City of Salinas

Illicit Discharge Detection And Elimination

Response Plan and Guidance Manual
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Section 1 – Introduction

1.1 Background

The City of Salinas has made a strong commitment to protect and manage the City’s natural resources. Within the Public Works Department’s Urban Watershed Management Program, the Stormwater Management (SWMP) Plan seeks to minimize the negative effects of development 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 SWMP program.

The top causes of Water Quality impairment include siltation, nutrients, bacteria, metals, and oxygen-depleting substances. Polluted stormwater runoff, including runoff from urban areas and construction sites can be a 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 to regulate stormwater discharges.

In the City of Salinas, the stormwater management program is a joint effort of the City's Public Works Department and the City's Planning and Development Department at the City's Permit Center. The NPDES Permit requires the City to have a stormwater management program (SWMP). One of the Permit conditions requires that the City will have an ongoing program to detect and remove illicit discharges and illegal connections, including spills, into the municipal separate storm sewers owned or operated by the Permittee. Therefore, the overreaching program goal is to prevent, locate, and correct illicit discharges.

The City’s IDDE program is managed by the Wastewater Division of the City's Public Works Department. Maintenance staff and construction site inspectors play an important role identifying illicit discharge problems and responding to clean-up requests. However, Staff from multiple City Departments will play a role in locating, identifying and reporting potential illicit discharges.
1.2 Summary of the IDDE Program

The Phase I Permit requires the permittee 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.

- Illicit Discharge Detection and Elimination BMP Development (Provision H.1); Develop a municipal storm sewer system map to include High Priority IDDE areas and Dry weather screening stations. (Provision H.2); Develop Illicit Discharge Reporting System; Maintain an effective information Management System
- Develop IDDE Source Investigation and Elimination Procedures (Provision H.7) an on-going program to detect and address non-stormwater discharges, spills, illicit connections, and illegal dumping (Section 4, 5, 6);
- 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 Plan 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 are following the same procedures in responding to illicit discharge concerns.
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 NPDES 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,
- Storm system pipelines that act as conveyances leading to outfalls,
- Drainage areas and land use for the drainage basins contributing to outfalls,

The City’s collection system maps are available to all Public Works staff but resides in the Wastewater Division that bears primary responsibility for implementing this IDDE Plan.

The City’s mapping efforts include maps of the locations of outfalls and the drainage system infrastructure (pipes, catch basins, manholes, and stormwater facilities). The drainage system infrastructure indicating large diameter pipelines, catchbasins and outfalls is overlaid onto aerial photographs to provide a visual guide to structures and the environment for the purpose of maintenance activities or spill response. Smaller diameter pipe and catchbasins are included on supplemental maps. Watershed maps and maps showing locations of structural controls have been developed and are available for reference.

The City’s Technology Committee is working to identify information needs for including both mapping systems into a GIS system that can be interactive with maintenance activities. Placing this information into a GIS system is an ongoing effort and will be developed over the next several years (target date 2015) as the City identifies available resources.

Section 3 – Stormwater Ordinance

3.1 What is an Illicit Discharge?

"Illicit discharge" or "illegal discharge" means any direct or indirect non-stormwater discharge to the storm drain system, except as exempted in Section 29-10 of the Salinas Municipal Code.

Examples of illicit discharges include:

- A measurable flow during dry weather that contains pollutants or pathogens,
- Disposal of vehicle maintenance fluids into a storm drain;
3.2 What is an Illicit Connection?

"Illicit connections." An illicit connection is defined as either of the following:

1. Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any nonstormwater discharge including sewage, process wastewater and wash water to enter the storm drainage system and any connections to the storm drainage system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted or approved by a government agency; or
2. Any drain or conveyance connected from a commercial or industrial land use to the storm drainage system, which has not been documented in plans, maps or equivalent records and approved by the City. Examples of illicit connections include:
   - Sanitary sewer piping that is connected directly from a building to the stormwater system;
   - A basement or shop floor drain that is connected to the stormwater system; or
   - A cross connection between the municipal sanitary sewer and the stormwater system.

3.3 City of Salinas Stormwater Ordinance

The Stormwater Ordinance is embedded in the City’s Municipal Code in Chapter 29 Stormwater Management and Discharge Control. Portions of Chapter 29-9 are included below. A copy of the full ordinance and code chapter, including definitions and a listing of discharges specifically or conditionally allowed under the Municipal stormwater code, is included in Appendix A.

Section 29-9 General Discharge prohibition - Illegal discharges

No person shall contribute or cause to be contributed, directly or indirectly, to the city's storm drainage system any pollutant, wastewater or any substance or material which will interfere with the operation or performance of the storm drainage system, violate the city's NPDES permit or violate other applicable law or regulations. (Ord. No. 2473 (NCS), § 1.)

Section 29-10 - Discharges exempt from the general prohibition

(b) Unless otherwise determined by the city engineer, discharges from the following activities shall not be considered a source of pollutants to waters of the United States when properly managed to ensure that no potential pollutants are present, and therefore they shall not be
considered illegal discharges unless determined to cause a violation of the provisions of the Porter-Cologne Act, Clean Water Act, or this chapter:

(1) Diverted stream flows;
(2) Rising ground waters;
(3) Uncontaminated ground water infiltration [as defined by 40 CFR Section 35.2005(20)];
(4) Uncontaminated pumped ground water;
(5) Foundation drains;
(6) Springs;
(7) Water from crawl space pumps;
(8) Footing drains;
(9) Air conditioning condensation;
(10) Flows from riparian habitats and wetlands;
(11) Water line flushing;
(12) Lawn and landscape irrigation from potable water sources;
(13) Discharges from potable water sources;
(14) Irrigation water;
(15) Individual residential car washing; and
(16) Dechlorinated or debrominated swimming pool/spa water.

(c) Discharges or flows from firefighting activities are excluded from the non-stormwater discharge prohibition and need only be addressed where identified as significant sources of pollutants to water of the United States.

Sec. 29-12. Requirement to eliminate illegal discharges.

