SSMP Program Audit

Sewer Maintenance Districts of Los Angeles County

Los Angeles County, CA
January 5, 2021

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1 Purpose

The purpose of this document is to report the results of the Sewer System Management Plan (SSMP) Program Audit conducted for the Sewer Maintenance Districts of Los Angeles County (SMD), covering January 2018 through June 2020. This report was prepared pursuant to the requirements included in the State Water Resources Control Board Order No. 2006-0003 – Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (WDR). The audit requirements are:

"As part of the Sewer System Management Plan (SSMP), the Enrollee shall conduct periodic internal audits, appropriate to the size of the system and the number of SSOs. At a minimum, these audits must occur every two years and a report must be prepared and kept on file. This audit shall focus on evaluating the effectiveness of the SSMP and the Enrollee's compliance with the SSMP requirements identified in this subsection (D.13), including identification of any deficiencies in the SSMP and steps to correct them."

This audit serves as the 2020 SSMP Program Audit for the Sewer Maintenance Districts.

2 Background

SMD operates and maintains approximately 4,614 miles of sanitary sewer pipelines, approximately over 104,000 maintenance access structures, and 159 sewage pump stations. SMD includes both the Consolidated Sewer Maintenance Districts (CSMD) and the Marina Sewer Maintenance District (MSMD).

CMSD operates and maintains collection systems for 35 cities as well as for unincorporated areas within Los Angeles County. In total, CMSD has enrolled 43 separate collection system in the California Integrated Water Quality System (CIWQS) database. MSMD operates and maintains one collection system serving Marina Del Rey and has enrolled this one collection system in the CIWQS database. In addition, Los Angeles County Department of Public Works has a Sewer Maintenance Agreement with both the City of Irwindale and the City of West Hollywood to operate and maintain their collection systems.

In unincorporated areas, the County owns the sewer mainlines and the point of connection to the sewer mainlines, but does not own any portion of the sewer lateral beyond the sewer connection. Similarly, the 35 cities, for which the County provides sewer operations and maintenance services, own the sewer mainlines and the point of connection to the sewer mainlines, but do not own any portion of the sewer lateral beyond the sewer connection.

This SSMP program audit covers the sewer system capacity, management, operations and maintenance activities performed by SMD.

The County has five staff authorized to serve as Onsite Managers for each of the collection systems managed by the County. These staff include:

- Martin Moreno, Principal Engineer
- Robert Swartz, Senior Civil Engineer
- Jeffrey Bouse, Senior Civil Engineer
- Nicholas Agbobu, Senior Civil Engineer
- Alex Villarama, Civil Engineer

Each of these staff members are authorized to act on behalf of SMD to serve as Legally Responsible Officials for each of the collection systems listed in **Table 2-1**.

Table 2-1: Collection Systems Maintained by SMD

WDID Type	CIWQS WDID	CIWQS Collection System Name
CSMD – City	4SSO10364	Artesia City CS
CSMD – City	4SSO10366	Baldwin Park City CS
CSMD – City	4SSO10368	Bell Gardens City CS
CSMD – City	4SSO10369	Bellflower City CS
CSMD – City	4SSO10371	Bradbury City CS
CSMD – City	4SSO10374	Carson City CS
CSMD – City	4SSO10377	Commerce City CS
CSMD – City	4SSO10380	Cudahy City CS
CSMD – City	4SSO10382	Diamond Bar City CS
CSMD – City	4SSO10384	Duarte City CS (SSO program)
CSMD – City	4SSO10389	Glendora City CS
CSMD – City	4SSO10390	Hawaiian Gardens City CS
CSMD – City	4SSO10394	Industry City CS
CSMD – City	4SSO10397	La Canada Flintridge City CS
CSMD – City	4SSO10398	La Habra Heights City CS
CSMD – City	4SSO10399	La Mirada City CS
CSMD – City	4SSO10402	Lakewood City CS
CSMD – City	4SSO10403	Lawndale City CS
CSMD – City	4SSO10404	Lomita City CS
CSMD – City	4SSO10414	Palos Verdes Estates City CS
CSMD – City	4SSO10415	Paramount City CS
CSMD – City	4SSO10417	Pico Rivera City CS
CSMD – City	4SSO10420	Rancho Palos Verdes City CS
CSMD – City	4SSO10423	Rolling Hills City Estates CS
CSMD – City	4SSO10424	Rosemead City CS
CSMD – City	4SSO10425	San Dimas City CS
CSMD – City	4SSO10429	Santa Clarita City CS
CSMD – City	4SSO10430	Santa Fe Springs City CS

WDID Type	CIWQS WDID	CIWQS Collection System Name
CSMD – City	4SSO10434	South El Monte City CS
CSMD – City	4SSO10437	Temple City CS
CSMD – City	4SSO10441	Walnut City CS
CSMD – City	4SSO11366	Agoura Hills CS
CSMD – City	4SSO11407	Westlake Village CS
CSMD – City	4SSO11439	Hidden Hills CS
CSMD – City	4SSO11447	Calabasas City CS (SSO)
CSMD – County Zone	4SSO10465	Malibu Mesa Zone of the CSMD CS
CSMD – County Zone	4SSO10496	Trancas Zone of the CSMD CS
CSMD – County Zone	4SSO11365	Unincorporated County Area CSMD South/County Sanitation District CS
CSMD – County Zone	4SSO11370	Unincorporated County Area CSMD North/County Sanitation District CS
CSMD – County Zone	4SSO11372	Unincorporated County Area CSMD/Las Virgenes Tapia CS
CSMD – County Zone	4SSO11374	Unincorporated County Area CSMD-NW/County Sanitation District CS
CSMD – County Zone	6SSO10459	Unincorporated County Area Lake Hughes Zone of the CSMD CS
Sewer Maintenance Agreement	4SSO10396	Irwindale City CS
Sewer Maintenance Agreement	4SSO11368	West Hollywood CS
MSMD – County Zone	4SSO11373	Unincorporated County Area Marina/Aneta Zone of the CSMD/City Hyperian CS

3 Audit Overview

This audit reviews the period between January 1, 2018 and June 30, 2020 and was performed to meet Provision D.13(x) of the WDR requiring completion of an SSMP Program Audit at least once every two years. The previous audit was completed in February 2018 and analyzed sewer overflow performance through December 31, 2017.

The last Sewer System Management Plan (SSMP) was adopted by the Los Angeles County Board of Supervisors (i.e. the governing board) in November 2018.

This audit assesses the current state of SSMP compliance with the provisions included in the WDR including Provision D.13, identifies any deficiencies found in the SSMP, and recommends corrective actions. In addition, the audit provides an evaluation of SSMP effectiveness. SMD intends to use the audit results to improve SSMP compliance and performance in reducing sewer overflows.

HDR conducted the audit on behalf of SMD through a series of meetings with staff involved with implementation of activities required by provisions included in Provision D.13 of the WDR. The HDR Audit Team members and staff supporting the audit interviews and audit process are identified in **Table 3-1**.

Table 3-1: SSMP Audit Team Members

Team Member	Organization	Role
Michael Flores	HDR	Lead Auditor

SSMP audit interviews were performed via multiple virtual meetings over the period from July 16, 2020 through July 23, 2020. The order of the audit interviews, WDR provisions discussed, and County staff interviewed is documented in **Table 3-2**.

Table 3-2: SSMP Audit Participants

Date	WDR Provision Section	Topics	Participants
7/16/2020 2:00 PM to 4:30PM	D.13.i D.13.ii D.13.iii D.13 ix D.13.x D.13.xi	SSMP Goals & Actions Organization Legal Authorities Monitoring, Measurement & Program Modification SSMP Program Audits Communication Program	Martin Moreno Alex Villarma Linh La Gohar Tsolakyan Nicholas Agbobu Sandra Medina
7/20/20 9:00 AM to 11:30 AM	D.13.iv D.13.vi	Collection System O&M Overflow Emergency Response Plan	Martin Moreno Jeff Bouse Alex Villarama Robert Swartz Mark Ramirez
7/21/20 9:00 AM to 11:30 AM	D.13.iv D.13.v D.13.viii	Rehab Program and Funding Design and Performance Provisions System Evaluation and Capacity Assurance Plan	Martin Moreno Jeff Bouse Alex Villarama Robert Swartz Mark Ramirez
7/23/20 2:00 PM to 3:30 PM	D.13.vii	FOG Program	Tim Smith Francisca Mandujano Saeid Shrizadegan Anoush Dejbakhsh Vanessa Olivas Elvira Delgadillo Maria Baker Joe Baiocco Alex Villarama Michael Garcia

4 Evaluation of SSMP Effectiveness

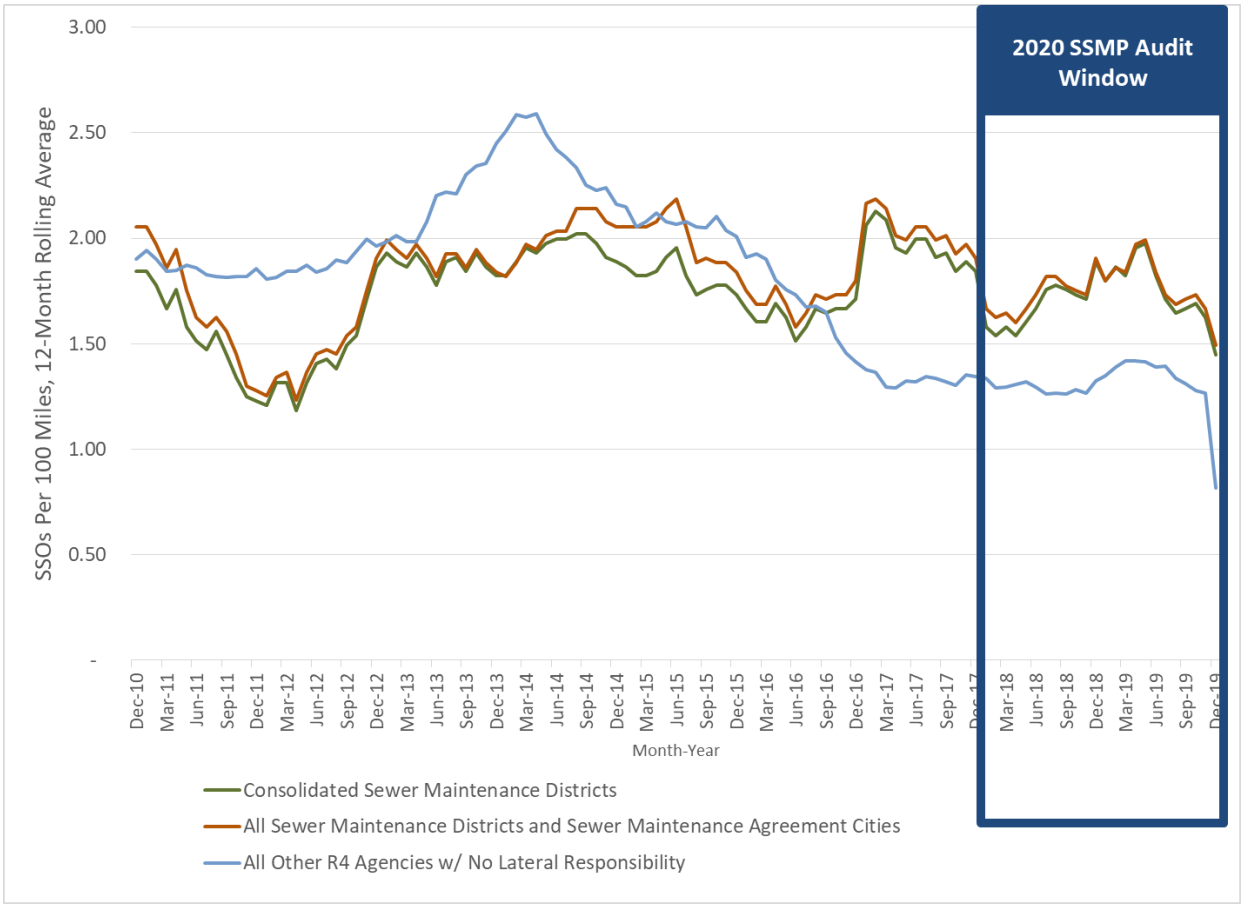
Overall, based on analysis of the sanitary sewer overflow (SSO) trends between January 1, 2018 through December 31, 2019 and the results of the SSMP Program audit, the overall program for managing the sewer systems is effective and operates at a high level of performance. SMD is actively planning the implementation of process improvements to further improve program performance within the next 5 years.

