

Water & Sewer Utility Maintenance SC-22

Description

Although the operation and maintenance of public utilities are not considered chronic sources of stormwater pollution, some activities and accidents can result in the discharge of pollutants that can pose a threat to both human health and the quality of receiving waters if they enter the storm drain system. Sewage incident response and investigation may involve a coordinated effort between staff from a number of different departments/agencies. Cities that do not provide maintenance of water and sewer utilities must coordinate with the contracting agency responsible for these activities and ensure that these model procedures are followed.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment ✓
Nutrients ✓
Trash
Metals
Bacteria ✓
Oil and Grease ✓
Organics ✓
Oxygen Demanding ✓

Approach

Pollution Prevention

Inspect potential non-stormwater discharge flow paths and clear/cleanup any debris or pollutants found (i.e. remove trash, leaves, sediment, and wipe up liquids, including oil spills).

Suggested Protocols

Water Line Maintenance and Cleaning

Procedures can be employed to reduce pollutants from discharges associated with water utility operation and maintenance activities. Planned discharges may include fire hydrant testing, flushing water supply mains after new construction, flushing lines due to complaints of taste and odor, dewatering mains for maintenance work. Unplanned discharges from treated, recycled water, raw water, and groundwater systems operation and maintenance activities can occur from water main breaks, sheared fire hydrants, equipment malfunction, and operator error.

Planned discharges

- Identify a suitable discharge option in the following order of preference:
 - Apply to the land.
 - Reuse water for dust suppression, irrigation, or construction compaction.
 - Discharge to a sanitary sewer system with approval.

- Discharge to the storm drain system using applicable pollution control measures. (Only available to clean water discharges such as water main/water storage tank/water hydrant flushing).
- If water is discharged to a storm drain, control measures must be put in place to control potential pollutants (i.e. sediment, chlorine, etc.). Examples of some storm drain protection options include:
 - Silt fence – appropriate where the inlet drains a relatively flat area.
 - Gravel and wire mesh sediment filter – Appropriate where concentrated flows are expected.
 - Wooden weir and fabric – use at curb inlets where a compact installation is desired.
 - Other commercially available device for controlling sediment.
- Prior to discharge, inspect discharge flow path and clear/cleanup any debris or pollutants found (i.e. remove trash, leaves, sediment, and wipe up liquids, including oil spills).
- General Design considerations for inlet protection devices include the following:
 - The device should be constructed such that cleaning and disposal of trapped sediment is made easy, while minimizing interference with discharge activities.
 - Devices should be constructed so that any standing water resulting from the discharge will not cause excessive inconvenience or flooding/damage to adjacent land or structures.
- The effectiveness of control devices must be monitored during the discharge period and any necessary repairs or modifications made.

Unplanned Discharges

- Stop the discharge as quickly as possible.
- Inspect flow path of the discharged water:
 - Identify erodible areas which may need to be repaired or protected during subsequent repairs or corrective actions
 - Identify the potential for pollutants to be washed into the waterway
- If repairs or corrective action will cause additional discharges of water, select the appropriate procedures for erosion control, chlorine residual, turbidity, and chemical additives. Prevent potential pollutants from entering the flow path.

Sanitary Sewer Maintenance

This section is applicable to municipalities who own and operate a sewage collection system. Facilities that are covered under this program include sanitary sewer pipes and

pump stations owned and operated by a municipality. The owner of the sanitary sewer facilities is the entity responsible for carrying out this prevention and response program.

- Clean sewer lines on a regular basis to remove grease, grit, and other debris that may lead to sewer backups.
- Establish routine maintenance program. Cleaning should be conducted at an established minimum frequency and more frequently for problem areas such as restaurants that are identified.
- Cleaning activities may require removal of tree roots and other identified obstructions.
- During routine maintenance and inspection note the condition of sanitary sewer structures and identify areas that need repair or maintenance. Items to note may include the following:
 - Cracked/deteriorating pipes
 - Leaking joints/seals at manhole
 - Frequent line plugs
 - Line generally flows at or near capacity
 - Suspected infiltration or exfiltration.
- Prioritize repairs based on the nature and severity of the problem. Immediate clearing of blockage or repair is required where an overflow is currently occurring or for urgent problems that may cause an imminent overflow (e.g. pump station failures, sewer line ruptures, sewer line blockages). These repairs may be temporary until scheduled or capital improvements can be completed.
- Review previous sewer maintenance records to help identify “hot spots” or areas with frequent maintenance problems and locations of potential system failure.

