

# SANITARY SEWER OVERFLOW RESPONSE PLAN



**City of Lodi**  
**Municipal Utility Services**  
**Division**

**2014**



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**SSORP REVISIONS**

Rev#:	Revision Date:	By:	Notes:
1	01/07/11	KMG	
2	01/31/14	KMG	MMP Update

**PLAN HOLDERS LIST**

Public Works Director  
 Deputy Public Works Director – Utilities  
 Compliance Engineer  
 Utility Superintendent  
 Water/Wastewater Supervisors  
 Water/Wastewater Maintenance Workers

City Hall  
 Municipal Service Center  
 Municipal Service Center  
 Municipal Service Center  
 Municipal Service Center  
 Municipal Service Center

## **INTRODUCTION**

The City of Lodi's Public Works Department's Municipal Utility Services Division is Responsible for the operation and maintenance of the city's Wastewater collection system, Storm drain Collection system, Wastewater and storm drain Manholes, and two wastewater transmission lines. The purpose of this system is to collect and convey the city's wastewater to its White slough Water pollution control facility for treatment. These facilities are well maintained and normally should not result in any sewage spills or overflows. However, the possibility exists that unforeseen accidents, unusual equipment failure or other events not controllable by the city could result in a sewage spill/overflow. This procedure provides a plan that when enacted in response to a sewer spill/overflow would reduce or eliminate public health hazards, spillage of raw sewage onto public or private property, unnecessary property damage, contamination of the environment, and the inconvenience of service interruptions.

This Sanitary Sewer Overflow Response Plan (SSORP) is designed to assist and train employees to comply with the responsibilities of the plan and to ensure that all citizens and employees health and safety are protected. It is also designed to ensure that all the appropriate entities are informed of all sewage spills.

## **DEFINITIONS**

**Blockage** – Something that partially or fully blocks the wastewater from flowing through a sewer pipeline. The blockage can be caused by debris in the sewer, grease buildup, root intrusion, or a partial or full collapse of the pipeline. If not caught in time, the blockage may cause an overflow. This is also called a stoppage.

**Category 1 SSO** – All discharges of sewage of **ANY VOLUME** resulting from a failure in the Enrollee's sanitary sewer system or flow condition that reach surface water and/or a drainage channel tributary to a surface water; or reach a storm drainpipe that was not fully captured and returned to the sanitary sewer system.

**Category 2 SSO** – All discharges of sewage resulting from a failure in the Enrollee's sanitary sewer system or flow condition that **equals or exceeds 1000 gallons** that does not reach surface water and/or a drainage channel and/or a storm drainpipe that is fully captured and returned to the sanitary sewer system.

**Category 3 SSO** – All other discharges of sewage, not included in Category 1 or 2, resulting from a failure in the Enrollee's sanitary sewer system or flow condition.

**GPM** – Gallons per Minute

**OES** – Office of Emergency Services

**Private Lateral Sewage Discharges** – Sewage discharges that are caused by blockages or other problems within a privately owned lateral or from other private sewer assets.

**RWQCB** –Regional Water Quality Control Board

## **REPORTING REQUIREMENTS**

**Category 1 SSO** – All SSOs that meet the above criteria for Category 1 SSOs must be reported as soon as:

- the Enrollee has knowledge of the discharge,
- reporting is possible, and
- reporting can be provided without substantially impeding cleanup or other emergency measures.

Initial reporting of Category 1 SSOs must be reported to the Online SSO System as soon as possible but no later than 3 business days after the Enrollee is made aware of the SSO. A final certified report must be completed through the Online SSO System within 15 calendar days of the conclusion of SSO response and remediation.

*Also, Category 1 SSOs greater than or equal to 1,000 gallons must also be reported to the State Office of Emergency Services (OES) within 2 hours of becoming aware of the SSO. All Category 1 spills shall be reported verbally to State of California Office of Emergency Services at: 800-852-7550.*

*Also, Category 1 SSOs great than or equal to 50,000 gallons that reach surface waters must have a technical report submitted within 45 calendar days after then end date of the SSO.*

**Category 2 SSO** – All SSOs that meet the above criteria for Category 2 SSOs must be reported to the Online SSO Database within 15 calendar days of the conclusion of SSO response and remediation.