4.1 Sewer Overflow Performance

4.1.1 Sanitary Sewer Overflow Rate

When analyzing the sewer overflow performance e for all sewer systems SMD manages as a whole, SMD is operating as a high-performing collection system agency with an SSO rate ranging between 1.45 to 1.98 SSOs per 100 miles between January 2018 and December 2019. Figure 4-1 shows the 12-Month rolling average of SSOs per 100 miles of sewer pipeline per year.

Figure 4-1: 12-Month Rolling Average of SSOs per 100 Miles of Sewer Pipeline per Year



4.1.2 Spills Impacting Surface Waters

Table 4-1 summarizes the total SSO volume releases from collection systems managed by SMD annually for Calendar Year 2015 through Calendar Year 2019. On average, SMD has discharged to surface water approximately 67% of the total volume spilled. On average, SMD is recovering approximately 17% of the total volume spilled. During this same time period, other Region 4 agencies with no lateral responsibility discharged 88% of the total volume spilled to surface waters and recovered 12% of the total volume spilled.

Table 4-1: Percentage of SSO Volume Recovered and Discharged to Surface Waters in Calendar Year 2015 through Calendar Year 2019

Calendar Year	Total SSO Volume	Total Volume Reaching Surface Waters	Total Volume Recovered	Percent of Volume Reaching Surface Waters	Percent of Volume Recovered
2015	206,233	112,630	69,743	55%	34%
2016	357,752	275,752	43,065	77%	12%
2017	215,617	145,854	31,516	68%	15%
2018	369,307	263,020	46,355	71%	13%
2019	160,448	74,902	26,495	47%	17%
Total	**1,309,357**	**872,158**	**217,174**	**67%**	**17%**

4.1.3 Number and Size of Sewer Overflows

Table 4-2 shows the definitions of the three spill categories the State Water Resources Control Board uses to categorize sewer overflows. Over 54% of sewer overflow events occurring in collections systems managed by SMD reach surface waters. This compares to 23% of SSOs reach surface water for all other Region 4 agencies with no lateral responsibility. This appears to be an area where SMD can improve.

Table 4-2: Spill Categories and Definitions*

SSO Category	Definition
Category 1	Discharges of untreated or partially treated wastewater of any volume resulting from an enrollee's sanitary sewer system failure or flow condition that: Reach surface water and/or reach a drainage channel tributary to a surface water; or Reach a Municipal Separate Storm Sewer System (MS4) and are not fully captured and returned to the sanitary sewer system or not otherwise captured and disposed of properly. Any volume of wastewater not recovered from the MS4 is considered to have reached surface water unless the storm drain system discharges to a dedicated storm water or groundwater infiltration basin (e.g., infiltration pit, percolation pond).
Category 2	Discharges of untreated or partially treated wastewater of 1,000 gallons or greater resulting from an enrollee's sanitary sewer system failure or flow condition that do not reach surface water, a drainage channel, or a MS4 unless the entire SSO discharged to the storm drain system is fully recovered and disposed of properly.
Category 3	All other discharges of untreated or partially treated wastewater resulting from an enrollee's sanitary sewer system failure or flow condition.

** Definitions from Monitoring and Reporting Requirements (Order No. WQ 2013-0058-EXEC)*

Table 4-3: Number and Percentage of SSOs by Category (January 2015 through December 2019)

SSO Category	SSO Count	SSO Volume	Percentage of SSO Count	Percentage of SSO Volume
Category 1	223	1,011,184	54%	77%
Category 2	40	263,360	10%	20%
Category 3	150	34,813	36%	3%
Total	**413**	**1,309,357**	**100%**	**100%**

The majority of SSOs events occurring in the collection systems SMD manages are in the range of 100 to 999 gallons. **Table 4-4** shows the number of SSOs by size category for all collection systems managed by SMD.

Table 4-4: Number and Size of SSOs for all Collection Systems Managed by SMD (1/1/2015 – 12/31/2019)

SSO Magnitude	SSO Count	SSO Volume	Percentage of SSO Count	Percentage of SSO Volume
0 to 9 gallons	7	24	2%	0%
10 to 99 gallons	59	2,265	14%	0%
100 to 999 gallons	198	77,826	48%	6%
1,000 to 9,999 gallons	117	400,295	28%	31%
10,000 to 99,999 gallons	31	643,947	8%	49%
100,000 to 999,999 gallons	1	185,000	0%	14%
Totals	413	1,309,357	100%	100%

4.1.4 Causes of SSOs

Seventy-five percent (75%) of SSO events are being caused by roots, grease and debris. This indicates potential for improvement in SSO performance through increased and targeted preventive maintenance sewer cleaning, monitoring of pipe segments with known maintenance issues, and proactive maintenance on higher risk pipe segments.

Figure 4-2: Number of SSOs by SSO Cause from January 2015 through December 2019

Type	SSO Cause	Count of SSOs	Total SSO Volume	Average SSO Volume	Percentage Count	Percentage Volume
Single Cause	Roots	188	391,091	2,080	46%	30%
	Grease	86	169,599	1,970	21%	13%
	Debris	33	130,460	3,950	8%	10%
	Structural	16	132,450	8,280	4%	10%
	Construction - 3rd Party	10	20,570	2,060	2%	2%
	Calcium Deposits	10	49,175	4,920	2%	4%
	Pump Station	6	15,970	2,660	1%	1%
	Capacity	5	12,307	2,460	1%	1%
	Vandalism	5	223,650	44,730	1%	17%
	Damage - 3rd Party	1	2,500	2,500	0%	0%
	Operator Error	1	800	800	0%	0%
	Subtotal	**361**	**1,148,572**	**3,180**	**87%**	**88%**
Multiple Cause	Roots & Grease	30	123,102	4,100	7%	9%
	Grease & Debris	8	4,601	580	2%	0%
	Unknown	5	12,845	2,570	1%	1%
	Debris & Calcium Deposits	3	4,600	1,530	1%	0%
	Roots & Grease & Debris	1	400	400	0%	0%
	Capacity Issue at Pump Station	1	192	190	0%	0%
	Roots & Structural Issue	1	10	10	0%	0%
	Other	1	15,000	15,000	0%	1%
	Roots & Debris	1	25	30	0%	0%
	Grease & Possible Structural Issues	1	10	10	0%	0%
	Subtotal	**52**	**160,785**	**3,090**	**13%**	**12%**

4.2 Review of Effectiveness of SSMP Elements

In November 2018, the County updated the SSMP to meet the requirement for updating the SSMP every 5 years. The SSMP was approved by the Board of Supervisors on November 7, 2018. The following sections focus on evaluating the effectiveness of each element of the SSMP.

4.2.1 Element 1 - Goal

WDR Requirement:

The goal of the Sewer System Management Plan (SSMP) is to provide a plan and schedule to properly manage, operate, and maintain all parts of the sanitary sewer system. This will help reduce and prevent SSOs, as well as mitigate any SSOs that do occur.

Audit Finding:

- The five goals and five actions provided in Chapter 1 of the SSMP encompass elements of the goal statement from the WDR and provide an additional level of detail with regards to goals for the SSMP and actions to be taken to achieve these goals.
- Action #4 includes a statement to "completely recover the overflow". This is technically not feasible. The County may want to update this action to statement to "recover the overflow to the extent feasible" or other language that is more realistic.
- This section satisfies the WDR requirement and regulatory expectations for the goal section of the SSMP.

4.2.2 Element 2 – Organization

WDR Requirement:

The Sewer System Management Plan (SSMP) must identify:

a. *The name of the responsible or authorized representative as described in Section J of this Order.*

b. The names and telephone numbers for management, administrative, and maintenance positions responsible for implementing specific measures in the SSMP program. The SSMP must identify lines of authority through an organization chart or similar document with a narrative explanation; and

c. The chain of communication for reporting SSOs, from receipt of a complaint or other information, including the person responsible for reporting SSOs to the State and Regional Water Board and other agencies if applicable (such as County Health Officer, County Environmental Health Agency, Regional Water Board, and/or State Office of Emergency Services (OES)).

