the hearing examiner or board of adjustment's decision unless within that time period an aggrieved person initiates review by writ of certiorari in Clark County superior court. (Ord. 1421 § 1, 2001)

18.96.130 Supplemental notice and order – Abatement or citation.

A director may at any time add to, rescind in part, or otherwise modify a notice and order by issuing a supplemental notice and order. The supplemental notice and order shall be governed by the same procedures applicable to all notices and order as contained in this title. (Ord. 1421 § 1, 2001)

18.96.140 Enforcement of an abatement or citation final order.

(1) If, after any abatement or citation order duly issued by a director has become final, the person to whom such order is directed fails, neglects, or refuses to obey such abatement or citation order, including refusal to pay a civil penalty assessed under such order, a director may:

(a) Cause such person to be prosecuted under this title; and/or

(b) Institute any appropriate action to collect a civil penalty under this title; and/or

(c) Abate the violation using the procedures of this title; and/or

(d) File in the auditor's recording office a lien describing the property and the violation and stating that the owner has been so notified; and/or

(e) Pursue any other appropriate remedy at law or in equity under this title.

(2) Enforcement of any notice and order of a director issued pursuant to this title shall be stayed during the pendency of any appeal under this title, except when a director determines that the violation will cause immediate and irreparable harm and so states in the notice and order issued. Mitigation measures may be imposed by the hearing examiner, board of adjustment, or director during the pendency of an appeal in superior court to minimize the impact of the alleged violation. Penalties assessed in the notice and order will continue to aggregate during the appeal period unless the appellant prevails on appeal. The aggregated penalty shall not exceed three times the amount of the daily penalty as determined in WMC 18.96.060 for any single violation from its inception through the date the hearing examiner or board of adjustment renders its final decision. (Ord. 1658 § 1 (Exh. A), 2010; Ord. 1613 § 1 (Exh. A), 2008; Ord. 1421 § 1, 2001)

18.96.150 Citation.

(1) In addition or as an alternative to any other judicial or administrative remedy provided herein or by law, the director or designee may, after investigation of a violation, issue a citation imposing a penalty upon any person who creates or maintains a violation, violates any regulations or ordinance subject to this chapter, or rules and regulations

adopted thereunder, or by each act, commission or omission procures, aids, or abets such a violation.

All civil penalties assessed will be enforced and collected in accordance with the lien, personal obligation, and other procedures specified in this title or authorized by law. (Ord. 1421 § 1, 2001)

18.96.160 Requirements of a citation.

(1) A citation conforming to the requirements of this section may be used for all ordinance violations which occur in the incorporated areas of the city of Washougal.

(2) The citation shall contain the following information or blanks in which such information is entered:

(a) File number/citation number;

(b) Name of person cited;

(c) Name of the property owner;

(d) Section of the ordinance or code violated;

(e) A brief description of the violation of which the person is charged in such manner as can be readily understood by a person making a reasonable effort to do so;

(f) The date and place at which the violation occurred;

(g) The place and method of appeal to a hearing examiner or board of adjustment, and the time within such appeal must be filed;

(h) The penalty fixed for the violation;

(i) The citation shall contain a certification to the effect that there are reasonable grounds to believe, and do believe, that the person cited committed a violation of the city of Washougal ordinance or regulation.

(3) In addition, the citation shall contain a notice to the person that the citation will be filed with the city attorney.

(4) The reverse side of the citation shall contain the following in a form substantially as follows:

READ CAREFULLY

You have been cited for a violation of a City of Washougal Ordinance or regulation. You **MUST** do **ONE** of the following:

1. Mail to the City of Washougal, 1701 C Street, Washougal, Washington 98671, this citation, together with a check or money order in the amount of the penalty shown on this citation. THIS CITATION AND THE PAYMENT OF PENALTY MUST REACH THE CODE ENFORCEMENT OFFICE WITHIN THIRTY (30) CALENDAR DAYS OF THE DATE OF ISSUANCE OF THIS CITATION.

ADMISSION

I, the undersigned, do hereby ACCEPT RESPONSIBILITY for said violation as cited, WAIVE my right to an APPEAL HEARING and agree to pay the penalty prescribed for my violation.

_____
Defendant's Name

2. File an appeal by signing the REQUEST FOR APPEAL and returning it to the City of Washougal, 1701 C Street, Washougal, WA 98671 to request a hearing within 10 calendar days from the date of this citation. The city will then set a time for a hearing.

REQUEST FOR APPEAL

I, the undersigned, do hereby request an appeal hearing for the violation charged on the other side of this citation. I am requesting an appeal because I do not believe I am in violation of the cited ordinance for the following reason(s):

_____
_____
_____
_____
_____
_____
_____
_____
_____
Appellant's Name

IF YOU FAIL TO COMPLY WITH THESE INSTRUCTIONS, A FINDING OF VIOLATION WILL BE ENTERED AND THE PENALTY MAY BE COLLECTED THROUGH THE LIEN PROCEDURE (CHAPTER 18.97 WMC).

IF YOU BELIEVE THE CITATION WAS WRITTEN IN ERROR AND WISH TO CONTACT SOMEONE IMMEDIATELY, CALL 835-8501 AND LEAVE A MES-

SAGE FOR THE CODE ENFORCEMENT OFFICE WHO WILL CONTACT YOU WITHIN 24 HOURS AND PROVIDE INFORMATION REGARDING THE VIOLATION OR APPEAL. Regardless of whether you call, you must still timely pay the penalty or appeal.

(5) Procedures Governing Hearing.

(a) Amendment. A citation may be amended at any time prior to a final ruling by the hearing examiner or board of adjustment. A continuance shall be granted if the appellant satisfies the hearing examiner or board of adjustment that additional time is needed to respond to the amended citation.