**Category 3 SSO** – All SSOs that meet the above criteria for Category 3 SSOs must be reported to the Online SSO Database within 30 days after the end of the calendar month in which the SSO occurs

All hazardous materials - contact the Lodi Fire Department **Immediately** at: **209-369-3531**

**Private Lateral SSO** – All sewage discharges that meet the above criteria for Private Lateral sewage discharges may be reported to the Online SSO Database based upon the Enrollee's discretion.

## **RESPONDING STAFF RESPONSIBILITIES**

The first crew responding to a sewer backup has the immediate responsibility to protect people, property, and the environment from effects of a sewage spill/overflow. To meet these objectives in a rapid, effective and organized manner, staff will respond and fulfill the duties in the following categories as directed by this plan:

### **#1 CONTAIN** spilling sewage from entering waterways

- Capture the sewage where it can be recovered and returned to the sewer system.
- Contain sewage in advantageous locations (i.e. flood control facilities, construction excavations locations, vacant lots etc.)
- Containment materials include sand, sand bags, poly sheeting, socks, etc.

### **#2 CONTROL** the spill overflow and bypass area of failure

- Bypass the obstructed line by pumping the spillage into another non-restricted line or vacuum with VacCon truck
- Set up barricades to prevent public contact with spill

### **#3 CLEANUP** the affected areas to ensure public health and safety

- Remove all visible debris
- Wash down and contain run-off being careful not to wash sewage into storm drain system
- Determine whether to disinfect or not to disinfect?
  - Consider requirements of other agencies
  - Consider beneficial use of receiving waters
  - Consider the uses and ownership of affected properties
- Clean all hard/soft surfaces

## **SPILL DEFINITIONS**

### ***Minor spill***

A minor spill is a sewage spill that is contained and can be effectively and satisfactorily cleaned up by city personnel, and does not require regulatory notification.

A minor *inside* spill is one that:

1. Is confined to the affected drain area and does not enter other rooms.
2. Does not contaminate carpet, furniture or other homeowner belongings that require specialized cleaning and disinfection.
3. Does not pose a threat to public health.

A minor *outside* spill is one that:

1. Is less than 50 gallons: or
2. Is between 50 and 1000 gallons and does not occur within 50 feet of human habitation, does not contaminate public waters, does not pose a threat to public health and/or the environment, and can be cleaned up by city personnel.

### ***Major Spill***

A major spill is a sewage spill that contaminates the homeowner's property inside the home, can not be effectively and satisfactorily cleaned up by city personnel, and requires regulatory notification.

A major *inside* spill is one that:

1. Spreads beyond the immediate drain area and into other living areas.
2. Contaminates wall-to-wall carpets, furniture or other homeowner's belongings that require specialized cleaning or disinfection.
3. Poses a threat to public health.

A major *outside* spill is one that:

1. Is greater than 1000 gallons.
2. Is more than 50 gallons but occurs within 50 feet of human habitation, contaminates public water and/or poses a threat to public health and/or the environment.

## **SAFETY**

Whenever City personnel respond to a report of an overflow/spill, they may encounter an emergency situation that requires immediate action. The most critical aspect of resolving an incident of this nature is to **safely and competently** perform the actions necessary to return the damaged equipment or facility to operation as soon as possible.

The most important item to remember during this type of incident is that safe operations, both to the employee and the public, always take precedence over expediency or short cuts.