(b) Unauthorized nonstormwater discharges include, but are not limited to, the following:

(1) Sanitary sewer overflows;
(2) Discharges of wash water resulting from the hosing off or cleaning of gas stations, vehicle repair services, or other types of automotive service facilities;
(3) Discharges resulting from the storage, cleaning, repair, or maintenance of any type of equipment, machinery, or facility including, but not limited to, motor vehicles, cement-related equipment, and portable toilet servicing;
(4) Discharges of wash water from mobile operations including, but not limited to, mobile vehicle washing, steam cleaning, power washing, and carpet cleaning;
(5) Discharges of wash water from the cleaning of impervious surfaces in municipal, industrial and commercial areas including, but not limited to, parking lots, streets, sidewalks, driveways, patios, plazas, work yards and outdoor eating or drinking areas;
(6) Discharges of runoff from material storage areas containing chemicals, fuels, grease, oil, or other hazardous materials;
(7) Discharges of pool or fountain water containing chlorine, biocides, or other chemicals and discharges of pool or fountain filter backwash water;

(8) Discharges of sediment, pet waste, vegetation clippings, or other landscape or construction-related wastes;

(9) Discharges of food-related wastes (e.g., grease, fish processing, and restaurant kitchen mat and trash bin wash water);

(10) Discharge of runoff from washing toxic materials from paved or unpaved areas; and

(11) Discharge of materials such as litter, landscape debris, construction debris, or any state or federally banned pesticides.

Prohibition of Illicit Connections.

Sec. 29-13. Illicit connections.

It is unlawful for any person to establish, use, maintain or continue illicit discharges or illicit drainage connections to the city storm drainage system. This prohibition shall apply to connections in existence at the time of the adoption of the ordinance codified in this chapter, irrespective of whether such connection was made under a permit or other authorization or whether permissible under the law or practices applicable or prevailing at the time the connection was made.

(Ord. No. 2473 (NCS), § 1.)

Sec. 29-14. Requirement to eliminate or secure approval for illicit connections.

The authorized enforcement officer may require by written notice that a person responsible for an illicit connection to the storm drain system comply with the requirements of this article to eliminate or secure approval for the connection by a specified date, regardless of whether or not the connection or discharges to it had been established or approved prior to the effective date of this article.

If, subsequent to eliminating a connection found to be in violation of this article, the responsible person can demonstrate that an illegal discharge will no longer occur, such person may request city approval to reconnect. The reconnection or reinstallation of the connection shall be at the responsible person's expense.

(Ord. No. 2473 (NCS), § 1.)

Section 4 – Illicit Discharge Detection Procedures

4.1 Purpose

Illicit discharges and connections are identified through Citizen Reporting, Interdepartmental or Interagency Referral, or through Outfall Inspection activities. The City relies on local citizens,
City field staff, and program inspections to detect potential problem areas quickly, so that they can be addressed before they cause significant water quality degradation.

The Citizen Reporting procedures provides a non-emergency number to reach the Environmental and Maintenance Services dispatcher at (831) 758-7233 who is trained to dispatch requests for services to the appropriate personnel for response. The Citizen Reporting procedures also include County Communications (911) that coordinates and prioritizes emergency calls to the appropriate agencies. This allows local citizens to call either number when they suspect a problem and be routed to the correct personnel for a timely response. This convenience encourages residents to participate in the reporting process and helps the City to 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, Monterey County Communications (911) is an established to handle emergencies including water quality incident reports countywide. Citizens that suspect an illicit discharge, an illicit connection, or an illegal dumping action can call 911 to report the incident. The 911 operator determines the location of the problem and will route the call to the appropriate agency or jurisdiction for response.

During normal business hours (Monday thru Thursday 8:00 am to 5:00 pm) citizens reporting incidents that have occurred within the city limits can also report the incident directly to the Public Works department (831-758-7233). Likewise, any City department or outside agency can report water quality incidents to 911 or the City’s Public Works Department.

After hours, emergency problems should be reported through 911, where operators will assess the severity of the incident and determine if emergency response (fire, hazmat, etc.) is needed. When contacted the City’s on-call staff will investigate to determine the level of response that is required and has authority to call in as many additional staff that they deem necessary to address the problem. If after hours messages are left on the City’s Public Works voicemail, staff 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 (either directly or from 911) the staff person taking the call should contact appropriate response personnel immediately. Staff responding to an illicit discharge should complete the Illicit Discharge Response Form documenting the response at the earliest convenience.

Once received, incident information is referred to the appropriate City department and/or staff person for follow-up. IDDE problems are referred to the Wastewater Division Group 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 conducts Outfall Inspections annually to visually inspect each known outfall from the
City’s stormwater drainage system to identify structural problems, conduct trash and debris cleanup,
vegetation clearing and to identify areas of obvious pollution or non-stormwater discharges.
Outfall inspections locate potential problem without the need for in-depth laboratory analysis.
Potential problem discharges

Outfall inspections locate potential problem areas without the need for in-depth laboratory analysis

can be identified by outfalls that are flowing during dry weather (potential activity within the City or potential illicit
connection) or outfalls that have high turbidity, strong odors, or unusual colors.

Note: If inspection staff encounter a transitory discharge, such as a
liquid or oil spill, during inspection activities, the problem should be immediately abated to the extent possible with regard to personal safety and referred to appropriate Department personnel for response assistance. The incident should be recorded on the Illicit Discharge Report Form, located in Appendix B, for entry into the reporting database.

4.3.1 Prioritization Schedule

The City has identified that the storm drainage infrastructure includes approximately 147 outfalls that discharge to either Gabilan Creek, Natividad Creek, Reclamation Ditch 1665 and one discharge pipe to the Salinas River. Detailed mapping of the City’s outfalls is overlaid onto City aerial maps so they can be identified and located by use of the map legend or by viewing identifiable surrounding infrastructure.

The City’s permit requires that the City identify and prioritize areas of potential illicit discharge activity. High priority has been given to outfalls in neighborhoods of older infrastructure and areas of commercial and/or industrial activity. The City will identify High Priority locations consistent with the implementation schedule in the Stormwater Permit. Consideration will also be given to complaint history, past history of illicit discharge responses and data collected through the City’s Water Quality Monitoring program.

