



Sewer System Management Plan

Category (check applicable):	<input checked="" type="checkbox"/> Policy <input type="checkbox"/> Process/Procedure <input type="checkbox"/> Program <input type="checkbox"/> Guidance		
Purpose:	The purpose of this document is to describe the Sewer System Management Plan (SSMP) of the Sacramento Area Sewer District (SacSewer).		
Version Date:	July 12, 2023	Original or Revision:	Revision
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Key Stakeholders:	SacSewer – All Units		
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District Engineer

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Signature

7/12/2023

Date

Approval Recommended By:

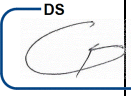

Rosemary Clark
Director of Operations

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Rosemary Clark
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Signature

7/12/2023

Date

SSMP Change Log			
Date of Approval	Approving Authority (Board / LRO)	Change Description	LRO Initial
7/12/2023	LRO	<p>The SSMP was updated as follows:</p> <ul style="list-style-type: none"> Updated Section 1. Purpose with reference to the reissued WDR Water Quality Order No. 2022-0103-DWQ Table 2-1 Asset Count was updated with the calendar year 2023 official counts Figure 8-1 Staff Responsible for Implementing SacSewer SSMP was updated to reflect staff changes and Engineering Structure: Replaced “SSO” and “overflow” with “spill” throughout the Document Replaced Sanitary Sewer Overflow (SSO) Emergency Response Procedures Manual (ERPM), with “Spill Emergency Response Plan (SERP) throughout the Document Changed Waters of the United States to Waters of the State in section 10. Legal Authority Added a section for Continuation of Coverage Updated Internal audits to every three years instead of every two years Updated Signature Page with Review/Revision from a period of 12month review/60-month update to a period of 3 years review/6 years update Changed the name of the SSO Assessment Program to Blockage Control Assessment Program Updated the reference to the Sacramento Area Sewer District from “SASD” to “SacSewer” throughout the Document 	
7/12/2023	LRO	<p>The Reference Document to the SSMP was reviewed, and edits were made as follows:</p> <ul style="list-style-type: none"> Table 100-2, Section Owners and Key Stakeholders was updated to reflect changes in staff Replaced “SSO” and “overflow” with “spill” throughout the Document <ul style="list-style-type: none"> Updated the title Sanitary Sewer Overflow (SSO) Emergency Response Procedures Manual (ERPM) to “Spill Emergency Response Plan (SERP) in Section 205 and throughout the Document Updated Table 100-1, Key Reference to WDR Requirements: changed the reference to SERP instead of ERPM Updated the SacSewer Training Policy to reflect the training of staff for the SERP at a minimum once a year Updated Sewer System Management Plan (SSMP) Document Update and Storage Policy to reflect updates of the SSMP from every five years to at least every six years and updates of the Reference Documents from every two years to at least every three years Updated Reference Document Signature Page from a period of 12-month review/24-month revise to update at least every three years Changed Section 500 title from SSO Assessment Program to Blockage Control Assessment Program Main Line-Repair-Maintain-Replace Decision Policy was updated to add Corroded pipes to main line structural defects. Updated names of groups to reflect changes in SacSewer Engineering structure Lower Lateral Incorrect Cleaning Frequency Strategy was updated: <ul style="list-style-type: none"> Updated Group names Added to Strategy TVI reviewer to verify Grease rating from TVI submitted and add a log note to document the discrepancy. 	

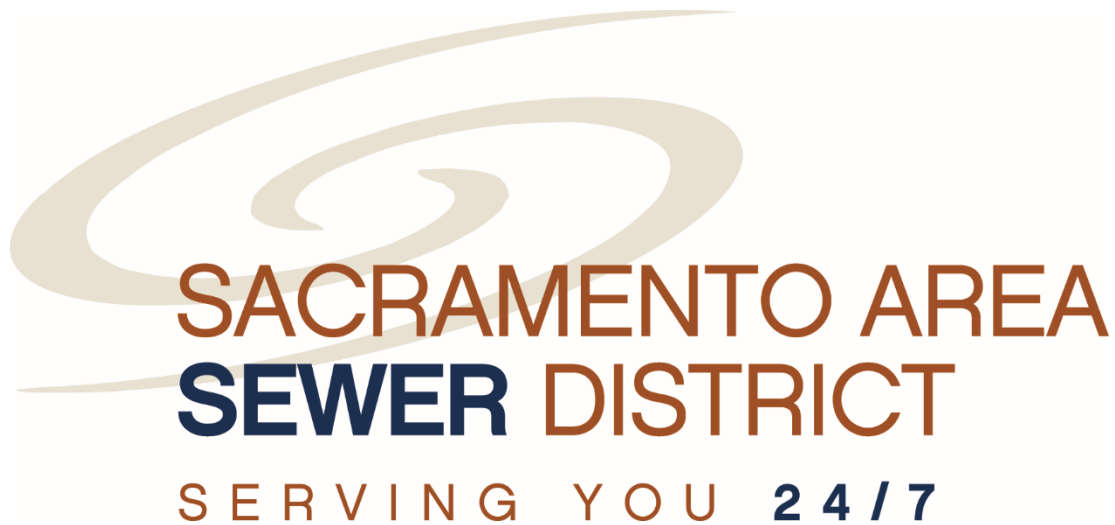
		<ul style="list-style-type: none"> • Main Line Incorrect Cleaning Frequency Strategy was updated: <ul style="list-style-type: none"> ➢ Updated Group names ➢ Deleted “Failure Mode” of its name to match the Lower Lateral Incorrect Cleaning Frequency Strategy for consistency ➢ Added a Strategy note, “if Pipeline Support Group review of the ML Frequency Adjustment Report determines no adjustment in frequency for a specific asset based on asset history, then the record will be excluded from the report.” • Root Control Program was updated to document the date and decision to end the chemical root foaming. • Updated the reference to the Sacramento Area Sewer District from “SASD” to “SacSewer” throughout the Document 	
10/19/2021	LRO	<p>The SSMP was updated as follows:</p> <ul style="list-style-type: none"> • Section 8.1 Certified Organization Structure Element was updated to reflect the appointment of Christoph Dobson as the District Engineer by the Board on September 12, 2021 • Figure 8-1 Staff Responsible for Implementing SASD SSMP was updated to change the District Engineer from Prabhakar Somavarapu to Christoph Dobson 	CD
7/21/2021	LRO	<p>The SSMP was updated as follows:</p> <ul style="list-style-type: none"> • SASD service map was replaced with current version • Table 2-1 Asset Count was updated with the calendar year 2021 official counts • Figure 8-1 Staff Responsible for Implementing SASD SSMP was updated to reflect changes in staff and to replace the reference to Sanitation Districts Agency in the headings with Regional San & SASD. This update addresses the first part of task 2 of the action items of the SSMP Internal Audit 2020 • Incorrect Cleaning Frequency Strategy title was replaced with Main Line Incorrect Cleaning Frequency Strategy • Lower Lateral Incorrect Cleaning Frequency Strategy was added to Section 15.2 SSO Assessment Program 	PS
7/21/2021	LRO	<p>The Reference Document to the SSMP was reviewed, and edits were made as follows:</p> <ul style="list-style-type: none"> • Figure 100-2, Sections Grouping: Updated the title of the Incorrect Cleaning Frequency Strategy to Main Line Incorrect Cleaning Frequency Strategy and added the Lower Lateral Incorrect Cleaning Frequency Strategy • Table 100-2, Section Owners and Key Stakeholders, was updated: <ul style="list-style-type: none"> ➢ Added the owners to Sections 203, 204, and 205. This update addresses the second part of task 2 of the action items of the SSMP Internal Audit 2020. Also updated to reflect staff changes. ➢ Updated the title of the Incorrect Cleaning Frequency Strategy to the Main Line Incorrect Cleaning Frequency Strategy ➢ Added the Lower Lateral Incorrect Cleaning Frequency Strategy • Incorrect Cleaning Frequency Strategy: <ul style="list-style-type: none"> ➢ updated the title to Main Line Incorrect Cleaning Frequency Strategy ➢ Added the PM frequency that can be selected • Reference to the Incorrect Cleaning Frequency Strategy was changed to the Main Line Incorrect Cleaning Frequency Strategy throughout the Document 	RMC

		<ul style="list-style-type: none"> • Main Line-Repair-Maintain-Replace Decision Policy: Added the 18-month ML PM frequency that SASD currently uses and updated the PM flowchart to correct the 12 months frequency from greater than 12 months to equal or greater than 12 months • Lower lateral Incorrect Cleaning Frequency Strategy was added as a Section under the SSO Assessment program • Crush Collapse Failure Mode Strategy: Added a proactive MH Strategy. This update addresses task 3 of the action items of the SSMP Internal Audit 2020 • Lower Lateral Repair-Maintain-Replace Decision Policy: <ul style="list-style-type: none"> ➤ Added to step 2.5.2 the sentence, "Create a follow-up TVI to be performed in 12 months" to reflect the criteria in the Lower lateral Incorrect Cleaning Frequency Strategy ➤ Added the 18-month LL PM frequency that SASD currently uses ➤ Updated Process Part 4 to remove the wording "tee taps with less than 20 ESDs" and add "tee" "ML tap defects to match the current SASD Standards • Lower Lateral Stoppage Failure Mode Strategy: Added a reference and a short description of the Lower Lateral Incorrect Cleaning Frequency Strategy in the Strategy proactive approach • Main Line Stoppage Failure Mode Strategy: Updated the description of the Main Line Incorrect Cleaning Frequency Strategy in the Strategy proactive approach to give a better description of the Strategy. • Televised Inspection Policy: Added a reference to the Lower Lateral Incorrect Cleaning Frequency Strategy in the Process Section under Preventive Maintenance Schedule Changes and Removal • SASD Comprehensive FOG Control Program: Added a list of FOG Manager Duties. This update addresses task 4 of the action items of the SSMP Internal Audit 2020. 	
11/12/2020	LRO	The SSMP was updated; Figure 8-1 Staff Responsible for Implementing SASD SSMP was updated to reflect staff changes.	PS
11/12/2020	LRO	<p>The Reference Document to the SSMP was reviewed, and edits were made as follows:</p> <ul style="list-style-type: none"> • The Loss of Support Failure Mode Strategy was updated: <ul style="list-style-type: none"> ➤ Updated the Annual Visual Inspection criteria and the Post-Storm Inspection criteria, and organized the strategy details under a Creek Inspection Program. ➤ Removed the reference to the one-time Creek Protection Project. ➤ Updated the reactive approach to be consistent with other strategies. • The Crush Collapse Failure Mode Strategy was updated: <ul style="list-style-type: none"> ➤ Removed the Structural Assessment Program and referenced its replacements, the Main Line Critical Assets, and the Main Line Scheduled Inspection Programs. Details of these programs are under the Main Line Stoppage Failure Mode Strategy. ➤ Removed the reference to the TVI part of the Lower Lateral Area Inspection Program and referenced its replacement, the Lower lateral Scheduled Inspection Program. Details of this program are under the Lower Lateral Stoppage Failure Mode Strategy. ➤ Added a reference to the Main Line Easement Rehabilitation Program, details of this program are under the Main Line Stoppage Failure Mode Strategy. • Main Line Stoppage Failure Mode Strategy was updated: 	RMC

		<ul style="list-style-type: none"> ➤ Removed the Main Line Maximum Interval Cleaning Program, the Main Line PM Setting Program, and the Structural Assessment Program. Added their replacement programs, the Main Line Scheduled Inspection Program, and the Main Line Critical Assets Program. • The Lower Lateral Stoppage Failure Mode Strategy was updated: <ul style="list-style-type: none"> ➤ Removed the CCTV part of the Lower Lateral Area Inspection Program and added its replacement program the Lower Lateral Schedule Inspection Program. • The Manhole Stoppage Failure Mode Strategy was updated: <ul style="list-style-type: none"> ➤ Removed the reference to the Main Line Maximum Interval Cleaning Program and added references the replacement programs, the Main Line Critical Assets, and the Main Line Scheduled Inspection Program. Details of these programs are under the Main Line Stoppage Failure Mode Strategy. ➤ Added, "If a manhole is accessed to perform a TVI of a main line, a manhole TVI shall also be performed," Section 107.5 in the TVI Manual." • The Televised Inspection Policy was updated to refer to the TVI programs in a general term, "TVI Based Programs" instead of listing the program names, "Main Line Scheduled Inspection, Main Line Critical Asset Program, and Lower Lateral Inspection Program." 	
5/28/2020	LRO	<p>The SSMP was updated as follows:</p> <ul style="list-style-type: none"> • Table 2-1 Asset Count was updated with calendar year 2020 official counts. • Figure 8-1 Staff Responsible for Implementing SASD SSMP was updated to reflect changes in staff. 	PS
5/27/2020	LRO	<p>The Reference Document to the SSMP was reviewed and edits were made as follows:</p> <ul style="list-style-type: none"> • Removed the references to the Development Services Procedures Manual throughout the Reference Document Sections. This manual is an internal document that describes SASD Engineering-Development Services work procedures and does not apply to the SSMP. • Table 100-2 Section Owners and Key Stakeholders was updated to reflect the changes in staff and document owners. • The SSMP Communication Program was updated. Added social media content to outreach activities and updated Detailed Group Responsibilities for the Business Planning group. • The Mapping Update Policy and Process was updated with current group names and additional cities that maintain and provide storm drain facilities information. • The SSMP Plan Document Update and Storage Policy was updated as follows: <ul style="list-style-type: none"> ➤ The process to the SSMP document storage and retrieval was updated. ➤ The reference to FileNet was replaced with the Records Center, which is the current SSMP storage location. • The Pressurized Asset Management Strategy and the Gravity Assets Management Strategy were updated to add a reference to the Condition Assessment Strategy for SASD Assets. • The Main Line Repair-Maintain-Replace Decision Policy was updated, edits were made to Section 304.3 Part 3 as follows: 	RC

- added a sentence defining the frequencies SASD use for main line PM cleanings
- Updated **Part 3.2.1** from “Write Priority 2 Cleaning WO and a Priority 4 TVI WO in 12 months” to “Put ML on PM”
- Updated **Part 3 – Preventive Maintenance** flowchart to reflect changes in process and added a Note 2 to box 3.1.4., “Create BCE when the next higher frequency is less than 3 months”
- The **Loss of Support Failure Mode Strategy**, the **Lower lateral Stoppage Failure Mode Strategy**, the **Pump Station Component Failure Mode Strategy**, and the **SASD Comprehensive FOG Control program** were updated. The references to the **Standards** were updated to reflect the content of the current version of the **Standards**.
- The **Crush Collapse Failure Mode Strategy** was updated as follows:
 - Added an end date for the **Main Line Structural Assessment Program**, and removed the details of the program.
 - Added the **Main Line Critical Assets Program**.
 - Added the **Main Line Scheduled Inspection Program**.
- The **Main Line Stoppage Failure Mode Strategy** was updated:
 - Updated the **MLSM** program and removed the reference to the 6-inch diameter that are 40 years old.
 - Added an end date for the **Main Line Maximum Interval Cleaning Program**, and removed the details of the program.
 - Added an end date for the **Main Line PM Setting Program**.
 - Added the **Main Line Easement Rehabilitation Program**.
- The **Manhole Stoppage Failure Mode Strategy** was updated as follows:
 - Added an end date for the **Main Line Maximum Interval Cleaning Program**.
 - Updated the references to the **Standards** to match the current version.
- The **Damage by Others Failure Mode Strategy** was updated to remove the reference to the **Standards and Specifications Strategy**. The **Standards and Specifications Strategy** is an internal document that describes **SASD Engineering-Information Management Group** work procedures and does not apply to the **SSMP**.
- The **Under Capacity Failure Mode Strategy** was updated as follows:
 - Renamed the Investigative Triggers to Monitoring Triggers.
 - Updated the Investigative Trigger, now it is an actual capacity-related overflow that occurs during a storm event that has similar or less impacts on the system compared to the SASD’s Performance Storm.
 - Removed the relief project alternatives development from the **UCFMS** and referred to the Project Authorization Process: PAC/PDP Guidelines document.
- The **Incorrect Cleaning Frequency Failure Mode Strategy** was updated. Added to **Table 507-1**, column 2 consecutive heavy Results, the sentence, “Create a BCE when the next higher frequency is less than 3 months”.
- The **Televised Inspection Policy** was updated as follows:
 - The references to the **Standards** for the TVI defect codes and Granite were replaced with references to the **TVI Manual**.
 - Replaced the reference to the old version of the **Standards Section 332.6** with reference to **Section 331 Television Inspection** of the current version of the **Standards**.

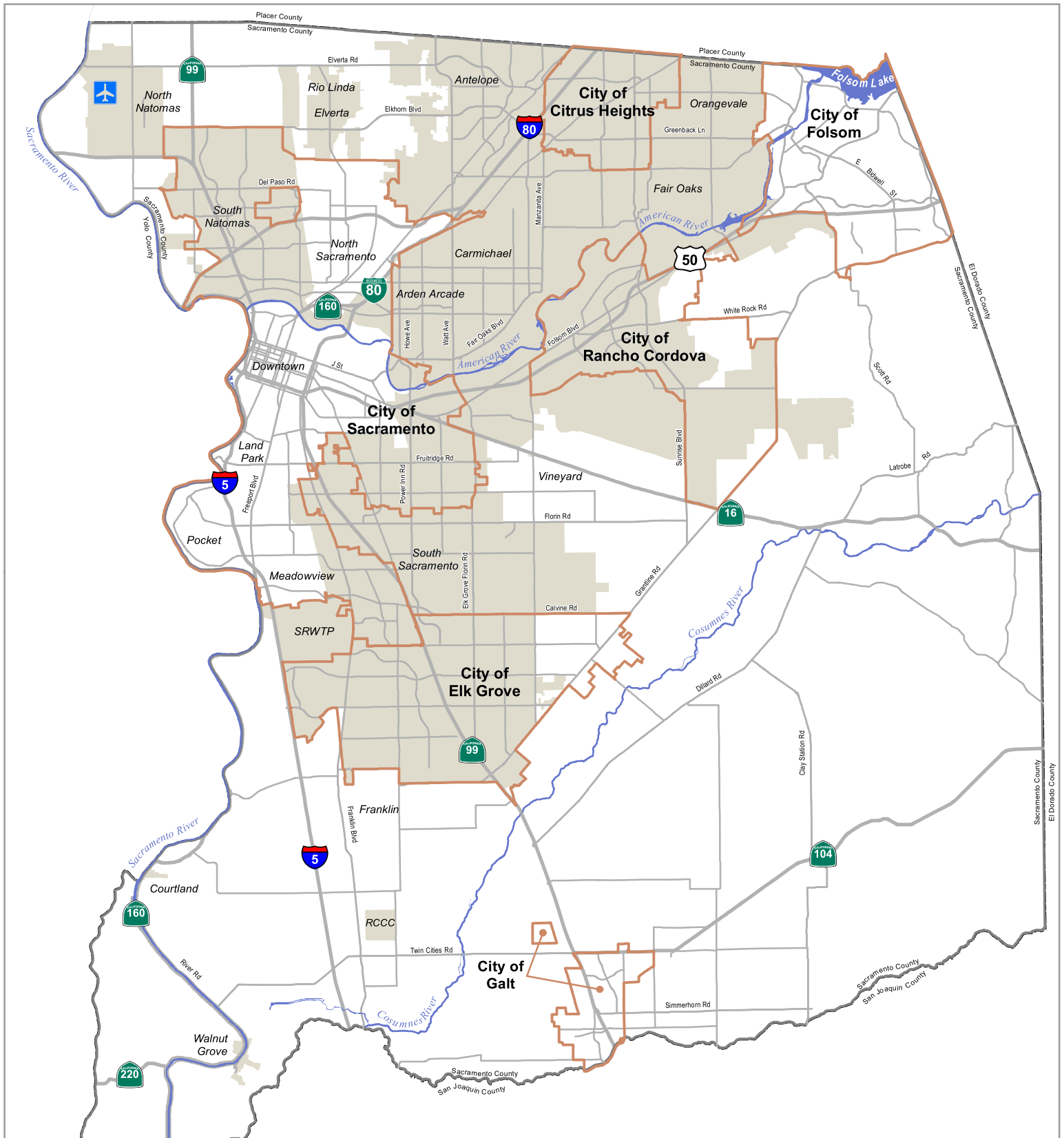
		<ul style="list-style-type: none"> ➤ Updated the Process: Added an end date for the Main Line Structural Assessment Program and added its replacement programs: the Main Line Critical Assets Program and the Main Line Scheduled Inspection Program ➤ Updated the Process flowchart to reflect the upcoming programs that will replace the Structural assessment Model. • The Quality Control for Sewer Pipe Cleaning Procedure/Policy was updated as follows: <ul style="list-style-type: none"> ➤ The timeframe for completion of QC TVI was updated from 30 days to 10 days to reflect current practices. ➤ Updated group responsibilities to reflect current practices. • The Root Control Program was updated to add a reference to the Main Line Easement Rehabilitation Program. 	
9/3/2019	LRO	<ul style="list-style-type: none"> • The SSMP was updated. The Reference to the Main Line Cracked, Broken, Missing, and Collapsed Pipe Decision Policy was updated to Main Line Repair-Maintain-Replace Decision Policy 	PS
8/26/2019	LRO	<ul style="list-style-type: none"> • The Main Line Cracked, Broken, Missing, and Collapsed Pipe Decision Policy was revised and updated to mimic the Lower Lateral Repair-Maintain-Replace (LLRMR) Decision Policy as follows: <ul style="list-style-type: none"> ➤ Existing Cracked, Broken, Missing, and Collapsed Pipe assessment process and its flowcharts were kept without any changes. ➤ Preventive Maintenance flowchart and Main Line Observed Problems flowchart were added. ➤ Title was changed to Main Line Repair-Maintain-Replace (MLRMR) Decision Policy. ➤ Purpose and background sections were updated to reflect the content of the updated policy. • The Reference to the Main Line Cracked, Broken, Missing, and Collapsed Pipe Decision Policy was updated to Main Line Repair-Maintain-Replace Decision Policy throughout the SSMP Reference Document. 	RC
3/13/2019	Board	<ul style="list-style-type: none"> • The SSMP was approved and certified by the SASD's Board of Directors. 	



Sewer System Management Plan

*Developed in compliance with Waste Discharge Requirement
Water Quality Order Number 2022-0103*

SacSewer Service Area



LEGEND

- Main Road
- Highway
- River
- SacSewer Service Area
- City Boundary



N
Not to Scale

Table of Contents

1.	Purpose	3
2.	Background	3
3.	Application for Permit Coverage.....	3
4.	Continuation of Coverage	3
5.	Reporting Program.....	4
6.	Sacramento Area Sewer District SSMP Document Overview	4
6.1	Diagram 6-1 General Management Overview	6
7.	Board Approved SSMP Development Plan and Schedule.....	7
8.	Goal	7
9.	Organization.....	7
9.1	Certified Organization Structure Element	7
9.2	Chain of Communication for Reporting Spills	7
9.3	Figure 9-1 Staff Responsible for Implementing SacSewer’s SSMP	9
10.	Legal Authority	11
11.	Spill Emergency Response Plan.....	11
12.	Design and Performance Provisions	11
13.	SSMP Program Audits	11
14.	Communication Program	11
15.	Combined SSMP Elements Overview.....	12
15.1	Computerized Maintenance Management System (CMMS)	12
15.2	Training	12
15.3	Up-to Date System Maps	12
16.	System-wide Assessment Programs	12
16.1	Structural Assessment Program.....	13
16.1.1	Loss of Support Failure Mode Strategy.....	13
16.1.2	Crush Collapse Failure Mode Strategy	14
16.1.3	Pump Station Structural Assessment Strategy	14
16.2	Blockage Control Assessment Program	14
16.2.1	Main Line Stoppage Failure Mode Strategy.....	14
16.2.2	Lower Lateral Stoppage Failure Mode Strategy.....	15
16.2.3	Manhole Stoppage Failure Mode Strategy	15
16.2.4	Pump Station Component Failure Mode Strategy	15
16.2.5	Damage by Others Failure Mode Strategy.....	15
16.2.6	Under Capacity Failure Mode Strategy	16
16.2.7	Underground Facility Damage Investigation Process	16

16.2.8	SacSewer Comprehensive FOG Control Program	16
16.2.9	Root Control Program	16
16.3	Management Plan Assessment Program	16
16.3.1	Gravity Assets Management Strategy.....	17
16.3.2	Pressurized Assets Management Strategy.....	17
16.3.3	Asset Management Plan and Staffing Projections	17
16.3.4	Funding Needs Assessments	18
17.	Appendix A - Notice of Intent	19
17.1	Appendix A – Notice of Intent (continued)	20
18.	Appendix B – Board Approved Plan and Schedule	21
18.1	Appendix B - Board Approved Plan and Schedule (continued).....	22
18.2	Appendix B - Board Approved Plan and Schedule (continued).....	23
18.3	Appendix B - Board Approved Plan and Schedule (continued).....	24
19.	Appendix C – Continuation of Coverage Certification	25

Sewer System Management Plan

1. Purpose

The purpose of this document is to provide the Sacramento Area Sewer District (**SacSewer**) a system-wide living management plan for the operation, maintenance, expansion, repair, and replacement of **SacSewer**'s sewer collection system. The intent of this document is to be a day-to-day working management plan that also meets Attachment D - Sewer System Management Plan – Required Elements of the **Statewide General Waste Discharge Requirements (WDRs)**, Water Quality Order No. 2022-0103-DWQ (Sanitary Sewer Order) approved on December 6, 2022 and effective on June 5, 2023. The District Engineer is authorized to make non-consequential changes to the SSMP.

2. Background

SacSewer provides wastewater collection services to approximately 281 square miles of the greater Sacramento area. Table 2-1 gives round values for various assets owned by **SacSewer**. The more current asset count for any given year is recorded and annually updated in the California Integrated Water Quality System (CIWQS) database questionnaire.

Table 2-1 Asset Count – Year 2023

Assets	Quantity
Main Lines	3,100 miles
Lower Laterals	1,600 miles
Connections	306,000
Pump Stations	106

3. Application for Permit Coverage

SacSewer Notice of Intent (NOI) for coverage under the Sanitary Sewer Order was submitted to the State Water Board on November 2, 2006. It is included in Appendix A.

SacSewer received the Waste Discharge Identification (WDID) # 5SSO10912.

4. Continuation of Coverage

SacSewer Continuation of Coverage under the Statewide Sanitary Sewer Systems General Order 2022-0103-DWQ was confirmed and certified on May, 03, 2023 The Certification Confirmation letter is included in Appendix C.

5. Reporting Program

SacSewer has complied with the General Monitoring and Reporting requirements by the online reporting (via CIWQS) of Sanitary Sewer Spills since September 2, 2007. The General Monitoring and Reporting requirements, which were amended in September of 2013, were superceded by the Statewide Sanitary Sewer Systems General Order 2022-0103-DWQ as of June 5 2023. SacSewer will comply with the latest Notification, Monitoring, Reporting, and Recordkeeping Requirements under the Statewide Sanitary Sewer Systems General Order 2022-0103-DWQ.

6. Sacramento Area Sewer District SSMP Document Overview

SacSewer Sewer System Management Plan (SSMP) is arranged to be a living day-to-day management plan. The arrangement for **SacSewer SSMP** is shown graphically in Section 6.1 Diagram 6-1. General Management Overview.

Attachment D of the latest **WDR** specifies the mandatory elements of the **SSMP**. Some of the mandatory elements are treated individually as standalone elements in the **SSMP**. These elements are listed in Table 6-1 below.

Table 6-1 Stand Alone Elements

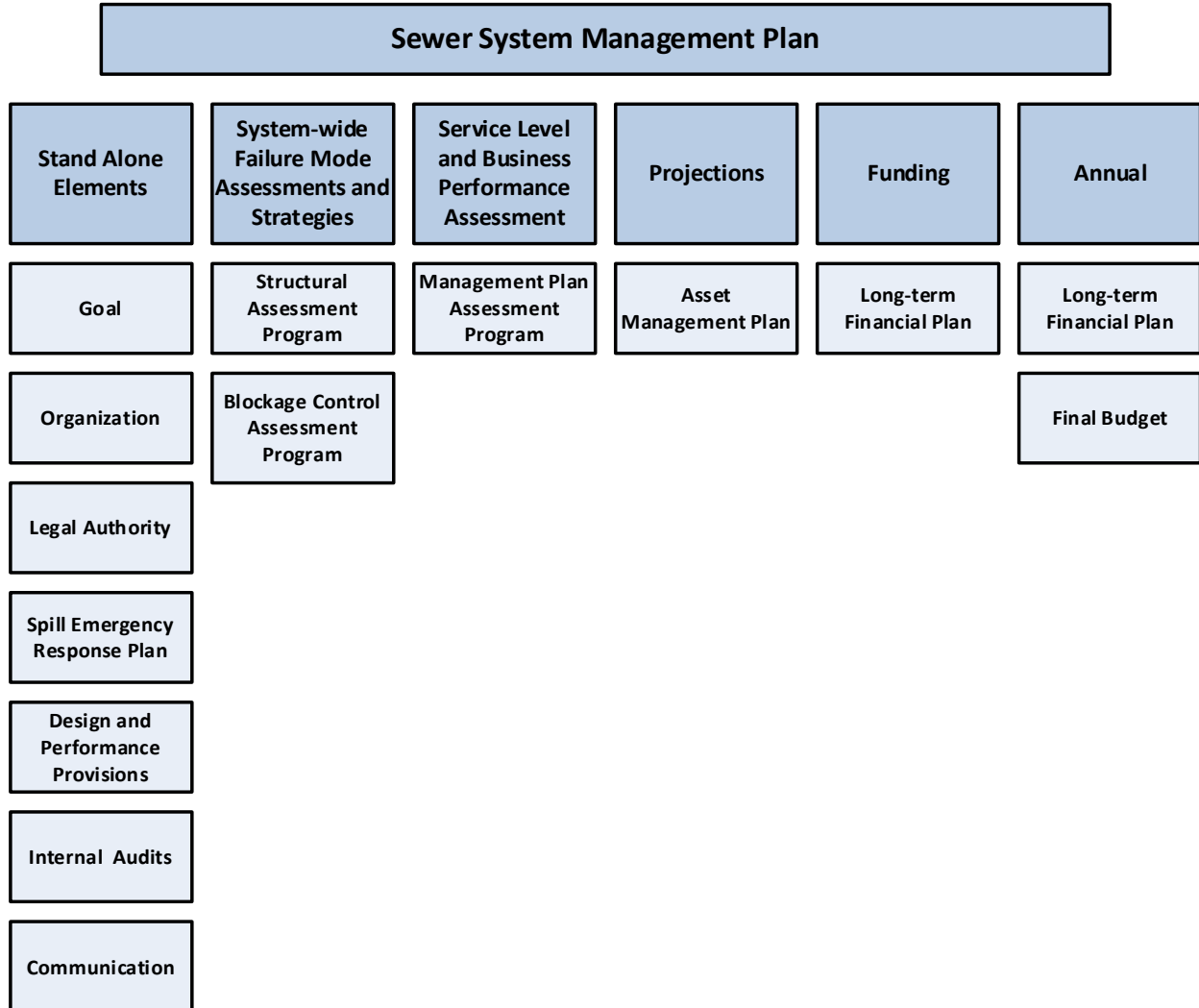
WDR Attachment-D, Section	WDR Mandatory Element	SSMP Section
1	Goal and Introduction	1, 2, 8, 15.3
2	Organization	9
3	Legal Authority	10
5	Design and Performance Provisions	12
6	Spill Emergency Response Plan	11
10	Internal Audits	13
11	Communication Program	14

The remaining mandatory elements are covered in combination in Section 15, Combined **SSMP** Elements Overview and Section 16, System-wide Assessment Programs. These elements are listed in Table 5-2 below.

Table 6-2 Combined Elements

WDR Attachment-D, Section No.	WDR Mandatory Element	SSMP Section
4	Operation and Maintenance Program	15 and 16
7	Sewer Pipe Blockage Control program	15 and 16
8	System Evaluation, Capacity Assurance and Capital Improvements	15and 16
9	Monitoring, Measurement, and Program Modifications	15 and 16

6.1 Diagram 6-1 General Management Overview



7. Board Approved SSMP Development Plan and Schedule

The **WDR 2006-003** required that publicly owned sewer collection systems that meet the requirements of the order have the approving authority to formally approve the agency's **SSMP Development Plan and Schedule**.

SacSewer approved the **SSMP Development Plan and Schedule** on June 13, 2007. A scanned copy of the Board approval documents can be found in Section 17 Appendix B.

The last update to the SSMP was approved by the SacSewer's Board on March, 19 2019 and Certified in the CIWQS website. The next update that complies with the requirements of the reissued WDR 2022-0103-DWQ is due for approval by the SacSewer Board and Certification in CIWQS by May, 2 2025, and will be followed by updates and certifications every six years.

8. Goal

On November 2, 2007, **SacSewer** certified that the "Goals" mandatory element of the **SSMP** was complete.

"The goal of the SacSewer SSMP is to provide a plan and schedule to continue to properly manage, operate, and maintain all parts of the sanitary sewer system. This will help reduce and prevent spills, as well as mitigate any spills that occur."

9. Organization

9.1 Certified Organization Structure Element

On November 2, 2007, **SacSewer's** Board certified that the District Engineer is the responsible or authorized representative as described in Section J of the Waste Discharge Requirement Water Quality Order Number 2006-0003-DWQ. Figure 9-1 on the following page shows the organizational structure that includes the LROs as required by the reissued WDR 2022-0103-DWQ. The District Engineer continues to be the responsible or authorized representative under the reissued WDR 2022-0103-DWQ.

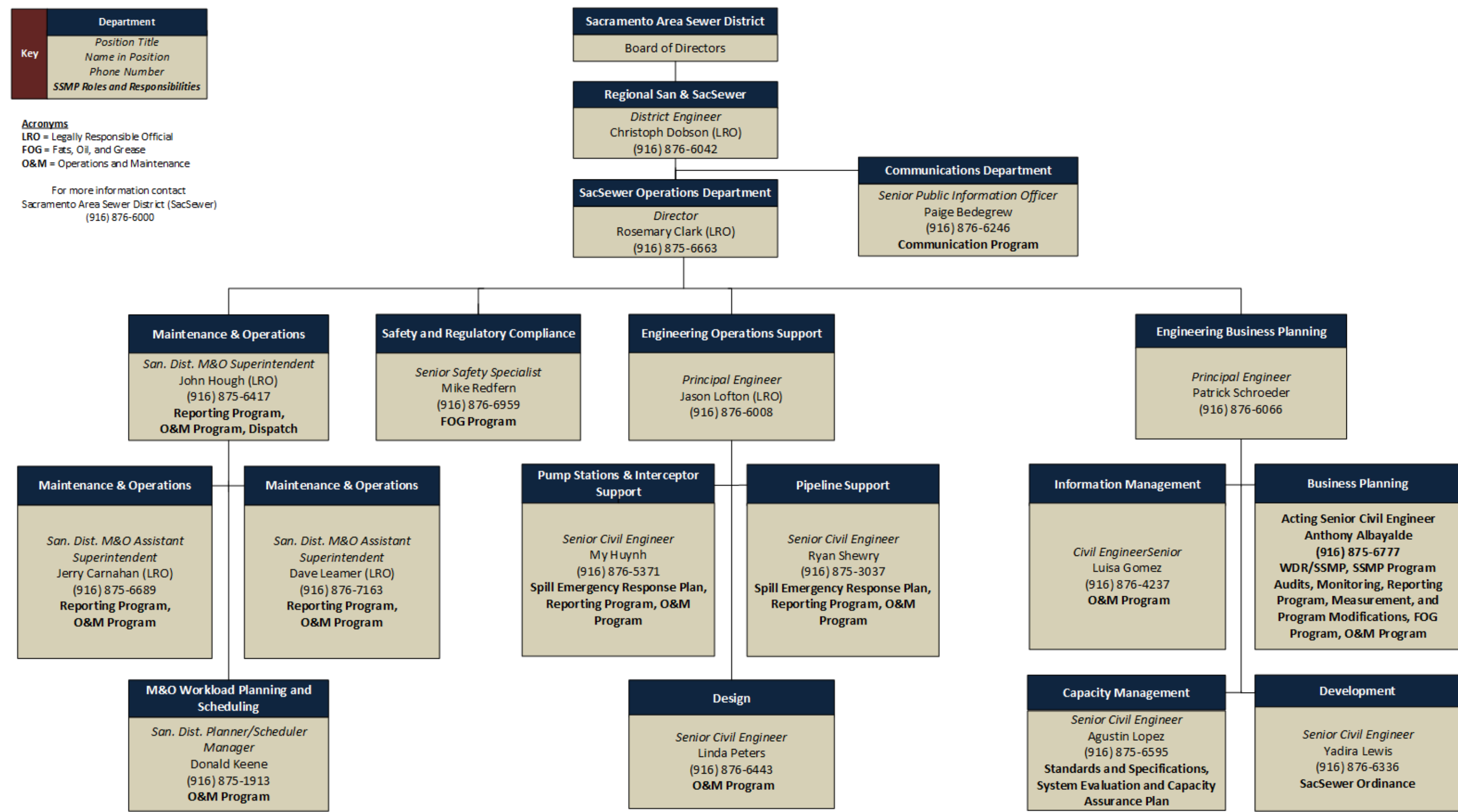
On September 12, 2021, the following person was appointed by the Board as the District Engineer.

District Engineer: Christoph Dobson

9.2 Chain of Communication for Reporting Spills

The chain of communication for reporting spills is located in the most current version of **Spill Emergency Response Plan (SERP), Section 205** of the **SSMP Reference Document** and the **Customer Call Handling and Service Request Creation Policy, Section 206** of the **SSMP Reference Document**. Figure 9-1 on the following page shows the Legal Responsible Officials (LRO) for reporting spills.

9.3 Figure 9-1 Staff Responsible for Implementing SacSewer’s SSMP



10. *Legal Authority*

The **Sacramento Area Sewer District Sewer Ordinance (Ordinance)**, **Section 203** of the **SSMP Reference Document** provides **SacSewer** with the Legal Authority that include the following:

- prevent illicit discharges
- require that sewers and connections be properly designed and constructed
- ensure access for maintenance, inspection, or repairs for portions of laterals owned by **SacSewer**
- limit the discharge of fats, oils, and grease (FOG) and other debris that may cause blockages
- enforce any violation of its sewer ordinance
- prohibit discharges to the system and identify measures to prevent spill's and blockages caused by FOG

When **SacSewer** finds an inconsistency or shortcoming in the **Ordinance** or when **SacSewer** program modifications are made, the **Ordinance** is reviewed and updated as necessary. The **Ordinance** is kept in alignment with current practices, ensuring the legal authority for the required **SSMP** elements is maintained. The Ordinance can also be found on SacSewer's public website at <http://www.SacSewer.com>

11. *Spill Emergency Response Plan*

SacSewer maintains a **Spill Emergency Response Plan(SERP)**, **Section 205** of the **SSMP Reference Document** that contains procedures, which comply with the requirements of Attachment D Section 6, Spill Emergency Response Plan of the reissued WDR 2022-0103-DWQ. The SERP can also be found on SacSewer's public website at <http://www.SacSewer.com>

12. *Design and Performance Provisions*

SacSewer maintains the **Sacramento Area Sewer District Standards and Specifications (Standards)**, **Section 204** of the **SSMP Reference Document** that complies with Attachment D Section 5 Design and Performance Provisions of the reissued WDR 2022-0103-DWQ. The **Standards** are reviewed annually and updated, as changes are needed. The Standards can also be found at SacSewer's public website <https://www.sacsewer.com/standards-specifications>

13. *SSMP Program Audits*

SacSewer will conduct periodic internal audits at least every three years as required by the reissued WDR 2022-0103-DWQ. A report will be prepared after the audit and kept on file and will be uploaded to the CIWQS website within six months after the end of an audit period. **SacSewer** uses the **SSMP Audit Procedures, Section 202** of the **SSMP Reference Document** as guidance when conducting an internal audit. The next audit for SacSewer will be for the 3-year period ending on 5/2/2024 with following audit periods every 3 years starting from the end of the last required Audit Period.

14. *Communication Program*

SacSewer has provided and will continue to provide information to its customers and the public with information about the **SSMP** as described in the **SSMP Communication Program, Section 201** of the **SSMP Reference Document**. **SacSewer** communicates with tributary and satellite sewer systems as needed.

15. Combined SSMP Elements Overview

As shown in Table 6-2 contained in Section 6 Sacramento Area Sewer District SSMP Document Overview, some of the Attachment D provisions of the **WDR** elements are covered in combination. Most of these elements are addressed in Section 15 System-wide Assessment Programs.

There are four combined **SSMP** elements that are not part of Section 16 System-wide Assessment Programs:

- Computerized Maintenance Management Systems (CMMS)
- Equipment Inventory
- Training
- Up-to Date System Maps

These elements are discussed below.

15.1 Computerized Maintenance Management System (CMMS)

SacSewer employs a computerized maintenance management system (CMMS) to document work orders, Preventive Maintenance (PM) schedules, emergency response, and the records of completed work. Reports from the CMMS are used to provide the data for trending **SacSewer's** sewer system performance. The performance trends for the spill related service levels, failure modes, and performance measures drive the priority for **SacSewer** actions. The CMMS is also used to document **SacSewer** equipment and replacement part inventories, including identification of critical replacement parts.

In order to increase the staff awareness of system-wide spill performance, **SacSewer** trends and prominently posts the main line and lower lateral overflow rate graphs monthly. In addition, performance measures such as work orders completed on time, production rates, and costs per unit completed are trended.

15.2 Training

SacSewer provides training for staff on regular basis in sanitary sewer system operations and maintenance. Training includes spill response procedures, job plans, and on the job training as described in **SacSewer Training Policy, Section 208** of the **SSMP Reference Document**.

Contractors awarded a job or a project by **SacSewer** are trained on spill response procedures and sanitary sewer system operations and maintenance.

15.3 Up-to Date System Maps

SacSewer utilizes a Geographic Information System (GIS) to display location and asset information about the sewer system. The computerized map shows various information including pipe sizes, manhole rim elevations, pipe materials, manhole depths, and the locations of pipes, manholes, pump stations, force mains, and sewer laterals.

The storm water facilities are owned and operated by local jurisdictions. These jurisdictions are responsible for the accuracy and timeliness of storm water facilities mapping updates to the regional GIS Collaborative. These storm water maps are then available to **SacSewer** staff by retrieving them from different layers in the GIS Viewer.

SacSewer maintains the sewer and storm water system map in accordance with the most current version of **Mapping Update Policy and Process, Section 207** of the **SSMP Reference Document**. The policy specifies mapping documentation procedures, mapping update timelines, and mapping rollout procedures.

16. System-wide Assessment Programs

This section describes the programs that are designed to investigate any shortcomings in meeting **SacSewer's** approved Service Levels or regulatory requirements as follows:

- monitor and analyze trends on service levels and performance measures
- review the results the work done to accomplish a strategy
- make Preventive Maintenance (PM) schedule, strategy modifications or other corrections, depending on trends and target performance level
- evaluate and manage risk associated with failing to meet service levels, regulatory requirements, community/social needs and business goals
- address capital and operating needs and project revenue and funding needs
- monitor the result of strategy modifications

The Assessment Programs are broken into the following three categories:

- **Structural Assessment Program**
- **Blockage Control Assessment Program**
- **Management Plan Assessment Program**

The Assessment Programs include strategies that drive **SacSewer's** operation and maintenance practices, FOG Control Program, system evaluation and capacity assurance plan, and monitoring, measurement, and program modifications elements. These strategies address:

- pipeline loss of support failure mode
- pipeline crush collapse failure mode
- pipeline stoppage failure mode
- pump station and force main failure modes
- under capacity failure mode
- damage by others failure mode

16.1 Structural Assessment Program

SacSewer owns and operates a variety of physical assets. Each asset type has its own degradation pattern that leads to various modes of structural failures. **The Structural Assessment Program, Section 400** of the **SSMP Reference Document** describes the strategies **SacSewer** implements to identify and mitigate failure modes that lead to structural failures of sewer collection assets such as manholes, pipes, and pump stations.

This program is divided into different types of strategies addressing structural failure modes. These strategies are then further divided by procedures and practices since different asset classes have different required methodology to determine investigatory and action triggers. **SacSewer's** supporting information can be found in the following:

- **Loss of Support Failure Mode Strategy, Section 401** of the **SSMP Reference Document**
- **Crush Collapse Failure Mode Strategy, Section 402** of the **SSMP Reference Document**
- **Pump Station Structural Assessment Strategy, Section 403** of the **SSMP Reference Document**

Structural failures, which have caused stoppages, are addressed directly through **SacSewer's Blockage Control Assessment Program, Section 500** of the **SSMP Reference Document**, (and via the **Spill Emergency Response Plan Manual**, if a spill or BIS resulted).

16.1.1 Loss of Support Failure Mode Strategy

Loss of support failure mode is when the gravity collection system asset failure is due to the failure of the supporting substructure – such as the erosion of soil beneath a buried pipe or the failure of a support pier or hanger. This type of failure mode results in the pipe separating at joints or structurally failing. The **Loss of Support Failure Mode Strategy** defines the reactive and proactive approaches to cost effectively reduce loss of support failures.

16.1.2 Crush Collapse Failure Mode Strategy

Crush collapse failure mode is when the asset fails due to either the degradation of the asset (such as corrosion of the asset structure) or when excessive forces have been applied causing cracking or breaking of the pipe. If this type of failure leads to the asset collapsing in on itself then it is considered a crush collapse failure. The **Crush Collapse Failure Mode Strategy** is used to cost effectively reduce the frequency of crush collapse caused spills.

16.1.3 Pump Station Structural Assessment Strategy

Pump stations consist of wet well structures, valve vaults, and force mains. Some pump stations also have buildings. These different asset classes have different approaches to mitigate the risk of structural failure. The **Pump Station Structural Assessment Strategy** addresses the actions **SacSewer** takes to assess the pressurized assets for risk of failure and discusses approaches to cost effectively minimize failures.

16.2 Blockage Control Assessment Program

SacSewer takes all feasible steps to reduce spills. The **Blockage Control Assessment Program** is used to identify strategies **SacSewer** implements to identify and mitigate failure modes that cause spills.

This program is divided into different types of strategies addressing spill-producing failure modes. These strategies are then further divided by procedures and practices since different asset classes have different required methodology to determine investigatory and action triggers. **SacSewer's** supporting information can be found in the following:

- **Main line Stoppage Failure Mode Strategy, Section 501 of the SSMP Reference Document**
- **Lower Lateral Stoppage Failure Mode Strategy, Section 502 of the SSMP Reference Document**
- **Manhole Stoppage Failure Mode Strategy, Section 503 of the SSMP Reference Document**
- **Pump Station Component Failure Mode Strategy, Section 504 of the SSMP Reference Document**
- **Damage by Others Failure Mode Strategy, Section 505 of the SSMP Reference Document**
- **Under Capacity Failure Mode Strategy, Section 506 of the SSMP Reference Document**
- **Underground Facility Damage Investigation Process, Section 509 of the SSMP Reference Document**
- **SacSewer Comprehensive FOG Program, Section 512 of the SSMP Reference Document**
- **Root Control Program, Section 513 of the SSMP Reference Document**

All **SacSewer** spill responses follow the **Spill Emergency Response Plan** and the **Customer Call Handling & Service Request Creation Policy**.

16.2.1 Main Line Stoppage Failure Mode Strategy

Main line stoppages are blockages in the pipe that impede the movement of sewage through the collection system. Stoppage failure mode is when a stoppage from such things as debris, roots, or grease causes a spill out of **SacSewer's** facility. The **Main Line Stoppage Failure Mode Strategy** defines the strategy that is used to cost effectively reduce the frequency of main line stoppage caused spills. The strategy incorporates both proactive and reactive approaches. A proactive approach is used when **SacSewer** can identify a cost-effective method to locate where stoppages may occur and take appropriate action, such as implementing the Main Line Scheduled Maintenance Program. The reactive approach is used when a stoppage occurs and **SacSewer** carries out actions to prevent future stoppages in that main line.

The **Main Line Incorrect Cleaning Frequency Strategy, Section 507 of the SSMP Reference Document** and the **Quality Control for Sewer Pipe Cleaning Procedure/Policy, Section 511 of the SSMP Reference**

Document are part of the proactive approach tools that were put in place to reduce the risk of spills in the main lines.

16.2.2 Lower Lateral Stoppage Failure Mode Strategy

Lower lateral stoppages are blockages in the pipe that impede the movement of sewage from the customer to the **SacSewer** collection system. Stoppage failure mode is when a stoppage from such things as debris, roots, or grease causes a spill out of **SacSewer's** facility. The **Lower Lateral Stoppage Failure Mode Strategy** defines the strategy that is used to cost effectively reduce the frequency of lower lateral stoppage caused spills. The strategy incorporates both proactive and reactive approaches. A proactive approach is used when **SacSewer** can identify a cost-effective method to locate where stoppages may occur and take appropriate action such as implementing the Lower Lateral Scheduled Maintenance Program. The reactive approach is used when a stoppage occurs and **SacSewer** carries out actions to prevent future stoppages in that lower lateral.

The **Lower lateral Incorrect Cleaning Frequency Strategy, Section 508** of the **SSMP Reference Document of the SSMP Reference Document** is part of the proactive approach tools that were put in place to reduce the risk of spills in the lower laterals.