Audit Finding:

Name of the Responsible or Authorized Representative:

- The SSMP states the Assistant Deputy Director for Sewer Maintenance Division is responsible for the execution of compliance actions required under the WDRs, including signing and certification of all reports and correspondence. Bill Winters is the Assistant Deputy Director for Sewer Maintenance Division, yet is not included as an Onsite Manager in CIWQS for any of the collection systems owned or managed by the County. Consider adding Bill Winters as an Onsite Manager.
- SSMP states that the Principal Engineer and Senior Civil Engineers in SMD may also perform signing and certification duties. The Principal Engineer is included as an Onsite Manager in CIWQS for most WDIDs the County manages, yet is not shown at Onsite Manager for all WDIDs managed by the County. At least one Senior Civil Engineer is included on each WDID the County manages. A Civil Engineer is also included as an LRO on all WDIDs and is not mentioned in the SSMP as an authorized representative. Consider indicating a Civil Engineer is also included as an authorized representative.
- If there exists a hierarchy for the LROs assigned to the WDIDs for which the County is responsible, the County should consider identifying the person or position serving as the Primary LRO for each WDID and others serving as Secondary LROs.
- Consider documenting any protocols or measures taken to ensure there is at least one LRO on duty and available when the Primary is unavailable.
- Appears each City has at least one City staff person serving as an Onsite Manager. Consider periodically checking to see that each City collection system SMD manages has at least on City staff person serving as an Onsite Manager in CIWQS.
- Multiple LROs are shown for each WDID the County manages, which is a best practice.

Names and Telephone Numbers for Management, Administrative, and Maintenance Positions:

- SSMP includes a full table of contact names and positions.
- SSMP does not specifically identify who is responsible for specific measures of the SSMP. Consider creating a table identifying specific measures of the SSMP and the names or positions of the person(s) responsible for specific measures. Consider linking the positions responsible for specific measures of the SSMP to the positions shown on the SSMP organization chart.

Lines of Authority:

- SSMP includes an organization chart showing lines of authority.
- Organization chart does not show Civil Engineer position and line of authority for Alex Villarama who is serving as an LRO.
- Consider placing a tag on the organization chart showing which positions are serving as an LRO.

Chain of Communication:

- SSMP includes SMD SSO Procedures Flow Chart providing guidance on the typical SSO response workflow from receipt of call/alarm through notification and reporting.
    - Does not identify communications and notifications between crew lead and Supervisor/Superintendent and Managers.
    - Does not include communications with Cities when in their jurisdiction.
- Consider noting this flow chart simplifies the SSO response workflow and is the typical SSO response workflow for the majority of SSOs the County experiences. Consider noting that large SSOs, high impacts SSOs, or SSOs requiring additional resources will include additional communications between the Crew Lead, Superintendent, Senior Civil Engineer and management when needed.

4.2.3 Element 3 – Legal Authority

WDR Requirement:

Each Enrollee must demonstrate, through sanitary sewer system use ordinances, service agreements, or other legally binding procedures, that it possesses the necessary legal authority to:

a. Prevent illicit discharges into its sanitary sewer system (examples may include I/I, stormwater, chemical dumping, or unauthorized debris and cut roots);

b. Require that sewers and connections be properly designed and constructed;

c. Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the Public Agency;

d. Limit the discharge of fats, oils, and grease and other debris that may cause blockages, and

e. Enforce any violation of its sewer ordinances.

Audit Finding:

The SSMP provides detailed documentation of the County's legal authorities. The audit team reviewed Title 20 of Los Angeles County Code and find the County has the necessary legal authorities required by the WDR as indicated in Table 4-5.

Table 4-5: Summary of Legal Authority

Requirement	Meets WDR Requirements?
PREVENT ILLICIT DISCHARGES	
Prevent illicit discharges into the wastewater collection system	Yes
Limit the discharge of fats, oils, and grease and other debris that may cause blockages	Yes
Control infiltration and inflow (I/I) from private service laterals	Yes
PROPER DESIGN AND CONSTRUCTION	
Require that sewers and connection be properly designed and constructed	Yes
ACCESS TO LATERALS	
Ensure access for maintenance, inspection, or repairs for portions of the service lateral owned or maintained by the Agency	Yes, County is not responsible for laterals
FOG SOURCE CONTROL	
Requirements to install grease removal devices (such as traps or interceptors)	Yes
Design standards for the grease removal devices	Yes
Maintenance requirements, BMP requirements, record keeping and reporting requirements for grease removal devices	Yes
Authority to inspect grease producing facilities	Yes
ENFORCEMENT	
Enforce any violations of its sewer ordinances	Yes

Legal Authorities for City's Annexed in CSMD

SMD has a process for annexing collection systems into the Consolidated Sewer Maintenance Districts when a City chooses. During this process, SMD will evaluate the condition of the system being annexed and will either require a City to fix condition issues prior to annexation or will require funds be provided for SMD to fix the issues in the system once annexation occurs.

Lateral Responsibility

SMD is not responsible for any portion of the service lateral in any of the collection systems it manages. When SMD finds issues in the lateral during CCTV inspection, SMD will sometime provide documentation of the issue to property owners along with the suggestion to find a qualified contractor to support remediation. This is provided as a courtesy.

4.2.4 Element 4 – Operation and Maintenance Program

WDR Requirement:

The Sewer System Management Plan (SSMP) must include those elements listed below that are appropriate and applicable to the Enrollee's system:

a. Maintain an up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and applicable stormwater conveyance facilities;

b. Describe routine preventive operation and maintenance activities by staff and contractors, including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance (PM) program should have a system to document scheduled and conducted activities, such as work orders;

c. Develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implementing the short- and long-term plans plus a schedule for developing the funds needed for the capital improvement plan;

d. Provide training on a regular basis for staff in sanitary sewer system operations and maintenance, and require contractors to be appropriately trained; and

e. Provide equipment and replacement part inventories, including identification of critical replacement parts.

Audit Findings:

Up-to-Date Mapping

- As-Built maps are maintained by entity owning collection system assets. For unincorporated areas this is SMD. For CSMD Cities, each City is responsible for maintaining as-built maps.
- SMD gathers as-built plans and compiles into a central Document Management System and central GIS system maintained by the SMD. Mapbook pages are electronically available on the County website (https://dpw.lacounty.gov/smd/sewernetwork/).
- SMD prints map books for sewer maintenance crews to use in the field for purposes of locating sewer infrastructure. When crews find discrepancies in sewer mapping, the discrepancies are noted on a printed map page and forwarded to SMD GIS resources to update the GIS mapping.
- Governance and protocols for updating CADD mapping and sewer GIS is not documented. Consider documenting CADD mapping and sewer GIS governance and update processes.

- The Sewer GIS does not include:
  - Air pressure relief valves
  - Ownership of assets
  - Installed/construction date or date of rehabilitation
- The Sewer GIS includes two fields for pipe segment length: P_Length and Shape_Leng.
  - Approximately 10 percent of pipe segments have a P_Length and Shape_Leng value that differs by more than 5 percent.
  - Approximately 3 percent of pipe segments have a P_Length and Shape_Leng value that differs by more than 25 percent.
  - Approximately 120 pipe segments have a P_Length and Shape_Leng value that differs by more than 100 percent.
  - Auditor sampled several pipe segments with significant discrepancy and found the P_Length value to be inaccurate in each case (e.g. GIS OBJECTIDs 5708, 23918, 102702).
- Mapping is updated within an approximate 8-month timeframe once changes are identified.
- SMD should update GIS to:
  - Identify manhole ownership
  - Identify pipe segment ownership
  - Map air pressure relief valves

Routine Preventive Operations and Maintenance Activities; Targeting of Known Problem Areas; System to Track Work Activities

- SMD performs routine system-wide manhole inspections on a 6-month cycle. In some areas, the cycle has been shortened to a 4-month cycle resulting in improved ability to identify cleaning needs. The purpose of the manhole inspections is to identify maintenance issues requiring sewer cleaning. Crews look for evidence of surcharging within the manholes as well as evidence of blockages based on comparison of upstream and downstream flow conditions. Manhole inspection crews flag pipe segments with sewer cleaning needs as well as manhole needing repair.
- Manhole inspection findings are documented on a printed map provided with the manhole inspection work order. Crews fill out a slip for any referrals identified as a result of manhole inspection. The slip is documented by clerk assigned to the yard and provided to the maintenance supervisor for assignment to a crew, depending on the type of referral.
  - SMD does not have set criteria for triggering frame and cover replacement. This is left up to the maintenance yard. SMD should consider developing standard criteria for triggering manhole frame and cover replacement.
  - Currently documenting manhole inspections on outliers. In the future, use mobile devices to document every manhole inspection. Integrate

assessment guidelines and criteria to trigger work orders directly from manhole inspection.

- SMD has identified a set pipe segments with known maintenance issues which are cleaned on a monthly, quarterly and semi-annually schedule. Pipes with known root issues are maintained either by periodic rodding or periodic chemical root treatment.
- SMD includes sewer cleaning in CCTV contracts and, over the past 15 years, has cleaned almost every pipe in the system at least once. The CCTV contractor is required to clean the pipe segment to 95% clear along the entire length of the pipe.
    - CCTV contractors are not required to provide documentation of cleaning findings. Pipe segments with significant material found during cleaning are communicated to SMD and placed on a periodic. Consider requiring CCTV contractors and cleaning contractors to provide coded-based feedback for each pipe segment cleaned. Coded feedback typically includes a material type identified (e.g. R-roots, G-grease, D-debris, O-other) and a severity indicator (e.g. L-light, M-moderate, S-severe). A CL-clear code can be used when nothing is found.
- SMD is not currently documenting sewer cleaning findings attached to each individual assets in the MMS. It is currently not possible to view the history of past cleaning findings on a specific asset. Consider using code-based feedback for cleaning findings to document SMD cleaning activities.
- SMD does not employ information tools to support collecting and analyzing data from maintenance crews, alarms, manhole inspections and CCTV data to optimize cleaning cycles. SMD has an opportunity to improve maintenance optimization once code-based data linked with individual assets is collected in the future MMS.
    - SMD has an additional opportunity to employ machine learning to support prediction of cleaning required in pipe segments not currently assigned to a periodic cleaning cycle.
- SMD documents work activities in the field using paper forms.
    - Customer calls and compliant investigations are documented on a Request for Assistance Form.
    - Connection requests are documented on a Request for Saddle Form.
    - Service Requests are documented on a Service Request Form.
    - Sewer Cleaning activities for a particular pipe segment are documented on a Sewer Cleaning Report (SLIP-SC) form.
    - CCTV referrals are documented on a Sewer Televising Report (SLIP-TV) Form. CCTV is performed on a contractor, which is reviewed by Engineering and triggers repair and rehabilitation when deficiencies are detected.

- Work orders are documented in Maximo. Work activities are being documented at the work order level and not the asset level, reducing the effectiveness of the data stored in the MMS.
- SMD is planning to replace Maximo in the near-future with a new MMS with the goal of significantly improving documentation of work activities in the MMS to support maintenance optimization decision-making and improved performance management.
- The SSMP does not document repair activities and Dig Alert activities. Update the SSMP to include a description of these activities.
- SMD does not have an asset inventory for pump stations. SMD should develop an asset inventory for pump stations along with a preventive maintenance program and standard condition assessment protocol for pump station assets. SMD needs a work plan and resources plan for the treatment plant and pump station maintenance program.