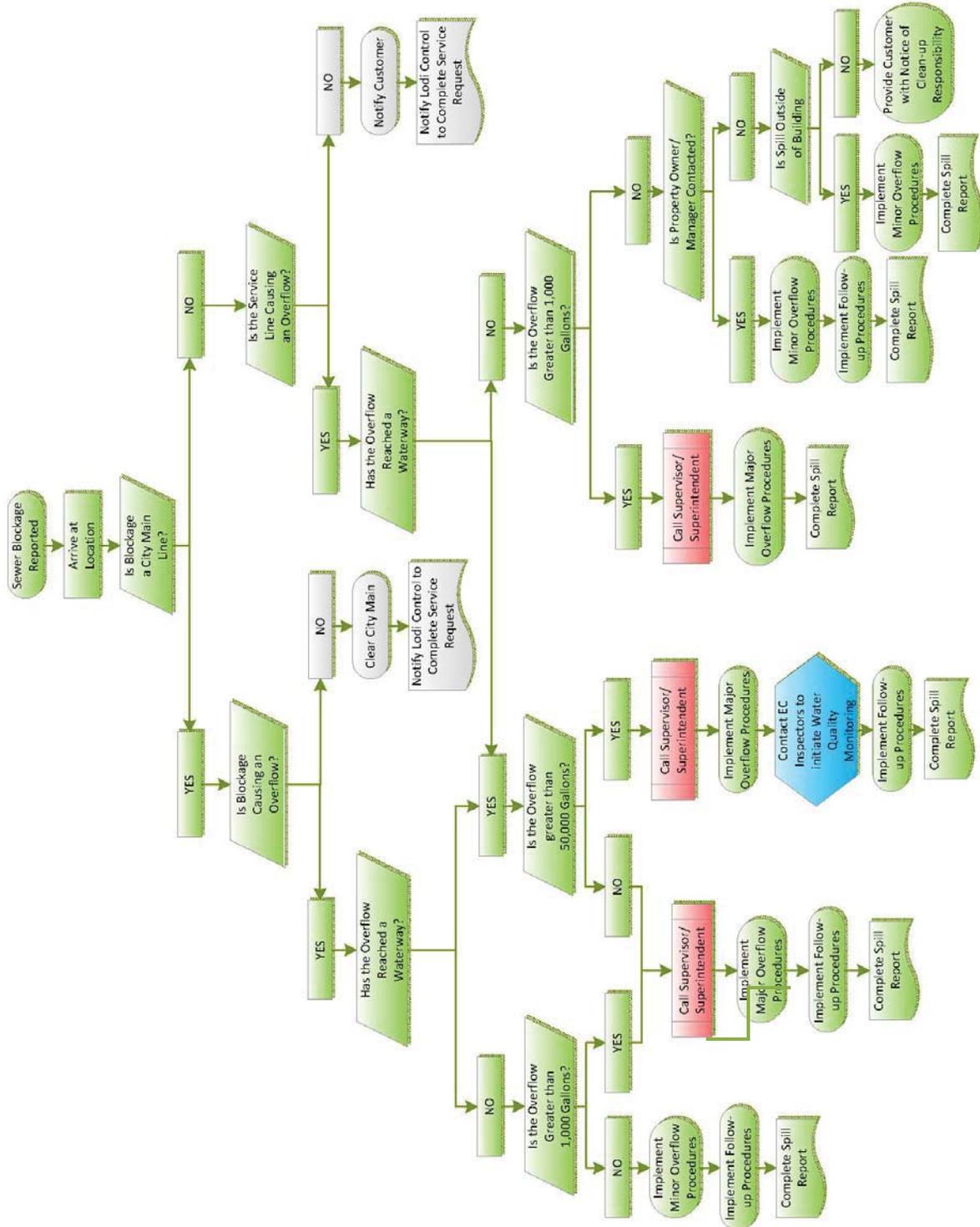
Depending on the nature or cause of the overflow/spill, personnel may be performing mechanical or electrical repairs at a pump station, removing a mainline blockage with the vactor truck or repairing a damaged section of pipeline. At this point, it is essential that all applicable safety procedures are followed so that the response does not cause the situation to escalate.

Typical responses may require personnel to implement the following types of safety procedures:

- Lockout/tagout of equipment for repairs
- Confined space entry procedures
- Traffic control procedures at site
- Equipment and/or vehicle operation
- Use of personnel protective equipment

Another important aspect of responding to an overflow/spill is the ability to maintain adequate communication via two-way radio and/or cellular telephone. Responders may need to call for additional resources as the situation may warrant as well as to notify other personnel and supervisors of the situation.