16.2.3 Manhole Stoppage Failure Mode Strategy

Manhole stoppages are blockages in the manhole that impede the movement of sewage through the collection system. Stoppage failure mode is when a stoppage from such things as debris, roots, or grease causes a spill out of **SacSewer's** facility. The **Manhole Stoppage Failure Mode Strategy** defines cost-effective strategies used to reduce the frequency of spills caused by stoppages in manholes. The strategy incorporates both proactive and reactive approaches. A proactive approach is used when **SacSewer** can identify a cost-effective method to locate where stoppages may occur and take appropriate action such as implementing a Manhole Scheduled Maintenance Program. The reactive approach is used when a stoppage occurs and **SacSewer** carries out actions to prevent future stoppages in that manhole.

16.2.4 Pump Station Component Failure Mode Strategy

Pump station component failures can impede the flow of sewage from a lower elevation gravity asset to a higher elevation gravity asset. There are a large number of failure modes that can cause pump station component failure. The purpose of the **Pump Station Component Failure Mode Strategy** is to identify circumstances in which non-structural pump station components may fail and approaches to cost effectively minimize failures. The strategy incorporates both proactive and reactive approaches. A proactive approach is used when **SacSewer** can identify a cost-effective method to repair, replace, or maintain the asset prior to failure. The reactive approach is used to respond to alarms that identify a failure in the pressurized system asset.

16.2.5 Damage by Others Failure Mode Strategy

Collection system failures caused by others is when any outside agency or vandal causes damage to **SacSewer's** facilities resulting in a spill. The **Damage by Others Failure Mode Strategy** defines strategies used to mitigate and reduce damage by others to **SacSewer's** assets. The strategy incorporates both proactive and reactive approaches. A proactive approach is used when **SacSewer** can identify a cost-effective method to locate where damages may occur and take appropriate action. The reactive approach is used when damage occurs and **SacSewer** does something to prevent future damages to that facility.

16.2.6 Under Capacity Failure Mode Strategy

The **Sacramento Area Sewer District Sewer System Capacity Plan** (formerly referred to as the Master Plan) is updated about every 5 years. The **Sewer System Capacity Plan** has the following two major components:

- an evaluation of the existing system's capacity performance and identification of potential relief projects
- design of new sewer trunk system to serve future development.

The evaluation of the existing system's capacity performance in the **Sewer System Capacity Plan** is intended to identify areas of potential capacity deficiencies, which then undergo further investigation through the **Under Capacity Failure Mode Strategy** that defines the design criteria and ensures consistency in the evaluation of potential capacity deficiencies and the development of alternative solutions in **SacSewer's** collection system. The expansion portion of the **Sewer System Capacity Plan** and the **Standards** are used as a guide to design sewer facilities to serve new development.

16.2.7 Underground Facility Damage Investigation Process

The **Underground Facility Damage Investigation Process, Section 509** of the **SSMP Reference Document** is used to ensure consistency in the investigation and reporting of damages to any **SacSewer** facility during an excavation process. This information will assist **SacSewer** in knowing who is financially responsible for the damage and assist in the recovery of all associated costs.

16.2.8 SacSewer Comprehensive FOG Control Program

SacSewer Comprehensive FOG Program captures all of **SacSewer's** data, efforts and achievements related to compliance with the **WDR** mandated FOG requirements. The program document contains the details of **SacSewer's** approach to mitigate FOG impacts and to meet the **SSMP** requirements. The **Main line Stoppage Failure Mode Strategy** and the **Televised Inspection Policy, Section 510** of the **SSMP Reference Document** address the way **SacSewer** develops maintenance schedules for areas subject to all types of stoppages, including FOG.

16.2.9 Root Control Program

The **Root Control Program** aims at reducing the impacts of root intrusion in **SacSewer's** system. This includes both a reactive approach and a proactive approach. The reactive approach aims at responding to and dealing with spills in a quick and effective way and enforcing corrective action of private root problems. This minimizes the impacts of root intrusion that has occurred. The proactive approach aims at stopping root intrusion before it becomes a problem. Finding innovative root control techniques, appropriate mechanical cleaning methods, applying physical pipeline rehabilitation, and maintaining **Sacramento Area Sewer District Standards and Specifications** are all part of this approach.

16.3 Management Plan Assessment Program

The purpose of the **Management Plan Assessment Program, Section 300** of the **SSMP Reference Document** is to describe the activities that explain how **SacSewer** manages decision-making processes and fiscal decision making. It also describes how **SacSewer** meets the requirements of the Monitoring, Measurement, and Program Modification element of the **SSMP**. Decision-making processes are managed so that attention is focused on assets at risk of failing in any of the failure modes identified to date. The document describes how various revenue scenarios are evaluated and how a schedule for developing the funds needed is updated each year.

16.3.1 Gravity Assets Management Strategy

The **Gravity Assets Management Strategy, Section 303** of the **SSMP Reference Document** documents how **SacSewer** manages the sustainability and performance of gravity assets by reviewing system-wide spill Service Level performance trends and evaluating operational efficiency, maintenance activities, procedures, frequencies and practices; along with these activities, costs are estimated and projected. **SacSewer** staff then develops scenarios of different approaches, estimates effectiveness, and projects cost and performance expectations. **Main line Stoppage Failure Mode Strategy, Lower Lateral Stoppage Failure Mode Strategy, Manhole Stoppage Failure Mode Strategy, and Damage by Others Failure Mode Strategy** are all evaluated for cost effective reduction of spills, mitigation of spill risk, and reduction of spill consequence.

The **Gravity Assets Management Strategy** references the **Under Capacity Failure Mode Strategy** and the **System Capacity Plan**, which describe how capacity assurance is managed. The **Gravity Assets Management Strategy** also references the **Structural Assessment Program**, which is intended to reduce the probability of high consequence of crush collapse failures.

The **Gravity Assets Management Strategy** documents how **SacSewer** manages the short-term repair and replacement processes as described in the **Main Line Repair-Maintain-Replace Decision Policy, Section 304** of the **SSMP reference Document**, the **Lower Lateral Repair-Maintain-Replace Decision Policy, Section 305** of the **SSMP Reference Document**, and the **Generic BCE Process, Section 306** of the **SSMP Reference Document**.

16.3.2 Pressurized Assets Management Strategy

The **Pressurized Assets Management Strategy, Section 302** of the **SSMP Reference Document** documents how **SacSewer** manages the sustainability and performance of pressurized assets by reviewing system-wide Spill Service Level performance trends and evaluating operational efficiency, maintenance activities, procedures, frequencies and practices. **SacSewer** staff then develops scenarios of different approaches, estimates effectiveness, and projects cost and performance expectations. **Pump Station Component Failure Mode Strategy, Pump Station Structural Assessment Strategy, and the Pump Station Condition Assessment Strategy, Section 301** of the **SSMP Reference Document** are evaluated for cost effective operations, reduction of Spills, mitigation of Spill risk, and reduction of Spill consequence.

The **Pressurized Assets Management Strategy** references the **Under Capacity Failure Mode Strategy** and the **System Capacity Plan**, which describe how **SacSewer** manages capacity assurance in the pressurized system. The **Pressurized Assets Management Strategy** also references the **Structural Assessment Program**, which is intended to reduce the probability of high consequence of crush collapse failures.

For pressurized assets, custom Business Case Evaluations (BCE), are performed for an asset class, and when appropriate, extended system-wide. The **Generic BCE Process** provides general guidelines on how **SacSewer** makes short-term repair and replacement decisions for pressurized assets.

16.3.3 Asset Management Plan and Staffing Projections

The **Asset Management Plan** is a report that describes **SacSewer's** asset portfolio and the asset life cycle projections. The purpose of the **Asset Management Plan** is to demonstrate responsible management, to communicate and justify funding requirements, to comply with regulatory requirements, and to assist in the long-term sustainability of **SacSewer's** assets.

Staffing plans provide information to be used as a planning tool to determine the amount of work and resources needed for **SacSewer** staff to effectively maintain its collection system. The staffing plans

are used in conjunction with the Service Level Agreements to ensure adequate resources are allocated for the operation, maintenance, and repair of the sanitary sewer system.

16.3.4 Funding Needs Assessments

The **Asset Management Plan** and the **Long-term Financial Plan (LTFP)** contain the plan to rehabilitate and replace capital assets along with a schedule for rehabilitation and replacement. The **Long-term Financial Plan** describes the methodology that **SacSewer** uses to ensure it is in good financial health, using details from audited reports and budgets. The **Long-term Financial Plan** looks at sources of funding and compares them to a financial needs forecast.

17. Appendix A - Notice of Intent

Enclosure 1

**State Water Resources Control Board
NOTICE OF INTENT
TO COMPLY WITH THE TERMS OF THE STATEWIDE GENERAL WASTE DISCHARGE
REQUIREMENTS FOR SANITARY SEWER SYSTEMS
(WATER QUALITY ORDER NO. 2006 – 0003)**

I. Notice of Intent (NOI) Status

Mark Only One Item 1. ☐ New Permittee 2. ☒ Change of Information WDID #: **5SSO10912**

II. Agency Information

A. Legally Responsible Official Mary Snyder			
B. Agency Sacramento Area Sewer District		C. Title District Engineer	
D. Mailing Address 10545 Armstrong Avenue		E. Address (Line 2)	
F. City Mather	State CA	G. Zip 95655	H. County Sacramento
I. Phone 916-876-6105	J. FAX 916-876-6160		K. Email Address SnyderM@SacCounty.net
L. Sanitary Sewer System Sacramento Area Sewer District		M. Regional Water Quality Control Board Region 5S - Sacramento	
N. Agency Type (check one) 1. <input type="checkbox"/> City 2. <input type="checkbox"/> County 3. <input type="checkbox"/> State 4. <input type="checkbox"/> Federal 5. <input checked="" type="checkbox"/> Special District 6. <input type="checkbox"/> Government Combination			
O. Population of Community Served (check one) <input type="checkbox"/> Less than 50,000 <input checked="" type="checkbox"/> Greater than or equal to 50,000			

III. Billing Information

A. Agency Sacramento Area Sewer District (formerly known as CSD-1)			
B. Contact Person Marcia Maurer		C. Title Chief Financial Officer	
D. Mailing Address 10545 Armstrong Avenue		E. Address (Line 2)	
F. City Mather	State CA	G. Zip 95655	H. County Sacramento
I. Phone 916-876-6116	J. FAX 916-876-6160		K. Email Address MauerM@SacCounty.net

The annual fee, which is required by the California Water Code (section 13260), is based on the daily population served by the sanitary sewer system. Additionally, an ambient water monitoring surcharge of 9 percent is required for each annual fee. The total fee is the sum of the annual fee and ambient water monitoring surcharge. Please see the instructions on completing this NOI for a detailed explanation of the fee structure.

L. Total Fee (check one)
☐ Population served < 50,000 – total fee submitted is \$ 872.00
☒ Population served ≥ 50,000 – total fee submitted is \$ 4,676.00

A check for the appropriate total fee amount should be made payable to SWRCB and mailed with this completed NOI to the following address:

State Water Board Accounting Office
P O Box 1888
Attn: SSO Fees
Sacramento, CA 95812-1888

SWRCB Tax ID is: 68-0281986

17.1 Appendix A – Notice of Intent (continued)

Enclosure 1

IV. Electronic Submittal Authorization

I, Mary Snyder, certify that I am the legally responsible official for Sacramento Area Sewer District. My signature on this form certifies that, I agree, my California Integrated Water Quality System (CIWQS) user ID and password constitute my electronic signature and any information I indicate I am electronically certifying contains my signature. I understand that I am legally bound, obligated, and responsible by use of my electronic signature as much as by a hand-written signature.

I agree that I will protect my electronic signature from unauthorized use, and that I will contact the State Water Resources Control Board, within 24-hours of discovery, if I suspect that my electronic signature has been lost, stolen, or otherwise compromised. I certify that my electronic signature is for my own use, that I will keep it confidential, and that I will not delegate or share it with any other person.

V. Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. Additionally, I certify that the provisions of the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, including electronic reporting of all sanitary sewer overflows and development and implementation of a sewer system management plan, will be complied with."

A. Printed Name: Mary Snyder
 B. Title: District Engineer
 C. Signature: Mary Snyder D. Date: 10-3-08

NOTE: Mail completed and signed form with a check for fee payment to the address below.

State Water Board Accounting Office
 P O Box 1888
 Attn: SSO Fees
 Sacramento, CA 95812-1888

18. Appendix B – Board Approved Plan and Schedule

10545 Armstrong Avenue

Mather

California

95655

Tele: [916] 876-6000

Fax: [916] 876-6160

www.csd-1.com

Board of Directors
 Representing:

County of Sacramento

City of Citrus Heights

City of Elk Grove

City of Folsom

City of Rancho Cordova

City of Sacramento

 Mary K. Snyder
 District Engineer

 Christoph Dobson
 Acting Collection Systems Manager

 Wendell H. Kido
 District Manager

 Marcia Maurer
 Chief Financial Officer

DATE: June 13, 2007

 TO: Honorable Board of Directors
 County Sanitation District 1

FROM: County Sanitation District 1 (CSD-1)

 SUBJECT: Development Plan and Schedule for the CSD-1 Sewer System
 Management Plan (SSMP)

 APPROVED
 BOARD OF DIRECTORS
 CD-1225
 JUN 13 2007

 Cindy H. Turner
 Clerk of the Board

27

RECOMMENDATION:

It is recommended that your Board approve the SSMP Development Plan and Schedule to comply with the Waste Discharge Requirements (WDRs) for CSD-1.

BACKGROUND:

On May 2, 2006, the California State Water Resources Control Board (SWRCB) adopted Statewide General Waste Discharge Requirements (WDRs), Order No. 2006-0003, for all publicly owned sanitary sewer collection systems.

CSD-1 is subject to the requirements of the General WDRs. The WDRs require that all publicly owned collection systems greater than one mile in length take all feasible steps to prevent Sanitary Sewer Overflows (SSO's), develop a Sewer System Management Plan (SSMP), and comply with reporting requirements.

The Statewide WDR requires that the agencies governing board approve the SSMP Development Plan and Schedule at a public meeting. The action your Board takes today by adopting this plan and schedule satisfies this requirement. The SSMP Development Plan and Schedule identifies the milestone dates for completing each element of the SSMP and identifies the responsible party for completing the SSMP plan sections. As the attached table illustrates, this is the first of many tasks the District will be undertaking and committing resources to develop a SSMP and comply with the WDR.

18.1 Appendix B - Board Approved Plan and Schedule (continued)

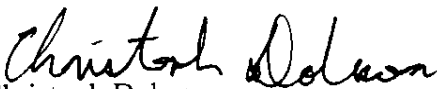
Honorable Board of Directors
June 13, 2007
Page 2

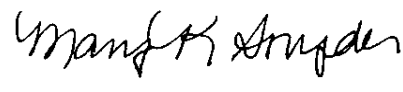
CONCLUSION:

It is recommended that the SSMP Development Plan and Schedule be approved and that the District Engineer be authorized to certify approval of the plan to the SWRCB.

Respectfully submitted,

APPROVED:


Christoph Dobson
Collection Systems Manager


Mary K. Snyder
District Engineer

CD/PKS:jc

Attachments: SSMP Development Plan and Schedule for CSD-1

Contact for additional information:
Christoph Dobson
Collection Systems Manager
876-6042

18.2 Appendix B - Board Approved Plan and Schedule (continued)

CSD-1 SSMP Development Plan and Schedule		
Main Task	Due Date	Responsible Party
Application for Permit Coverage (Completed)	Nov 11, 2006	Mary Snyder
SSMP Development Plan and Schedule (This Board item)	Aug 2, 2007	Patrick Schroeder
Reporting Program	Sept 2, 2007	Christoph Dobson
Goals and Organization Structure	Nov 2, 2007	Patrick Schroeder
Overflow Emergency Response Plan	Nov 2, 2008	Patrick Schroeder
Legal Authority	Nov 2, 2008	Patrick Schroeder
Operation and Maintenance Program	Nov 2, 2008	Patrick Schroeder
Fats, Oils and Grease Control Program	Nov 2, 2008	Patrick Schroeder
Design and Performance	May 2, 2009	Patrick Schroeder
System Evaluation and Capacity Assurance Plan	May 2, 2009	Patrick Schroeder
Final SSMP, incorporating all of the SSMP requirements	May 2, 2009	Patrick Schroeder

18.3 Appendix B - Board Approved Plan and Schedule (continued)**COUNTY SANITATION DISTRICT NO. 1
RESOLUTION NO. CD-1225****SSMP DEVELOPMENT PLAN AND SCHEDULE – SACRAMENTO COUNTY
SANITATION DISTRICT NO. 1 SEWER SYSTEM MANAGEMENT PLAN**

BE IT RESOLVED AND ORDERED that the Board of Directors of the SACRAMENTO COUNTY SANITATION DISTRICT NO. 1 (CSD-1), a sanitation district organized under the laws of the State of California, hereby approves a Sewer System Management Plan (SSMP) Development Plan and Schedule, in the form hereto attached, and authorizes the District Engineer or her designee to certify approval of the SSMP Development Plan and Schedule in the California State Water Resources Control Board's (SWRCB) electronic database to comply with the SWRCB statewide general Waste Discharge Requirements (WDR's).

ON A MOTION by Director Yee, and seconded by Director MacGlashan, the foregoing resolution was passed and adopted by the Board of Directors of the Sacramento County Sanitation District No. 1, State of California, this 13th day of June, 2007, by the following vote, to wit:

AYES: Directors, Bruins, Dickinson, MacGlashan, Nottoli, Peters, Scherman, Skoglund, Yee, McCarty

NOES: Directors, none

ABSENT: Directors, Howe11

ABSTAIN: Directors, none

Ken McLarty

Chair of the Board of Directors
Sacramento County Sanitation District No. 1, a sanitation district organized under the laws of the State of California.



Cathy A. Turner
Clerk of the Board of Supervisors of Sacramento County, California, and ex-officio Secretary of the Board of Directors of the Sacramento County Sanitation District No. 1

In accordance with Section 25103 of the Government Code of the State of California a copy of the document has been delivered to the Chairman on **JUN 13 2007**

Glorianna Dowling
Deputy Clerk, Board of Directors

FILED

JUN 13 2007

BOARD OF DIRECTORS
By *Cathy A. Turner*
Clerk of the Board

19. Appendix C – Continuation of Coverage Certification



State Water Resources Control Board

Date: May 03, 2023

David Leamer
Sacramento Area Sewer District
10060 Goethe Road
Sacramento, CA 95827

NOTICE OF APPLICABILITY; CONTINUATION OF REGULATORY COVERAGE; STATEWIDE SANITARY SEWER SYSTEMS GENERAL ORDER, 2022-0103-DWQ

Dear David Leamer

Thank you for certifying your Continuation of Existing Regulatory Coverage form in the California Integrated Water Quality System (CIWQS) database. This Notice of Applicability serves as confirmation of the continuation of regulatory coverage from Order 2006-0003-DWQ to Order 2022-0103-DWQ for:

- Agency name: Sacramento Area Sewer District
- Sanitary Sewer System name: Sacramento Area Sewer District CS
- Waste Discharge Identification Number (WDID): 5SSO10912
- Certification date: May 03, 2023

As of the June 5, 2023 effective date, General Order 2022-0103-DWQ serves as the new statewide waste discharge requirements regulating sanitary sewer systems. The General Order, including all Attachments, is enforceable by the State Water Resources Control Board and the applicable Regional Water Quality Control Board. As of June 5, 2023, Order 2006-0003-DWQ is rescinded (except for enforcement purposes) and previously-held regulatory coverage under Order 2006-0003-DWQ is terminated.

If you have any questions regarding the statewide Sanitary Sewer Systems General Order or this Notice of Applicability, please email your questions to SanitarySewer@waterboards.ca.gov.

Sincerely,

Karen Mogus, Deputy Director
Division of Water Quality

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

1001 I Street, Sacramento, CA 95814 | Mailing Address: P.O. Box 100, Sacramento, CA 95812-0100 | www.waterboards.ca.gov

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**REFERENCE DOCUMENT
FOR THE
SEWER SYSTEM
MANAGEMENT
PLAN**

Approved By:

Rosemary Clark
Director Of Operations

DocuSigned by:

Rosemary Clark

B6FE20AC21174D7

Signature

7/12/2023

Effective Date

Sacramento Area Sewer District
10060 Goethe Road
Sacramento, CA 95827

Review and revise at least every 3-years

Table of Contents

100	Overview	7
100.1.	Purpose	7
100.2.	Background	7
100.3.	Key Reference to WDR Requirements	9
100.4.	Roles and Responsibilities	10
100.5.	Abbreviations	15
200	General and Stand Alone Sections	19
201	SSMP Communication Program	19
201.1.	Purpose	19
201.2.	Background	19
201.3.	SacSewer SSMP Communication Policy	19
201.4.	SSMP Communication Program	19
201.5.	Detailed Group Responsibilities	20
202	SSMP Audit Procedures	20
202.1.	Purpose	20
202.2.	Background	20
202.3.	Detailed Group Responsibilities	22
202.4.	Record Keeping Requirements	22
203	SacSewer Sewer Ordinance	22
204	Sacramento Area Sewer District Standards and Specifications	22
205	Spill Emergency Response Plan	23
206	Customer Call Handling and Service Request Creation Policy	23
206.1.	Purpose	23
206.2.	Background/Procedures	23
206.3.	Policy	23
206.4.	Call Categories	23
206.5.	Supplemental Materials	25
206.6.	Detailed Group Responsibilities	25
207	Mapping Update Policy and Process	26
207.1.	Purpose	26
207.2.	Background	26
207.3.	Policy	26
207.4.	Detailed Group Responsibilities	27
208	SacSewer Training Policy	29
208.1.	Purpose	29
208.2.	Background	29
208.3.	Policy	30

208.4.	Detailed Group Responsibilities	30
208.5.	Staff to be Trained	30
208.6.	Training Required	30
208.7.	Training Process	31
209	Sewer System Management Plan (SSMP) Document Update and Storage Policy	31
209.1.	Purpose	31
209.2.	Background	31
209.3.	Process	32
209.4.	Definitions used in Section 209.....	33
209.5.	Effectiveness Measure	33
209.6.	Appendix A: Example Change Log	34
300	Management Plan Assessment Program	35
300	Program Overview	35
300.1.	Purpose	35
300.2.	Background	35
300.3.	Program.....	35
300.4.	Effectiveness Measure	38
301	Pump Station Condition Assessment Program	38
301.1.	Background	38
301.2.	Purpose	38
301.3.	Pump Station Condition Assessment Strategy.....	38
301.4.	Supporting Strategies, Systems, and Processes.....	40
301.5.	Effectiveness Measure	41
301.6.	Detailed Group Responsibilities.....	41
302	Pressurized Asset Management Strategy	41
302.1.	Purpose	41
302.2.	Background	41
302.3.	Strategy	42
302.4.	Effectiveness Measure	43
303	Gravity Assets Management Strategy.....	43
303.1.	Purpose	43
303.2.	Background	43
303.3.	Strategy	43
303.4.	Effectiveness Measure	44
304	Main Line Repair-Maintain-Replace Decision Policy.....	44
304.1.	Purpose	44
304.2.	Background	44
304.3.	Process	45
304.4.	Pipe Defects Covered in This Policy	53

304.5.	Effectiveness Measure	54
304.6.	TVI Observed Problems Flowchart.....	55
304.7	Cracked, Broken, Missing, and Collapsed Pipe Flowcharts	56
304.8.	Preventive Maintenance Flowchart	59
304.9	Repair Decision Flowchart	60
305	Lower Lateral Repair-Maintain-Replace Decision Policy	61
305.1.	Purpose	61
305.2.	Background	61
305.3.	Process	61
305.4.	Effectiveness Measure	68
305.5.	Process Flowchart Part 1 – Sunken Area, Void, and Cleanout Check	69
305.6.	Process Flowchart Part 2 – TVI Observed Problems	71
305.7.	Process Flowchart Part 3 – Preventive Maintenance and Repair Decisions.....	73
305.8.	Process Flowchart Part 4 – Replace vs. Lining Decisions	74
306	Generic BCE Process.....	75
306.1.	Purpose	75
306.2.	Background	75
306.3.	Process	75
306.4.	Definitions Used in Section 306	82
306.5.	Effectiveness Measure	82
306.6.	Process Flowchart	83
306.7.	Generic Business Case Evaluation (BCE) Process Appendix.....	85
400	Structural Assessment Program.....	91
400	Program Overview	91
400.1.	Purpose	91
400.2.	Background	91
400.3.	Program.....	91
400.4.	Effectiveness Measure	91
401	Loss of Support Failure Mode Strategy.....	92
401.1.	Purpose	92
401.2.	Background	92
401.3.	Definitions used in Section 401.....	92
401.4.	Strategy	92
401.5.	Effectiveness Measure	95
402	Crush Collapse Failure Mode Strategy	95
402.1.	Purpose	95
402.2.	Background	95
402.3.	Strategy	95
402.4.	Effectiveness Measure	97
403	Pump Station Structural Assessment Strategy	97

403.1.	Purpose	97
403.2.	Background	97
403.3.	Strategy	98
403.4.	Effectiveness Measure	101
500	Blockage Control Assessment Program	103
500	Program Overview	103
500.1.	Purpose	103
500.2.	Background	103
500.3.	Program.....	103
500.4.	Effectiveness Measure	104
501	Main Line Stoppage Failure Mode Strategy.....	104
501.1.	Purpose	104
501.2.	Background	104
501.3.	Strategy	104
501.4.	Effectiveness Measure	109
502	Lower Lateral Stoppage Failure Mode Strategy.....	109
502.1.	Purpose	109
502.2.	Background	109
502.3.	Strategy	110
502.4.	Effectiveness Measure	113
503	Manhole Stoppage Failure Mode Strategy	114
503.1.	Purpose	114
503.2.	Background	114
503.3.	Strategy	114
503.4.	Effectiveness Measure	117
504	Pump Station Component Failure Mode Strategy.....	117
504.1.	Purpose	117
504.2.	Background	117
504.3.	Definitions used in Section 504.....	117
504.4.	Strategy	118
504.5.	Effectiveness Measure	120
505	Damage By Others Failure Mode Strategy.....	120
505.1.	Purpose	120
505.2.	Background	120
505.3.	Strategy	120
505.4.	Effectiveness Measure	121
506	Under Capacity Failure Mode Strategy	121
506.1.	Purpose	121
506.2.	Background	121

506.3.	Process	122
506.4.	Process Flowchart	125
507	Main Line Incorrect Cleaning Frequency Strategy	127
507.1.	Purpose	127
507.2.	Background	127
507.3.	Strategy	127
507.4.	Effectiveness Measure	128
508	Lower Lateral Incorrect Cleaning Frequency Strategy	128
508.1.	Purpose	128
508.2.	Background	128
508.3.	Strategy	129
508.4.	Effectiveness Measure	130
509	Underground Facility Damage Investigation Process	130
509.1.	Purpose	130
509.2.	Background	130
509.3.	Process	131
510	Televised Inspection Policy	132
510.1.	Purpose	132
510.2.	Background	132
510.3.	Process	133
510.4.	Detailed Group Responsibilities	139
510.5.	Process Flowchart	141
511	Quality Control for Sewer Pipe Cleaning Procedure/Policy	143
511.1.	Purpose	143
511.2.	Background	143
511.3.	SacSewer M&O Quality Control Procedure	143
511.4.	Contract QC Procedure	144
511.5.	Detailed Group Responsibilities	144
512	SacSewer Comprehensive FOG Control Program	145
512.1.	Purpose	145
512.2.	Background	145
512.3.	Keeping the SacSewer Comprehensive FOG Control Program Relevant	146
512.4.	Program	147
512.5.	Effectiveness Measure	153
512.6.	Detailed Group Responsibilities	154
513	Root Control Program	154
513.1.	Purpose	154
513.2.	Background	154
513.3.	Characterization of Roots within SacSewer's Service Area	156
513.4.	Program	156

513.5. Detailed Group Responsibilities 157

100 Overview

100.1. Purpose

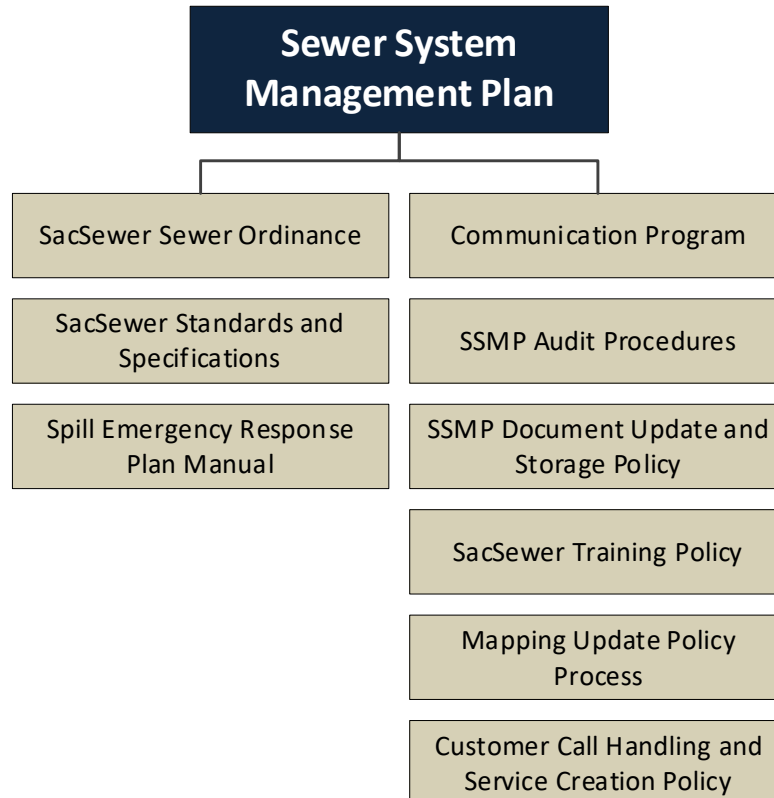
The purpose of the **Sewer System Management Plan (SSMP)** is to provide the Sacramento Area Sewer District (**SacSewer**) with a system-wide living management plan for the operation, maintenance, expansion, repair, and replacement of **SacSewer's** sewer collection system. This document is a **Reference Document** to the **SSMP**, going into greater detail than the **SSMP**. This document also establishes the policies that **SacSewer** employees are required to follow in their daily work activities.

100.2. Background

The **SSMP** lays out the structure for the **SSMP** Reference Document Sections; Programs, Policies, Procedures, and Strategies. The Sections are arranged to best meet the business needs as a living management plan. The **Statewide General Waste Discharge Requirements (WDR)** Attachment D specifies the mandatory elements of the **SSMP**. Section 100.3 is a key reference that ties **WDR** Attachment D mandatory elements to the **SSMP** Reference Document Sections. Figures 100-1 and 100-2 show how the elements are organized as Sections in the **SSMP Reference Document**.

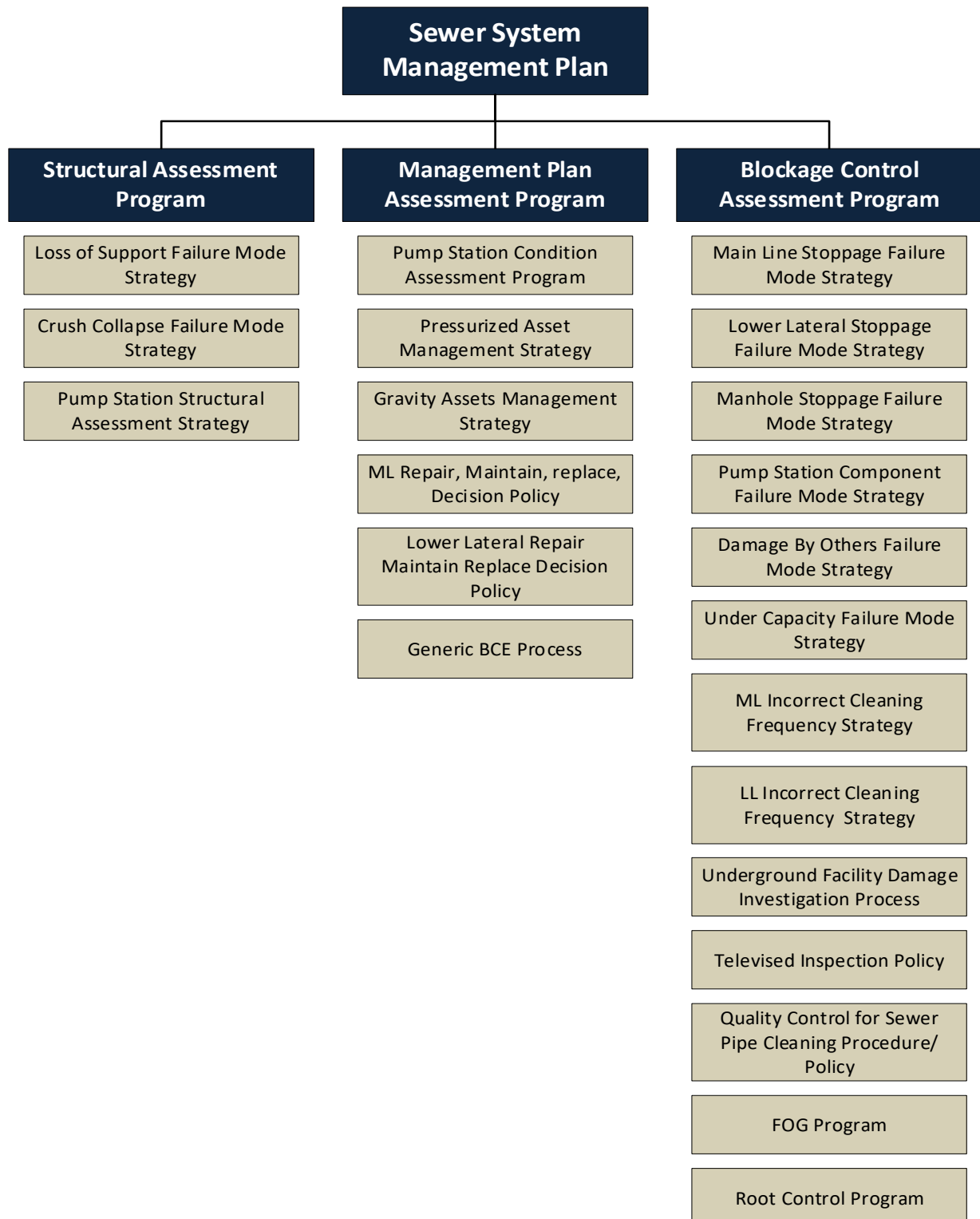
Some **SSMP** mandatory elements best fit into the business structure as independent elements and are referenced in Section 200 of the **SSMP** Reference Document. These elements are shown in Figure 100-1; **SacSewer Sewer Ordinance**, **SacSewer Standards and Specifications**, and **Spill Emergency Response Plan Manual**. Figure 100-1 lists the elements included in the **SSMP Reference Document Sections** but best fit under the General Section (Section 200).

Figure 100-1 General and Stand Alone Elements



The remaining mandatory elements of the **SSMP** are grouped in Sections according to why, when, and how the business decision is made. These Sections; strategies, policies, and procedures are grouped under three main Sections named programs; **Structural Assessments Program**, **Management Plan Assessment Program**, and **Blockage Control Assessment Program**, as shown in Figure 100-2.

Figure 100-2 Sections Grouping



100.3. Key Reference to WDR Requirements

Table 100-1 below lists the Reference Document Section and ties it to the **WDR** Section requirement that it satisfies. The **WDR** Sections in this table are limited to Section 13.

Table 100-1 Key Reference to WDR Requirements

WDR Section	Sewer System Management Plan (SSMP) Reference Document Section	SSMP Reference Document Section	SSMP Page Number
1	All Sections of SSMP	All Sections	
2	Organization		7
3	SacSewer Sewer Ordinance	203	
	Damage By Others Failure Mode Strategy	505	
	Underground Facility Damage Investigation Process	509	
4 and 7	Mapping Update Policy and Process	208	
	Blockage Control Assessment Program	500	
	ML Stoppage Failure Mode Strategy	501	
	LL Stoppage Failure Mode Strategy	502	
	Root Control Program	513	
	TVI Policy	510	
	Quality Control for Sewer Pipe Cleaning Procedure/Policy	511	
	MH Stoppage Failure Mode Strategy	503	
	Pump Station Component Failure Mode Strategy	504	
	Management Plan Assessment Program	300	
	Pressurized Asset Management Strategy	302	
	Gravity Assets Management Strategy	303	
	Main Line Repair-Maintain-Replace Decision Policy	304	
	Lower Lateral Repair-Maintain-Replace Decision Policy	305	
	Structural Assessment Program	400	
4	Loss of Support Failure Mode Strategy	401	
	Crush Collapse Failure Mode Strategy	402	
	Pump Station Condition Assessment Program	301	
	Generic BCE Process	306	
	SacSewer Training Policy	208	
	CMMS		9
5	SacSewer Standards and Specifications	204	
6	Spill Emergency Response Plan Manual	205	
	Customer Call Handling and Service Creation Policy	206	
7	Blockage Control Assessment Program	500	
7	SacSewer Comprehensive FOG Control Program	512	
8	Under Capacity Failure Mode Strategy	506	
9	Management Plan Assessment Program	300	
10	SSMP Audits Procedure	202	
11	SSMP Communication Program	201	

100.4. Roles and Responsibilities

The Engineering Business Planning Group is the lead on updating the SSMP and its Reference Document. Business Planning will liaise between the Reference Document Section owner and the District Director of Operations to produce an updated document at least every six years.

Table 100-2 lists the **SSMP** Reference Document Sections and their owners. The listed owner will be the primary contact for any questions. The owner will also be responsible for periodic reviews and updates of their Section to ensure it meets its stated goals. Stakeholders are listed as a guide for the units affected by each Section. Updates to the Sections should be made in coordination with the affected stakeholders.

Table 100-2 Section Owners and Key Stakeholders

Section	Section Title	Owner	Key Stakeholders
201	SSMP Communication Program	Paige Bedegrew, Communication Department	Communication Department, Engineering-Business Planning, Engineering Operations Support
202	SSMP Audit Procedures	Rosemary Clark, SacSewer Operations Department	Maintenance and Operations (M&O), Engineering-Business Planning, Engineering Operations Support
203	SacSewer Sewer Ordinance	Yadira Lewis, Engineering Business Planning-Development	Maintenance and Operations (M&O), Engineering-Business Planning, Engineering Operations Support
204	Sacramento Area Sewer District Standards and Specifications	Agustin Lopez, Engineering Business Planning-Capacity Management	Maintenance and Operations (M&O), Engineering-Business Planning, Engineering Operations Support
205	Spill Emergency Response Plan (SERP)	My Huynh, Engineering Operations Support-Pump Station & Interceptor Support Ryan Shewry, Engineering Operations Support-Pipeline Support	Maintenance and Operations (M&O), Engineering-Business Planning, Engineering Operations Support
206	Customer Call Handling and Service Creation Request Policy	John Hough, Maintenance & Operations	Engineering-Business Planning, Engineering Operations Support, M&O
207	Mapping Update Policy and Process	Luisa Gomez, Engineering Business Planning-Information Management	Engineering Business Planning-Information Management, M&O
208	SacSewer Training Policy	Jennifer Weitz, Internal Services-Training	Engineering-Business Planning, Engineering Operations Support, M&O, Customer Care

Section	Section Title	Owner	Key Stakeholders
209	SSMP Document Update and Storage Policy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering Business Planning- Business Planning
300	Management Plan Assessment Program	Anthony Albayalde, Engineering Business Planning-Business Planning	Finance, M&O, Administration, Engineering-Business Planning, Engineering Operations Support
301	Pump Station Condition Assessment Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
302	Pressurized Asset Management Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
303	Gravity Assets Management Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
304	Main Line Repair-Maintain-Replace Decision Policy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
305	Lower Lateral Repair-Maintain-Replace Decision Policy	Ryan Shewry, Engineering Operations Support- Pipeline Support	Engineering Operations Support-Pipeline Support, M&O
306	Generic Business Case Evaluation Process	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support -Operations Support, M&O
400	Structural Assessment Program	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
401	Loss of Support Failure Mode Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
402	Crush Collapse Failure Mode Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
403	Pump Station Structural Assessment Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O

Section	Section Title	Owner	Key Stakeholders
500	Blockage Control Assessment Program	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
501	Main Line Stoppage Failure Mode Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
502	LL Stoppage Failure Mode Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
503	Manhole Stoppage Failure Mode Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
504	Pump Station Component Failure Mode Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
505	Damage By Others Failure Mode Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
506	Under Capacity Failure Mode Strategy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support
507	Main Line Incorrect Cleaning Frequency Strategy	Ryan Shewry, Engineering Operations Support-Pipeline Support	Engineering-Business Planning, Engineering Operations Support, M&O
508	Lower Lateral Incorrect Cleaning Frequency Strategy	Ryan Shewry, Engineering Operations Support-Pipeline Support	Engineering-Business Planning, Engineering Operations Support, M&O
509	Underground Facility Damage Investigation Process	Jerry Carnahan, Maintenance & Operations	Engineering-Business Planning, Engineering Operations Support, M&O
510	Televised Inspection Policy	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, M&O
511	Quality Control for Sewer Pipe Cleaning Procedure / Policy	John Hough, Maintenance & Operations	Engineering-Business Planning, Engineering Operations Support, M&O

Section	Section Title	Owner	Key Stakeholders
512	SacSewer Comprehensive FOG Control Program	Anthony Albayalde, Engineering Business Planning-Business Planning	P&P-Legislative & Regulatory Affairs, P&P-WSCS, PAO, Engineering-Business Planning, Engineering Operations Support, M&O
513	Root Control Program	Anthony Albayalde, Engineering Business Planning-Business Planning	Engineering-Business Planning, Engineering Operations Support, Safety & Regulatory Compliance, M&O

Table 100-3 Lists the general **SSMP**-related roles and their respective responsible units. Specific roles are found as part of the **SSMP** Reference Document Sections.

Table 100-3 General Roles Related to the SSMP

Responsible Unit	Roles
Engineering-Development	<ul style="list-style-type: none"> Plans review and installation inspection
Engineering-Design	<ul style="list-style-type: none"> Responsible for completing the detailed work orders (WOs), per job plan and according to the SASD's Standards and Specifications, for any work that is contracted out as well as in-house originated projects
Maintenance & Operations	<ul style="list-style-type: none"> Writing WOs, planning and scheduling work, and completing work Performs the necessary maintenance and construction work Damage investigation
Engineering-Operations Support	<ul style="list-style-type: none"> TVI Review, writing WOs, and planning and scheduling work
Engineering-Business planning	<ul style="list-style-type: none"> Determine the effectiveness of the programs that have been approved
ISD Training Office (Goethe)	<ul style="list-style-type: none"> Manage and coordinate training
SASD	<ul style="list-style-type: none"> The Reference Document Sections incorporate numerous activities taking place throughout SASD. As such all units within SASD should be familiar with the basic nature and elements of these Sections Each business unit identified as a stakeholder in Table-1, and each business unit identified as having a role or responsibility for carrying out a Section of this Reference Document, is responsible for training its staff as needed to successfully implement the Section

	<ul style="list-style-type: none">• Follow the SSMP Document Update and Storage Policy when creating or updating a portion of the SSMP Reference Document
--	--

100.5. Abbreviations

ARV	Air Relief Valve
ASM	Area Scheduled Maintenance
ASMRP	Area Scheduled Maintenance Reduction Program
BCE	Business Case Evaluation
BIS	Backup Into Structures
BMP	Best Management Practices
BPX	Broken Pipe or Hole in Pipe
Cal - EMA	California Emergency Management Agency
CARV	Combination Air Release Valves
CCTV	Closed Circuit Television Inspection
CGA	The Common Ground Alliance
CIP	Capital Improvement Project
CIPP	Cured-in-Place Pipe
CIT	Collaboration and Innovation Team
CLEANOBS	Pipeline PM Cleaning Observations
CMMS	Computerized Maintenance Management System
CMO	Communication and Media Office
CO	Cleanout
CPL	Cracked Pipe - Light
CPM	Cracked Pipe – Moderate
CPS	Cracked Pipe – Severe
CSD-1	The County Sanitation District 1
DIP	Ductile Iron Pipe
DIRT	Damage Information Report Tool
District	Sacramento Area Sewer District
DWPF	Dry Weather Peak Flow
EMD	Environmental Management Department
FOG	Fats, Oils, and Grease
Generic BCE Process	Generic Business Case Evaluation Process
GIS	Geographic Information System
HMP	Hazardous Materials Plan
I/I	Inflow & Infiltration

IIPP	Injury & Illness Prevention Program
IT	Information Technology
LL	Lower Lateral
LLORP	Lower Lateral Overflow Reduction Program
LLSM	Lower Lateral Scheduled Maintenance Program
LRO	Legally Responsible Official
M&O	Maintenance and Operations
MHSM	Manhole Scheduled Maintenance Program
ML	Main Line
MLORP	Main Line Overflow Reduction Program
MLSM	Main Line Scheduled Maintenance Program
MMICP	Main Line Maximum Interval Cleaning Program
MPAP	Management Plan Assessment Program
MRP	Monitoring and Reporting Program
NACWA	National Association of Clean Water Agencies
NPV	Net Present Value
NTSB	National Transportation Safety Board
OES	Office of Emergency Services
OPS	Office of Pipeline Safety
OPT	Organizational Planning Team
Ordinance	SacSewer Sewer Ordinance
P&S	Planning & Scheduling
PAC	Project Authorization Committee
PAP	Project Authorization Process
PDP	Project Development Plan
PDP-1	Project Development Plan Phase #1
PDP-2	Project Development Plan Phase #2
PM	Preventive Maintenance
PrePAC	Pre Project Authorization Committee
PSCFMS	Pump Station Component Failure Mode Strategy
PSSAS	Pump Station Structural Assessment Strategy
PSU	Permit Services Unit
PWWF	Peak Wet Weather Flow
QC	Quality Control

RCP	Reinforced Concrete Pipe
RDII	Rainfall-Dependent Inflow and Infiltration
RTU	Remote Telemetry Unit
SACC	Sacramento Area Creeks Council
SAP	Structural Assessment Program
SacSewer	Sacramento Area Sewer District
SCADA	System Control and Data Acquisition
SECAP	System Evaluation and Capacity Assurance Plan
SMUD	Sacramento Municipal Utility District
SPCCP	Spill Prevention Control and Countermeasure Plan
SR	Service Request
SRCSD	Sacramento Regional County Sanitation District
SRV	Sewer Relief Valve
SRWQCB	State Regional Water Quality Control Board
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow
SSOAP	Sanitary Sewer Overflow Assessment Program
Standards	Sacramento Area Sewer District Standards and Specifications
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TVI	Televised Inspection
UCFMS	Under Capacity Failure Mode Strategy
USA	Underground Service Alert
VCP	Vitrified Clay Pipe
VFI	Visual Flow Inspections
WDR	Statewide General Waste Discharge Requirements for Sanitary Sewer Systems
WMR	Waste Management and Recycling Department
WO	Work Order
WQCMMS	Water Quality Computerized Maintenance Management System
WSCS	Wastewater Source Control Section
XPX	Collapsed Pipe

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200 General and Stand Alone Sections

201 SSMP Communication Program

201.1. Purpose

The purpose of the **Sewer System Management Plan (SSMP) Communication Program** is to define the policy, describe the **SSMP** performance communication plan, and define the roles and responsibilities.

201.2. Background

The **SSMP Communication Program** is a requirement of the **Statewide General Waste Discharge Requirements (WDR)**, Section 13 (xi).

201.3. SacSewer SSMP Communication Policy

The Sacramento Area Sewer District (**SacSewer**) will provide convenient public access to the current **SSMP** and any proposed revisions for continued public review and comment. Annually, **SacSewer** will communicate with the public on the performance of **SacSewer's SSMP**. **SacSewer** also produces an annual State of the District Report and publishes service-level performance reports. Service levels are the key measures of how well **SacSewer** implements its **SSMP**.

201.4. SSMP Communication Program

SacSewer implements robust communications and outreach within its service area using various methods. Many communication methods focus on public awareness of **SacSewer's SSMP**; others are general methods that help support and achieve performance in **SacSewer's SSMP**.

To foster public awareness of the **SSMP**, **SacSewer** uses its website (www.SacSewer.com) as the primary source for public information. The website allows the public to review and comment on the **SSMP** and **SacSewer's** annual service level performance. The website is advertised on nearly all of **SacSewer's** customer and stakeholder communication materials. The website features a "Being a Sewer Steward" section where the public can easily navigate the dedicated **SSMP** pages.

The **SSMP** web pages provide public access to view and download the most current, approved version of the **SSMP**, along with any proposed revisions. The **SSMP** web pages provide the public with a convenient way to provide input on the **SSMP**, any proposed revisions, and on the performance of the **SSMP**. The public may comment by clicking the "comment" button, where their comments can be written and immediately submitted to **SacSewer** staff.

SacSewer posts updated service level performance information no less than annually.

SacSewer also coordinates with the cities it serves to promote **SacSewer** on its websites and newsletters.

Other general communication and outreach activities that help **SacSewer** achieve the performance of its **SSMP** may vary from year to year but generally include:

- A comprehensive Fats, Oils, and Grease (FOG) education program
- Presentations to community groups, local Boards, and Councils
- Attendance at local community fairs and festivals
- Dissemination of brochures, fact sheets, promotional items
- Public outreach about rehabilitation, repair, or other collection system improvement projects
- Media Relations

- Website updates
- Specialized outreach for efforts such as backflow prevention devices and root foaming
- Advertising campaigns for public awareness
- Social media content

201.5. *Detailed Group Responsibilities*

The following groups and individuals are responsible for the corresponding areas of the implementation of the **SSMP Communication Program**.