Regular Visual and TV Inspections of Maintenance Hole and Sewer Pipes

- SMD has a goal of periodically televising all sewer pipelines. The last CCTV cycle occurred over a 15-year period. SMD has a goal to complete the next cycle within 10 years. Consider using CCTV data collected during this next cycle to gain an understanding of the degradation rate of specific types of pipe defects. Use this analysis to develop asset specific monitoring schedules driving future CCTV inspection scheduling.
- CCTV data is provided to Engineering. Engineering will research issues found during CCTV inspection and determine whether it is an issue the yard needs to address either with recurring maintenance or one-time maintenance actions.
    - CCTV data is not currently available for use by the Maintenance Yards. Consider implementing a system to store CCTV inspection data in a central repository accessible by staff at maintenance yards.
- SMD visually inspects every sewer manhole once over 6-months. Currently, manhole inspections are documented by marking on a mapbook page assigned with the manhole inspection work order. Consider implementing an inspection documentation process to document the specific finding of each manhole inspection performed by a crew.

System for Ranking and Selecting Pipe Segments for Remediation

- SMD performs system-wide CCTV inspection on a cycle. CCTV inspection is performed in batches by a CCTV contractor and an inspection report and data is generated for each separate City or collection system area. Quality control of contractor CCTV is performed after the work is complete. SMD should develop a quality control program to evaluate early batches of CCTV data and provide timely feedback to improve overall quality of the remainder of CCTV on the contract.

- The CCTV contractor will notify SMD is critical defects are observed. SMD will address critical defects (e.g. pipe collapses, defects with visible voids or visible soil) using emergency contracts.
- Once CCTV for a city or collection system area is complete, SMD Engineering will review PACP Structural Grade 4 and 5 defects to identify pipe segments requiring repair or rehabilitation.
    - Consider developing remediation decision guidelines to support Engineering staff with determining remediation actions.
    - Consider building decision guidelines into asset management tools to support Engineering staff with applying decision guidelines efficiently. Current off-the-shelf decision support tools support risk assessment, data and video review, remediation decision support and decision documentation.
- SMD has as-needed sewer repair contracts in place to perform sewer repair work. SMD Engineering will plan and execute capital projects for sewer rehabilitation.
- In the last CCTV inspection cycle, only 23 miles (~0.5%) of pipelines needed repair or rehabilitation. This indicates the collection systems SMD manages are in good condition and in the early phases of degradation. A large portion of the systems SMD manages were constructed in the post-WWII time period using modern vitrified clay pipe, modern construction methods, and high standards for lateral connections.
- SMD does not have a risk assessment framework for pipelines. Consider development of a risk assessment framework.
    - Consider likelihood factors such as:
        - Soil movement
        - Calcium/mineral deposits
        - Materials such as truss pipe or ductile iron pipe
        - Pipes requiring aggressive maintenance (hard on older clay pipes or clay pipes with significant structural issues
        - Roots intrusion
        - Infiltration
    - Consider consequence factors such as:
        - Proximity to surface waters
        - Potential for large volume SSO
        - Impacts to critical facilities or business districts
        - Impacts to public/customers
        - Difficult accessibility or constrained easements

System for Ranking and Selecting Pump Stations for Remediation

- SMD does not have a risk assessment framework and risk evaluation approach for pump stations. Develop a risk assessment framework for pump stations.

- SMD does not have a standard condition assessment approach for pump stations. Develop a standard condition assessment approach for pump stations to support risk assessment and rehabilitation and replacement planning.

Schedule for Developing Funds Needed for Capital Improvements

- SMD is initiating the next 10-year CCTV program and will be inspecting approximately 500 miles per year.
- SMD should consider developing a strategy for upgrading older pump stations. Once the strategy is developed, SMD can then determine the funding requirements and schedule to implement the strategy.
- Current Accumulative Capital Outlay (ACO) Program balance is $28M. SMD is limited on how much funding can be increased to build up a fund balance for future improvements needed to rehabilitate and replacement pipelines and pump stations.
- SMD does not have a long-term forecast of system rehabilitation and replacement needs. SMD should consider developing a strategic asset management plan for pump stations and pipelines to forecast longer-term repair, rehabilitation and replacement needs and determine the level of funding required to invest for sustainable management of the system.

4.2.5 Element 5 – Design and Performance Provisions

WDR Requirement:

a. *Design and construction standards and specifications for the installation of new sanitary sewer systems, pump stations and other appurtenances; and for the rehabilitation and repair of existing sanitary sewer systems; and*

b. Procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances and for rehabilitation and repair projects.

Audit Finding:

- DPW has standard plans and specifications for the construction of sanitary sewers and appurtenances to ensure that sewer lines and connections are properly designed and constructed. The DPW specifications by reference incorporate the Standard Plans and Specifications for Public Works Construction, Special Provisions, and Standard Drawings.
- DPW has a Private Contract Sanitary Sewer Procedural Manual and Guidelines for the Design of Pump Stations, etc., to ensure consistency in the design of collection systems within the unincorporated County areas. The current standard is to require dual force mains in new pump stations. The design manual for pump stations is outdated as standard are continually changing. SMD should consider updating the pump station design manual.
- Each city within the CSMD has its own design and construction standards and requirements. Prior to accepting newly completed sewer system for maintenance, the CSMD requires the city's assurance that the system has been designed and constructed to their standards.

- DPW's Land Development Division provides inspection services for the installation of new and rehabilitation of deteriorated sanitary sewer facilities in the unincorporated County area.
- DPW requires the preparation and submittal of "As-Built" plans of completed projects prior to final approval and acceptance of the project as public infrastructure.
- The Districts also require all new sewers and sewer lines rehabilitated by lining be televised and the video reviewed by SMD's personnel prior to the acceptance of the completed project.
- The Districts' policy also requires that all new or rehabilitated pumping stations be inspected by experienced SMD Electro-Mechanics prior to acceptance for maintenance by the SMD.

4.2.6 Element 6 – Overflow Emergency Response Plan

WDR Requirement:

Each Enrollee shall develop and implement an overflow emergency response plan that identifies measures to protect public health and the environment. At a minimum, this plan must include the following:

a. Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSOs in a timely manner;

b. A program to ensure an appropriate response to all overflows;

c. Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, Regional Water Boards, and water suppliers) of all SSOs that potentially affect public health or reach the waters of the State in accordance with the MRP. All SSOs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Board WDRs or NPDES permit requirements. The Sewer System Management Plan (SSMP) should identify the officials who will receive immediate notification;

d. Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained;

e. Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and

f. A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.

Audit Finding:

Appendix G of the SSMP documents the Standard Sanitary Sewer Overflow Response Procedure.

Proper Notification Procedures

- Section 2.3.5 of the Standard Sanitary Sewer Overflow Response Procedure provides an SMD SSO Procedure Flow Chart noting which agencies need to be notified when an SSO occurs.
- The sewer overflow report form used by field crews to document sewer overflows contains a page providing an Agency Notification List with contact information along with guidance on when agencies should be notified.

Appropriate Response

- SMD has the staff and equipment to appropriately respond to the majority of SSO events. SMD has the ability to gain access to additional staff to support SSO response such as access to Flood Control support for larger SSO events discharging into Flood Control channels. Flood Control has containment equipment to capture and contain flows using a rubber dam if needed. SMD also has access to emergency contractor support.

Prompt Notification to Regulatory Agencies and Affected Entities

- The SSO field report form includes agency notification protocols and a contact list. SMD has not experienced issues with agency notification.

Procedures to Ensure Staff and Contractors Follow Response Protocols

- SMD trains sewer maintenance staff on the Standard Sanitary Sewer Overflow Response Procedure. SMD reviews SSO response actions to identify corrective actions to improve future response.
- SMD does not have documented pump station response protocols to use for training. SMD should consider developing site specific pump station response protocols. Since SMD has a large number of stations, a set of typical response protocols can be created for similar pump stations to reduce the effort required to develop the protocols.

Procedures to Address Emergency Operations Such as Traffic and Crowd Control

- The Standard Sanitary Sewer Overflow Response Procedure does not include procedures to address traffic and crowd control. Update to document standard protocols for traffic and crowd control.

Program to Ensure Reasonable Steps Taken to Contain Flow and Prevent Discharges to Water of US; Steps to Minimize and Correct Impacts to Environment

- The Standard Sanitary Sewer Overflow Response Procedure does not document any of the containment protocols used by SMD to contain SSOs. Update to document standard containment protocols and containment equipment available to crews.
- The Standard Sanitary Sewer Overflow Response Procedure does not document steps typically taken to minimize and correct impacts to the environment. For example, the procedure does not document that different approaches to clean up a spill depending on where the spill occurs. Document different approaches to spill cleanup that may be necessary depending on whether the spill occurs in a street, on landscape, or in an environmentally sensitive area.

- The Standard Sanitary Sewer Overflow Response Procedure should contain guidance for the decision on when to focus initial effort on containment versus blockage removal.
- The Standard Sanitary Sewer Overflow Response Procedure should include protocols for determining the point of discharge from the storm drainage system to Waters of the State and protocols for intercepting and capturing sewage entering into the storm drainage system. The procedure should also contain protocols for cleaning the portion of the storm drainage system impacted by the sewer overflow.

4.2.7 Element 7 – FOG Control Program Plan

WDR Requirement:

Each Enrollee shall evaluate its service area to determine whether a FOG control program is needed. If an Enrollee determines that a FOG program is not needed, the Enrollee must provide justification for why it is not needed. If FOG is found to be a problem, the Enrollee must prepare and implement a FOG source control program to reduce the amount of these substances discharged to the sanitary sewer system. This plan shall include the following as appropriate:

a. An implementation plan and schedule for a public education outreach program that promotes proper disposal of FOG;

b. A plan and schedule for the disposal of FOG generated within the sanitary sewer system service area. This may include a list of acceptable disposal facilities and/or additional facilities needed to adequately dispose of FOG generated within a sanitary sewer system service area;

c. The legal authority to prohibit discharges to the system and identify measures to prevent SSOs and blockages caused by FOG;

d. Requirements to install grease removal devices (such as traps or interceptors), design standards for the removal devices, maintenance requirements, BMP requirements, record keeping and reporting requirements;

e. Authority to inspect grease producing facilities, enforcement authorities, and whether the Enrollee has sufficient staff to inspect and enforce the FOG ordinance;

f. An identification of sanitary sewer system sections subject to FOG blockages and establishment of a cleaning maintenance schedule for each section; and

g. Development and implementation of source control measures for all sources of FOG discharged to the sanitary sewer system for each section identified in (f) above.