(b) Hearing Dates. If the person cited requests an appeal hearing, pursuant to subsection (2)(g) of this section, the code enforcement office shall fix a date and time for hearing within 60 calendar days, and, unless notice is waived, shall notify the appellant at least 20 calendar days in advance of the hearing by certified mail or hand delivery, a notice of the date and time so fixed. The notice shall set forth a warning that, in the event that the appellant fails to appear, the hearing examiner or board of adjustment will issue a finding of violation against the appellant.

(c) Penalties. At the discretion of the community development director or authorized designee, any penalty(ies) not paid within 30 calendar days from the date of issuance of the citation may be placed as a lien against the property on which the violation has occurred pursuant to law.

(d) Settlement and Disposition of Penalties. The director or designee is authorized to enter into negotiations with the parties, or their legal representative named in an enforcement action involving any provision of this title for the collection of penalties, to negotiate a settlement, compromise or suspension, when to do so will be in the best interest of the city. (Ord. 1613 § 1 (Exh. A), 2008; Ord. 1421 § 1, 2001)

18.96.170 Method of service – Citation.

The method of service of a citation shall be the same as the method of service for an abatement notice and order, described in WMC 18.96.100. (Ord. 1421 § 1, 2001)

18.96.180 Appeals – Citation.

Any person aggrieved by the citation shall follow the same appeal procedure as identified for an appeal of an abatement order, described at 18.96.110, and shall complete the request for appeal section of the citation; described in WMC 18.96.160. (Ord. 1421 § 1, 2001)

18.96.190 Final citation order.

(1) Any citation duly issued by a director pursuant to the procedures contained in this title shall become final 10 calendar days after service of the citation unless a written request for hearing is received by the hearing examiner or board of adjustment within the 10-calendar-day period.

(2) A citation which is subjected to the appeal procedure shall become final 20 calendar days after a mailing of the hearing examiner or board of adjustment's decision unless within that time period an aggrieved person initiates review by writ of certiorari in Clark County superior court. (Ord. 1421 § 1, 2001)

18.96.200 Supplemental citation by issuing a supplemental citation notice and order.

The supplemental notice and order shall be governed by the same procedures applicable to all notices and order and contained in this title. (Ord. 1421 § 1, 2001)

18.96.210 Enforcement of a final citation order.

If, after any citation order duly issued by a director has become final, the person to whom such order is directed fails, neglects, or refuses to obey such citation order, including refusal to pay a civil penalty assessed under such order, a director may enforce the order, as described in WMC 18.96.140. (Ord. 1421 § 1, 2001)

18.96.220 Additional enforcement.

Notwithstanding the existence or use of any other remedy, the director may seek legal or equitable relief to enjoin any acts, practices, or abate any conditions, which constitute or will constitute a violation of this title, or public health or rules and regulations adopted thereunder. (Ord. 1421 § 1, 2001)

18.96.230 Special investigation.

(1) Whenever any work has been commenced, for which a permit or approval is required by the building, environmental, land division, or zoning code, without first obtaining said permit, a special investigation shall be made before a permit may be issued for such work.

(2) An investigation fee, in addition to the permit or approval fee shall be collected whether or

not a permit is then or subsequently issued. The investigation fee shall be equal to the permit or approval fee required by the applicable code. (Ord. 1421 § 1, 2001)

18.96.240 Settlement of civil penalty claims.

The director is authorized to settle and compromise claims for civil penalties accruing pursuant to this chapter where such settlement is clearly in the interests of the city of Washougal. (Ord. 1421 § 1, 2001)

18.96.250 Revocation of permits.

(1) A director may permanently revoke any permit issued by the city for:

(a) Failure of the holder to comply with the requirements of any land use or public health ordinance or rules or regulations promulgated thereunder; or

(b) Failure of the holder to comply with any notice and order issued pursuant to this title; or

(c) Interference with a director in the performance of his duties; or

(d) Discovery of a director that a permit was issued in error or on the basis of incorrect information supplied to the city.

(2) Such permit revocation shall be carried out through the notice and order provisions of this title and the revocation shall be effective upon service of the notice and order upon the holder or operator. The holder or operator may appeal such revocation, as provided by this title.

(3) A permit may be suspended pending its revocation or a hearing relative thereto. (Ord. 1421 § 1, 2001)

Appendix B — IDDE Reporting Forms

- Stormwater Pollution Incident Tracking Sheet
- Outfall Inspection Form
- Incident Response Form

Stormwater Pollution Incident Tracking Sheet

Incident ID:

Responder Information	
Call taken by:	Call date:
Call time:	Precipitation in past 24-48 hrs (if known):
Reporter Information	
Incident time:	Incident date:
Caller contact information:	

Incident Location *(complete one or more below)*

Latitude and longitude:			
Stream address or outfall #:			
Closest street address:			
Nearby landmark:			
Primary Location Description	**Secondary Location Description:**		
☐ Stream corridor *(In or adjacent to stream)*	☐ Outfall	☐ In-stream flow	☐ Along banks
☐ Upland area *(Land not adjacent to stream)*	☐ Near storm drain	☐ Near other water source (storm water pond, wetland, etc.):	
Narrative description of location:			

Upland Problem Indicator Description

☐ Dumping	☐ Oil/solvents/chemicals	☐ Sewage
☐ Wash water, suds, etc.	☐ Other: _____	

Stream Corridor Problem Indicator Description

Odor	☐ None	☐ Sewage	☐ Rancid/Sour	☐ Petroleum (gas)
	☐ Sulfide (rotten eggs); natural gas	☐ Other: Describe in "Narrative" section		
Appearance	☐ "Normal"	☐ Oil sheen	☐ Cloudy	☐ Suds
	☐ Other: Describe in "Narrative" section			
Floatables	☐ None:	☐ Sewage (toilet paper, etc)	☐ Algae	☐ Dead fish
	☐ Other: Describe in "Narrative" section			

Narrative description of problem indicators:

Suspected Violator (name, personal or vehicle description, license plate #, etc.):