Communications Department

PAO is responsible for the following tasks:

- Maintaining **SacSewer**'s website, including updating the **SSMP** web pages
- Advertising **SacSewer**'s website on customer and stakeholder communication materials (i.e., design and construction newsletters, service level report cards, etc.)
- Coordinating with the cities, **SacSewer** serves to promote awareness

SacSewer Engineering Business Planning Section-Business Planning Group

SacSewer Engineering Business Planning Section-Business Planning Group is responsible for the following tasks:

- Archiving the document that has been updated. Creating a new PDF of the entire **SSMP** to be published and stored to maintain a record of what **SSMP SacSewer** was operating under at any given time.
- Updating the hardcopy stored in the Documentation room
- Providing the most current version of the **SSMP**, referenced documents, and any proposed revisions to PAO no less than ten working days before website posting.
- Providing PAO with annual service level performance information as required by this policy and no less than ten working days before website posting
- Reviewing the SSMP web pages for quality control and confirming that the correct versions are posted.

202 **SSMP Audit Procedures**

202.1. *Purpose*

The purpose of this document is to describe the internal evaluation process that will be applied to assist with meeting the **Sewer System Management Plan (SSMP)** Audit requirements.

202.2. *Background*

202.2.1 *Regulatory Requirement*

On May 2, 2006, the State Water Resources Control Board (SWRCB) enacted Order No. 2006-0003 (Order), **Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (WDR)**. The **WDR** requires any public agency that owns or operates a sanitary sewer system more than one mile in length that collects and/or conveys untreated or partially treated wastewater to a publicly owned treatment facility in the State of California to comply with the requirements of the **WDR**. The Sacramento Area Sewer District (**SacSewer**) operates a sanitary sewer system as described, therefore is subject to the **WDR**.

202.2.2 Sewer System Management Plan

The WDR requires each agency to prepare an SSMP. The SSMP is required to include these eleven elements:

- I. Goals
- II. Organization
- III. Legal Authority
- IV. Operations and Maintenance Program
- V. Design and Performance Provisions
- VI. Spill Emergency Response Plan
- VII. Fats, Oils and Grease (FOG) Control Program
- VIII. System Evaluation and Capacity Assurance Plan
- IX. Monitoring, Measurement, and Plan Modifications
- X. **SSMP** Program Audits
- XI. Communication Program

SWRCB **WDR** Order No. 2006-0003 Subsection (D.13) requires an internal audit occur at least every 2 years and a report must be prepared and kept on file. **SacSewer** meets these requirements by conducting periodic internal audits, appropriate to the size of the system and the number of Spills, through the **SacSewer** Process titled, “**SSMP Audit Procedures**” (this document).

202.2.3 Audit Objective

The evaluations are to assist **SacSewer** in meeting the formal **SSMP** audit requirement and provide continuous improvement. The audit should focus on evaluating the effectiveness of the **SSMP** and **SacSewer**’s compliance with the **SSMP** requirements, including identification of any deficiencies in the **SSMP** and steps to correct them.

202.2.4 Evaluation Approach and Structure

There are two parts to the audit:

- SSMP Compliance Review – Evaluation of the SSMP required and voluntary elements to determine compliance with the WDR requirements.
- SSMP Effectiveness Review – Evaluation of **SacSewer**’s data and processes used to determine the effectiveness of its SSMP in meeting the goals of the WDR.

The approach for the SSMP Compliance Review segment will be to ask specific questions relating to the eleven sections of the SSMP. The structure includes documenting the questions and responses to them in writing. Questions will be developed, and may vary from audit to audit. As **SacSewer**’s business practices and performance evolve, management may modify the questions accordingly to stimulate continuous improvement and ensure WDR compliance. The SSMP Effectiveness Review segment will consist of key **SacSewer** staff providing data analysis that **SacSewer** uses to analyze data, adapt to trends, and make decisions.

The written report of the audit will consist of three parts:

- The evaluation results of the SSMP required and voluntary elements in compliance with the WDR requirements.
- The evaluation results of the data and processes used to determine the effectiveness of the SSMP in meeting the goals of the WDR.

- An action plan identifying any deficiencies in **SacSewer's** SSMP and steps to correct them. Although many possible deficiencies may be identified, the plan should only include those actions expected to result in the most progress towards meeting the goals of the WDR prior to the **SacSewer** next internal audit.

202.3. *Detailed Group Responsibilities*

The following groups and individuals will be responsible for implementing the SSMP audit:

The Director of Operations will identify the key staff and management to be involved in the audit.

The key staff will be responsible for developing the SSMP audit questions, providing written responses to the questions based on **SacSewer's** SSMP and current practices, responding to the auditor/evaluator's follow-up questions, and developing the draft action plan.

The auditor/evaluator role will be selected by the Director of Operations at each audit cycle. The evaluator is responsible for:

- Reviewing the SSMP audit questions for completeness and making comments on the questions.
- Performing the SSMP evaluation to determine:
 - o if **SacSewer** shows SSMP compliance with the WDR
 - o if **SacSewer** can demonstrate the effectiveness of the SSMP
- Providing follow-up questions to the written responses provided by the key staff.
- Reviewing the responses to the follow-up questions, and assisting the key staff in determining if the response is adequate.
- Assisting the key staff with preparation of the action plan.

202.4. *Record Keeping Requirements*

SacSewer maintains an SSMP Internal Audit SharePoint site that contains the audit report, findings, and action items list for each internal audit performed. Each action item is assigned to a manager for completion, and progress is tracked regularly at the OPT and recorded on the SharePoint site. **SacSewer's** SSMP Audit Reports are available for public review by appointment only, requests for review can be made through the **SacSewer** website.

203 **SacSewer Sewer Ordinance**

Sacramento Area Sewer District Sewer Ordinance (Ordinance) can be found on the Sacramento Area Sewer District Intranet and on the Internet. The most current version of the **Ordinance** is available on **SacSewer** public website at <http://www.SacSewer.com/ordinances.html>

204 **Sacramento Area Sewer District Standards and Specifications**

Sacramento Area Sewer District Standards and Specifications (Standards) can be found on the Sacramento Area Sewer District Intranet and on the Internet. A hard copy is available for viewing at 10060 Goethe Road, Sacramento 95827. The most current version of the **Standards** is available on **SacSewer's** public website at <http://www.SacSewer.com/devres-standards.html>

205 Spill Emergency Response Plan

For the most current version of the Sacramento Area Sewer District **Spill Emergency Response Plan (SERP)** (Including Backup Into Structure (BIS) Process). The most current version of the **Spill Emergency Response Plan Manual** is available on **SacSewer** public website at

<http://www.SacSewer.com/sewer-system-management-plan>

206 Customer Call Handling and Service Request Creation Policy

206.1. Purpose

Document the policy for handling sewer problem customer calls and initiating service requests, and establish procedures for handling these activities.

206.2. Background/Procedures

The current Board-approved service level states that **SacSewer** will respond to 95% of all customer service calls (that are determined to be Priority 1) within two hours, as a monthly average. This time is measured from when the call is first received by either **SacSewer** personnel or County Central to when **SacSewer** staff (typically an M&O Pre-Checker) arrives on site. It is, therefore, incumbent upon Dispatch staff to gather as much relevant information as possible from the caller and assign the service request as quickly and accurately as possible.

206.3. Policy

In order to comply with regulatory requirements and Board-approved service levels, Dispatch staff will promptly and professionally answer all incoming calls and prepare service requests in accordance with this document. Dispatch staff will complete the service request and assign it (usually to an M&O pre-checker) before taking another call.

206.4. Call Categories

Following is a table Dispatch staff will use to create SRs to dispatch Priority 1 calls as shown.

Table 206-1 Priority 1 Calls

Reported Problem	Problem Description	Dispatch To
1. BIS	Backups-Into Structure (including burped toilets the splash onto the bathroom floor)	M&O Pre-Checker
2. DAMAGED	Damage done by others (not SacSewer) to an SacSewer Asset. This call should accompany notification to SacSewer USA Group.	M&O Pre-Checker
3. ODOR	Any type of odor complaint	M&O Pre-Checker
4. OTHER	Any occasion that may require immediate attention but does not have a category (i.e., bugs/cockroaches coming out of cleanout or manhole; customers who have dug up	Typically, M&O Pre-Checker (possibly Customer

Reported Problem	Problem Description	Dispatch To
	their service lines for a cleanout installation and have an open excavation hole)	Service Assistant (CSA)
5. Spill	Sanitary Sewer Spills of any type, i.e., out of a pipe, cleanout, manhole etc.	M&O Pre-Checker
6. SAFETY	A safety concern (other than sunken or wet area) that is located in the street, curb or gutter	M&O Pre-Checker
7. SAFETY	A safety concern (other than sunken or wet area) that is located in the Sidewalk, Back of Walk, or Yard	M&O Eng. Tech
8. SLOWDRN	A complaint of the sewer system draining slowly	M&O Pre-Checker
9. SUNKEN	Sunken areas within the street, curb or gutter	M&O Pre-Checker
10. SUNKEN	Sunken areas within the sidewalk, back of walk, or yard	M&O Eng. Tech
11. WET	A wet area within the street, curb, gutter, sidewalk, back of walk or yard that could be sewer related	M&O Pre-Checker
ANY REPORTED PROBLEMS LISTED ABOVE RELATED TO PUMP STATIONS <ul style="list-style-type: none"> i.e., water / sewage flowing from site, odor complaint, audible alarm coming from site, person in station, fire, open gate, open building, etc. (M&O Facilities Supervisor) 		

Following is a table Dispatch staff will use to create SRs to dispatch Priority 2 calls as shown. All priority 2 SRs should be accompanied by an SR communication (e-mail) sent from Maximo. Priority 2 call response time is within five (5) business days from the day **SacSewer** receives the call.

Table 206-2 Priority 2 Calls

Reported Problem	Problem Description	Dispatch To
1. ADJUST	Asset (typically manhole or cleanout) too high or too low	M&O Eng. Tech
2. CFC	Noise from loose manhole lid that is not identified by the caller to be a safety concern	CSA
3. CFC	Loose or missing cleanout lid not identified by the caller to be a safety concern	M&O Eng. Tech

Reported Problem	Problem Description	Dispatch To
4. OTHER	Any occasion that may require urgent attention but not immediate	Typically, M&O Eng. Tech or CSA
5. PLUMBER	After restoring service, a Plumber feels SacSewer should review SacSewer Assets (i.e., plumber sees roots in SacSewer portion of line)	M&O Eng. Tech
6. PERSON	Compliments about past work or current work, staff etc.	M&O Manager
7. RESTORE	Site Restoration is being requested or question about restoration is being asked	M&O Manager
<p>COMPLAINTS to M&O Manager (currently no “Complaint” Reported Problem in Maximo, so use Reported Problem above that best fits)</p> <ul style="list-style-type: none"> ▪ Questions about work performed ▪ Questions about the work that is going to be performed ▪ Complaint about how SacSewer staff have been driving the crew trucks ▪ Complaint about employee behavior 		
<p>COMPLAINTS to Customer Service Liaison (currently no “Complaint” Reported Problem in Maximo, so use Reported Problem above that best fits)</p> <ul style="list-style-type: none"> ▪ Second or more requests for Site Restoration ▪ Escalating situation with Customer communication such as customer is notably upset, agitated, or frustrated in communicating (examples include extreme emotion displayed, shouting, accusations, threats to call media or elected officials or take legal action, etcetera) ▪ Exhausted talks with manager ▪ Claims related ▪ Dispute findings 		
<p>WORK PERFORMED BY CONTRACTORS ON SacSewer’s BEHALF (Future and Past) to Engineering Design Project Manager</p> <p>Examples would be LLORP Bundles, Pipe lining project, etc.</p>		
<p>ANY REPORTED PROBLEMS LISTED ABOVE RELATED TO PUMP STATIONS</p> <ul style="list-style-type: none"> • i.e., graffiti or vandalism, general questions, construction access requests, utility questions, complains about personnel, cleanup, annoyances, station landscaping non-urgent issues, etc. (M&O Facilities Supervisor) 		

206.5. Supplemental Materials

- Dispatch Guidelines
- Spill Emergency Response Plan Manual
- Door Hangers

206.6. Detailed Group Responsibilities

The following groups and individuals will be responsible for the corresponding areas of the implementation of this process.

Customer Care-Dispatch Group

The Customer Care Dispatch staff is responsible for handling calls that come into the **SacSewer** emergency phone number (916) 875-6730 between 7:00AM and 3:30PM, Monday through Friday excluding Weekends and County of Sacramento observed Holidays.

Sacramento County-County Central

County Central is responsible for handling calls that occur outside of hours shown above, and will process calls for Priority 1 using the same protocols as describe in this document. County Central will ask customers to call back during regular **SacSewer** business hours (0700-1530) for Priority 2 issues.

Maintenance & Operations

- M&O Managers will e-mail “**SacSewer** Dispatch” Monday morning with a weekly schedule – no later than 7AM - a list of available pre-checkers and correct phone numbers for the week, including any absences, training, meetings, etc. that will cause a pre-checker to be unavailable between 7:00AM and 3:30PM (excluding normal lunch breaks.)
- M&O Managers will notify **SacSewer** Dispatch via “**SacSewer** Dispatch” e-mail AND phone the Customer Care Principal Engineering Technician (PET) and, if the PET does not answer, the Customer Care Supervisor, with any changes throughout the day.
- Dispatch staff will notify M&O Managers by phone when all pre-checkers are unavailable to take a call and may assign the service request to the Manager for further disposition.

207 Mapping Update Policy and Process

207.1. Purpose

The purpose of this policy is to set the standard for maintaining up to date maps of the sewer collection system and applicable storm water conveyance facilities as required by the **Sewer System Management Plan (SSMP)** regulatory requirements. This document describes the mapping update process.

207.2. Background

The Sacramento Area Sewer District (**SacSewer**) uses an electronic map to provide the sewer collection system mapping needs for **SacSewer**. **SacSewer** uses information from hard copy civil plan and profile drawings to create the various mapped assets such as manholes, main lines, and lower laterals. Information about existing assets gathered in the office and field is used to update existing mapped assets and related records. In addition to the sewer specific data, **SacSewer** utilizes the Sacramento County Department of Technology Geographic Information System (GIS) group’s product to provide the shared layers, such street centerlines, parcel boundaries, address information, and storm drain facilities. **SacSewer** utilizes a sewer specific viewer that displays the sewer assets over the shared layers to provide functional electronic maps. The asset information in the electronic map links to a scanned version of the original hard copy drawings, so a more detailed engineering drawing is available when needed.

207.3. Policy

SacSewer shall have an up-to-date electronic map of the sewer collection system providing compliance with the most current version of the **SacSewer’s SSMP**.

207.4. Detailed Group Responsibilities

Engineering Information Management Group, Data Management Unit is responsible for creating and updating the electronic mapped assets of the sewer collection system. Data Management is responsible for responding to the update notifications (service requests for documentation updates) based on the following priority and timeline list, where complete means that the updates are reflected on the electronic map:

- Complete priority 2 update notifications within Two weeks of the update notification creation.
- Complete priority 3 update notifications within six weeks of the update notification creation.
- Complete priority 4 update notifications within 12 weeks of the update notification creation.

Different sources provide the notifications to the Data Management Unit.

Engineering Development Group is responsible for obtaining drawings of any additions and changes to the collection system that originate from the development sector within **SacSewer's** service area. The Development Group is responsible for providing update notifications when new project plans are approved, go under construction, and when the projects become operational. This group is also responsible for assuring that the dividing line between **SacSewer's** responsibility and the responsibility of others are clearly identified on the drawings.

Engineering Design Group is responsible for providing drawings of any changes and revisions to the sewer collection system that originate from relief or rehabilitation projects managed by the Design Group, and providing the associated update notifications as the projects proceed from design through completion. The Design Group is also responsible for providing update notifications when field findings do not match asset data records or maps.

Engineering Information Management Group, GIS Unit is responsible for ensuring mapped information is accessible to **SacSewer** staff by providing analysis, map viewers, and printed maps. In addition, the unit represents **SacSewer's** geographic data needs to the Sacramento Regional GIS Cooperative.

Engineering Operations Support Group, TV Review and PM Program Adjustment Unit is responsible for providing update notifications to asset attributes when discrepancies are found between existing asset data records or maps and the current TV inspections.

M&O field staff are responsible for providing update notifications when discrepancies between asset data records or maps and actual field conditions are found.

Storm water facilities information is maintained and provided by different storm water jurisdictions (Sacramento County Department of Water Resources [DWR], City of Citrus Heights, City of Elk Grove, City of Rancho Cordova, and City of Sacramento). **SacSewer** uses this information to complete the storm drain facilities mapping requirements based on the **Statewide General Waste Discharge Requirements (WDR)** and **SacSewer's SSMP**.

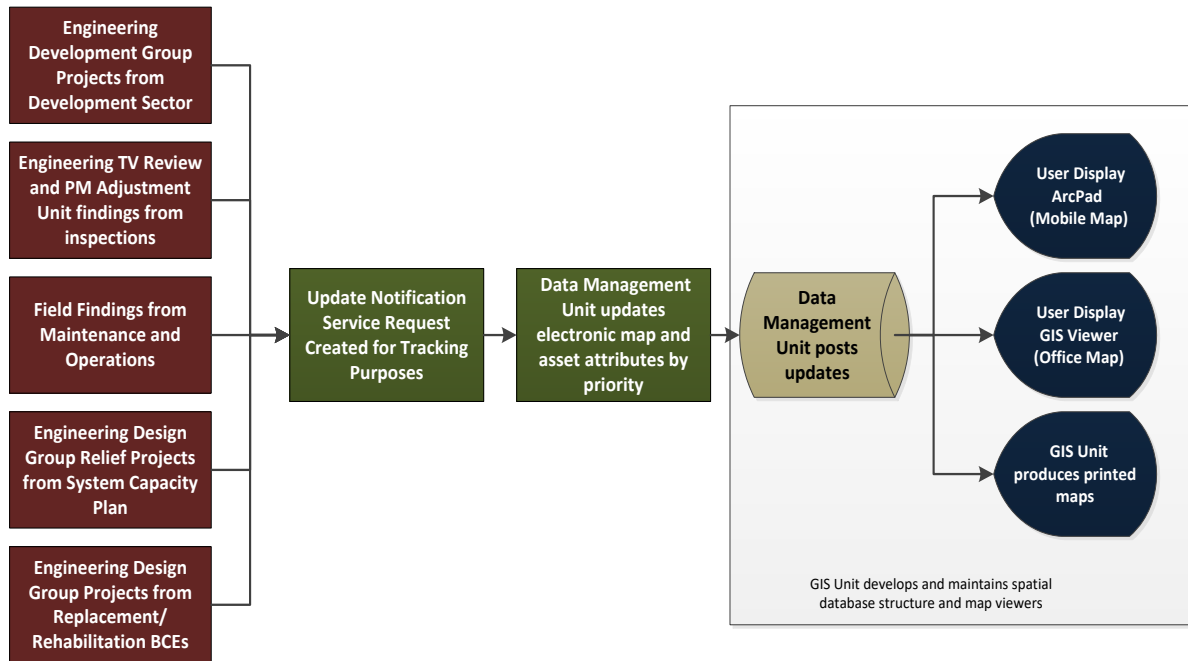
The process diagram that follows shows the flow of work from the source that either:

- Originates the changes in the collection system through a development project or a relief or rehabilitation project, or
- Finds the discrepancy in asset data records and actual conditions.

Each of these sources has staff trained to create an update notification and forward it with appropriate notations, plans, sketches, or details to the Data Management Unit for incorporation into the electronic mapping and asset data records.

The accuracy and completeness of the asset data records and mapping continually improves by this iterative documented and tracked method of identifying, notifying and updating **SacSewer** sewer collection system asset data records and mapping system.

SASD Mapping Update Process



208 SacSewer Training Policy

208.1. Purpose

This document establishes a training policy which meets the requirements of the State Water Resources Control Board Order No. 2006-0003-DWQ Statewide Waste Discharge Requirements for Sanitary Sewer Systems (WDR) to ensure that all staff (including employees, contractors, or other agents) in sanitary sewer system operations and maintenance are adequately trained and possess adequate knowledge, skills, and abilities.

208.2. Background

Changes in regulatory requirements have increased the need for documented training programs that ensure both that the training is adequate and employees and contractors possess the knowledge skills and abilities needed. This policy establishes a centralized training program approach to address the training requirements included in such documents as the:

- State Water Resources Control Board Order No. 2006-0003 **Statewide General Waste Discharge Requirements for Sanitary Sewer System (WDR)**, Provision D.8 and D.13,
- **Sacramento Area Sewer District (SacSewer)'s Sewer System Management Plan (SSMP)**,
- Hazardous Material Plan (HMP),
- Spill Prevention Control and Containment Program (SPCCP),
- Storm Water Pollution Prevention Program (SWPPP), and
- Illness and Injury Prevention Plan (IIPP).

208.3. *Policy*

Staff will be adequately trained and possess knowledge, skills, and abilities as applicable to job assignment to ensure:

- Adherence to all Federal, State, County, and **SacSewer** laws and regulations.
- All duties are being performed safely.
- All duties are being performed following Standard Operating Procedures, where appropriate.

208.4. *Detailed Group Responsibilities*

The following groups and individuals will be responsible for the corresponding areas of the implementation of this process:

Training and Development Section

The Training and Development Section is responsible for managing and coordinating the training course implementation. This group is also responsible for tracking the training courses and hours logged for each staff.

Maintenance and Operations (M&O) Section

M&O will be responsible for training all appropriate staff on its Sections of the Spill Emergency Response Plan Manual, job plans, and the on-the-job training. M&O is also responsible for providing subject matter experts for the creation of training and testing materials used to ensure adequacy of training and possession of the knowledge, skills, and abilities for Spill response, and sewer collection system maintenance, repair and cleaning activities.

Spill Emergency Response Plan Manager

The Spill Emergency Response Plan Manager is responsible for providing adequate training on the Spill Emergency Response Plan Manual to the Category 1 Spill responders in this Section.

208.5. *Staff to be Trained*

M&O Staff – Consisting of Underground Construction and Maintenance, Mechanical Maintenance, **SacSewer** Construction and Maintenance, Electrician, and Control Systems employees and contractors.

Office Staff – Consisting of Management, Supervision, Administrative, and Engineering employees who may perform spill response duties and/or fieldwork.

208.6. *Training Required*

M&O Staff

- General Safety System/Equipment Related
- Spill Emergency Response Plan, as needed for job assignment at minimum once a year.
- Software needed for field work

Office Staff

- General Safety
- Spill Emergency Response Plan, as needed for job assignment at minimum once a year.
- Software needed for field work
- General Spill Awareness

208.7. Training Process

The existing training program has provided and continues to provide adequate training for employees and contractors. This program has been accomplished using the following methods:

M&O Staff

- Monthly safety tailgate meetings
- Quarterly for staff required to take Spill Emergency Response Plan training
- Job Plans (written steps necessary to complete a sewer system maintenance and operation task)
- On-the-job for system/equipment-related training (pairing a new employee with an experienced journey-level craftsman)

In order to more fully address the need to ensure the possession of adequate knowledge, skills, and abilities for system/equipment-related training, Spill Emergency Response Plan training, and software used in-house training, **SacSewer** embarked upon developing and implementing a Competency-Based Training Program.

The Competency-Based Training Program objectives are to develop the following:

- Job Competency Requirements - Written documentation that compiles the knowledge and skills required to master the basics for a given system/piece of equipment.
- Standard Answers - Standards against which the employee will be measured.
- Standard Operating Procedures - Developed when an employee is required to follow specific steps each time they perform a task.
- Competency Assessments – Examination forms that assess whether or not the employee possesses the knowledge and skills to demonstrate competency in the work function(s).

The Competency-Based Training also includes:

- A Recertification process for follow-up/refresher training at standardized time intervals.
- Field-Experience/Qualifying Experience process which certifies that the job is being performed (in the field) within acceptable performance standards.

This program recognizes the needs of the affected Sections and will leverage the knowledge, skills, and abilities of Subject Matter Experts within **SacSewer**.

Office Staff

- Monthly safety tailgate meetings
- Quarterly for staff required to take Spill Emergency Response Plan training

209 Sewer System Management Plan (SSMP) Document Update and Storage Policy

209.1. Purpose

The purpose of this policy is to provide guidance on how to update and store the Sacramento Area Sewer District (**SacSewer**) **Sewer System Management Plan (SSMP)**.

209.2. Background

To provide a consistent, statewide regulatory approach to address Spills, the State Water Resources Control Board (State Water Board) adopted **Statewide General Waste Discharge Requirements (WDRs)**

for Sanitary Sewer Systems, Water Quality Order No. 2006-0003 (Sanitary Sewer Order) on May 2, 2006. The Sanitary Sewer Order requires public agencies that own or operate sanitary sewer systems over 1 mile in length develop and implement **SSMPs**. At this time, the **WDR** requires that the **SSMP** be updated every five years, and must include any significant program changes. The **WDR** also requires that a copy of the certified **SSMP** shall be maintained at appropriate locations and shall be available to personnel and the public at all times.

SacSewer will follow the intent of the **WDRs** when producing the documents that make up the **SSMP**. **SacSewer's SSMP** is intended to be a day-to-day working management plan that also meets the requirements of the **WDR**. In order to accomplish this goal, **SacSewer** has arranged the **SSMP** to meet its business needs as a living management plan.

There are two parts to the overall **SSMP**. The first part is the Board approved **SSMP** document, this is referred to as the **SSMP** (see Definition). The second part is the collection of supporting Sections, which are the **Reference Document to the SSMP** (see Definition).

This policy is intended to satisfy the **WDR** requirements for document update and storage.

209.3. Process

The **SSMP** and its Reference Document are required to be updated. The **SSMP** will be updated at least every six years. The Reference Document shall be updated at least every three years.

New Sections will follow this policy when created.

Significant program changes will require an immediate **SSMP** update, above and beyond that is required through the revision cycle. Program changes will occur through the **Management Plan Assessment Program**, which analyzes different programs for effectiveness. Staff program change requests to management will require that the updated **SSMP** and program change be approved at the same time. Changes directed by management will require that staff immediately begin the process of updating the **SSMP**. Preparation work may begin, but implementation of new programs is not allowed until the **SSMP** documentation has been completed.

When practical, data analysis that includes risk and cost analysis should support the **SSMP** update. The cost analysis will be presented as a 40 year Net Present Value (NPV). This is to aid in the decision making process through the **Management Plan Assessment Program**, which may also require the use of the **Generic BCE Process** to analyze different alternative solutions to a problem.

An Effectiveness Measure Section is required in each reference document. This Section will explain the way to analyze that document to see if it is meeting its purpose. In effect, it will provide a performance measure. This will aid the **Management Plan Assessment Program** in its analysis of different programs effectiveness.

SSMP updates will include a change log that follows the template in Appendix A. The change log will consist of a list of what has changed from one version to the next and serves as a historical record of changes over time.

SSMP documents will follow the layout of this document. The **SSMP** is approved by **SacSewer** Board and the reference document is approved by the District Engineer or the Director of Operations.

Updates to the **SSMP** are required to follow the following process to ensure proper document storage and retrieval:

1. The Master Word document to be checked out from Business Planning SharePoint by the Engineering Business Planning Group.

2. The Document revision will take place using the check in/check out process in SharePoint by the Engineering Business Planning Group.
3. The changes will be documented in the Change Log.
4. The change log will need to be initialed and the document will need to be approved and signed by a Legally Responsible Official (LRO).
5. The updated approved **SSMP** document will be checked back in Business Planning SharePoint as a new version.
6. A pdf copy of the document is saved and filed in the Records Center SharePoint under Reports.
7. The Public Affairs Office (PAO) and Information Technology (IT) will be notified that an approved update to the **SSMP** is available by the Engineering Business Planning Group. The **SSMP Communication Program** will be followed when notifying the PAO.
8. PAO will update the **SacSewer** website following the **SSMP Communication Program**, and IT will update the link to the **SSMP** on the intranet page.
9. The Business Planning Group will update the Document room with the updated hard copy of the **SSMP** contained on site.
10. Business Planning Group has a responsibility to communicate with **SacSewer** that the document has been updated and training may be required.

The above process is intended to ensure that a hard copy of the **SSMP** is available, that the intranet and internet versions of the **SSMP** are up to date, that the native files of the **SSMP** are stored securely, and that historical **SSMP** documents are available.

Significant Program Changes – Changes to a program or process that alters the 40-year net present value by more than 15%. Development of a new program or process will be considered a significant program change.

209.4. Definitions used in Section 209

SSMP – Board approved guidance document, will be referenced to as **SSMP**.

SSMP Reference Document— The collection of Sections that are referenced in the **SSMP** or are presented with it. The Table of Contents for the Reference Document to the **SSMP** is made of the collection of Reference Sections.

Significant Program Changes – Changes to a program or process that alters the 40-year net present value by more than 15%. Development of a new program or process will be considered a significant program change.

209.5. Effectiveness Measure

Effectiveness of this Policy is measured by how well the SSMP Sections represent current business practices. If the information presented is up to date, has been analyzed, and is retrievable, then this document has fulfilled its purpose.

209.6. *Appendix A: Example Change Log*

[illegible]

300 Management Plan Assessment Program

300 Program Overview

300.1. Purpose

This program describes the activities that explain how the Sacramento Area Sewer District (**SacSewer**) manages decision-making processes and fiscal decision-making. It also describes how **SacSewer** meets the requirements of the Monitoring, Measurement, and Program Modification element of the **Sewer System Management Plan (SSMP)**.

300.2. Background

This document is directly referenced in the Board Approved **SSMP**, and is one of the **SacSewer**'s system wide assessment programs. The assessment programs consist of strategies, programs, policies, systems, activities, and teams that drive **SacSewer**'s routine day-to-day operations.

This program is intended to describe the following activities of **SacSewer**:

- Meeting the requirements of the Monitoring, Measurement, and Program Modification element of the **SSMP**
- Describing how **SacSewer** identifies and prioritizes system deficiencies
- Describing how **SacSewer** implements short and long term rehabilitation, replacement, and capacity assurance projects

300.3. Program

The Sacramento Area Sewer District owns and operates a variety of physical assets. In support of **SacSewer**'s goals of meeting **SSMP** regulatory requirements, achieving identified service level targets, and operating in a cost-effective manner, it has documented several efforts designed to optimize the management of its assets.

The **Management Plan Assessment Program** encompasses several separately described but interrelated activities. Component efforts, which are included either entirely or in part within the **Management Plan Assessment Program**, are documented below:

- **Gravity Asset Management Strategy**
- **Pressurized Assets Management Strategy**
- **Sanitary Sewer Blockage Control Assessment Program**
- **Structural Assessment Program**
- Computerized Maintenance Management System
- **Mapping Updates Policy and Process**
- Decision making processes
- **SSMP Program Audit**
- Funding needs assessments
- **Asset Management Plan**
- **Under Capacity Failure Mode Strategy**

A major goal of the **Gravity Asset Management Strategy** and the **Pressurized Assets Management Strategy** is to reduce spills and to optimize maintenance activities within the collection system to find the most cost effective techniques to sustain the assets. An asset that has had a stoppage is addressed directly

through the SSMP **Blockage Control Assessment Program** (and via the **Spill Emergency Response Plan Manual** if a Spill or Backup Into Structure (BIS) has resulted). By recognizing common causes of spills, **SacSewer** can focus efforts and financial resources on projects and programs that will prevent the most spills.

The **Structural Assessment Program** and associated strategies are intended to evaluate the structural integrity of all **SacSewer** collection system assets. The program also aims to mitigate any potential structural failures in the system.

The Computerized Maintenance Management System (CMMS) is the repository for **SacSewer**'s work orders (WOs), preventive maintenance (PM) schedules, and records of completed work. CMMS data is used in the decision making process to monitor and measure the effectiveness of **SacSewer**'s Programs and Strategies including spill trends. Reports from CMMS data are also used for service levels, failure modes, performance measures, and production rates.

The **Mapping Updates Policy and Process** describes how **SacSewer** maintains up-to-date sewer and storm water maps. **SacSewer** utilizes a Geographic Information System (GIS) to display location and some asset information about the sanitary sewer and storm water system.

SacSewer uses several decision-making processes to sustain **SacSewer** assets and manage risk at a socially, environmentally, and economically appropriate level:

- Organizational Planning Team (OPT)

The OPT objectives are to provide approval and direction on:

- how to comply with the **Statewide General Waste Discharge Requirements (WDR)**
- development of long-term asset plans, staffing plans, and associated cost projections
- service level target attainment
- projections for use in the revenue model
- appropriate risk levels

- Purchasing Authorization Levels

Two documents detail the purchasing authorization levels, the **Procurement Policy and Process Procedures and Purchasing Authority Limits** and the **Project Authorization Process** (forming the Project Authorization Committee).

- **Procurement Policy and Process Procedures and Purchasing Authority Limits**
The purpose of this document is to establish purchasing authority policy and update purchasing limits for goods and services needed by **SacSewer** to conduct business in the most cost effective manner.
 - For goods and services below the Project Authorization Committee threshold
- **Project Authorization Process (PAP)**
The purpose of the **PAP** is to lay out the process to obtain management approval to proceed with capital and non-capital projects or programs that meet established criteria and financial thresholds. (See **PAP** guidelines).

- Business Case Evaluations (BCEs)

The BCE process is described in the **Generic BCE Process** document. This process is meant to support optimized decision-making, adhering to **SacSewer**'s asset management principles.

- Equitable cost comparison (typically a 40 year net present value) for different alternatives

- Selection based on lowest cost alternative including risk
- Collaboration and Innovation Team (CIT)

The CIT was established to support **SacSewer**'s mission by providing on-call resources to do the following:

- Develop processes that are more efficient.
- Investigate new products, equipment, or technologies not currently being used by **SacSewer** that promise to enhance service levels or reduce life cycle cost.
- Review and approve new suppliers of products, equipment, or services already in use.
- Brainstorm ideas to address significant issues such as spills.
- Asset Management Roundtable Team

The Asset Management Round Table's (AMRT) primary focus is to communicate Asset Management (AM) concepts throughout **SacSewer** Operations. The AMRT will provide the following benefits to **SacSewer**:

- Build upon already established AM principles and ensure they are being applied uniformly throughout **SacSewer**
- Act as a central clearing house for resolving questions or concerns about the implementation of AM principles
- Act as a liaison to ensure **SacSewer**'s Director of Operations and Section Managers are in agreement with AM principles and how they are implemented
- Provide support to the **SacSewer**/SRCSD AM Coordination group and **SacSewer**'s AM Steering Committee
- Evaluate proposals for improvements to current AM processes
- Provide input into **SacSewer** AM Plan
- **SacSewer** Management Meeting

The **SacSewer** Management Meeting is a twice-monthly meeting between the Director of Operations and her direct reports. The intention of the meeting is to have a management discussion forum.

SacSewer's SSMP Program Audit is designed to monitor the implementation and measure the effectiveness of each element of the **SSMP**, **SacSewer's** compliance with the **SSMP** requirements, and identify deficiencies in the **SSMP** and steps to correct them.

Funding Needs Assessments:

Programs and strategies for operating and maintaining the sewer collection system are regularly evaluated. Performance trends are presented to the OPT and reviewed. Through decision-making processes, a determination is made for investigation or changes to existing approaches and/or development of new ones. During the development of new approaches or changes to existing ones, the cost of the business change is estimated and projected. This information is then communicated to **SacSewer's** Chief Financial Officer for inclusion in the expense projections that make up the revenue needs projections.

Capacity assurance and the associated approach to forecasting capacity-related capital investment needs are addressed in the **Under Capacity Failure Mode Strategy** and the **Sewer System Capacity Plan**. The results from these evaluations are then used to estimate capital funding and operating funding needs for

capacity related projects. The **Asset Management Plan** describes the projected funding needs for operations, and the renewal and rehabilitation of assets.

A detailed discussion of the funding needs assessments can be found in the **SSMP**.

300.4. Effectiveness Measure

This system wide Program is in place to guide the efforts of **SacSewer** as a whole. Its effectiveness can be monitored through **SacSewer** ability to meet its Service Levels as well as meeting the requirements of the of the Monitoring, Measurement, and Program Modification element of the **SSMP**.

301 Pump Station Condition Assessment Program

301.1. Background

Condition assessment is a proactive measure meant to identify the condition of an asset at a particular point in time. The information gathered enables the Sacramento Area Sewer District (**SacSewer**) to make cost effective maintenance and replacement decisions while minimizing risk of failure. Condition assessment is not meant to take the place of failure analysis, although information gathered during condition assessments is invaluable during the failure analysis process.

Condition assessment can be performed by both qualitative and quantitative measurements. Qualitative measurements consist of visual, sound, and touch assessments. Examples of this are conducting visual assessments of all components in the stations, collecting equipment information, photographs, and general observations. Quantitative measurements consist of physical measurements such the ultrasonic test, which inspects the thickness of a wet pits' metal walls.

After measurement, the condition assessment process moves into interpretation of the results. At this time, Maintenance and Operations (M&O) crews interpret the results and determine if more actions should be taken or if a work order for further evaluation is needed. Any failure found during condition assessment will be handled through the **Generic BCE Process** by way of a work order in the Computerized Maintenance Management System. The Spill Emergency Response Plan **Manual** will dictate the appropriate response if it is an emergency. As stated in the **Asset Management Plan**, "annual condition assessments are typically conducted in conjunction with routine equipment preventive maintenance and station inspections." Proper condition assessments provide the information that will be used when making long-range renewal and replacement revenue needs projections such as those in the **Asset Management Plan**. Condition assessment data is used in the **Management Plan Assessment Program** to monitor and measure the effectiveness of **SacSewer's** Programs and Strategies.

301.2. Purpose

The purpose of this program is to identify and record the condition of pump station components and provide a comprehensive assessment of those facilities. The findings will develop recommendations for any necessary repair, rehabilitation, or replacement. More internal details can be found in the comprehensive **Pump Station Condition Assessment Strategy** document, which describes the proper responses to specific condition and performance ratings.

301.3. Pump Station Condition Assessment Strategy

The pump station condition assessment strategy is a proactive approach to identify and rank the condition of **SacSewer** pump stations through a comprehensive condition assessment. There are five portions of the condition assessment, which include: the selection process, condition assessment, condition and performance ranking, level of service standards, and recommendations.

A selection process determines the **SacSewer** pump stations and components that will be evaluated. The selection process consists of two portions, a data analysis and a workshop with **SacSewer** personnel. The selected stations will undergo the assessments outlined in **Pump Station Condition Assessment Strategy**.

After the selection of the highest ranked pump stations, the condition assessment will begin on those stations. The condition assessment at each pump station may consist of, but is not limited to, the following activities:

- Visual Condition Assessment- Visiting each station and conducting visual assessments of all components of the stations, collecting equipment information, photographs, and general observations.
- Corrosion Field Survey – A corrosion specialist will conduct inspections and collect field measurements of major structural components that are subject to corrosion at each pumping station.
- Pump Performance Testing- Collecting pressure readings on the discharge piping for each pump, and the corresponding pump start and stop times from the supervisory control and data acquisition (SCADA) system to calculate flows. Using this information, measure the actual performance against the manufacturer’s pump curve.
- Camera Inspections – To safely provide inspections within wet wells, a pole-mounted camera is used to collect video of the interior of the wet wells to conduct detailed non-destructive assessment of any defects that can be identified.

Assessment activities will be performed by a combination of in-house **SacSewer** staff, consultants, and specialists depending on the capabilities and availability of in-house staff. Other condition and performance testing methods are possible, and may be used in some cases. A detailed list of assessment activities is provided in Appendix B of the **Pump Station Condition Assessment Strategy**.

Major components found in each pump station will undergo condition and performance scoring during the condition assessment. The results of the visual observations, testing, and analysis activities will be used to score the major components of each pump station.

Level of Service (LOS) standards were established through a series of workshops and are defined as the minimum acceptable thresholds in five categories; safety, reliability, cost of maintenance, good neighbor, and efficiency (cost of operations). The LOS standards were established to better define the minimum performance for the entire pump station, as well as individual components, and can be found in the **Pump Station Condition Assessment Strategy**.

The condition and performance scores establish recommendations for each component based on the severity of the scores. These recommendations are defined by the region where the performance and condition ranking scores intersect. A graphic of the recommendations associated with each combination of condition and performance scores is provided in the **Pump Station Condition Assessment Strategy**.

After recommendations for each component have been made, staff will review the level of service for updates or changes. The review will ensure that the LOS based recommendations are cost effective and

appropriate. The review may result in the deletion or addition of a LOS to address a recommendation that was not previously identified.

After the LOS standards are updated, staff can begin to develop and evaluate alternatives using the Project Development Plan (PDP). During PDP-1, staff will take into account all the recommendations and develop alternatives addressing the pump station as a whole. Staff may coordinate with consultant engineers to provide preliminary investigations into these alternatives. The chosen alternatives for each station will be further evaluated in PDP-2.

301.4. Supporting Strategies, Systems, and Processes

SacSewer strategies, systems, and processes that support the condition assessment strategy are listed below:

- **Pump Station Structural Assessment Strategy**

The **Pump Station Structural Assessment Strategy** identifies methodologies to assess the pressurized system assets for risk of structural failure, and approaches to cost effectively minimize failures. The strategy contains monthly, semi-annual and annual preventive maintenance activities that include condition assessments. Examples are visual pump station inspections, visual pump station building inspections, and measured ultrasonic wall thickness testing for condition assessment.

- **Pump Station Component Failure Mode Strategy**

The **Pump Station Component Failure Mode Strategy** identifies ways that non-structural pump station components may fail, and approaches to cost effectively minimize failures. There are monthly, semi-annual and annual preventive maintenance activities that include condition assessments. Examples are the removal of pumps for visual inspection and visual inspections of various components.

- **Pump Station and Force Mains Inventory and Expenditures List**

SacSewer has developed an inventory and expenditure list for each pump station and pump station facility. The **Pump Station and Force Mains Inventory and Expenditures List** is a list of all the major components and facilities at each pump station, and includes the year the components were installed and the estimated design life. The spreadsheet also calculates the remaining useful life for each component.

- **Computerized Maintenance Management System (CMMS)**

The Computerized Maintenance Management System (CMMS) is the repository for **SacSewer's** work orders, job plans, preventive maintenance schedules, and records of findings.

- **Supervisory Control and Data Acquisition (SCADA) system**

All **SacSewer** pump stations are monitored through a Supervisory Control and Data Acquisition (SCADA) system. The condition of the pump station is transmitted to a local server at different time intervals. This information is stored on the server and can be accessed at any time. The information is then used for trending the change in condition over time. Alarms are built into the system. The alarms are monitored on a 24-hour a day basis and are responded to as needed.

- **Generic BCE Process**

The **Generic BCE Process** is a method used by **SacSewer** to find the most cost effective solution to a problem. The process uses the available information to develop a list of alternative solutions to a problem. The result of the process is the approval of a solution. Examples of a solution are changing the preventive maintenance frequency, changing the method of condition assessment, adding additional preventive maintenance, or rehabilitation of an asset. The cost of the preventive maintenance or rehabilitation will also be analyzed along with the risk and consequence of failure.

- **Sewer Ordinance**

The **SacSewer Sewer Ordinance** gives **SacSewer** the legal authority to access assets to perform condition assessments.

- **SacSewer Standards and Specifications**

SacSewer Standards and Specifications provide the minimum standards for the planning, design, construction, and rehabilitation of **SacSewer** assets. These standards will allow **SacSewer** to perform condition assessment activities as needed. For example, staff can assess a pump station component while keeping the station operational.

301.5. *Effectiveness Measure*

The effectiveness of the Pump Station Condition Assessment Program will be measured by the time interval between evaluations and the cost of corrective maintenance work orders. The strategy will be deemed effective if a pump station is not reevaluated within 10 years and if the costs for corrective maintenance work orders decreases.

301.6. *Detailed Group Responsibilities*

Engineering-Operations Support

The Operations Support group will be responsible for setting the Design Life, Useful Remaining Life, Preventive Maintenance (PM), Renewal / Replacement plan, Selection Process, Condition Assessment, Condition and Performance Ranking, LOS Standards, and Recommended Alternatives.

Maintenance and Operations

The Maintenance and Operations group will be responsible for conducting the PMs and for following the Renewal / Replacement plan.

302 **Pressurized Asset Management Strategy**

302.1. *Purpose*

This Strategy documents how the Sacramento Area Sewer District (**SacSewer**) manages the performance of pressurized assets.

302.2. *Background*

This document is directly referenced in the Board approved **Sewer System Management Plan (SSMP)** and it is part of the **Management Plan Assessment Program**.

SacSewer owns and operates a variety of physical assets. In support of **SacSewer's** goals of meeting **SSMP** regulatory requirements, achieving identified service level targets, and operating in a cost-effective

manner, **SacSewer** has documented several practices designed to optimize the management of its pressurized collection system assets including force mains and pump station components. These practices include maintenance activities to prevent spills and assessment activities to find the most cost effective techniques and programs to reduce spills and sustain the asset.

There are a number of different failure modes within the pressurized collection system that can cause spills, or shortened asset life. It is important to monitor the most common causes of failure, recognize the consequence of failure, identify the best practices to prevent failures from occurring, and to focus efforts and financial resources on projects and programs that will prevent the most failures and sustain asset life.

This strategy does not cover spill emergency response. All spill responses follow the Spill Emergency Response Plan **Manual** and the **Customer Call Handling and Service Request Creation Policy**. If a stoppage was caused by a structural problem, refer to the **Structural Assessment Program**.

302.3. Strategy

SacSewer uses several strategies, programs, and decision-making processes to sustain **SacSewer** assets and manage risk at a socially, environmentally, and economically appropriate level. The decision-making processes that are designed to sustain **SacSewer** assets are outlined and described in the **Management Plan Assessment Program**. A detailed discussion of the **Funding Needs Assessments** for long-term repair and rehabilitation can be found in the **SSMP**.

The facilities (pump stations and force mains) assets condition assessment are covered in the programs and strategies of the Reference Document to the SSMP. A high-level summary of the facilities condition assessment strategy is found in the **Condition Assessment Strategy for SacSewer Assets**.

Different failure mode strategies and programs are monitored and evaluated for cost effective reduction of spills, mitigation of spill risk, and reduction of spill consequence, based on asset classification or failure mode or both asset classification and failure mode. Each strategy has its own effectiveness measure. This example list is not exclusive:

- **Pump Station Component Failure Mode Strategy**
- **Pump Station Structural Assessment Strategy**
- **Pump Station Condition Assessment Program**

The overall effectiveness of these strategies is tracked by the effectiveness measures in the associated documents. If any one of the strategies is determined to be ineffective it will be re-evaluated, and solutions will be presented to Management in accordance with the **Management Plan Assessment Program**.

The **Pump Station Component Failure Mode Strategy** and the **Pump Station Structural Assessment Strategy** outline the details of the preventative maintenance program for pressurized assets including force mains and pump station components. Preventative maintenance activities are performed on a predetermined schedule based on the asset performance history and risk, to prevent sewer spills or functional failures. The **Pump Station Condition Assessment Program** provides a comprehensive assessment of pump stations conditions. The findings will develop recommendations for any necessary repair, rehabilitation, or replacement.

The **Under Capacity Failure Mode Strategy** and the **System Capacity Plan** describe how **SacSewer** manages capacity assurance in the pressurized system.

The short-term repair and replacement process is described in the **Generic BCE Process**

302.4. *Effectiveness Measure*

The effectiveness of this Strategy is measured by the reduction of spills in the pressurized collection system and sustaining asset life while managing risk at a socially, environmentally, and economically appropriate level.

303 Gravity Assets Management Strategy

303.1. *Purpose*

The **Gravity Assets Management Strategy** documents how the Sacramento Area Sewer District (**SacSewer**) manages the performance of gravity assets by reviewing system-wide Spill Service Level performance trends and evaluating operational efficiency, maintenance activities, procedures, frequencies, and practices; along with these activities, costs are estimated and projected.

303.2. *Background*

This document is directly referenced in the Board approved **Sewer System Management Plan (SSMP)** and it is part of the **Management Plan Assessment Program**.

SacSewer owns and operates a variety of physical assets. In support of **SacSewer's** goals of meeting **SSMP** regulatory requirements, achieving identified service level targets, and operating in a cost-effective manner, it has documented several efforts designed to optimize the management of its gravity collection system assets.

The goal of maintenance activities is to prevent spills. The goal of assessment is to find the most cost effective techniques and programs to reduce spills and sustain the asset, while managing risk at a socially, environmentally, and economically appropriate level.

There are a number of different failure modes within the gravity collection system that can cause spills, or shortened asset life. It is important to monitor the most common causes of failure, recognize the consequence of failure, identify the best practices to prevent failures from occurring, and to focus efforts and financial resources on projects and programs that will prevent the most failures and sustain asset life.

This strategy does not cover spill emergency response. All spill responses follow the **Spill Emergency Response Plan Manual** and the **Customer Call Handling and Service Request Creation Policy**. If a stoppage was caused by a structural problem, refer to the **Structural Assessment Program**.

303.3. *Strategy*

SacSewer uses several strategies, programs, and decision-making processes to sustain **SacSewer** assets and manage risk at a socially, environmentally, and economically appropriate level. The decision-making processes that are designed to sustain **SacSewer** assets are outlined and described in the **Management Plan Assessment Program**. A discussion of the **Funding Needs Assessments** for long-term repair and rehabilitation can be found in the **SSMP**.