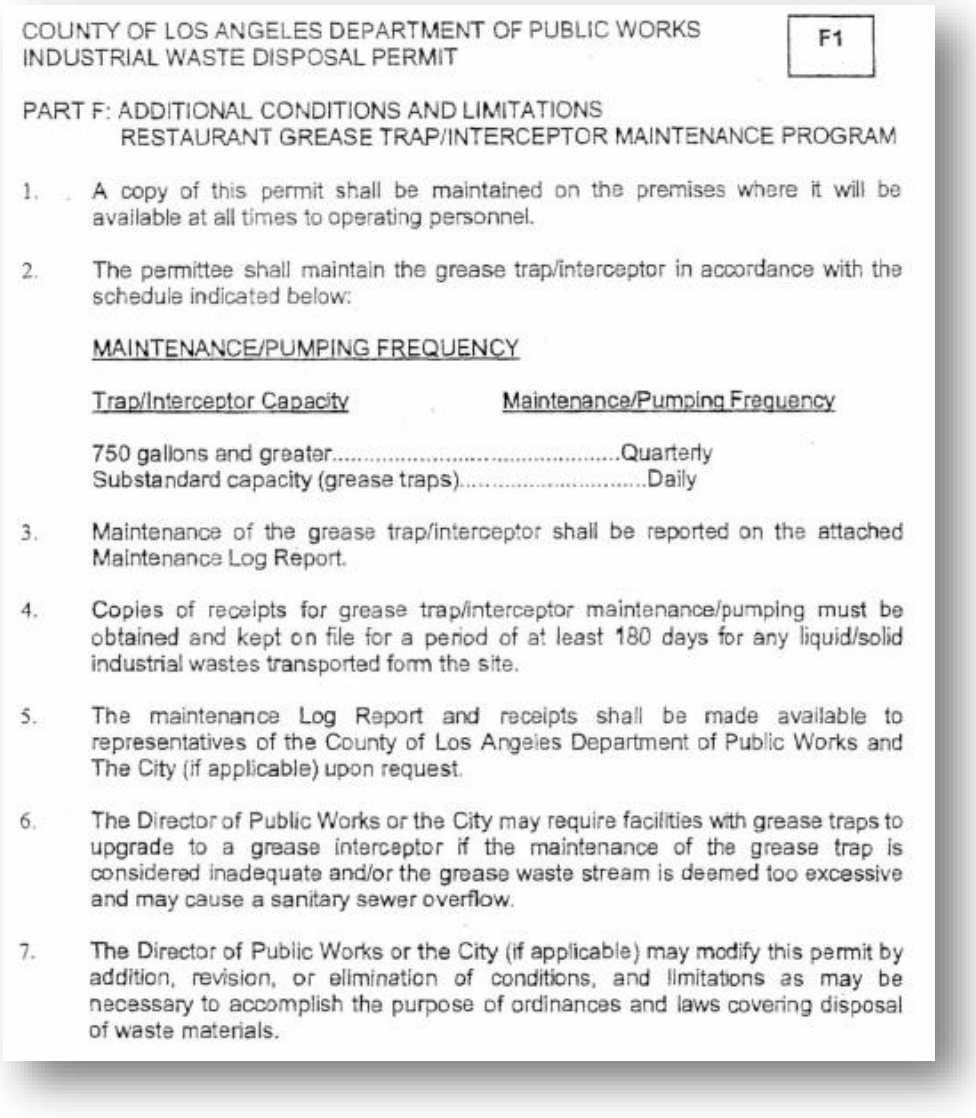
Audit Finding:

- Environmental Programs Division (EPD) is responsible for performing fats, oils and grease source control inspections of food service establishments (FSEs). EPD has 31 source control inspectors and 7 field offices. The workplan for inspectors is dynamic.
- EPD performs source control for 37 SMD Cities by contract and all unincorporated areas.

- Any FSE with potential to produce grease are required to install a grease control device.
- Any commercial FSE wanting to do business in Los Angeles County is required to obtain a business license. Any new FSE or remodels are required to obtain a permit from the Building and Safety Division (BSD). Same for a change in ownership.
- EPD requires each FSE to obtain an Industrial Waste Discharge Permit. EPD performs annual inspection of all FSEs. The annual anniversary date is based on the date the permit was issued. Upcoming permit inspections are printed on a monthly basis and assigned to FOG source control inspectors. Inspector perform inspections, document results, and enter the data into the HMS database.
- EPD maintains a database for source control data. Plans are scanned and available to FOG source control inspectors. The database tracks activities according to the Site ID, which is linked with a specific parcel as well as by a File ID linked with the specific business. A new File ID is generated upon ownership change.
- The COVID pandemic has interrupted normal inspection operations. EPD has developed specific protocols for operating during the pandemic for the safety of EPD employees and the public. Moving forward, EPD is working to stay on schedule with inspection activities. Inspectors currently have limited ability to stay on-site and are asking for GCD maintenance documentation to be provided. Inspectors are requesting electronic records.
- EPD has guidelines in place for performing FSE inspections. During the inspection the inspector will perform a physical inspection of the Grease Removal Device (GRD). If the GRD is a Grease Interceptor (GI), the inspector will open and inspect. If an issue is found during the inspection, the inspector will document on a job order. The FSE will sign off and is given a receipt. Requirements for issues are assigned on a case-by-case basis. The typical inspection workflow consists of the following steps:
    - Research plans
    - Prep for inspection
    - Review operations
    - Request Receipts/documentation for GRD maintenance
        - Receipt of FOG disposal manifest is required
            - Who discharged
            - What was discharged
            - Volume discharged
            - Where discharged
    - Walk through questions
        - Waste oil management
        - GRD maintenance
        - Changes in operation affecting permit
        - Frequency of maintenance

        - Walk around outside; visually inspect the trash area; check compliance with Best Management Practices (BMP) for FOG disposal
        - Check to see if BMP poster is posted in the kitchen in visible area
    - Determine if violation or compliance issue
        - If yes, then Notice of Violation generated during the visit and provided.

- The Industrial Waste Disposal Permit Conditions and Limitations has a minimum maintenance frequency condition and a requirement to maintain the GRD in proper working order. The permit conditions are researched and documentation is requested during the inspection to ensure the FSE is complying with the permit conditions.
    - FSEs with grease traps are required to perform daily maintenance.
    - Grease interceptors are required to be cleaned at least once every 3 months.
    - Part F of the Industrial Waste Disposal Permit include the following additional condition and limitations:



COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
INDUSTRIAL WASTE DISPOSAL PERMIT

F1

PART F: ADDITIONAL CONDITIONS AND LIMITATIONS
RESTAURANT GREASE TRAP/INTERCEPTOR MAINTENANCE PROGRAM

1. A copy of this permit shall be maintained on the premises where it will be available at all times to operating personnel.

2. The permittee shall maintain the grease trap/interceptor in accordance with the schedule indicated below:

MAINTENANCE/PUMPING FREQUENCY

Trap/Interceptor Capacity	Maintenance/Pumping Frequency
750 gallons and greater	Quarterly
Substandard capacity (grease traps)	Daily

3. Maintenance of the grease trap/interceptor shall be reported on the attached Maintenance Log Report.

4. Copies of receipts for grease trap/interceptor maintenance/pumping must be obtained and kept on file for a period of at least 180 days for any liquid/solid industrial wastes transported form the site.

5. The maintenance Log Report and receipts shall be made available to representatives of the County of Los Angeles Department of Public Works and The City (if applicable) upon request.

6. The Director of Public Works or the City may require facilities with grease traps to upgrade to a grease interceptor if the maintenance of the grease trap is considered inadequate and/or the grease waste stream is deemed too excessive and may cause a sanitary sewer overflow.

7. The Director of Public Works or the City (if applicable) may modify this permit by addition, revision, or elimination of conditions, and limitations as may be necessary to accomplish the purpose of ordinances and laws covering disposal of waste materials.

- FOG haulers have multiple options for disposing grease.
    - Baker Commodity in Vernon
    - Specific disposal locations in City of Los Angeles or County Sanitation Districts of Los Angeles County collection systems. These are regulated and require a fee.
- EPD is notified of new FSEs, remodels or changes in ownership by BSD or the Building Departments of the SMD cities. Initial inspections of new FSEs, remodels, or changes in ownership take longer than the typical routine inspection. The inspector will draw a diagram of plumbing and installation of the GCD.
- FSEs are required to size, design and construct grease traps and interceptors according to the Los Angeles County Plumbing Code.
- Enforcement Workflow

- Unincorporated Areas
  - Inspector generates Notice of Violation or Order to Comply and will provide a compliance date.
  - After time has passed, the inspector will follow up with the FSE to determine if compliance is achieved or to remind about the compliance issue. If necessary, the inspector may elevate the compliance issue to the Supervisor.
  - If necessary, the compliance issue can be further elevated to headquarters and a final Notice of Violation/Order to Comply can be issued. This final communication will have stronger language. In general, this step is not used as most situations are resolved prior to reaching this milestone.
  - The final step in the enforcement protocol is to refer the compliance issue to the District Attorney. The FSE will have the opportunity to meet in an office conference. If not resolved, then it will be resolved in court. This is extremely rate for a FOG source control compliance issue to reach this step in the enforcement process. No example provided of reaching this point in the process.
- SMD Cities
  - EPD follows similar approach outlined above, yet will provide Notice of Violation to the SMD City's Code Enforcement. If further elevated, the matter will then go to the SMD City's City Attorney.

- When SMD encounters a FOG issue in the collection system either as a result of an SSO, CCTV inspection or sewer cleaning, SMD will evaluate the areas to determine whether the grease issue can be characterized as residential, commercial or both.
  - If the SSO is characterized as being linked to a residential issue, SMD will go door-to-door and leave door hangers notifying residents of the SSO event and proper grease disposal practices.
  - Sometime it is difficult to pinpoint the source of the issue
  - If specific pipe segments are identified as having recurring grease accumulation issues, SMD will place on a periodic to address the issue through preventive maintenance cleaning.
  - If the SSO is characterized as having linkage to a potential commercial grease issue, the SSO is referred to EPD for investigation. EPD will bracket the area and determine with businesses may have contributed. EPD will check the maintenance of GRD.
    - If an FSE without a GRD is found to have caused an SSO, EPD will require the FSE to install a GRD.

  - If an FSE with a GRD is found to have caused an SSO, EPD may require more frequent GRD maintenance. This is determined on a case-by-case basis.
  - The investigation is documented in HMS system for each site visited. If determined pertinent, EPD will communicate results back to SMD via email.