Investigation Notes	
Initial investigation date:	Investigators:
☐ No investigation made	Reason:
☐ Referred to different department/agency:	Department/Agency:
☐ Investigated: No action necessary	
☐ Investigated: Requires action	Description of actions:
Hours between call and investigation:	Hours to close incident:
Date case closed:	
Notes (Attach Photos):	

OUTFALL INSPECTION REPORT

Section 1: Background Data

Watershed:	Date/Time:	Last rain (circle): > 72 hours < 72 hours
Receiving Water:	Investigators:	Temperature:
Outfall ID:	Photos:	Tide:
Location (Lat/Long, GPS LMK#, etc):	Other Background Notes:	

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
☐ Closed Pipe ☐ Single ☐ Double	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other:_____	☐ Circular ☐ Elliptical ☐ Box ☐ Other:_____	Diameter _____ Height/Width _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open Drainage	☐ Concrete ☐ Earthen ☐ Rip-rap ☐ Other:_____	☐ Trapezoid ☐ Parabolic ☐ Other:_____	Depth:_____ Top Width:_____ Bottom Width:_____	

Section 3: Initial Assessment:

Flow Present?	☐ No ☐ Yes (Complete Section 5 and 6):	If both questions are answered "No," outfall is not a suspected illicit discharge. Complete Sections 4 and 7 and file report. No further action is required.
Illicit Discharge Concern? (based on visual observation)	☐ No ☐ Yes (Complete Section 6)	

Section 4: Additional Observations

Note any non-illicit discharge concerns observed at the outfall that should be reported to maintenance (e.g., trash, outfall damage, excessive vegetation impeding flow, or needed infrastructure repairs)**:**

Section 5: Field Data for Flowing Outfalls

FLOW ESTIMATE			MEASUREMENT	UNIT	EQUIPMENT	CALCUATED FLOW
☐ Trickle ☐ Moderate ☐ Substantial	☐ Flow – Volume Method	Volume		Liter	Bottle	
		Time to fill		Sec	Stop Watch	
	☐ Flow – Area Method	Flow depth		In	Tape measure	
		Flow width		Ft, In	Tape Measure	
		Measured length		Ft, In	Tape Measure	
		Time of travel		Sec	Stop Watch	

Section 6: Physical Indicators of Potential Illicit Discharge

INDICATOR (Check if Present)	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
☐ Flow Odor	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other*	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
☐ Flow Color	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other*	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
☐ Turbidity	See severity index	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
☐ Floatables (Do not include trash)	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other*	☐ 1 – Few/slight; origin not obvious	☐ 2 – Indications of origin (e.g., possible suds or oil sheen)	☐ 3 – Obvious origin
☐ Deposits or Stains	☐ Oily ☐ Flow Line ☐ Paint ☐ Other*	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
☐ Quality of Standing Water	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other*	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
☐ Pipe Benthic Growth	☐ Brown ☐ Orange ☐ Green ☐ Other*	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
TOTAL INDICATOR SCORE (add Severity Index scores):				

*Describe Here:

Section 7: Action Level (Circle one)

No Suspected Illicit Discharge (Total Indicator Score: 3 or lower)	**Suspected Illicit Discharge** (Total Indicator Score: 4-7)	**Obvious Illicit Discharge** (Total Indicator Score: 8 or higher)
No further action required	Open Case Log Refer for Investigation	Open Case Log Refer for Investigation and Corrective Action

INCIDENT RESPONSE FORM

Section 1: Background Data

Watershed:	Date/Time:	Last rain (circle): > 72 hours < 72 hours
Receiving Water:	Investigators:	Temperature:
Outfall ID:	Photos:	Tide:
Location (Lat/Long, GPS LMK#, etc):	Summary of Problem:	
Date of Initial Inspection or Problem Report:		

Suspected Pollutants (circle):	PRIORITY LEVEL*
Alkalis Automotive products Bases Cleaning products Degreaser or solvent Drain cleaner Fertilizer Flammable/explosive materials Herbicide Metals Painting products Pesticide Petroleum Process Wastewater Sewage Unknown chemicals	1
Ammonia Construction runoff (silt, sediment, gravel) Detergents Food waste (fats, oils, grease) Soap	2
Car washing Pressure washing waste Spa or pool water Steam cleaning waste Yard waste	3
Animal carcasses Bacteria Construction materials Debris Foam Rust Trash Other _____	4

*Refer to IDDE Program Manual for target response times based on priority level

Section 2: Investigation Methods

☐ Storm Drain Network Investigation ☐ Drainage Area Investigation ☐ Other: _____

Section 3: Field Notes

Describe field activities (e.g. manholes inspected, odors/colors observed, suspected land uses, activities observed, any dye testing, smoke testing, or video testing conducted, etc):

Attach map, field sketch, or additional notes as needed to describe field activities.

Section 4: Sampling Data (as needed)

Attach any laboratory testing results to this form and file with case log.

FIELD TEST PARAMETERS							
Date of Field Tests:							
PARAMETER	EQUIPMENT	UNIT	Describe location:	Describe location:	Describe location:	Describe location:	Describe location:
Temperature	Thermometer	○C					
pH	Probe	pH Units					
DO	Probe	mg/L					
Conductivity	Probe	ms/cm					
Ammonia	Test Strip	mg/L					

Section 5: Additional Observations

Note any other concerns observed during investigations (e.g., trash, damage, excessive vegetation impeding flow, or needed repairs)**:**

Appendix C — Stormwater System Map

Appendix D — IDDE Investigative Resources

- Field Equipment Checklists
- Smoke Testing, Dye Testing and Video Testing
- Water Quality Sampling Parameters