Gravity assets (main lines, lower laterals, and manholes) condition is regularly assessed through visual and television inspection (TVI) activities. These activities are documented and implemented through the programs, policies, and processes in the Reference document to the SSMP. A high-level summary of the condition assessment for the gravity assets strategy is found in the **Condition Assessment Strategy for SacSewer Assets**.

Different failure mode strategies and programs are monitored and evaluated for cost effective reduction of spills, mitigation of spill risk, and reduction of spill consequence, based on asset classification or failure

mode or both asset classification and failure mode. Each strategy has its own effectiveness measure. This example list is not exclusive:

- **Main Line Stoppage Failure Mode Strategy**
- **Lower Lateral Stoppage Failure Mode Strategy**
- **Manhole Stoppage Failure Mode Strategy**
- **Damage by Others Failure Mode Strategy**
- **FOG (Fats, Oils, Grease) Program**
- **Root Control Program**

The overall effectiveness of these strategies and programs are tracked by service level targets that have been approved by the Board of Directors. All overflow rate graphs and service level measurements are presented monthly to management, as described in the **Management Plan Assessment Program**. The **Service Level Bands Policy** has action guidelines to direct staff to appropriately respond to different service level trends annually.

The **Lower Lateral Stoppage Failure Mode Strategy**, the **Manhole Stoppage Failure Mode Strategy**, and the **Main Line Stoppage Failure Mode Strategy** outline the details of the preventive maintenance (PM) program for their respective asset types. These PM activities are performed on a predetermined schedule based on the asset performance history and risk, to prevent sewer spills or functional failures.

The **Under Capacity Failure Mode Strategy** and the **System Capacity Plan** describe how **SacSewer** manages capacity assurance in the gravity collection system.

The **Structural Assessment Program** is intended to reduce the probability of high consequence crush collapse failures.

The short-term repair and replacement process is described in the following documents:

- **Main Line Repair-Maintain-Replace Decision Policy**
- **Lower Lateral Repair-Maintain-Replace Decision Policy**
- **Generic BCE Process**

303.4. Effectiveness Measure

The effectiveness of this Strategy is measured by the reduction of spills in the gravity collection system, achieving service level targets and sustaining asset life while managing risk at a socially, environmentally, and economically appropriate level.

304 Main Line Repair-Maintain-Replace Decision Policy

304.1. Purpose

The purpose of the **Main Line Repair-Maintain-Replace Decision Policy** is to document and ensure consistent decision-making processes to address problems observed in Main Lines (MLs). These decision-making processes are developed to identify the most economical solution while considering risks.

304.2. Background

The Sacramento Area Sewer District (**SacSewer**) policy is to identify and implement cost-effective solutions for maintaining its assets while considering risk. In August of 2005, **SacSewer** began performing business case evaluations (BCEs) to address problems with **SacSewer's** assets, including MLs. BCEs provide a cost-based comparison between various alternatives proposed for resolving identified ML problems. These alternatives typically include status quo, re-evaluation at a future date, adding or

changing a maintenance schedule, and performing a repair or replacement. The analysis conducted in numerous ML BCEs has provided cost and solution efficacy data that has been used to develop the following processes and procedures.

Any spill response that may have resulted from defects outlined in this policy is governed by the **Spill Emergency Response Plan Manual**.

304.3. *Process*

ML defects are found through televised inspections (TVIs). TVIs are performed as directed by the **Televised Inspection (TVI) Policy**, **Spill Emergency Response Plan**, and the **SacSewer Television Inspection Manual (TVI Manual)**, which is available on **SacSewer** public website at <https://www.SacSewer.com/standards-specifications>.

Part 1 - TVI Observed Problems

1.0. ML TVI Review

Part 1 describes the process if problems or defects are found in the main line through a ML TVI. This part also addresses any lower lateral problems found through the ML TVI.

1.1. Is there a ML problem?

Assess the ML for problems.

1.2. Does the ML have structural issues?

If the ML is cracked, broken, missing, collapsed, or corroded, through the ML TVI, go to process Part 2.

1.3. Is there Grease?

This section describes the process when grease is found through a ML TVI.

1.3.1. Severity?

If the grease is light, then document and end.

If the grease is moderate or severe, then check for previous TVIs on the ML.

1.3.2. Initiate FOG Advisory

If the grease is severe then Initiate FOG advisory.

Refer to the **Enforcement Response Process** for the FOG advisory and enforcement process.

1.3.3. Is this 1st Assessment TVI?

If previous TVIs are available, then go to Flowchart Part 3.

If this is the first ML TVI, then a second TVI is needed.

1.3.4. Write Priority 2 Cleaning Work Order (WO) and a Priority 4 TVI WO in 12 months

The review of the second TVI in 12 months is used for determining the preventive maintenance (PM) interval for the ML.

1.4. Is Solids/Debris or Roots?

This section describes the process if Solids/Debris or Roots are found through a ML TVI.

1.4.1. Severity?

If the solids/debris or roots are light then Document and end.

If the solids/debris or roots are moderate or severe, then check for previous TVIs on the ML.

1.4.2. Is this 1st Assessment TVI?

If previous TVIs are available, then go to flowchart Part 3.
If this is the first TVI, then a second TVI is needed.

1.4.3. Write Priority 2 Cleaning WO and a Priority 4 TVI WO in 12 months

The review of the second TVI in 12 months is used for determining the PM interval for the ML.

1.5. Is there a LL Problem?

Is there a LL problem that can be seen from the ML TVI? A LL problem could potentially cause a problem in the ML.

1.5.1. Are there multiple laterals with problems?

If the answer is yes, then go to step 1.5.2.

If the answer is No, then go to step 1.5.3.

1.5.2. Follow the Generic BCE process

1.5.3. Follow the LL Repair Maintain Replace Decision Policy

If a LL problem is observed, then follow the **LL Repair Maintain Replace Decision Policy – Process Part 2.0.**

End of Process for Part 1

Part 2 - Cracked, Broken, Missing, Collapsed, or corroded Pipe

Flowcharts Part 2a, 2b, and 2c show the assessment process for cracked, broken, missing, collapsed, or corroded pipe. The process can lead to a document and end, a re-evaluation of the segment, a BCE as outlined by the **Generic BCE Process**, or a repair solution to address the defects covered under this policy.

1.0. Generic BCE Process

The **Generic BCE Process** outlines the process of performing a business case evaluation that is not covered by this Policy or other policies. This process is applied to problems requiring detailed analysis to determine the most economical solution for the problem while considering the risk.

2.0. Covered by Main Line Repair Maintain Replace Decision Policy?

Engineering Pipeline Support - Main Line TVI Review Unit and the BCE Decisions Unit - use this Process when a cracked, broken, missing, collapsed, or corroded pipe is found during a ML TVI review. The ML TV & PM Adjustment unit reviews TVIs and identifies if there is a defect covered under this policy. The ML TVI Review & PM Program Adjustment Unit reviews TVIs, identifies defects covered under this policy, and writes WOs to address defects that need additional evaluation. The BCE Decisions Unit follows this policy to analyze how to address the defect, either with the Repair Decision Flowchart, Part 4 or through the **Generic BCE Process**. Is the Pipe Moderately or Severely Corroded?

If yes, then a BCE is required

2.1.1. Are There Multiple Defects?

Multiple defects are not covered under this policy. A BCE is required to evaluate this special case if multiple defects are found during the TVI review. See this policy's multiple and continuous defect definitions to determine whether it is considered a multiple defects.

2.1.2. Is the ML Active?

MLs that are not active may not need to be repaired. The **MLRMR Decision Policy** should only be used on active MLs.

2.1.3. Write WO for BCE

The **Generic BCE Process** is necessary to analyze the problem. A BCE WO will be written by the ML TVI Review & PM Program Adjustment Unit for BCE Decisions unit to evaluate the problem.

2.2. Is the Pipe Lightly Cracked (CPL)?

If the answer is yes, then proceed to step 2.2.1.

Cracked pipe light, Moderate, and Severe are described in the **TVI Manual, Section 205** Continuous Defect Codes.

2.2.1. Does a Previous TVI Exist?

Does a previous TVI exist?

2.2.2. Has the Condition of the Crack Changed?

Review the previous TVI to evaluate if the crack severity has changed.

2.2.3. Document and End

Since the crack condition has not changed since the last TVI was performed, there is no need to take action. Close the WO.

2.3. Is CPM?

Is the pipe moderately cracked, as described in the **TVI Manual, Section 205.2?**

2.3.1. Is Crack Below Spring Line?

Is the crack located below the spring line?

2.3.2. Is There Infiltration?

Is there infiltration?

2.3.3. Are There #4 Roots or Greater at Crack?

As defined in the **TVI Manual** Section 204.9, under the Television Inspections, General Observation Codes, roots are rated on a scale from 1 to 9, representing the relative portion of the pipe's cross-sectional area that is blocked by the roots.

Roots that grow into cracks can grow wider and worsen the defective area's structural condition.

2.4. Is CPS?

Is the pipe severely cracked, as described in **TVI Manual** Section 205.2?

If the answer is yes, then go Part 2b

2.4.1. Is Crack Larger Than 1" Wide?

Is the crack larger than 1" wide?

2.4.2. Is the ML Diameter Less Than 12"?

Is the ML diameter less than 12"?

2.4.3. Are There Visible Voids?

Are voids visible?

2.4.4. Is There Evidence of Soil Intrusion?

Is there evidence of soil intrusion?

2.4.5. Would PM Activity Cause Soil Intrusion?

Would a preventive maintenance (PM) activity cause soil intrusion?

2.4.6. Is Crack Below the Spring Line?

Is the crack located below the spring line?

2.4.7. Is There Infiltration?

Is there infiltration?

2.4.8. Are There #4 Roots or Greater at Crack?

As defined in the **TVI Manual** Section 204.9 Roots in Pipe. Under the Television Inspections, General Observation Codes, roots are rated on a scale from 1 to 9, representing the relative portion of the pipe's cross-sectional area that is blocked by the roots.

Roots that grow into cracks can grow wider and worsen the defective area's structural condition.

2.5. Is BPX?

Is there a broken pipe, as described in the **TVI Manual** Section 204.3?

If the answer is yes, then go to Part 2c

2.5.1. Missing Pipe?

Missing pipe is an additional condition of a broken pipe, where a piece of broken pipe is missing, leaving a hole in the main line.

Is there a missing pipe?

2.5.2. Is Largest Hole Dimension $\geq \frac{1}{4}$ Pipe Diameter?

Is the largest hole dimension $\frac{1}{4}$ of the pipe's diameter or larger?

2.5.3. Is ML Diameter Less Than 12"?

Is the main line diameter less than 12"?

2.5.4. Are There Visible Voids?

Are voids visible?

2.5.5. Is There Evidence of Soil Intrusion?

Is there evidence of soil intrusion?

2.5.6. Would PM Activity Cause Soil Intrusion?

Would a PM activity cause soil intrusion?

2.5.7. Missing Pipe Below the Spring Line?

Is the missing pipe below the spring line?

2.5.8. Is There Infiltration?

Is there infiltration?

2.5.9. Are There #4 Roots or Greater at Missing Pipe Area?

As defined in the **TVI Manual** Section 204.9. Under the Television Inspections, General Observation Codes, roots are rated on a scale of 1 to 9, representing the relative portion of the pipe's cross-sectional area that is blocked by the roots.

Roots that grow wider into the missing pipe area can worsen the defective area or the structural condition.

2.5.10. BPX Stable?

Stable, for this policy's purpose, is defined as not easily moved or disturbed and resistant to displacement. A PM cleaning activity will not disturb the broken pipe. Stable also assumes that the broken pipe is above the spring line, has no evidence of infiltration occurring and may have smaller than #4 roots.

Does the broken pipe appear to be stable?

2.6. Is XPX?

Is there collapsed pipe, as described in **TVI Manual** Section 204.4?

If the answer is yes, then go to Part 2c

3.0. Write TVI Work Order

Another TVI will need to be performed to compare with the first TVI to monitor if there are any changes to the current condition of the defect. The Engineering Pipeline Support Group will write a new TVI WO to occur 5 years after the previous TVI was performed. This future TVI will be used to determine the area of concern (cracked or missing pipe area) has changed in severity

Note: When the new TVI is completed, it will be reviewed and evaluated from the start of the assessment cycle.

4.0. Write Work Order to Evaluate

The Engineering Pipeline Support Group will write a BCE WO to evaluate the problem

BCE or Repair?

Can the problem be addressed through the Repair Decision Flowchart (RDF), or does the problem have extenuating circumstances requiring a BCE to be further evaluated through the Generic BCE Process, with manager approval?

The Engineering Pipeline Support Group performs an initial evaluation when they receive the WO to evaluate a problem. This is a preliminary check for significant or extenuating circumstances requiring a BCE to be performed versus using the RDF Part 4 to fix the defect. Some examples of significant or extenuating circumstances may be the location of the pipe where it may not be feasible for a dig and replace repair method due to existing structures above the pipe; or if there are surrounding sensitive areas, such as schools or hospitals, where a dig and replace repair may not be economical or feasible; or there is not sufficient space to perform a repair.

Should any extenuating circumstances exist such that the Engineering Pipeline Support Group feels that a repair from the RDF Part 4 is not the best solution, the BCE Decisions unit will present the problem to the Engineering Pipeline Support Group Manager and request approval to analyze the problem through the **Generic BCE Process**.

The Engineering Pipeline Support Group will use this policy's RDF Part 4 to address the defective main line if no extenuating circumstances exist that would require further evaluation through the **Generic BCE Process**.

The RDF prescribes three repair alternatives, depending on the condition of the defective main line; dig and replace (D&R), Cured in Place Pipe (CIPP), and a grout and CIPP method. The BCE Decision Unit will follow the RDF to repair the defective pipe.

5.0. Is Repair an Emergency?

In some instances, the defective area of the main line is stable (not easily moved or disturbed and resistant to displacement) and does not cause an immediate threat to the flow through the system, despite the apparent severity of the condition of the pipe. In other instances, the severity of the pipe condition is causing a blockage or has the potential to cause a blockage in the ML, which can cause a spill. This would be considered an emergency situation.

Is the defect condition severe enough that it is considered an emergency and needs to be repaired as soon as possible?

6.0. Contact the M&O Pipelines Manager

The Engineering Pipeline Support Group reviewing the ML TVI will contact the appropriate Maintenance and Operations (M&O) Pipelines Manager to alert for the need for an emergency repair.

7.0. Perform Emergency Repair

The M&O Pipelines Manager will assign **SacSewer** crews to perform the emergency repair.

End of Process for Part 2

Part 3 - Preventive Maintenance

Part 3 assesses the main line to adjust the PM interval, change the job plan, initiate a PM schedule (if the stoppage interval is greater than 12 months), or initiate the BCE process (if the stoppage interval is less than or equal to 12 months).

SacSewer uses 3, 6, 12, 18, 24, 36, 48, 60, or 96 month PM frequencies for main lines. PM frequencies outside this approved list would require supervisor approval

3.1. Is the ML on PM?

If the ML is not on a PM, check its history for previous stoppages.

3.1.1. Is ML on the correct Job Plan?

If the ML is on a PM, check if it is on the correct job plan.

3.1.2. Change Job Plan

If the ML is not on the correct job plan, then change the job plan.

3.1.3. Is ML on Correct PM Frequency?

If the ML is on the correct frequency, then document and end.

3.1.4. Increase to next higher frequency

If the ML frequency is not sufficient, then increase it to the next higher frequency (Initiate the BCE process if the next higher frequency is less than 3 months).

3.2. Previous Stoppages?

If a previous stoppage, go to step 3.3.

3.2.1 Put the ML on a PM

3.3. Evaluate ML history for stoppages interval

Determine the PM frequency (with the frequency less than the stoppage interval or estimated interval).

If the stoppage interval is less than 12 months then a BCE is required by Engineering Pipeline Support group.

3.3.1. BCE

If the stoppage interval is less than 12 months, then a BCE is required by the Engineering Pipeline Support group.

The BCE may result in a repair, replace, or lining/grouting work order or a service request (SR) to put the ML on a decided PM frequency.

3.4. Put ML on PM

If the stoppage interval is equal to or greater than 12 months, then put the ML on the PM schedule.

End of Process for Part 3

Part 4 - Repair Decision

The Repair Decision Flowchart Part 4 outlines the decisions that prescribe the proper repair for defects covered under this Policy. This part of the Policy is used by the BCE Decisions Unit to determine the respective repair to specific defects outlined in this policy.

4.0. Repair Decision Flowchart

The BCE will determine the repair method using flowchart Part 4 – Repair Decision Flowchart of this Policy.

4.1. Is Pipe Flagged for Rehab/Relief Project?

Is pipe flagged for a rehab or relief project? The Engineering Pipeline Support Group will check with the Contracted M&O Work unit if there are any current or upcoming rehabilitation or relief projects under which this work may be performed.

4.1.1. Will Project Replace Line before Repair Target Date?

The BCE Decision Unit will confirm with the Contracted M&O Work unit if the work can be completed before the target date.

Will the project replace the main line before the repair target date?

4.1.2. Coordinate With Contracted M&O Work unit for Project

The Contracted M&O Work unit will be the Project Manager for the repair work. The Engineering Pipeline Support Group will coordinate with the Project Manager to include this main line repair work under a rehab/relief project.

4.2. Is Pipe Too Uneven for CIPP Patch?

The defective area of the main line may have cracked or broken pipe edges or pieces that may be oriented such that it may be too severe and uneven for a CIPP patch repair. The preferred alternative is a dig and replace method of repairing the defective main line.

Is the pipe too uneven for CIPP patch?

4.2.1. Are There Visible Voids Around the Pipe?

Voids detected from the TVI around the pipe would need to be grouted to minimize the risk of loss of support around the main line and other possible structural damage.

Are there visible voids around the pipe?

4.2.2. Is CIPP Patch Cost 15% Less Than Dig and Replace Cost?

The Engineering Pipeline Support Group prepares cost estimates to compare and decide on the most economical alternative to repair the defective main line. The CIPP cost criteria of less than 15% of the dig and replace repair method is to account for additional risks associated with CIPP, future maintenance, and potential unseen outside voids. The BCE Decision Unit consults with the Contracted M&O Work unit for the latest costs to use for the BCE. Three cost estimates typically used are:

- CIPP Patch Repair
- Grout & CIPP Patch Repair
- Dig & Replace (D&R)

These estimates allow the Engineering Pipelines Support Group to make the most cost-effective decision by comparing the costs of the common methods of repairing the defective main line.

Is CIPP Patch Cost 15% Less Than Dig and Replace Cost?

4.2.3. Write WO For CIPP Patch

The Engineering Pipeline Support Group will write a WO for the CIPP patch repair. The BCE Decision group can directly assign this work to the Contracted M&O Work unit.

4.2.4. Is Grout & CIPP Patch Repair Cost 15% Less Than Dig and Replace Cost?

Since there are visible voids and the pipe is still smooth enough for a CIPP repair, a Grout & CIPP Patch repair may be used, depending on the cost comparison to a D&R repair.

Is the grout & CIPP patch repair cost 15% less than the dig and replace cost?

4.2.5. Write Work Order for Grout and CIPP Patch Repair

The Engineering Pipeline Support Group will write a WO for a grout and CIPP repair.

4.3. Write WO for D&R

The Engineering Pipeline Support Group will write a WO for D&R repair.

4.3.1 Can M&O Perform the Work?

The Engineering Pipeline Support Group will check with the Linear Repair Group to see if their schedule can accommodate the work or if they have the proper equipment to handle the job.

The Engineering Pipeline Support Group will assign the work order to the Linear Repair Group if they can perform the work.

Can M&O perform the work?

4.3.2 Perform the Dig and Replace Repair

The M&O Workload Planning & Scheduling Group will schedule the work for the M&O Repair and Maintenance Group to perform the work.

4.3.3. Assign Work Order to Contracted M&O Work unit

The Engineering Pipeline Support Group or the M&O Repair and Maintenance Group will assign the work order to the Contracted M&O Work Unit . The BCE Decision Unit will arrange a meeting to discuss with the Contracted M&O Work unit the problem found and the recommended repair.

5.0. Complete Project

The Contracted M&O Work unit will be responsible for completing the repair project and any necessary documentation.

6.0. Perform Repair through Contractor

The Engineering Pipeline Support Group will coordinate the recommended repair through the use of contractors. The Contracted M&O Work unit will be responsible for completing any necessary documentation. *End of Process for Part 4*

304.4. Pipe Defects Covered in This Policy

Defect Codes

This policy covers ML defects. For a full list of defect codes and their definitions, refer to the **TVI Manual**, Section 204 Pipe Observations. This Section of the **TVI Manual** has a photo chart to show examples of severity levels of the various pipe defects, ranging from light (L) to moderate (M) to severe (S).

Multiple Defects

The **TVI Manual** does not define cracked, broken, missing, or collapsed pipe with multiple defects with a specific code. For the sake of this Policy, multiple defects are defined when a ML has two or more defects located more than 10 feet from each other. This applies to all defects defined in this Policy except the lightly cracked pipe (CPL). Defects include offset joints – medium and severe (OJM and OJS, respectively), tap defects (TD), corrosion (CR), and other defects (OTH X). The **TVI Manual** Section 202.11 does not have a specific code for liner defects like missing sections or bulging liners. Main lines with multiple defects defined in this policy are not covered under this policy.

Examples:

- If a main line has more than one instance of CPL throughout the pipe, regardless of distance between cracks, it will be treated as one continuous defect, CPL, as policy decisions are concerned.
- If a main line has CPL, and one other policy defect is found, it is not considered multiple defects, as CPL is disregarded and the more serious defect is addressed by this policy.
- A main line with OJS and BPX located more than 10 feet from each other is considered a multiple defect.
- If a main line has OJS and CPL, technically, it is not multiple defects, as CPL would be disregarded, and OJS would be the main defect to address. However, OJS would not be covered under this policy.

These are not exclusive cases, but some common cases to help illustrate the definition of multiple defects, and how the CPL exception affects classifying defects for this policy.

Continuous Defects

To clarify the difference between multiple vs. continuous defects in this Policy, continuous defects are two or more cracked, broken, missing, or collapse defects within 10 feet of each other and shall be treated as one defect, rather than a multiple defect. Continuous defects will be treated as one defect for the sake

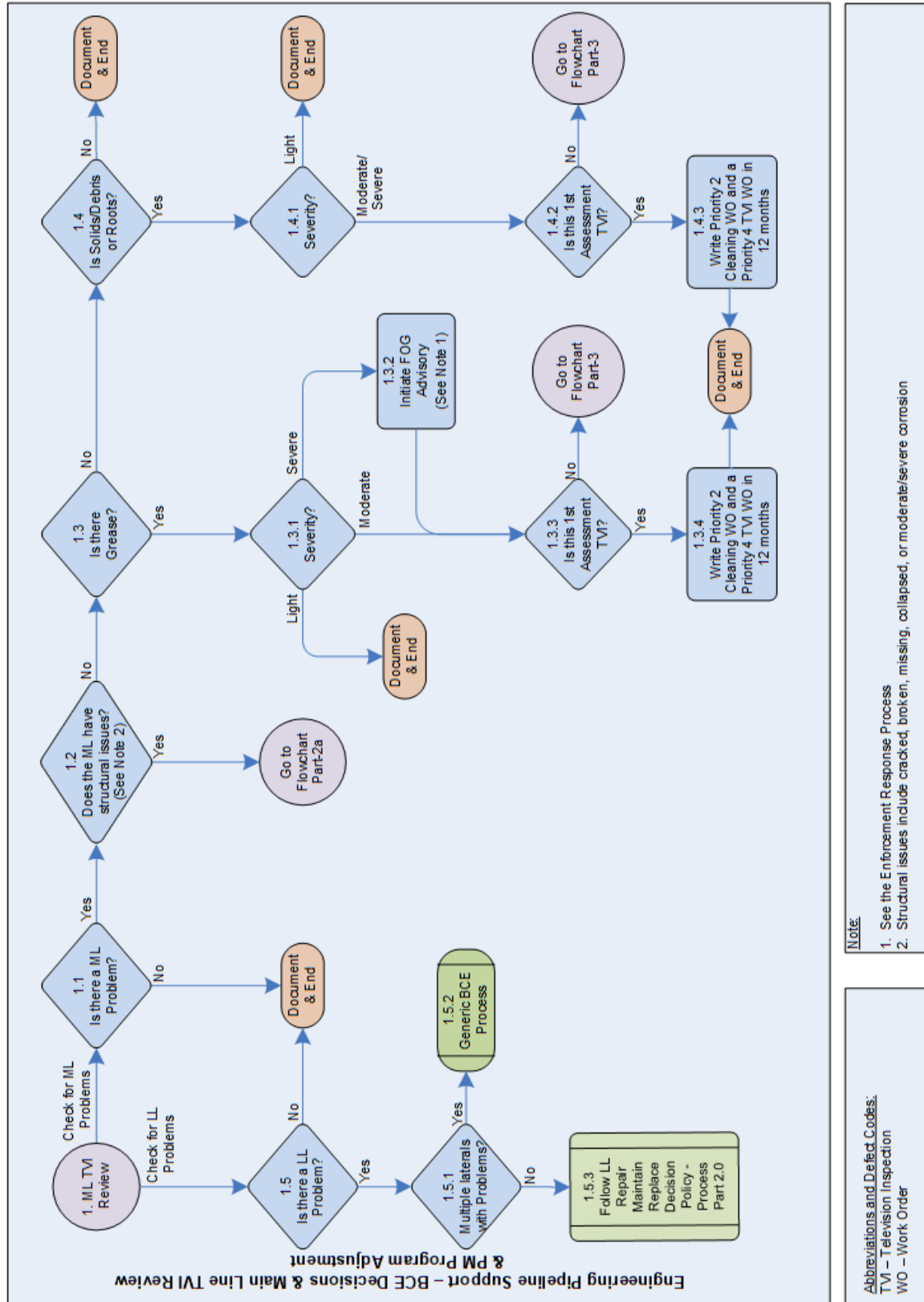
of this Policy. Use the most severe condition of a continuous defect when assessing the pipe through this Policy.

An exception to the within 10 feet rule is CPL. For example: If a ML has more than one instance of CPL throughout the pipe, regardless of the distance between cracks, it will be treated as one defect, CPL, as policy decisions are concerned. CPL is excluded since there is a high occurrence of light cracks throughout the system and typically poses an insignificant threat to the system's operation.

304.5. Effectiveness Measure

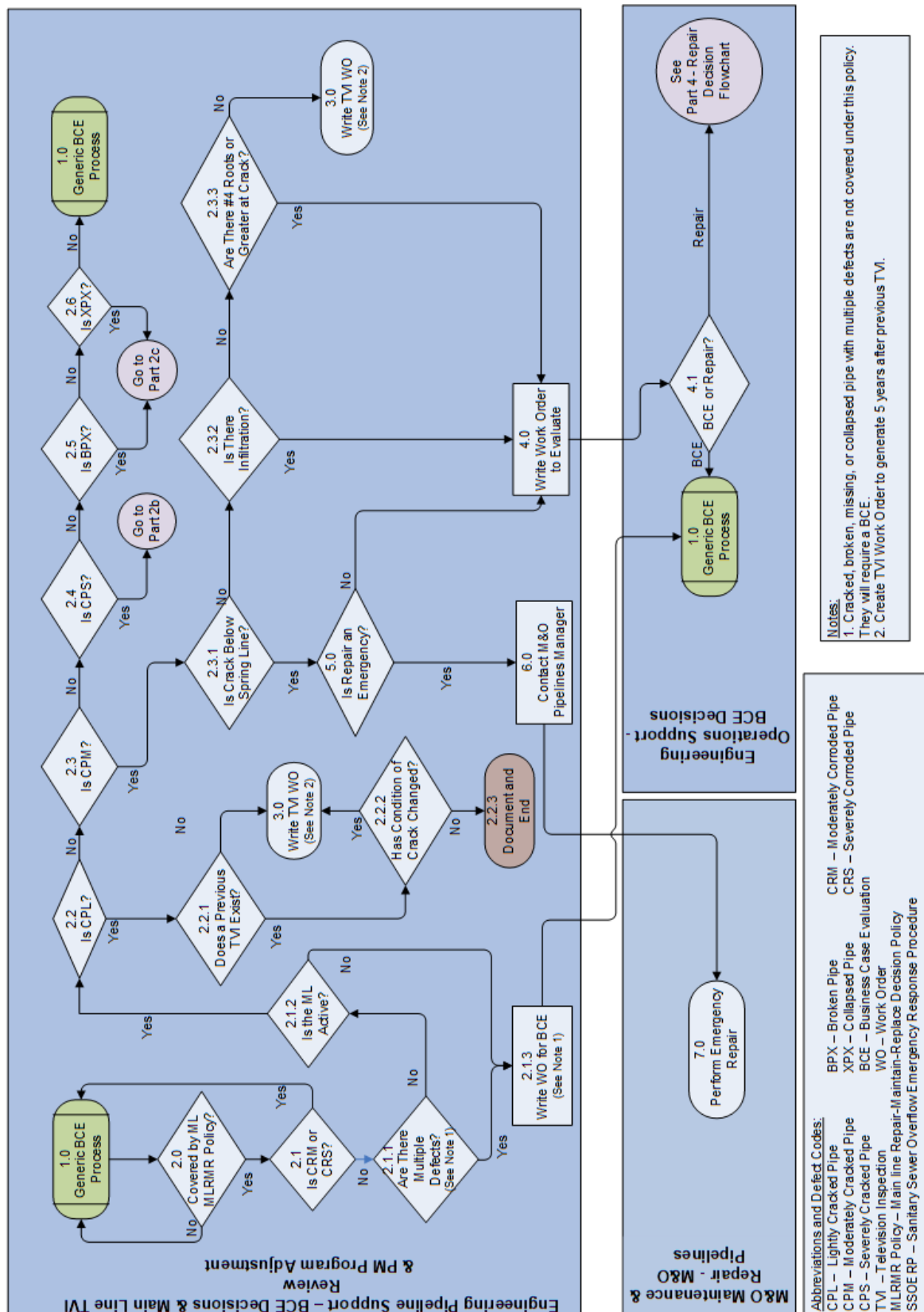
This policy reflects the most effective solutions to various main line problems. The effectiveness of this policy will be measured by the cost and effectiveness of addressing main line problems discovered in the field and through the main line TVIs review.

304.6. TVI Observed Problems Flowchart

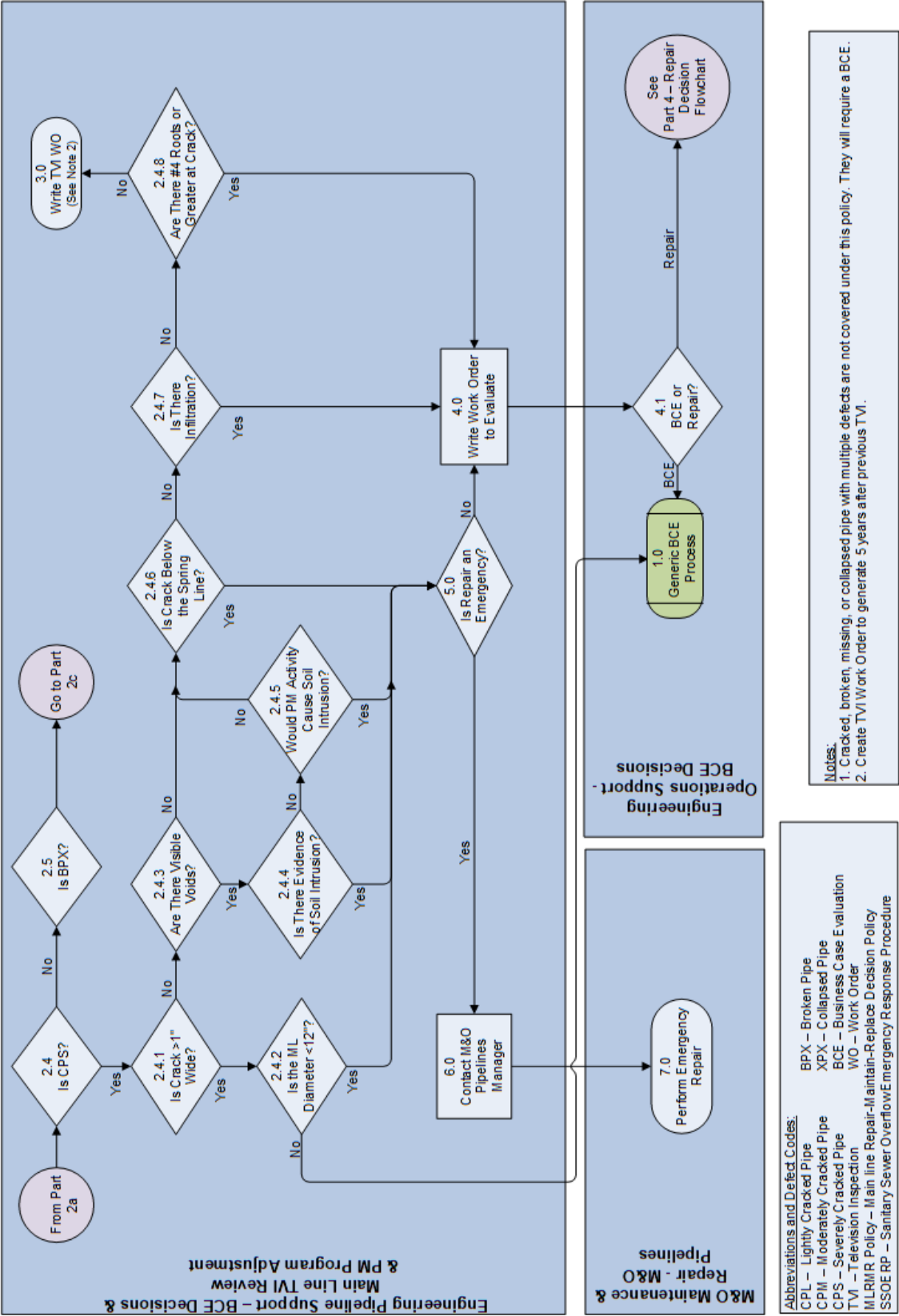


304.7 Cracked, Broken, Missing, and Collapsed Pipe Flowcharts

Main Line Repair-Maintain-Replace Decision Policy Part 2a - Cracked, Broken, Missing, and Corroded Pipe Assessment

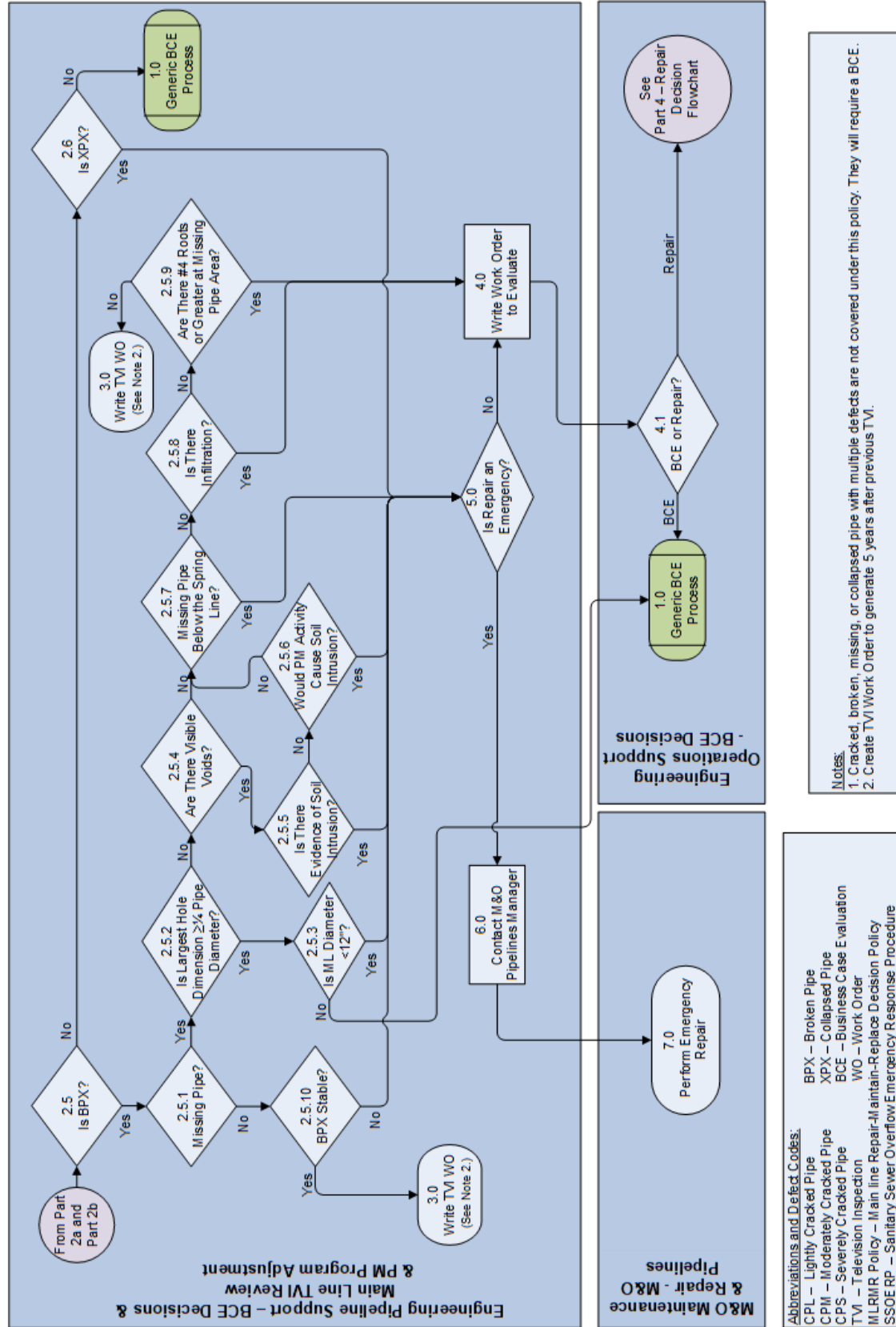


Main Line Repair-Maintain-Replace Decision Policy
Part 2b - Cracked, Broken, Missing, Collapsed, and Corroded Pipe Assessment



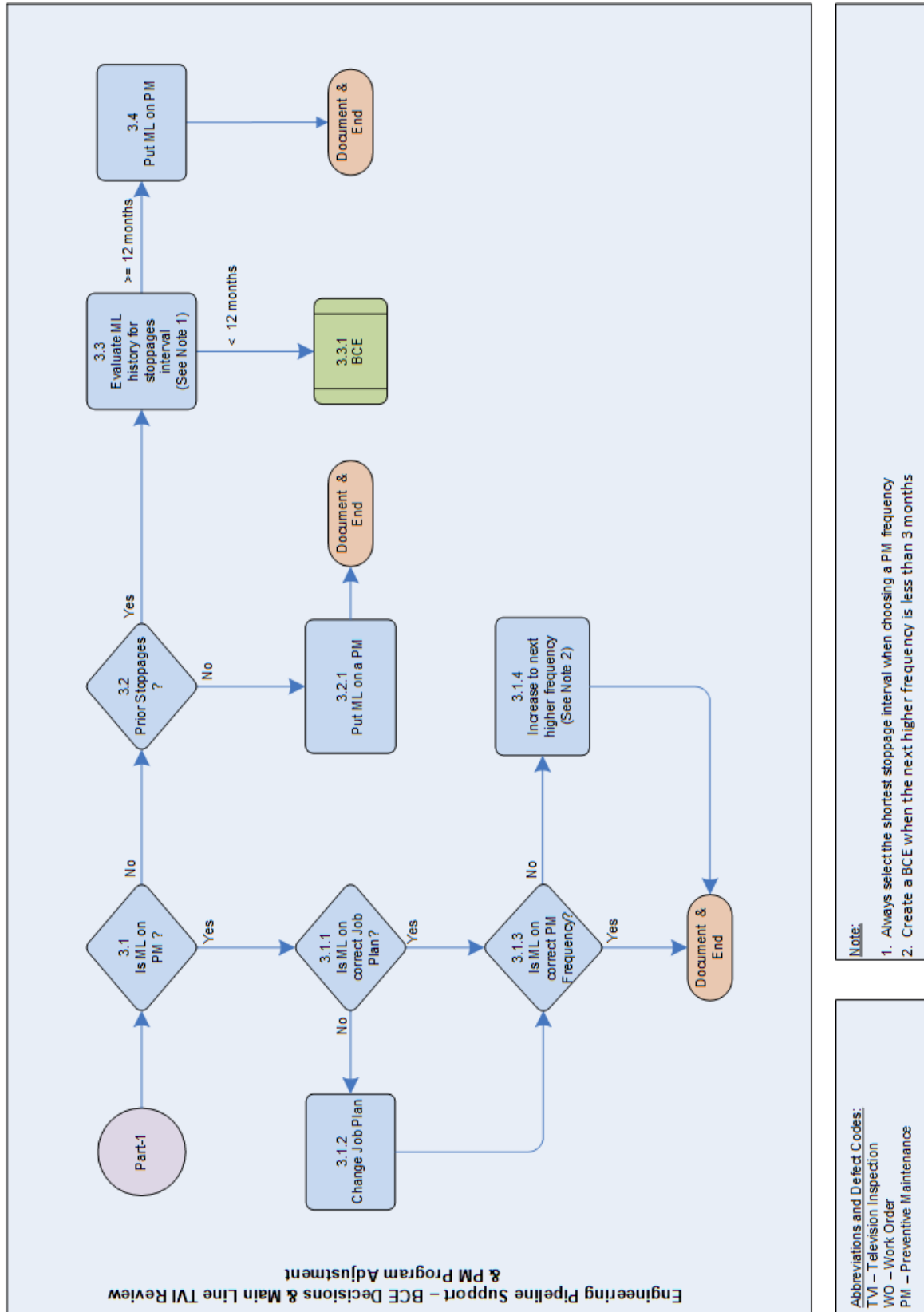
Main Line Repair-Maintain-Replace Decision Policy

Part 2c - Cracked, Broken, Missing, Collapsed, and Corroded Pipe Assessment

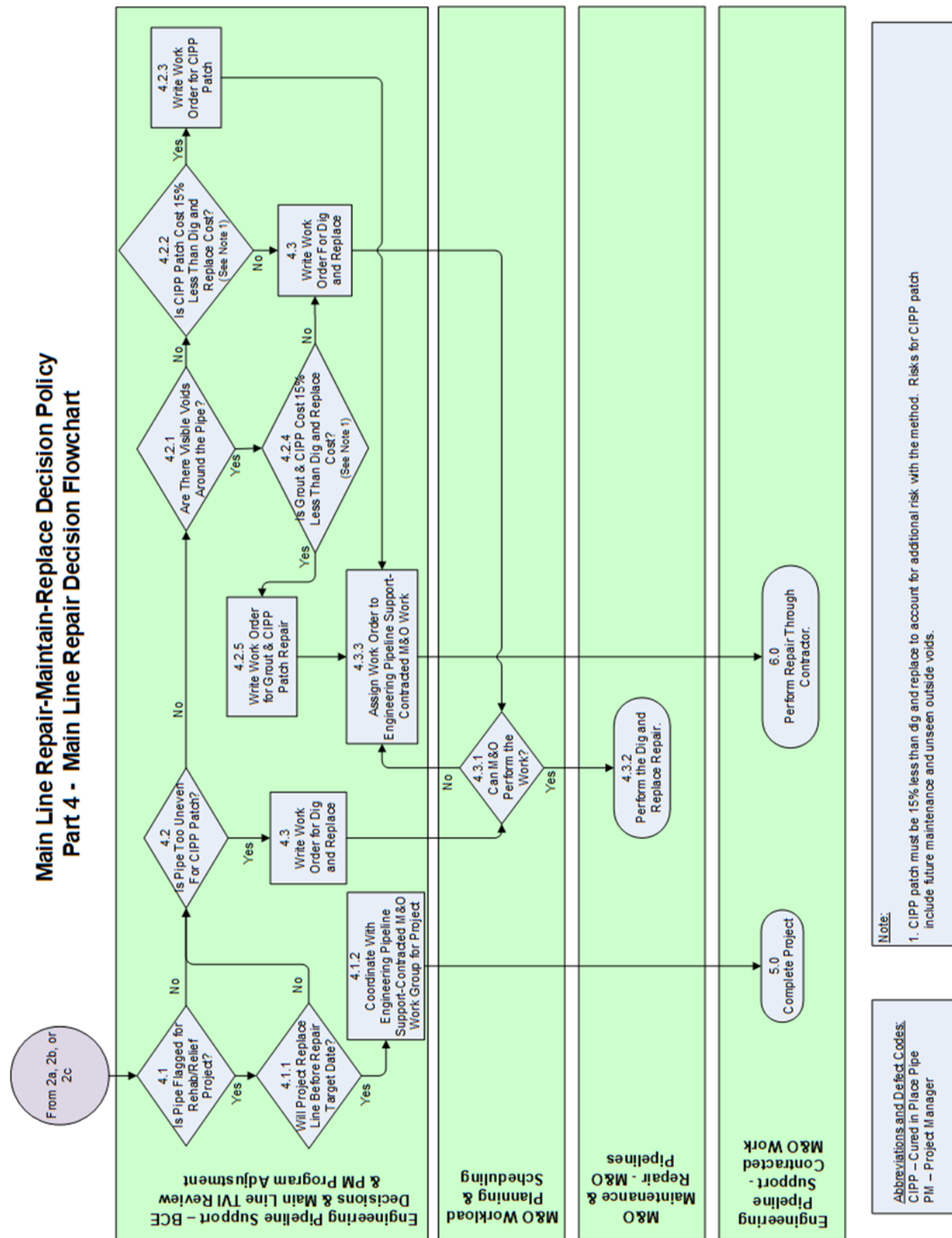


304.8.Preventive Maintenance Flowchart

Main Line Repair-Maintain-Replace Decision Policy Part 3 - Preventive Maintenance



304.9 Repair Decision Flowchart



305 Lower Lateral Repair-Maintain-Replace Decision Policy

305.1. Purpose

The purpose of the **Lower Lateral Repair-Maintain-Replace Decision Policy** is to document decision-making for problems observed in lower laterals (LLs).

305.2. Background

It is the policy of the Sacramento Area Sewer District (**SacSewer**) to identify and implement cost-effective solutions for maintaining its assets. In August of 2005, **SacSewer** Asset Management Section began performing business case evaluations (BCEs) to address problems with **SacSewer**'s assets, including LL sewer service lines. LLs were previously referred to as "service lines" or "SLs". BCEs provide a cost-based comparison between various alternatives proposed for resolving identified LL problems. These alternatives typically include status quo, re-evaluate at a future date, add or change a maintenance schedule, and perform a repair or replacement. The analysis conducted in numerous LL BCEs has provided cost and solution efficacy data that has been used to develop the following processes and procedures.

Any spill response that may have resulted from any one of the defects outlined in this Policy is governed by the **SacSewer Spill Emergency Response Plan Manual**.

305.3. Process

Part 1 – Sunken Area, Void, and Cleanout Check

1.0. Start Part 1 - Sunken Area, Void, and Cleanout Check

See Process Flowchart Part 1 – Sunken Area, Void, and Cleanout Check

1.1. Is there a connection downstream of the Cleanout (CO)/Easement?

If there is a connection downstream of the CO/easement then a BCE is required.

1.2. BCE

Write a BCE Work order (WO). No other WOs or SRs shall be written.

Note for BCE staff:

Was there an **SacSewer** WO that required street excavation (via a repair or replace WO) since April 10, 2002? **SacSewer** must warranty all excavation repairs in County streets after April 10, 2002. The warranty will remain in effect for each excavation until such time as the affected street is completely resurfaced with a structural overlay. For more information regarding **SacSewer**'s responsibility and pavement warranty, see the Agreement with Sacramento County Department of Transportation for Pavement Life Performance Warranty (approved by **SacSewer**'s Board of Directors on April 10, 2002).

1.3. Is the Televised Inspection (TVI) Complete?

1.4. Sunken Area or Voids?

This question usually stems from a service request (SR) via a service call, where M&O staff will verify if there is a sunken area or voids and its location.

1.5. LL Problem Causing Sunken Area or Voids?

Such problems are generally structural defects, which create voids for soil above the pipe to cave in, thus causing a sunken area at ground level. These types of defects will generally require a dig and repair.

1.6. LL Location?

Is the LL located in the street or the easement?

1.7. Was there a WO to Repair LL in Last Year?

Has there been a **SacSewer** WO to repair or replace the LL that required digging in the last year? **SacSewer** contractors warranty their repair work for one year after the repair.

1.8. Write a Repair/Restoration WO

Write a repair or restoration WO to repair the LL, and thus the sunken area. Depending on the length and location of the sunken area, a full line replacement may be the cost-effective solution. Discuss this decision with your supervisor, and if necessary, create a BCE.

1.9. SacSewer CO Present?

An **SacSewer** CO is a single direction cleanout located within the **SacSewer** easement or Right of Way.

1.10. CO or Riser Problem?

Is there a problem with the CO or riser (i.e., poor grade, broken pipe, CO high or CO low, broken or missing sewer relief valve (SRV) or Carson box, etc.)?

1.11. Are there any other problems in the LL?

If there are other problems in the LL then follow Part 2 - TVI Observed Problems.

1.12. Write a WO to Fix CO and TVI after or Fix Riser Problem

Write a WO to repair CO or Riser only if no other structural problems exist in the LL. A structural problem is considered to be any of the following: broken pipe, collapsed pipe, Orangeburg pipe, moderate or severe cracked pipe, severe offset joint, severe swale, and moderate or severe oval pipe.

1.13. LL Location?

Is the LL located in the street or the easement?