**SSO DECISION FLOW CHART**



**SPILL RESPONSE PLAN*****(Public Right of Way)***

1. Upon Arrival assess the severity of the spill and determine the manpower and equipment needed. Contain spillage immediately if possible.
2. Locate and clear stoppage and restore unobstructed flow.
3. Prevent contact between public and spill, utilize barricades, cones, and for dangerous traffic areas contact police for assistance in traffic control.
4. Once the blockage has been relieved or problem corrected and the overflow has ceased, every effort shall be made to contain the sewage that has spilled
5. If there is flooding or property damage, notify supervisor immediately.
6. Take photographs or video of the affected area, before and after clean-up, for city records.
7. Solids and debris and/or blockage material should be raked up, bagged and disposed of at the White Slough Water Pollution Control Facility and any excess liquid may be returned to an unobstructed sewer main. Wash down and sanitize affected areas.
8. Do not volunteer or disown City liability. Instead, neutral comments should be used by City personnel indicating that the liability issue cannot be addressed until all of the relevant information has been evaluated.
9. After clean up is complete remove barricades to restore public access after area is safe.
10. Contact Lodi Control to complete service request.
11. The responding employee shall complete the Sanitary Sewer Overflow Field Data Sheet and turn it in to the Water/Wastewater Supervisor.

***(Private Property)***

1. Upon Arrival assess the severity of the spill and determine the manpower and equipment needed. Contain spillage immediately if possible. If it is determined that it is a customer problem and not a city main line blockage, notify the customer to clear their service line and clean up the spill. Try to contain the spill to the property, if you can not contain the spill call for assistance.
2. If it is a city problem, Locate and clear stoppage and restore unobstructed flow.
3. Prevent contact between public and spill, utilize barricades, cones, and for dangerous traffic areas contact police for assistance in traffic control.
4. Once the blockage has been relieved or problem corrected and the overflow has ceased, every effort shall be made to contain the sewage that has spilled to public property.
5. Obtain customer/property owner information, including Name, Address Phone Number, and the date and time they were notified and record on Agency Notification sheet. Provide customer with a "Customer Information Sheet".
6. If there is flooding or property damage, notify supervisor immediately.
7. Take photographs or video of the affected area, before and after clean-up, for city records.
8. Solids and debris and/or blockage material on public property should be raked up, bagged and disposed of at the White Slough Water Pollution Control Facility and any excess liquid may be returned to an unobstructed sewer main. Wash down and sanitize affected areas.
9. Do not volunteer or disown City liability. Instead, neutral comments should be used by City personnel indicating that the liability issue cannot be addressed until all of the relevant information has been evaluated.
10. After clean up is complete remove barricades to restore public access after area is safe.
11. Supply the customer with the customer information sheet.
12. For major spills caused by the city, additional assistance may be required, including hotel/motel accommodations. Details and arrangements for Major spills shall be the responsibility of the Water/Wastewater Supervisor.
13. Contact Lodi control to complete service request.
14. The responding employee shall complete the Sanitary Sewer Overflow Field Data Sheet and turn it in to the Water/Wastewater Supervisor.

## **SPILL PROCEDURES**

### ***Major Spill – Public***

1. Call Supervisor/ Superintendent
2. Assess spill location and prioritize and implement containment strategy
3. Clear stoppage & restore flow
4. Contain spill with earth berms, plugs for downstream storm drain pipe, and plastic sheets for drop inlets
5. Prevent contact between public and spill utilizing barricades, cones and traffic control (contact Police for dangerous traffic areas)
6. Investigate overflow inside structures and take photographs before and after clean-up for City records
7. Return spill to collection system with Vac-Con truck, pumps & hoses, or water truck
8. Remove all signs of gross pollution
9. Flush with water and disinfect area if needed
10. Notify Lodi Control to complete service request
11. Implement Follow-up procedures

### ***Minor Spill – Public***

1. Assess spill location and prioritize and implement containment strategy
2. Clear stoppage & restore flow
3. Contain spill and return to system
4. Prevent contact between public and spill
5. Investigate overflow inside structures and take photographs before and after clean-up for City records
6. Remove all signs of gross pollution
7. Flush with water and disinfect area if needed
8. Notify Lodi Control to complete service request
9. Implement Follow-up Procedures

### ***Major Spill – Private***

1. Request Assistance
2. Call Supervisor/ Superintendent
3. Clear blockage and clean up spill outside building
4. Take photographs or video of the affected area, before and after clean-up, for city records.
5. Fill-out report for billing the customer
6. Provide customer with Notice of Clean-up Responsibility for any spills inside building
7. Notify Lodi Control to complete service request

***Minor Spill - Private***

1. Notify Customer of customer's responsibility to clear blockage and clean-up
2. Stay at location to verify customer takes care of blockage and clean-up
3. Notify Lodi Control to complete service request
4. Check back at location during working hours to verify spill has stopped

***Follow-up Procedures***

1. Investigate cause of spill
2. Do CCTV Inspection
3. Add to Cleaning Schedule (if needed)
4. Repair or replace any broken line segments

**INCIDENT STAFF RESPONSIBILITIES**

The Utility Superintendent and the Water/Wastewater Supervisor are responsible to ensure that all Operations and Maintenance personnel are trained in and follow these procedures.