Field Equipment Checklists

Equipment for Outfall Inspections

- ☐ Minimum 2 person crew
- ☐ Safety Gear – boots, high visibility vest, hard hat, safety cones
- ☐ Field Notebook/Pencils
- ☐ Outfall Inspection Report Forms
- ☐ Map or Aerial Photo of Inspection Area
- ☐ GPS Unit (optional)
- ☐ Cell phone w/ charged battery
- ☐ Digital camera w/ charged battery
- ☐ Compass
- ☐ Machete/Clippers
- ☐ Flash light or headlamp
- ☐ Tool Box – hammer, tape measure, duct tape, zip ties
- ☐ Spray paint or other marker
- ☐ First Aid Kit
- ☐ Clear sample bottles
- ☐ Wide mouth container and watch with second hand

Equipment for Incident Response

- ☐ Minimum 2 person crew
- ☐ Safety Gear – boots, high visibility vest, hard hat, safety cones
- ☐ Field Notebook/Pencils
- ☐ Incident Response Forms
- ☐ Map or Aerial Photo of Area
- ☐ GPS Unit (optional)
- ☐ Cell phone w/ charged battery
- ☐ Digital camera w/ charged battery
- ☐ Compass
- ☐ Machete/Clippers
- ☐ Flash light or headlamp
- ☐ Tool Box – hammer, tape measure, duct tape, zip ties
- ☐ Pick or CB grate/cover remover
- ☐ Spray paint or other marker
- ☐ First Aid Kit
- ☐ Field Test Kit (see next)

Equipment for Field Test Kit

- ☐ Dye Tracer
- ☐ Test Strips
- ☐ Sets of sample bottles for laboratory
- ☐ Coolers (non metallic) and ice packs
- ☐ Laboratory chain of custody forms
- ☐ Nitrile gloves – clean, non talc
- ☐ Multi-parameter probe
- ☐ Turbidimeter
- ☐ Extension sampling pole/sludge pole
- ☐ Kim-wipes
- ☐ Distilled water for equipment decontamination
- ☐ Deionized water for field blanks
- ☐ Storage bags – clean zip-type
- ☐ Garbage bags
- ☐ Sharpie Markers/Pencils/Pens

Table 56: Techniques to Locate the Discharge		
Technique	**Best Applications**	**Limitations**
Dye Testing	• Discharge limited to a very small drainage area (<10 properties is ideal) • Discharge probably caused by a connection from an individual property • Commercial or industrial land use	• May be difficult to gain access to some properties
Video Testing	• Continuous discharges • Discharge limited to a single pipe segment • Communities who own equipment for other investigations	• Relatively expensive equipment • Cannot capture non-flowing discharges • Often cannot capture discharges from pipes submerged in the storm drain
Smoke Testing	• Cross-connection with the sanitary sewer • Identifying other underground sources (e.g., leaking storage techniques) caused by damage to the storm drain	• Poor notification to public can cause alarm • Cannot detect all illicit discharges

TIP

The Wayne County Department of the Environment provides excellent training materials on on-site investigations, as well as other illicit discharge techniques. More information about this training can be accessed from their website: http://www.wcdoe.org/Watershed/Programs___Srvcs_/IDEP/idep.htm.

Figure 63: Dye Testing Plumbing (NEIWPCC, 2003)

Dye Testing

Dye testing is an excellent indicator of illicit connections and is conducted by introducing non-toxic dye into toilets, sinks, shop drains and other plumbing fixtures (see Figure 63). The discovery of dye in the storm drain, rather than the sanitary sewer, conclusively determines that the illicit connection exists.

Before commencing dye tests, crews should review storm drain and sewer maps to identify lateral sewer connections and how they can be accessed. In addition, property owners must be notified to obtain entry permission. For industrial or commercial properties, crews should carry a letter to document their legal authority to gain access to the property. If time permits, the letter can be sent in advance of the dye testing. For residential properties, communication can be more challenging. Unlike commercial properties, crews are not guaranteed access to homes, and should call ahead to ensure that the owner will be home on the day of testing.

Communication with other local agencies is also important since any dye released to the storm drain could be mistaken for a spill or pollution episode. To avoid a costly and embarrassing response to a false alarm,

crews should contact key spill response agencies using a "quick fax" that describes when and where dye testing is occurring (Tuomari and Thomson, 2002). In addition, crews should carry a list of phone numbers to call spill response agencies in the event dye is released to a stream.

At least two staff are needed to conduct dye tests – one to flush dye down the plumbing fixtures and one to look for dye in the downstream manhole(s). In some cases, three staff may be preferred, with two staff entering the private residence or building for both safety and liability purposes.

The basic equipment to conduct dye tests is listed in Table 57 and is not highly specialized. Often, the key choice is the type of dye to use for testing. Several options are profiled in Table 58. In most cases, liquid dye is used, although solid dye tablets can also be placed in a mesh bag and lowered into the manhole on a rope (Figure 64). If a

Table 57: Key Field Equipment for Dye Testing
(Source: Wayne County, MI, 2000)

Maps, Documents
- Sewer and storm drain maps (sufficient detail to locate manholes)
- Site plan and building diagram
- Letter describing the investigation
- Identification (e.g., badge or ID card)
- Educational materials (to supplement pollution prevention efforts)
- List of agencies to contact if the dye discharges to a stream.
- Name of contact at the facility

Equipment to Find and Lift the Manhole Safely (small manhole often in a lawn)
- Probe
- Metal detector
- Crow bar
- Safety equipment (hard hats, eye protection, gloves, safety vests, steel-toed boots, traffic control equipment, protective clothing, gas monitor)

Equipment for Actual Dye Testing and Communications
- 2-way radio
- Dye (liquid or "test strips")
- High powered lamps or flashlights
- Water hoses
- Camera

Figure 64: Dye in a mesh bag is placed into an upstream manhole (left); Dye observed at a downstream manhole traces the path of the storm drain (right)

longer pipe network is being tested, and dye is not expected to appear for several hours, charcoal packets can be used to detect the dye (GCHD, 2002). Charcoal packets can be secured and left in place for a week or two, and then analyzed for the presence of dye. Instructions for using charcoal packets in dye testing can be accessed at the following website: http://bayinfo.tamug.tamu.edu/gbeppubs/ms4.pdf.