- Analysis of sewer overflows over the last 10 years indicates an average of 32 percent of SSOs are linked to grease accumulation either as a primary or secondary cause factor. Between 2010 and 2014, an average of 34% of SSOs were linked to grease accumulation. Between 2015 and 2019, the average lowered slightly to 30% of SSOs caused by grease accumulation. SSOs linked to FOG accumulation are contributing approximately 0.5 to 0.6 SSOs per 100 miles per year.
- As mentioned in the O&M Program section of this audit, SMD is currently documenting the sewer cleaning crew findings from cleaning activities in a text field on work orders in Maximo at the work order level, making it very labor intensive to analyze and nearly impossible to incorporate into an automated or semi-automated decision support analysis. Currently, SMD relies on direct communications between sewer cleaning crew, yard clerk, supervisor and Superintendent to drive changes to maintenance frequencies on specific pipe segments. SMD should continue to move forward with maintenance management system improvements designed to improve maintenance documentation, planning, scheduling, reporting and decision workflows.

4.2.8 Element 8 – System Evaluation and Capacity Assurance Plan

WDR Requirement:

The Enrollee shall prepare and implement a capital improvement plan (CIP) that will provide hydraulic capacity of key sanitary sewer system elements for dry weather peak flow conditions, as well as the appropriate design storm or wet weather event. At a minimum, the plan must include:

a. Evaluation: Actions needed to evaluate those portions of the sanitary sewer system that are experiencing or contributing to an SSO discharge caused by hydraulic deficiency. The evaluation must provide estimates of peak flows (including flows from SSOs that escape from the system) associated with conditions similar to those causing overflow events, estimates of the capacity of key system components, hydraulic deficiencies (including components of the system with limiting capacity) and the major sources that contribute to the peak flows associated with overflow events;

b. Design Criteria: Where design criteria do not exist or are deficient, undertake the evaluation identified in (a) above to establish appropriate design criteria; and

c. Capacity Enhancement Measures: The steps needed to establish a short- and long-term CIP to address identified hydraulic deficiencies, including prioritization, alternatives analysis, and schedules. The CIP may include increases in pipe size, I/I reduction programs, increases and redundancy in pumping capacity, and storage facilities. The CIP shall include an implementation schedule and shall identify sources of funding.

d. Schedule: The Enrollee shall develop a schedule of completion dates for all portions of the capital improvement program developed in (a)-(c) above. This schedule shall be reviewed and updated consistent with the Sewer System Management Plan (SSMP) review and update requirements as described in Section D. 14.

Audit Finding:

- Building and Safety Division is responsible for ensuring newly constructed pipelines within County-owned unincorporated areas are constructed with adequate capacity.
    - The County requires submittal of a capacity study for new projects affecting the capacity of the public sewer system.
- Pump stations are designed for full buildout. If a developer wants to connect additional tracts they will be required to have an engineer evaluate pump station capacity needs.
- SMD is not responsible for capacity evaluation for pipelines owned by SMD cities.
- Approximately 98 percent of pipelines owned by SMD are less than 15 inches in diameter. Small diameter pipelines are sized based on estimating equivalent dwelling unit (EDU) flows coming from parcels connected to pipe segments. The number of upstream EDUs are accumulated to determine sizing of branch sewers. Pipeline sizing using this approach is conservative.
- SMD performs manhole inspections at every manhole in the system every 6 months. Crews identify signs of surcharge and high flows.
- SMD performs CCTV inspection on every pipe in the system. The last cycle occurred over a 15-year period. The height of the watermark in a pipe is used as an indicator of capacity.
- Between Calendar Year 2015 thru Calendar Year 2019, 4 of 126 SSOs occurring within County-owned pipelines (2 SSOs) or pump stations (2 SSOs) were attributed to capacity-related issues during wet weather events. All 4 SSOs occurred during heavy rain events.
- As stated in the SSMP, SMD should perform sewer line flow measurements to evaluate the capacity of sewer lines suspected of being surcharged. SMD should consider documenting the analysis performed and results.
    - SMD is using a flow level sensor to monitor flow at one of the locations with a capacity-related SSO.

4.2.9 Element 9 – Monitoring, Measurement, and Program Modifications

WDR Requirement:

The Enrollee shall:

a. Maintain relevant information that can be used to establish and prioritize appropriate Sewer System Management Plan (SSMP) activities;

b. Monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP;

c. Assess the success of the preventative maintenance program;

d. Update program elements, as appropriate, based on monitoring or performance evaluations; and

e. Identify and illustrate SSO trends, including: frequency, location, and volume.

Audit Finding:

Maintain relevant information that can be used to establish and prioritize appropriate Sewer System Management Plan (SSMP) activities

- SSO data is maintained in a spreadsheet database. SMD analyzes SSO trends as evidenced in previous SSMP program audit reports. The following clipping from the 2018 SSMP Program Audit shows the type of performance measurement and monitoring data SMD collects and analyzes for purposes on SSMP program review, modification and prioritization.

PERFORMANCE MEASURES INSTRUCTIONS FOR SSMP AUDIT

	Workload/Performance Indicator	Data Source/Calculation
Input		
1	Total miles of scheduled CCTV	Condition Assessment Unit Report (Enclosures E)
2	Total miles of scheduled periodic cleaning*	Maintenance Management System (MMS) Report (Enclosure C)
3	Total miles of scheduled cleaning (periodic and contract CCTV)*	Row 2 + Row 3
4	Total number of pump station inspections scheduled	# of Pump stations x 104 (sewer facilities summary sheet) (Enclosure H)
5	Total number of manhole inspections scheduled	# of Manholes x 2 (sewer facilities summary sheet) (Enclosure H)
Workload/Output		
6	Total number of SSOs responded to in a 12-month period**	Enclosures A or F
7	Total volume of SSOs	Enclosure A
8	Total SSO response time (in hours)	Enclosure A
9	Total miles of sewer lines maintained	Sewer facilities summary sheet (Enclosure H)
10	Total miles of scheduled periodic cleaning completed	SMD Productivity Report (Enclosure G)
11	Total number of pump stations maintained	Sewer facilities summary sheet (Enclosure H)
12	Total number of pump station inspections completed	SMD Productivity Report (Enclosure G)
13	Total number of manhole inspections completed	SMD Productivity Report (Enclosure G)
14	Total SSOs >1,000 gallons responded to	Enclosure A
15	Total FOG-related SSOs responded to	Enclosure A
16	Total root-related SSOs responded to	Enclosure A
17	Total SSOs due to other causes (debris, vandalism, etc.)	Enclosure A
18	Total number of capacity-related SSOs	Enclosure A
19	Total number of SSOs due to pump station malfunction	Enclosure A
20	Number of SSOs responded to within 2 hours or less	Enclosure A
21	Total miles of scheduled CCTV completed	CAU (Enclosure E)
22	Total miles of scheduled cleaning completed	Row 10 + Row 21
23	Total miles of CCTV completed (including contract CCTV)	SMD Productivity Report (Enclosure E & G)
24	Total miles of sewer lines cleaned (all including contract CCTV)	SMD Productivity Report (Hydro + Mechanical + Televising) (Enclosure E&G)
25	Total number of service requests responded to	SMD Productivity Report (excluding false alarms) (Enclosure G)
Efficiency		
26	Number of SSOs per 100 miles of sewer lines	Column 3 of SSO Report (Enclosure F)
27	Volume of SSOs recovered	Enclosure A
28	Number of SSOs that reached surface water	Enclosure A
29	Average response time per SSO	Row 9 / Row 7
30	Average number of SSOs per pump station	Row 20 / Row 12
Effectiveness/Outcome		
31	Percentage of SSOs >1,000 gallons	Row 15 / Row 7 x 100
32	Percentage of SSOs captured	Row 29 / Row 8 x 100
33	Percentage of SSOs due to FOG	Row 16 / Row 7 x 100
34	Percentage of SSOs due to roots	Row 17 / Row 7 x 100
35	Percentage of SSOs due to other causes	100% - (Row 35 + Row 36)
36	Percentage of SSOs that reached surface water	Row 30 / Row 7 x 100
37	Percentage of SSOs with response time 2 hours or less	Row 21 / Row 7 x 100
38	Percentage of manhole inspections completed	Row 14 / Row 6 x 100
39	Percentage of scheduled CCTV completed	Row 22 / Row 2 x 100
40	Percentage of pump station condition assessments completed	Row 25 / Row 1 x 100
41	Percentage of pump station inspections completed	Row 13 / Row 5 x 100
42	Percentage of scheduled cleaning completed ***	Row 23 / Row 4 x 100
43	SSOs from house laterals not related to mainline sewer problems	Column 16 - Column 17 of SSO Report (Enclosure F)

*Map of Hot Spots/Periodics (Enclosure D).
**Not including SSOs from house laterals.
***All scheduled periodics were completed. The higher than 100 and/or less than 100 percent completion rate recorded could be attributed to the different sewer segment length determination methods used by field staff and office engineers (GIS), plus the fact that occasional adjustments in the frequencies of the periodics are not reflected in these numbers.

- Maintenance data is documented using paper forms. Work activities are documented in work orders using Maximo MMS. Work activity documentation in Maximo MMS is not stored in an easy to analyze format. Maintenance performance measurement/management reporting is currently very labor-intensive and is periodically performed when needed.
    - SMD will generate a Crystal Report for Cities documenting maintenance activities performed. This report is voluminous and time consuming to generate and is only provided upon request.
- Program success is primarily measured by strong overall sewer overflow performance. SMD management meets with maintenance yard Superintendents and Supervisors monthly and review safety metrics, maintenance production, backlog and issues documented in a monthly staff report. Maintenance production is tracked using daily reporting and is not linked with the specific assets maintained. The combined leadership team will discuss trends in the monthly meetings and determine appropriate action.

  - SSOs are researched. Staff will check Maximo MMS to determine prior maintenance performed and whether a Periodic was past due. The goal is to identify a recommendation and determine a corrective action.
  - Yard Superintendents and Supervisors track progress to goal for key activities such as manhole inspections.

- Environmental Programs Division tracks FOG source control inspection activities in a database. FOG program permittees are inspected annually.
- Between, 2015 and 2019, 95 of 413 SSOs occurring in systems managed by WDID were related to grease.
- SMD assessed maintenance program work management business processes and developed business requirements for implementation of a new maintenance management system. Future enhancements include implementation of business processes to track maintenance activities at the asset-level to support improved management reporting. SMD should continue with implementation of the new maintenance management system. The new CMMS will provide a quantum leap in SMDs ability to manage maintenance work activities and collection system performance.
- Analysis of sewer overflows over the past five years indicates SMD is managing 16 collection systems with over 600 miles of sewer pipelines that have sewer overflow rates over 5 SSOs per 100 miles. SMD should consider modifying maintenance strategy within these areas to improve collection system performance.

