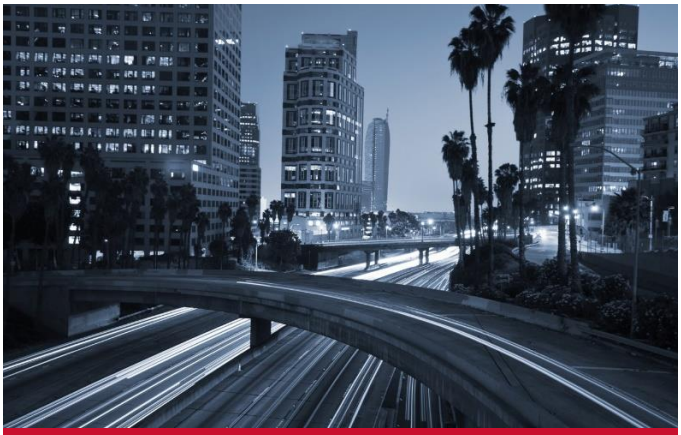


SSMP Program Audit

City of Los Angeles

LA Sanitation & Environment

Los Angeles, CA

January 25, 2019

Contents

Tables

Figures

Table of Acronyms

Acronym	Description
BMP	Best Management Practices
CCTV	Closed Circuit Television
CIP	Capital Improvement Plan
CIPP	Cured-In-Place Pipe
City	City of Los Angeles
CIWQS	California Integrated Water Quality System
CMMS	Computerized Maintenance Management System
CS	Collection System
CWNCD	Clean Water North Collection Division
CWSCD	Clean Water South Collection Division
d/D	Depth to Diameter ratio
EMD	Environmental Monitoring Division
EMPAC	Enterprise Maintenance Planning and Control
FAST	Field Automation Sanitation Trucks
FOG	Fats, Oils and Grease
FSE	Food Service Establishment
GIS	Geographical Information System
HWRP	Hyperion Water Reclamation Plant
ISCD	Industrial Safety and Compliance Division
IWMD	Industrial Waste Management Division
JWPCP	Joint Water Pollution Control Plant
LABOE	LA Bureau of Engineering
LACSD	Sanitation Districts of Los Angeles County
LAFD	LA Fire Department

LAPD	LA Police Department
LASAN	LA Sanitation & Environment
LRO	Legally Responsible Official
MGD	Million Gallons per Day
MRP	Monitoring and Reporting Requirements
MS4	Municipal Separate Storm Sewer System
NASSCO	National Association of Sewer Service Companies
NEIS	Northeast Interceptor Sewer
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OES	Office of Emergency Services
PACP	Pipeline Assessment and Certification Program
PM	Preventive Maintenance
QC	Quality Control
R&R	Rehabilitation and Replacement
R4	Los Angeles Regional Water Quality Control Board, Region 4
RAMS	Risk Assessment Management System
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow
SWRCB	State Water Resources Control Board
TIWRP	Terminal Island Water Reclamation Plant
WCIP	Wastewater Capital Improvement Program
WCSD	Wastewater Collection System Division
WDID	Waste Discharger Identification
WDRs	General Waste Discharge Requirements for Sanitary Sewer Systems (Order No. 2006-003)
WESD	Wastewater Engineering Services Division

1 Purpose

The purpose of this document is to report the results of the Sewer System Management Plan (SSMP) Program Audit conducted for the City of Los Angeles (City) Bureau of Sanitation, or LA Sanitation & Environment (LASAN), covering Calendar Years 2017 through 2018. 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 City's 2019 SSMP Program Audit. This audit was scheduled and completed within two years from the prior SSMP Program Audit finalized in February 2017.

2 Background

The City of Los Angeles operates and maintains approximately 6,500 miles of sanitary sewer pipelines, approximately 157,000 maintenance access structures, and 44 pumping plants. The City 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.

The City's sanitary sewers operate as three distinct collection systems with one system conveying to Hyperion Water Reclamation Plant (HWRP), one to Terminal Island Water Reclamation Plant (TIWRP), and the third discharging into the Sanitation Districts of Los Angeles County (LACSD) collection system and conveying to LACSD's Joint Water Pollution Control Plant (JWPCP) in Carson. **Table 2-1** includes information from the California Integrated Water Quality System (CIWQS) Facility At-A-Glance report for each of the City's three collection systems and identifies the Active Onsite Managers and Active Data Submitters identified for each collection system the City operates.

Table 2-1: Active Onsite Managers and Active Data Submitters Included in CIWQS Facility At-A-Glance Report

HYPERION COLLECTION SYSTEM

- **CIWQS WDID**: 4SSO10450
- **CIWQS Collection System Name**: Hyperion CS
- **Active Onsite Managers in CIWQS**: Barry Berggren, Brian McCormick, Efrain Gonzalez
- **Active Data Submitters in CIWQS**: Paul E. Blasman, Gerald Watson, Kwasi Berko
- **CIWQS Facility At-A-Glance Report Webpage**: https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?reportName=facilityAtAGlance&placeID=631789

TERMINAL ISLAND COLLECTION SYSTEM

- **CIWQS WDID:** 4SSO10491
- **CIWQS Collection System Name:** Terminal Island CS
- **Onsite Managers in CIWQS:** Barry Berggren, Brian McCormick, Efrain Gonzalez
- **Data Submitters in CIWQS:** Paul E. Blasman, Gerald Watson, Kwasi Berko
- **CIWQS Facility At-A-Glance Report Webpage:** https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?reportName=facilityAtAGlance&placeID=631858

REGIONAL SANITARY SEWER SYSTEM

- **CIWQS WDID:** 4SSO10502
- **CIWQS Collection System Name:** LA City Bureau of Sanitation CS
- **Onsite Managers in CIWQS:** Barry Berggren, Brian McCormick, Efrain Gonzalez
- **Data Submitters in CIWQS:** Paul E. Blasman, Gerald Watson, Kwasi Berko
- **CIWQS Facility At-A-Glance Report Webpage:** https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?reportName=facilityAtAGlance&placeID=630989

3 Audit Overview

This audit reviews the period between July 1, 2016 and June 30, 2018 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 2017 and analyzed sewer overflow performance through June 30, 2016.

The City's Sewer System Management Plan (SSMP) was last adopted by the Board of Public Works (i.e. the governing board) in February 2014. The SSMP was subsequently updated in 2017 to address findings from the February 2017 SSMP Program Audit. The changes to the SSMP in 2017 are not considered significant updates and did not require re-certification by the governing board.

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. The City intends to use the audit results to improve SSMP compliance and performance in reducing sewer overflows.

HDR conducted the audit on behalf of the City 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
Luis R. León, PE, BCEE, ENV SP	HDR	Subject Matter Expert, Project Manager
Elizabeth Lowell	HDR	Subject Matter Expert
Farsheed Farhang	LASAN	Audit Oversight and Coordination

SSMP audit interviews were performed over the three-day period from September 11, 2018 through September 13, 2018. The order of the audit interviews, WDR provisions discussed, and City staff interviewed is documented in **Table 3-2**.

Table 3-2: SSMP Audit Participants

Date	WDR Provision Section	Topics	Participants
9/11/2018	13.iv	O&M Program - Information and Data Management, Decision-Making-Secondary Sewer CCTV, and R&R Basin Planning	Barry Berggren Farsheed Farhang Oscar Figueroa Eduardo Perez Vincent Tan Regidia Voong Spencer Yu
9/11/2018	13.iv	O&M Program - Information and Data Management -Primary Sewer Inspection, Assessment, and Decision-Making	Barry Berggren Farsheed Farhang Oscar Figueroa Vincent Tan Regidia Voong
9/11/2018	13.iv	O&M Program - Information and Data Management-Cleaning PM for Large and Small Diameter Pipes	Barry Berggren Farsheed Farhang Vincent Tan
9/11/2018	13.iv	O&M Program - Information and Data Management - Pump Station O&M, RCM, Inspection, Condition Assessment and R&R Decision-Making	Barry Berggren Farsheed Farhang Vincent Tan
9/12/2018	13.iv	O&M Program - Review of Cleaning and Inspection Crew CMMS Records	Farsheed Farhang Vincent Tan
9/12/2018	13.iv	O&M Program - Review of Pump Station Crew CMMS Records and Documentation	Barry Berggren Farsheed Farhang Vincent Tan
9/12/2018	13.vi	Overflow Emergency Response Plan – Reporting	Barry Berggren Farsheed Farhang Brian McCormick
9/12/2018	13.vi	Overflow Emergency Response Plan – Response, Containment, Clean-up	Barry Berggren Farsheed Farhang Brian McCormick
9/12/2018	13.vii	FOG Control Program	Sam Amir Theodore Higgins Sereyivath Keng Bhupendra Patel Michael Simpson Diana Xu Farsheed Farhang
9/13/2018	13.viii	System Evaluation and Capacity Assurance Program	Javier Dennis Farsheed Farhang Ali Poosti Regidia Voong
9/13/2018	13.ix; 13.x	Monitoring, Measurement, and Program Modifications; SSMP Program Audits	Farsheed Farhang Ali Poosti
9/13/2018	13.xi	Communication Program	Farsheed Farhang
9/13/2018	13.v	Design and Performance Provisions	Farsheed Farhang Brad Jenson Ali Poosti
9/13/2018	13.i; 13.ii; 13.iii	Goal, Organization, and Legal Authorities	Farsheed Farhang Ali Poosti

4 Evaluation of SSMP Effectiveness

Overall, based on analysis of the sanitary sewer overflow (SSO) trends between July 1, 2016 through June 30, 2018 and the results of the SSMP Program audit, the overall program for managing the sewer systems is very effective and continues to operate at a high level of performance. The City has actively planned and implemented process improvements to improve program performance.

4.1 Sewer Overflow Performance

The primary measure of the effectiveness of the SSMP is sewer overflow performance. The primary indicators of sewer overflow performance include:

- **SSO Rate**: Number of SSOs per 100 miles of gravity mainlines and force mains per Year
- **Spills Impacting Surface Waters**: Number of SSOs and Spill Volume Reaching Surface Waters
- **High Volume SSO Events**: Number of High Volume SSO Events and associated Spill Volume

This section reviews the City's recent sewer overflow performance through analysis of the sewer overflow data reported to the State Water Resource Control Board (SWRCB) California Integrated Water Quality System (CIWQS) SSO database.

4.1.1 Sanitary Sewer Overflow Rate

The SSO rates of the City's three collection systems are in the category of high-performing sewer systems. During the audit period (July 2016 through June 2018), the City's three collection systems have consistently operated below 1.86 SSOs per 100 miles per year as shown in **Table 4-1**. When viewed as one unified system, the SSO rate for all sewer pipelines operated by the City was below 1.56 SSOs per 100 miles over the audit period.