4.3.2 Responsibility

Inspections are the responsibility of the Wastewater Division of Public Works. 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 Wastewater Crew Supervisor.

4.3.3 Timing

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

- Dry season – preferably in summer or early fall
- No run-off producing rainfall within the last 48 hours
- The preferred conditions allow detection of flows when there should be none and prevent the dilution of pollutants.

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

During Outfall Inspection, field crews should visually inspect each outfall and the immediate surrounding area, photograph the current conditions if needed, and complete the Outfall Inspection 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.

When illicit discharge problems are identified field crews will conduct a quick visual inspection of the surrounding area to identify any obvious pollution sources. These simple actions can give valuable direction to the upcoming IDDE inspection. Field crews should also report problem areas to the Wastewater Crew Supervisor or Wastewater Manager and complete an illicit discharge report form as soon as the event is successfully concluded.

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 Wastewater Supervisor. Observed spills or environmental hazards should be immediately reported to the Wastewater Supervisor or Wastewater Manager and the incident should be documented using the Illicit Discharge Report Form located in Appendix B. The Wastewater Division staff will implement cleanup procedures or take additional steps, if more resources are needed, to address the problem such as contract with a cleanup agency such as (NRC Environmental) to clean-up and properly dispose of the spilled material.

4.5 Follow-up Actions

As noted above, when potential problem areas are identified, field crews should report the observations to the Wastewater Supervisor or the Wastewater Manager. Based on the severity of the problem, the Wastewater Manager will direct staff to begin the investigation procedures outlined in Section 5. The Wastewater Manager will also determine if other City departments or outside agencies need to be involved. For example, polluted discharges that may be the cause of leaking septic tanks warrant contacting the Monterey County Health District for assistance and follow-up.
Section 5 – Investigation Procedures

5.1 Purpose

Potential illicit discharge problems can be revealed through outfall inspections or reports from staff, businesses, or the public as described in Section 4. When a complaint is reported, the City’s Permit requires that a follow-up investigation be initiated. 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 illicit discharge investigation, following the procedures outlined in this section. Figure 5-1 illustrates the steps that lead to an illicit discharge investigation and is a flow chart for actions, that is required in the Permit.

![Flowchart](image)

**Figure 5-1. Routes to an Illicit Discharge Investigation**

When an illegal dumping or illicit 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 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 illicit 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 City's Permit, illicit discharge investigations should begin within seven days of identifying a problem. In most cases, the City of Salinas strives to respond faster than the required timeline with most cases investigated within an hour or less of the reported observation. The City works toward an immediate response so that any event can be identified, abated and cleaned up to minimize the impact to receiving waters or other environmental areas.

<table>
<thead>
<tr>
<th>Priority Level</th>
<th>Suspected Pollutants</th>
<th>Response Time (Work Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Alkalis</td>
<td>• Herbicide</td>
</tr>
<tr>
<td></td>
<td>• Automotive products</td>
<td>• Metals</td>
</tr>
<tr>
<td></td>
<td>• Bases</td>
<td>• Painting products</td>
</tr>
<tr>
<td></td>
<td>• Cleaning products</td>
<td>• Pesticide</td>
</tr>
<tr>
<td></td>
<td>• Degreaser or solvent</td>
<td>• Petroleum</td>
</tr>
<tr>
<td></td>
<td>• Drain cleaner</td>
<td>• Process Wastewater</td>
</tr>
<tr>
<td></td>
<td>• Fertilizer</td>
<td>• Sewage</td>
</tr>
<tr>
<td></td>
<td>• Flammable/explosive materials</td>
<td>• Unknown chemicals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-2</td>
</tr>
<tr>
<td>2</td>
<td>• Ammonia</td>
<td>• Detergents</td>
</tr>
<tr>
<td></td>
<td>• Construction runoff (silt, sediment, gravel)</td>
<td>• Food waste (fats, oils, grease)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Soap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-5</td>
</tr>
<tr>
<td>3</td>
<td>• Car washing</td>
<td>• Steam cleaning waste</td>
</tr>
<tr>
<td></td>
<td>• Pressure washing waste</td>
<td>• Yard waste</td>
</tr>
<tr>
<td></td>
<td>• Spa or pool water</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-7</td>
</tr>
<tr>
<td>4</td>
<td>• Animal carcasses</td>
<td>• Foam</td>
</tr>
<tr>
<td></td>
<td>• Bacteria</td>
<td>• Rust</td>
</tr>
<tr>
<td></td>
<td>• Construction materials</td>
<td>• Trash</td>
</tr>
<tr>
<td></td>
<td>• Debris</td>
<td>• Other</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within 14 days</td>
</tr>
</tbody>
</table>

- In most cases response time by City staff will be within one hour if not minutes after a reported incident. Table 5.1 depicts the maximum response time allowed.

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 initiating a source investigation. Most cases will be resolved with hours of reporting. *Contact 911 immediately if a discharge poses a threat to human health or the environment.*
5.3 Tracing the Source

Contact Emergency Services (911) and Monterey County Health Department immediately if discharge poses severe threat to human health or the environment.

This section outlines the basic tools that can be used to trace the source of a suspected illicit discharge. Source tracing begins when a suspected problem area is identified through outfall inspections, 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 illicit 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.

Any field investigations, photographs, corrective actions, or other activities associated with the suspected problem area should be documented for entry into the Trackit database information management system. This becomes the City’s official record of the IDDE investigation.

5.3.1 Method A – Storm Drain Network Investigations

The source of some illicit connections or 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 (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:

Latex paint residue on catch basin
1. Consult the drainage system map (if available) and identify the major branches.
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 observations.
3. Repeat observations 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. If a drainage system map is not available or major branches cannot be identified, then manhole observations must be done at each successive upstream manhole to map the drainage system and isolate the location of the polluted discharge entry.
7. 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 illicit discharge is entering the storm drainage network.
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/Underground Pipeline Video Inspection
- 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 C.

Confirmed illicit 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.