The basic drill for dye tests consists of three simple steps. First, flush or wash dye down the drain, fixture or manhole. Second, pop open downgradient sanitary sewer manholes and check to see if any dye appears. If none is detected in the sewer manhole after an hour or so, check downgradient storm drain manholes or outfalls for the presence of dye. Although dye testing is fairly straightforward, some tips to make testing go more smoothly are offered in Table 59.

Table 58: Dye Testing Options

Product	Applications
Dye Tablets	• Compressed powder, useful for releasing dye over time • Less messy than powder form • Easy to handle, no mess, quick dissolve • Flow mapping and tracing in storm and sewer drains • Plumbing system tracing • Septic system analysis • Leak detection
Liquid Concentrate	• Very concentrated, disperses quickly • Works well in all volumes of flow • Recommended when metering of input is required • Flow mapping and tracing in storm and sewer drains • Plumbing system tracing • Septic system analysis • Leak detection
Dye Strips	• Similar to liquid but less messy
Powder	• Can be very messy and must dissolve in liquid to reach full potential • Recommended for very small applications or for very large applications where liquid is undesirable • Leak detection
Dye Wax Cakes	• Recommended for moderate-sized bodies of water • Flow mapping and tracing in storm and sewer drains
Dye Wax Donuts	• Recommended for large sized bodies of water (lakes, rivers, ponds) • Flow mapping and tracing in storm and sewer drains • Leak detection

Table 59: Tips for Successful Dye Testing
(Adapted from Tuomari and Thompson, 2002)

Dye Selection
- Green and liquid dyes are the easiest to see.
- Dye test strips can be a good alternative for residential or some commercial applications. (Liquid can leave a permanent stain).
- Check the sanitary sewer before using dyes to get a "base color." In some cases, (e.g., a print shop with a permitted discharge to the sanitary sewer), the sewage may have an existing color that would mask a dye.
- Choose two dye colors, and alternate between them when testing multiple fixtures.

Selecting Fixtures to Test
- Check the plumbing plan for the site to isolate fixtures that are separately connected.
- For industrial facilities, check most floor drains (these are often misdirected).
- For plumbing fixtures, test a representative fixture (e.g., a bathroom sink).
- Test some locations separately (e.g., washing machines and floor drains), which may be misdirected.
- If conducting dye investigations on multiple floors, start from the basement and work your way up.
- At all fixtures, make sure to flush with plenty of water to ensure that the dye moves through the system.

Selecting a Sewer Manhole for Observations
- Pick the closest manhole possible to make observations (typically a sewer lateral).
- If this is not possible, choose the nearest downstream manhole.

Communications Between Crew Members
- The individual conducting the dye testing calls in to the field person to report the color dye used, and when it is dropped into the system.
- The field person then calls back when dye is observed in the manhole.
- If dye is not observed (e.g., after two separate flushes have occurred), dye testing is halted until the dye appears.

Locating Missing Dye
- The investigation is not complete until the dye is found. Some reasons for dye not appearing include:
- The building is actually hooked up to a septic system.
- The sewer line is clogged.
- There is a leak in the sewer line or lateral pipe.

Video Testing

Video testing works by guiding a mobile video camera through the storm drain pipe to locate the actual connection producing an illicit discharge. Video testing shows flows and leaks within the pipe that may indicate an illicit discharge, and can show cracks and other pipe damage that enable sewage or contaminated water to flow into the storm drain pipe.

Video testing is useful when access to properties is constrained, such as residential neighborhoods. Video testing can also be expensive, unless the community already owns and uses the equipment for sewer inspections. This technique will not detect all types of discharges, particularly when the illicit connection is not flowing at the time of the video survey.

Different types of video camera equipment are used, depending on the diameter and condition of the storm sewer being tested.

Field crews should review storm drain maps, and preferably visit the site before selecting the video equipment for the test. A field visit helps determine the camera size needed to fit into the pipe, and if the storm drain has standing water.

In addition to standard safety equipment required for all manhole inspections, video testing requires a Closed-Circuit Television (CCTV) and supporting items. Many commercially available camera systems are specifically adapted to televise storm sewers, ranging from large truck or van-mounted systems to much smaller portable cameras. Cameras can be self-propelled or towed. Some specifications to look for include:

- The camera should be capable of radial view for inspection of the top, bottom, and sides of the pipe and for looking up lateral connections.
- The camera should be color.
- Lighting should be supplied by a lamp on the camera that can light the entire periphery of the pipe.

When inspecting the storm sewer, the CCTV is oriented to keep the lens as close as possible to the center of the pipe. The camera can be self-propelled through the pipe using a tractor or crawler unit or it may be towed through on a skid unit (see Figures 65 and 66). If the storm drain has ponded water, the camera should be attached to a raft, which floats through the storm sewer from one manhole to the next. To see details of the sewer, the camera and lights should be able to swivel both horizontally and vertically. A video record of the inspection should be made for future reference and repairs (see Figure 67).

Figure 65: Camera being towed

Smoke Testing

Smoke testing is another "bottom up" approach to isolate illicit discharges. It works by introducing smoke into the storm drain system and observing where the smoke surfaces. The use of smoke testing to detect illicit discharges is a relatively new application, although many communities have used it to check for infiltration and inflow into their sanitary sewer network. Smoke testing can find improper

Figure 66: Tractor-mounted camera

Figure 67: Review of an inspection video

connections, or damage to the storm drain system (Figure 68). This technique works best when the discharge is confined to the upper reaches of the storm drain network, where pipe diameters are to small for video testing and gaining access to multiple properties renders dye testing infeasible.