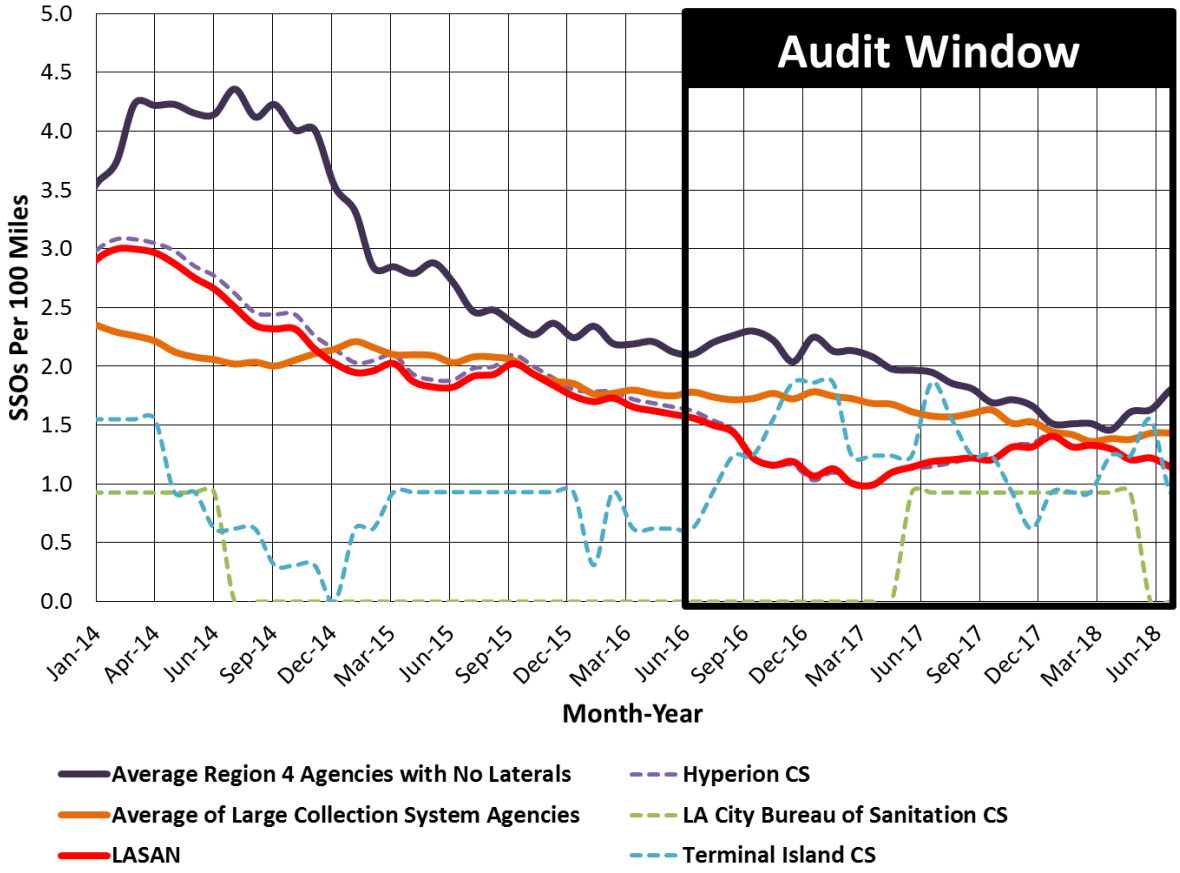
Table 4-1: SSO Rates for LA Sanitation's Collection Systems during the Audit Period

Collection System	Minimum SSO Rate	Average SSO Rate	Maximum SSO Rate	Miles
Hyperion	0.98	1.24	1.62	6,096
Regional	0.00	0.46	0.93	108
Terminal Island	0.62	1.26	1.86	323
Unified City System	0.99	1.24	1.56	6,472
Other Region 4 Agencies	1.46	1.90	2.30	12,923
Other Large Agencies	1.36	1.60	1.78	23,086

The City operates within the Regional Water Quality Control Board's Los Angeles Region, otherwise known as Region 4. The SSO rate of all three City collection systems is well below the average annual SSO rate during the same period of the other 85 active municipal agencies operating in Region 4 that do not have sewer lateral responsibility. **Figure 4-1** shows the 12-month rolling average of SSOs per 100 miles of pipelines per year from January 2014 through July 2018.

This excellent level of SSO performance in all three collections systems is accomplished through a combination of the following activities: an aggressive system-wide cleaning cycle; focused preventive maintenance (PM) cleaning; FOG source control inspections; pipeline closed circuit television (CCTV) inspection and condition assessment; and pump station maintenance.

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



4.1.2 Spills Impacting Surface Waters

During the audit period, the City experienced a total of 153 sewer overflow events, of which 3 percent (5 SSOs) resulted in a discharge to surface waters. During that same period, large agencies, with over 500 miles of gravity mains and force mains and no lateral responsibility, had 23 percent of events reaching surface waters, while other Region 4 agencies had 44 percent of events reaching surface waters. The City has far

fewer SSO events resulting in discharge to surface waters compared to local peer agencies and similar sized agencies as shown in **Table 4-2**.

The more important measure is the volume of sewage released to surface waters. During the audit window, the City released 1,697,649 gallons of sewage, with most of that volume released by one large SSO event on July 18, 2016. This is approximately 26,231 gallons released per 100 miles of sewer pipelines. This compares to 17,122 gallons released per 100 miles for large agencies and 6,907 gallons per 100 miles for local Region 4 peer agencies as shown in Table 4-2. Almost all of the discharge to surface waters occurred during the one large SSO event (99.8 percent) and in absence of that one event, the City would have discharged 45 gallons per 100 miles to surface waters. **Figure 4-2** further illustrates that, aside from the one large SSO event occurring in July 2016, the City is very effective at minimizing discharges to surface waters.

Table 4-2: Percent of Sewer Overflow Events and Volume Reaching Surface Waters between July 2016 and June 2018

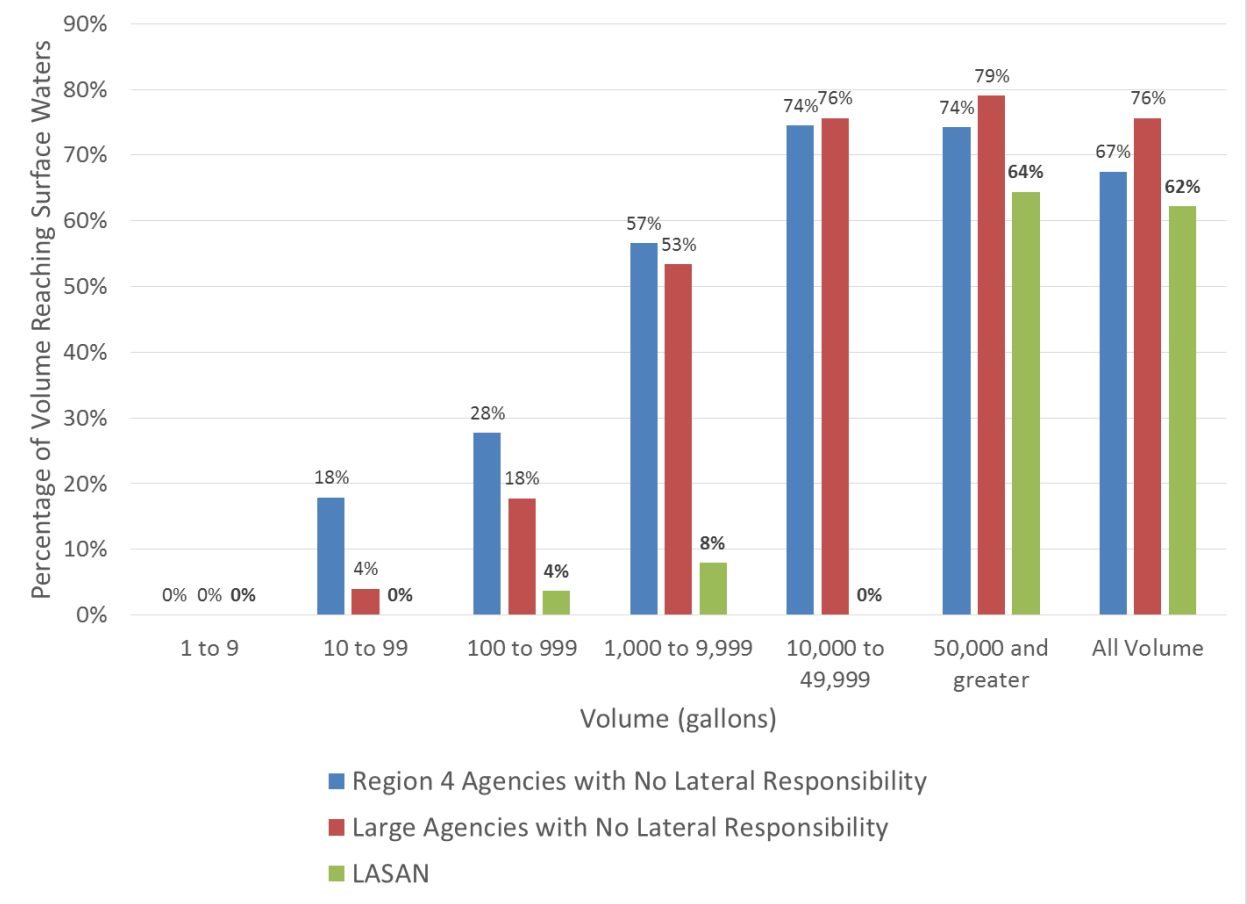
	Region 4 Agencies*	Large Agencies**	LASAN
Miles of Sewer	*12,923*	*23,086*	*6,472*
Number of SSOs	379	635	153
Number of SSOs Reaching Surface Waters	165	148	5
Percent of SSO Events Reaching Surface Waters	**44%**	**23%**	**3%**
Total Volume Spilled	1,322,827	5,225,402	2,730,408
Volume Reaching Surface Waters	892,543	3,952,874	1,697,649
Gallons Per 100 Miles Reaching Surface Waters	**6,907**	**17,122**	**26,231*** **

** Region 4 agencies include all municipal agencies with no lateral responsibility in the Los Angeles Regional Water Quality Control Board region, excluding LASAN.*

*** Large agencies include all agencies with over 500 miles of gravity mains or force mains and having no lateral responsibility, excluding LASAN.*

**** LASAN experienced one large SSO event causing the majority of the release to surface waters within the audit window. Aside from this one event, LASAN experienced only 4 other SSO events reaching surface water releasing 2,895 gallons to surface waters, which is less than 45 gallons per 100 miles.*

Figure 4-2: Percentage of Spill Volume Reaching Surface Waters between July 2016 and June 2018