Drainage area investigations should begin with a discussion between the field crews, 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>
<thead>
<tr>
<th>Observed Discharge</th>
<th>Potential Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clogging Sediment</td>
<td>Construction activity without proper erosion and sediment controls</td>
</tr>
<tr>
<td></td>
<td>Roadway sanding operations</td>
</tr>
<tr>
<td></td>
<td>Outdoor work areas or material storage areas</td>
</tr>
<tr>
<td>Thick Algae Growth</td>
<td>Fertilizer Leak or Spill</td>
</tr>
<tr>
<td></td>
<td>Landscaping operations</td>
</tr>
<tr>
<td></td>
<td>Hydroseeding following Construction</td>
</tr>
<tr>
<td></td>
<td>Failing or leaking septic system</td>
</tr>
<tr>
<td>Oil</td>
<td>Refueling operations</td>
</tr>
<tr>
<td></td>
<td>Vehicle or machinery maintenance activities</td>
</tr>
<tr>
<td>Sudsy discharge</td>
<td>Power washing of buildings</td>
</tr>
<tr>
<td></td>
<td>Vehicle or equipment washing operations</td>
</tr>
<tr>
<td></td>
<td>Mobile cleaning crew dumping</td>
</tr>
<tr>
<td></td>
<td>Laundry or Cleaner</td>
</tr>
<tr>
<td></td>
<td>Household grey water discharge</td>
</tr>
<tr>
<td>Clogged Grease</td>
<td>Restaurant sink drain connection to stormwater system</td>
</tr>
<tr>
<td>Sewage</td>
<td>Surcharge sewer main or failing or leaking septic systems</td>
</tr>
</tbody>
</table>

Staff should make a list of likely discharge sources and consult City land use and drainage system maps to identify areas of likely pollutions 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 C) 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 water quality incident reports from the area to become familiar with the background information and potential pollution sources.

<table>
<thead>
<tr>
<th>Table 5-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Equipment for Source Investigations</td>
</tr>
<tr>
<td>Minimum 2 person crew</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety Gear:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic vest</td>
</tr>
<tr>
<td>Latex gloves</td>
</tr>
<tr>
<td>Hard hat</td>
</tr>
<tr>
<td>Traffic cones</td>
</tr>
<tr>
<td>Storm drain maps</td>
</tr>
<tr>
<td>Sewer system maps</td>
</tr>
<tr>
<td>Cell phone/truck radio</td>
</tr>
<tr>
<td>Flash light (for night response)</td>
</tr>
<tr>
<td>Shovel, pick and broom</td>
</tr>
<tr>
<td>Pick or catchbasin grate/cover remover</td>
</tr>
<tr>
<td>First aid kit</td>
</tr>
</tbody>
</table>

5.3.5 Analytical Sampling (if needed)
If illicit discharge sources cannot be identified based on a storm drain network investigation and/or drainage area investigation, the Wastewater Manager 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 C includes additional information regarding indicator parameters in water quality testing.
Table 5-4
Water Quality Test Parameters and Uses

<table>
<thead>
<tr>
<th>Water Quality Test</th>
<th>Use of Water Quality Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductivity</td>
<td>Used as an indicator of dissolved solids. Used to distinguish between seawater and stormwater.</td>
</tr>
<tr>
<td>pH</td>
<td>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).</td>
</tr>
<tr>
<td>Temperature</td>
<td>Sanitary wastewater and industrial cooling water can substantially influence outfall discharge temperatures.</td>
</tr>
<tr>
<td>Ammonia</td>
<td>High levels can be an indicator of the presence of sanitary wastewater</td>
</tr>
<tr>
<td>Surfactants</td>
<td>Indicate the presence of detergent (e.g. laundry, car washing)</td>
</tr>
<tr>
<td>Total Chlorine</td>
<td>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).</td>
</tr>
<tr>
<td>Potassium</td>
<td>High levels may indicate the presence of sanitary wastewater.</td>
</tr>
<tr>
<td>Bacteria</td>
<td>Sanitary wastewater or septic systems.</td>
</tr>
</tbody>
</table>


Results of any analytical testing should be attached with the Incident Response Report Form and reported to the Wastewater Supervisor or Wastewater Manager. Testing results may lead to another round of field investigations using either Method A or B. All data shall be recorded in the Trackit database.

5.4 Follow-Up Actions

Once the source of an illicit 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. This is an important first step in the corrective action process. Field crews should also notify the Wastewater Manager, Wastewater Crew Supervisor or Environmental Compliance Inspector, complete the Illicit Discharge Response Form, and when time allows the information should be entered in the illicit discharge database in the Trackit Information Management System. The Wastewater Manager 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 illicit 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 Wastewater Manager and/or Code Enforcement Officer should use judgment in exercising the right mix of compliance assistance and enforcement to correct identified problems. The administrator may immediately levy fines if the violation is found to be willful, intentional or egregious.

In the event the violation constitutes an immediate danger to public health or safety, the investigator is authorized to enter upon the subject property...to take any and all measures necessary to abate the violation and/or restore the property.

6.2 Voluntary Compliance

The preferred approach to address illicit discharge problems is to pursue voluntary compliance through property owner or responsible party education. 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. Responding staff should also provide the property operator with an educational brochure describing illicit discharge violations. Field staff should also remind property owners of their obligation to report discharges to the proper agencies.
6.2.1 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.

6.2.2 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. Depending on the level of actions enforcement may be a combination of responsibilities involving the Wastewater Manager, Code Enforcement, the City Attorney or other outside agencies such as the Monterey County Environmental Health Department. 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>
<thead>
<tr>
<th>Table 6-1 Illicit Discharge Enforcement Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enforcement Step</strong></td>
</tr>
</tbody>
</table>
| Step 1 – Initial Actions | • Provide educational materials (i.e. Illicit Discharge brochure  
• 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 |  |
| 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 | Wastewater Manager  
Wastewater Supervisor  
Environmental Compliance Officer |
| 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 through Code Enforcement or City Attorney. | Code Enforcement Officer |

* Keep copies of all letters and correspondence.
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 City’s Permit requires identified problems to be corrected and illicit connections removed. 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 illicit 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.