Notifying the public about the date and purpose of smoke testing before starting is critical. The smoke used is non-toxic, but can cause respiratory irritation, which can be a problem for some residents. Residents should be notified at least two weeks prior to testing, and should be provided the following information (Hurco Technologies, Inc., 2003):

- Date testing will occur
- Reason for smoke testing
- Precautions they can take to prevent smoke from entering their homes or businesses
- What they need to do if smoke enters their home or business, and any health concerns associated with the smoke
- A number residents can call to relay any particular health concerns (e.g., chronic respiratory problems)

Program managers should also notify local media to get the word out if extensive smoke testing is planned (e.g., television, newspaper, and radio). On the actual day of testing, local fire, police departments and 911 call centers should be notified to handle any calls from the public (Hurco Technologies, Inc., 2003).

The basic equipment needed for smoke testing includes manhole safety equipment, a smoke source, smoke blower, and sewer plugs. Two smoke sources can be used for smoke testing. The first is a smoke "bomb," or "candle" that burns at a controlled rate and releases very white smoke visible at relatively low concentrations (Figure 69). Smoke bombs are suspended beneath a blower in a manhole. Candles are available in 30 second to three minute sizes. Once opened, smoke bombs should be kept in a dry location and should be used within one year.

The second smoke source is liquid smoke, which is a petroleum-based product that is injected into the hot exhaust of a blower where it is heated and vaporized (Figure 70). The length of smoke production can vary depending on the length of the pipe being

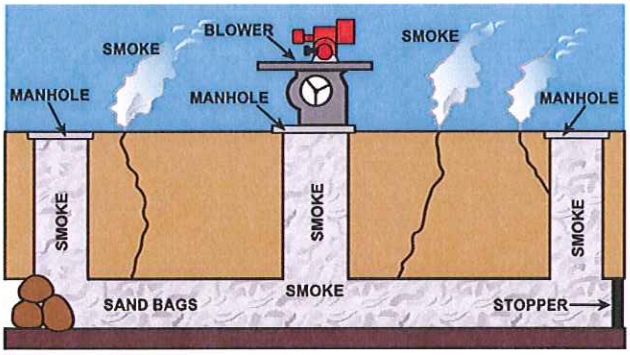

Figure 68: Smoke Testing System Schematic

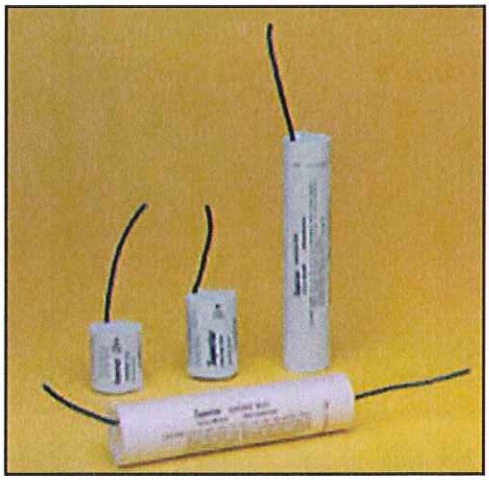

Figure 69: Smoke Candles

Figure 70: Smoke blower

tested. In general, liquid smoke is not as consistently visible and does not travel as far as smoke from bombs (USA Blue Book).

Smoke blowers provide a high volume of air that forces smoke through the storm drain pipe. Two types of blowers are commonly used: "squirrel cage" blowers and direct-drive propeller blowers. Squirrel cage blowers are large and may weigh more than 100 pounds, but allow the operator to generate more controlled smoke output. Direct-drive propeller blowers are considerably lighter and more compact, which allows for easier transport and positioning.

Three basic steps are involved in smoke testing. First, the storm drain is sealed off by plugging storm drain inlets. Next, the smoke is released and forced by the blower through the storm drain system. Lastly, the crew looks for any escape of smoke above-ground to find potential leaks.

One of three methods can be used to seal off the storm drain. Sandbags can be lowered into place with a rope from the street surface. Alternatively, beach balls that have a diameter slightly larger than the drain can be inserted into the pipe. The beach ball is then placed in a mesh bag with a rope attached to it so it can be secured and retrieved. If the beach ball gets stuck in the pipe, it can simply be punctured, deflated and removed. Finally, expandable plugs are available, and may be inserted from the ground surface.

Blowers should be set up next to the open manhole after the smoke is started. Only one manhole is tested at a time. If smoke candles are used, crews simply light the candle, place it in a bucket, and lower it in the manhole. The crew then watches to see where smoke escapes from the pipe. The two most common situations that indicate an illicit discharge are when smoke is seen rising from internal plumbing fixtures (typically reported by residents) or from sewer vents. Sewer vents extend upward from the sewer lateral to release gas buildup, and are not supposed to be connected to the storm drain system.

Ammonia

Ammonia is a good indicator of sewage, since its concentration is much higher there than in groundwater or tap water. High ammonia concentrations may also indicate liquid wastes from some industrial sites. Ammonia is relatively simple and safe to analyze. Some challenges include the tendency for ammonia to volatilize (i.e., turn into a gas and become non-conservative) and its potential generation from non-human sources, such as pets or wildlife.

Boron

Boron is an element present in the compound borax, which is often found in detergent and soap formulations. Consequently, boron is a good potential indicator for both laundry wash water and sewage. Preliminary research from Alabama supports this contention, particularly when it is combined with other detergent indicators, such as surfactants (Pitt, IDDE Project Support Material). Boron may not be a useful indicator everywhere in the country since it may be found at elevated levels in groundwater in some regions and is a common ingredient in water softeners products. Program mangers should collect data on boron concentrations in local tap water and groundwater sources to confirm whether it will be an effective indicator of illicit discharges.

Chlorine

Chlorine is used throughout the country to disinfect tap water, except where private wells provide the water supply. Chlorine concentrations in tap water tend to be significantly higher than most other discharge types. Unfortunately, chlorine is extremely volatile, and even moderate levels of organic materials can cause chlorine levels to drop below detection levels. Because chlorine is non-conservative, it is not a reliable indicator, although if very high chlorine levels are measured, it is a strong indication of a water line break, swimming pool discharge, or industrial discharge from a chlorine bleaching process.