4.1.3 Number and Size of Sewer Overflows

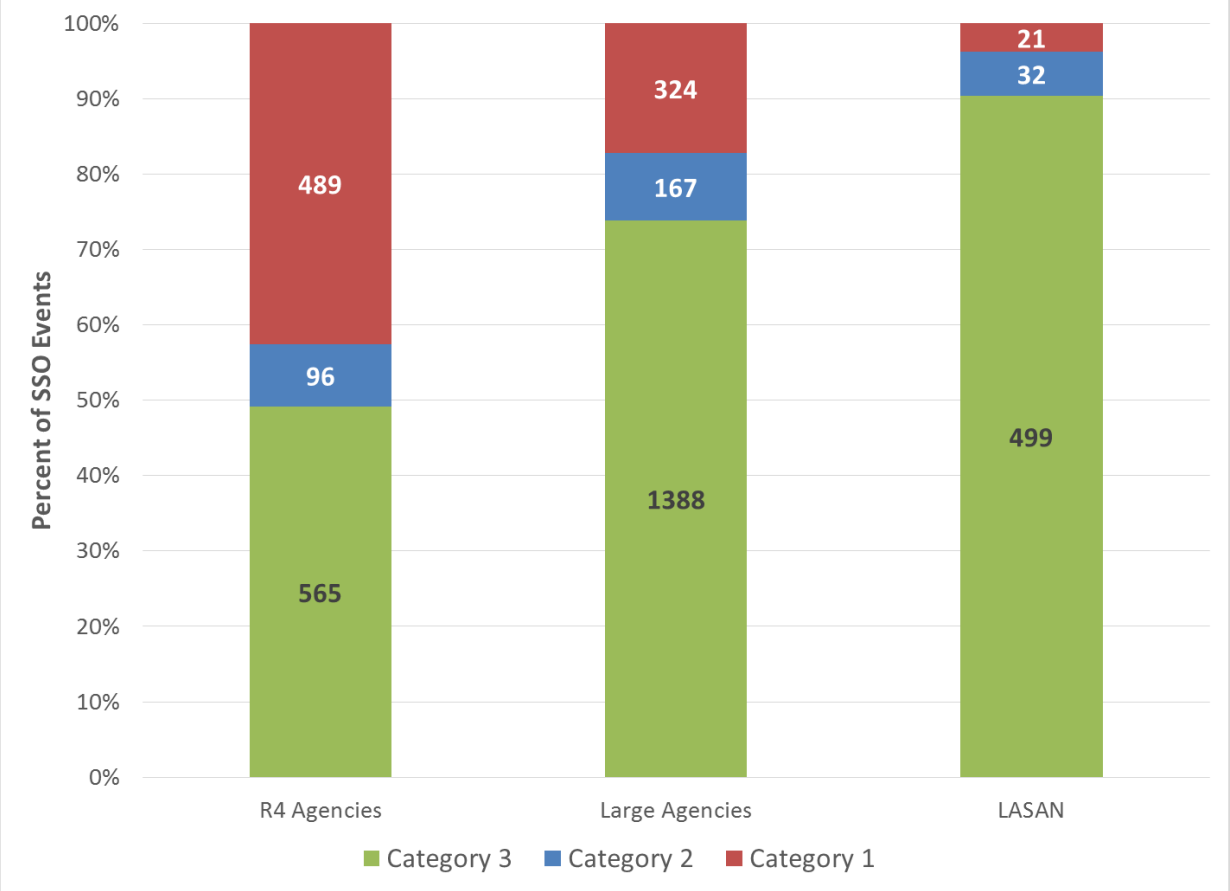
State Water Resources Control Board categorizes SSO events into Category 1, Category 2 or Category 3 as shown in **Table 4-3**. Category 1 SSOs are considered most severe since all are either large and/or reach surface waters. Category 3 SSOs are least severe since all are less than 1,000 gallons and do not reach surface waters. Figure 4-3 shows that most of the City's SSOs are the lower severity Category 3 SSOs. Almost 90 percent of the City's SSOs are Category 3 compared to approximately 74 percent for other comparable large agencies with no lateral responsibility and approximately 49 percent for other Region 4 agencies with no lateral responsibility.

Table 4-3: 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)*

Figure 4-3: Number and Percentage of SSOs by Category (July 2013 through June 2018)



The majority of SSOs occurring in the City's collection systems are in the range of 100 to 999 gallons. **Table 4-4** thru **Table 4-6** show the number of SSOs by size category for the Hyperion, Regional, and Terminal Island collection systems, respectively.

Table 4-4: Number and Size of SSOS (7/1/2013 – 6/30/2018) in Hyperion Collection System

Size of SSO (gallons)	FY14	FY15	FY16	FY17	FY18 e	TOTAL	Percent of Total
50,000 and greater		1		1		2	**1%**
From 10,000 to 49,999	1		2	1	1	5	**6%**
From 1,000 to 9,999	11	7	10	2	4	34	**53%**
From 100 to 999	93	51	54	42	40	280	**38%**
From 10 to 99	67	50	34	23	27	201	**2%**
From 1 to 9	2	6	1		2	11	**0%**
Total	**174**	**115**	**101**	**69**	**74**	**533**	**100%**

Table 4-5: Number and Size of SSOS by Fiscal Year (7/1/2013 – 6/30/2018) in Regional Collection System

Size of SSO (gallons)	FY14	FY15	FY16	FY17	FY18	TOTAL	Percent of Total
50,000 and greater	-	-	-	-	-	-	**0%**
From 10,000 to 49,999	-	-	-	-	-	-	**0%**
From 1,000 to 9,999	-	-	-	-	-	-	**0%**
From 100 to 999	1	-	-	1	-	2	**100%**
From 10 to 99	-	-	-	-	-	-	**0%**
From 1 to 9	-	-	-	-	-	-	**0%**
Total	**1**	**-**	**-**	**1**	**-**	**2**	**100%**

Table 4-6: Number and Size of SSOS by Fiscal Year (1/1/2014 – 6/30/2018) in Terminal Island Collection System

Size of SSO (gallons)	FY14	FY15	FY16	FY17	FY18	TOTAL	Percent of Total
50,000 and greater	-	-	-	-	-	-	**0%**
From 10,000 to 49,999	-	-	-	-	-	-	**0%**
From 1,000 to 9,999	-	-	-	-	-	-	**0%**
From 100 to 999	3	3	2	3	4	15	**88%**
From 10 to 99				1	1	2	**12%**
From 1 to 9	-	-	-	-	-	-	**0%**
Total	**3**	**3**	**2**	**4**	**5**	**17**	**100%**

Causes of SSOs

The four main causes of the number of sewer overflows are roots, debris, grease, and pipe structural failure. These causes account for 98 percent of all SSOs occurring between 2014 and June 2018 as shown in **Figure 4-4**. These same four causes also account for 99.8 percent of the volume spilled from the collection system as shown in **Figure 4-5**, with structural failure accounting for approximately 85 percent of the total volume released over that time period due to the one large SSO event that was caused by pipeline structural failure.

Figure 4-4: Number of SSOs by SSO Cause from July 2013 through June 2018

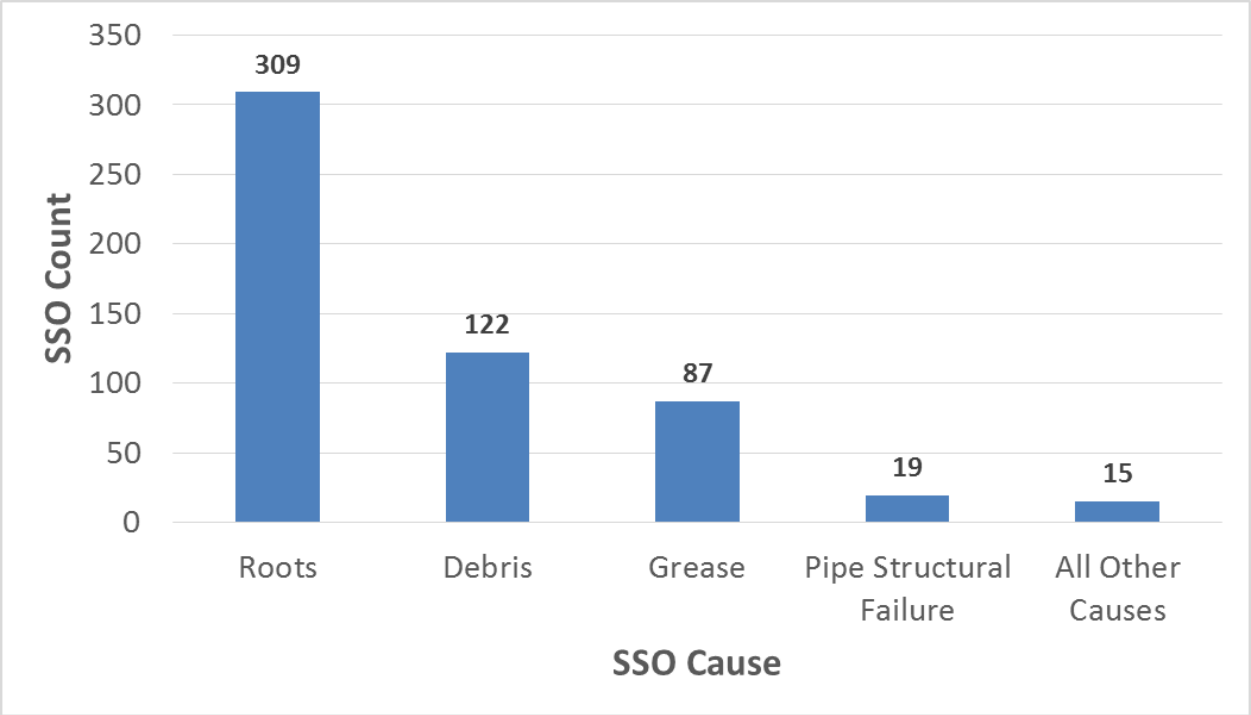
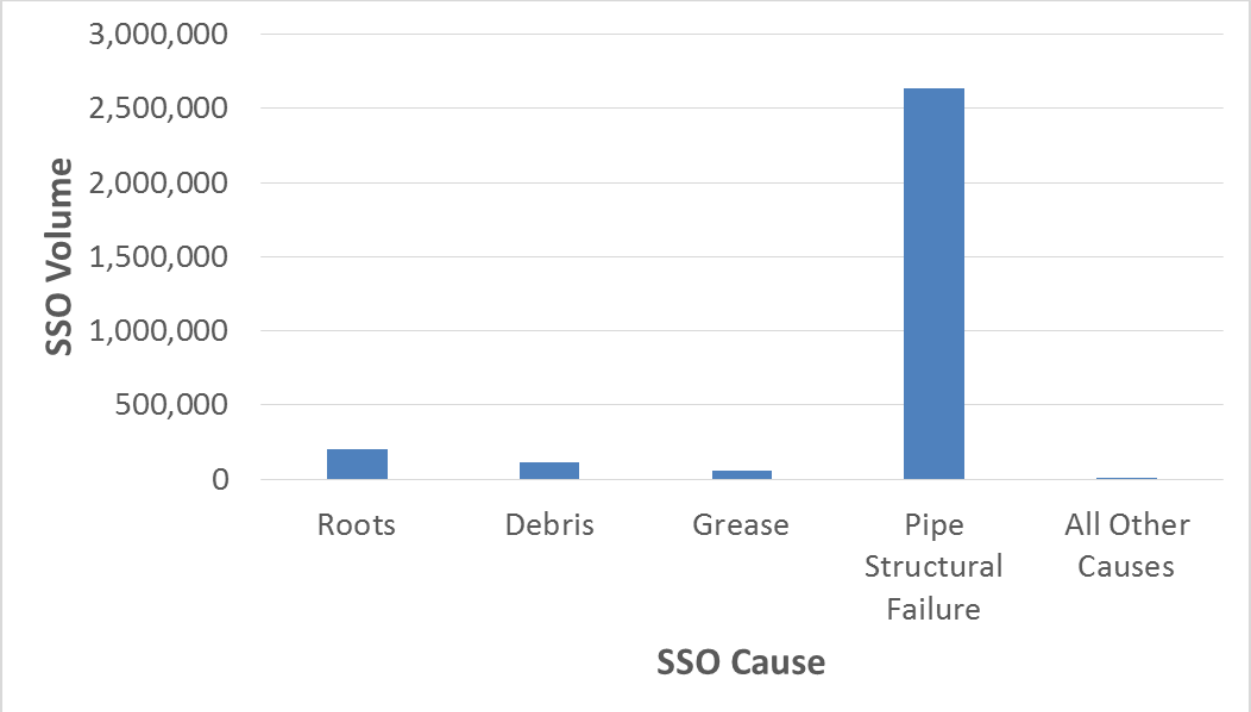


Figure 4-5: Volume of SSOs by SSO Cause from July 2013 through June 2018



4.2 Review of Effectiveness of SSMP Elements

In February 2014, the City updated the SSMP to meet the requirement for updating the SSMP every 5 years. The SSMP was approved by the Board of Public Works on February 14, 2014. The City updated the SSMP in February 2017 to address findings from the 2017 SSMP Program Audit. The 2017 SSMP update did not include significant updates and therefore did not require approval by the governing board. This SSMP Program Audit reviewed the February 2017 versions of the SSMPs for the three collection systems operated by the City. Although each of the three collection systems had a separate SSMP document, each of these SSMPs are essentially identical with the exception of the overview section of each document. Since all of the elements required by the WDR are identical in these documents, this SSMP Program Audit treats these as one document. 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 goal section includes the goal for the SSMP from the WDR. The section provides historical context related to City policy dating back to 1956 regarding sewer system capacity management as well as protection of public health and beneficial water uses. The section identifies the Wastewater Collection System Division as the lead operational unit responsible for the operation and maintenance of the collection system and identifies the mission of Wastewater Collection System Division to protect the environment and public health. The section also identifies seven key objectives for sewer system management and performance and links these objectives to the WDR requirement. By linking the City policy to LASAN objectives for sewer system management to the SSMP goal, the Goal section provides line of sight alignment of SSMP with City and LASAN goals and objectives. 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 Name of Authorized Representative is Barry Berggren and is clearly included in the SSMP. The CIWQS At-A-Glance Report for all three collection systems identify Barry Berggren as the Onsite Manager. In CIWQS, the Onsite Manager is the Legally Responsible Official (LRO) for the collection system and these terms can be used interchangeably. Brian McCormick and Efrain Gonzalez are also shown as Onsite Managers for all three collection systems in CIWQS, essentially operating as secondary or backup LROs. The SSMP should identify both primary and secondary LROs. It is a good practice to have more than one LRO to ensure that at least one LRO is always available.