Spills and Overflows

- Identify and track sanitary sewer discharges. Identify dry weather infiltration and inflow first. Wet weather overflow connections are very difficult to locate.
- Locate wet weather overflows and leaking sanitary sewers using conventional source identification techniques such as monitoring and field screening. Techniques used to identify other illicit connection sources can also be used for sewer system evaluation surveys (see SC-20 Drainage System Operation and Maintenance).
- Implement community awareness programs for monitoring sanitary sewer wet weather overflows. A citizen’s hotline for reporting observed overflow conditions should be established to supplement field screening efforts.
- Establish lead department/agency responsible for spill response and containment. Provide coordination within departments.

- When a spill, leak, and/or overflow occurs and when disinfecting a sewage contaminated area, take every effort to ensure that the sewage, disinfectant and/or sewage treated with the disinfectant is not discharged to the storm drain system or receiving waters. Methods may include:
 - Blocking storm drain inlets and catch basins
 - Containing and diverting sewage and disinfectant away from open channels and other storm drain fixtures (using sandbags, inflatable dams, etc.)
 - Removing the material with vacuum equipment
- Record required information at the spill site.
- Perform field tests as necessary to determine the source of the spill.
- Develop notification procedures regarding spill reporting.

Septic Systems

- Ensure that homeowners, installers, and inspectors are educated in proper maintenance of septic systems. This may require coordination with staff from other departments. Outreach to homeowners should include inspection reminders informing them that inspection and perhaps maintenance is due for their systems. Recommend that the system be inspected annually and pumped-out regularly.
- Programs which seek to address failing septic systems should consider using field screening to pinpoint areas where more detailed onsite inspection surveys are warranted.

Training

- Conduct annual training of water utility personnel and service contractors. (field screening, sampling, smoke/dye testing, TV inspection).
- OSHA-required Health and Safety Training 29 CFR 1910.120 plus annual Refresher Training (as needed).
- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and federal OSHA 29 CFR 1910.146).
- MIOSHA General Industry Standard, Part 90. Confined Space Entry (29CFR 1910.146)
- MIOSHA Occupational Health Standard, Part 490. Permit Required Confined Spaces (29CFR 1910.146)

- MIOSHA Construction Standard Part 1, R408.40121. General Rules, Confined or Enclosed Spaces; Testing” Neutralizing Hazard
- MIOSHA Part 622. Control Measures for Hazardous Atmosphere in Confined Spaces for Construction
- MIOSHA General Industry Safety Standards, Part 33, Personal Protective Equipment
- Hazard Communication Training as specified in and MIOSHA Part 42, R 408.44201 to R408.44203 (Construction Safety Standards), MIOSHA Part 92, R408.19501 to R408.19203 (General Industry Safety Standards) and MIOSHA Rules 325.77001 to 325.77003. (Occupational Health Standards)

Spill Response and Prevention

- See previous section regarding spills and overflows.
- Refer to SC-2, Spill Prevention, Control & Cleanup.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Enact ordinance granting “right-of-entry” to locate potentially responsible parties for sewer overflows.
- Reliance on individual onsite inspection to detect failed septic systems can be a major limitation. The individual onsite inspection is very labor-intensive and requires access to private property to pinpoint the exact location of the failing system.
- A significant limitation to correcting failing septic systems is the lack of techniques available for detecting individual failed septic systems.

Requirements

Costs

- Departmental cooperation recommended for sharing or borrowing staff resources and equipment from municipal wastewater department.
- Infiltration, inflow, and wet weather overflows from sanitary sewers are very labor and equipment intensive to locate.

- The costs associated with detecting and correcting septic system failures are subject to a number of factors, including availability of trained personnel, cost of materials, and the level of follow-up required to fix the system problems.

Maintenance

- Minimum 2-person teams to perform field screening and associated sampling.
- Larger teams required for implementing other techniques (i.e. smoke testing, fluorometric dye testing, television camera inspection and physical inspection with confined space entry) to identify sewer system leaks.
- Program coordination required for handling emergencies, record keeping, etc.
- Many of the problems associated with improper use of septic systems may be attributed to lack of user knowledge on operation and maintenance. Educational materials for homeowners and training courses for installers and inspectors can reduce the incidence of pollution from these widespread and commonly used pollution control devices.