Color

Color is a numeric computation of the color observed in a water quality sample, as measured in cobalt-platinum units (APHA, 1998). Both industrial liquid wastes and sewage tend to have elevated color values. Unfortunately, some “clean” flow types can also have high color values. Field testing by Pitt (IDDE Project Support Material) found high color values associated for all contaminated flows, but also many uncontaminated flows, which yielded numerous false positives. Overall, color may be a good first screen for problem outfalls, but needs to be supplemented by other indicator parameters.

Conductivity

Conductivity, or specific conductance, is a measure of how easily electricity can flow through a water sample. Conductivity is often strongly correlated with the total amount of dissolved material in water, known as Total Dissolved Solids. The utility of conductivity as an indicator depends on whether concentrations are elevated in “natural” or clean waters. In particular, conductivity is a poor indicator of illicit discharge in estuarine waters or in northern regions where deicing salts are used (both have high conductivity readings).

Field testing in Alabama suggests that conductivity has limited value to detect sewage or wash water (Pitt, IDDE Project Support Material). Conductivity has some

value in detecting industrial discharges that can exhibit extremely high conductivity readings. Conductivity is extremely easy to measure with field probes, so it has the potential to be a useful supplemental indicator in subwatersheds that are dominated by industrial land uses.

Detergents

Most illicit discharges have elevated concentration of detergents. Sewage and washwater discharges contain detergents used to clean clothes or dishes, whereas liquid wastes contain detergents from industrial or commercial cleansers. The nearly universal presence of detergents in illicit discharges, combined with their absence in natural waters or tap water, makes them an excellent indicator. Research has revealed three indicator parameters that measure the level of detergent or its components-- surfactants, fluorescence, and surface tension (Pitt, IDDE Project Support Material). Surfactants have been the most widely applied and transferable of the three indicators. Fluorescence and surface tension show promise, but only limited field testing has been performed on these more experimental parameters. Methods and laboratory protocols for each of the three detergent indicator parameters are reviewed in Appendix F2.

E. coli, Enterococci and Total Coliform

Each of these bacteria is found at very high concentrations in sewage compared to other flow types, and is a good indicator of sewage or septage discharges, unless pet or wildlife sources exist in the subwatershed. Overall, bacteria are good supplemental indicators and can be used to find "problem" streams or outfalls that exceed public health standards. Relatively simple analytical methods are now available to test for bacteria indicators, although they still suffer from two monitoring constraints. The first is the relatively long analysis time (18-24 hours) to get results, and the second is that the waste produced by the tests may be classified as a biohazard and require special disposal techniques.

Fluorescence

Laundry detergents are highly fluorescent because optical brighteners are added to the formula to produce "brighter whites." Optical brighteners are the reason that white clothes appear to have a bluish color when placed under a fluorescent light. Fluorescence is a very sensitive indicator of the presence of detergents in discharges, using a fluorometer to measure fluorescence at specific wavelengths of light. Since no chemicals are needed for testing, fluorometers have minimal safety and waste disposal concerns.

Some technical concerns do limit the utility of fluorescence as an indicator of illicit discharges. The concerns include the presence of fluorescence in non-illicit flow types such as irrigation water, the considerable variation of fluorescence between different detergent brands, and the lack of a readily standard or benchmark concentration for optical brighteners. For example, Pitt (IDDE Project Support Material) measured fluorescence in mg/L of Tide™ brand detergent, and found the degree of fluorescence varied regionally, temporally, and between specific detergent formulations.

Given these current limitations, fluorescence is best combined with other detergent indicators such as surfactants. Appendix F3 should be consulted for more detailed information on analytical methods and experimental field testing using fluorescence as an indicator parameter.

Fluoride

Fluoride is added to drinking water supplies in most communities to improve dental health, and normally found at a concentration of two parts per million in tapwater. Consequently, fluoride is an excellent conservative indicator of tap water discharges or leaks from water supply pipes that end up in the storm drain. Fluoride is obviously not a good indicator in communities that do not fluoridate drinking water, or where individual wells provide drinking water. One key constraint is that the reagent used in the recommended analytical method for fluoride is considered a hazardous waste, and must be disposed of properly.

Hardness

Hardness measures the positive ions dissolved in water and primarily include magnesium and calcium in natural waters, but are sometimes influenced by other metals. Field testing by Pitt (IDDE Project Support Material) suggests that hardness has limited value as an indicator parameter, except when values are extremely high or low (which may signal the presence of some liquid wastes). Hardness may be applicable in communities where hardness levels are elevated in groundwater due to karst or limestone terrain. In these regions, hardness can help distinguish natural groundwater flows present in outfalls from tap water and other flow types.

pH

Most discharge flow types are neutral, having a pH value around 7, although groundwater concentrations can be somewhat variable. pH is a reasonably good indicator for liquid wastes from industries, which can have very high or low pH (ranging from 3 to 12). The pH of residential wash water tends to be rather basic (pH of 8 or 9). The pH of a discharge is very simple to monitor in the field with low cost test strips or probes. Although pH data is often not conclusive by itself, it can identify problem outfalls that merit follow-up investigations using more effective indicators.

Potassium

Potassium is found at relatively high concentrations in sewage, and extremely high concentrations in many industrial process waters. Consequently, potassium can act as a good first screen for industrial wastes, and can also be used in combination with ammonia to distinguish wash waters from sanitary wastes. (See Chapter 12). Simple field probes can detect potassium at relatively high concentrations (5 mg/L), whereas more complex colorimetric tests are needed to detect potassium concentrations lower than 5 mg/L.

Surface Tension

Surfactants remove dirt particles by reducing the surface tension of the bubbles formed in laundry water when it is agitated. Reduced surface tension makes dirt particles less likely to settle on a solid surface (e.g., clothes or dishes) and become suspended instead on the water's surface. The visible manifestation of reduced surface tension is the formation of foam or bubbles on the water surface. Pitt (IDDE Project Support Material) tested a very simple procedure to measure surface tension that quantifies the formation of foam and bubbles in sample bottles. Initial laboratory tests suggest that surface tension is a good indicator of surfactants, but only when they are present at relatively high concentrations. Section F3 provides a more detailed description of the surface tension measurement procedure.