The NPDES Permit requires identified problems to be corrected and illicit connections removed.
6.3.2 Potential Fines
Illicit discharge violations are subject to fines and penalties under the City’s Municipal code. The City has the ability to back charge costs and penalties to the violator or reduce or waive the penalty if the property owner can show that they have been actively working to correct the problem and have run into time delays beyond their control. Repeat offenders may also find themselves subject to criminal penalties.

Sec. 29-27. Civil actions.

In addition to any other remedies provided in this chapter, any violation of this chapter may be enforced by civil action brought by the city. In any such action, the city may seek, and the court may grant, as appropriate, any or all of the following remedies:

(a) A temporary and/or permanent injunction;

(b) Assessment against the violator for the costs of any investigation, inspection, or monitoring survey, which led to the discovery of the violation, and for the reasonable costs incurred in preparing and prosecuting legal action as a result of violations of this chapter;

(c) Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation;

(d) Compensatory damages for loss or destruction to water quality, wildlife, fish and aquatic life; and

(e) Such other relief as the court may authorize. Assessments under this subsection shall be paid to the city to be used exclusively for costs associated with monitoring and establishing stormwater discharge pollution control systems and/or implementing or enforcing the provisions of these standards.

(Ord. No. 2473 (NCS), § 1.)

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. Section 8 discusses illicit discharge record keeping in greater detail.
Section 7 – Public Education

The NPDES 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: Outreach included multi-media advertising, distribution of materials using email, special events, and conducting public events/meetings. Partnerships continued to be the principal means by which the City conducted its public participation. Partnerships included: the Stormwater Information Network, the Central Coast Region Media Coalition, the 3-R Group, the Salinas Valley Solid Waste Authority, CSUMB, and the Integrated Regional Watershed Management Group.

Illicit discharge detection and elimination will be a focus point of the educational outreach to the local business community. The City continues its stormwater compliance inspection for Commercial and Industrial business. The businesses receive a self-inspection form so they may determine their individual level of compliance with storm water protection prior to the actual inspection. These are intended to raise the knowledge level and engage industry and business managers in active watershed stewardship.

Educational material is handed out including an Illicit Discharge BMP Brochure at each facility inspection. The inspection form indicates that non-stormwater discharges are prohibited from their business. The inspections inform business owners and their employees of their responsibilities related to water quality protection.

The City also continued its mobile advertising campaign. City vehicles promote the message: “Be the Solution to Water Pollution” with our thematic frog (see report cover), and a informational link to a web site where the public can obtain more detailed information. Information regarding the number of impressions this campaign generates was not available. Conservative estimates from this mobile campaign are on the order of 250,000 – 350,000 gross Impressions annually.

The City is also partnered with the Southern Monterey Bay Dischargers, a group of Bay Area cities that that promotes public education to prevent sanitary sewer overflows. The annual effort includes radio newspaper and television ads promoting the protection of the environment and proper disposal of grease waste from cooking. The effort includes a web site, Clogbusters.org, with other educational materials including the phone numbers of the various participating Cities or Agencies for reporting sewer spills. These educational efforts will continue to be the focus or the illicit discharge program.
Section 8 – Record Keeping

The NPDES 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 information into Trakit information database
Investigations – retain Incident Response forms, photographs when appropriate, in addition to the information collected during the investigation process, retain copies of compliance letters, correspondence with property owners, and proof of corrected problems (contracts and invoices for completed work)

8.1 Data Sources

Outfall Inspections – Outfall inspection data is recorded onto an outfall inspection form or into a hand held computer. The data is then entered into a computer database or downloaded from the handheld devise to the computer database. An Access Database interface is used to save and retrieve data.

Investigations – Illicit discharge investigation records is recorded onto the illicit discharge reporting form which is translated into the Trackit database system.

8.2 Long Term Record Storage

The NPDES permit required 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 Salinas.
Section 9 – Staff Training

The City has developed a training program, to meet the requirements of the NPDES Permit. Two primary trainings have been identified related to IDDE:

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

These trainings are generally conducted by Wastewater staff using materials developed for other aspects of the IDDE program. The City has developed a PowerPoint presentation that is used for conducting the overview training for all field staff.

In addition to meeting the permit deadline of getting all field staff trained prior to May 2, 2013, the City will schedule follow-up trainings as needed to keep the information fresh or introduce new information acquired during implementation of the IDDE program. These follow-up trainings will occur annually.

Training for illicit 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 illicit 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 10 – References


Salinas Municipal Code, Chapter 1.26 and 15.22.

*Salinas, NPDES Permit*.

*City of Salinas Drainage System Field Maps.*
Appendix A
Stormwater Ordinance
Salinas Municipal Code

The Stormwater Ordinance is not shown in its entirety. The complete Section of the Municipal Code can be found at the following web address:

http://library.municode.com/index.aspx?clientId=16597

Division 1. Title, Purpose and Definitions.

Sec. 29-1. Title.

This ordinance shall be known as the "City of Salinas Stormwater Management and Discharge Control Ordinance" and may be so cited.

(Ord. No. 2473 (NCS), § 1.)

Sec. 29-2. Purpose and intent.

The purpose and intent of this chapter is to ensure the health, safety and general welfare of citizens, and protect the water quality of watercourses and water bodies in a manner pursuant to and consistent with the requirements of the NPDES permit issued to the city of Salinas by the California Regional Water Quality Control Board and the Federal Clean Water Act (33 U.S.C. Section 1251 et seq.) by reducing pollutants in urban stormwater discharges to the maximum extent practicable and by effectively prohibiting non-stormwater discharges to the storm sewer drain system. The provisions of this chapter shall be implemented and enforced in such a manner as to prevent or reduce downstream erosion, to protect stream habitat and to implement controls for the post-development runoff and discharges. To that end, development within the jurisdictional authority of the city of Salinas shall be done in a manner consistent with low impact development guidance set forth in the stormwater development standards document established by the city of Salinas.

(Ord. No. 2473 (NCS), § 1.)
Division 1. Discharge Prohibitions.