The responding Employee is responsible for filling out the Sanitary Sewer Overflow Field Data sheet. The Wastewater Supervisor is responsible for filling out the Overflow report and signs off that it is complete and accurate.

The Utility Superintendent or the Water/Wastewater Supervisor is responsible for notifying regulatory agencies within the required time frames outlined on Page 2.

## **TRAINING PLAN**

Training is the key to the success of this plan. Employees will participate in an orientation exercise every six months and one tabletop or functional full-scale exercise shall be conducted annually.

**ORIENTATION EXERCISE** – This exercise will consist of a lecture with handouts and overheads covering all aspects of the sewage spill response plan. Each employee will learn individual duties and responsibilities and learn how to effectively use this plan and work together as a team.

**TABLETOP EXERCISE** – In this exercise, equipment or deployment of resources will not be used. All activities will be simulated. Employees will learn through discussion and the use of a facilitator. The exercise will focus on the events leading to a potentially large spill and how to mitigate the effects.

**FUNCTIONAL FULL SCALE EXERCISE** – This exercise will simulate a large scale spill where employees will respond to a mock spill. Equipment will be deployed including sewer trucks, pumps, and containment equipment. Backup resources will be controlled and included in this exercise. A confined space entry exercise *will not be conducted and a manhole entry will not be done*. Following any of the above mentioned plans a critique will be conducted in order to refine or improve this plan.

**SANITARY SEWER OVERFLOW (SSO) FIELD DATA SHEET**

Initials: _____	Date: _____	State #: _____
Pipe #: _____	C.G. #: _____	

**SPILL DATA SHEET**

*(Check all that apply)*

SEE PAGE 2 FOR ADDITIONAL INFORMATION

Date: \_\_\_\_\_ # Photos Taken:  Before Cleanup \_\_\_\_\_  After Cleanup \_\_\_\_\_  Video

Spill Category:  SSO Category 1  SSO Category 2  SSO Category 3  Private  
 Reached Surface Water  1,000 Gallons or Greater

Location (MH#, Nearest Address): \_\_\_\_\_ Cross Street: \_\_\_\_\_

Weather:  Clear  Overcast/Cloudy  Rain (light/heavy)  Fog  Hot  Cold  Mild

Time O/F Reported: \_\_\_\_\_ am/pm Time O/F Started: \_\_\_\_\_ am/pm

Crew Arrival Time: \_\_\_\_\_ am/pm Time O/F Stopped: \_\_\_\_\_ am/pm

Crew Departure Time: \_\_\_\_\_ am/pm Total Time of O/F: \_\_\_\_\_

Est. Spill Rate: \_\_\_\_\_ gpm Est. Spill Volume: \_\_\_\_\_ Gallons Est. Spill Volume Recovered: \_\_\_\_\_ Gallons

Area: Width \_\_\_\_\_ Length \_\_\_\_\_ Depth \_\_\_\_\_

Gutter Flow: Width \_\_\_\_\_ Length \_\_\_\_\_ Depth \_\_\_\_\_

Est. Pick Hole Spout Height: \_\_\_\_\_  Cover in Place  Cover Displaced  Cover Removed

Spill appearance point:  Manhole  Main  Force Main  Gravity Sewer  Pump Station  
 Clean-out  Other SS Structure  Building/Structure  Other \_\_\_\_\_

Overflow to:  Street/Curb & Gutter  Other Paved Surface  Storm Drain Inlet  Alley  
 Unpaved Surface  Surface Water  Drainage Channel  Building/Structure

Cause of Overflow:  Debris  Root Intrusion  Storm Event  Flow Exceeded Capacity  Vandalism  
 FOG  Pump Station Failure  Pipe/Structure Failure  Other (specify) \_\_\_\_\_

Location of Failure:  Main  Upper Lateral  Lower Lateral  Other (specify) \_\_\_\_\_