1.14. Depth ≥ 16 feet or Horizontal Length > 10 feet?

Horizontal length is measured from the bottom of the wye to the bend to the main.

1.15. BCE

Write a BCE WO. No other WOs or SRs shall be written. See section 1.2 of this Policy for additional information.

1.16. Write a WOs to Replace LL and TVI after

Write the necessary WOs and SRs based on your supervisor's recommendation. Follow the **TVI Policy** and write a quality control TVI WO to TVI LL after replacement work is completed to verify that the quality of work performed is acceptable.

1.17. Are there any other problems in the LL?

If there are other problems in the LL then follow Part 2 - TVI Observed Problems.

1.18. Write a WO to Install an SacSewer CO and TVI after

Write a WO to install an **SacSewer** CO if no other problem exists in the LL more than 8 feet from the bottom of the wye. Follow the **Televised Inspection Policy** and write a quality control TVI WO to TVI LL after repair work is completed to verify that the quality of work performed is acceptable.

1.19. Incomplete due to Method?

An alternate method, such as using string to guide the camera past an offset, or using a reverse set up from a node may be required to complete an inspection. In some cases, cleaning is needed to enable a complete inspection to be recorded.

1.20. Write a WO to Rework TVI**1.21. Cause of TVI Not Complete?**

If the TVI is incomplete due to structural issue then go to Part 3.

1.22. Write WO to clean & TVI within the next 30 days

End Process for Part 1

Part 2 – TVI Observed Problems**2.0. Start Part 2 – TVI Observed Problems**

See Process Flowchart Part 2 - TVI Observed Problems

2.1. LL Problems

This section describes the process if there are defects or problems found in the LL through the TVI. This section also addresses any main line (ML) problems found through the LL TVI.

2.1.1. Is there a ML Problem?

Is there a ML problem that can be seen from the LL TVI? A ML problem could potentially cause a problem in the LL.

If the ML flow is stagnant or slow draining, write a WO to clean the ML and notify the ML TVI and PM Adjust Supervisor for possible PM or PM adjustment for the ML. No BCE required for this ML problem.

2.1.2. Is the Tap defective?

If the tap is not defective then write a BCE WO.

2.1.3. BCE

Write a BCE WO. No other WOs or SRs shall be written. See section 1.2 of this Policy for additional information.

2.1.4. Is the Location in the Street and either a Cul-de-sac (CDS) or Intersection (INT)?

If the location is in the street in a CDS or INT then write a BCE WO.

2.1.5. Write WOs to Replace the Tap and TVI the LL after

If the location is not in the street, in a CDS, or INT, then write a WO to replace the Tap and TVI the LL after.

2.2. Problems at Multiple Footages

This section describes the process if multiple problems or defects are found through the LL TVI.

2.2.1. Two Structural Problems More Than Eight Feet Apart?

A structural problem is considered any of the following: broken pipe, collapsed pipe, Orangeburg pipe, moderate or severe cracked pipe, moderate or severe offset joint, severe swale, and moderate or severe oval pipe. When there are two structural problems less than eight feet apart, they are considered one problem.

2.2.2. One Structural Problem?

Is there only one structural problem?

- 2.2.3. Is There a Need for Maintenance?**
In addition to one structural problem, is there also a need to maintain the problem through scheduled preventive maintenance? A maintenance problem is considered any of the following: roots, grease, solids, and debris.
- 2.3. Offset Joint Severe (OJS), Moderate or Severe Oval Pipe (OVM) or (OVS)**
This section describes the process if an offset OJS, or OVM or OVS, is found through the LL TVI.
- 2.3.1. Can Maintenance Equipment Pass?**
Can maintenance equipment get past the OJS, OVM, or OVS? Can a cutter 2 inches smaller than the pipe diameter pass? If not, this becomes an emergency repair.
- 2.3.2. Did OJS, OVM, or OVS Cause a Stoppage or Cause a Maintenance Issue?**
If the OJS, OVM, or OVS Cause a Stoppage or Cause a Maintenance Issue then got to Process Part 3.
- 2.3.3. Create SR for Asset Alert noting OJS, OVM, or OVS**
Write an SR for an Asset Alert noting the OJS, OVM, or OVS and its footage. If an Asset Alert for that problem already exists, do not create another Asset Alert SR.
- 2.4. Broken, Collapsed, Moderate or Severe Cracked, Orangeburg Pipe, or Voids**
If the pipe is broken, collapsed pipe, moderate or severe cracked pipe, Orangeburg pipe, or voids surrounding the pipe are found through the LL TVI then go to Part 3.
- 2.5. Grease**
This section describes the process if grease is found through the LL TVI.
- 2.5.1. Severity?**
Is the grease severity Light, Moderate, or Severe?
- 2.5.2. Create SR to Initiate FOG Process and Create a Priority 2 TVI to be Performed in 12 Months**
Refer to the **Enforcement Response Process** for FOG advisory and enforcement process.
- 2.5.3. Has the LL been cleaned?**
If the LL has been cleaned then go to Part 3.
- 2.5.4. Write WOs to Clean and TVI in 12 months after Cleaning**
Write WOs to clean the LL and TVI the LL 12 months after the cleaning to evaluate the build-up of grease.
- 2.6. Swales, Reverse Grade, Solids, or Debris**
This section describes the process if swales, reverse grade, solids, or debris are found through the LL TVI.
- 2.6.1. Is the Camera Underwater?**
Is the camera underwater, preventing a complete review of the condition of the LL?
- 2.6.2. Is the Tap Location MH and LL diameter ≥ 6 inches?**
A BCE is required if the tap location is not a MH and the LL diameter is less than 6 in.
- 2.6.3. BCE**
Write a BCE WO. No other WOs or SRs shall be written. See section 1.2 of this Policy for additional information.

2.6.4. Write WO to TVI from MH with ML camera.**2.7. Roots**

This section describes the process if roots are found through the LL TVI.

2.7.1. Roots in the Upper Lateral (UL)?**2.7.2. Initiate UL Root Process**

Refer to the Enforcement Response Process and the Upper Lateral Root Process.

2.7.3. Is LL problem Due to a ML Problem?

If the ML flow is stagnant or slow draining, write a WO to clean the ML and notify the ML TVI and PM Adjust Supervisor for possible PM or PM adjustment for the ML. No BCE required for this ML problem. All other ML problems should go to BCE.

2.7.4. BCE

Write a BCE WO. No other WOs or SRs shall be written. See section 1.2 of this Policy for additional information...

2.7.5. Cleaned in the last 5 years?

Has the LL been cleaned in the last 5 years?

2.7.6. Severity?

Is the defect severity either Severe or Light/Moderate?

2.7.7. Write WOs to clean and TVI 12 months after Cleaning**2.7.8. Cleaned After Current TVI?**

Was the LL cleaned through or after the current LL TVI?

2.7.9. Write WO to Clean LL

Write a WO to hydro clean the LL. Follow the **TVI Policy** and write a quality control TVI WO to TVI LL after cleaning is completed to verify that the quality of work performed is acceptable.

2.7.10. TVI in 1 Year

Write a WO to TVI the LL in 1 year.

2.7.11. BCE

Write a BCE WO. No other WOs or SRs shall be written. See section 1.2 of this Policy for additional information.

End Process for Part 2

Part 3 – Preventive Maintenance and Repair Decisions**3.0. Start Part 3 – Preventive Maintenance (PM) and Repair Decisions**

See Process Flowchart Part 3 – Preventive Maintenance and Repair Decisions

3.1. Determine PM Frequency

Determine the preventive maintenance (PM) frequency (with the frequency less than the stoppage interval or estimated interval) or decide if the LL cannot be maintained.

SacSewer uses 12, 18, 24, 36, 48, or 60 month PM frequencies. PM frequencies greater than 48 months would need supervisor approval.

The highest frequency for LLs located in easements is 36 months.

The highest frequency for LLs located in the street is 12 months.

PM frequencies higher than 36 or 12 months for LLs located in easements or streets, respectively, are considered on a case-by-case basis through a BCE by the Engineering Operations Support group.

A LL cannot be maintained if it has one of the following defects: broken pipe, collapsed pipe, Orangeburg pipe, moderate or severe cracked pipe, severe offset joint, and moderate or severe oval pipe.

3.2. Schedule or Adjust PM

Schedule or adjust the PM that was determined in step 3.1 of this Policy. Write an SR to request that the LL be put on the appropriate PM schedule, or to request to adjust the existing PM schedule to a different, more appropriate frequency.

3.3. LL Location?

Is the LL located in the street or the easement?

3.4. Are All Defects Located Between CO and Edge of Asphalt?

If any part of the defect is located in the street, then the answer to this question is no.

3.5. Write WOs to Repair Defects to Edge of Asphalt and a TVI after

Follow the TVI Policy and write a quality control TVI WO to TVI LL after work is completed to verify that the quality of repair work performed is acceptable.

3.6. Determine PM Frequency

Determine the PM frequency (with the frequency less than the stoppage interval or estimated interval) or decide if the LL cannot be maintained.

The frequency limit for LLs located in the street is 12 months. The decision to put a LL on a PM frequency higher than 12 months can only be made by the Engineering Operations Support Group, after evaluating the LL problem through a BCE.

A LL cannot be maintained if it has one of the following defects: broken pipe, collapsed pipe, Orangeburg pipe, moderate or severe cracked pipe, severe offset joint, and moderate or severe oval pipe.

3.7. Horizontal Length Required to Repair LL

Determine the horizontal length required to repair the LL that would eliminate the defects, and thus the need for a PM. Assume that the horizontal length of pipe to repair one defect is four feet.

Example 1. There are two joints that have roots, one at 15 ft. and the other at 30 ft. from the CO. The roots are growing at a rate that requires either a 12, 18 or 24 months PM. The total horizontal length required to repair both joints would be 8 feet because each defect requires 4 ft. of pipe removal. Thus, the decision would be to schedule a PM.

Example 2. There are two joints that have roots, one at 17 ft. and the other at 22 ft. from the CO. The roots are growing at a rate that requires either a 12, 18, or 24 months PM. The total horizontal length required to repair both joints would be 5 feet, then go to step 3.8 to further evaluate for location of LL.

3.8. Is LL Location a CDS or Intersection INT?

A BCE is required if the LL is in a CDS or INT.

3.9. BCE

Write a BCE WO. No other WOs or SRs shall be written. See section 1.2 of this Policy for additional information.

3.10. Depth Required to Repair LL?

If the deepest portion of the LL required for repair is equal or more than 16 feet deep then a BCE is required.

3.11. Write WOs to Spot Repair LL And a TVI after

Only write this WO if all structural and/or maintenance problems in the LL will be resolved with this repair. Follow the **TVI Policy** and write a quality control TVI WO to TVI LL after work is completed to verify that the quality of repair work performed is acceptable.

3.12. Schedule or Adjust PM

Schedule or adjust the PM that was determined in step 3.6 of this Process. Write a SR to request that the LL be put on the appropriate PM schedule, or to request an adjustment to the PM schedule to a different, more appropriate frequency.

End Process for Part 3

Part 4 - Replace vs. Lining Decisions**4.0. Start Part 4 – Replace vs. Lining Decisions**

See Process Flowchart Part 4 – Replace vs. Lining Decisions

4.1. LL Location?

Is the LL located in the street or the easement?

4.2. Are There Defects That Would Prevent Lining?

Refer to the Lining Training Guide for defects and other criteria that would prevent lining.

4.3. Is LL Location CDS or INT?

A BCE is required if the LL is located in a CDS or INT.

4.4. BCE

Write a BCE WO. No other WOs or SRs shall be written. See section 1.2 of this Policy for additional information.

4.5. Is LL Connected to MH?

A BCE is required if the LL is connected to a MH.

4.6. Depth of LL?

Is the tap depth <16 feet or ≥16 feet?

4.7. Is the ML Tap Defective?

Is the ML tap defective? ML tap defects include hammer, core, tee, severely cracked, broken, missing.

4.8. Write WO to Replace ML Tap

Write a WO to replace the ML tap when the LL is scheduled to be replaced

4.9. Write Dig and Replace LL WO and TVI after**4.10. Write a WO to Line LL**

4.11. Are There Defects That Would Prevent Lining?

Refer to the Lining Training Guide for defects and other criteria that would prevent lining.

4.12. Depth of LL?

Is the tap depth <8 feet or ≥8 feet?

4.13 Is the ML Tap Defective?

Is the ML tap defective? ML tap defects include hammer, core, tee, severely cracked, broken, missing.

4.14 Write WO to Replace ML Tap

Write a WO to replace the ML tap when the LL is scheduled to be replaced

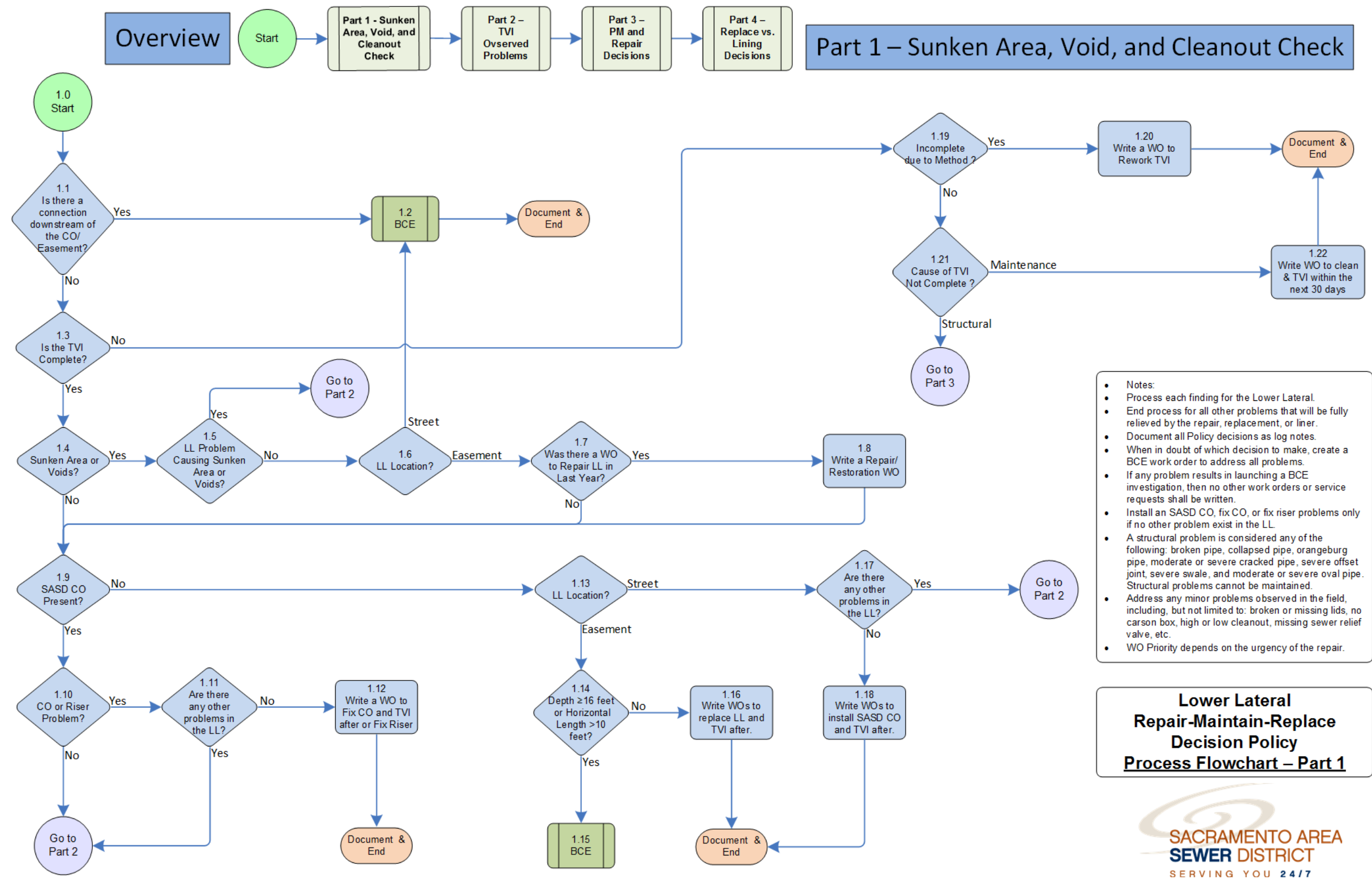
4.15 Write Dig and Replace LL WO and TVI after

End Process for Part 4

305.4. Effectiveness Measure

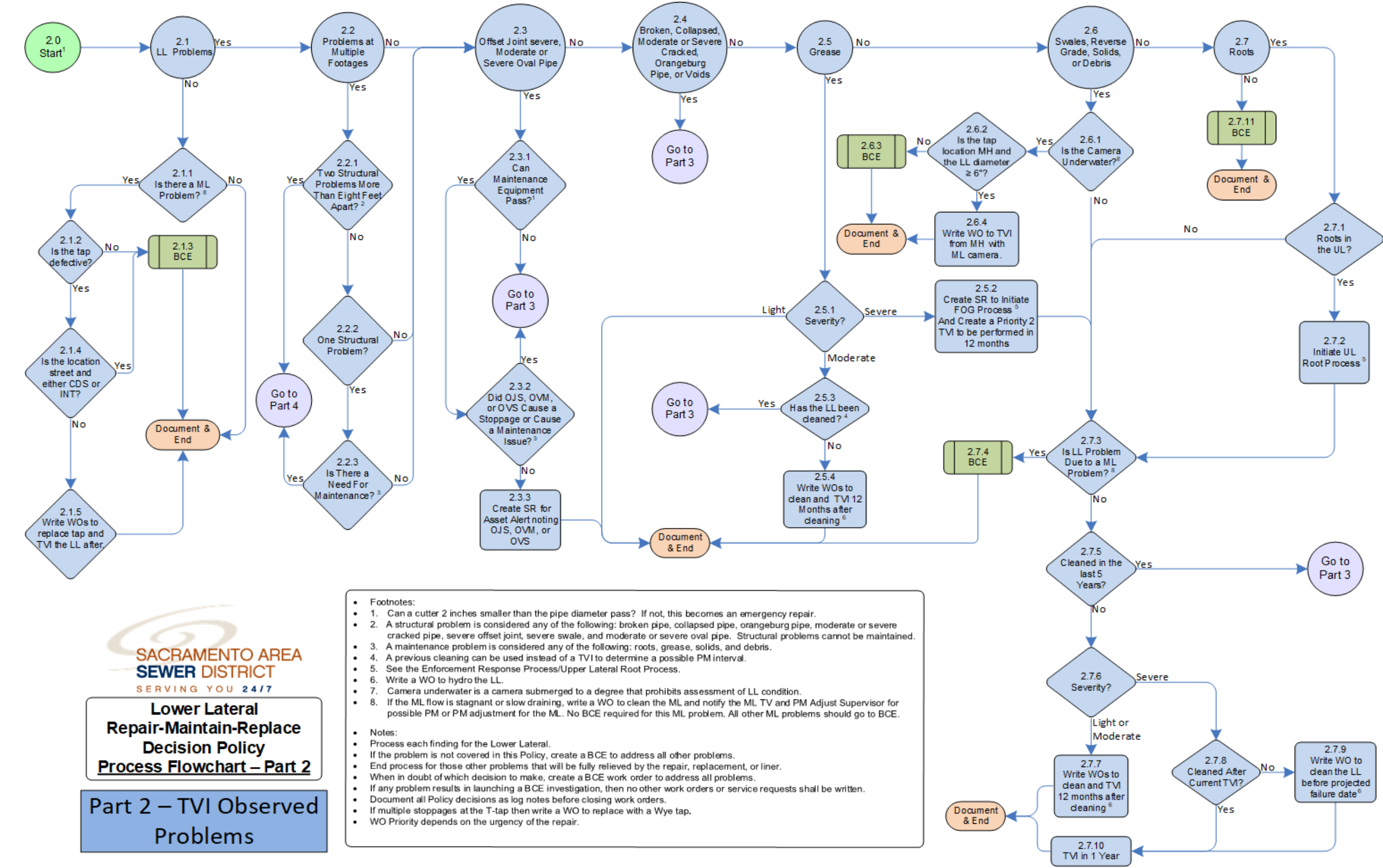
This Policy has been revised to reflect the most cost effective solutions to a variety of LL problems. The effectiveness of this Policy will continue to be measured by the cost and effectiveness of addressing routine LL problems discovered in the field and through LL TVI reviews.

305.5. Process Flowchart Part 1 – Sunken Area, Void, and Cleanout Check



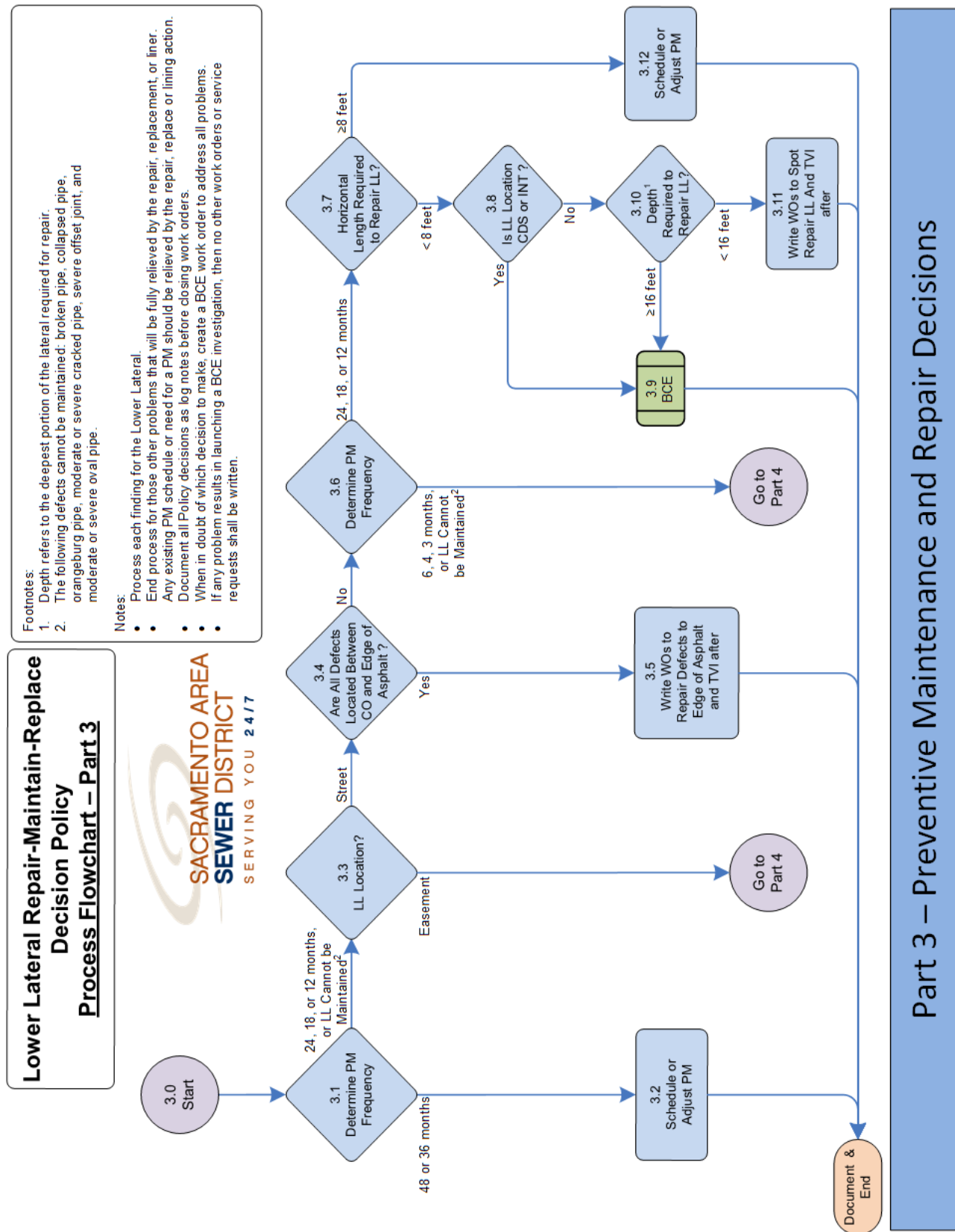
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305.6. Process Flowchart Part 2 – TVI Observed Problems

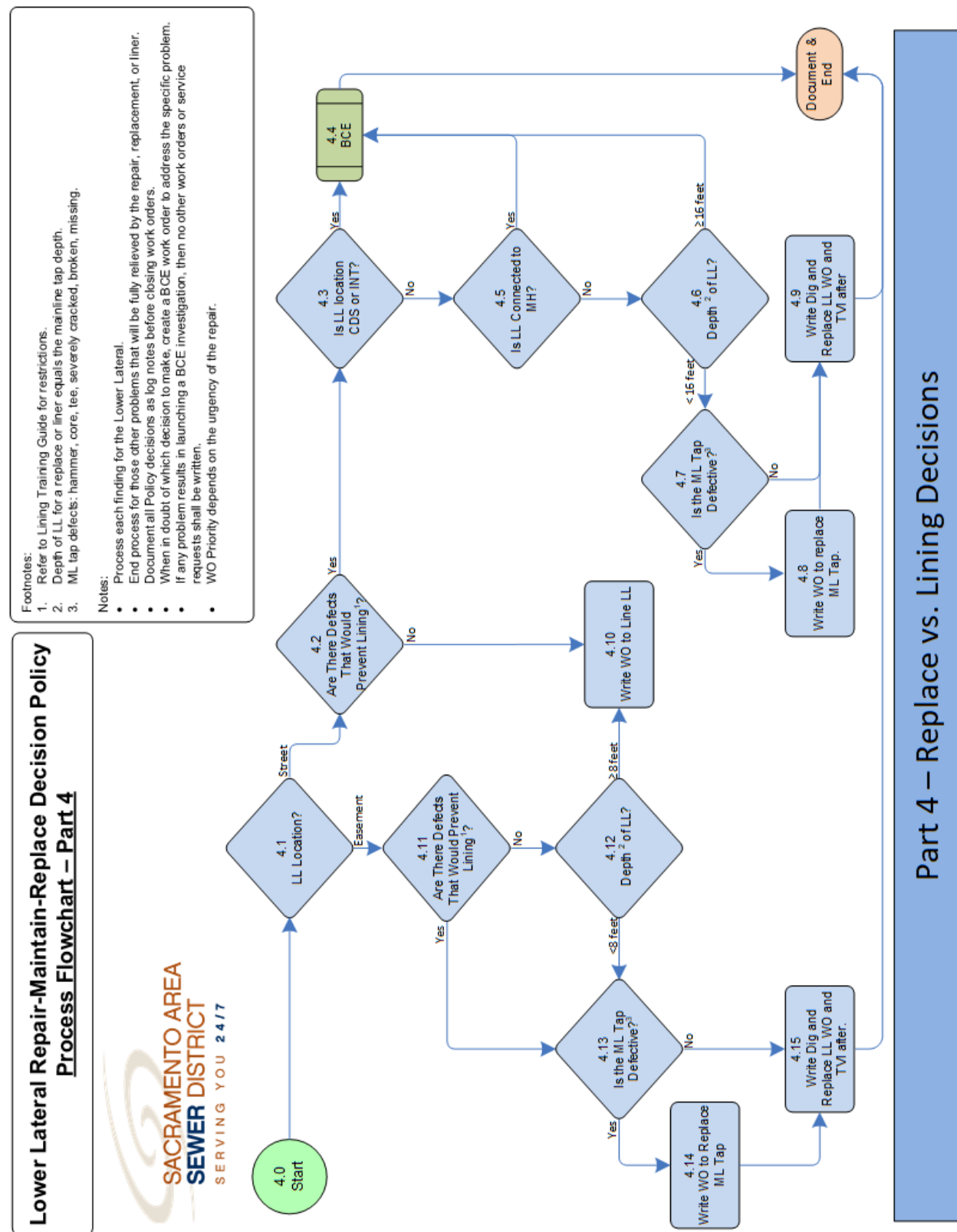


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305.7. Process Flowchart Part 3 – Preventive Maintenance and Repair Decisions



305.8. Process Flowchart Part 4 – Replace vs. Lining Decisions



306 Generic BCE Process

306.1. Purpose

The purpose of this document is to record the common process and procedure for conducting Business Case Evaluations (BCEs).

306.2. Background

State Water Resources Control Board Order No. 2006-0003-DWQ, **Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (WDR)** (May 2, 2006), requires the Sacramento Area Sewer District (**SacSewer**) to prepare a plan to be implemented to reduce spills. This plan is referred to as the **Sewer System Management Plan (SSMP)**.

This **Generic Business Case Evaluation Process (Generic BCE Process)** is directly referenced in the **SacSewer's** Board of Directors (Board) Approved **SSMP**. This **Generic BCE Process** is intended to cover the **WDR** requirements to efficiently manage, maintain, and operate **SacSewer's** sanitary sewer system, as well as provide guidelines for use in evaluating any other business case decisions through the use of BCEs.

306.3. Process

Flowchart 306.6 outlines the **Generic BCE Process**. The flowchart guides staff through the **Generic BCE Process** of the tasks and decisions generally conducted during BCE activities, which are described in the procedural narrative.

1.0 Initiation

Any **SacSewer** unit or management may identify any potential problem that requires BCE analysis and approval. These problems may include the following:

- Maintenance issues
- Operational issues
- Programmatic changes
- Design and Construction Activities
- Cost Improvement Strategies

2.0 Initial Problem Analysis

Potential problems that have been identified by any **SacSewer** unit are subject to review to determine the proper **SacSewer** unit(s) to solve the potential problem. Refer to Group Manager(s) to determine the proper resources to analyze the potential problem.

2.1 Review Problem

Review the problem statement presented. Determine if there is a valid problem to be addressed, and whether it is covered by a separate policy. Determine the assets involved, if applicable.

2.1.1 Is There a Problem?

The Engineering - Operations Support, BCE Decisions and Annual Workload Planning group (BCE Group) typically perform an initial evaluation of potential problems to decide how to approach the potential problem. The BCE Group evaluates potential problems to determine if there are existing policies to address the issue, including this Process, or if there is not a problem.

The BCE Group may determine that there is not a problem. For example, the Television Review & PM Program Adjustments group (TV Group) may have flagged a potential problem to be further evaluated by the BCE Group. The BCE Group may determine that there is not a problem, either the work order (WO) was created in error, the line may be inactive, it may be an emergency (where it would be addressed under the **Spill Emergency Response Plan**, or it may be privately owned, for example.

Is there a problem that requires proceeding with either the BCE Process or the Project Development Plan Process?

2.1.2 Covered by Another Policy?

Is the problem covered by another policy, procedure, or guidelines?

(For example: **Lower Lateral Repair-Replace-Maintain Policy**; **Main Line Repair-Maintain-Replace Decision Policy**; or Pump Stations and Facilities Business Case Evaluation Policy.)

2.1.3 Follow Separate Policy

Follow separate policy and end this process.

2.2 BCE or PDP?

The difference between a BCE and PDP is based on whether it is a Capital Improvement Project (CIP) and what the solution cost for the problem is.

2.2.1 Capital Improvement Project?

Is the solution to the problem a Capital Improvement Project?

2.2.2 Solution Cost \geq \$1.0M?

Is it apparent that the solution cost is a CIP and solution cost greater than or equal to \$1.0 M?

3.0 BCE Process

This Section details the BCE process.

3.1 Research and Investigate

Research the history of the involved assets for information pertinent to the identified problem. Other supporting data and solutions input may be obtained from other groups, as outlined in 5.0 Data & Solutions Support. Business Planning is responsible for technical support to other units implementing this Process

3.1.1 Documentation Process

Typical BCEs originated from a customer or **SacSewer** Staff that reports an issue, request information, or requests some sort of service. **SacSewer** Maintenance & Operations Section (M&O) generates many of these types of Service Requests (SRs) or WOs in Maximo to capture the nature of the problem. If, after further investigation (for example: television inspection, or site visit) reveals that a BCE is necessary to determine the best economic solution for the problem, a Maximo BCE WO may be generated to flag the potential problem for further evaluation.

Although most of these BCEs are covered by other existing policies or strategies, there are BCEs that are not covered by those existing policies or strategies. These particular BCEs are covered under this **Generic BCE Process**.

BCE WO may be the first time a potential problem may be documented. The potential problem is then described and recorded into a Maximo BCE WO and routed to the appropriate group to be evaluated.

In some cases, the BCE may not be appropriate to be tracked in Maximo (for example, a policy revision). Consult the effective Group Manager(s) on their internal documentation practices. Typical documentation management practices may include: preparing any physical files, preparing electronic files in **SacSewer's** shared folders, preparing database entries, or conducting other methods of document management.

3.1.2 Research and Document History

Conduct and document descriptive, quantitative, and historical research as appropriate to the asset or process under review.

For example, for pipelines, research and record asset age, size, depth, dimensions, etc. Use Maximo, Water Quality Computerized Maintenance Management System, Geographic Information System (GIS), and any other available data source to attain the necessary asset information required to proceed.

3.1.3 Research and Document Findings

For BCEs related to currently owned assets, research and document the detailed findings and results for the asset. For example, for pipeline assets, document all stoppages, repairs, preventive maintenance schedules, cleanings, televised inspections, customer service requests, and any other relevant information regarding the involved asset(s).

Review and document findings from any testing activities, pilot programs, or other empirical evaluations of the asset type or process under review.

3.2 Prepare NPV and BCE Report

Prepare the BCE report by identifying, analyzing, documenting, and recommending alternate solutions, typically based on a 40-year Net Present Value (NPV). Exceptions to the 40-year NPV can be made on a case-by-case basis. Use any pertinent information found in 3.1 Research and investigate to prepare the BCE report. Other supporting data and solutions input may be obtained from other groups, as outlined in 5.0 Data & Solutions Support.

3.2.1 Define Alternatives

For BCEs evaluating current assets, identify and define alternatives for the following:

- status quo
- maintenance
- repairs
- rehabilitation
- replacement
- and any other viable option, as appropriate

For each alternative defined, consider the lifecycle costs, risks, and mitigation measures. Capture the lifecycle costs for each alternative for the NPV analysis, typically a 40-year NPV is used. Exceptions to the 40-year NPV can be made on a case-by-case basis. See 3.2.2 Prepare NPV.

For purchase evaluations, document equipment options, sourcing options, purchase/lease/rental and any other acquisition options. Document lifetime ownership costs, including servicing, disposal, and replacement cycles.

3.2.2 Prepare NPV

For each alternative identified in **3.2.1 Define Alternatives**, a lifecycle cost is necessary for comparison, typically using a 40-year NPV, unless another time span is more appropriate to use for analysis. Exceptions to the 40-year NPV can be made on a case-by-case basis.

Examples of lifecycle costs to consider for each alternative are maintenance, labor, material purchase, risk, equipment, salvage costs, and any other costs that may be particular to the alternative solution. Cite sources of information used to prepare lifecycle costs.

Lifecycle costs are typically compiled per year, so that the yearly cost can be analyzed through an NPV. Compare all alternatives using the chosen NPV criteria.

See Sample BCE NPV appended to this document.

3.2.3 Prepare BCE Report

The BCE Report contains the Sections:

Problem Statement – State the nature of the problem.

Background – Give an overview of the history, backup information, failure modes, associated risk, preventive maintenance, or any other supporting information in this Section. State specific constraints that may be present.

Alternatives – General statement of how many alternatives were analyzed for the BCE, and what type of NPV was used, typically a 40-year NPV.

Alternative 1 - Status Quo – Description of the Status Quo alternative is always listed first. See 3.2.1 Define Alternatives

Alternative n – Description of each alternative analyzed for the BCE. See 3.2.1 Define Alternatives (where **n** is any number of alternatives.)

Recommendation – State the recommended alternative, and a brief description of the alternative.

Prepare a cover letter for the BCE addressed to the approving authority. Briefly state the problem, how many alternatives were analyzed, and the recommended alternative. The signature blocks that follow the problem statement include the Staff member submitting and recommending the alternative solution, the Staff member's supervisor (if BCE was not prepared by a supervisor), any affected manager(s), and the approving authority to whom the BCE is addressed. Attach the BCE Report and the supporting BCE NPV to the cover letter.

See the Sample Generic BCE Cover Letter, Sample Generic BCE Report, Sample Generic BCE NPV, and Sample Generic BCE Lifecycle Costs Sheet appended to this document.

3.3 BCE Approval Process

Based on the recommended solution, existing policies, procedures, processes, or guidelines may govern the approval process for your particular BCE.

- **Project Authorization Committee (PAC)**

PAC approval is required if the initial investment exceeds \$1.0M or if the NPV is greater than \$2.0 M over 5 years. New recurring expenses shall be based on the following:

- NPV will be calculated for 5 years of costs and include the initial investment, staff costs, M&O replacements, and salvage value.

Refer to the most current version of the **Project Authorization Process** for clarification if PAC is necessary for BCE approval.

- **Pre Project Authorization Committee (PrePAC)**

PrePAC was born out of the PAC to give upper level management a chance to comment and approve the BCE presentation before it went to PAC. **SacSewer** Director of Operations may approve a BCE at this level if the solution cost is within his approval authority limit. If the BCE solution cost is above the Director's approval limit, the Director may recommend the BCE presentation proceed to the PAC process.

The BCE approval process is dependent on the nature of the solution (operational or capital), the solution cost, or both.

Table 306-1 below outlines the approval authority levels of the BCE approval process. Based on the solution and its cost, use the cited source document to verify the correct approving authority level. (The most current approval limits should be confirmed by the user at the time of use of this document.)

Table 306-1 BCE Approval Limits

Approving Authority Level	Operational BCE Approval Limits	Capital Improvement BCE Approval Limits	Source (Operational/ Capital)
Supervisor(s)	Up to and including \$2,500*	Up to and including \$2,500*	Generic BCE Process/ Generic BCE Process
Group Manager(s)	Up to and including \$100,000	Up to and including \$20,000**	Organizational Planning Team (OPT)/ Generic BCE Process
Section Manager(s)	Up to and including \$250,000	Up to and including \$100,000**	OPT/Generic BCE Process
Director of SacSewer Operations through PrePAC***	Up to \$1.0M****	Up to \$1.0M****	OPT/Generic BCE Process

Approving Authority Level	Operational BCE Approval Limits	Capital Improvement BCE Approval Limits	Source (Operational/Capital)
District Engineer through Project Authorization Committee	Exceeds \$1.0M, Or if NPV > \$2.0M over 5 years****	(Under Project Development Plan Procedures)	Project Authorization Process

*Supervisor(s) approval limits are defined in this revision of the **Generic BCE Process**.

These approval limits were originally defined in this **Generic BCE Process document and are still effective for capital solution costs. This **Generic BCE Process** document defines these approval limits. Should there be a change in these approval limits, the approval limits for these approving authority levels must be changed in this **Generic BCE Process** document to reflect the most current approval levels.

*****SacSewer** Director of Operations has the discretion to approve a BCE within this dollar amount or refer the BCE to go through the PrePAC approval process.

****PAC approval limit was raised in 2011 from \$250K to \$1.0M, and refers to the initial investment costs. NPV expenditure level criteria was added in 2012.

The Board approval may be necessary for final approval. Approving Authority and/or appropriate manager(s) will follow the Board meeting procedures if necessary.

Also, typical to the approval process, it is assumed that manager(s) below the Approving Authority Level have already recommended the BCE as ready to be presented for approval. For example, if the Approving Authority Level was determined to be **SacSewer** Director of Operations, the affected Section Manager(s), Group Manager(s), Supervisor(s), Underground C & M Supervisor(s), or Supervising Engineering Technician(s) that may have been involved in development of the BCE, have already recommended the BCE for the higher approval level.

3.3.1 BCE Approved?

After presenting the BCE to the appropriate approving authority level or process, was the BCE approved?

3.4 BCE Follow-up

Complete the paperwork, work order entries, and other items necessary to complete the approved BCE and execute the approved actions. Refer to Section 3.1.1 Documentation Process, if necessary.

3.4.1 Update Asset Inventory (if necessary)

From the originating Service Request, if applicable, create any Work Orders based on the approval, if necessary. For BCEs pertaining to current assets, create Service Request(s) to update asset attributes, including asset information, activity instructions, special instructions regarding problems with the asset, and any other updated information. When creating Service Requests, follow the latest **Maximo Non-Emergency Service Request Templates**, updated May 25, 2011.

3.4.1 Create Maximo Work Orders (if necessary)

The staff lead of the BCE is responsible for the creation of Maximo Work Orders, if necessary, for activities approved.

3.4.2 Scan & Save Recommendation Sheet

Scan signed and completed BCE recommendation/approval sheets and associated papers as necessary, and save appropriately per current document management practices. Refer to Section 3.1.1 Documentation Process, if necessary.

3.4.3 Close Documentation Process

Close documentation process per current document management practices. For example, complete BCE Work Order(s), Service Request(s), follow PrePAC or PAC procedures, or any other task to finalize the documentation process.

3.4.4 Complete File

Complete BCE file(s) per current documentation management practices.

3.5 Detailed Design/Construct Project (if necessary)

Project Lead is responsible for providing a detailed design and directs construction of the project, if necessary.

Project Lead may have to collaborate with other groups, and/or consultants as necessary.

3.6 Final Cost Verification BCE (if necessary)

Project Lead may have to prepare a final cost verification BCE that compares actual with projected costs.

Provide verification to group that prepared original BCE (if different from Project Lead). Refer to Section 3.1.1 Documentation Process, if necessary.

4.0 Project Development Plan (PDP) Procedures

Refer to the **Project Development Plan Procedures for Capital Improvement Projects** and end this **Generic BCE Process**. Verify the most recent version of the PDP Procedures before proceeding.

5.0 Data & Solutions Support

Input to research and range of solution alternatives, including identification of alternatives, associated risks, and modeling are available from sources such as the **SacSewer** Design, M&O, and Business Planning. Additional solutions input may be drawn from sources such as research activities, vendors, field testing, pilot programs.

If additional information is necessary from other **SacSewer** groups or vendors, check with the effected Group Manager(s) for available resources to meet the project needs. Define the information necessary to address your BCE needs.

Data and solutions support typically are performed to support Sections 3.1 Research and Investigate and 3.2 Prepare BCE Report and NPV of this Process.

6.0 Document Investigation & Findings

When a decision is made to discontinue a BCE, document the investigation and findings in Maximo, if necessary or follow current documentation management practices.

7.0 End

End the **Generic BCE Process**.

306.4. *Definitions Used in Section 306*

Business Case Evaluation - A BCE is an evaluation of alternatives to a problem. A BCE is used to economically compare alternatives against each other to provide a basis for selecting a preferable, cost effective alternative solution. BCE alternatives typically include status quo, repair, maintain, replace, or other alternatives that may be appropriate, and consider risks involved with each alternative, if any. Typically, a 40-year net present value (NPV) is used to compare alternatives, but may be adjusted if a different NPV time span is more appropriate.

Capital Asset - see latest version of the **Capital Asset Policy** for definition.

Solution Cost - Solution process steps and approval levels are based upon the cost of the solution. In the case of a capital solution, the solution cost is the total cost of the recommended alternative and the projected alternative's maintenance and operations cost, usually presented in a 40-year NPV. If the solution is a combination of capital and operational costs, the affected supervisor(s) or group manager(s) will decide if the solution is to be considered as a capital or an operational solution, in order to determine the proper approval authority level, as outlined in 3.3 BCE Approval Process of this Process.

For operational solutions, the solution cost is the difference between the lifecycle status quo (exclusive of risk) and the solution lifecycle costs, usually projected as a 40-year NPV. For example: For an operational recommended solution with a 40-year NPV of \$21,000 and a status quo 40-year NPV of \$5,000, the solution cost would be \$16,000.

Capital BCE Approval Limits - Section Managers are authorized with approval limits for capital solution costs up to and including \$100,000. Group Managers are authorized with approval limits for capital solution costs up to and including \$20,000. These costs are typically based on a 40-year NPV. This document defines these approval limits. Should these limits change, this document must be updated to reflect those changes.

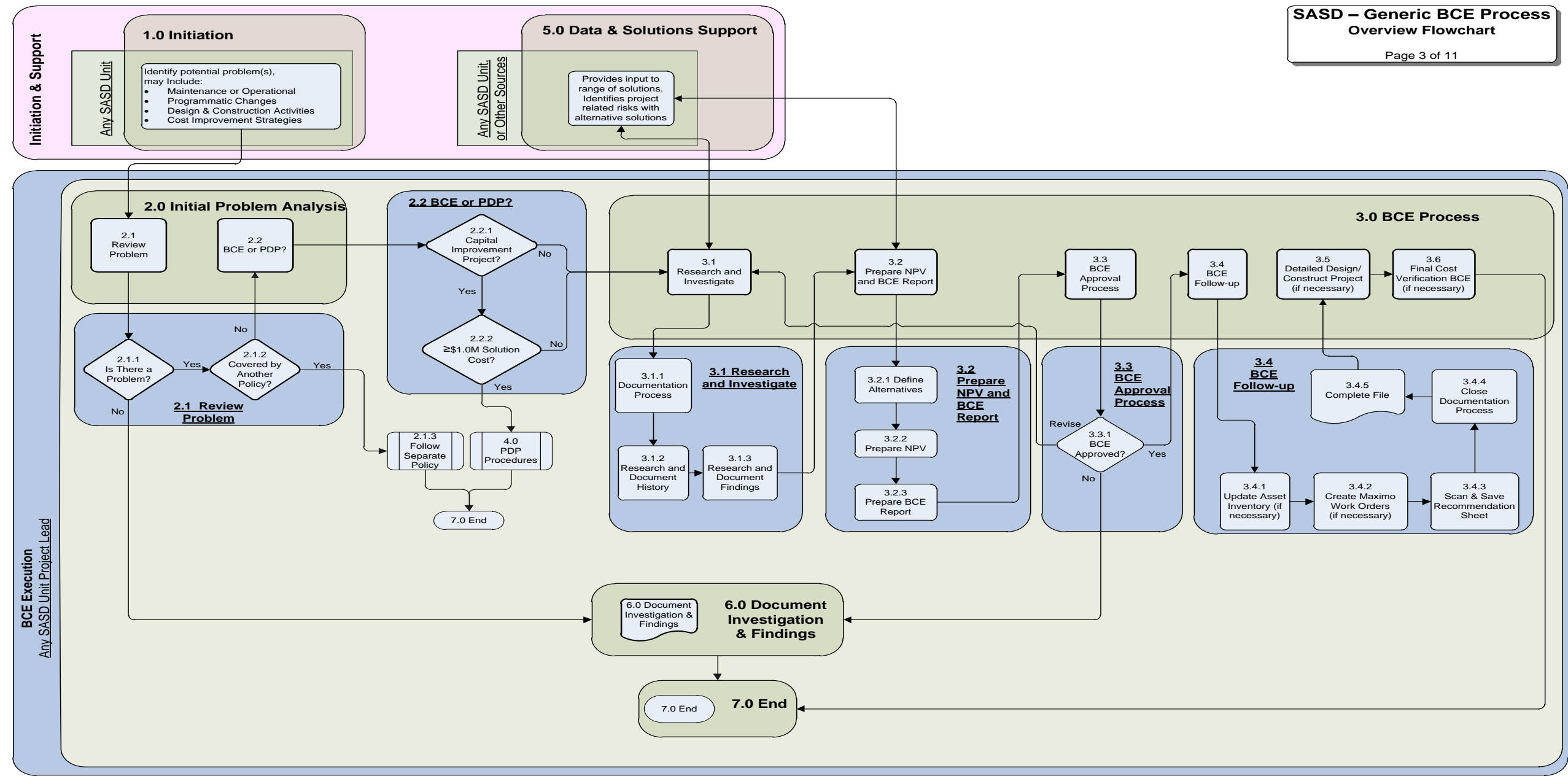
*(Authorized purchase limits for managers and supervisors remain the same, as listed in the **Procurement Policy & Process Procedures and Purchasing Authority Limits**. These limits are not to be confused with capital or operational BCE approval limits that govern the approval process in this Process.)*

Operational BCE Approval Limits - Section Managers and Group Managers have been authorized for operational BCE solution costs, up to and including \$250,000 and \$100,000, respectively. These costs are typically based on a 40-year NPV. These limits were approved by the **SacSewer's** Organizational Planning Team (OPT) on February 15, 2011, and are defined in this document. These limits should be verified as current at the time of use of this document.

306.5. *Effectiveness Measure*

The effectiveness of the **Generic BCE Process** is how well the process determines the most cost effective solution to a problem.

306.6. Process Flowchart



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306.7. Generic Business Case Evaluation (BCE) Process Appendix**Sample Generic BCE Cover Letter**

[Date]

To: [Approving Authority]

[Title of Approving Authority]

Subject: Business Case Evaluation for [Name of BCE]

[Briefly state the problem, including the affected asset(s), if any. State the number of alternatives analyzed for this BCE. State the recommended alternative solution, briefly describing the recommended solution.]

Approval Recommended: _____

[Signature of Staff member who prepared report], [Section
and Group title]

[Date]

Approval Recommended: _____

[Staff member's Supervisor's Name (if BCE was not
prepared by a supervisor)], [Title]

[Date]

(If necessary, add additional signature blocks if additional levels of approval recommendations are necessary.)

Approved by: _____

[Approving Authority Name], [Title]

[Date]

Sample Generic BCE Report**Business Case Evaluation****[Name of BCE]****Problem Statement**

[State your problem here.]

Background

[Describe the problem.]

Alternatives

[State the number of alternatives evaluated and the how they were compared to each other to determine the best alternative solution to the problem, a 40-year NPV is typically used. State any significant circumstances or considerations to summarize the alternatives.]