Surfactants

Surfactants are the active ingredient in most commercial detergents, and are typically measured as Methyl Blue Active Substances (or MBAS). They are a synthetic replacement for soap, which builds up deposits on clothing over time. Since surfactants are not found in nature, but are always present in detergents, they are excellent indicators of sewage and wash waters. The presence of surfactants in cleansers, emulsifiers and lubricants also makes them an excellent indicator of industrial or commercial liquid wastes. In fact, research by Pitt (IDDE Project Support Material) found that detergents were an excellent indicator of "contaminated" discharges in Alabama (i.e., discharges that were not tap water or groundwater). Several analytical methods are available to monitor surfactants. Unfortunately, the reagents used involve toluene, chloroform, or benzene, each of which is considered hazardous waste with a potential human health risk. The most common analysis method uses chloroform as a reagent, and is recommended because it is relatively safer when compared to other reagents.

Turbidity

Turbidity is a quantitative measure of cloudiness in water, and is normally measured with a simple field probe. While turbidity itself cannot always distinguish between contaminated flow types, it is a potentially useful screening indicator to determine if the discharge is contaminated (i.e., not composed of tap water or groundwater).

Research Indicators

In recent years, researchers have explored a series of other indicators to identify illicit discharges, including fecal steroids (such as coprostanol), caffeine, specific fragrances associated with detergents and stable isotopes of oxygen. Each of these research indicators is profiled in Pitt (IDDE Project Support Material) and summarized below in Table F1. Most research indicators require sophisticated equipment and specific expertise that limit their utility as a general indicator, given the high sampling cost and long turn-around times needed. To date, field tests of research indicators have yielded mixed results, and they are currently thought to be more appropriate for special research projects than for routine outfall testing. While they are not discussed further in this manual, future research and testing may improve their utility as indicators of illicit discharges.

Table F1: Summary of Research Indicators Used for Identifying Inappropriate Discharges into Storm Drainage		
Parameter Group	**Comments**	**Recommendation**
Coprostanol and other fecal sterol compounds	Used to indicate presence of sanitary sewage	Possibly useful. Expensive analysis with GC/MSD. Not specific to human wastes or recent contamination. Most useful when analyzing particulate fractions of wastewaters or sediments.
Specific detergent compounds (LAS, fabric whiteners, and perfumes)	Used to indicate presence of sanitary sewage	Possibly useful. Expensive analyses with HPLC. A good and sensitive confirmatory method.
Pharmaceuticals (colfibric acid, aspirin, ibuprofen, steroids, illegal drugs, etc.)	Used to indicate presence of sanitary sewage	Possibly useful. Expensive analyses with HPLC. A good and sensitive confirmatory method.
Caffeine	Used to indicate presence of sanitary sewage	Not very useful. Expensive analyses with GC/MSD. Numerous false negatives, as typical analytical methods not suitably sensitive.
DNA profiling of microorganisms	Used to identify sources of microorganisms	Likely useful, but currently requires extensive background information on likely sources in drainage. Could be very useful if method can be simplified, but with less specific results.
UV absorbance at 228 nm	Used to identify presence of sanitary sewage	Possibly useful, if UV spectrophotometer available. Simple and direct analyses. Sensitive to varying levels of sanitary sewage, but may not be useful with dilute solutions. Further testing needed to investigate sensitivity in field trials.
Stable isotopes of oxygen	Used to identify major sources of water	May be useful in area having distant domestic water sources and distant groundwater recharge areas. Expensive and time consuming procedure. Can not distinguish between wastewaters if all have common source.
GC/MSD - Gas Chromatography/Mass Selective Detector HPLC - High Performance Liquid Chromatography		

TABLE 1 WATER QUALITY TEST PARAMETERS AND USES

Water Quality Test	Use of Water Quality Test	Comments
Conductivity	Used as an indicator of dissolved solids	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Typically measured in the field with a probe
Ammonia	High levels can be an indicator of the presence of sanitary wastewater	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Used very often and equipment is readily available; Boston, MA uses a field test kit (see case example)
Surfactants	Indicate the presence of detergent (e.g., laundry, car washing)	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Boston, MA uses a field test kit (see case example)
pH	Extreme pH values (low or high) may indicate commercial or industrial flows; not useful in determining the presence of sanitary wastewater (which, like uncontaminated baseflows, tends to have a neutral pH, i.e., close to 7)	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Typically measured in the field or lab with a probe
Temperature	Sanitary wastewater and industrial cooling water can substantially influence outfall discharge temperatures. This measurement is most useful during cold weather.	- Pitt et al. 1993 suggested parameter - Measured in the field with a thermometer or probe
Hardness	Used to distinguish between natural and treated waters	- Pitt et al. 1993 suggested parameter
Total Chlorine	Used to indicate inflow from potable water sources; not a good indicator of sanitary wastewater because chlorine will not exist in a "free" state in water for long (it will combine with organic compounds)	- Pitt et al. 1993 suggested parameter
Fluoride	Used to indicate potable water sources in areas where water supplies are fluoridated	- Pitt et al. 1993 suggested parameter
Potassium	High levels may indicate the presence of sanitary wastewater	- Pitt et al. 1993 suggested parameter
Optical Brighteners (Fluorescence)	Used to indicate presence of laundry detergents (which often contain fabric whiteners, which cause substantial fluorescence)	-Pitt et al. 1993 suggested parameter -Used by City of Winooski, VT (see case example)
Bacteria (fecal coliform, *E. coli,* and/or *enterococci)*	Used to indicate the presence of sanitary wastewater	- Used by NHDES (see case example in chapter 5)