Names and Telephone Numbers for Management, Administrative, and Maintenance Positions: The SSMP includes the phone number for Barry Berggren as the LRO and one phone number for all other staff. The management positions responsible for elements or specific measures of the SSMP are identified, yet the names of the managers are not included, nor are the phone numbers for these positions. The SSMP should be updated to include a list of the names and phone numbers associated with the positions responsible for SSMP elements or specific measures of the SSMP. This could be included as an attachment with the update frequency documented in the SSMP (i.e., annual update) and can be redacted in the public-facing version of the document. With regards to the identification of positions responsible for SSMP elements and specific measures of the SSMP, the best practice is to identify the lowest level position fully responsible for an SSMP element or specific measure of the SSMP.

Lines of Authority: The SSMP includes a bulleted list of positions, which in some cases (e.g., Bureau of Engineering) shows a line of authority from the City Engineer to the Deputy City Engineer, to the Division Engineers. In other cases, the lines of authority are not included in the bulleted list (e.g., LASAN is shown directly at the Division Management level. The SSMP also includes an SSMP Implementation Organization Chart, which is a functional organization chart for the SSMP program implementation. This shows the lines of authority from the Mayor, City Council, and Board of Public Works down to the operating departments and operating divisions. It also includes bullets indicating which department or operational unit is responsible for various SSMP elements or specific measures. The SSMP Organization Chart does not include clear lines of authority for the positions responsible for these various SSMP elements and specific measures up to the governing board. For example, at LASAN, the Wastewater Engineering Services Division Manager reports to an Assistant Director that reports to LASAN's Director. This is not shown on the SSMP Organization Chart. LASAN is also in the final phases of implementing a significant organizational change for sewer operations with the creation of the Clean Water North Collection Division and the Clean Water South Collection Division. The SSMP should be updated to include these details as appropriate.

Chain of Communication: The SSMP references Figure 6-1 of the SSMP and the Sanitary Sewer Overflow Response and Reporting Procedures. Figure 6-1 provides a high-level workflow of the steps involved in SSO response and reporting, yet does not provide a clear chain of communication from receipt of complaint to notification to State, Regional Water Board and other agencies. The Sanitary Sewer Overflow Response and Reporting Procedures referenced in the SSMP provides a clear chain of communication and identifies the roles of the staff involved in SSO response and their responsibilities for communication and notification throughout the SSO response workflow. The City should update the SSMP to clearly illustrate the chain of communication documented in the Sanitary Sewer Overflow Response and Reporting Procedures.

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 audit team reviewed the Municipal Code, Board Rules and Regulations, and sewer connection permits and finds the City possesses the necessary legal authorities required by the WDR. **Table 4-7** summarizes the specific sections of the City of Los Angeles Municipal Code and the City of Los Angeles Board of Public Works Rules and Regulations that provide the City with the authorities required.

The Municipal Code defines a House Connection Sewer as meaning "*any sewer pipe line, or portion thereof, constructed in a street, alley, walk or other public place or in a sewer easement granted to the City and connecting, or proposed to connect, any lot or part of a lot with any public sewer.*" The City used public funds to build the public mainline sewers that convey sewage collected from House Connection Sewers to one of the City's three wastewater treatment facilities. The City did not build or pay for any portion of the House Connection Sewer and is not responsible for maintenance, repair, rehabilitation or replacement for any portion of the House Connection Sewer. Currently, the Municipal Code does not directly state the property owner's responsibility for maintenance, repair, rehabilitation, and replacement for the House Connection Sewer. The City is considering inclusion of language directly stating property owner responsibilities for the sewer lateral in a future lateral ordinance. The audit team did find reference to a City Attorney opinion and City policy regarding sewer lateral responsibility

on the Bureau of Street Services webpage (https://bss.lacity.org/urbanforestry/index_residentsewerlines.htm) and was provided a copy of the City Attorney opinion. The City should consider adding clear language to the SSMP and LASAN sewer webpages to clearly communicate property owner responsibilities for the entire sewer lateral to the connection of the sewer.

Table 4-7: Summary of Legal Authority

Requirement	Reference in Municipal Code	Reference in Rules and Regulations	Meets WDR Requirements?
PREVENT ILLICIT DISCHARGES			
Prevent illicit discharges into the wastewater collection system	Sec 64.25; Sec 64.30.B Sec. 64.30.C.1.(l).(4)	Sec. 3	Yes
Limit the discharge of fats, oils, and grease and other debris that may cause blockages	Sec 64.30.B.1.(a).(3); Sec 64.30.B.2.(a) Sec. 64.30.C.1.(l).(4)	Sec. 11.A Sec. 11.B	Yes
Control infiltration and inflow (I/I) from private service laterals	Sec 64.25; Sec 64.30.B.1.(12) Sec. 64.30.C.1.(l).(4)	Sec. 3	Yes
PROPER DESIGN AND CONSTRUCTION			
Require that sewers and connection be properly designed and constructed	Sec. 64.11; Sec. 64.11.1 Sec. 64.12 Sec. 64.17		Yes
ACCESS TO LATERALS			
Ensure access for maintenance, inspection, or repairs for portions of the service lateral owned or maintained by the Agency	The City does not own or maintain any portion of the lateral.		Yes
FOG SOURCE CONTROL			
Requirements to install grease removal devices (such as traps or interceptors)	Sec. 64.30.C.1.(d).(11) Sec. 64.30.C.1.(l).(2)		Yes
Design standards for the grease removal devices	Sec. 64.30.C.1.(l).(4)	Sec. 11.F	Yes
Maintenance requirements, BMP requirements, record keeping and reporting requirements for grease removal devices	Sec. 64.30.C.1.(l).(4)	Sec. 11.B Sec. 11.F Sec. 11.H	Yes
Authority to inspect grease producing facilities	Sec. 64.30.C.1.(b).(21)		Yes
ENFORCEMENT			
Enforce any violations of its sewer ordinances	Sec 64.30.C.5.(c) Sec 64.30.E		Yes

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 Finding:

The City's operation and maintenance program complies with WDR requirements and is one of the primary drivers of the City's blockage-related SSO reduction since the early 2000s.

Up-to-Date Mapping

The City uses ESRI ArcGIS for maintaining sewer system mapping. The City has separate mapping layers publicly available on internet for gravity and pressurized sewer pipelines, maintenance access holes, sewer wye connections, and stormwater pipelines. The City has also mapped pump plants. Air release valves are not currently mapped in GIS.

Sewer system maps are kept up-to-date through the following mechanisms:

- GIS mapping is updated using record drawings/as-builts once projects are completed.
- WCSD crews have a process to communicate mapping discrepancies to GIS staff to update maps.

- WESD basin planners identify map corrections during basin planning and communicate these to GIS to update maps.
- A survey is performed when there are large discrepancies.
- The City has processes in place to document the rehabilitation of an existing pipe segment. The rehabilitation material and date are stored in GIS along with the host pipe segment original installation date and material.
- WCSD crews utilize mobile devices and have ready access to up-to-date GIS data for both sewer and stormwater pipelines in the field.
- The GIS layer for sewer pipelines maintained by LABOE has to be modified by LASAN to migrate it into their databases. LASAN tracks all maintenance activities for each maintenance hole to maintenance hole pipe segment. LABOE tracks pipe segments to a deeper level and will place “phantom nodes” at changes in slope or material and track potentially more than one record for a maintenance hole-to-maintenance hole pipe segment. LASAN will periodically pull sewer pipe GIS data from LABOE, process the data to remove the phantom nodes, and migrate the updated GIS into FAST. The process is routine and LASAN has models and subroutines to streamline the process workflow.

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

The City employs a comprehensive and effective sewer system maintenance program.

- The City has a 3-year goal to clean all secondary sewer pipes (pipes 15 inches or less).
- The City tracks all maintenance activities using the EMPAC computerized maintenance management system. Each cleaning activity is tracked in EMPAC, including the type and severity of materials removed during cleaning. The cleaning findings are reviewed periodically to analyze maintenance history to optimize and modify the maintenance approach and cleaning frequency. This optimization process is an important component of the maintenance program continual improvement process. The City has documented the optimization process workflow and decision flow and is considering the implementation of decision support tools to automate and streamline workflows. The main goal is to improve the transferability of this process.
- Pipes in specific secondary sewer basins with a high density of root issues, as well as pipes with a history of root intrusion-related SSOs, are placed on a root control program. Pipes on the root control program are treated with chemical root control. The City cleans pipes prior to chemical root foam treatment as well as a set period afterwards. This approach has proven extremely effective based on extensive studies.
- Pipes with grease accumulation are evaluated for an enhanced cleaning strategy, which could include more cleaning. Pipe segments with excessive grease accumulation are communicated to the Industrial Wastewater Management Division to investigate the source and apply appropriate source control measures.

- Any primary pipes known to have maintenance issues are also targeted and cleaned on a maintenance schedule with siphons and primary pipes under 30 inches in diameter cleaned by City crews and larger diameter pipes cleaned by contractors.
- The City performs cleaning quality control CCTV inspections of sewer cleaning activities. Ten pipe segments cleaned by the crew are selected, televised, and given a QC score. Results are shared with crews with the goal of influencing actions and behavior and are not used to penalize performance.
- The City is considering the use of GoPro cameras attached to a cleaning tool to support cleaning crews with gaining quick video data of potential issues or blockages.
- Easement access maintenance, if needed, is performed in conjunction with scheduled cleaning activities. The City can use an emergency contractor to support easement cleaning if needed.

Regular Visual and TV Inspections of Maintenance Hole and Sewer Pipes

Beginning in 2000, the City initiated an inspection program to televise all primary and secondary sewer basins within 10 years. The City completed the program and is in the process of re-televising the sewer system on a 15 to 20 year cycle, currently performing approximately 400 miles of inspection per year.

Cleaning crews identify maintenance hole deficiencies and create work orders to address issues. These issues are addressed using contractors. Cleaning crews open both the upstream and downstream maintenance holes of pipe segments being cleaned. Theoretically, all maintenance holes on pipes 15 inches in diameter and less are opened and visually inspected at least once every five years. Maintenance hole repair rehabilitation or replacement can also be incorporated into WCIP projects.