Sec. 29-9. General discharge prohibition—Illegal discharges.
Sec. 29-10. Discharges exempt from the general prohibition.
Sec. 29-11. Discharge in violation of permit.
Sec. 29-12. Requirement to eliminate illegal discharges.

Sec. 29-9. General discharge prohibition—Illegal discharges.

Non-stormwater discharges to the city storm drain system are prohibited, except as specifically allowed in Section 29-10. No person shall contribute or cause to be contributed, directly or indirectly, to the city’s storm drainage system any pollutant, wastewater or any substance or material which will interfere with the operation or performance of the storm drainage system, violate the city’s NPDES permit or violate other applicable law or regulations.

(Ord. No. 2473 (NCS), § 1.)

Sec. 29-10. Discharges exempt from the general prohibition.

(a) The general discharge prohibition shall not apply to any discharge regulated under an NPDES permit, or, in the case of a non-point source discharge, a waiver or waste discharge order issued to the discharger and administered by the State of California under the authority of the United States Environmental Protection Agency ("USEPA"), provided that the discharger is in full compliance with all requirements of the permit, waiver or order and other applicable laws or regulations.

(b) Unless otherwise determined by the city engineer, discharges from the following activities shall not be considered a source of pollutants to waters of the United States when properly managed to ensure that no potential pollutants are present, and therefore they shall not be considered illegal discharges unless determined to cause a violation of the provisions of the Porter-Cologne Act, Clean Water Act, or this chapter:

1. Diverted stream flows;
2. Rising ground waters;
3. Uncontaminated ground water infiltration [as defined by 40 CFR Section 35.2005(20)];
4. Uncontaminated pumped ground water;
5. Foundation drains;
6. Springs;
(7) Water from crawl space pumps;
(8) Footing drains;
(9) Air conditioning condensation;
(10) Flows from riparian habitats and wetlands;
(11) Water line flushing;
(12) Lawn and landscape irrigation from potable water sources;
(13) Discharges from potable water sources;
(14) Irrigation water;
(15) Individual residential car washing; and
(16) Dechlorinated or debrominated swimming pool/spa water.

(c) Discharges or flows from firefighting activities are excluded from the non-stormwater discharge prohibition and need only be addressed where identified as significant sources of pollutants to water of the United States.

(Ord. No. 2473 (NCS), § 1.)

Sec. 29-11. Discharge in violation of permit.

Any discharge not managed in accordance with the city's stormwater management program as referenced in the city's NPDES permit or any amendment, revision or reissuance thereof, either separately considered or when combined with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the person(s) causing or responsible for the discharge, and such person(s) shall defend, indemnify, and hold the city harmless against any litigation, administrative proceeding, claim, expense, liability, fine, penalty or payment for injury or damage to any person or property resulting from such discharges.

(Ord. No. 2473 (NCS), § 1.)

Sec. 29-12. Requirement to eliminate illegal discharges.

(a) An authorized enforcement officer may require by written notice that a person responsible for an illegal discharge immediately, or by a specified date, discontinue the discharge and, if necessary, take measures to eliminate the source of the discharge to prevent the occurrence of future illegal discharges.
(b) Unauthorized nonstormwater discharges include, but are not limited to, the following:

(1) Sanitary sewer overflows;
(2) Discharges of wash water resulting from the hosing off or cleaning of gas stations, vehicle repair services, or other types of automotive service facilities;
(3) Discharges resulting from the storage, cleaning, repair, or maintenance of any type of equipment, machinery, or facility including, but not limited to, motor vehicles, cement-related equipment, and portable toilet servicing;
(4) Discharges of wash water from mobile operations including, but not limited to, mobile vehicle washing, steam cleaning, power washing, and carpet cleaning;
(5) Discharges of wash water from the cleaning of impervious surfaces in municipal, industrial and commercial areas including, but not limited to, parking lots, streets, sidewalks, driveways, patios, plazas, work yards and outdoor eating or drinking areas;
(6) Discharges of runoff from material storage areas containing chemicals, fuels, grease, oil, or other hazardous materials;
(7) Discharges of pool or fountain water containing chlorine, biocides, or other chemicals and discharges of pool or fountain filter backwash water;
(8) Discharges of sediment, pet waste, vegetation clippings, or other landscape or construction-related wastes;
(9) Discharges of food-related wastes (e.g., grease, fish processing, and restaurant kitchen mat and trash bin wash water);
(10) Discharge of runoff from washing toxic materials from paved or unpaved areas; and
(11) Discharge of materials such as litter, landscape debris, construction debris, or any state or federally banned pesticides.

(Ord. No. 2473 (NCS), § 1.)

Division 2. Illicit Connections.

Sec. 29-13. Illicit connections.

Sec. 29-14. Requirement to eliminate or secure approval for illicit connections.

Sec. 29-13. Illicit connections.

It is unlawful for any person to establish, use, maintain or continue illicit discharges or illicit drainage connections to the city storm drainage system. This prohibition shall apply to connections in existence at the time of the adoption of the ordinance codified in this chapter, irrespective of whether such connection was made under a permit or other authorization or whether permissible under the law or practices applicable or prevailing at the time the connection was made.

(Ord. No. 2473 (NCS), § 1.)

Sec. 29-14. Requirement to eliminate or secure approval for illicit connections.

The authorized enforcement officer may require by written notice that a person responsible for an illicit connection to the storm drain system comply with the requirements of this article to eliminate or secure approval for the connection by a
specified date, regardless of whether or not the connection or discharges to it had been established or approved prior to the effective date of this article.

If, subsequent to eliminating a connection found to be in violation of this article, the responsible person can demonstrate that an illegal discharge will no longer occur, such person may request city approval to reconnect. The reconnection or reinstallation of the connection shall be at the responsible person’s expense.

(Ord. No. 2473 (NCS), § 1.)

Division 4. Spill Prevention and Notification.

Sec. 29-16. Spill prevention plan.

Sec. 29-17. Notification of spills.

Sec. 29-16. Spill prevention plan.

Each facility shall provide protection from spills of hazardous or prohibited materials or other substances regulated by this chapter. The methods, procedures, mechanisms and facilities established and utilized for the purpose of preventing accidental discharges or spills of materials with pollution potential shall be provided and maintained at the owner’s own cost and expense.