Response Activities:  Cleaned-up/Mitigated effects  Returned O/F Volume to SS System  Restored Flow  
 Contained All/Portion  CCTV Inspected SS to Determine Cause  Other (specify) \_\_\_\_\_

Clean-up Methods Used:  High Pressure Water  Rodding  Vacuum up Spill Fluid  Other (specify) \_\_\_\_\_

Corrective Action:  Repair Failure  Add to Cleaning Schedule  Add to CCTV Schedule  Notify Owner  
 Monitor  Distributed FOG Flyers  Other (specify) \_\_\_\_\_

Calculations:

Report Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

Supervisor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name & Title: \_\_\_\_\_

Utilities Superintendent: \_\_\_\_\_ Date: \_\_\_\_\_ Compliance Engineer: \_\_\_\_\_ Date: \_\_\_\_\_

Spill Data Sheet  
(Continued)

For any discharges of sewage that results in a **discharge of ANY VOLUME into a surface water**, (IN LODI THIS ONLY MEANS: LODI LAKE, MOKELUMNE RIVER OR THE WID CANAL) **or a drainage channel** the Discharger shall **IMMEDIATELY**, but **no later than two (2) hours** after becoming aware of the discharge, **notify** the State Office of Emergency Services (OES).

Surface Waters Reached:  Mokelumne River  Lodi Lake  WID Canal  None

Spill Volume to Surface Water: \_\_\_\_\_ Gallons  Greater than 1,000 Gallons  Greater than 50,000 Gallons

Signs Posted:  Yes  No Notified Public:  Yes  No Barricaded:  Yes  No

May affect Fish/Wildlife:  Yes  No Flyers Distributed:  Yes  No

**WATER QUALITY MONITORING (SSOs greater than 50,000 Gallons):**

Samples Taken:  Yes  No Sampling time: \_\_\_\_\_ am/pm Sampling Date: \_\_\_\_\_

**CONTACTS MADE:**

Office of Emergency Services (SSOs greater than 1,000 Gallons that reach surface water): **(800) 852-7550** Hours: 24/7

Contact Name: \_\_\_\_\_ Time: \_\_\_\_\_ Control #: \_\_\_\_\_

Private Overflow:

Contact Name: \_\_\_\_\_ Time: \_\_\_\_\_  Information Packet Distributed

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**EQUIPMENT USED:**

**NAMES OF ALL CREWS AT SSO SCENE:**

- Sand Bags  Plastic Sheeting  Hydrant # \_\_\_\_\_
- Shovels  Brooms  Drain Mats (sticky)
- Air Tank  Compressor  Generator
- Snake  CCTV Van  Mini Camera
- Plugs (Sizes) \_\_\_\_\_  Plugs (Sizes) \_\_\_\_\_
- Vac-con # \_\_\_\_\_  Vac-con # \_\_\_\_\_
- Truck # \_\_\_\_\_  Truck # \_\_\_\_\_
- Other (Specify) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_

**REPORTING:**

- Category 1: Draft Report within **3** business days and certify within **15** calendar days of SSO end date;  
Technical Report (SSO greater than 50,000 Gallons) within **45** calendar days of SSO end date.
- Category 2: Draft Report within **3** business days and certify within **15** calendar days of SSO end date
- Category 3: Draft Report within 30 calendar days of end of month that SSO occurred

### **CUSTOMER INFORMATION SHEET**

The following list of contacts are for clean up and water damage, they were chosen at random out of the yellow pages, for more details look in the yellow pages under carpets.

The companies listed below are all 24 hour services. The city of Lodi will not recommend or endorse any one company.

Servpro – Lodi  
209-368-6119

Primo Clean – Near Lodi  
209-477-7242

Spectrum Restoration Service – Lodi  
209-367-1886

Kleen-Pro – Lodi  
209-366-1081

Dennis' Clean-n-bright - Lodi  
209-334-0581

Marlin's Cleaning Service – Lodi  
209-367-7949

If you feel you have a claim against the city, contact the city clerk's office at City Hall and obtain all the necessary forms to be filled out. Further instructions will be given to you at that time.