System for Ranking and Selecting Pipe Segments for Remediation

The City collects standardized and coded observations and assigns an A (Good) to E (Very Poor) condition rating to all inspected pipe segments using a condition rating guideline. The City's CCTV defect coding system was developed prior to NASSCO Pipeline Assessment and Certification Program (PACP) coding standard. The coding system can be used to record the following types of observations:

- Lateral types and severity of protruding laterals. The coding system does not have a code for laterals connected using the "hammer tap" or "break-in" method, whereby the party connecting the House Connection Sewer to the mainline breaks a hole in the mainline pipe to connect the lateral. This type of defect is probably not common in the City's sewer system due to City standards for a wye connection and permitting process for all connections to the public sewer system.
- Structural codes in either a barrel or at a joint with codes to cracks, fractures, holes, broken, deformed, and collapse. There are modifiers for cracks and fractures (longitudinal, radial, spiral, and multiple). One recent enhancement to NASSCO PACP was the addition of defect codes for hinge cracks or fractures. These are special case cracks and fractures with higher failure risk. LASAN's

defect coding system would describe hinge defect as a longitudinal crack or fracture, which would miss the distinction.

- Joint structural codes include open and offset with modifiers for offset severity.
- Additional structural codes are included for missing or loose bricks, crown gone, peeling T-Lock, and several for tile failure defects. Some of the oldest and most critical sewers are clay tile line pipes and these codes are specifically useful for coding issues with the tile lining.
- Corrosion codes with an array of corrosion severity modifiers.
- Other condition codes for roots, minerals infiltration, and debris along with location modifiers (i.e., joints, pipe, connection, inside lateral) and severity modifiers.
- Pipe alignment codes for documenting changes in pipe alignment.

NASSCO PACP has additional codes for structural defects not present in the LASAN defect coding system, including:

- A family of codes for documenting CIPP liner defect observations, including codes for weld failures.
- A family of codes for documenting defective point repairs.
- A family of code for documenting different types of surface damage on the pipe wall beyond corrosion.
- Codes for missing mortar in brickwork.

Ninety-six percent of all pipes (approximately 6,240 miles) in the City's system are constructed of either vitrified clay, concrete, or reinforced concrete. The City's current coding system enables the City to code structural and O&M defects in these types of pipes. The City has approximately 500 miles of rehabilitated pipe segments and additional miles with point repairs. The City is currently developing a plan to use NASSCO PACP for future CCTV inspection coding. If the City does not proceed with this plan, the City may want to consider adding codes and ratings to the existing coding system to enable coding of CIPP lining defects, point repair defects, and the distinction of hinge cracks or fractures.

Contractors performing CCTV data are required to code observations using the City's defect coding system. All data collected by both City CCTV crews and CCTV contractors is uploaded into the WCSD's CCTV database. All CCTV video is reviewed again in the office by a quality control team and assigned a condition rating per condition rating guidelines. The condition rating and defect observations are utilized by basin planners to prioritize and select pipe segments for condition remediation. Pipes are prioritized at the basin-level using a set of weighted likelihood of failure factors based on maintenance history, SSO failure history, and pipe materials to rank the overall sewer basins. Remediation planning is performed for all pipes within a basin and packaged together into a basin plan. The City performed planning for all primary sewer basins in the 2000s and has planned 138 secondary sewer basins to date. Pipes within a sewer basin are selected for remediation based on the condition rating and the number and severity of structural defects. There are cases where the City has not been able to collect condition

data prior to rehabilitation or replacement planning. In the primary system, the City used a Risk Assessment Management System (RAMS) to evaluate pipe segments without condition data using data from adjacent pipes, materials, and other factors to determine a probable condition. The City used a similar, yet less rigorous approach during secondary sewer planning to assign probable condition to secondary sewer pipes using known condition in adjacent pipes, knowledge of materials, and maintenance history to make planning decisions on these pipes.

Condition remediation decisions are combined and coordinated with pipe segments selected for capacity remediation. The City is in the process of updating primary sewer basin plans by 2020 to plan capital improvements needed in areas impacted by the World Cup (2022) and Olympics (2028). The City is going to make a push to perform any capital improvements needed in these areas ahead of the events. There will be a multi-year window where capital improvements in these areas will not be allowed. Pipe segments requiring remediation in areas impacted by these events will be addressed with priority.

The City has identified a set of major defects that might lead to sewer overflows that are addressed with either a near-term point repair or longer-term condition remediation of the entire pipe segment. Inspection, condition assessment, and selection of pipe segment for remediation is performed by LASAN while rehabilitation design and capital project delivery is performed by LABOE. LASAN uses decision support tools to select a preliminary remediation method for capital budgeting purposes. Remediation selection criteria for secondary sewer planning is based largely on likelihood of failure (i.e. condition) and does not include consequence of failure in the selection criteria. The City may want to consider evaluating consequence of failure for pipe segments and incorporating consequence of failure into the remediation selection criteria (i.e. higher consequence pipe segments may be selected for remediation for lesser likelihood of failure defects than pipes with having lower consequence of failure).

Schedule for Developing Funds Needed for Capital Improvements

An outcome of LASAN's planning process is the identification of preliminary recommendations for condition remediation. LASAN will decide between near-term condition remediation actions (i.e., one or more spot repairs) or longer-term condition remediation actions such as rehabilitation or replacement. LASAN then applies average unit costs to these preliminary remediation actions to forecast capital costs associated with the basin plan. This approach provides the City with 5 to 10 year projections of sewer rehabilitation planning needs. The Financial Management Division places these costs estimates into the capital plan and uses these to project funding needs. The City may want to consider using statistical analysis of historical CCTV data, historical condition remediation decisions, and "second pass" CCTV data to understand deterioration rates of clay pipes and remaining unlined concrete pipes and to better predict longer-term rehabilitation and replacement needs of the system.

Rehabilitation and Replacement Design and Capital Delivery

LABOE is responsible for reviewing the data provided by LASAN to determine the preferred remediation actions, design solutions, create bid packages, and manage capital delivery. Pipes included in a basin planning package typically remain together through the capital delivery process. In some cases, pipes with difficult access, or other

issues holding up streamlined capital delivery, are separated from the basin package to be addressed separately. LASAN should begin to identify pipe segments that may pose accessibility, permitting, or other issues during capital delivery. LASAN may want to consider applying a different remediation selection criteria for these pipe segments to introduce them into the capital delivery process early enough in their lifecycle to provide additional time for traditional capital delivery or to decide to use alternative project delivery methods.

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:

Design and construction is performed or managed by the City's Bureau of Engineering (LABOE). The City has adequate design and construction standards and specifications for the installation of new sewer systems, pump stations, and appurtenances as well as for the rehabilitation and repair of existing sanitary sewer systems. The City also has procedures and standards for inspecting and testing of new, repaired, and rehabilitated sewer infrastructure.

- The City was a major contributor to the development of the "Greenbook" in the 1960s and was one of the first agencies to adopt the Greenbook Standard Specifications for Public Works Construction.
- LABOE hosts a Manuals and Standard webpage with links to a wide array of design and construction guidance, standards, specification, and manuals (http://eng2.lacity.org/techdocs/). These document include:
    - Standard Plans (http://eng2.lacity.org/techdocs/stdplans/index.htm): Set S-100 and S-200 focus on sewers and cover lower laterals, maintenance holes, sewer structures, casings, and pipe laying.
    - Specifications Library: Includes link to a set of Master Specification and the Brown Book.
        - The City has a set of Master Specifications available on the internet in both pdf format and Microsoft .doc format. The Master Specification cover general construction activities (http://boe.lacity.org/bms/menu.cfm).
        - The City has a separate document, called the Brownbook, documenting additions and amendments to the Greenbook. The City's Brown Book is available on the internet (http://eng2.lacity.org/brownbook/frame.cfm).

- Approved Products and Materials Lists: The City has a webpage for approved products and materials (http://eng2.lacity.org/techdocs/product_material/Product_materials.htm).
    - The Approved Products Tracking System webpage provides a list of approved sewer pipeline materials, structure materials, sewer rehabilitation materials, and miscellaneous products.
    - One of the webpages provides a procedure for Prequalification Testing for Pipe and Sanitary Sewer Products.
- The City has a Sewer Design Manual (Part F) covering sewer design covering flow hydraulics, sewer alignment, sewer materials and structures, plan preparation, sewer constructions, operations and maintenance, and sewer rehabilitation. The manual was created in 1992 and has sections that are outdated. The City may want to consider implementing a review cycle of the Sewer Design Manual to periodically update outdated sections of the document or to positively validate that specific sections remain relevant.
    - Section F800 Operation and Maintenance of the Sewer Collection System references operating units that no longer exist and practices no longer being employed to operate and maintain the system. The SSMP essentially supersedes F800. The City should consider either updating or retiring this section of the Manual.
    - Sewer Design Manual, Section F900 Rehabilitation Design is outdated as well. F900 does not document which portions of the process are being performed by LASAN versus LABOE. The document still describes an assessment process focused on defining and assessing primary sewers. In practice, the City has evolved to designate some sewers as critical, primary, and secondary and is assessing much more of the system than described in F900. Rehabilitation technology has also evolved since 1992. The City may want to consider creating separate documents for the portions of the process performed by LASAN versus the portions of the process performed by LABOE.
- The City has a process in place to gather feedback on design standards and specification on projects, which can ultimately lead to changes in standards and specifications.

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:

The audit team reviewed the Overflow Emergency Response Plan section of the SSMP, the document titled Response and Reporting Procedures for Sanitary Sewer Overflows and Sewer or Stormwater Contamination, and the City's website.

The document contains SSO response procedures, reporting and notification procedures, and quality assurance protocols to review and improve response and reporting procedures.

Proper Notification Procedures

- The City's website communicates 311 as the primary mode of communicating issues to the City. Anyone in the City can dial 311 or can call (213) 473-3231. The SSMP also states that calls to LAFD, LAPD, and directly to LASAN are relayed to WCSD as well. It is assumed that any calls to 911 are relayed as well through either LAFD, LAPD, or directly from 911 to 311.
- Anyone with access to the internet can go to the myla311 webpage and potentially create a service request. There is no clear service request associated with reporting a sewer overflow or sewer odors. The City may want to consider updating myla311 to more clearly indicate the appropriate service request for

reporting a sewer overflow or sewer odors. Alternatively, the main page can instruct the public to call 311 instead of submitting a service request through the myla311 webpage.

- The SSMP Overflow Emergency Response section documents how the City receives calls from customers, contractors, and internal employees and routes these calls "to the Venice Pump Station". It is not clear who is the responsible party at Venice Pump Station who takes the call and whether that changes during normal working hours versus after hours. The documentation is unclear as to who is contacted next to get to the point of assignment of a primary responder for the event and whether this changes depending on whether the event is occurring during or after normal business hours. The City should update the SSMP to indicate the On-Duty Operator as the responsible party at Venice Pump Station, the position contacted to identify and dispatch a primary responder, and whether this process is different during working hours versus after normal working hours.
- Once a primary responder is assigned, the Section 6 of the City's Response and Reporting Procedures for Sanitary Sewer Overflows and Sewer or Stormwater Contamination contains clear notification procedures and chain of notification for the parties involved (i.e., primary responder, District Supervisor, Area Manager, Manager II, Manager III, Assistant Director) depending on the SSO Category and the impacted parties, and impacts to surface waters.

Appropriate Response

- Section 5 of the Response and Reporting Procedures for SSOs and Sewer or Stormwater Contamination includes a set of SSO Response Procedures.
    - Containment protocols do not describe typical containment methods, equipment available, or containment within storm drainage system. Consider updating to document the primary containment methods the City uses.
    - Subsection 5.7 references standard operating procedures that are not included as attachments to the document. Consider identifying specifically which standard operating procedures is being referenced and incorporating the referenced procedure as an attachment.
    - Protocols for cleanup do not describe protocols for cleaning different types of affected areas such as hard surfaces, landscaped areas, other unimproved areas with natural vegetation, natural and manmade waterways or the storm drainage system. Consider updating to document how cleanup protocols change depending on the type of surface or affected areas being cleaned.