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Table 4-6: Program of Work and Typical Program Modifications Identified for Core SSMP Elements

SSMP Element	Program of Work	Typical Program Modifications
Operations and Maintenance Program	• Manhole inspection • Sewer cleaning • Sewer inspection • Sewer repairs • Pump plant operations and maintenance	• Cleaning referrals • Cleaning frequency changes • Cleaning method changes • Inspection referrals • Sewer repairs and renewal identified
Overflow Emergency Response Plan	• SSO Response and Reporting	• After Action Review leads to lessons learned for response team
Fats, Oils, and Grease Control Program	• FOG inspections • FOG enforcement • Outreach	• FOG investigations • Targeted outreach
System Evaluation and Capacity Assurance	• Sewer rehabilitation planning • Sewer capacity availability review	• Problem areas identified • Flow monitoring • Capacity upgrades identified

4.2.10 Element 10 – SSMP Program Audits

WDR Requirement:

As part of the SSMP, the Enrollee shall conduct periodic internal audits, appropriate to the size of the system and the number of SSOs. At a minimum, these audits must occur every two years and a report must be prepared and kept on file. This audit shall focus on evaluating the effectiveness of the SSMP and the Enrollee's compliance with the SSMP requirements identified in this subsection (D.13), including identification of any deficiencies in the SSMP and steps to correct them.

Audit Finding:

Conduct periodic internal audits, appropriate to the size of the system and the number of SSOs

SMD manages 45 collection systems enrolled in CIWQS, which together has approximately 4,614 miles of collection system pipelines and 159 pump stations. As a whole, the portfolio of collection systems managed by SMD is the second largest collection of pipelines in California, with the largest being the City of Los Angeles. During the audit timeframe over Calendar Years 2018 and 2019, the collection systems managed by SMD had a combined sewer overflow rate ranging between 1.5 to 2 SSOs per 100 miles per year, which on average places SMD in a high-performing range for collection system performance. Within the portfolio, 16 of the 45 collection systems had an average SSO rate greater than 5.6 SSOs per 100 miles over the past two years.

These 16 collection systems include approximately 618 miles of pipelines (~13% of SMD managed collection system pipelines).

At a minimum, these audits must occur every two years and a report must be prepared and kept on file.

The last SSMP program audit was completed in December 2018. This SSMP program audit will be completed within two years of the last audit. SMD has posted all SSMP program audits on the SMD website:

https://dpw.lacounty.gov/smd/smd/index.cfm

Audit shall focus on evaluating the effectiveness of the SSMP and Enrollee's compliance with the SSMP requirements identified in D.13, in including identification of any deficiencies in the SSMP and steps to correct them.

Prior SSMP program audits include a review of multiple lagging and leading key performance indicators for to evaluate collection system performance and the performance of the SSMP program implementation. The audits also identify corrective actions for any deficiencies found during the audit process with steps to correct them.

Summary

Overall, the previous four SSMP program audits have been appropriate given the given the average SSO performance of SMD-managed infrastructure. In future audits, SMD may want to consider focusing additional inquiry on the root causes of SSOs occurring within the 16 collection systems with elevated SSO rates to identify corrective actions improve SSO performance in these collection systems. SMD may also want to consider transitioning the purpose of the SSMP Program Audit from focusing on WDR compliance to becoming a management system audit focused on driving continual improvement. This will lead to the SSMP Program Audit becoming a tool to drive change versus a task that requires a large effort with no reward.

4.2.11 Element 11 – Communication Program

WDR Requirement:

The Enrollee shall communicate on a regular basis with the public on the development, implementation, and performance of its SSMP. The communication system shall provide the public the opportunity to provide input to the Enrollee as the program is developed and implemented.

The Enrollee shall also create a plan of communication with systems that are tributary and/or satellite to the Enrollee's sanitary sewer system.

Audit Finding:

Regular communication with the public on the development, implementation, and performance of its SSMP; Communication system shall provide the public the opportunity to provide input as the program is developed and implemented.

- SMD hosts a Sewer Maintenance webpage on the Los Angeles County Department of Public Works website:
    - (https://dpw.lacounty.gov/smd/smd/index.cfm)
- The website provides the public with ample information regarding the SSMP and SSMP program implementation:
    - Interactive sewer mapping providing the public with a means to find the sewer map and sewer pipeline servicing their property
    - Annual performance reports
    - Current SSMP
    - SSMP audits (2010, 2012, 2015, 2018)
    - Condition assessment reports
    - FOG best management practices
    - Homeowner responsibilities
    - Answer to frequently asked questions
- The Sewer Maintenance webpage provides a means to report urgent problems:
    - https://pw.lacounty.gov/Contact/#emergencyInfo
- In 2016, SMD hosted a Waste Discharge Requirements workshop in Lakewood and provided four hours of training on the Waste Discharge Requirements, regulatory expectations, public outreach, SSMP audits, division of responsibilities between SMD and Cities.
    - SMD recorded video of all presentations from the workshops and provided a public link to the workshop videos.
- SMD provides a "Contact Us" link on the Sewer Maintenance webpage providing the public with a phone number for inquiries, an 800 number for emergencies and a mailing address for written inquiries.
- SMD provided the public with the opportunity to review the SSMP prior to adoption by the Los Angeles County Board of Supervisors. The SSMP was approved at a public meeting providing the public with the opportunity to comment.
- SMD may want to consider a page within Sewer Maintenance home dedicated to communicating WDR requirements and an overview of the SSMP. The page can provide an open invitation for the public to review the document and provide contact information for the public to provide comment at any time. The comments can be considered in the following SSMP audit and SSMP update.

Create a plan of communication with systems that are tributary and/or satellite to the sanitary sewer system

- SMD has on-going communications with SMD Cities regarding SSMP program activities.
    - SMD sends an report documenting SSMP program performance when requested.
    - SMD provides communication when an SSMP audit is performed and when the SMD SSMP is updated.

  - SMD communicates with a City during or following an SSO event as appropriate.
  - SMD periodically hosts training events regarding WDR compliance and invites SMD member cities to attend. SMD should consider hosting another set of WDR Workshops in the future to communicate the upcoming revisions to the WDR and to support SMD member cities with preparing for complying with the upcoming changes to the WDR.

- SMD has developed working relationships with City of Los Angeles Sanitation and Environment, Los Angeles County Sanitation Districts, City of Long Beach, Los Angeles County Flood Control, and Los Angeles County Department of Health. In cases where direct communication and action is needed such as a sewer overflow event, SMD's established relationships streamline communication and response.
- With regards to system capacity
  - In unincorporated County areas: LA County Building and Safety Division is responsible for reviewing new connection requests and determining whether the existing system is properly sized to accommodate additional sewer flows. This includes coordination with Los Angeles County Sanitation Districts (LACSD) to confirm the regional system can handle the increased flows.
  - Within the service areas of SMD member cities: Each City is responsible for reviewing new connection requests and determining whether their sewer pipelines are properly sized for wastewater flows. SMD member cities are also responsible for communicating and coordinating increases in flow with LACSD to determine the regional system can handle increased flows.

5 Strengths and Implementation Accomplishments

Documenting the strengths and implementation accomplishments of the SSMP is as important as determining the deficiencies and corrective actions. The City should both recognize the areas of strength in sewer system management as well as continue building upon success in these areas. **Table 5-1** includes the strengths and implementation accomplishments that were identified during the audit.

Table 5-1: Strengths and Implementation Accomplishments

WDR Provision	Strengths and Implementation Accomplishments
Overall	Strong sewer overflow performance with less than 2 SSOs per 100 miles per year.
D.13.ii – Organization	Multiple LROs assigned in CIWQS for each of the 45 WDIDs SMD is managing.
D.13.iii – Legal Authorities	Strong legal authorities.
D.13.iv – O&M Program	System network mapping is compiled and available on mobile devices and via the internet.
D.13.iv – O&M Program	Manhole inspection approach appears to be cost effective able to manage maintenance required on low to moderate risk pipe segments.
D.13.iv – O&M Program	SMD has completed one cycle of CCTV for the collection system and, in general, the pipelines appear to be in very good condition.
D.13.v – Design and Performance Provisions	The County has strong design and construction standards.
D.13.vii – FOG Control Program	The Environmental Programs Division has implemented a strong FOG source control inspection program along with a database to track inspection activities.
D.13.viii – System Evaluation and Capacity Assurance Plan	SMD has very few capacity-related sewer overflows. The County designs pump stations for full buildout. Developers are required to perform capacity analyses when requesting new connections to the system. The process is working.
D.13.ix – Monitoring, Measurement and Program Modifications	SMD develops monthly staff reports with performance metrics included. The combined SMD leadership team meets monthly to review program progress and identify actions to improve the program.
D.13.xi – Communication Program	SMD uses a website page to provide program transparency. The website includes the SSMP, past SSMP program audits, CCTV data and network mapping.

6 SSMP Audit Findings and Recommended Corrective Actions

Several audit findings were identified during the audit and are in this Section along with recommended corrective actions. Audit findings are divided into three categories and coded with a letter, as defined in **Table 6-1**. No compliance deficiencies were identified as a result of this audit, therefore, this audit finds the CSMD and MSMD in compliance with the WDR. Major and minor non-conformance findings and recommended corrective actions are included in **Table 6-2,** along with a status update for actions related to these findings. The table also includes opportunity findings and associated opportunities for improvement.

Table 6-1: Audit Finding Definitions

Finding Category	Finding Type	Finding Definition
A	Non-Compliance	A process or outcome resulting in the SSMP or SSMP Program implementation not currently being in compliance with the WDR/SSMP requirements.
B-major	Major Non-Conformance	Moderate to high risk that a statement in the SSMP is not fully conformed to the WDR. Moderate to high risk to the effectiveness of the SSMP implementation.
B-minor	Minor Non-Conformance	Low risk that a statement in the SSMP or SSMP Program implementation is not fully conformed to the WDR. Low risk to the effectiveness of the SSMP implementation.
C	Opportunity	Opportunity to improve effectiveness of SSMP program implementation. These findings and opportunities are not required by the WDR and are focused on enhancements to business processes, practices, and documentation.