City of Lodi contact numbers:

Utility Superintendent – 209-333-6740

Risk Manager – 209-333-6704

City Attorney – 209-333-6701

City Manager – 209-333-6700

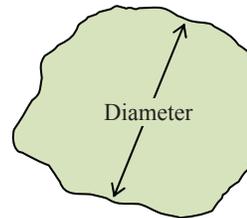
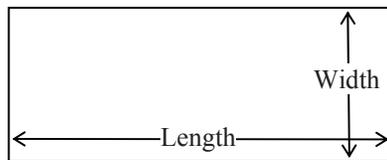
***Note: Wastewater can be hazardous to human health and should be handled with caution and by professionally trained personnel***

## **FLOW CALCULATIONS**

### ***Contained Area***

Estimate the volume of an overflow based on area calculations. Use the following steps to calculate volume:

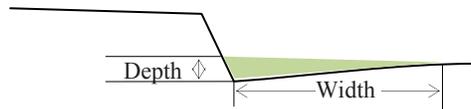
1. Sketch the shape of the spill
2. Measure the dimension of the spill
3. Measure the average depth of the spill
4. Convert all measurements to feet
5. Calculate the volume using the following formulas:
6. Rectangular (gallons) = length x width x depth x 7.48
7. Circular (gallons) =  $0.785 * (\text{diameter})^2 * \text{depth}$



### ***Contained in Street Gutter***

Estimate the volume of an overflow contained along a street gutter. Use the following steps to calculate volume:

1. Measure the length and width of the spill
2. Measure the average depth of the spill
3. Convert all measurements to feet
4. Calculate the volume using the following formula:
5. Volume (gallons) = length x width x depth x 3.74



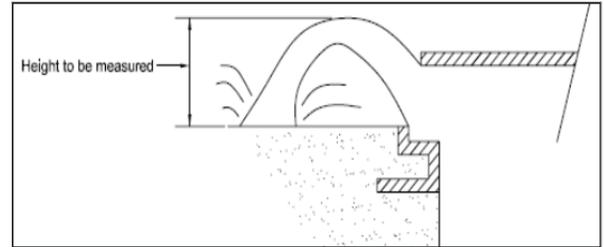
### ***Un-contained Flow***

The overflow volume can be estimated with the following formula:

$$\text{Volume (gallons)} = \text{Flow Rate (gpm)} \times \text{duration (minutes)}$$

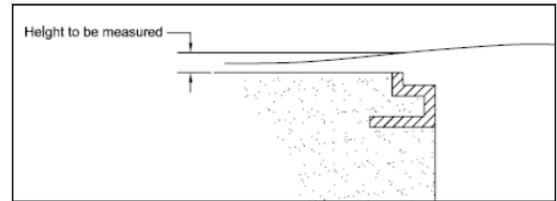
**Manhole with Cover in Place**

Height of spout above M/H Rim "H" in height	24" MH Cover in Place		36" MH Cover in Place	
	SSO flow "Q" in gpm	Min. Sewer size in which these flows are possible	SSO flow "Q" in gpm	Min. Sewer size in which these flows are possible
1/4	1		1	
1/2	3		4	
3/4	6		8	
1	9		13	
1 1/4	12		18	
1 1/2	16		24	
1 3/4	21		31	
2	25		37	
2 1/4	31		45	
2 1/2	38		55	
2 3/4	45		66	
3	54		78	
3 1/4	64		93	
3 1/2	75		109	
3 3/4	87		127	
4	100		147	
4 1/4	115		169	
4 1/2	131		192	
4 3/4	148		217	6"
5	166		243	
5 1/4	185		270	
5 1/2	204		299	
5 3/4	224	6"	327	
6	244		357	
6 1/4	265		387	8"
6 1/2	286		419	
6 3/4	308		451	
7	331		483	
7 1/4	354		547	
7 1/2	377		551	
7 3/4	401	8"	587	10"
8	426		622	
8 1/4	451		659	
8 1/2	476		697	
8 3/4	502		734	
9	529		773	