Prompt Notification to Regulatory Agencies and Affected Entities

- Section 6 of the Response and Reporting Procedures for SSOs and Sewer or Stormwater Contamination contain detailed protocols for prompt notification of regulatory agencies and affected entities.

Procedures to Ensure Staff and Contractors Follow Response Protocols

- All wastewater operations and maintenance staff are trained on the response protocols annually.
- New employees receive the training as part of their orientation.
- SSO response lessons learned are reinforced during tailgate training sessions.
- Construction contractors are required to create Emergency Response Plans as part of their contract and must submit and obtain approval for all flow bypasses prior to start of construction. Construction inspectors are trained on SSO response procedures and understand the protocols for communicating the event promptly to WCSD.

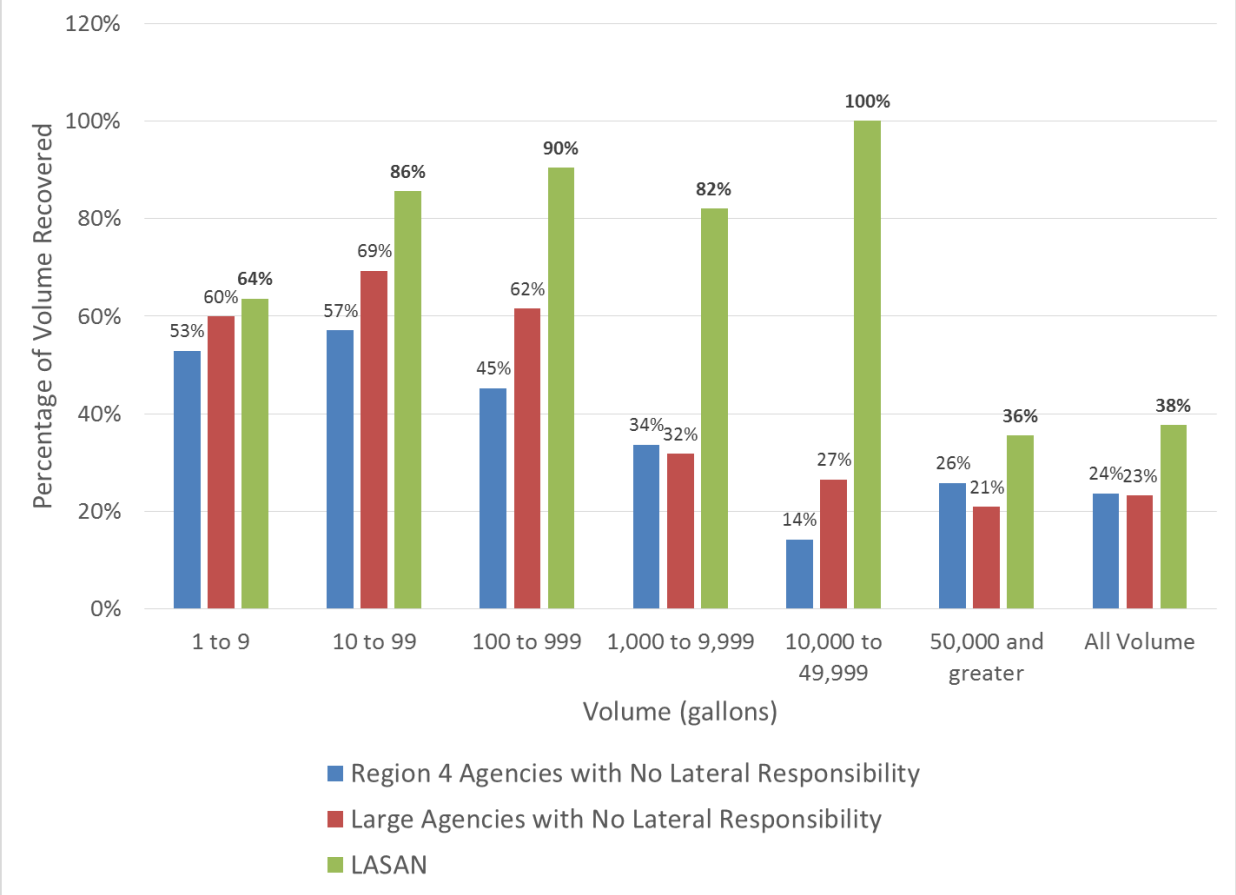
Procedures to Address Emergency Operations Such as Traffic and Crowd Control

- Section 5 of the Response and Reporting Procedures for SSOs and Sewer or Stormwater Contamination include the posting of community warning signs and barricades if necessary.
- The SSMP section on the Overflow Emergency Response Plan discusses the ability to utilize the LAPD, LAFD, and Department of Transportation if needed for traffic and crowd control. These situational responders are directed by management on a case by case basis. The City should consider adding this detail to Section 5 of the Response and Reporting Procedures for SSOs.
- The City conducts table top exercises to simulate multi-agency response to a major sewer emergency. Section 6.1.13 of the Response and Reporting Procedures for SSOs includes steps to notify ISCD to support multi-agency response coordination.

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

- The audit team analyzed the SSO volume recovered by the City versus other agencies in Region 4 without lateral responsibility as well as other large agencies with over 500 miles of sewer pipelines and no lateral responsibility. The results of the analysis, shown in **Figure 4-6**, clearly indicate the exceptional results the City is achieving with spill recovery. In most spill size categories, the City is recovering more than 80 percent of the spill volume on average.
- Crews are instructed to perform sampling early in the response process, if needed. Procedures are also in place to have EMD or others perform additional water sampling once notified of a Category 1 spill.
- When Category 1 spills occur, the City is communicating with the Regional Board on the monitoring of impacts, remedial/cleanup measures, and corrective/preventive actions taken.

Figure 4-6: Percentage of Spill Volume Recovered between July 2016 and June 2018



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:

LA Sanitation's FOG control program is very effective at controlling SSOs and only experienced 26 grease-related SSOs during the audit window (in the past 2 years) with an average volume of 510 gallons. LA Sanitation uses a combination of FOG investigations, food service establishment inspection and enforcement, and public outreach to reduce the amount of FOG being discharged into the system and targeted sewer cleaning to remove FOG form locations prone to accumulation.

Elements of the FOG control program include:

- Public educational outreach using the website, booths at conferences and expositions, and annual workshops. Best management practice pamphlets and door hangers are also distributed to City residents.
- Strong FSE educational outreach with videos and brochures on FOG source control best management practices available in five languages and provided to FSEs as appropriate.
- LA Sanitation provides FSEs with a list of licensed haulers and grease rendering locations. The City prohibits FOG haulers from discharging in the City's wastewater collection system.
- The City has strong FOG source control legal authorities in the municipal code. The municipal code also requires FSEs all of the Board of Public Works Rules and Requirements, which provide additional FOG source control requirements and provide a streamlined means to more easily modify and update FOG source control legal authorities in the future, if needed.
- The City requires grease interceptors to be designed according to plumbing code. The City is in the process of evaluating a potential deviation from plumbing code to allow smaller volume grease interceptors when appropriate, since the larger interceptors can be problematic when flows are low. Grease traps are allowed in some cases with authorization from LA Sanitation. A conditional waiver can also be authorized if grease discharge is determined not to be an issue by LA Sanitation.
- LA Sanitation has authority to inspect FSEs and has a robust program to inspect all FSEs annually. One unique aspect of the FOG program is the separation of inspection and enforcement roles and responsibilities within the Industrial Waste Management Division enabling each team to focus efforts and operating efficiencies.

- The City has sufficient inspection and enforcement staffing to achieve an annual FSE inspection cycle and following up on requirements and violations identified. FSEs rarely require the full application of enforcement authorities to comply.
- The Wastewater Collection System Division and Industrial Wastewater Management Division work closely together to identify locations in the collection system with grease accumulation. The Wastewater Collection System Division has processes in place to optimize sewer cleaning activities in pipe segment prone to FOG accumulation. The Industrial Wastewater Management Division focuses on determining the source of the FOG with a FOG investigation and employs public outreach, if the source is determined to be residential, or FSE inspection, if the source is determined to be commercial.

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:

The audit finds the City is in compliance with WDR requirements and is effectively managing capacity needs. The City has addressed the known capacity issues that existed in the early 2000s. Since 2007, the City has experienced 3 capacity-related SSOs and has not experienced any capacity-related SSOs since March 17, 2012. Two of those events were in small diameter pipes (8-inch) caused when a larger diameter pipe surcharged. These two events resulted in relatively small discharges with a total SSO volume of 1,353 gallons and only 118 gallons reaching surface waters. The other

capacity-related SSO occurred on March 20, 2011 during a record-setting rain event. Downtown Los Angeles experienced with 2.42 inches of rainfall, compared with the previous record of 1.48 inches in 1943.

Beginning in December 2011, California began experiencing the longest duration of drought on record. This has led to increased conservation over the past seven years, which shows no signs of changing. This has led to significant reductions in wastewater flows conveyed by the City's sewer system over the past 10 years. An indication of this is the wastewater flow at Hyperion, which went from approximately 350 MGD to 260 MGD average daily flow.

Evaluation

The City uses MIKE URBAN, a sophisticated GIS-based dynamic hydraulic model to predict sewer flows in the primary system for planning purposes. The City is currently modeling 200 miles of outfall sewers and 581 miles of primary sewers. The City has an on-going flow monitoring program with three different types of flow gauging: near-term gauging, periodic gauging, and special gauging. The City maintains a database of all gauging data. When these areas experience flows above 75 percent depth over diameter, follow-up actions are triggered to address the issue.

Design Criteria

The primary sewer system is modeled against a 10-year design storm and has the capacity to convey 10-year storms and, in some parts of the system, can handle larger less frequent storms. Primary sewers indicating greater than 50 percent d/D but less than 75 percent d/D are monitored. Primary sewers greater than 75 percent d/D by 2040 are the targets of further evaluation, monitoring, and identification of measures to address capacity issues. Outfall sewers are allowed to surcharge in the model as long as SSOs are not occurring in future wet weather simulations. In the secondary sewer system, CCTV data is reviewed to determine the height of the watermark to identify pipe segments showing greater than 50 percent d/D targeted for upsizing in secondary basin plans.

Capacity Enhancement Measures

The City has few capacity enhancement measures in the capital planning process as the result of past efforts and reduced flows. All of the projects identified from 2008 are complete. The NEIS 2A project that was entering into final design was reviewed and determined unnecessary and removed from the WCIP. Efforts are still underway to relieve flows on the North Outfall Sewer. The San Fernando Relief Sewer is in the conceptual planning stage and moving towards the design phase. Some previously borderline capacity issues are moving towards becoming capacity constraints due to increased development. Since 2013-2014 timeframe the City has received 500 to 600 new capacity requests due to new construction. This is up from approximately 100 capacity requests.

Schedule

There are 2 capacity upgrade projects on the WCIP currently to address previously borderline issues that are now triggered due to new capacity requests. Aside from this, LASAN will be updating the 24 Primary Sewer Basin Plans in the next 18 to 24 months to identify any condition and capacity remediation required on these pipelines prior to the

World Cup and Olympics. The City has a separate line item in the WCIP for the North Outfall Sewer of approximately $50 million per year to address condition and capacity issues.

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:

LASAN is the lead City department responsible for WDR implementation and compliance and has a robust performance management system in place. Line-of-sight alignment exists between the Mayor's Executive Directives, LASAN goals, Division goals, and operational objectives and targets. Operating units monitor and report monthly to Division management who report monthly to LASAN management who report into the Mayor's "Back to Basics" Dashboard. The primary Divisions responsible for operations, maintenance, source control, and capital planning elements of the SSMP (core SSMP elements) include:

- Wastewater Collection System Division: Responsible for the Operations and Maintenance Program element and Overflow Emergency Response Plan element
- Wastewater Engineering Services Division: Responsible for the Sewer Rehabilitation and Replacement Planning, System Evaluation and Capacity Assurance Plan element, and SSMP Program Audit element
- Industrial Wastewater Management Division: Responsible for Fats, Oils, and Grease Control Program element
- Financial Management Division: Responsible for Budget and WCIP

Capital delivery of engineering projects is being performed by the LABOE, while LASAN is responsible for specifying capital improvements and serving as the owner of the infrastructure. The Financial Management Division is tracking the progress of the capital improvement program from a financial perspective and the Wastewater Engineering Services Division is tracking the progress of the sewer system capital improvement program from a system upgrade and renewal perspective.