Alternative 1 – [Title of Alternative 1]

[Alternative 1 description. Include a statement about whether this is the preferred alternative or not]

Alternative 2 – [Title of Alternative 2]

[Alternative 2 description.]

Alternative [n] – [Title of Alternative n]

[Alternative n description, with n being any number. The number of alternatives evaluated varies case by case.]

Recommendation

[State the recommended Alternative and a brief description of what the recommended Alternative entails.]

Sample Generic BCE Net Present Value

(This Sample Generic BCE Cover Letter uses brackets ([]) to show where particular information needs to be customized.)

Table 306-1 40 Year NPV

40 Year NPV Table			
Year	Alternative 1	Alternative 2	Alternative n*
	Status Quo	Alternative Title	Alternative Title
1	Cost	Cost	Cost
2	Cost	Cost	Cost
3	Cost	Cost	Cost
4	Cost	Cost	Cost
5	Cost	Cost	Cost
6	Cost	Cost	Cost
7	Cost	Cost	Cost
8	Cost	Cost	Cost
9	Cost	Cost	Cost
10	Cost	Cost	Cost
11	Cost	Cost	Cost
12	Cost	Cost	Cost
13	Cost	Cost	Cost
14	Cost	Cost	Cost
15	Cost	Cost	Cost
16	Cost	Cost	Cost
17	Cost	Cost	Cost
18	Cost	Cost	Cost
19	Cost	Cost	Cost
20	Cost	Cost	Cost
21	Cost	Cost	Cost
22	Cost	Cost	Cost
23	Cost	Cost	Cost
24	Cost	Cost	Cost
25	Cost	Cost	Cost

40 Year NPV Table			
26	Cost	Cost	Cost
27	Cost	Cost	Cost
28	Cost	Cost	Cost
29	Cost	Cost	Cost
30	Cost	Cost	Cost
31	Cost	Cost	Cost
32	Cost	Cost	Cost
33	Cost	Cost	Cost
34	Cost	Cost	Cost
35	Cost	Cost	Cost
36	Cost	Cost	Cost
37	Cost	Cost	Cost
38	Cost	Cost	Cost
39	Cost	Cost	Cost
40	Cost	Cost	Cost
NPV	**	**	**
Discount Rate	%***		

Row and Column headings are shown for this example only.

Typically, use 40 years for the NPV cost analysis. Adjust as necessary if using a different time span.

"Cost" can vary depending on the Alternative solution conditions.

*n varies depending on the number of alternatives to be evaluated per BCE

**The NPV Cost Calculation = NPV (Discount Rate, Year 2 through 40 Costs) + Year 1 Costs.
For example: for the Status Quo NPV Cost in cell B44, the equation would be: **=NPV(\$B\$45,B5:B43)+B4**

***Discount Rate - This rate is typically set by the Chief Financial Officer/Finance Office. Check with Supervisor as to what is the current discount rate to be used for NPV analysis.

Sample Generic BCE Lifecycle Costs Sheet**Table 306-2 Costs Summary**

Costs Summary	
Replacement Costs	
Replacement cost	\$
Replacement cost	\$
Total Replacement Costs	\$
Installation Costs	
Number of crew	#
Hourly Rate	\$/hour
Required installation hours	#
Other material costs	\$
Total Installation Costs	\$
Maintenance Costs	
Number of Mechanics	#
Hourly Rate	\$/hour
Hours per year	#
Number of Electricians	#
Hourly Rate	\$/hour
Hours per year	#
Total Maintenance Costs	\$
Summary of Total Costs	
Total Replacement Costs	\$
Total Installation Costs	\$
Total Maintenance Costs	\$

All entries on this sample lifecycle costs sheet is an **example only**. This sample lifecycle costs sheet is not intended to exclusively represent all cost necessary for BCE evaluations. Staff preparing the lifecycle costs sheet(s) should account for all costs necessary for each identified BCE alternative.

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400 Structural Assessment Program

400 Program Overview

400.1. Purpose

The purpose of this document is to describe the strategies the Sacramento Area Sewer District (**SacSewer**) implements to identify and mitigate failure modes that lead to structural failures of sewer collection system assets.

400.2. Background

SacSewer owns and operates a variety of physical assets. In support of the District's goals of meeting regulatory requirements, achieving identified service level targets, and operating in a cost-effective manner, it has documented several efforts designed to assess the structural condition of its assets and determine appropriate solutions for any identified problems.

The **Structural Assessment Program** is intended to evaluate the structural integrity of all **SacSewer** collection system assets such as manholes, pipes, and pump stations. The Program is further intended to mitigate any potential structural failures in the system. It is divided into three different structural failure modes: Loss of Support, Crush Collapse, and Pump Station. These failure modes each have a strategy that may be further broken down and refined as needed for different asset types or unique situations.

A structural failure, which has caused a stoppage, is addressed directly through **SacSewer's SSMP Blockage Control Assessment Program** (via the **Spill Emergency Response Plan Manual** if a spill or Backup Into Structure (BIS) has occurred).

This document is directly referenced in the **Sewer System Management Plan (SSMP)**, and is one of the District's system wide assessments. The assessment programs consist of strategies that drive **SacSewer's** routine day-to-day operations.

400.3. Program

The **Structural Assessment Program** encompasses several separately documented but sometimes-interrelated failure modes. Each failure mode has an associated strategy, which is listed below:

- **Loss of Support Failure Mode Strategy**
 - Strategy to reduce the frequency of spills due to loss of support failure mode.
 - Inspection strategies.
- **Crush Collapse Failure Mode Strategy**
 - Strategy to cost-effectively reduce the risk of crush collapse failures.
 - Inspection strategies.
- **Pump Station Structural Assessment Strategy**
 - Strategy to cost-effectively mitigate the risk of pressurized asset structural failures.
 - Inspection strategies.

400.4. Effectiveness Measure

The effectiveness of this document is based upon the structural integrity of **SacSewer's** assets. Any structural failure in the system will initiate a review of this document and the strategies contained within it.

401 Loss of Support Failure Mode Strategy

401.1. Purpose

This document defines strategies used to cost-effectively reduce the loss of support failures.

401.2. Background

This Strategy is directly referenced in the Board Approved **Sewer System Management Plan (SSMP)** as part of the **Structural Assessment Program**.

Loss of support failures are caused by a pipeline's loss of contact with bedding material or loss of other support structures. Examples of bedding material are crushed rock and soil. Examples of other support structures are piers and hangers. Erosion of bedding or corrosion of support may cause loss of support. The loss of support allows the pipe to separate, fall, or break, which may result in a spill). Loss of support failures can occur within creeks. Creek characteristics frequently change with storm events and debris build-up on obstructions may cause velocity changes that can alter the width and depth of the creek.

SacSewer has numerous pipelines that cross creeks. This Strategy covers **SacSewer** Loss of Support Strategy for gravity assets (main lines, manholes and lower laterals). Loss of support in force mains is covered under the **Pump Station Structural Assessment Strategy**. The loss of support failure due to construction activities is covered under the **Damage by Others Failure Mode Strategy**.

This Strategy does not cover initial spill emergency response. All spill responses follow the **Spill Emergency Response Plan Manual** and the **Customer Call Handling and Service Request Creation Policy**.

Loss of support in a pipeline that crosses a creek or is adjacent to a creek can result in a spill that reaches a waterway. The consequence of failure is the cost associated with an spill (initial response, cleanup activities, reporting, etc.), as well as environmental and social risk costs. Environmental and social aspects are evaluated on a case-by-case basis, and where quantifiable are added to the base costs.

401.3. Definitions used in Section 401

Creek – A low-lying area that may or may not have an active stream flowing within it. For the purposes of this document, low-lying areas will include any depression, gully, ravine, or canyon.

Aerial crossings – A sewage pipe that is above the creek floor and may or may not have support structures in the creek. The material of the crossing is typically some type of ductile iron or steel pipe.

Covered crossings – A sewage pipe that is buried as it crosses the creek.

Exposed crossings – A sewage pipe that is exposed on the floor of the creek. The crossing may or may not be in a carrier pipe or encased in concrete that protects the pipe and provides support.

Parallel pipeline – A pipeline within a creek and that extends in the same direction as the creek.

Crossing – A pipeline traversing a creek.

401.4. Strategy

The following proactive and reactive approaches will be used to prevent loss of support failures in aerial creek crossings, covered creek crossings, exposed creek crossings, and parallel pipelines within creeks.

Proactive Approach:**1. Creek Inspection Program**

This proactive program is focused on reducing the risk of failure in gravity pipes that cross creeks including aerial creek crossings, covered creek crossings, exposed creek crossings, and parallel pipelines within creeks, by identifying defects before they become an issue.

Program Details:

- **Strategy for Identifying Sewer Pipelines along Waterways**

Sewer pipelines along waterways are assessed and have the potential to be inspected for erosion and structural issues. This strategy is performed every 10 years. The next assessment will occur in 2029.

- Desktop Assessment

All pipelines within 25 feet of the waterway centerline as determined by GIS mapping receive desktop assessment. Assessment includes:

- Review of aerial photo to determine waterway characteristics
- Review of aerial photo to determine pipeline and waterway relationship
- Review of as-builts (if available)
- Review of Computerized Maintenance Management System (CMMS) records

Pipelines found to have potential erosion or structural issues are inspected.

- Field Assessment (Inspection)

Pipelines determined by desktop assessment to have the potential for issues will be visually inspected.

Results of Strategy for Identifying Sewer Pipelines may result in a BCE or adding the site to the Annual Visual Inspections list.

- **Annual Visual Inspections**

- Includes crossings that were identified using the **Strategy for Identifying Sewer Pipelines along Waterways**.
- Visual inspection is performed on a recurring frequency determined by the condition and location of the crossing.
- Crossings are visually inspected for corrosion, erosion and structural issues.
- Depending on the likelihood and consequence of failure, the frequency of visual site inspection may be adjusted.

Table 401-1 Minimum Inspection Frequencies

Minimum Inspection Frequency (Years)	Crossing Type
1	<ul style="list-style-type: none"> • Aerial not attached to bridge structure • Exposed without encasement
2	<ul style="list-style-type: none"> • Exposed with degrading encasement
3	<ul style="list-style-type: none"> • Aerial attached to bridge structure

5	<ul style="list-style-type: none"> Covered by 1' or less
---	---

- Post Storm Visual Inspections**

Aerial crossings not attached to a bridge structure and exposed crossings without encasements will be inspected within five business days following a storm greater than the 2-year return period (6 or 24-hour duration) storm as determined following the Hydrology Standards of the Sacramento County/City Drainage Manual (December 1996).

Using the methodology described above, the following rain events will trigger inspections:

Table 401-2 Rainfall Event Triggers

Rainfall Event Triggers			
Inspection Criteria	Storm Return Period	Storm Duration	Total Volume
<ul style="list-style-type: none"> Aerial Crossings not attached to bridge structure 	2-Year	6 Hour	1.06 in
<ul style="list-style-type: none"> Exposed crossings without encasements 	2-Year	24 Hour	1.90 in

Failure Analysis and Follow-up Work:

As a follow-up to any of the Annual visual Inspections or post-storm visual inspections, the **Generic BCE Process** will be employed to analyze any problem found.

2. Standards and Specifications (Standards)

- The **Standards** states that **SacSewer** will only allow waterway crossings if there is not another feasible design option.
- The **Standards** contain several other proactive approaches to help minimize loss of support. For example, trench dams, trench foundation, and bedding specifications are designed to help minimize loss of support failures.

3. Sacramento Area Sewer District Sewer Ordinance (SacSewer Ordinance)

The **SacSewer Ordinance** establishes penalties for violations, including illegal discharges that have resulted in a stoppage.

Reactive Approach:

The reactive approach is performing corrective work after a stoppage or defect has occurred. The **Spill Emergency Response Plan** lays out the initial spill response and cross-references the policies below:

1. Televised Inspection Policy (TVI Policy)

The **TVI Policy** defines when a main line that has had a stoppage will be inspected with Closed Circuit Television Inspection (CCTV) equipment. Major portions of the **TVI Policy** that address a main line stoppage include:

- 1.1. The stoppage follow-up (failure analysis) guidelines of the **TVI Policy** prescribes when, why and who will perform the televised inspection (TVI) under certain conditions.
- 1.2. The TVI will be reviewed. Review of the TVI may create future actions that may include Business Case Evaluation (BCE), future TVI, or Preventive Maintenance (PM) changes.

2. Generic Business Case Evaluation Process (Generic BCE Process)

Business case evaluation is conducted as described in the **Generic BCE Process**.

401.5. Effectiveness Measure

The effectiveness of this Strategy is based on the number of loss of support failures.

402 Crush Collapse Failure Mode Strategy

402.1. Purpose

The purpose of this document is to establish the strategy that is used to cost effectively reduce the frequency of crush collapse caused spills.

402.2. Background

The **Crush Collapse Failure Mode Strategy** is intended to assess the structural integrity of the gravity assets in the Sacramento Area Sewer District (**SacSewer**) collection system. Pump Station and Force Main strategies are covered in the **Pump Station Structural Assessment Strategy**.

SacSewer realizes that crush collapse failures can cause spills, interruptions in service, and environmental consequences. The Crush Collapse Failure Mode occurs when degradation of the assets or excessive forces have occurred causing cracking and breaking of the pipe or manhole, potentially leading to the asset collapsing. Strategies to reduce the frequency of spills can be proactive or reactive, as defined by the **Maintenance Terminology Definitions** approved by the Organizational Planning Team.

The cost of consequence is the cost associated with a spill (initial response, cleanup activities, reporting, etc.), as well as environmental and social costs. Environmental and social aspects are evaluated on a case-by-case basis, and where quantifiable are added to the base costs. Any spill that may have resulted from the crush collapse failure is responded to per the **Spill Emergency Response Plan Manual**.

402.3. Strategy

Crush collapse failures within **SacSewer**'s gravity assets can happen in lower laterals, main lines, or manholes. Two approaches will be used to reduce crush collapse failures in gravity assets: proactive and reactive.

Proactive Approach

1. TVI Policy

The TVIs will be reviewed per the **TVI Policy**. This review includes any proactive TVI as follow-up work resulting from **SacSewer**'s maintenance programs.

2. Standards

- 2.1. The **Standards** provide minimum requirements to be applied to assets dedicated to the public for operation and maintenance, requiring the approval of the Sacramento Area Sewer **SacSewer**, or to be installed within existing or new public rights-of-way or easements. These **Standards** are written to provide for the safety and general welfare of the public that

will be using the sewer facilities. Included are requirements such as minimum depth of cover that are intended to protect the pipe from crush collapse failures. These **Standards** regulate and guide the planning, design, and construction of all assets within **SacSewer** service area.

- 2.2. Any deviations are processed through the **Request for Deviation from Standards and Specifications**.
- 2.3. Quality control is employed by plan review and inspections. Plans are submitted to **SacSewer** for review. An **SacSewer** representative conducts inspections during construction, minimizing potential problems that could impede flow, and other possible construction defects.

The following Strategies are broken up between the different asset classes, as the strategies are significantly different in each.

402.3.1 Lower Lateral Strategy

Lower Lateral Proactive Approach:

Lower Lateral Scheduled Inspection Program (LLSI)

This program is focused on preventing asset failures such as a stoppage or structural collapse by putting lower Laterals over the age of 40 on an inspection interval to identify any problems that may develop before they become an issue. For Program details, refer to the **Lower lateral Stoppage Failure Mode Strategy**.

402.3.2 Main Line Strategy

Main Line Proactive Approach:

1. Main Line Critical Assets Program (MLCA)

This program is focused on preventing asset failures such as a stoppage or structural collapse by putting main line assets that are in a geographic proximity to critical features on inspection interval to identify any problems that may develop before they become an issue. For Program details, refer to the **Main Line Stoppage Failure Mode Strategy**.

2. Main Line Scheduled Inspection Program (MLSI)

This program focused on preventing asset failures such as a stoppage or structural collapse by putting main lines over the age of 40 on an inspection interval to identify any problems that may develop before they become an issue. For Program details, refer to the **Main Line Stoppage Failure Mode Strategy**.

3. Main Line Easement Rehabilitation Program

This program is a revised version of the main line lining for root mitigation effort. It is a proactive program focused on repair and rehabilitation of defective main line easement assets on MLSM program to prevent future stoppages or structural collapses. This program will also reduce customer impact, reduce risk to employees, and reduce maintenance and operations costs. For Program details, refer to the **Main Line Stoppage Failure Mode Strategy**.

402.3.3 Manhole Strategy

Manhole Proactive Approach:

Manhole proactive approach is covered under the main line proactive approach programs. If a manhole is accessed to perform a TVI of a main line, a manhole TVI shall also be performed, Section 107.5 in the TVI Manual.

Manhole Reactive Approach:

Inside Drop Repair/Replace

Broken/missing inside drops are found during work done through **SacSewer's** maintenance programs. Inside drops are repaired if they are damaged, broken, or disconnected. Missing inside drops are reinstalled. If corrosion or erosion of the manhole wall is found, then a BCE work order is written to evaluate the manhole for repair. If the defect in the drop results in build-up of severe to moderate solids, then a priority 2 manhole work order is written to clean the Manhole, along with a priority 4 work order to repair/install the drop.

The following Strategies apply to all three-asset classes.

Reactive Approach

1. Televised Inspection Policy (TVI Policy)

The **TVI Policy** helps determine when an asset that has had a spill due to a crush collapse failure will be inspected with closed-circuit television equipment. The portions of **TVI Policy** that react to gravity asset's spill include the following:

- 1.1.** The Stoppage Follow-up (Failure Analysis) guidelines of **TVI Policy** prescribe when, why, and who will perform the TVI under certain conditions.
- 1.2.** The TVI will be reviewed per **TVI Policy**. Review of the TVI may indicate more evaluation of a problem is needed. TVI reviewers create work orders that include Business Case Evaluations (BCEs) and future TVIs.

2. Generic Business Case Evaluation Process (Generic BCE Process)

If a problem is not covered by a separate policy or procedure then the **Generic BCE Process** will be used.

402.4. Effectiveness Measure

The effectiveness of this Strategy is tracked by a reduction in the number of spills caused by crush collapse failures.

403 Pump Station Structural Assessment Strategy

403.1. Purpose

This strategy identifies methodologies to assess the pressurized system structural assets for risk of failure and discusses approaches to cost effectively minimize failures.

403.2. Background

Pump station structural components failure may result in spills. Pump station structural components include wet-wells, force mains, combination air release valves (CARV), dry-pits, valve vaults, force main vaults, and buildings. Possible failure modes include, but are not limited to, corrosion, erosion, crush/collapse and damage.

This strategy only covers pump station structural component failures, all other pump station component failures are covered under the **Pump Station Component Failure Mode Strategy**.

Although, the Sacramento Area Sewer District (**SacSewer**) number of spills due to a structural failure of a pressurized system asset is small, the consequence may be high due to the flow rate and pressure of sewage in the assets.

This strategy does not cover initial spill emergency response. All spill responses follow the **Spill Emergency Response Plan Manual** and the **Customer Call Handling and Service Request Creation Policy**.

This strategy is directly referenced in the Board Approved **Sewer System Management Plan (SSMP)** as part of the **Structural Assessment Program** and as part of the **Pressurized Assets Management Strategy**.

For clarity, this strategy will use pump station to refer to both sewer pump and sewer lift stations and all their associated appurtenances.

Two approaches will be used to reduce pump station structural failures: reactive and proactive. The **Maintenance Terminology Definition** document, approved by the Organizational Planning Team, defines reactive and proactive activities.

403.3. Strategy

This strategy incorporates reactive and proactive approaches for minimizing pump station structural failures.

Reactive Approach:

1. SCADA

- 1.1.** The Supervisory Control and Data Acquisition (SCADA) system alerts **SacSewer** of any unusual operating patterns at a pump station. Component alarms can be an indirect indicator for a structural problem. For example, if a pump runs longer than normal, a pump cycle duration alarm will be sent to **SacSewer** staff, who will then respond and determine the nature of the problem.

2. Failure Analysis

When structural failures occur the pump station structural assets are inspected and tests are performed to determine the failure cause. The outcome of the failure analysis may fall under the **Management Plan Assessment Program**.

2.1. Generic Business Case Evaluation Process (Generic BCE Process)

The **Generic BCE Process** may be used to analyze any structural problem. The resulting recommendations may include any one or a combination of the following:

- Add or change a Preventive Maintenance (PM) schedule
- Perform a repair
- Replacement
- Change operating practices

Engineering Operations Support is responsible for creating Business Case Evaluations for any major repairs, replacement, or change in operating procedures. Operations Support also assists M&O in terms of engineering review of procedure changes and addition or modification of structural components.

Proactive Approach:

1. Facilities Scheduled Maintenance

1.1. Facilities Scheduled Maintenance is in place to prevent failures through regularly scheduled maintenance. PM activities and frequencies vary by structural component. There are several PM activities that relate to structural items at a pump station. Below are the most common PMs, but the list is not inclusive of all PM work performed on pump stations. Any damage found during the PM is documented in a corrective maintenance work order and the **Generic BCE Process** may be used to determine the most cost effective alternative to mitigate the structural deficiency.

Program details:

- **Pump Station Monthly and Annual Inspections** – The monthly and annual PM includes a visual inspection of viewable components and any indication of structural deterioration is evaluated. A sample of the procedures performed at each pump station inspection is listed below.
 - Safety inspection: Complete confined space entry form. Wear all required Personal Protective Equipment (PPE) such as; hard hat, rubber gloves, and safety glasses, goggles, face-shield.
 - General maintenance inspection: Check building condition. Observe area for vandalism.
 - Spill Inspection: Look for possible signs of spill at wet well.
 - Force Main inspections: Force mains are visually inspected by walking or driving the length of the pipeline and checked for sinkholes, leaking CARV, or leakage along the force main.
 - CARV inspections: These inspections are for testing, cleaning, and flushing the CARV assets on the force mains.
 - Pump and valve inspection: Open inspection access hole and check for plugging pump, worn wear rings
 - Sealed water lines and filter inspection: Check water lines and filter.
 - Sump pump inspection: Remove and inspect sump pump and float for corrosion and damage. Clean sump pump area.
 - Compressor or wet well transducer inspection: If a bubbler system is installed, test compressor for proper operation. Clean air filters as needed. If a wet well transducer is installed, check transducer and clean as needed (no rags or debris on transducer or drop cable)
 - Wet well inspection: Visually inspect all hardware such as; pump rails, brackets, clamps and piping for corrosion.
 - Blower/fan operational check: Check for proper airflow. Check for loud noises and excessive vibrations
- **Ultrasonic wall thickness testing** – SacSewer owns and operates 11 metal walled pump stations. Due to sewer gases and the electrical potential in the soil, the metal walls may corrode. The test checks the thickness of metal walled pump stations and force mains in order to estimate the rate of corrosion. A sample of the procedures performed at each ultrasonic wall thickness test is listed below.
 - Safety inspection: Complete confined space entry form. Wear all required PPE such as; hard hat, rubber gloves, and safety glasses, goggles, face-shield.

- General maintenance inspection: Check building condition. Observe area for vandalism.
- Spill Inspection: Look for possible signs of a spill at wet well.
- Calibrate the unit: Turn the unit on by pressing ON/OFF button. Plug the transducer into the unit. Wipe the surface of the transducer to remove any debris.
- Taking measurements: Apply approximately two drops or more of coupling gel to the transducer surface. Press the transducer with the gel side flat against the surface that is being measured. Repeat steps until all desired data points are collected.
- **Aerial Force Main Crossings** –The following three force mains (Table 403-1) have been identified as having an aerial crossing over a waterway. They are assessed using the following PM schedule (Table 403-2).

Table 403-1 Aerial Force Main Crossings

Station	FM Length (ft)	Diameter at crossing	Material	Crossing Length (ft)	Location of Crossing
S132	35,933	22"	HDPE	200	NW Intersection of Sunrise Blvd and Kiefer Blvd (over utility bridge, contained within 36" steel casing)
S102	1,350	4"	Aluminum	60	1000 feet east of pump station (supported by piers)
S070 (Two Force Mains)	2,891	8" & 10"	Ductile Iron*	150	Sunrise Blvd crossing over the Folsom South Canal north of White Rock Rd (attached to the west side of bridge)

* Aerial crossing is ductile iron pipe; underground portion of pipe on both sides of the crossing is PVC

Table 403-2 Aerial Force Main Preventive Maintenance Schedule

Station	Aerial Force Main Preventive Maintenance	Frequency
S132	1. Visually inspect the visible containment pipe for possible failures at joints and supports from the ground.	Monthly
	2. Inspect slope for erosion and stability.	Annually
	3. Collect and record a pressure reading at each CARV.	Quarterly
S102	1. Visually inspect pipe joints and supports without removing wrap.	Monthly
	2. Inspect polyvinyl protective tape and re-wrap as necessary.	Annually
	3. Inspect concrete pipe supports.	Annually
	4. Inspect slope for erosion and stability.	Annually
S070 (Two Force Mains)	1. Ultrasonic wall thickness testing.	10 years
	2. Visually inspect visible pipe joints, pipe supports and sewer crossing warning sign for damage	Monthly
	3. Inspect slope for erosion and stability.	Annually

The force mains for S132, S102, and S070 are visually inspected after rainfall events based on the trigger found in the **Loss of Support Failure Mode Strategy**. The post rainfall visual inspections are performed by the Operations Support group.

2. Pump Station and Force Mains Inventory and Expenditures

SacSewer has developed an inventory and expenditure list for each pump station. The inventory and expenditure list contains a list of the major structural components, for example a wet well at each pump station, and includes the year the structural components were installed, the estimated life-cycle, and estimates the remaining useful life to structural failure for each structural component.

3. Standards and Specifications (Standards)

- 3.1. The **Standards** provide minimum requirements for the planning, design, construction, and inspection of **SacSewer's** sewer system. **SacSewer** has outlined the requirements for new and replacement pump stations. The **Standards** were established to standardize pump station design and equipment, and so that all stations would have similar operation and maintenance characteristics.
- 3.2. Any design deviations to the **Standards** are processed through the **Request for Deviation from Standards and Specifications**.
- 3.3. Quality control is employed by the Development Group who reviews designs for pump stations for conformance to the Standards. An **SacSewer** representative conducts inspections during construction, minimizing potential problems. Additionally, pump stations are tested using the Pump Station Startup Checklist prior to acceptance by **SacSewer**.

403.4. *Effectiveness Measure*

The effectiveness is shown by trending pump station structural failures on an as needed basis. **SacSewer** staff query data as needed for pump station structural failures and compare it to historical data to measure the trending behavior. If there is an increase in structural failures, this Strategy will be re-evaluated, and solutions to reduce structural failures will be presented to Management in accordance with the **Management Plan Assessment Program**.

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500 Blockage Control Assessment Program

500 Program Overview

500.1. Purpose

The purpose of this document is to describe the **SSMP Blockage Control Assessment Program** of the Sacramento Area Sewer District (**SacSewer**).

500.2. Background

This document is directly referenced in the **Sewer System Management Plan (SSMP)**, and is one of **SacSewer's** system wide assessments. The assessment programs consist of strategies that drive the **SacSewer's** routine day-to-day operations.

SacSewer owns and operates a variety of physical assets. In support of **SacSewer's** goals of meeting regulatory requirements, achieving identified service level targets, and operating in a cost-effective manner, it has documented several efforts designed to take all feasible steps to eliminate. The **SacSewer's SSMP Blockage Control Assessment Program** is used to identify strategies **SacSewer** implements to identify and mitigate failure modes that cause spills.

All spill response in **SacSewer** follows the **Spill Emergency Response Plan Manual**. This Program does not cover initial spill emergency response.

500.3. Program

The **Blockage Control Assessment Program** contains both failure mode strategies that are broken down by asset type and programs that are intended to limit specific causes of stoppages independent of asset type.

The **Blockage Control Assessment Program** encompasses several separately documented but sometimes-interrelated failure modes. Each failure mode has an associated strategy, which is a reference document to the **SSMP**. The strategies listed below:

- **Main Line Stoppage Failure Mode Strategy**
 - Strategy to cost-effectively reduce Main Line spills.
- **Lower Lateral Stoppage Failure Mode Strategy**
 - Strategy to cost-effectively reduce Lower Lateral spills.
- **Manhole Stoppage Failure Mode Strategy**
 - Strategy to reduce the frequency of Manhole spills.
- **Pump Station Component Failure Mode Strategy**
 - Strategy to cost-effectively sustain the pressurized collection system.
- **Damage by Others Failure Mode Strategy**
 - Strategy to cost-effectively reduce spills caused by damage from others.
- **Under Capacity Failure Mode Strategy**
 - Strategy to ensure consistency in the evaluation of potential capacity deficiencies.

SacSewer has documented that Fats, Oils, and Grease (FOG) and root stoppages are the cause of the vast majority of stoppages in the system, independent of asset type. So, in addition to the above strategies, a program was created to limit FOG stoppages and a program was created to limit root stoppages. These programs are part of the overall **Blockage Control Assessment Program** and are reference documents to the **SSMP**. The programs are listed below:

- **FOG Control Program**
 - Program to limit the amount of FOG discharged to the sewer system.
- **Root Control Program**
 - Program to limit the number of Root caused stoppages.

500.4. Effectiveness Measure

The effectiveness of the **Blockage Control Assessment Program** is based on how **SacSewer** is meeting the Service Levels that relate to Spills. Meeting the Main Line Overflow Rate, Lower Lateral Overflow Rate, and BIS Rate Service Levels indicate that this Program is effective. Not meeting the Service Levels will mean that the Program is not functioning as it should. The effectiveness is monitored through the **Management Plan Assessment Program**.

501 Main Line Stoppage Failure Mode Strategy

501.1. Purpose

The purpose of this document is to define the strategy that is used to cost effectively reduce the frequency of spills caused by main line stoppages.

501.2. Background

This document is directly referenced in the Board Approved **Sewer System Management Plan (SSMP)** as part of the **Blockage Control Assessment Program** and as part of the **Gravity Asset Management Strategy**.

Main line stoppages are blockages in the pipe that impede the movement of sewage through the collection system. Blockages can be composed of one or a combination of roots, grease, and debris. Strategies to reduce the frequency of spills due to stoppages can be proactive or reactive, as defined by the **Maintenance Terminology Definitions** approved by the Organizational Planning Team (OPT).

This strategy does not cover spill emergency response. All spill responses follow the **Spill Emergency Response Plan Manual** and the **Customer Call Handling and Service Request Creation Policy**. If a stoppage was caused by a structural problem, refer to the **Structural Assessment Program**. If an spill was caused by a capacity constraint, refer to the **Under Capacity Failure Mode Strategy**.

Stoppages in a main line can result in a spill. The consequence of failure is the cost associated with a spill (initial response, cleanup activities, reporting, etc.), as well as environmental and social risk costs. Environmental and social aspects are evaluated on a case-by-case basis, and where quantifiable are added to the base costs.

501.3. Strategy

Two approaches will be used to reduce main line stoppages: proactive and reactive.

Proactive Approach:

Before a stoppage has occurred, the following tools are in place to attempt to reduce the risk of a spill in the main line.

1. Main Line Scheduled Maintenance Program (MLSM Program)

This program focused on preventing future stoppages by cleaning main lines regularly that have known, but maintainable sewer issue such as roots, grease, and debris. Main lines can be placed on preventive maintenance (PM) from the TVI Review Group or from the **Generic BCE Process**. Best judgment and cost analysis is used along with previous history to determine the maintenance interval and the job plan.

Program Details:

- A PM interval is determined by several factors listed below:
 - The history of the main line is reviewed to see if there are recurring problems (roots, grease, or debris).
 - If there is a prior stoppage history, the shortest stoppage interval will be used as the minimum PM interval if it is applicable.
 - A first stoppage on a main line is followed by a TVI in 12 months to determine if it needs to be put on a PM as well as the PM interval.
- All main line schedules will be adjusted per the **Main Line Incorrect Cleaning Frequency Strategy**, or if not applicable the **TVI Policy**.
- PM Job plan is chosen.
 - Appropriate job plan will be determined depending on the findings; roots, grease, or debris.
 - New technologies are introduced and piloted successfully through the Collaboration and Innovation Team (CIT), which is documented in the **Management Plan Assessment Program**.
 - Change in PM Job plan may also fall under the direction of the **TVI Policy**.
- The effectiveness of this program is measured by the number of repeat stoppages on the main lines that were due to the PM failure. The lower the number, the more effective the program. Repeat stoppages will require an investigation of the event. Failure to prevent a future stoppage due to frequency failure and incorrect job plans are the fault of this program.

2. Main Line Scheduled Inspection Program (MLSI)

This program is focused on preventing asset failures such as a stoppage or structural collapse by putting main lines over the age of 40 on an inspection interval to identify any problems that may develop before they become an issue.

Program Details:

- The main line assets that will be included in the MLSI program are the assets that meet the following criteria:
 - Assets over 40 years of age
 - Assets that are part of the MLCA Program or the MLSM Program will not be part of the MLSI program.

- The MLSI interval is determined based on the asset diameter as follows:
 - 6-inch diameter and less: 10 year frequency
 - 8-12 inch diameter: 12 year frequency
 - Greater than 12 inch diameter: 15 year frequency

MLSI work orders:

- The CMMS system will auto generate the TVI work orders.
- The lines where the TVI cannot be completed due to a blockage will be cleaned as defined in **SacSewer's** Standards and then TV'd.

3. Main Line Critical Assets Program (MLCA)

This Program is focused on preventing asset failures such as a stoppage or structural collapse by putting main line assets that are in a geographic proximity to critical features on inspection interval to identify any problems that may develop before they become an issue.

Program Details:

The main line assets that will be included in the MLCA program are the assets that meet the following criteria:

- Assets within 125 feet of a waterway
- Assets within 15 feet of a railway
- Assets that intersect with a highway or levee

Assets will be inspected on a 5-year frequency. The appropriate inspection job plan is determined based on the diameter of the asset.

This program will start July 2020.

MLCA work orders:

- The CMMS system will auto generate the TVI work orders.
- The lines where the TVI cannot be completed due to a blockage will be cleaned as defined in **SacSewer's** Standards and then TV'd.

4. Main Line Visual Flow Inspection Program (VFI Program):

This program is focused on reducing main line spills by visually inspecting the flow in the line at a manhole. The program requires at least 90% of the main lines that are not scheduled to be cleaned or inspected in a calendar year to be visually inspected per the **Visual Flow Inspection (VFI Program)**.

Program Details:

- Compare the flow with the VFI Normal Flow Depth chart.
 - If the flow is determined to be stagnant or surcharged:
 - The main line with the issue will be cleaned within 4 hours. A follow-up TVI WO is written.

- The TVI will be reviewed. Review of the TVI may create future actions that may include Business Case Evaluation (BCE), future TVI, or adding the main line to the **MLSM Program**.
- If the flow is determined to be slow flow:
 - The main line will be scheduled to be cleaned within the next 5 days. A follow-up TVI WO is written.
 - The TVI will be reviewed. Review of the TVI may create future actions that may include Business Case Evaluation (BCE), future TVI, or adding the main line to the **MLSM Program**.
 - If the main line experiences a second slow drain within 10 years of the first cleaning, the main line will be assigned to the **MLSM Program**.
- If the flow is determined stagnant, surcharged or slow, and the main line with the issue was on Area Scheduled Maintenance (ASM, a former Program no longer used), then the main line shall be assigned to **MLSM Program**.
- The effectiveness of this program will be evaluated by trending the main line spill rate on main lines that are not on **MLSM Program** or have not been TVI'd or cleaned that year.

5. Main Line Easement Rehabilitation Program

This program is a revised version of the main line lining for root mitigation effort. It is a proactive program focused on repair and rehabilitation of defective main line easement assets on MLSM program i to prevent future stoppages or structural collapses. This program will also reduce customer impact, reduce risk to employees, and reduce maintenance and operations costs.

Program Details:

Easement areas will be selected each year for rehabilitation based on ranking. Easement areas are assigned a ranking determined by a number of risk factors including age, spill history, and quantity of PMs. Main lines within the selected area will then be evaluated for rehabilitation needs. The program takes a 2-year phase approach to rehabilitate each selected easement area.

Phase 1 – Investigation & Planning (Year 1):

- Rehabilitation area is identified
- Area is evaluated for rehabilitation needs
- Evaluation and estimated cost will be determined, and budgeted for next fiscal year

Assets selection criteria:

- Easement Main Line assets on 12-month frequency or less will be evaluated for CIPP lining
- Main lines qualified for lining will have lower laterals evaluated
 - Lower laterals without a cleanout will be replaced
 - Lower laterals with a cleanout will be evaluated for asset and tap condition
- Main line assets that cannot be lined will be assessed individually through BCE

Phase 2 – Construction (Year 2):

- Project will be bid out to contractors
- Construction is completed for evaluated area within fiscal year

This program will start July 2020

6. **Quality Control for Sewer Pipe Cleaning Procedure/Policy:**

The **Quality Control for Sewer Pipe Cleaning Procedure/Policy** details how **SacSewer** spot checks main line cleaning using CCTV to ensure adequate cleaning.

7. **Main Line Incorrect Cleaning Frequency Strategy:**

This strategy is focused on reducing the number of spills experienced by main lines on the **Main Line Scheduled Maintenance Program (MLSM Program)** that may have incorrect cleaning frequencies assigned or that over time, require adjustments to its cleaning frequency. Cleaning frequencies of main lines on the **MLSM program** will be adjusted based on their latest preventive maintenance (PM) observations

8. **SacSewer Standards and Specifications (Standards)**

8.1 Standards provide minimum requirements for the **SacSewer** public sewer system. The Standards apply to planning, design, construction, and rehabilitation of the public sewer collection system that **SacSewer** operates and maintains, require **SacSewer** approval, or are installed within existing or new public rights-of-way or easements. The **Standards ensure SacSewer's facilities are consistently designed and constructed and** provide for the safety and general welfare of the public. Included are requirements such as minimum pipe sizes and slopes that are intended to keep a scouring velocity in the system, as well as proper placement requirements that are intended to minimize pipe irregularities and root intrusion locations.

8.2 Deviations to the Standards follow the **Process for Deviation from SacSewer Standards and Specifications**.

8.3 Quality control is employed by plan review and inspections. Plans are submitted to **SacSewer** by the local jurisdiction and are reviewed by **SacSewer** to ensure public facilities are designed in accordance with the Standards. Inspections are conducted by an **SacSewer** representative during construction and include confirming proper bedding, pipe placement, and initial backfill, air testing to verify joint integrity, and a TVI to check for defects including offset joints, sags, and other defects.

9. **FOG Program**

The public outreach component is used to reduce grease entering the system. **SacSewer** uses a variety of approaches to educate the public about fats, oils, and grease (FOG) control. These approaches include televised public outreach through local channels, public service announcements on the local radio stations, FOG decals on all **SacSewer's** vehicles, FOG prevention information booths at local schools, conventions, conferences, and community fairs; providing education and information to owners and property managers and property maintenance personnel through partnership with the California Apartment Association (CAA); ongoing enhancement of the **www.stoptheclog.com** information website, and FOG prevention information inserted with monthly County utility billing pamphlets.

10. **SacSewer Ordinance**

The **SacSewer Ordinance** forbids activities that are known to cause spills. The **SacSewer Ordinance** defines uniform requirements for design, construction, and use of the sewer system. The **SacSewer Ordinance** provides for the enforcement of these requirements and defines responsibility for sewer collection system maintenance.

The **SacSewer Ordinance** prohibits activities that may damage sewers or obstruct flow that may cause a spill. The **SacSewer Ordinance** also prohibits discharges that may cause spills such as: large flows exceeding quantities normally allowed for permitted use; cementitious materials; garbage; any substance that may cause damage to the structural integrity of the sewer system; fats, oils, and grease in amounts that can cause a build-up in the sewer system and alter flows in the system. Prohibited activities and discharges can be anything that can cause a spill, and are not limited to those listed above.

Reactive Approach:

The reactive approach is performing corrective work after a stoppage or defect has occurred. The **Spill Emergency Response Plan Manual** lays out the initial spill response and cross-references the policies below:

1. Televised Inspection Policy (TVI Policy)

The **TVI Policy** defines when a main line that has had a stoppage will be inspected with Closed Circuit Television Inspection (CCTV) equipment. Major portions of the **TVI Policy** that address a main line stoppage include:

- 1.1.** The stoppage follow-up (failure analysis) guidelines of the **TVI Policy** prescribes when, why and who will perform the televised inspection (TVI) under certain conditions.
- 1.2.** The TVI will be reviewed. Review of the TVI may create future actions that may include Business Case Evaluation (BCE), future TVI, or Preventive Maintenance (PM) changes.

2. Generic Business Case Evaluation Process (Generic BCE Process)

If a problem is not covered by a separate policy or procedure, then a business case evaluation is conducted as described in the **Generic BCE Process**.

3. Sacramento Area Sewer District Sewer Ordinance (SacSewer Ordinance)

The **SacSewer Ordinance** establishes penalties for violations, including illegal discharges that have resulted in a stoppage.

501.4. Effectiveness Measure

The effectiveness of this Strategy is tracked by the main line overflow rate service level. Per the Board Approved **SSMP**, **SacSewer** trends and prominently displays the main line overflow rate graphs. The rate is presented to management, and staff may receive direction to make any needed changes to the documents contained here, as described in the **Management Plan Assessment Program**.

502 Lower Lateral Stoppage Failure Mode Strategy

502.1. Purpose

The purpose of this document is to define the strategy that is used to cost effectively reduce the frequency of spills caused by lower lateral stoppages.

502.2. Background

This document is directly referenced in the Board Approved **Sewer System Management Plan (SSMP)** as part of the **Blockage Control Assessment Program** and as part of the **Gravity Asset Management Strategy**.

Lower lateral stoppages are blockages in the pipe that impede the movement of sewage through the collection system. Blockages can be composed of one or a combination of roots, grease, and debris. Strategies to reduce the frequency of spills due to stoppages can be proactive or reactive, as defined by the **Maintenance Terminology Definitions** approved by the Organizational Planning Team.

This Strategy does not cover spill emergency response. All spill responses follow the **Sanitary Sewer Spill Emergency Response Plan** and the **Customer Call Handling and Service Request Creation Policy**. If a stoppage was caused by a structural problem, refer to the **Structural Assessment Program**.

Stoppages in lower laterals can result in spills. The consequence of failure is the cost associated with a spill (initial response, cleanup activities, reporting, etc.), as well as environmental and social risk costs. Environmental and social aspects are evaluated on a case-by-case basis, and where quantifiable are added to the base costs.

The **Sacramento Area Sewer District Sewer Ordinance (SacSewer Ordinance)** (effective on February 9, 2018) defines the portion of the lateral that is the lower lateral.

502.3. *Strategy*

Two approaches will be used to reduce lower lateral stoppages: proactive and reactive.

Proactive Approach:

Before a stoppage has occurred, the following tools are in place to reduce the spill risk in the lower lateral.

1. Lower Lateral Scheduled Maintenance Program (LLSM Program)

- 1.1.** The **LLSM Program** is a program focused on preventing future stoppages by cleaning lower laterals regularly that have known, but maintainable sewer issue such as roots, grease, and debris. Lower laterals can be placed on preventive maintenance (PM) from the **Lower Lateral Repair-Maintain-Replace Decision Policy** or from a **Generic BCE Process** decision. Best judgment and cost analysis is used along with previous history to determine the maintenance interval.

Program details:

- A PM interval is determined by several factors listed as follows.
 - The history of the lower lateral is reviewed to see if there are recurring issues (roots, grease, or debris).
 - If there is a prior stoppage history, the shortest stoppage interval will be used as the minimum PM interval if it is applicable.
 - A first stoppage on a lower lateral is followed by a TVI in 12 months to determine if it needs to be put on a PM as well as the PM interval.
- A PM Job plan is chosen.
 - Appropriate job plan will be determined depending on the findings: roots, grease, or debris.
 - New technologies are introduced and piloted through the Collaboration and Innovation Team (CIT), which is documented in the **Management Plan Assessment Program**.
- The effectiveness of this program is measured by the number of repeat stoppages on lower laterals that were due to the PM failure. The lower the number, the more effective the

program. Repeat stoppages will require an investigation of the event. Failure to prevent a future stoppage due to frequency failure and incorrect job plans are the fault of this program.

2. Lower Lateral Area Inspection Program (LLAIP)

2.1. The **LLAIP** is focused on reducing lower lateral spills and BISs by concentrating the TVIs and cleanout install efforts in geographical locations (grids) prioritized according to spill ratio (BIS ratio and spill ratio overlap). The highest spill ratio grids will be completed first. This process is based on the assumption that areas that have had past spills and BISs have a higher risk of future occurrences.

Program details:

- **LLAIP – CCTV** - This portion of the program ended in FY 1819.
- **LLAIP - Cleanout installs**
 - Annually **SacSewer** selects a predetermined number of lower laterals to write cleanout install work orders based on budget and grid location.
 - If a cleanout is found buried, the cleanout is to be raised to grade and a Carson box is to be installed.
 - If a cleanout does not exist, one is to be installed.
 - Lower laterals will have a functioning SRV installed if a functioning SRV does not exist.
 - Record the cleanout location.
 - Cleanout location will be determined per the **Locate, Measure, and Document Existing District Cleanouts Procedure**.
- The effectiveness of this **LLAIP** program will be determined by evaluating the month-to-month trends of the BIS Rate and Lower Lateral Overflow Rate. Downward trends during the initial years and a holding pattern after that, means that the program is working. An upward trend will require a reworking of the program.

3. Lower Lateral Scheduled Inspection Program (LLSI)

The **LLSI Program** is focused on preventing asset failures such as a stoppage or structural collapse by putting lower Laterals over the age of 40 on an inspection interval to identify any problems that may develop before they become an issue. This Program will start July 1, 2021.

Program Details:

- The Lower Lateral assets that will be included in the LLSI program are the assets that meet the following criteria:
 - Assets over 40 years of age
 - Assets are not part of the Lower lateral Scheduled Maintenance Program (LLSM).
 - Assets that have an existing Cleanout.
- The LLSI interval is determined based on the material type as follows:
 - MULTI material type: 8-year frequency
 - Not MULTI and Not ABS material type: 10-year frequency

- ABS material type: 12-year frequency

LLSI work orders:

- The CMMS system will auto generate the TVI work orders.
- The lines where the TVI cannot be completed due to a blockage will be cleaned as defined in **SacSewer's** Standards and then TV'd.

4. Lower Lateral Incorrect Cleaning Frequency Strategy

This strategy is focused on reducing the number of spills experienced by lower laterals on the **Lower Lateral Scheduled Maintenance Program (LLSM Program)** that may have incorrect cleaning frequencies assigned or that over time, require adjustments to its cleaning frequency. Frequencies of lower lateral assets on the **LLSM program** will be adjusted based on their latest preventive maintenance (PM) observations.

5. Televised Inspection Policy (TVI Policy)

The TVI Manual directs inspection of the visible portion of the lower laterals during CCTV inspections. If problems are detected during the CCTV inspection, a BCE is performed following the Generic BCE Process unless covered under the Lower Lateral Repair-Maintain-Replace Decision Policy.

6. SacSewer Standards and Specifications (Standards)

- 6.1.** The **Standards** provide minimum requirements for the **SacSewer** public sewer system. The Standards apply to planning, design, construction, and rehabilitation of the public sewer collection system that **SacSewer** operates and maintains, require **SacSewer's** approval, or are installed within existing or new public rights-of-way or easements. These **Standards** ensure **SacSewer's** facilities are consistently designed and constructed and provide for the safety and general welfare of the public. Included are requirements such as minimum pipe sizes and slopes that are intended to maintain a scouring velocity in the system, as well as proper placement requirements that are intended to minimize pipe irregularities and root intrusion locations.
- 6.2.** Deviations to the Standards follow the **Process for Deviation from SacSewer Standards and Specifications**.
- 6.3.** Quality assurance is achieved by plan review and field inspections. Plans are submitted to **SacSewer** by the local jurisdiction and are reviewed by **SacSewer** to ensure public sewer facilities are designed in accordance with the Standards. Inspections are conducted by an **SacSewer** representative during construction and include confirming proper bedding, pipe placement, and initial backfill, air testing to verify joint integrity, and a TVI to check for defects including offset joints, sags, and other defects.

7. FOG Program

The public outreach component is used to reduce fats, oils, and grease (FOG) from entering the system. **SacSewer** uses a variety of approaches to educate the public about FOG control. These approaches can include televised public outreach through local channels; public service announcements on the local radio stations; FOG decals on all **SacSewer** vehicles; FOG prevention school assemblies, information booths at local schools, conventions, conferences, and community fairs; providing education and information to owners and property managers and property maintenance personnel through partnership with the California Apartment Association (CAA);

ongoing enhancement of the www.stoptheclog.com information website; and FOG prevention information inserted with monthly County utility billing statements.

8. **SacSewer Ordinance**

The **SacSewer Ordinance** forbids activities that are known to cause stoppages. The **SacSewer Ordinance** defines uniform requirements for design, construction, and use of the sewer system. The **SacSewer Ordinance** provides for the enforcement of these requirements and defines responsibility for sewer collection system maintenance. The **SacSewer Ordinance** prohibits activities that may damage sewers or obstruct flow that may cause a stoppage. The **SacSewer Ordinance** also prohibits discharges that may cause stoppages such as; large flows exceeding quantities normally allowed for permitted use; cementitious materials; or garbage. The **SacSewer Ordinance** prohibits any substance that may cause damage to the structural integrity of the sewer system such as hazardous waste, chemicals, or petroleum. The **SacSewer Ordinance** also prohibits fats, oils, and grease in amounts, either alone or combined with other discharges, that cause any build-up in any portion of **SacSewer** sewer collection system. Prohibited activities and discharges can also be anything that can cause a stoppage, and not limited to that listed above.