Supplemental Information

Further Detail of the BMP

Onsite Sewage Disposal Systems

New onsite sewage disposal systems should be designed, located, and installed away from open waterbodies and sensitive resources such as wetlands and floodplains. A protective separation between the OSDS and groundwater should also be established. OSDSs should be operated and maintained to prevent surface water discharges and reduce pollutant loadings to groundwater. Inspection of OSDSs should occur regularly and repairs made immediately. New or replacement plumbing fixtures should be of the high efficiency type.

Typical Sanitary Sewer Problems

- Old and deteriorated main and lateral pipes - Sewers range in age from 30 to 100 years with an average age of 50 years.
- Cracked sewer pipes - Existing sewers are mostly clay pipes which can crack as they deteriorate with age and also by earth movement.
- Misaligned and open pipe joints - Most of the mortar used to seal the joints between sections of clay pipe has deteriorated.

- Undersized sewer pipe - The existing sewer system is overloaded due to new sewer hookups, underground water infiltration, and illegal roof and/or yard drain connections.
- Defective manholes - Old manholes are made of bricks. Typical problems associated with brick manholes are loose bricks, missing bricks, and misaligned manholes.
- Missing and/or unrecorded sewer pipes and manholes - This problem is typical in the easement/backline sewer. Sewer pipe locations shown on the sewer record map are different from the actual sewer location.
- Sewer main under houses and other improvements - Complaints of sewer main alignment crossing the house and other improvements. A solution to this problem requires an agreement with the property owner for a new sewer easement at a relocated line.

Causes of Sanitary Sewer Backups

- Root infiltration - Tree roots are a major cause of backups.
- Water inflow/infiltration - Rain water entering the sewer pipe causes overflows.
- Solids - Typical solids that buildup in the pipe and cause backups are grease, dirt, bones, tampons, paper towels, diapers, broken dishware, garbage, concrete, and debris.
- Structural defects in pipes and manholes - Sags in the line, cracks, holes, protruding laterals, misaligned pipe, offset joints are all possible causes of backups.

Design Considerations

Sanitary sewer overflows can often be reduced or eliminated by a number of practices, in addition to sewer system cleaning and maintenance, including the following:

- Reducing infiltration and inflow through rehabilitation and repair of broken or leaking sewer lines.
- Enlarging or upgrading the capacity of sewer lines, pump stations, or sewage treatment plants.
- Constructing wet weather storage and treatment facilities to treat excess flows.
- Addressing SSOs during sewer system master planning and facilities planning.

Septic Systems

Two field screening techniques that have been used with success at identifying possible locations of failing septic systems are the brightener test and color infrared (CIR) aerial photography. The first involves the use of specific phosphorus-based elements found in many laundry products, often called brighteners, as an indicator of the presence of failing onsite wastewater systems.

The second technique uses color infrared (CIR) aerial photography to characterize the performance of septic systems. This method has been found to be a quick and cost-effective method for assessing the potential impacts of failing systems and uses variations in vegetative growth or stress patterns over septic system field lines to identify those systems that may potentially be malfunctioning. Then a more detailed onsite visual and physical inspection will confirm whether the system has truly failed and the extent of the repairs needed. These inspections may be carried out by county health departments or other authorized personnel.

References and Resources

Alameda Countywide Clean Water Program on-line

<http://www.ci.berkeley.ca.us/pw/Storm/stormala.html>

Los Angeles County Stormwater Quality. Public Agency Activities Model Program. On-line: http://ladpw.org/wmd/npdes/public_TC.cfm

Orange County Stormwater Program

http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1998. Water Utility Operation and Maintenance Discharge Pollution Prevention Plan. June

United States Environmental Protection Agency (USEPA). 2001. Illicit Discharge Detection and Elimination. On-line:

http://cfpub.epa.gov/npdes/stormwater/menuofbmps/illi_1.cfm

United States Environmental Protection Agency (USEPA). 2001. Pollution Prevention/Good Housekeeping for Municipal Operators Septic System Controls. On-line: http://www.epa.gov/npdes/menuofbmps/poll_14.htm

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