Relevant information for prioritization of SSMP activities is collected in an array of information systems, databases, and spreadsheets. Field work activities performed by Wastewater Collection System Division are tracked in the EMPAC Maintenance

Management System. CCTV inspection data is stored in the CCTV Database. SSO data is stored in both the SWRCB CIWQS database and the City's SSO database. Changes to the sewer system infrastructure are tracked in GIS. Fats, oils, and grease source control inspections are documented in the Permitting Information Management System (PIMS) database. Other relevant information is stored, tracked, and analyzed in separate database and spreadsheets by the individuals or teams responsible for implementing specific programs.

The primary means of measuring overall SSMP program effectiveness is SSO performance. When an SSO occurs, WCSD reviews the root cause of the SSO event and determines a corrective action on an event-by-event basis. The corrective action may involve just WCSD or another Division (e.g. IWMD for a FOG-related SSO) depending on the cause of the SSO. On a monthly basis, the number of SSOs are tracked and SSO trends are reviewed. If an upward trend persists, WCSD staff will analyze and determine if the issue is isolated or systemic. Staff are reporting to Division management and Division management is reporting to LASAN management on a monthly basis, and as upwards trends persist upper management will also begin to inquire into whether systemic causes exists and if programmatic changes or process modifications are required. This entire process uses the lagging indicator of SSO performance to identify and drive potential changes to any of the SSMP elements linked to systemic SSO issues. Evidence of this process is seen in the WCSDs monthly reporting, the 2017 SSMP program audit, and during staff interviews.

Large SSO events, especially large discharges to surface waters, can also trigger inquiry resulting in programmatic or process modifications (e.g., the increased level of analysis associated with development of a technical report documenting SSOs with greater than 50,000 gallons to surface waters). For example, a large SSO in July 2016 required an SSO Technical Report and was a big focus during the 2017 SSMP Program Audit. The event led to renewed focus on condition assessment and efforts to mitigate risk associated with the North Outfall Sewer.

SSMP program elements with an associated program of work are monitored by the operational units responsible for accomplishing the program of work. The operational units are continually modifying the program for these elements based on either events or progress towards meeting program objectives. The audit team reviewed and verified monthly reporting activities and examples of program modifications performed by WCSD, WESD, and IWMD for core elements of the SSMP as indicated in **Table 4-8**.

Table 4-8: Program of Work and Typical Program Modifications Identified for Core SSMP Elements

SSMP Element	Program of Work	Typical Program Modifications
Operations and Maintenance Program	• Sewer cleaning • Sewer inspection • Sewer repairs • Pump plant operations and maintenance	• Cleaning frequency changes • Cleaning method changes • Cleaning referrals • 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	• Primary basin planning • Sewer Capacity Availability Request • Watermark review • Gauging	• 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:

The audit team reviewed the City's 2015 and 2017 SSMP Program Audit reports. The City performed these internal audits at a minimum of every two years as required by the WDR. Each audit included an evaluation of the effectiveness of the SSMP, identification of SSMP deficiencies and steps to correct them. Based on prior audits and this current audit process, the City is in compliance with the SSMP Program Audit requirement of the WDR.

The 2015 SSMP Program Audit was, as documented in the audit report, a cursory audit occurring immediately after a major update and recertification of the SSMP by the Board of Public Works. The City had also achieved an 80 percent reduction in SSOs since the early 2000s. The 2017 SSMP Program Audit documented the audit results of each individual SSMP element, which was a significant improvement upon the level of detail

included in the previous audit report. Neither report documented the audit team participants, audit meeting/interview dates and topics discussed. The City may want to consider documenting the audit team, meeting dates and times, and topics discussed in future audit reports. The previous audits focused primarily on compliance with the WDR requirements. As the City's SSMP Program continues to mature, the City may want to consider evolving future internal SSMP Program Audit from focusing on compliance to treating the SSMP Program as a management system and focusing the program audit on continual improvement and risk mitigation.

The SSMP Program Audit element of the SSMP currently includes reference to the Five-Year Strategic Planning process and monitoring of progress towards reaching those goals as well as examples of self-monitoring and program modifications. These portions are more relevant to the Monitoring, Measurement, and Program Modification section of the SSMP and the City should consider moving these portions of the document to that section.

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:

In practice, the City is in compliance with the Communication Program element required by the WDR. The audit team found significant and leading practice examples of communication with the public. The audit team identified an opportunity for improving public communication by providing a means for the public to provide input to the SSMP development and implementation on the SSMP webpage.

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

According to the SSMP, the City utilizes numerous modes of communication with the public including:

- Newsletters
- Surveys
- Community events
- Presentations to neighborhood councils and other community organizations
- Advisories and press releases
- Websites
- Toll-free helplines
- Outreach events on FOG, root control and other SSMP elements that target the general public, commercial and industrial entities, trade associations, professional organizations, and students.

- Annual solid waste open houses for public outreach and education

Examples of each were discussed in the audit meeting and an example newsletter and outreach brochure was provided. In addition, internet research on the City of LA's sewer program resulted in additional examples such as an article on the Curating LA website (https://curatingla.com/cla/2017/02/09/sewage-treatment-los-angeles/) written by Jim Gilbert based on his tour of the HWRP and the Environmental Learning Center. The article describes his experience on the tour, what he learned and ends with a link to how the public can schedule their own free tour.

One of the continual modes of communication is a set of webpages on the www.lacitysan.org website devoted to the Sewer program that provides information on sewer construction and capital improvements, sewer hazards, spills and backwater valves, sewer odors, SSMP, how the sewer system is built and maintained, and sewer system frequently asked questions. On the Sewer System Management Plan webpage (https://www.lacitysan.org/ssmp), the City posts the SSMPs for the three collection systems and the last SSMP program audit report. The combination of the sewer webpages and the posting the SSMP program audit report provides several modes of communication to the public on the development, implementation and performance of the SSMP.

The State Water Resources Control Board (SWRCB) California Integrated Water Quality System (CIWQS) contains a Collection System Operational Report webpage for each of the three City collection systems comparing the sewer overflow performance of each collection system to the State average and Regional average. The City may want to consider including a link to these webpages on the SSMP webpage.

The City does not currently have a clear means through the webpages for providing the public the opportunity to provide input as the program is developed and implemented. One way the City may expand the opportunity for the public to provide input on a continual basis is to provide a phone number and email on the SSMP webpage where the public may provide input on the SSMP at any time. These comments could be collected and incorporated into the SSMP program audit process or more frequent management reviews.

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

The SSMP states that the City has contracts with 29 satellite communities for wastewater conveyance and treatment services and meets with these communities regularly. The SSMP does not list the communities, where they are located, and provide a communication plan. The City may want to consider including a map or table of the communities, and the LASAN collection system to which each community discharges. The City may also want to elaborate on the triggers that may lead to interactions with the satellite cities and the minimum frequency of communication in the absence of a trigger (i.e., contractual update frequency or other scheduled interaction).

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
D.13.i – Goal	SSMP Goal section provides line of sight alignment between City, Bureau and SSMP goals and objectives.
D.13.iv – Operations and Maintenance Program – Mapping	The City has up-to-date mapping of the sewer system and continually improves mapping accuracy using multiple mechanisms.
D.13.iv – Operations and Maintenance Program – Preventive Maintenance	The City has an aggressive cleaning program with a 3-year system wide cleaning goal of pipes 15 inches and smaller, aggressive root control on pipes found to have root intrusion, and targeted cleaning on pipes with grease and debris.
D.13.iv – Operations and Maintenance Program – Preventive Maintenance	The City collects crew feedback on cleaning findings and uses data analytics to analyze this data to optimize maintenance frequencies.
D.13.iv – Operations and Maintenance Program – Preventive Maintenance	The City performs cleaning quality control CCTV inspections of sewer cleaning activities. Ten pipe segments cleaned by the crew are selected, televised, and given a QC score. Results are shared with crews with the goal of influencing actions and behavior.
D.13.iv – Operations and Maintenance Program – Condition Assessment	The City has completed a cycle of condition and capacity assessment for the entire system and is beginning a new cycle of capacity assessment and condition assessment.
D.13.iv – Operations and Maintenance Program – Rehabilitation Planning	The City has developed a standardized decision process for sewer rehabilitation planning and implemented decision support tools for use by primary and secondary sewer basin planners during the basin planning process.
D.13.vi – Overflow Emergency Response Plan	All wastewater operations and maintenance staff are trained on the response protocols annually. New employees receive SSO response training as part of orientation.

WDR Provision	Strengths and Implementation Accomplishments
D.13.vi – Overflow Emergency Response Plan	Construction contractors are required to create Emergency Response Plans as part of their contract and must submit and obtain approval for all flow bypasses prior to start of construction. Construction inspectors are trained on SSO response procedures and understand the protocols for communicating the event promptly to WCSD.
D.13.vi – Overflow Emergency Response Plan	The City conducts table top exercises to simulate multi-agency response to a major sewer emergency. Section 6.1.13 of the Response and Reporting Procedures for SSOs includes steps to notify ISCD to support multi-agency response coordination.
D.13.vi – Overflow Emergency Response Plan	The audit team analyzed the SSO volume recovered by the City versus other agencies in Region 4 without lateral responsibility as well as other large agencies with over 500 miles of sewer pipelines and no lateral responsibility. The results of the analysis, shown in **Figure 4-6**, clearly indicate the exceptional results the City is achieving with spill recovery. In most spill size categories, the City is recovering more than 80 percent of the spill volume on average.
D.13.vii – Fats, Oils, and Grease Control Program	LA Sanitation's FOG control program is very effective at controlling SSOs and only experienced 26 grease-related SSOs during the audit window (in the past 2 years) with an average volume of 510 gallons. LA Sanitation uses a combination of FOG investigations, food service establishment inspection and enforcement, and public outreach to reduce the amount of FOG being discharged into the system and targeted sewer cleaning to remove FOG form locations prone to accumulation.
D.13.viii – Monitoring, Measurement, and Program Modifications	Line-of-sight alignment exists between the Mayor's Executive Directives, Bureau of Sanitation goals, Division goals, and operational objectives and targets. Operating units monitor and report monthly to Division management who report monthly to Bureau management who report into the Mayor's "Back to Basics" Dashboard.
D.13.xi – Communication Program	The audit team found significant and leading practice examples of communication with the public.

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 City of Los Angeles 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	Status
D.13.ii - Organization	The SSMP does not identify the secondary or backup Legally Responsible Officials that are included in CIWQS.	The SSMP should identify the primary LRO and the secondary or backup LROs.	**B-minor**	Addressed in 2019 SSMP update.
D.13.ii - Organization	Aside from the LRO, the management positions responsible for elements or specific measures of the SSMP are identified, yet the names of the managers are not included, nor are the phone numbers for these positions.	The SSMP should be updated to include a list of the names and phone numbers associated with the positions responsible for SSMP elements or specific measures of the SSMP. This could be included as an attachment with the update frequency documented in the SSMP (i.e., annual update) and can be redacted in the public-facing version of the document. With regards to the identification of positions responsible for SSMP elements and specific measures of the SSMP, the best practice is to identify the lowest level position fully responsible for an SSMP element or specific measure of the SSMP.	**B-minor**	Addressed in 2019 SSMP update.
D.13.ii - Organization	The organization chart does not include clear lines of authority for the positions responsible for these various SSMP elements and specific measures up to the governing board. For example, in the Bureau of Sanitation, the Wastewater Engineering Services Division Manager reports to an Assistant Director that reports to the LASAN Director. This is not shown on the SSMP Organization Chart.	The SSMP should be updated to include these details as appropriate.	**B-minor**	Addressed in 2019 SSMP update.