Table 6-2: Audit Findings and Recommended Corrective Actions or Opportunities for Improvement

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category
D.13.i – Goal	Action #4 includes a statement to "completely recover the overflow". This is technically not feasible.	The County may want to update this action to statement to "recover the overflow to the extent feasible" or other language that is more realistic.	**B-minor**
D.13.ii - Organization	The SSMP states the Assistant Deputy Director for Sewer Maintenance Division is responsible for the execution of compliance actions required under the WDRs, including signing and certification of all reports and correspondence. Bill Winters is the Assistant Deputy Director for Sewer Maintenance Division, yet is not included as an Onsite Manager in CIWQS for any of the collection systems owned or managed by the County.	Consider adding Bill Winters as an Onsite Manager. Consider documenting any protocols or measures taken to ensure there is at least one LRO on duty and available when the Primary is unavailable.	**B-minor**
D.13.ii - Organization	SSMP does not specifically identify who is responsible for specific measures of the SSMP.	Consider creating a table identifying specific measures of the SSMP and the names or positions of the person(s) responsible for specific measures. Consider linking the positions responsible for specific measures of the SSMP to the positions shown on the SSMP organization chart.	**B-minor**
D.13.ii - Organization	Organization chart does not show Civil Engineer position and line of authority for Alex Villarama who is serving as an LRO.	Update the organization chart to the Civil Engineer position and line of authority for Alex Villarama who is serving as an LRO. Consider placing a tag on the organization chart showing which positions are serving as an LRO.	**B-minor**

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category
D.13.ii - Organization	The SMD SSO Procedures Flow Chart does not identify communications and notifications between crew lead and Supervisor/Superintendent and Managers and does not include communications with Cities when in their jurisdiction.	Consider updating to communications procedures to address. Consider noting this flow chart simplifies the SSO response workflow and is the typical SSO response workflow for the majority of SSOs the County experiences. Consider noting that large SSOs, high impacts SSOs, or SSOs requiring additional resources will include additional communications between the Crew Lead, Superintendent, Senior Civil Engineer and management when needed	**B-minor**
D.13.iv – O&M Program	Governance and protocols for updating CADD mapping and sewer GIS is not documented.	Consider documenting CADD mapping and sewer GIS governance and update processes.	**B-minor**
D.13.iv – O&M Program	The Sewer GIS does not include air pressure relief valves, designation of asset ownership, or installed/construction date or date of rehabilitation.	Consider updating the GIS to identify manhole ownership, identify pipe segment ownership and to map air pressure relief valves.	**B-major**
D.13.iv – O&M Program	SMD does not have set criteria for triggering frame and cover replacement. This is left up to the maintenance yard.	SMD should consider developing standard criteria for triggering manhole frame and cover replacement.	**C**
D.13.iv – O&M Program	SMD is currently documenting manhole inspections when an issue is identified.	In the future, use mobile devices to document every manhole inspection. Integrate assessment guidelines and criteria to trigger work orders directly from manhole inspection.	**C**

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category
D.13.iv – O&M Program	CCTV contractors are not required to provide documentation of cleaning findings. Pipe segments with significant material found during cleaning are communicated to SMD and placed on a periodic.	Consider requiring CCTV contractors and cleaning contractors to provide coded-based feedback for each pipe segment cleaned. Coded feedback typically includes a material type identified (e.g. R-roots, G-grease, D-debris, O-other) and a severity indicator (e.g. L-light, M-moderate, S-severe). A CL-clear code can be used when nothing is found	**C**
D.13.iv – O&M Program	SMD is not currently documenting sewer cleaning findings attached to each individual assets in the MMS. It is currently not possible to view the history of past cleaning findings on a specific asset.	Consider using code-based feedback for cleaning findings to document SMD cleaning activities.	**C**
D.13.iv – O&M Program	SMD does not employ information tools to support collecting and analyzing data from maintenance crews, alarms, manhole inspections and CCTV data to optimize cleaning cycles.	SMD has an opportunity to improve maintenance optimization once code-based data linked with individual assets is collected in the future MMS. SMD has an additional opportunity to employ machine learning to support prediction of cleaning required in pipe segments not currently assigned to a periodic cleaning cycle	**C**
D.13.iv – O&M Program	The SSMP does not document repair activities and Dig Alert activities.	Update the SSMP to include a description of these activities.	**B-minor**
D.13.iv – O&M Program	SMD does not have an asset inventory for pump stations.	SMD should develop an asset inventory for pump stations along with a preventive maintenance program and standard condition assessment protocol for pump station assets. SMD needs a work plan and resources plan for the treatment plant and pump station maintenance program.	**C**

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category
D.13.iv – O&M Program	SMD has collected at least one CCTV inspection on every pipe segment in the system.	Consider using CCTV data collected during this next cycle to gain an understanding of the degradation rate of specific types of pipe defects. Use this analysis to develop asset specific monitoring schedules driving future CCTV inspection scheduling	**C**
D.13.iv – O&M Program	CCTV data is not currently available for use by the Maintenance Yards.	Consider implementing a system to store CCTV inspection data in a central repository accessible by staff at maintenance yards.	**B-major**
D.13.iv – O&M Program	SMD performs system-wide CCTV inspection on a cycle. CCTV inspection is performed in batches by a CCTV contractor and an inspection report and data is generated for each separate City or collection system area. Quality control of contractor CCTV is performed after the work is complete.	SMD should develop a quality control program to evaluate early batches of CCTV data and provide timely feedback to improve overall quality of the remainder of CCTV on the contract.	**B-minor**
D.13.iv – O&M Program	Once CCTV for a city or collection system area is complete, SMD Engineering will review PACP Structural Grade 4 and 5 defects to identify pipe segments requiring repair or rehabilitation.	Consider developing remediation decision guidelines to support Engineering staff with determining remediation actions. Consider building decision guidelines into asset management tools to support Engineering staff with applying decision guidelines efficiently. Current off-the-shelf decision support tools support risk assessment, data and video review, remediation decision support and decision documentation	**C**
D.13.iv – O&M Program	SMD does not have a risk assessment framework for pipelines.	Consider development of a risk assessment framework.	**B-major**
D.13.iv – O&M Program	SMD does not have a risk assessment framework and risk evaluation approach for pump stations.	Develop a risk assessment framework for pump stations.	**B-major**

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category
D.13.iv – O&M Program	SMD does not have a standard condition assessment approach for pump stations.	Develop a standard condition assessment approach for pump stations to support risk assessment and rehabilitation and replacement planning. SMD should consider developing a strategy for upgrading older pump stations. Once the strategy is developed, SMD can then determine the funding requirements and schedule to implement the strategy.	**C**
D.13.iv – O&M Program	SMD does not have a long-term forecast of system rehabilitation and replacement needs.	SMD should consider developing a strategic asset management plan for pump stations and pipelines to forecast longer-term repair, rehabilitation and replacement needs and determine the level of funding required to invest for sustainable management of the system.	**C**
D.13.v – Design and Performance Provisions	The design manual for pump stations is outdated.	SMD should consider updating the pump station design manual.	**B-minor**
D.13.vi – Overflow Emergency Response Plan	SMD does not have documented pump station response protocols to use for training.	SMD should consider developing site specific pump station response protocols. Since SMD has a large number of stations, a set of typical response protocols can be created for similar pump stations to reduce the effort required to develop the protocols.	**B-minor**
D.13.vi – Overflow Emergency Response Plan	The Standard Sanitary Sewer Overflow Response Procedure does not include procedures to address traffic and crowd control.	Update to document standard protocols for traffic and crowd control.	**B-major**

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category
D.13.vi – Overflow Emergency Response Plan	The Standard Sanitary Sewer Overflow Response Procedure does not document any of the containment protocols used by SMD to contain SSOs.	Update to document standard containment protocols and containment equipment available to crews. Consider including guidance for the decision on when to focus initial effort on containment versus blockage removal. The Standard Sanitary Sewer Overflow Response Procedure should include protocols for determining the point of discharge from the storm drainage system to Waters of the State and protocols for intercepting and capturing sewage entering into the storm drainage system. The procedure should also contain protocols for cleaning the portion of the storm drainage system impacted by the sewer overflow.	**B-major**
D.13.vi – Overflow Emergency Response Plan	The Standard Sanitary Sewer Overflow Response Procedure does not document steps typically taken to minimize and correct impacts to the environment. For example, the procedure does not document that different approaches to clean up a spill depending on where the spill occurs.	Document different approaches to spill cleanup that may be necessary depending on whether the spill occurs in a street, on landscape, or in an environmentally sensitive area.	**B-minor**
D.13.viii – System Evaluation and Capacity Assurance Plan	As stated in the SSMP, SMD should perform sewer line flow measurements to evaluate the capacity of sewer lines suspected of being surcharged.	SMD should consider documenting the analysis performed and results.	**B-minor**

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category
D.13.ix – Monitoring, Measurement and Program Modifications	SMD assessed maintenance program work management business processes and developed business requirements for implementation of a new maintenance management system. Future enhancements include implementation of business processes to track maintenance activities at the asset-level to support improved management reporting.	SMD should continue with implementation of the new maintenance management system. The new CMMS will provide a quantum leap in SMDs ability to manage maintenance work activities and collection system performance.	**C**
D.13.ix – Monitoring, Measurement and Program Modifications	Analysis of sewer overflows over the past five years indicates SMD is managing 16 collection systems with over 600 miles of sewer pipelines that have sewer overflow rates over 5 SSOs per 100 miles.	SMD should consider modifying maintenance strategy within these areas to improve collection system performance.	**B-minor**
D.13.x – SSMP Program Audits	Overall, the previous four SSMP program audits have been appropriate given the given the average SSO performance of SMD-managed infrastructure.	In future audits, SMD may want to consider focusing additional inquiry on the root causes of SSOs occurring within the 16 collection systems with elevated SSO rates to identify corrective actions improve SSO performance in these collection systems. SMD may also want to consider transitioning the purpose of the SSMP Program Audit from focusing on WDR compliance to becoming a management system audit focused on driving continual improvement. This will lead to the SSMP Program Audit becoming a tool to drive change versus a task that requires a large effort with no reward.	**C**

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category
D.13.xi – Communication Program	The SMD website does not provide background on the WDR. The website does not provide an invitation to provide input on the SSMP.	SMD may want to consider a page within Sewer Maintenance home dedicated to communicating WDR requirements and an overview of the SSMP. The page can provide an open invitation for the public to review the document and provide contact information for the public to provide comment at any time. The comments can be considered in the following SSMP audit and SSMP update.	**C**
D.13.xi – Communication Program	SMD periodically hosts training events regarding WDR compliance and invites SMD member cities to attend.	SMD should consider hosting another set of WDR Workshops in the future to communicate the upcoming revisions to the WDR and to support SMD member cities with preparing for complying with the upcoming changes to the WDR.	**C**