Reactive Approach:

The reactive approach is performing corrective work after a stoppage or defect has occurred. The **Spill Emergency Response Plan Manual** lays out the initial spill response and cross-references the policies below:

1. **Televised Inspection Policy (TVI Policy)**

The **TVI Policy** defines when a lower lateral that has had a stoppage will be inspected with Closed Circuit Television Inspection (CCTV) equipment. Major portions of the **TVI Policy** that address a lower lateral stoppage include the following:

- 1.1. The stoppage follow-up (failure analysis) guidelines of the **TVI Policy** prescribes when, why and who will perform a televised inspection (TVI) under certain conditions.
- 1.2. The TVI will be reviewed. Review of the TVI may create future actions that may include Business Case Evaluations (BCEs), future TVIs, or Preventive Maintenance (PM) changes.

2. **Generic Business Case Evaluation Process (Generic BCE Process)**

If a problem is not covered by a separate policy or procedure, such as the **Lower Lateral Repair-Maintain-Replace Decision Policy**, then a business case evaluation is conducted as described in the **Generic BCE Process**.

3. **SacSewer Ordinance**

The **SacSewer Ordinance** establishes penalties for violations, including illegal discharges that have resulted in a stoppage.

502.4. *Effectiveness Measure*

The effectiveness of this Strategy is tracked by the Lower Lateral Overflow Rate and Backups Into Structure Rate Service Levels. The Strategy will be evaluated only on overflows or BISs that are caused by roots, grease, or debris. The Board Approved **SSMP** directs **SacSewer** to trend and prominently display the Lower Lateral Overflow Rate graphs. The Backup-Into-Structures Rate is also affected by lower lateral stoppages. Both rates are presented monthly to management, and staff receives direction to make any changes to the documents contained within this Strategy, as described in the **Management Plan Assessment Program**.

503 Manhole Stoppage Failure Mode Strategy

503.1. Purpose

The purpose of this document is to define the strategy that is used to cost-effectively reduce the frequency of spills. caused by manhole stoppages.

503.2. Background

This document is directly referenced in the Board Approved **Sewer System Management Plan (SSMP)** as part of the **Blockage Control Assessment Program** and as part of the **Gravity Assets Management Strategy**.

Manhole stoppages are blockages in the manhole that impede the movement of sewage through the collection system. Blockages can be made up of one or any combination of roots, grease, or debris. Strategies to reduce the frequency of spills due to stoppages can be proactive or reactive, as defined in the **Maintenance Terminology Definitions** approved by the Organizational Planning Team.

This strategy does not cover spill emergency response. All spill responses follow the **Emergency Response Plan Manual** and the **Customer Call Handling and Service Request Creation Policy**. If a stoppage was caused by a structural problem, refer to the **Structural Assessment Program**.

Stoppages in a manhole may result in a spill. The consequence of failure is the cost associated with a spill (initial response, cleanup activities, reporting, etc.), as well as environmental and social risk costs. Environmental and social aspects are evaluated on a case-by-case basis, and where quantifiable are added to the base costs.

503.3. Strategy

Two approaches are used to reduce manhole stoppages: proactive and reactive.

Proactive Approach:

Before a stoppage has occurred, **SacSewer** employees use the following tools to reduce the risk of spills.

1. Manhole Scheduled Maintenance Program (MHSM Program)

The **MHSM Program** is focused on preventing future stoppages by cleaning manholes regularly that have known, but maintainable sewer issues such as roots, grease, and debris. Manholes can be placed on preventive maintenance (PM) from the **TVI Policy** or from the **Generic BCE Process**. Best judgment and cost analysis is used along with previous history to determine the maintenance interval and the job plan.

Program Details:

- A PM interval for the manhole is determined by several factors listed below: chosen for the manhole.
 - The history of the manhole is reviewed to see if there are recurring problems (roots, grease, or debris).
 - If there is prior stoppage history, the shortest stoppage interval will be used as the minimum PM interval.
 - A first Stoppage on a manhole is followed by a TVI in 12 months to determine if it needs to be put on a PM as well as the PM interval.

- A PM job plan is chosen.
 - Appropriate job plan will be determined depending on the findings; roots, grease, or debris.
 - Through the Collaboration and Innovation Team (CIT) new technologies are introduced and piloted successfully. Current pilot programs include the application of epoxy coating to an eroded manhole to extend its useful life.
 - Manhole schedules will be adjusted per of the **TVI Policy**.
- The program effectiveness is measured by the number of repeat stoppages on the manholes that were due to the PM failure. Repeat stoppages will require an investigation of the event. Failure to prevent a future stoppage due to frequency failure and incorrect job plans are the fault of this program.

2. FOG Program

The public outreach component is used to reduce grease entering the system. Historically, **SacSewer** has taken a variety of approaches to educate the public about Fats, Oils, and Grease (FOG) control and includes the following; public service announcements on local TV channels; public service announcements on local radio stations; FOG decals on all **SacSewer** vehicles; FOG prevention information booths at local schools, conventions, conferences, and community fairs; providing education and information to owners and property managers and property maintenance personnel through partnership with the California Apartment Association (CAA); ongoing enhancement of the www.stoptheclog.com information website; and FOG prevention information inserted with monthly County utility billing pamphlets.

3. Main Line Scheduled Maintenance Program (MLSM Program)

This program is defined in the **Main Line Stoppage Failure Mode Strategy**. Manholes are opened and visually inspected during main line cleaning.

4. Visual Flow Inspections (VFI)

This program is defined in the **Main Line Stoppage Failure Mode Strategy**. Manholes are opened and visually inspected during flow inspections.

5. Standards and Specifications (Standards)

- 5.1. The **Standards** provide minimum requirements for the **SacSewer** public sewer system. The Standards apply to planning, design, construction, and rehabilitation of the public sewer collection system that **SacSewer** operates and maintains, require **SacSewer's** approval, or are installed within existing or new public rights-of-way or easements. These **Standards** ensure **SacSewer's** facilities are consistently designed and constructed and provide for the safety and general welfare of the public. Included are requirements such as minimum pipe sizes and slopes that are intended to maintain a scouring velocity in the system, as well as proper placement requirements that are intended to minimize pipe irregularities and root intrusion locations.
- 5.2. Deviations to the **Standards** follow the **Process for Deviation from SacSewer Standards and Specifications**.
- 5.3. Quality control is achieved by plan review and field inspections. Plans are submitted to **SacSewer** by the local jurisdiction and are reviewed by **SacSewer** to ensure public sewer

facilities are designed in accordance with the Standards. Inspections are conducted by an **SacSewer** representative during construction and include confirming proper bedding, pipe placement, and initial backfill, air testing to verify joint integrity, and a TVI to check for defects including offset joints, sags, and other defects.

6. **SacSewer Ordinance**

The **SacSewer Ordinance** forbids activities that are known to cause spills. The **SacSewer Ordinance** defines uniform requirements for design, construction, and use of the sewer system. The **SacSewer Ordinance** provides for the enforcement of these requirements and defines responsibility for sewer collection system maintenance. The **SacSewer Ordinance** prohibits activities that may damage sewers or obstruct flow that may cause a spill. The **SacSewer Ordinance** also prohibits discharges that may cause spills such as: large flows exceeding quantities normally allowed for permitted use; cementitious materials; garbage; any substance that may cause damage to the structural integrity of the sewer system; fats, oils, and grease in amounts that can cause a build-up in the sewage system and alter flows in the system. Prohibited activities and discharges can also be anything that can cause a spill, and not limited to that listed above.

7. **Quality Control for Sewer Pipe Cleaning Procedure/Policy:**

This program is defined in the **Main Line Stoppage Failure Mode Strategy**. Manholes that are accessed to perform a TVI of a main line will also have a manhole TVI performed as part of the inspection.

8. **Main Line Incorrect Cleaning Frequency Strategy:**

This program is defined in the **Main Line Stoppage Failure Mode Strategy**. Manholes that are accessed to perform a TVI of a main line will also have a manhole TVI performed as part of the inspection.

9. **Main Line Scheduled Inspection Program (MLSI) and Main Line Critical Assets Program (MLCA)**

These programs are defined in the **Main Line Stoppage Failure Mode Strategy**, "If a manhole is accessed to perform a TVI of a main line, a manhole TVI shall also be performed." Section 107.5 in the TVI Manual.

Reactive Approach:

The reactive approach is performing corrective work after a stoppage or defect has occurred. The **Emergency Response Plan Manual** lays out the initial spill response and cross-references the policies below:

1. **Televised Inspection Policy (TVI Policy)**

The **TVI Policy** defines when a manhole that has had a stoppage will be inspected by Closed Circuit Television Inspection (CCTV) equipment. Major portions of the **TVI Policy** that address a manhole stoppage include the following:

- 1.1. The Stoppage Follow-up (Failure Analysis) guidelines of the **TVI Policy** prescribe when, why, and who will perform a televised inspection (TVI) under certain conditions.
- 1.2. The TVI will be reviewed. Review of the TVI may create future actions, that may include Business Case Evaluations (BCEs), future TVIs, or Preventive Maintenance (PM) changes.

2. **Generic Business Case Evaluation Process (Generic BCE Process)**

If a problem is not covered by a separate policy or procedure, then a business case evaluation is conducted as described in the **Generic BCE Process**.

3. Sacramento Area Sewer District Sewer Ordinance (SacSewer Ordinance)

The **SacSewer Ordinance** establishes penalties for violations, including illegal discharges that have resulted in a stoppage.

503.4. Effectiveness Measure

The effectiveness is shown by trending manhole stoppages on an annual basis. **SacSewer** staff query data annually for manhole stoppage failures and compare it to the previous year data to measure a trending behavior. If there is an increase in manhole stoppage failures from the previous year, this Strategy will be re-evaluated, and solutions to reduce manhole stoppage failures will be presented to Management in accordance with the **Management Plan Assessment Program**.

504 Pump Station Component Failure Mode Strategy

504.1. Purpose

The purpose of this strategy is to identify circumstances in which non-structural pump station components may fail and approaches to cost effectively minimize failures.

504.2. Background

This Strategy is referenced in the Board Approved **Sewer System Management Plan (SSMP)** as part of the **Blockage Control Assessment Program** and as part of the **Pressurized Assets Management Strategy**.

Two approaches will be used to reduce pump station component failures: reactive and proactive. The **Maintenance Terminology Definition** document defines reactive and proactive activities. The following table provides examples of reactive and proactive activities found within the document.

504-1 Pump Station Component Failure Mode Strategy Approaches

Reactive activities	Proactive activities
Event response repairs	Facilities scheduled maintenance
Customer calls	Condition assessments
Spill response	Structural assessment program inspections

This Strategy does not cover initial spill emergency response. All spill responses follow **Emergency Response Plan Manual** and the **Customer Call Handling and Service Request Creation Policy**.

For clarity, this Strategy will use pump station to refer to both sewer pump and sewer lift stations.

Pump station component failures may result in spills. Pump station component structural failures are covered under the **Pump Station Structural Assessment Strategy**.

Aerial force main crossings that have been identified in the **Creek Protection Project (Project)** are not covered by this document.

504.3. Definitions used in Section 504

Pump Station Component – Any item relating to the pressurized sewer system.

Pump Station Component Failure – Any failure in a pressurized asset that is not structural.

504.4. Strategy

This Strategy incorporates reactive and proactive approaches for minimizing pump station component failures in the most cost-effective way.

Reactive Approach:

1. Failure Analysis

When failures occur the pump station components are inspected, the operating conditions are evaluated, and tests are performed to determine the failure cause. Depending on the failure cause, the Sacramento Area Sewer District (**SacSewer**) may make changes to maintenance activities, frequencies, system design, operating practices, repair, or replace components. The outcome of the failure analysis may fall under the **Management Plan Assessment Program**.

1.1. Generic Business Case Evaluation Process (Generic BCE Process)

The **Generic BCE Process** may be employed to analyze the problem causing the spill. The resulting recommendations may include any one or a combination of the following:

- Add or change a Preventive Maintenance (PM) schedule.
- Perform a repair on the component
- Replace the component
- Change operating practices.

2. Computerized Maintenance Management System (CMMS)

2.1 Pump station component failures are recorded in the **SacSewer's** CMMS. CMMS is used as a repository for the **SacSewer's** work orders.

3. Supervisory Control and Data Acquisition (SCADA)

3.1 The SCADA system alerts **SacSewer** of any unusual operating pattern at a pump station. For example, if a pump fails to start, an alert will be sent, allowing **SacSewer** staff to respond and determine the nature of the problem.

Proactive Approach:

1. Pump Station and Force Mains Inventory and Expenditures

1.1 **SacSewer** has developed an inventory and expenditure list for each pump station. The inventory and expenditure list contains a list of all the major components at each pump station, and includes the year the components were installed; the estimated life cycle estimates the remaining useful life for each component. Maintenance costs for each of the major components are incorporated in the inventory and expenditure list and the list is shared with Mechanical.

2. Facilities Scheduled Maintenance

2.1 The Facilities Scheduled Maintenance program is an existing program that has been in place to put pump station components onto a regularly scheduled maintenance frequency to prevent failures.

Program details:

- A PM frequency may be determined by several factors which are listed below. PM changes may fall under the **Management Plan Assessment Program**.
 - Manufacturers recommended maintenance frequency
 - The component history is reviewed to check for recurring issues.
 - The **Generic BCE Process** may set the maintenance frequency.
- A PM activity is chosen
 - Manufacturers recommended maintenance method.
 - The component history is reviewed to check for recurring issues.
- The effectiveness of this program is measured by the number of failures of components that are a part of this program.

3. SCADA

- 3.1** The SCADA system alerts **SacSewer** of any unusual operating patterns at a pump station. For example, high level wet well alerts are set to allow sufficient time for **SacSewer** staff to respond to the problem before a spill occurs.

4. Sacramento Area Sewer District Standards and Specifications (Standards)

- 4.1** **SacSewer** has outlined the requirements for new and replacement pump stations. These **Standards** were established to standardize equipment, so that all stations would have similar operation and maintenance characteristics. The **Standards** require two hours emergency storage capacity (using Peak Wet Weather Flow (PWWF) estimates). Critical stations require four hours of emergency PWWF storage (205.4.19). This allows **SacSewer** time to repair equipment failure or set up bypass pumping before a spill occurs.
- 4.2** Deviations to the Standards follow the Process **for Deviation from District Standards and Specifications**.
- 4.3** Quality assurance is achieved by plan review and inspections. Plans are submitted to **SacSewer** by the local jurisdiction and are reviewed by **SacSewer** to ensure public sewer facilities are designed in accordance with the Standards.

5. Utility Reliability

- 5.1** **SacSewer** relies on electrical power to operate the pump stations. Electrical power is supplied by the different utility companies in the area of the pump station. Since **SacSewer** does not have control over electrical power, **SacSewer** has four approaches to handling electrical power outages. The following options are used depending on the downtime and cost effectiveness of each option:
- Install stationary generators.
 - Install bypass pumping at the station.
 - Deliver a portable generator to the stations as needed.
 - Install additional storage capacity.

504.5. *Effectiveness Measure*

The effectiveness of this Strategy is tracked by the number of spills due to pump station component failures. Pump station component failures are documented in CMMS. This strategy is evaluated for cost effective operations, mitigation of spill risk, and reduction of spill consequence.

505 **Damage By Others Failure Mode Strategy**

505.1. *Purpose*

This document defines strategies used to mitigate and reduce damage by others to Sacramento Area Sewer District (**SacSewer**) assets.

505.2. *Background*

Damage caused by others include accidental events such as pipeline breaks caused by contractors or other utilities striking an **SacSewer** asset, unintentional damage such as a vehicle striking a perimeter fence, and intentional damage such as vandalism or the dumping of debris into **SacSewer** manholes.

This Strategy incorporates reactive and proactive approaches for mitigating and reducing damage by others failure in the most cost-effective way.

This Strategy is directly referenced in the Board Approved **Sewer System Management Plan (SSMP)** as part of the **Blockage Control Assessment Program** and as part of the **Gravity Assets Management Strategy**.

This Strategy does not cover initial Sanitary Sewer spill emergency response. All spill responses follow the **Emergency Response Plan Manual** and the **Customer Call Handling and Service Request Creation Policy**.

505.3. *Strategy*

Two approaches will be used to reduce damage by others: reactive and proactive. These approaches are defined and broken down in the **Maintenance Terminology Definitions** that was approved by the Organizational Planning Team (under the **Management Plan Assessment Program**).

Reactive Approach:

After damage to an asset has occurred, **SacSewer** investigates and attempts to mitigate the damage and reduce the risk of future damage to the asset through the use of the following:

1. Underground Facility Damage Investigation Process

The **Underground Facility Damage Investigation Process** specifies the process for investigating underground facility damage incidents, determining their causes, and identifying the persons or groups responsible for the damage.

2. Generic Business Case Evaluation Process (Generic BCE Process)

The **Generic BCE Process** may be used to analyze the cost of repairing damage or reduce the risk of future damage.

2.1 Vandalism - Specific assets may be modified to prevent repeat incidents of vandalism or other intentional damage. For example, a manhole into which debris has been dumped or whose cover has been stolen may be re-fit with a bolted-down cover.

3. Sacramento Area Sewer District Sewer Ordinance (Ordinance)

The **SacSewer Ordinance** provides it the legal authority to take effective actions when damage occurs to **SacSewer** assets.

Proactive Approach:

Before damage to an asset has occurred, **SacSewer** attempts to reduce risk of damage occurring through the use of the following:

1. Underground Service Alert (USA)

SacSewer participates in the **Underground Service Alert (USA)**, a facility damage prevention service. **USA's** purpose is to receive planned excavation reports from public and private excavators, and to transmit those planned excavation reports to all participating members of **USA** who may have underground facilities at the location of the excavation. The **USA** Members will mark or stake their facility, provide information or give clearance to dig.

2. Sacramento Area Sewer District Standards and Specifications (Standards)

The **SacSewer Standards** include requirements intended to reduce the chance of intentional damage to **SacSewer** assets, such as pump station perimeter fences. Other **Standards** are intended to reduce the chance of accidental damage, such as requirements for installing locator balls and locator ribbon on newly installed pressurized pipelines.

3. SacSewer documents deviations to the Standards. In addition, requests and suggestions for changes, interpretations, or modifications to the **Standards** may arise from a variety of sources. These may be “internal” requests from other units within **SacSewer** or other public agencies. Suggested changes may also come from “external” sources, such as developers or **SacSewer** customers.

4. Sacramento Area Sewer District Sewer Ordinance (Ordinance)

The **Ordinance** contains several proactive approaches to ensure the safety of the **SacSewer's** assets. One example is the Access Request. A request for access shall be submitted to **SacSewer** for approval before opening, entering, connecting, or disturbing the existing **SacSewer**-owned and operated sewer collection system facilities. On approval of the access request, **SacSewer** will issue an access permit.

505.4. Effectiveness Measure

The effectiveness of this Strategy is tracked by the reduced number of occurrences of damage by others.

506 Under Capacity Failure Mode Strategy

506.1. Purpose

The purpose of the **Under Capacity Failure Mode Strategy (UCFMS)** is to ensure consistency in the evaluation of potential capacity deficiencies in the Sacramento Area Sewer District (**SacSewer**) collection system. The **UCFMS** supports the System Evaluation and Capacity Assurance Plan (SECAP) portion of the **SacSewer** Sewer System Management Plan (SSMP).

506.2. Background

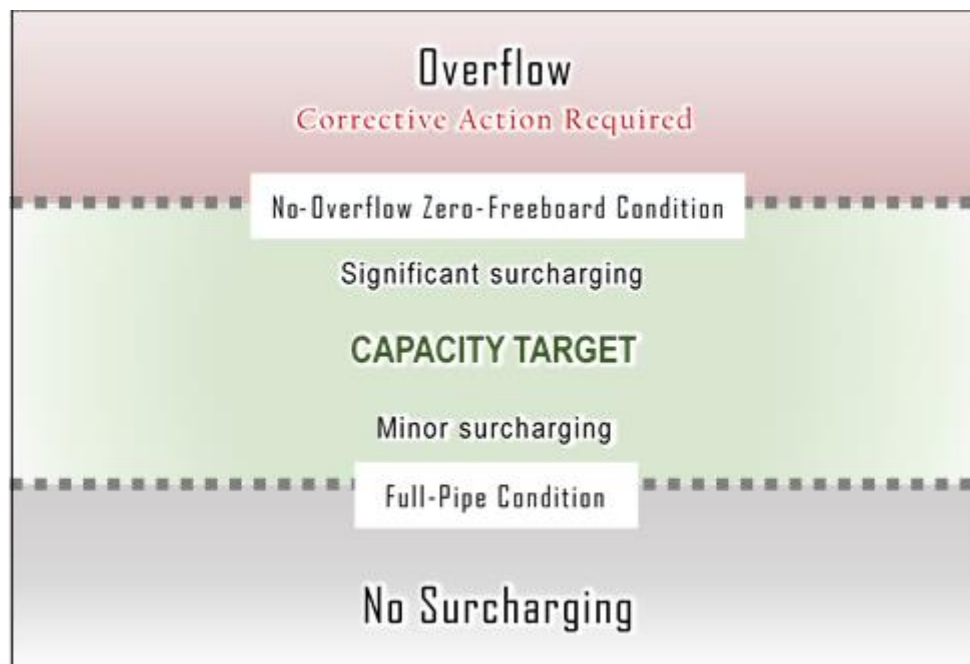
One of the objectives of the **SacSewer's System Capacity Plan** is to identify areas of potential capacity deficiencies, which then undergo further investigation through this **UCFMS**. Recognizing that the **System**

Capacity Plan may not identify all potential capacity deficiencies, observed capacity-related spills and model predicted spills caused by new development will also undergo investigation through this strategy.

The **SacSewer's UCFMS** has introduced the concept of a capacity target. As shown in figure 506-1, the capacity target is bounded by the no-spill, zero freeboard condition and the full-pipe condition. When a capacity-related spill occurs in the system, a corrective action may be necessary to return the system performance to within the capacity target range and the "do nothing" alternative for the project area is not acceptable. In general, a relief project returns the system performance to within the capacity target range by increasing system capacity and/or decreasing system flow.

Several relief alternatives which result in various hydraulic performances within the capacity target range should be evaluated. A cost-benefit sensitivity analysis should be performed to select the best alternative that provides the optimal balance between cost, benefit, and risk.

Figure 506-1 Capacity Target



506.3. Process

1.0 Monitoring Trigger Met?

The evaluation of potential capacity deficient sheds through the **UCFMS** begins with the monitoring trigger. There are three monitoring triggers, which are listed below.

- Actual capacity-related spill during a storm event that has similar or less impacts on the **SacSewer** system compared to the **SacSewer's** Performance Storm
- Model predicted spill from the **System Capacity Plan** under existing land use conditions
- Model predicted spill caused by new development

If one of these monitoring triggers is met, flow monitoring is initiated in the shed, along with a Preventive Maintenance Program Review.

2.0 Flow Monitoring Implementation and Preventive Maintenance (PM) Program Review

Flow meters are installed in the potential deficient system to characterize flow throughout the project area. Flow monitoring and rain data are used to develop flow parameters (domestic flow factors, unit flow hydrographs, rainfall dependent inflow and infiltration (RDI&I) percentages, etc.) for use in model calibration.

Concurrently, the maintenance histories of the capacity deficient pipes identified through modeling will be reviewed and their PM schedules may be developed or adjusted based on the pipe conditions. The goal of this procedure is to ensure that capacity constrained main lines can operate at full capacity during storm events.

3.0 Investigative Trigger Met?

The investigative trigger is met when an actual capacity-related spill occurs during a storm event that has similar or less impacts on the system compared to the **SacSewer's** Performance Storm. The **SacSewer's** Performance Storm is a real storm event that occurred on January 21, 1997. This storm event was selected through continuous simulation modeling and a statistical analysis of the **SacSewer** system's response to actual storms (refer to report titled "Summary of Findings from Continuous Simulation Modeling for **SacSewer** Performance Storm Development" dated January 18, 2008).

4.0 Asset Data Verification and Model Construction

When the investigative trigger is met, asset data verification for the shed will be implemented, including surveying if needed. A new hydraulic model for the shed will be constructed from the latest system data.

The model will then be calibrated using the flow monitoring data that was collected previously. Model calibration is a process of adjusting the model parameters to match the model predictions with the observed data. The calibrated model is used to evaluate the true hydraulic performance of the collection system under various flow scenarios.

5.0 Correction Action Trigger Met?

The correction action trigger is met when the **newly calibrated model** predicts a spill when using the **SacSewer's** Performance Storm and under existing land use conditions. A relief project is needed to bring the system performance within the acceptable capacity target range.

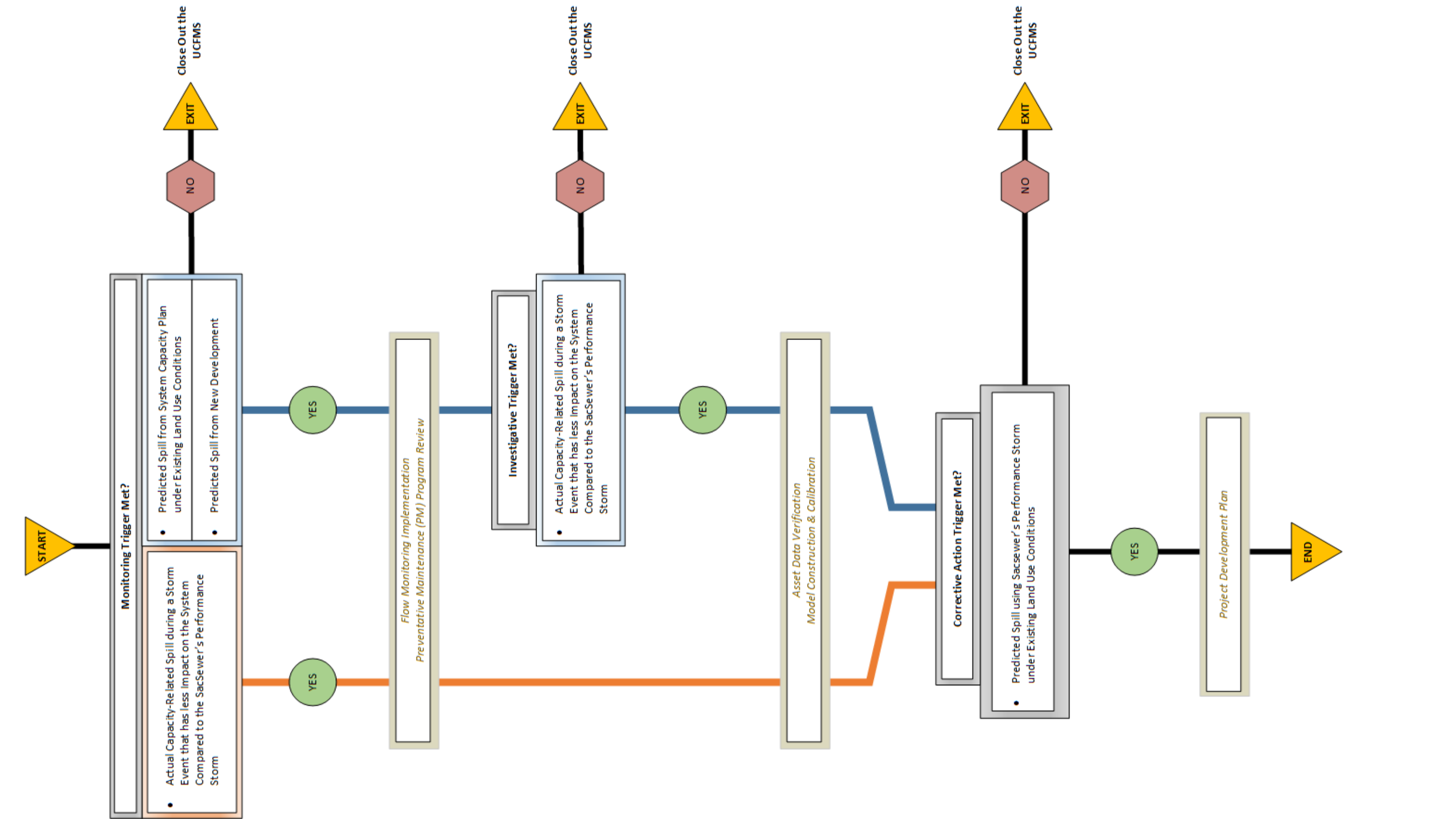
Relief projects for systems that meet the **UCFMS** corrective action trigger will be further developed through the project development process.

Refer to the **Project Authorization Process: PAC/PDP Guidelines** document for the next steps in project development.

The flowchart on the following page highlights key points of the UCFMS.

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506.4. Process Flowchart



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507 Main Line Incorrect Cleaning Frequency Strategy

507.1. Purpose

This strategy is directed at reducing the number of spills experienced by main lines currently placed on the **Main Line Scheduled Maintenance Program (MLSM Program)**. It is specifically directed at spills attributed to main lines placed on incorrect cleaning frequencies, or that over time, require adjustments to its cleaning frequency.

507.2. Background

The four primary causes of failure for main lines currently on the **MLSM Program** are the following:

- Incorrect cleaning frequency
- Incorrect cleaning activity selected for the main line
- Incorrect maintenance solution selected for the recurring spill (i.e., choosing a cleaning activity instead of a repair/renewal solution)
- Poor cleaning technique resulting in the main line needing to be cleaned prior to the next expected cleaning interval.

The following strategy focuses on reducing main line spills attributed to incorrect cleaning frequency.

This strategy consists of using Sacramento Area Sewer District (**SacSewer**) standard methods to record the cleanliness of a pipe at the time of the MLSM cleaning; collect and report data; outline criteria for decision making and adjusting cleaning frequencies, and measures effectiveness.

507.3. Strategy

507.3.1 Standard Measures for Recording Main Line Cleaning Observations

A majority of **SacSewer's** main line cleanings are completed using high velocity/vacuum cleaning equipment, such as high velocity jetters, easement carts, and Minuteman trucks. Section 7: Standard Measure of Observed Results of **SacSewer's Intro to HVVC Training Manual** outlines standard measures for recording field observations of the line at the time of the cleaning. Documented cleaning observations include None, Light, Moderate, or Heavy for debris, grease, and roots, which help evaluate future maintenance activities and frequencies needed for the main line. This strategy uses the same observation methods and codes as the **Intro to HVVC Training Manual**.

507.3.2 Data Collection and Reporting

Main line data is collected for all MLSM cleaning activities by using the Maximo database, selecting CLEANOBS (Pipeline Cleaning Observations) as the problem code, and then by completing the Failure Reporting field for each category of Grease, Roots, and Solids/Debris.

The MLSM Frequency Adjustment Report will be produced on a monthly basis. This report will query all lines on the **MLSM Program** for up to three of the most recent MLSM cleaning work orders. CLEANOBS data categorized from these work orders are used to report any main lines needing cleaning frequency adjustments based on the criteria shown in Table 507-1. Main lines on the **MLSM Program** with a stoppage occurring within the three most recent MLSM cleaning work orders will be removed from the list. Their cleaning frequency will be adjusted according to the **Main Line Stoppage Failure Mode Strategy**.

507.3.3 Decision Making Criteria

The **Main Line Stoppage Failure Mode Strategy** will take precedence over the **Main Line Incorrect Cleaning Frequency Strategy**; actions taken based on an actual stoppage will be based on the **Main Line Stoppage Failure Mode Strategy** and not from the results of the cleanliness data alone. The following table provides the criteria for adjusting main line cleaning frequencies:

Table 507-1 Frequency Adjusted Decision Making Criteria

If this cleanliness rating occurs...	2 consecutive None results in all three categories	3 consecutive Light or None results in all three categories	2 consecutive Heavy results in any one category	Any other results
Then adjust frequency as follows...	Adjust frequency to longer PM interval	Adjust frequency to longer PM interval	Adjust frequency to shorter PM interval Create a BCE when the next higher frequency is less than 3 months.	Continue current maintenance frequency

SacSewer uses 6, 12, 18, 24, 36, or 48 month PM frequencies when adjusting to a longer PM Interval, and 3, 6, 12, 24, 36, when adjusting to a shorter PM Interval.

The Pipeline Support Group is responsible for reviewing and taking action within 30 days of publishing the monthly MLSM Frequency Adjustment Report. Any main line cleaning frequency changes are to follow the criteria shown in Table 507-1. However, if Pipeline Support review determines no adjustment in frequency based on asset history it will be excluded from the report.

507.4. Effectiveness Measure

The effectiveness of this strategy is determined by a reduction of **MLSM Program** stoppages due to incorrect cleaning frequency. **MLSM Program** stoppages will be reviewed on a monthly basis. In addition, each year the Frequency Adjustment Decision Making Criteria will be reviewed relative to the effectiveness of the strategy, and changes will be made as necessary.

508 Lower Lateral Incorrect Cleaning Frequency Strategy

508.1. Purpose

This strategy is focused on reducing the number of spills experienced by lower laterals on the **Lower Lateral Scheduled Maintenance Program (LLSM Program)** that may have incorrect cleaning frequencies assigned or that over time, require adjustments to its cleaning frequency.

508.2. Background

Lower Lateral assets are assigned to the **LLSM Program** because of a previous Television Inspection (TVI) or stoppage where roots, grease, or debris/solids were found, and the lower lateral can be maintained through scheduled cleanings. However, as time passes, conditions may change, which may cause these assets to fail before their next scheduled cleaning. The three primary causes of failure for lower laterals currently on the **LLSM Program** are the following:

- Incorrect maintenance solution selected for the recurring spill (i.e., choosing to place the asset on LLSM instead of a repair/renewal solution)
- Poor cleaning technique during LLSM cleaning
- Incorrect cleaning frequency assigned

508.3. Strategy

The **Lower Lateral Incorrect Cleaning Frequency Strategy** was created. It will be used to adjust the frequencies of lower lateral assets on the **LLSM program** based on their latest preventive maintenance (PM) observations.

An asset that experiences a spill before reaching its next scheduled PM will be evaluated through the **Lower Lateral Repair Maintain Replace Decision Policy**.

508.3.1 Standard Measures for Recording Lower Lateral Observations

Lower Laterals scheduled maintenance work orders consist of performing a dry run TVI before cleaning. The TVI is performed according to the **TVI Manual and is recorded when required by the JTTV job plan**. The lower lateral is cleaned according to the **Minuteman Training Manual**.

M&O field staff documents the TVI observations for Grease, Roots, and Solids/Debris in the Failure Reporting tab in Maximo. Section 12: Standard Measures of Cleaning Observations of **SacSewer's Minuteman Truck Training Manual** outlines the standard measures for recording observations based on cleaning work. The same method for recording cleaning observations is followed by M&O field staff to document lower lateral TVI observations for LLSM work orders in the Failure Reporting tab in Maximo. Documented severities include None, Light, Moderate, or Heavy, for solid/debris, grease, and roots.

508.3.2 Frequency Adjustment Criteria

The following table provides the criteria for the Pipeline Support group when adjusting lower lateral cleaning frequencies according to the **Lower Lateral Incorrect Cleaning Frequency Strategy**:

Table 508-1 Frequency Adjustment Decision Making Criteria

If this cleanliness rating occurs...	2 consecutive PMs with None results in all three categories	1 PM with Heavy Roots	1 PM with Heavy Grease	Any other results
Then	Adjust frequency to longer PM interval (See note 1)	Adjust frequency to shorter PM interval (See note 2)	<ul style="list-style-type: none"> • Verify Grease rating from TVI submitted and add a log note to document the discrepancy • 	Continue current maintenance frequency

SacSewer uses 12, 18, 24, 36, or 48 month PM frequencies when adjusting to a longer PM Interval, and 12, 24, 36, when adjusting to a shorter PM Interval. The shortest frequency interval for LLs in easement is 36 months and the shortest frequency interval for LLs in street (including a cul-de-sac or an intersection) is 12 months.

Notes:

- 1) If the asset has 2 consecutive PMs with the same frequency and None results for both PMs in all three categories (roots, grease, solids/debris) and the LL is already on the longest frequency interval, then evaluate to remove or keep the asset from the **LLSM Program**. PM frequency interval greater than 48 months will need supervisor approval.
- 2) Create a priority 2 TVI WO if the asset is already on the shortest frequency. The TVI work order will be reviewed by Operations Support staff to determine the corrective action according to the Lower Lateral Repair Maintain Replace Decision Policy.
- 3) See Enforcement Response Process

508.3.3 **LLSM Monthly Frequency Adjustment Report**

When M&O Field staff perform an **LLSM Program** work order and an asset is found to have Heavy Grease or None results in all three categories (roots, grease, and debris/solids), M&O is required to record and submit a TVI. The TVI will be reviewed by Operations Support Staff through the **LLRMR Decision Policy**.

A LLSM Monthly Frequency Adjustment Report will be created to identify the assets on **LLSM Program** that were cleaned the previous month with Heavy Roots or None observations.

SacSewer Operations Support Group will be responsible for producing the LLSM Frequency Adjustment Report monthly and will need to make the necessary adjustments according to this strategy within 30 days.

508.4. **Effectiveness Measure**

The effectiveness of this strategy is determined by a reduction of **LLSM Program** stoppages due to incorrect cleaning frequency. **LLSM Program** stoppages will be reviewed on a monthly basis. In addition, the criteria will be reviewed as needed relative to the effectiveness of the strategy, and changes will be made as necessary.

509 **Underground Facility Damage Investigation Process**

509.1. **Purpose**

To ensure consistency in the investigation and reporting of damages to any Sacramento Area Sewer District (**SacSewer**) facility during an excavation process. This information will assist **SacSewer** in knowing who is financially responsible for the damage and assist in the recovery of all associated costs.

509.2. **Background**

The reason in investigating underground facility damages is to identify the root cause, and person/group responsible for the damages. This information will assist **SacSewer** in knowing who is financially responsible for the damage and assist in the recovery of all associated costs. The collection of underground facility damage data is to analyze data, to learn why events occur, and how actions by industry can prevent them in the future; thereby, ensuring the safety and protection of people and the infrastructure. Damages will be reduced through effective practices and procedures with the collection of data that allows **SacSewer** to identify root causes, perform trend analysis, and help educate contractors, employees as well as the public.

509.3. *Process*

SacSewer will investigate and report all excavation damages that occur to any **SacSewer** owned underground facility. This is an Inherently Reactive process.

Detailed group responsibilities are listed below:

1. Maintenance & Operations – Customer Service Group

The Customer Service Quality Control (QC) group will be responsible for performing (collecting and reporting) all underground facility damage reports and maintaining **SacSewer** in house database. A final copy of the report will be provided to all key stakeholders.

2. Maintenance & Operations – Linear Group

The M&O linear staff that find and or receive notification of an underground facility damage will be required to fill out an Underground Facility Damage Report Form (Located at P:\Shared\Underground_Facility_Damage_Report) with the following available information:

- Date and Time of Notification
 - By whom, when and how
- Type of Utility Damaged
- Location of Damage
- Description of Damage
- Were there other Damages
- Contractor and or Person Performing Work
- Who the Work is Being Done For?
- Nature of Work Being Performed
- Representative's Name and Title
- Was an Underground Service Alert (USA) Called in, USA Ticket Number?
- If there are USA Sewer Marks, are the Marks in the Location of the Damage
 - Within 2ft of the marks, plus the size of pipe if the size was identified
- Pictures of the Damage and Repair
- Pictures of any USA Marks
 - To include the relationship of the marks to damage

The M&O linear staff will provide a copy of the Underground Facility Damage Report as well as the photos electronically to the Customer Service QC group the next business day.

3. Customer Care – Underground Service Alert (USA) Group

The M&O Customer Service Group will send an e-mail to the Customer Care USA Group requesting that they perform a search of the current or past USA ticket database to locate the USA ticket covering the area where the damage occurred. This search will be performed back a minimum of 5 years from the date the damage was identified. If a USA ticket was located, a copy of the ticket (to include **SacSewer's** Actions) will be sent electronically to the Customer Service QC group along with their Investigation report. If no ticket is located, they will send a copy of their Investigation report stating their actions and findings no later than five working days after the date of the request.

4. Customer Care – Dispatch Group

The Dispatch Operator will create a service request when being notified of damage to an **SacSewer** underground facility by the following:

- Property Owner
- Contractor
- Other Facility Owner
- County Inspector (CMID)

The service request needs to contain the following information:

- Date and time of Notification
- Type of Utility Damaged (if known)
- Location of Damage (address)
- Contractor and or Person performing Work
- Who the Work is Being Done For?
- Representative's Name and Title
- Was a USA called in, USA Ticket Number?

The dispatcher will notify the responsible M&O linear staff as well as the USA Group supervisor.

5. Engineering – Operations Support Group

The Operations Support Group when receiving information of an excavation damaged facility from a televised inspection (TVI) will notify the Customer Service group to start an investigation.

6. Internal Services Department – Administration – Admin Fiscal Group – Goethe Rd

The Admin Fiscal Group will review and process the cost recovery damage report form. This form will be forwarded back to the M&O Customer Service Group for review and signatures.

7. Maintenance & Operations – Customer Service Group

The Customer Service QC group will forward the entire packet to the Customer Care Manager with a recommendation to pursue cost recovery if the investigation supports it.

8. Customer Care – Manager

The Customer Care Manager or his/her delegate will pursue cost recovery and refer the matter to **SacSewer's** Third Party Adjustor as necessary.

510 **Televised Inspection Policy**

510.1. **Purpose**

The purpose of this document is to provide direction for when Televised Inspections (TVIs) of main lines, lower laterals, and manholes are required.

510.2. **Background**

It is Sacramento Area Sewer District (**SacSewer**) policy to perform TVIs of sewer pipes for structural assessment, spill and stoppage failure analysis, research for business case evaluations (BCEs) and project investigations, quality control of preventive maintenance (PM), repairs replacements, and Service Requests (SR) assigned to Maintenance and Operations (M&O). Inspections can reduce the risks

associated with failures due to structural defects, spill, stoppages, faulty repairs, and inadequate cleanings. The following process implements this policy for both lower laterals and main lines.

Main line preventive maintenance (PM) frequency changes and removals will be first completed under the **Main Line Incorrect Cleaning Frequency Strategy**

The **TVI Policy** will only be used to change or remove PM schedules when there is not enough data to follow the **Main Line Incorrect Cleaning Frequency Strategy**. See the **Main Line Stoppage Failure Mode Strategy** for details of the main line scheduled maintenance program.

The results from TVIs conducted per this policy will be reviewed and may be subject to further analysis if defects are found. Further analysis will follow the **Main Line Repair-Maintain-Replace Decision Policy**, **Lower Lateral Repair-Maintain-Replace Decision Policy**, and the **Generic Business Case Evaluation Process (Generic BCE Process)**.

Detailed instructions for conducting TVIs can be found in **SacSewer's Television Inspection (TVI) Manual**. The **TVI Manual** contain the defect codes for TVIs. TVI defect codes are used by Maintenance and Operations (M&O) staff and Contractors to provide consistent inspection results and are used as a decision making tool to evaluate the condition of the sewer pipe. Per the **TVI Manual** Granite is the repository of all completed TVIs and includes defect code information.

510.3. *Process*

(Refer to process flowchart 510.5)

1. **TVI based Programs**

1.1. **TVI WOs**

TVI WOs are auto generated in the CMMS system

1.2. **Schedule & Assign WO(s) to Supervisor or Engineering Design**

The M&O Workload Planning and Scheduling Group schedules the TVI WO(s) within the target completion date and assigns an M&O supervisor or Engineering Design. Maintenance & Repair Group or Engineering Design is responsible for completing the work by the scheduled completion date. The Engineering Design Group manages TVI contractors and will verify completion of contracted work.

1.3. **Conduct TVI**

Perform TVI(s) as directed by the TVI WO(s) and complete by the target completion date.

*End Process. Results from TVIs conducted per this policy shall be submitted to the appropriate review and assessment policy or procedure, for example, **Main Line Repair-Maintain-Replace Decision Policy**.*

2. **Stoppage Follow-up (Failure Analysis)**

Follow-up TVIs are required for all spills and stoppages in the **SacSewer's** system.

The target completion for the TVI is dependent on:

- Asset type;
- Whether there was a backup into structure (BIS);
- Whether there was an emergency repair;
- Private spill or **SacSewer** responsibility; and

- Category of the spill (Category 1 or not).

Multiple TVIs may be required. Stoppage follow-up TVIs are described as follows (refer to the Televised Inspection Policy Process Flowchart):

2.1. Private spill?

Is the spill classified as a private spill that is originating from a non-**SacSewer**-owned asset?

2.2. Private LL or ML Spill/Stoppage?

Is this Private Spill originating from a stoppage/blockage in a private LL or a private ML?

2.3. BIS?

Is this Private LL Spill resulting in a BIS?

2.4. SacSewer Cleanout?

Is there a usable **SacSewer** Cleanout ready to perform a TVI? If there is not a usable **SacSewer** Cleanout, an M&O staff will install one prior to the TVI. The Cleanout install is governed by the **Lower Lateral Repair-Maintain-Replace Policy**.

2.5. TVI Lower Lateral Within 1 Business Day

TVI the lower lateral within one business day. The purpose of the TVI is to establish responsibility for and cause of the spill/stoppage. The TVI WO will be written by the M&O staff responding to the spill/stoppage and completed by the M&O staff responding to the spill/stoppage or any other M&O staff who can complete the TVI within one business day.

*End Process. Results from TVIs conducted per this policy shall be submitted to the appropriate review and assessment policy or procedure, for example, **Lower Lateral Repair-Maintain-Replace Decision Policy**.*

2.6. TVI Lower Lateral Within 5 Business Days

TVI the lower lateral within five business days. A cleanout will be installed prior to the TVI being performed. The purpose of the TVI is to establish responsibility for and cause of the spill/stoppage. The TVI WO will be written by M&O staff responding to the spill/stoppage and completed by the M&O staff responding to the stoppage or any other M&O staff who can complete the TVI within five business days.

*End Process. Results from TVIs conducted per this policy shall be submitted to the appropriate review and assessment policy or procedure, for example, **Lower Lateral Repair-Maintain-Replace Decision Policy**.*

2.7. Write WO to TVI Lower Lateral within 2 Weeks

Write a WO to TVI the lower lateral with a target completion date within 2 weeks. The purpose of the TVI is for quality control of the cleaning. The TVI WO will be written by the M&O staff responding to the spill/stoppage and forwarded to the M&O Workload Planning & Scheduling Group for scheduling, and then performed by the staff of the M&O supervisor assigned by the M&O Workload Planning & Scheduling Group or by a TVI contractor managed by the Engineering Design Group.

2.8. No TVI of Private ML Unless Requested by EMD

With a Private spill originating from a blockage/stoppage of a private main line, no TVI is conducted unless specifically requested by the County Environmental Management Division (EMD) to do so.

End Process.

2.9. TVI as Needed to Locate or Evaluate Spill/Stoppage

During the response to a spill event originating within an **SacSewer** owned asset, conduct TVI(s) as needed to determine the location of the stoppage, evaluate the asset condition and cause of the stoppage, and support mitigation of the spill event.

2.10. LL or ML Spill/Stoppage?

Is the spill/stoppage located within a LL or a ML?

2.11. Category 1 Spill?

Did the stoppage result in a Category 1 spill?

2.12. BIS?

Did the spill/stoppage result in a BIS?

2.13. TVI Within 1 Business Day After Breaking Spill/Stoppage

TVI within one business day after breaking the stoppage. The purpose of the TVI is to determine the cause of the spill/stoppage. The TVI WO will be written by M&O staff responding to the spill/stoppage and completed by the M&O staff responding to the spill/stoppage or any other M&O staff who can complete the TVI within one business day.

2.14. Write WO to TVI within 2 Weeks after Cleaning

Write a WO to TVI the affected asset(s) within 2 weeks after follow-up cleaning. The purpose of the TVI is for quality control of the cleaning. The TVI WO will be written by the M&O staff responding to the spill/stoppage and forwarded to the M&O Workload Planning & Scheduling Group for scheduling, and then the TVI will be performed by the staff of the M&O supervisor assigned by the M&O Workload Planning & Scheduling Group.

2.15. Category 1 Spill?

Did the stoppage result in a Category 1 spill?

2.16. BIS?

Did the spill/stoppage result in a BIS?

2.17. SacSewer Cleanout?

Is there a usable **SacSewer** Cleanout ready to perform TVI? If there is not a usable **SacSewer** cleanout an M&O staff will install one prior to the TVI. The **Lower Lateral Repair-Maintain-Replace Decision Policy** governs the Cleanout install.

2.18. TVI Within 5 Business Days After Breaking Spill/Stoppage

TVI within five business days after breaking stoppage. A cleanout will be installed prior to the TVI being performed. The purpose of the TVI is to establish responsibility for and cause of the spill/stoppage. The TVI WO will be written by M&O staff responding to the spill/stoppage and completed by the M&O staff responding to the stoppage or any other M&O staff who can complete the TVI within five business days.

2.19. Write WO to TVI within 2 Weeks after Cleaning

Write a work order (WO) to TVI the affected asset(s) within 2 weeks after follow-up cleaning. The purpose of the TVI is for quality control of the cleaning. The TVI WO will be written by the M&O staff responding to the spill/stoppage and forwarded to the M&O Workload Planning & Scheduling Group for scheduling, and then the TVI will be performed by the staff of the M&O supervisor assigned by the M&O Workload Planning & Scheduling Group.