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category	Status
D.13.ii - Organization	Figure 6-1 provides a high-level workflow of the steps involved in SSO response and reporting, yet does not provide a clear chain of communication of from receipt of complaint to notification to State, Regional Water Board and other agencies.	The Sanitary Sewer Overflow Response and Reporting Procedures referenced in the SSMP provide a clear chain of communication and identify the roles of the staff involved in SSO response and their responsibilities for communication and notification throughout the SSO response workflow. The City should update the SSMP to either clearly illustrate the chain of communication documented in the Sanitary Sewer Overflow Response and Reporting Procedures or to simply reference those procedures.	**B-minor**	Addressed in 2019 SSMP update.
D.13.iii – Legal Authorities	The Municipal Code does not clearly state that the City is not responsible for any construction, maintenance, repair or renewal of any portion of the sewer lateral or house connection sewer.	The City is currently developing a lateral ordinance and may want to consider adding clear language in the ordinance to clearly communicate property owner responsibilities for the entire sewer lateral to the connection of the sewer.	**C**	
D.13.iv – Operations and Maintenance Program	The City tracks all maintenance activities using the EMPAC computerized maintenance management system. Each cleaning activity is tracked in EMPAC, including the type and severity of materials removed during cleaning. The cleaning findings are reviewed periodically to analyze maintenance history to optimize and modify the maintenance approach and cleaning frequency. Currently, this process is performed by one person using a set of queries of maintenance history.	This optimization process is an important component of the maintenance program continual improvement process. The City should consider developing decision support tools to automate and streamline workflows. The main goal is to improve the transferability of this process.	**C**	

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category	Status
D.13.iv – Operations and Maintenance Program – Condition Assessment	The City's CCTV defect coding system does not have defect codes for lining defects, defective point repairs, surface damage on pipe walls other than corrosion, or codes for missing mortar in brickwork.	The City may want to consider adding codes to the coding system to enable coding of CIPP lining defects, point repair defects, and the distinction of hinge cracks or fractures. Alternatively, the City may want to consider using NASSCO PACP for future CCTV inspection coding. Changing to a recognized national standard presents several benefits. First, there are many contractors in the Los Angeles area that are already trained, certified, and set up to capture NASSCO PACP defect codes; this would provide more competition between contractors and may benefit the City in getting more competitive bids for inspections. Second, there are several certified software packages that use the PACP format. In addition, the City's decision support software (Innovyze's InfoMaster) is already configured to accept CCTV data in NASSCO PACP Exchange format; this software could easily be configured to perform more risk-based prioritization of the basins and the sewers within them.	**B-minor**	The City is planning to migrate to NASSCO PACP in the near future.
D.13.iv – Operations and Maintenance Program – Rehabilitation Planning	The City currently projects near-term sewer rehabilitation needs during the sewer basin planning process providing 5 to 10 year horizon funding needs.	The City may want to consider using statistical analysis of historical CCTV data, historical condition remediation decisions, and "second pass" CCTV data to understand deterioration rates of clay pipes and remaining unlined concrete pipes and to better predict longer-term (greater than 10 years) rehabilitation and replacement needs of the system.	**C**	

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category	Status
D.13.iv – Operations and Maintenance Program – Rehabilitation Planning	In some cases, pipes with difficult access, or other issues holding up streamlined capital delivery, are separated from the basin package to be addressed separately.	LASAN should begin to identify pipe segments that may pose accessibility, permitting, or other issues during capital delivery. LASAN may want to consider applying a different remediation selection criteria for these pipe segments to introduce them into the capital delivery process early enough in their lifecycle to provide additional time for traditional capital delivery or to decide to use alternative project delivery methods.	**C**	
D.13.iv – Operations and Maintenance Program – Rehabilitation Planning	Remediation selection criteria for secondary sewer basin planning is based largely on likelihood of failure (i.e. condition) and does not include consequence of failure in the selection criteria.	The City may want to consider evaluating consequence of failure for pipe segments and incorporating consequence of failure into the remediation selection criteria (i.e. higher consequence pipe segments may be selected for remediation for lesser likelihood of failure defects than pipes with having lower consequence of failure).	**C**	
D.13.v – Design and Performance Provisions	The City has a Sewer Design Manual (Part F) covering sewer design covering flow hydraulics, sewer alignment, sewer materials and structures, plan preparation, sewer constructions, operations and maintenance, and sewer rehabilitation. The manual was created in 1992 and has sections that are outdated.	The City may want to consider implementing a review cycle of the Sewer Design Manual to update outdated sections of the document periodically or to positively validate that specific sections remain relevant.	**B-minor**	The City is planning to review and update the Sewer Design Manual.

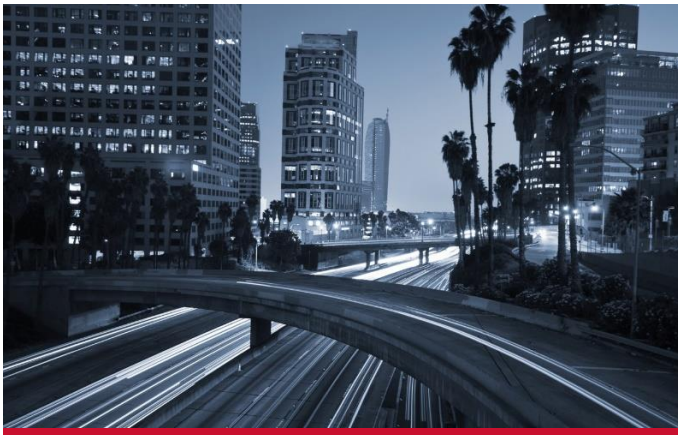
WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category	Status
D.13.v – Design and Performance Provisions	Sewer Design Manual, Section F800 Operation and Maintenance of the Sewer Collection System references operating units that no longer exist and practices no longer being employed to operate and maintain the system. Portions of the Sewer System Management Plan currently serves the purpose F800 once served.	The City should consider either updating or retiring this section of the Manual.	**B-major**	The City is planning to retire this section of the Sewer Design Manual.
D.13.v – Design and Performance Provisions	Sewer Design Manual, Section F900 Rehabilitation Design is outdated. F900 does not document which portions of the process are being performed by LASAN versus LABOE. The document still describes an assessment process focused on defining and assessing primary sewers. In practice, the City has evolved to designate some sewers as critical, primary, and secondary and is assessing much more of the system than described in F900. Rehabilitation technology has also evolved since 1992.	The City may want to consider creating separate documents for the portions of the process performed by LASAN versus the portions of the process performed by LABOE.	**B-minor**	The City is planning to update this section of the Sewer Design Manual in the near future.
D.13.vi – Overflow Emergency Response Plan	Anyone with access to the internet can go to the myla311 webpage and create a service request. It is possible myla311 could be utilized to submit SSO complaints. There is no clear service request associated with reporting a sewer overflow or sewer odors.	The City may want to consider updating myla311 to more clearly indicate the appropriate service request for reporting a sewer overflow or sewer odors. Alternatively, the myla311 webpage can be updated to instruct the public to call 311 in the case of sewer overflows or emergencies.	**B-minor**	The City will evaluate to determine if feasible.

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category	Status
D.13.vi – Overflow Emergency Response Plan	The SSMP Overflow Emergency Response section documents how the City receives calls from customers, contractors, and internal employees and routes these calls to Venice Pump Station. It is not clear who is the responsible party at Venice Pump Station who takes the call and whether that changes during normal working hours versus after hours. The documentation is unclear as to who is contacted next to get to the point of assignment of a primary responder for the event and whether this changes depending on whether the event is occurring during or after normal business hours.	Update the SSMP to indicate the responsible party at Venice Pump Station, the position contacted to identify and dispatch a primary responder, and whether this process is different during working hours versus after normal working hours.	**B-minor**	The SSO response and reporting procedures will be reviewed to determine if updates are necessary..

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category	Status
D.13.vi – Overflow Emergency Response Plan	Section 5 of the Response and Reporting Procedures for SSOs and Sewer or Stormwater Contamination includes a set of SSO response procedures. Containment protocols do not describe typical containment methods, equipment available, or containment within storm drainage system. Subsection 5.7 references standard operating procedures that are not included as attachments to the document. Protocols for cleanup do not describe protocols for cleaning different types of affected areas such as hard surfaces, landscaped areas, other unimproved areas with natural vegetation, natural and manmade waterways or the storm drainage system.	Consider updating to document the primary containment methods the City uses. Consider identifying specifically which standard operating procedures is being referenced and incorporating the referenced procedure as an attachment.	**B-minor**	The SSO response and reporting procedures will be reviewed to determine if updates are necessary. .
D.13.vi – Overflow Emergency Response Plan	The SSMP section on the Overflow Emergency Response Plan discusses the ability to utilize the LAPD, LAFD, and Department of Transportation if needed for traffic and crowd control.	The City should consider adding this detail to Section 5 of the Response and Reporting Procedures for SSOs.	**B-minor**	The SSO response and reporting procedures will be reviewed to determine if updates are necessary.
D.13.x – SSMP Program Audits	The previous two SSMP Program Audits did not document the audit team participants, audit meeting/interview dates and topics discussed, although prior audits have included this documentation.	The City may want to consider documenting the audit team, meeting dates and times, and topics discussed in future audit reports.	**C**	Addressed with this audit report.

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category	Status
D.13.x – SSMP Program Audits	The previous audits focused primarily on compliance with the WDR requirements.	As the City's SSMP Program continues to mature, the City may want to consider evolving future internal SSMP Program Audit from focusing on compliance to treating the SSMP Program as a management system and focusing the program audit on continual improvement and risk mitigation.	**C**	
D.13.xi – Communication Program	The City's webpage does not include reference to the WDR or SSO performance information available within CIWQS.	The State Water Resources Control Board (SWRCB) California Integrated Water Quality System (CIWQS) contains a Collection System Operational Report webpage for each of the three City collection systems comparing the sewer overflow performance of each collection system to the State average and Regional average. The City may want to consider including a link to these webpages on the SSMP webpage.	**C**	
D.13.xi – Communication Program	The City does not currently have a clear means through the webpages for providing the public the opportunity to provide input as the program is developed and implemented.	One way the City may expand the opportunity for the public to provide input on a continual basis is to provide a phone number and email on the SSMP webpage where the public may provide input on the SSMP at any time. These comments could be collected and incorporated into the SSMP program audit process or more frequent management reviews.	**B-minor**	The City will update the LASAN webpage to address.

WDR Provision	Audit Finding	Recommended Corrective Action or Opportunity for Improvement	Finding Category	Status
D.13.xi – Communication Program	The SSMP states that the City has contracts with 29 satellite communities for wastewater conveyance and treatment services and meets with these communities regularly. The SSMP does not list the communities, where they are located, and provide a communication plan.	The City may want to consider including a map or high-level flow schematic of the communities, the approximate location of where they discharge into the system. The City may also want to elaborate on the triggers that may lead to interactions with the satellite cities and the minimum frequency of communication in the absence of a trigger (i.e., contractual update frequency or other scheduled interaction).	**C**	Addressed with the 2019 SSMP update.



SSMP Program Audit

City of Los Angeles

LA Sanitation & Environment

Los Angeles, CA

January 25, 2019