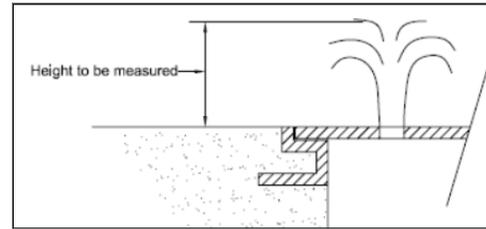
**Manhole with Cover Removed**

Height of spout above M/H Frame "H" in height	24" MH Cover Removed		36" MH Cover Removed	
	SSO flow "Q" in gpm	Min. Sewer size in which these flows are possible	SSO flow "Q" in gpm	Min. Sewer size in which these flows are possible
1/8	28		49	
1/4	62		111	
3/8	111		187	6"
1/2	160		271	
5/8	215	6"	361	8"
3/4	354	8"	458	
7/8	569	10"	556	10"
1	799	12"	660	12"
1 1/8	1,035		1,035	
1 1/4	1,340	15"	1,486	15"
1 3/8	1,660		1,951	
1 1/2	1,986		2,424	18"
1 5/8	2,396		2,903	
1 3/4	5,799		3,382	
1 7/8	3,132		3,917	24"
2	3,444	21"	4,458	
2 1/8	3,750		5,000	
2 1/4	3,986		5,556	
2 3/8	4,215		6,118	
2 1/2	4,437		6,764	
2 5/8	4,569	24"	7,403	
2 3/4	4,687		7,972	30"
2 7/8	4,799		8,521	
3	4,910		9,062	
3 1/8			9,604	
3 1/4			10,139	
3 3/8			10,625	36"
3 1/2			11,097	
3 5/8			11,569	
3 3/4			12,035	
3 7/8			12,486	
4			12,861	
4 1/8			13,076	
4 1/4			13,285	
4 3/8			13,486	



**Manhole pick-hole with Cover in Place**

Height of spout above M/H Cover "H"	SSO flow "Q" in gpm	Height of spout above M/H Cover "H"	SSO flow "Q" in gpm
1/8	1.0	5 1/8	6.2
1/4	1.4	5 1/4	6.3
3/8	1.7	5 3/8	6.3
1/2	1.9	5 1/2	6.4
5/8	2.2	5 5/8	6.5
3/4	2.4	5 3/4	6.6
7/8	2.6	5 7/8	6.6
1	2.7	6	6.7
1 1/8	2.9	6 1/8	6.8
1 1/4	3.1	6 1/4	6.8
1 3/8	3.2	6 3/8	6.9
1 1/2	3.4	6 1/2	7.0
1 5/8	3.5	6 5/8	7.0
1 3/4	3.6	6 3/4	7.1
1 7/8	3.7	6 7/8	7.2
2	3.9	7	7.2
2 1/8	4.0	7 1/8	7.3
2 1/4	4.1	7 1/4	7.4
2 3/8	4.2	7 3/8	7.4
2 1/2	4.3	7 1/2	7.5
2 5/8	4.4	7 5/8	7.6
2 3/4	4.5	7 3/4	7.6
2 7/8	4.6	7 7/8	7.7
3	4.7	8	7.7
3 1/8	4.8	8 1/8	7.8
3 1/4	4.9	8 1/4	7.9
3 3/8	5.0	8 3/8	7.9
3 1/2	5.1	8 1/2	8.0
3 5/8	5.2	8 5/8	8.0
3 3/4	5.3	8 3/4	8.1
3 7/8	5.4	8 7/8	8.1
4	5.5	9	8.2
4 1/8	5.6	9 1/8	8.3
4 1/4	5.6	9 1/4	8.3
4 3/8	5.7	9 3/8	8.4
4 1/2	5.8	9 1/2	8.4
4 5/8	5.9	9 5/8	8.5
4 3/4	6.0	9 3/4	8.5
4 7/8	6.0	9 7/8	8.6
5	6.1	10	8.7



← Unrestricted M/H cover will start to lift

Note: this chart is based on a 7.8 inch diameter pick hole.

**Flow Estimation Pictures**

**City of San Diego  
Metropolitan Wastewater Department**

**Wastewater Collection Division  
(619) 654-4160**

**Reference Sheet for Estimating Sewer Spills  
from Overflowing Sewer Manholes**  
*All estimates are calculated in gallons per minute (gpm)*

5 gpm

25 gpm

50 gpm

100 gpm

150 gpm

200 gpm

225 gpm

250 gpm

275 gpm

rev. 4/99

All photos were taken during a demonstration using metered water from a hydrant in cooperation with the City of San Diego's Water Department.



City of Lodi  
Municipal Utility Services Division  
Municipal Service Center  
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