2.20. Repair/Replace Work Done?

Was any repair or replacement work performed on an **SacSewer** asset(s) during the spill/stoppage event? If there was repair/replacement work performed then *End Process* here. Risk of a new spill/stoppage has been minimized. Section 5 of this Policy governs repair/replacement work TVIs.

2.21. Spill/Stoppage Interval <7 Months?

Does the affected asset have a spill/stoppage interval of less than 7 months?

2.22. Write WO to TVI within 12 Months After Cleaning

Write a WO to TVI the affected asset(s) within 12 months, at the shortest stoppage interval, after the follow-up cleaning. The purpose of the TVI is to establish any needed maintenance interval. The TVI WO will be written by the Ops Support Group and then scheduled by the M&O Workload Planning & Scheduling Group.

2.23. Schedule and Assign WO(s) to Supervisor or Engineering Design

The M&O Workload Planning & Scheduling Group schedules the TVI WO(s) within the target completion date and assigns a supervisor or Engineering Design.

2.24. Conduct TVI

Perform TVI(s) as directed by the TVI WO(s) and complete by the target completion date.

*End Process. Results from TVIs conducted per this policy shall be submitted to the appropriate review and assessment policy or procedure, for example, **Lower Lateral Repair-Maintain-Replace Policy**.*

3. Project or BCE Investigation

If a TVI is needed to assess the line as part of a **Generic BCE Process** or project, write a WO for a TVI. The person in the Engineering Operations Support Group working on the **BCE** is responsible for writing the WO with an appropriate target completion date.

If a TVI cannot be performed on a lower lateral due to a missing cleanout or problems with the cleanout, install or repair the cleanout and riser, then perform the TVI.

If the TVI cannot be completed due to problems with the main line or lower lateral, keep the recording up to the point where the camera cannot pass. Attempt to do a reverse setup or lateral launch (as appropriate) to complete as much of the inspection as possible.

3.1. Write/Review Generic BCE Process WO

The Engineering Operations Support Group writes TVI WO(s) as needed for evaluating a project or conducting a **BCE** investigation.

3.2. Schedule & Assign WO(s) to Supervisor or Engineering Design

The M&O Workload Planning & Scheduling Group schedules the TVI WO(s) within the target completion date and assigns a supervisor or Engineering Design. The M&O Workload Planning and Scheduling Group also schedules/assigns any cleanout install/repair WO(s) needed to complete assigned TVI(s).

3.3. LL or ML?

Is the investigation on a lower lateral or main line?

3.4. SacSewer Cleanout?

Is there a usable **SacSewer** cleanout present through which the TVI can be conducted?

3.5. MH Tap?

Is the lower lateral connected to a manhole tap through which the TVI can be conducted?

3.6. Can TVI be done by Lateral Launch?

In the absence of a usable **SacSewer** cleanout or a manhole tap, can the TVI be conducted via lateral launch from the main line?

3.7. Write WO to Install/Fix Cleanout

Write a WO to install a new **SacSewer** cleanout or repair an existing cleanout. The M&O staff assigned the TVI WO will write a separate work order to install an **SacSewer** cleanout.

3.8. Conduct TVI

Perform TVI(s) as directed by the TVI WO(s) and complete by the target completion date.

*End Process. Results from TVIs conducted per this policy shall be submitted to the appropriate review and assessment policy or procedure, for example, **Lower Lateral Repair-Maintain-Replace Decision Policy**.*

4. Quality Control – Preventive Maintenance Evaluations

Maintenance evaluation TVIs shall be performed for two purposes:

1. Random quality assurance inspection of pipe cleaning activities
2. Evaluate effectiveness of cleaning frequency and methodology

The **Quality Control for Sewer Pipe Cleaning Procedure/Policy** governs quality control of preventive maintenance (PM) evaluations. The Engineering Operations Support Group is responsible for writing the WO with a target completion date. The M&O Workload Planning and Scheduling Group is responsible for assigning an M&O Supervisor or Engineering Design and setting the scheduled completion date. The assigned M&O Supervisor and M&O staff are responsible for completing the work by the scheduled completion date. The Engineering Design Group manages TVI contractors and will verify completion of contracted work.

4.1. Write TVI WO for QC of Maintenance

The M&O Ops support Group writes WO(s) for quality control of maintenance activities.

4.2. Schedule & Assign WO(s) to M&O Supervisor or Engineering Design

The M&O Workload Planning & Scheduling Group schedules the TVI WO(s) within the target completion date and assigns an M&O supervisor or Engineering Design. The Engineering Design Group manages TVI contractors and will verify completion of contracted work.

4.3. Conduct TVI

Perform TVI(s) as directed by the TVI WO(s) and complete by the target completion date.

*End Process. Results from TVIs conducted per this policy shall be submitted to the appropriate review and assessment policy or procedure, for example, **Main Line Repair-Maintain-Replace Decision Policy**.*

5. Quality Control – Repairs & Replacements

The **SacSewer Standards and Specifications** Section 331 Television Inspection. Following the repair or replacement of a lower lateral or main line, a TVI shall be performed for quality control of the repair or replacement.

Target Completion Date: Within 2 weeks of the repair or replacement.

The Engineering Operations Support Group is responsible for writing the WO with target completion date. The M&O Workload Planning and Scheduling Group is responsible for assigning an M&O Supervisor or Engineering Design and setting the scheduled completion date. The assigned M&O Supervisor and M&O staff are responsible for completing the work by the scheduled completion date. The Engineering Design Group manages TVI contractors and will verify the completion of contracted work. For emergency repair/replacement work in response to a spill, see the Emergency Response Plan Manual.

5.1. Write TVI WO for QC of Repairs/Replacement Work

The Engineering Operations Support Group writes WO(s) for quality control of non-emergency repairs and replacements.

5.2. Schedule & Assign WO(s) within 2 weeks to M&O Supervisor or Engineering Design

The M&O Workload Planning & Scheduling Group schedules the TVI WO(s) within the target completion date and assigns an M&O Supervisor or Engineering Design. The TVI will be completed within 2 weeks of the completion of repair or replacement work.

5.3. Conduct TVI

Perform TVI(s) as directed by the TVI WO(s) and complete by the target completion date.

*End Process. Results from TVIs conducted per this policy shall be submitted to the appropriate review and assessment policy or procedure, for example, **Lower Lateral Repair-Maintain-Replace Decision Policy**.*

6. Preventive Maintenance Schedule Changes and Removal

The **Main Line Incorrect Cleaning Frequency Strategy** governs ML PM frequency changes and removals. The **Lower Lateral Incorrect Cleaning Frequency Strategy** governs LL PM frequency changes and removals. The **TVI Policy** will only be used to change or remove PM schedules when there is not enough data to follow the **Main Line Incorrect Cleaning Frequency Strategy** for MLs or the **Lower Lateral Incorrect Cleaning Frequency Strategy** for LLs.

6.1. Modify or Remove a PM Schedule/Activity

BCE derived decisions to modify or remove PM activity on an asset are generated by the Engineering Operations Support Group. Policy-derived decisions to modify or remove PM activity on an asset also are generated by the Engineering Operations Support Group.

6.2. Schedule & Assign WO(s) to M&O Supervisor or Engineering Design

The M&O Workload Planning & Scheduling Group schedules the TVI WO(s) within the target completion date and assigns an M&O Supervisor or Engineering Design.

6.3. Conduct TVI

Perform TVI(s) as directed by the TVI WO(s) and complete by the target completion date.

End Process.

7. Service Requests (SR)(s) Assigned to M&O

Follow-up TVI(s) may be performed for priority 1 & 2 SRs to evaluate the condition of **SacSewer's** assets as a result of customer service calls. WO(s) will be produced with a specified target completion date by M&O field staff while the M&O Workload Planning and Scheduling Group is responsible for assigning the work and setting the scheduled completion date. M&O Maintenance & Repair / LL Maintenance & Repair and Emergency Response or Engineering Design is responsible for completing the work by the scheduled completion date.

7.1. Write TVI WO

The M&O Field staff writes the WO(s), as needed to TVI the specified lines.

7.2. Schedule & Assign WO(s) to M&O Supervisor or Engineering Design

The M&O Workload Planning and Scheduling Group schedules the TVI WO(s) within the target completion date and assigns an M&O supervisor or Engineering Design. The Engineering Design Group manages TVI contractors and will verify completion of contracted work.

7.3. Conduct TVI

Perform TVI(s) as directed by the TVI WO(s) and complete by the target completion date.

*End Process. Results from TVIs conducted per this policy shall be submitted to the appropriate review and assessment policy or procedure, for example, **Lower Lateral Repair Maintain-Replace Decision Policy***

510.4. Detailed Group Responsibilities

The following groups will be responsible for the corresponding areas of the implementation of this procedure:

Engineering Operations Support - BCE Decisions & Annual Workload Planning

The BCE Decisions & Annual Workload Planning Group is responsible for writing the work orders as specified above, writing TVI work orders associated with stoppages and spills handled by contractors, and coordinating clarification on any questions regarding this policy and its implementation.

Maintenance & Operations - Workload Planning & Scheduling

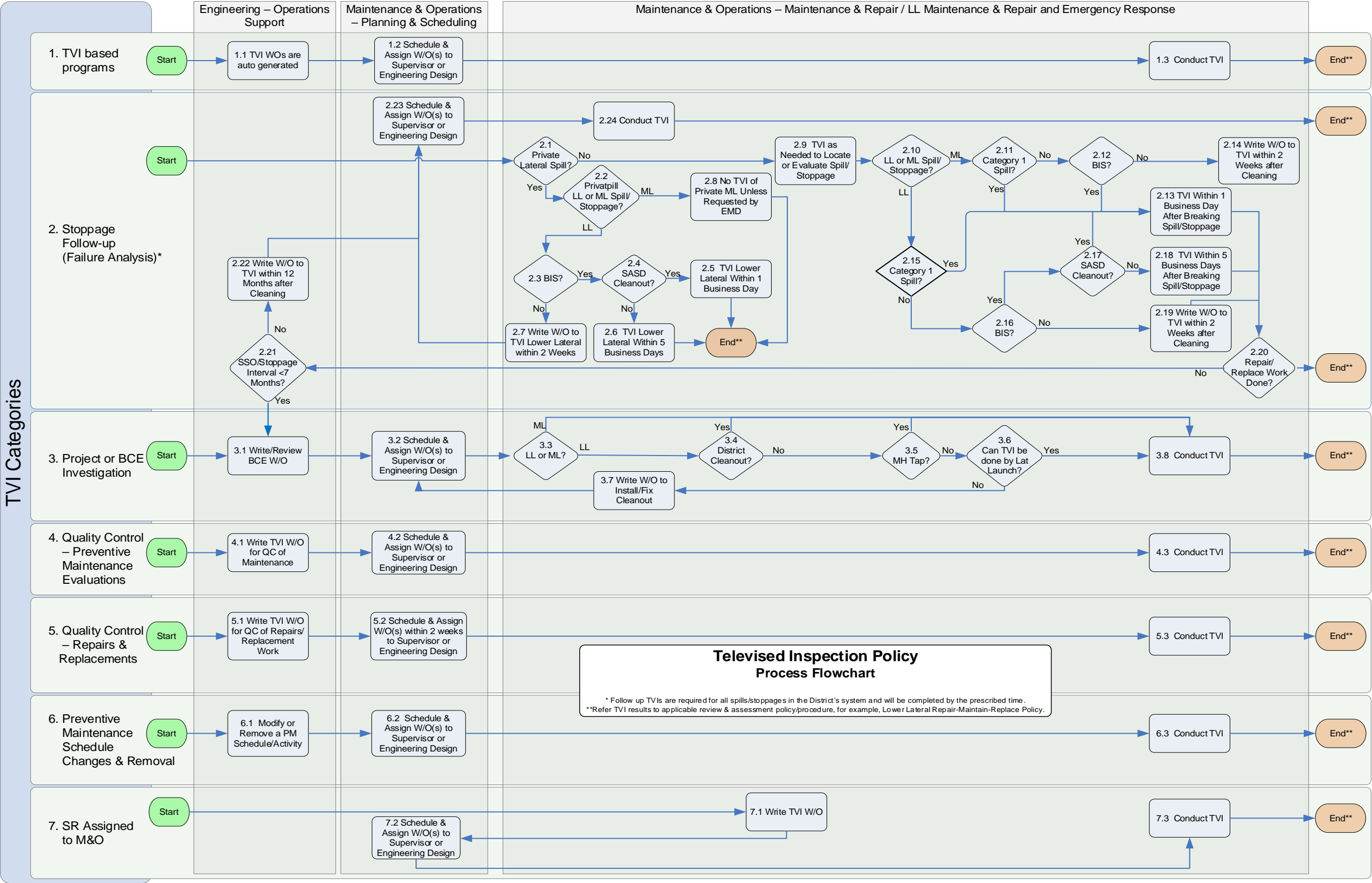
The Workload Planning & Scheduling Group is responsible for scheduling work by the target completion dates so that either Maintenance & Operations staff or Engineering Design complete the work prior to the target date. The Engineering Design Group manages TVI contractors and will verify completion of contracted work.

Maintenance & Operations - Maintenance & Repair / LL Maintenance & Repair and Emergency Response

The M&O Maintenance & Repair / LL Maintenance & Repair and Emergency Response Group or Engineering Design is responsible for completing the TVI work by the scheduled completion date. The M&O Supervisors responding to spills/stoppages are responsible for ensuring that all required WOs are

written at the time of or immediately after the spill response. M&O Supervisors are also responsible for writing TVI work orders associated with stoppages and spills handled by contractors.

510.5. Process Flowchart



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511 Quality Control for Sewer Pipe Cleaning Procedure/Policy

511.1. Purpose

The purpose of this document is to define the procedure to evaluate the effectiveness of the Sacramento Area Sewer District (**SacSewer**) main line scheduled maintenance (MLSM), also commonly referred to as preventative maintenance (PM), activities completed by **SacSewer** Maintenance and Operations (M&O) field staff and any private cleaning companies under contract with **SacSewer**. The main objective of this procedure is to verify that **SacSewer** main lines on PM are being cleaned adequately. To do this, three major factors will be addressed;

1. The specified activity (jetting, rodding, and balling).
2. The equipment being used in the completion of the PMs.
3. The operator of the equipment.

511.2. Background

Historically, **SacSewer** has maintained an informal review of the quality of the PM work being completed within the collection system. An unspecified number of television inspection (TVI) work orders were created to review the effectiveness of PM activities, and occasionally feedback was provided to the M&O manager, activity supervisor, and/or specific operator(s).

This Procedure outlines specific guidelines and procedures for the amount of PM work to be reviewed, the appropriate percentage of each PM activity, and a system for the equal review of the various operators and/or equipment. Although implementation of this policy is slightly different for **SacSewer** staff and private companies under contract with **SacSewer**, each will be held to the same quality control standards.

511.3. SacSewer M&O Quality Control Procedure

1. The M&O Workload Planning & Scheduling (P&S) Group will create a methodology for tracking the Quality Control (QC) of PM work orders completed by **SacSewer** field staff and **SacSewer** contractors in the computerized maintenance management system (CMMS). A minimum of three percent (3%) of the total number of PM work orders completed by **SacSewer** M&O staff will be inspected monthly. Quality Control will be completed utilizing TVIs to ensure adequate cleaning is being performed. When cleaning is found to be inadequate, a work order to re-clean the line segment will be created and assigned to the same supervisor, crew and equipment that completed the original work order. In addition, an additional QC TVI work order will be created and completed. Both the re-work and QC work orders will be completed and reviewed within thirty (30) days.
2. Engineering Operations Support and M&O Workload Planning and Scheduling will establish percentages of the total number of PM TVI work orders to be completed in each activity and adjust as needed based on previous results. A higher than average failure rate in a specific activity or by a certain piece of equipment or **SacSewer** staff member will result in higher frequency of review until the cause is identified and issue resolved. Conversely, low rates of failure identified by activity, equipment and/or operator may result in less frequent reviews.
3. M&O Workload Planning and Scheduling will develop a method and/or query by which work orders will be created within **SacSewer** CMMS which will take into account the percentages of each activity to be TVI'd and spread that work out between the various operators and/or equipment. This will ensure that **SacSewer** staff and the various pieces of equipment completing PM work orders are reviewed on as equal basis as possible. With the exception of higher or lower failure rates resulting in higher or lower review frequencies as stated in the paragraph above.

4. M&O Workload Planning and Scheduling Group will assign the PM QC work orders as required to ensure the QC TVI will be no more than ten (10) calendar days from the completion date of the initial cleaning work order.
5. M&O Maintenance & Repair Group will consider the PM TVI work orders as priority work and complete them on or before the assigned target completion date. When completed, all work orders will be processed and moved through the review process as quickly as possible.
6. Engineering-TV Review & PM Program Adjustment Group will receive the completed TVI recordings and review within 14 days after the work order is received, providing feedback to the **SacSewer** management team on the effectiveness of the cleaning being done and noting any deficiencies identified by activity, operator(s), and/or the equipment utilized. The group will also be responsible for creating any required re-cleaning and follow up QC TVI work orders.
7. **SacSewer** M&O Management will relay QC work order results back to the area supervisors, doing the necessary preliminary review to identify what **SacSewer** staff member completed each PM work orders found to be deficient and any additional work orders pending on the asset.
8. **SacSewer** M&O Supervisory staff will relay QC work order information to the field staff, work with individual staff to identify the root cause of all PM failures and report back all findings to management. If a vehicle is found to be the cause of a failure, the supervisor will work with management and the appropriate vendor and/or County Fleet Services to address the vehicle deficiency. If the problem is identified as an equipment issue (nozzle, cutter, etc.) the supervisor will work with management and the appropriate vendor to repair, exchange and/or replace the equipment as necessary. If the deficiency is identified as an operator issue, the supervisor will work with the operator to emphasize proper technique. Supervisors will ensure all re-cleaning work orders are assigned to the staff and equipment that completed the original work order. If the re-cleaning work is also found to be inadequate, the identified operator and crew will be re-trained within thirty (30) days. Continued and/or repeated technique failures by individual **SacSewer** field staff will be addressed by supervision and/or management as it is deemed appropriate and necessary. Re-training will not be required in instances where staff associated with deficient work has been re-assigned to a different activity.

511.4. **Contract QC Procedure**

SacSewer Engineering-Design Group will bundle and distribute main line PM work orders to designated third party contractors or to M&O Workload Planning and Scheduling for completion of work orders by M&O staff. The use of a third party contractor and/or **SacSewer** field staff will complete the required number of QC work orders as assigned to comply with the 3% minimum. Deficient cleaning will be addressed with the contractor on a case-by-case basis with a minimum of re-cleaning each segment. Continued deficiencies will be addressed by **SacSewer** Engineering Design Group with the contracted company up to and including termination of the contract. Main line PM work orders created and bundled by **SacSewer** Engineering Design Group assigned to M&O will follow the **SacSewer** M&O QC procedures listed previously in this document.

511.5. **Detailed Group Responsibilities**

The following groups will be responsible for the corresponding areas of the implementation of this procedure.

Maintenance & Operations Workload Planning & Scheduling Group – Planning & Scheduling Group will create a methodology for tracking completed MLSM PM TVI review. The group will develop a set of

queries or reports within **SacSewer**'s CMMS to create TVI work orders for the review of MLSM work orders completed by **SacSewer** field staff.

Engineering-TV Review & PM Program Adjustments Group will review the MLSM TVI work orders completed by **SacSewer** field staff, providing feedback to M&O management and supervisors on equipment and operator performance. TVI Review staff will also review the TVI work orders completed by private companies under contract with **SacSewer** and provide feedback to the responsible **SacSewer** Project Manager.

Maintenance & Operations-Maintenance & Repair Group – M&O Maintenance & Repair Group will complete PM QC work orders as assigned.

Engineering-Design Group – Engineering-Design Group oversees the private companies under contract with **SacSewer** to complete main line cleaning. Design staff will develop a methodology to select specific main lines and create TVI work orders for a third party contractor to complete. Design staff will oversee the third party contractor performing main line QC work orders.

512 SacSewer Comprehensive FOG Control Program

512.1. Purpose

The purpose of this document is to capture all of Sacramento Area Sewer District (**SacSewer**) data, efforts and achievements related to compliance with the State Water Resources Control Board Order No. 2006-003-DWQ **Statewide General Wastewater Discharge Requirements (WDR)** for Wastewater Collection Agencies – **Sewer System Management Plan (SSMP)**, Section D.13 (v) – Legal Authority and Section D.13 (vii) – FOG Control Program.

512.2. Background

SacSewer provides local collection services to more than one million people in the Sacramento region. **SacSewer** is the largest contributing agency to the Sacramento Regional County Sanitation District (SRCSD). SRCSD is responsible for operation and maintenance of the larger pipelines and the Sacramento Regional Wastewater Treatment Plant (SRWTP).

SacSewer Key Facts

- 270 square mile service area
- 3,000 miles of main lines
- 1300 miles of lower laterals
- 65,000 manholes
- 107 pump stations
- 320,000 customer accounts
- 1.2 million population served
- 274 employees
- \$112,000,000 operating budget

SacSewer recognizes that fats, oils and grease (FOG) represent a major challenge in its efforts to operate its collection in a manner that meets regulatory requirements, achieves identified service level targets, and is cost effective. Past estimates have placed the systematic impact of FOG at hundreds of stoppages per year and the combined cost of FOG-related damage claims and FOG-related maintenance activities on the order of hundreds of thousands of dollars per year. The "Grease Source Control Program Summary Report 2004; FOG Information, July 2004," indicated that approximately 80% of grease related spills were

located in residential areas and that the bulk of the **SacSewer's** claims costs were also directly related to residential areas.

Around that same time frame, SRCSD performed a series of data analyses and determined that, because the interceptor and treatment plant system is not negatively impacted by FOG, SRCSD is not required to maintain a FOG program under the WDR.

Prior to that determination, SRCSD had collaborated with its contributing agencies including **SacSewer**, City of Folsom, City of Sacramento and City of West Sacramento, to create a regional outreach and educational campaign with consistent key messages, instructions and requirements for both residents and food service establishments. In addition, FOG Control Information kits were designed, printed and made available to each contributing agency to disseminate as they saw fit.

SRCSD, not having FOG problems in their system, ceased providing region-wide FOG outreach coordination in April 2009. Since then, **SacSewer** has assumed the responsibility and costs associated with maintaining the Stop the Clog website (stoptheclog.com), which contains much of the same information and materials originally produced by SRCSD, as well as new campaign materials that are available to any interested party and can be downloaded from the website.

SacSewer has a myriad of tools, including data collection and analysis software and a well-trained staff that is capable of performing complex data analysis to identify locations within **SacSewer's** service area where FOG is most problematic. The Maintenance & Operations (M&O) and Engineering staffs are well versed in proper cleaning techniques and rehabilitation and repair work, and combine their resources and knowledge to achieve **SacSewer's** vision to "Provide the best value of any sewage collection utility in California, as measured by cost and level of service." **SacSewer** has well documented policies, procedures, practices, strategies and programs that are written to identify, determine the source, and provide an approach to minimize, reduce or prevent a recurrence of a spill caused by FOG, roots or debris, or other reasons.

Data analysis performed in 2001, 2004 and 2011 all reached the same conclusion: The majority of FOG-related stoppages occurred in **SacSewer's** residential areas. Therefore, **SacSewer's** FOG source control and reduction efforts remain focused on stoppages and spills in the main lines located in residential areas more than commercial sites where food preparation and/or food service establishments (FSE) are typically located.

In order to increase the staff awareness of system-wide spill performance, **SacSewer** trends and prominently posts the main line and lower lateral overflow rate graphs in its two office buildings. In addition, performance measures such as work orders completed on time, production rates, and costs per unit completed are trended, and reported monthly.

512.3. Keeping the SacSewer Comprehensive FOG Control Program Relevant

SacSewer is committed to keeping the **SacSewer Comprehensive FOG Control Program** relevant and up-to-date by providing a separate, companion document that describes program achievements since the last writing, and goals for the upcoming program period. The achievements and goals will not be deleted; rather they will be delineated by year so there is a running history since the creation of this document in 2013.

This document shall serve as a repository of evidence of on-going activities performed by **SacSewer** to achieve the requirements and intent of the above-referenced regulations. **SacSewer** uses asset management principles to determine the effectiveness of various programs and strategies that are aimed at reducing spills caused by Fats, Oils, and Grease (FOG).

512.4. Program

The following is a description of **SacSewer Comprehensive FOG Control Program**, which addresses all Sections (a through g) of the **SSMP Section D.13 (vii) – Fog Control Program**.

Proactive Approach:

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

Public education and outreach remain a key component of **SacSewer's** FOG control efforts.

- Each year, **SacSewer** enters into a contract that provides professional consulting services to sustain ongoing marketing, communications, public education and outreach, and media relations efforts to support the FOG Awareness and Prevention Campaign. The contract contains a scope of work that describes the goals and objectives during the contract period.
- Each holiday season (November through December); **SacSewer** and its consultant(s) conduct an elaborate campaign push throughout **SacSewer** service area. For example, in 2012, the campaign consisted of news releases, appearances on local TV news shows, electronic billboard ads, Facebook ads, Sacramento Bee sticker ads, utility bill inserts, and radio spots. We even produced a U-Tube video that made its debut in late 2011.
- Spill data analysis continues to reach the same conclusion as it relates to FOG stoppages. The majority of FOG stoppages occur in residential areas of **SacSewer** service area.

2. 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.

SacSewer's stoptheclog.com website has an entire Section dedicated to educating FSE owner/operators and employees on the proper techniques and Best Management Practices (BMP) for the disposal of FOG. The materials can be printed and used by FSE owners, operators, managers, staff and other interested parties such as local environmental health or food safety concerns to train and remind them of the BMP's. The resources include information and instruction sheets on the proper storage and disposal of FOG, proper care of grease removal devices and grease bins, local grease disposal options and other educational data. In addition, there is a quiz to evaluate staff's understanding of proper FOG disposal as well as an employee set of materials. Furthermore, there is a video and an 11" x 17" BMP poster, which can be displayed and referred to as needed.

FSE's that are found to be the source of a spill is put on an investigation and visitation schedule and are given the **FOG Control Program** Information Kit, which contains the above-described materials.

SacSewer engages the services of SRCSD's Wastewater Source Control Systems (WSCS) staff to inspect and enforce the provisions of the **SacSewer Sewer Ordinance** and Enforcement Response Plan. WSCS staff is notified by **SacSewer** when the cause of a FOG-related spill can be traced to an FSE. WSCS staff then follows its internal **FOG Incident Response Standard Operating Procedures**, a copy of which can be found in the Appendix Section of this document.

SacSewer and WSCS staff have monthly meetings scheduled to review the status of open FOG Incident cases and discuss what enforcement actions may be necessary to ensure compliance.

3. The SacSewer Standards and Specifications

The **SacSewer** Standards and Specifications provides minimum standards and specifications to be used by both Contractors and **SacSewer** during planning, design, and construction of sewer collection systems that are to be or are dedicated to **SacSewer** for operations and maintenance, or require the approval of **SacSewer**, or are to be installed within existing or new public rights-of-way or easements. **SacSewer** Standards and Specifications are necessary to provide for the safety and general welfare of the public that use the sewer facilities.

The Standards and Specifications include details such as minimum pipe slope to keep scouring velocity and exclude swales, which can lead to FOG buildup.

The Standards and Specifications document includes a Section that describes the purpose and requirements for pipeline cleaning. Section 329.1 states, "Pipeline cleaning is performed as part of **SacSewer's** maintenance programs. Clean all pipelines to be inspected for structural condition or rehabilitated before starting work. The contractor must assume a reasonable amount of debris within the pipe. Clean pipelines by removing all sludge, dirt, sand, grease, rocks, roots, and other material and obstructions from the pipelines and manholes. Take all necessary precautions to prevent spills and backups into structures and protect existing facilities from damage from cleaning equipment. " In addition, the document provides general procedures and codes required to perform a Television Inspection."

4. Building Code, Uniform Plumbing Code, CA Plumbing Code

Many different state and federal codes and regulations that govern building plumbing and fixtures, FSE's, and sewer pipelines. Each is designed to provide for the health and safety of the public. In addition to the state and federal codes and regulations and the **WDR** and **SSMP**, the **SacSewer** sewer collection system is safeguarded by codes and regulations that must be adhered to by various departments within the County of Sacramento. These include:

- 4.1 Sacramento County's Environmental Management Department performs plan reviews to ensure compliance with health and safety regulations. The Application for Food Facility Plan Review includes two references specifically related to proper FOG handling and disposal including Section 114201, which describes location and installation requirements for grease traps/interceptors, and Section 11425.8 that describes the requirement for separate rendering containers for inedible kitchen grease.
- 4.2 The County of Sacramento Building Permits and Inspection Division also has a role in ensuring proper installation of grease traps/installations as required by the Uniform Plumbing Code and other State regulations.
- 4.3 Residents within Sacramento County are allowed to place used cooking oil at curbside for pick up by Sacramento County's Waste Management and Recycling (WMR) Department on the same pick up schedule as mixed recycling. WMR's public website has guidelines for proper containment and placement of used oils. WMR disposes of the used oils at one of the region's FOG disposal sites as shown on the stoptheclog.com website.

5. SacSewer Policies, Procedures and Practices

The assessment programs are designed to investigate any shortcomings in meeting **SacSewer's** approved Service Levels or regulatory requirements, including this **FOG control program**. These assessments are broken into the following three categories:

- **Structural Assessment**
- **Spill Assessment**

- **Management Plan Assessment**

The assessment programs consist of strategies that drive **SacSewer's** operation and maintenance practices, **FOG control program**, system evaluation and capacity assurance plan, and monitoring, measurement, and program modifications.

SacSewer uses system-wide assessment programs to:

- monitor and analyze trends on service levels and performance measures
- review the results the work done to accomplish a strategy
- make PM schedule, strategy modifications or other corrections, depending on trends and target performance level
- evaluate and manage risk associated with failing to meet service levels, regulatory requirements, community/social needs and business goals
- address capital and operating needs and project revenue and funding needs
- monitor the result of these changes

The assessment programs incorporate the following concepts:

- Investigatory triggers
- the point at which further investigation is warranted as the predicted performance or response is above or below the required range, and
 - Action triggers
- the point at which a capital investment is required or a change in operation and maintenance practice, staffing, policy, or procedure is required as the investigation and cost analysis has determined performance is outside of the acceptable range

SacSewer uses strategies to address actions taken to mitigate the risks associated with specific failure modes and to address performance deficiencies, or cost inefficiencies. These strategies address:

- pipeline loss of support failure mode
- pipeline crush collapse failure mode
- pipeline stoppage failure mode
- pump station and force main failure modes
- under capacity failure mode
- management assessment strategies for performance and efficiencies

One of the results of the strategies is to study the investigatory triggers to assess asset plan and staffing plan projections.

Detailed descriptions of key programs and plans are listed below:

5.1 Structural Assessment Program

SacSewer owns and operates a variety of physical assets. Each asset type has its own degradation pattern that leads to various modes of structural failures. The **Structural Assessment Program** document describes the strategies **SacSewer** implements to identify and mitigate failure modes that lead to structural failures of sewer collection assets such as

manholes, pipes, and pump stations. If a structural failure causes a stoppage, the **Blockage Control Assessment Program** is employed.

5.2 Blockage Control Assessment Program

The **Blockage Control Assessment Program** is used to document strategies **SacSewer** implements to identify and mitigate failure modes that cause spills.

This program is divided into different types of strategies addressing spill-producing failure modes. These strategies are further divided by procedures and practices when different asset classes have different required methodology needed to determine investigatory and action triggers. **SacSewer's** supporting information can be found in the following:

- **Main Line Stoppage Failure Mode Strategy**
- **Lower Lateral Stoppage Failure Mode Strategy**
- **Manhole Stoppage Failure Mode Strategy**
- **Pump Station Component Failure Mode Strategy**
- **Damage by Others Failure Mode Strategy**
- **Under Capacity Failure Mode Strategy**

In addition to the above strategies, the **Root Control Program** and this **Comprehensive FOG Control Program** describe actions taken to address the impact that roots and FOG have on the system.

5.3 Management Plan Assessment Program

The **Management Plan Assessment Program** contains strategies, programs, policies, systems, activities and teams that drive **SacSewer's** day-to-day operations and references both reactive and proactive actions to reduce the likelihood of spills.

The purpose of the **Management Plan Assessment Program** document is to describe how **SacSewer** identifies and prioritizes system deficiencies and implements short and long-term rehabilitation, replacement, and capacity assurance projects. The document describes the overall program **SacSewer** uses to manage decision making processes such that attention is focused on assets at risk of failing in any of the failure modes identified to date, and how various revenue scenarios are evaluated, and how a schedule for developing the funds needed is updated each year.

SacSewer's computerized maintenance management system (CMMS) documents work orders, preventive maintenance schedules, and the records of completed work. Reports from the CMMS are used to provide the data for trending the system performance. The performance trends for the spill related service levels, failure modes, and performance measures drive the priority **SacSewer** actions.

5.4 Asset Management Plan

SacSewer has a comprehensive Asset Management Plan, which demonstrates responsible management and sustainability of **SacSewer** assets. The Plan includes, but is not limited to, asset analysis, risk management, financial management, decision-making and quality management.

6. Requirements to Install Grease Removal Devices (such as traps or interceptors), design standards for removal devices, maintenance requirements, BMP requirements, record keeping, and reporting requirements.

The following codes, ordinances, procedures and protocols – all of which are referenced elsewhere in this document – contribute to the adherence of this Section of the **SSMP**.

- **SacSewer** Standards and Specifications
- Uniform Plumbing Code
- CA Plumbing Code
- Health & Safety Code
- County Building Code
- County Environmental Health Department requirements
- **SacSewer** & SRCSD Sewer Ordinances
- Stoptheclog.com website
- FOG Control Program Information Kits
- WSCS' Fog Incident Response Standard Operating Procedures
- WSCS' FOG Response Log

Reactive Approach:

1. The legal authority to prohibit discharges to system and measures to prevent spills caused by FOG

1.1 Governance

SacSewer is governed by a 10-member Board of Directors made up of five members of the Sacramento County Board of Supervisors, as well as representatives from the five cities it serves – Citrus Heights, Elk Grove, Rancho Cordova, and a portion of the cities of Sacramento and Folsom.

SacSewer Board of Directors is responsible for administering all provisions of **SacSewer Sewer Ordinance (Ordinance)** and shall exercise these responsibilities according to the purpose and intent of the **Ordinance** in a fair and objective manner. Except as otherwise provided in the **Ordinance**, the Board has delegated to the District Engineer the responsibility to administer, implement and enforce the provisions of the **Ordinance**. The District Engineer may delegate duties, except termination of service, to subordinate staff.

1.2 Sewer Ordinance

The **Sacramento Area Sewer District Sewer Ordinance** and the **Sacramento Regional County Sanitation District Consolidated Ordinance** provide **SacSewer** with the Legal Authority to do the following:

- prevent illegal discharges
- require that sewers and connections be properly designed and constructed
- ensure access for maintenance, inspection, or repairs for portions of laterals
- limit the discharge of fats, oils, and grease (FOG) and other debris that may cause blockages
- enforce any violation of its sewer ordinance
- prohibit discharges to the system and identify measures to prevent spills and blockages caused by FOG

- inspect grease producing facilities

The **Ordinance** defines uniform requirements for design, construction, and use of the sewer collection system, provides the enforcement of these requirements, establishes penalties for violations, and defines responsibility for sewer collection system maintenance. The **Ordinance** provides protection of the system from damage, and protects the health and safety of the public and **SacSewer's** employees responsible for its maintenance, and the environment.

Because **SacSewer** collects wastewater and diverts it to the conveyance and treatment systems of the SRCSD, users are required to comply with the provisions of the SRCSD Consolidated Ordinance in addition to the provisions of **SacSewer Ordinance**.

1.3 Enforcement Response Plan

SacSewer's Enforcement Response Plan (ERP) was approved by the Board of Directors in January 2013. The ERP describes procedures when users do not comply with the provisions of **SacSewer** and SRCSD ordinances. The procedures can generally be applied to all users of the system in conformance with both ordinances, including those subjects to the requirements of the Federal pre-treatment program (typically referred to as industrial users) and those discharging under a Wastewater Discharge Permit (WDP).

The ERP does not expand the authority described in the **Ordinance**. It is used by staff to identify, document, track and respond to non-compliance and to select the enforcement action most appropriate for a given violation. The ERP ensures that consistent, timely, fair and equitable enforcement procedures are implemented for instances of non-compliance.

1.4 Spill Emergency Response Plan

The **Spill Emergency Response Plan** provides specific steps to take when a spill occurs and identifies requirements for incident investigations, TV Inspections, and instructions for staff to request public education/outreach for FOG-caused spills.

There are other policies that provide **SacSewer** staff the ability to analyze and mitigate future.

2. Authority to inspect grease producing facilities, enforcement authorities, and whether (SacSewer) has sufficient staff to inspect and enforce the FOG Ordinance

2.1 Authority to inspect and enforce

- **SacSewer & SRCSD Ordinances**
- **SacSewer & SRCSD Enforcement Response Plans**
- WSCS' Fog Incident Response Standard Operating Procedures
- Sacramento County Environmental Health Department policies and procedures
- Sacramento County Building Inspection Department policies and procedures

2.1 Sufficient staff to inspect and enforce

As noted above, the majority of FOG-related spills occur in residential areas, thus our **SacSewer Comprehensive FOG Control Program** places greater emphasis on public outreach and education. The majority of funding for the FOG program goes to Media and Public Relations contractors. The contract(s) is managed by the FOG Program Manager in consultation with **SacSewer** Communications and Media Officer. **SacSewer** engages staff from WSCS to investigate and enforce Food Service Establishment (FSE) FOG incidents, and is

able to fund additional human resources if data analysis indicates a need for an increased level of inspection and enforcement. Therefore, **SacSewer** has sufficient resources to ensure adequate inspection and enforcement.

3. An identification of sanitary sewer system Sections subject to FOG blockages and establishment of a cleaning maintenance schedule for each Section

FOG blockages and FOG-related spill happen throughout our service area and are most often found in single-family residential areas. Therefore, the **SacSewer Comprehensive FOG Control Program** incorporates all disciplines in reducing blockages and spills caused by FOG.

Because the majority of **SacSewer's** FOG stoppages occur in residential areas, reducing FOG loading by increasing source control efforts is difficult. That is why **SacSewer** has clear and defined procedures to analyze data and make necessary repairs, cleaning methods or cleaning schedule adjustments.

SacSewer understands that importance of a broader examination of the underlying causes of a blockage or spill. The various strategies, policies and procedures described herein illustrate our commitment to both proactive and reactive approaches related to performing thorough investigations subsequent to a blockage or spill.

A post-blockage/spill investigation is conducted after each such incident to determine the underlying cause before deciding on a corrective measure to be taken to prevent recurrence. Potential underlying causes of a FOG stoppage include:

- Site condition (root intrusion, sag, debris, etc.)
- Inadequate cleaning schedule
- Improper cleaning technique
- Excessive grease discharge from connected parcels
- Excessive grease discharge from parcels in the upstream shed
- Cold weather (causes FOG to solidify more readily)

The investigation process allows **SacSewer** to make smart preventative maintenance decisions to reduce the risk of repeated FOG-related stoppages as well as identify any potential systematic weaknesses that should be addressed. Furthermore, **SacSewer** has robust TV inspection, data analysis, cleaning schedule and technique policies and procedures to mitigate repeat FOG events.

4. Development and implementation of source control measures for all sources of FOG discharged to the sanitary sewer system

SacSewer will continue to closely monitor and analyze FOG stoppage data and utilize sound asset management principals and best management practices to identify and mitigate sources of FOG-related stoppages. As delineated in Section (3) above, **SacSewer's** commitment goes beyond developing source control measures in the most common FOG-incident locations in its service area.

512.5. Effectiveness Measure

The effectiveness of this program will be determined by a periodic analysis of FOG stoppage data, and statistics provided by the public outreach and education consultant.

512.6. Detailed Group Responsibilities

The following groups and individuals will be responsible for the corresponding areas of the implementation of this program:

FOG Program Manager

The FOG program manager oversees the following:

- FOG program documentation updates
- FOG studies
- FOG enforcement response process as outlined in the Enforcement Response Plan and actions taken under the Enforcement Response Plan to update management as needed
- FOG related coordination activities with internal and external entities. Internal entities are **SacSewer** Data Management Group, Maintenance and Operations staff, Public Affairs Office, and Wastewater Source control Section. External entities include Environmental Management Department (EMD), the public, Housing Associations, and property managers

SacSewer Public Affairs Office

SacSewer Public Affairs Office is responsible for providing support and co-managing the consultant contract for the Public Outreach and Education portion of the FOG program.

SacSewer Business Planning

SacSewer Business Planning staff captures and produces complex FOG stoppage data for analysis.

SacSewer Operations Support and M&O Staff

The Televised Inspection (TVI) reviewers in the **SacSewer** Operations Support unit, as well as M&O staff are responsible for identifying, properly documenting and preparing Service Requests or Work Orders or other established means of notifying the Safety and Regulatory Compliance staff or WSCS when inspection or enforcement may be warranted.

SacSewer Safety and Regulatory Compliance

SacSewer-Safety and Regulatory Compliance is also responsible for the development of certain component elements within this program. Business Implementation is typically responsible for the day-to-day application of the assessment and problem analysis activities described in the individual components.

SacSewer Wastewater Source Control Section (WSCS)

WSCS provides inspection and enforcement support as requested by **SacSewer**.

513 Root Control Program

513.1. Purpose

The purpose of this document is to describe the **Root Control Program** of the Sacramento Area Sewer District (**SacSewer**).

513.2. Background

SacSewer recognizes that root intrusion represents a major challenge in its efforts to operate its gravity collection system (system) in a manner that meets regulatory requirements, achieves identified service level targets, and is cost effective.

Historical stoppage and spill data show that roots growing into the system cause a large number of the stoppages and spills in **SacSewer's** system. Stoppages in **SacSewer's** system cause the vast majority of spills. Aggressive management of root intrusion in **SacSewer's** system will reduce the number of root-related spills.

The main tool that **SacSewer** uses to combat root is mechanical cleaning. Gravity sewer lines can be cleaned with a tool that has a spinning cutter on the front (rodding), by pushing through the line with a ball (balling), by cleaning with a hydraulically pressurized nozzle (jetting), and by cleaning with a hydraulically pressurized nozzle with chains attached (flailing).

SacSewer has tried a variety of techniques to control root intrusion, in addition to the methods discussed above. The following chronology provides a few milestones in the **SacSewer's** Root Control Program history:

In September of 1973, **SacSewer**, (as CSD-1) published a study on the Chemical Control of Roots. At the time, **SacSewer** was already cleaning roots out of underground sewer pipelines mechanically. The introduction to this document states, "Collection systems, as we know them today, well-engineered, efficient and an absolute necessity to public health continue to be plagued by root intrusion." This study concluded that chemical root control was an effective method for controlling root intrusion in the system. However, the risks associated with the chemicals were thought to outweigh the benefits.

In 1997, a second small pilot of chemical root control was undertaken on 87 pipeline segments. The pilot was executed in a way that did not provide a conclusive result of the effectiveness and value of chemical root control in **SacSewer's** system.

In March of 2005, **SacSewer** (as CSD-1) collaborated on the California Collection System Collaborative Benchmarking Group publication of the Sanitary Sewer Integrated Root Control Best Management Practices.

In October of 2009, **SacSewer** again began a substantial pilot study designed to statistically test chemical root control cost effectiveness relative to mechanical root control. This pilot is being done under a strict inspection and monitoring protocol in order to provide more conclusive results than previous studies have attained.

In April of 2012, **SacSewer** added a private root problem enforcement process to provide an enforcement trigger to maintain compliance with the **Sewer Ordinance** by advising owners of private root problems and enforcing corrective action.

In April of 2013, **SacSewer** expanded the use of chemical root control application. In this expansion, **SacSewer** applied chemical root control on assets that were identified with less aggressive root intrusion.

In January 17, 2017, in the Management meeting, the decision to discontinue the chemical root foaming program was taken. This decision was taken because it was determined that Lines that had Grease and debris in addition to roots had to be cleaned with mechanical cleaning after the root foaming. The root foaming was only effective to clear roots while the mechanical cleaning was effective in removing roots, grease, and debris at the same time. Since the majority of the lines that was foamed also required mechanical cleanings, it was determined that the mechanical cleaning is a more effective method than the root foaming.

In August of 2013, **SacSewer** board approved the Main Line Lining for Root Mitigation - Project 1. This project was part of the effort to reduce root related maintenance and operations costs.

Lining pipelines to mitigate root intrusion can be a cost effective option. Select main lines were lined with a cured-in-place liner.

In August 2016, **SacSewer** approved the **Enforcement Response Process** to align and more consistently document processes for enforcement efforts related to roots, FOG, unpermitted connections, prohibited discharges and easement access. The private root problem enforcement process implemented in 2012 is incorporated in this Enforcement Response Process.

In July 2020, **SacSewer** will implement a **Main Line Easement Rehabilitation Program** targeted at rehabilitating main lines in easement on a preventive maintenance frequency of 12 months and under, many of which have root related issues. Easement areas will be selected each year for rehabilitation based on risk. Each main line within the selected area will be evaluated for lining eligibility. Construction for the evaluated assets will be completed in the following fiscal year.

513.3. *Characterization of Roots within SacSewer's Service Area*

The entire **SacSewer** service area is susceptible to root intrusion. There are some areas of the system that televised inspection (TVI) data has shown to be more susceptible to root intrusion. Roots that are removed from the system tend to re-grow and need to be removed again later. The **Management Plan Assessment Program** continues to monitor trends in root-related spills in order to find and implement improvements that will further reduce the number of root-related spills.

513.4. *Program*

The **Root Control Program** aims at reducing the impacts of root intrusion in **SacSewer's** system. This includes both a reactive approach and a proactive approach. The reactive approach aims at responding to and dealing with spills in a quick and effective way and enforcing corrective action of private root problems. This minimizes the impacts of root intrusion that has occurred. The proactive approach aims at stopping root intrusion before it becomes a problem. Finding innovative root control techniques, appropriate mechanical cleaning methods, applying physical pipeline rehabilitation, and maintaining **SacSewer Standards and Specifications** are all part of this approach.

Reactive Approach:

SacSewer provides 24-hour emergency response. **SacSewer** personnel who respond to spills use the **Spill Emergency Response Plan** to direct their response activities.

The reactive approaches to root stoppage failures in the system are listed in the **Lower Lateral Stoppage Failure Mode Strategy**, the **Main Line Stoppage Failure Mode Strategy**, and the **Manhole Stoppage Failure Mode Strategy** depending on what type of asset has the stoppage. See the specific strategy for the detailed reactive approach. Generally, the approaches in each of these strategies include the following elements:

- Post stoppage TVI and review, which can lead to placement in a program or the **Generic BCE Process**
- Problem and solution analysis through the **Generic BCE Process**; solutions can be anything from periodic mechanical cleaning, to asset rehabilitation, to asset replacement
- Changes to the **SacSewer Standards and Specifications**, because the way they are written allows construction that enables root intrusion
- Changes to the **Asset Management Plan**

- Penalties for violations to the **Sewer Ordinance**, which forbids activities that might damage the system and enable root intrusion

Enforcement Response Process

SacSewer has set strategies to minimize root intrusion into **SacSewer's** system. The **Sewer Ordinance** states that the owner has the sole responsibility for clearing stoppages, inspecting, maintaining, and repairing the upper lateral, including backflow prevention devices. The **Sewer Ordinance** gives **SacSewer** authority to monitor discharge and take enforcement action for inadequate control of fats, oil, and grease and ineffective facility maintenance practices.

Generally, the Enforcement Response Process for private root intrusion includes the following elements:

- Advisory letters are sent to give the owner knowledge of roots entering the lower lateral from their upper lateral
- Follow up evaluations occur to confirm that the owner has taken corrective action
- Notice of violation letters are sent if owner has not performed corrective action, or if the roots from the upper lateral caused a stoppage in **SacSewer's** lower lateral

Proactive Approach:

Root control methods that show promise to reduce root-related spills are taken through a pilot test phase. Approved methods will be incorporated into the appropriate stoppage failure mode strategy.

The proactive approaches to root stoppage failures in the system are listed in the **Lower Lateral Stoppage Failure Mode Strategy**, the **Main Line Stoppage Failure Mode Strategy**, and the **Manhole Stoppage Failure Mode Strategy** depending on what the asset is in question. See the specific strategy for the detailed Proactive Approach. Generally, the approaches in each of these strategies include the following elements:

- **SacSewer Standards and Specifications** are written so that constructed pipelines will be more resistant to root intrusion
- The **Sewer Ordinance** is written to forbid activities that might damage the system and enable root intrusion
- Proactive cleaning programs exist to remove roots before they cause a stoppage which could lead to a spill

513.5. Detailed Group Responsibilities

The following groups and individuals will be responsible for the corresponding areas of the implementation of this program:

Engineering Operations Support-Lower Lateral TVI Review

Engineering Operations Support-Lower Lateral TVI Review is responsible for identifying the roots protruding from the upper lateral, creating advisory and enforcement service requests, and creating follow-up television inspections.

Maintenance and Operations (M&O)

SacSewer-M&O is typically responsible for the day-to-day application of the assessment and problem analysis activities described in the individual components.

Safety & Regulatory Compliance

SacSewer-Safety & Regulatory Compliance is responsible for upper lateral advisory and enforcement service request reports, determining if compliance has been achieved, creating, filing, and sending advisory and enforcement letters.