Facilities required to file a NOI for coverage under the California general industrial activities stormwater permit shall submit to the city a copy of the stormwater pollution prevention plan (SWPPP) prepared for the general permit. The SWPPP shall outline the user’s spill prevention and response procedure, describe the nature and location of any chemicals stored on the user’s premises and shall contain procedures for immediately notifying the city and preventing adverse impacts of any discharge of such chemicals, substances or materials.

(Ord. No. 2473 (NCS), § 1.)

Sec. 29-17. Notification of spills.

All persons in charge of a facility or responsible for emergency response for a facility have a personal responsibility to train facility personnel and maintain notification procedures to assure immediate notification is provided to the city of any suspected, confirmed or unconfirmed release of material, pollutants or waste creating a risk of discharge into the city storm drain system.
As soon as any person in charge of a facility or responsible for emergency response for a facility has knowledge of any suspected, confirmed or unconfirmed release of materials, pollutants or waste which may result in pollutants or nonstormwater discharge entering the city storm drain system, such person shall take all necessary steps to ensure the discovery, containment and clean-up of such release and notify the city of the occurrence.

In the event of a release of hazardous materials, such person shall telephone 911 to report the release immediately. In the event of a release of nonhazardous materials, see Section 29-3(q), such person shall notify the city of Salinas maintenance services department in person or by phone or facsimile no later than 5:00 p.m. of the next business day. Notifications in person and by phone shall be confirmed by written notice addressed and mailed, within three business days, to the maintenance services director, city of Salinas, 426 Work Street, Salinas CA 93901, Attention: Spill Notification.

Notification shall identify the location of the discharge, the type, concentration and volume of waste, and corrective actions taken and/or anticipated. Such notification shall not relieve the user of any expense, loss, damage or other liability which may be incurred as a result of damage to the city, fish kills, or any other damage to person or property; nor shall such notification relieve the user of any fines, civil penalties or other liabilities which may be imposed by this part or other applicable law.

A notice advising employees whom to call in the event of an accidental discharge or spill shall be posted on the user's bulletin board or other prominent place. Employers shall provide spill prevention and response training for all employees who may cause an accidental discharge or spill to occur.

(Ord. No. 2473 (NCS), § 1.)
Appendix B

IDDE Reporting Forms
- Illicit Discharge Report Form
- Outfall Inspection Report
# I illicit Discharge Reporting Form

<table>
<thead>
<tr>
<th>Location:</th>
<th>Date:</th>
<th>Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Taken By</td>
<td>Reporting Party</td>
<td>Phone Number</td>
</tr>
</tbody>
</table>

### Problem/Violation
- [ ] Oil In Storm Drain
- [ ] Oil In Gutter / Street
- [ ] Paint In Storm Drain
- [ ] Paint In Gutter/ Street
- [ ] Grease
- [ ] Insecticides/Pesticides
- [ ] Concrete Waste
- [ ] Grey Water Discharge
- [ ] Garbage /Trash, Cans ETC.
- [ ] Grass Clippings/Leaves
- [ ] Animal Waste
- [ ] Motor Home/Vehicle Discharge
- [ ] Fuel/ Diesel/ Gal:
- [ ] Sewer Spill /Gal:
- [ ] Other:

### Work Performed
- [ ] Sweep Street (By Hand)
- [ ] Vacuumed Storm Drain
- [ ] Absorbent Materials Applied
- [ ] Wash Down
- [ ] Sweeper Called or Used
- [ ] Storm Drain Cleaned (Clammed)
- [ ] Other

### Agency Contacted
- [ ] Fire/ Police Report #
- [ ] Other Agency: #

### Responsible Party Info:

### Comments:

### Employee Names:

### Equipment Used:

### Date Work Performed: _____ Hours: _____
Environmental & Maintenance Services
Wastewater Division
CITY OF SALINAS
Outfall Inspection Field Data Sheet
Dry Weather Field Screening Program

SHEET NO. ____________
SITE NO. ____________
DATE: ____________
TIME: ____________

GENERAL INFORMATION:
TIME SINCE LAST RAIN: Lichte / Greater 72 hr.
QUANTITY OF LAST RAIN: Less than 1 in. / Greater 0.1 in.

FIELD SITE DESCRIPTION:
LOCATION: ____________
CLOSED CONDUIT OPEN CHANNEL MAJOR HOLE OTHER ____________ SIZE ____________
OUTFALL TYPE MAJOR MINOR SIZE ____________ MATERIAL: CONCRETE/ METAL/ PVC/ CLAY/ OTHER: ____________

FIELD OBSERVATION:
FLOW OBSERVED: YES NO STANDING WATER: YES NO

METHOD 1:
1) WIDTH OF WATER SURFACE (FEET) ____________
2) APPROXIMATE DEPTH OF WATER (FEET) ____________
3) APPROXIMATE FLOW VELOCITY: a) ____________ FEET IN b) ____________ SECONDS
4) FLOW RATE (GAL PER MIN) = 454600 x 1/60 x ____________ = ____________ GPM

METHOD 2:
1) TIME (SEC) ____________ TO FILL CONTAINER (GAL) ____________
2) FLOW RATE (GPM) = ____________ GAL/SEC = ____________ GPM

VISUAL OBSERVATIONS: PHOTO TAKEN: NO/YES PHOTO NUMBERS ____________
COLOR: NONE/ BROWN/ SEWAGE / SULFIDE (ROTTON EGG)/ SOUR MILK/ OILY/ OTHER: ____________
COLOR: CLEAR/ RED/ YELLOW/ BROWN/ GREEN/ GREY/ OTHER: ____________
TURBIDITY: CLEAR/ CLOUDY/ OPAQUE/ SUSPEND SEDIMENT/ OTHER: ____________
FLOATABLES: NONE/ OILY/ SEWAGE/ GARBAGE/ SEWAGE OTHER: ____________
DEPOSITS/ STAINS: NONE/ SEWAGE/ OILY/ GARBAGE/ OTHER: ____________
VEGETATION CONDITION: NONE/ NORMAL/ EXCESSIVE GROWTH/ INHIBITED GROWTH/ OTHER: ____________
STRUCTURAL CONDITION: NORMAL/ CONCRETE/ LACKING, SPALLING/ METAL/ CORROSION/ OTHER: ____________
BILOGICAL: NONE/ MOSQUITO/ LARVA/ ALGAE/ OTHER: ____________

DATA SHEET FILLED OUT BY (SIGNATURE): ____________
Appendix C

IDDE Investigation Tracing Discharges to as Source
- Smoke Testing, Dye Testing, Video Testing (CWP)
- Water Quality Sampling Parameters
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

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**Table 56: Techniques to Locate the Discharge**

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

**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)**
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

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

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

<table>
<thead>
<tr>
<th>Equipment for Actual Dye Testing and Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 2-way radio</td>
</tr>
<tr>
<td>- Dye (liquid or &quot;test strips&quot;)</td>
</tr>
<tr>
<td>- High powered lamps or flashlights</td>
</tr>
<tr>
<td>- Water hoses</td>
</tr>
<tr>
<td>- Camera</td>
</tr>
</tbody>
</table>
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)
Chapter 73: Tracking Discharges To A Source

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>
<thead>
<tr>
<th>Table 58: Dye Testing Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
</tr>
<tr>
<td>Dye Tablets</td>
</tr>
<tr>
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<tr>
<td>Liquid Concentrate</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Dye Strips</td>
</tr>
<tr>
<td>Powder</td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Dye Wax Cakes</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Dye Wax Donuts</td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Chapter 13: Tracking Discharges To A Source

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).

**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

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**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 too 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 managers 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 D2.

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 D3 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 tap water. 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.
Appendix D: Analytical Procedures for Outfall Monitoring

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 1  WATER QUALITY TEST PARAMETERS AND USES

<table>
<thead>
<tr>
<th>Water Quality Test</th>
<th>Use of Water Quality Test</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductivity</td>
<td>Used as an indicator of dissolved solids</td>
<td>Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter  Typical measured in the field with a probe</td>
</tr>
<tr>
<td>Ammonia</td>
<td>High levels can be an indicator of the presence of sanitary wastewater</td>
<td>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)</td>
</tr>
<tr>
<td>Surfactants</td>
<td>Indicate the presence of detergent (e.g., laundry, car washing)</td>
<td>Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter  Boston, MA uses a field test kit (see case example)</td>
</tr>
<tr>
<td>pH</td>
<td>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)</td>
<td>Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter  Typically measured in the field or lab with a probe</td>
</tr>
<tr>
<td>Temperature</td>
<td>Sanitary wastewater and industrial cooling water can substantially influence outfall discharge temperatures. This measurement is most useful during cold weather.</td>
<td>Pitt et al. 1993 suggested parameter  Measured in the field with a thermometer or probe</td>
</tr>
<tr>
<td>Hardness</td>
<td>Used to distinguish between natural and treated waters</td>
<td>Pitt et al. 1993 suggested parameter</td>
</tr>
<tr>
<td>Total Chlorine</td>
<td>Used to indicate inflow from potable water sources; not a good indicator of sanitary wastewater because chlorine will not exist in a &quot;free&quot; state in water for long (it will combine with organic compounds)</td>
<td>Pitt et al. 1993 suggested parameter</td>
</tr>
<tr>
<td>Fluoride</td>
<td>Used to indicate potable water sources in areas where water supplies are fluorided</td>
<td>Pitt et al. 1993 suggested parameter</td>
</tr>
<tr>
<td>Potassium</td>
<td>High levels may indicate the presence of sanitary wastewater</td>
<td>Pitt et al. 1993 suggested parameter</td>
</tr>
<tr>
<td>Optical Brighteners (Fluorescence)</td>
<td>Used to indicate presence of laundry detergents (which often contain fabric whiteners, which cause substantial fluorescence)</td>
<td>Pitt et al. 1993 suggested parameter  Used by City of Winooski, VT (see case example)</td>
</tr>
<tr>
<td>Bacteria (fecal coliform, <em>E. coli</em>, and/or <em>enterococci</em>)</td>
<td>Used to indicate the presence of sanitary wastewater</td>
<td>Used by NHDES (see case example in chapter 5)</td>
</tr>
</tbody>
</table>
**Appendix E**

**Emergency Contact Information**

**EMERGENCY COORDINATOR AND EMERGENCY CONTACTS**

<table>
<thead>
<tr>
<th>Name</th>
<th>Business Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superintendent of Environmental &amp; Maintenance Services - Emergency Coordinator*</td>
<td>831-758-7233</td>
</tr>
<tr>
<td>Emergency Center (Monterey County)</td>
<td>911</td>
</tr>
<tr>
<td>Monterey County Health Department - Environmental Health</td>
<td>831-755-4880</td>
</tr>
<tr>
<td>Salinas Fire Department</td>
<td>831-758-7261</td>
</tr>
<tr>
<td>Chemtrec (Highway Incidents Only)</td>
<td>800-424-9300</td>
</tr>
<tr>
<td>Poison Control Center</td>
<td>800-662-9886</td>
</tr>
<tr>
<td>Hospital - Salinas Valley Memorial Hospital</td>
<td>831-757-4333</td>
</tr>
<tr>
<td>Business Physician - Pinnacle Healthcare, 2 Rossi Cir. Salinas, Ca.</td>
<td>(831) 770-0444</td>
</tr>
<tr>
<td>Ambulance</td>
<td>911</td>
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<tr>
<td>Also call:</td>
<td></td>
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<tr>
<td>California Highway Patrol (For Highway Related Incidents)</td>
<td>911</td>
</tr>
<tr>
<td>Sheriff (County Roads)</td>
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<tr>
<td>Salinas Police Department (City Streets)</td>
<td></td>
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<tr>
<td>For Pesticide Related Incidents, also call:</td>
<td></td>
</tr>
<tr>
<td>County Agricultural Commissioner</td>
<td>831-759-7325</td>
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</tbody>
</table>