

Clean Water 2020 Program

CONSENT DECREE ANNUAL REPORT

January 1, 2022 – December 31, 2022



Table of Contents

Acronyms & Abbreviations	2
Section 1 Introduction	4
1.1 Summary of Reporting Requirements	4
1.2 Report Organization.....	4
Section 2 CMOM Programs Update.....	5
2.1 Sewer Overflow Response Program	5
2.2 Contingency and Emergency Response Plan	5
2.3 WCTS Training Program	5
2.4 Information Management System Program	5
2.5 Capacity Assurance Program	6
2.6 Sewer Mapping Program	7
2.7 Fats, Oils, and Grease Management Program	7
2.8 Transmission System Operations and Maintenance Program.....	7
2.9 Gravity Sewer System Operation and Maintenance Program.....	8
2.10 Financial Analysis Program	10
Section 3 Capital Projects Update	11
3.1 Infrastructure Rehabilitation Report Projects	11
Section 4 Sanitary Sewer Overflow Trends Analysis.....	13
4.1 SSO Frequency and Volume by Cause.....	13
4.2 SSO Frequency and Volume by Month	16
4.3 SSO Duration	17
4.4 SSOs per 100 Miles of Pipe	17
4.5 Building Backup Frequency, Volume, and Causes	18

List of Tables

Table 1: CY 2022 Lift Station Work Order Summary.....	8
Table 2: CY 2022 WCTS Work Order Summary.....	9
Table 3: CY 2022 WCTS Key Performance Indicators (KPIs).....	9
Table 4: IRR Projects (V.16).....	11
Table 5: SIRR Projects (V.16.c)	12
Table 6: Total SSO Frequency and Volume by Cause, CY 2021 & 2022	13
Table 7: Monthly SSO Frequency by Cause, CY 2021 & 2022	14
Table 8: Total Building Backup Frequency and Volume by Cause, CY 2021 & 2022.....	18
Table 9: Monthly Building Backup Frequency by Cause, CY 2021 & 2022.....	19

List of Figures

Figure 1: CY 2021 SSOs by Cause	15
Figure 2: CY 2022 SSOs by Cause	15
Figure 3: SSO Frequency by Month.....	16
Figure 4: SSO Volume by Month	16
Figure 5: SSOs per 100 Miles of Pipe	17

Acronyms & Abbreviations

ARV – Air Release Valve

CAP – Capacity Assurance Program

CD – Consent Decree

CERP – Contingency Emergency Response Plan

CIP – Capital Improvements Program

City – City of Columbia

CMOM – Capacity, Management, Operations and Maintenance

CMMS – Computerized Maintenance Management System

CSAP – Continuing Sewer Assessment Program

CW2020 – City’s Program to Manage the Consent Decree Compliance

CY – Calendar Year

DOJ – United States Department of Justice

EPA – United States Environmental Protection Agency

FAP – Financial Analysis Program

FOG – Fats, Oils, and Grease

FSE – Food Service Establishment

FY – Fiscal Year

GIS – Geographic Information System

GSOMP – Gravity Sewer System Operation and Maintenance Program

H₂S – Hydrogen Sulfide

IFAS – Integrated Financial and Administrative Solution

IMS – Information Management System

IR – Infrastructure Rehabilitation [Program]

IRR – Infrastructure Rehabilitation Report

KPI – Key Performance Indicator

NASSCO – National Association of Sewer Service Companies

O&M – Operations & Maintenance

NTP – Notice to Proceed

PACP – Pipeline Assessment and Certification Program

SCADA – Supervisory Control and Data Acquisition

SCDHEC – South Carolina Department of Health and Environmental Control

SIRR – Supplemental Infrastructure Rehabilitation Report

SMP – Sewer Mapping Program

SORP – Sewer Overflow Response Program

SSES – Sanitary Sewer Evaluation Survey

SSO – Sanitary Sewer Overflow

TSOMP – Transmission System Operations and Maintenance Program

WCTS – Wastewater Collection and Transmission System

WMD – Wastewater Maintenance Division

WWTP – Wastewater Treatment Plant

Section 1 Introduction

1.1 Summary of Reporting Requirements

On May 21, 2014 the City of Columbia (City) entered into a Consent Decree (CD) with the United States Environmental Protection Agency (EPA), the United States Department of Justice (DOJ) and the South Carolina Department of Health and Environmental Control (SCDHEC). To fulfill the reporting requirements as defined in Section IX.39.c of the CD, the City has prepared this *Annual Report*, which includes the following information (as excerpted from the CD):

1. A summary of the CMOM [Capacity, Management, Operations and Maintenance] Programs implemented pursuant to this Consent Decree, including a comparison of actual performance with any performance measures that have been established;
2. A summary of each remedial measure and capital project implemented pursuant to this Consent Decree;
3. A trends analysis of the number, volume, duration, and cause of Columbia's SSOs [sanitary sewer overflows] for the previous twenty-four (24) month period.

1.2 Report Organization

This Annual Report is organized as follows:

Section 1 – Introduction

This section includes a summary of the reporting requirements and describes the report organization.

Section 2 – CMOM Programs Update

This section addresses the requirements of Section IX.39.c.(i) of the CD. The section provides a summary and update on the implementation of the specific Management, Operations, and Maintenance (MOM) Programs included in Section V.12 of the CD.

Section 3 – Capital Projects Update

This section addresses the requirements of Section IX.39.c.(ii) of the CD. The section provides a summary and update on the remedial measures and capital projects implemented as a part of the CD. The remedial measures and capital projects noted in this report have been identified by the City in the course of the assessment of the Wastewater Collection and Transmission System (WCTS) and may be included in the Infrastructure Rehabilitation Report (IRR) required under Section V.16 of the CD.

Section 4 – Sanitary Sewer Overflow Trends Analysis

This section addresses the requirements of Section IX.39.c.(iii) of the CD. The section provides information on the number, volume, duration, and cause of the City's SSOs for the previous twenty-four month period.

Section 2 CMOM Programs Update

In accordance with Section IX.39.c.(i) of the CD, this section provides a summary and update on the implementation of the specific CMOM Programs included in Section V.12 of the CD. The Program elements addressed in this section provide information regarding activities involving the Metro Wastewater Treatment Plant (WWTP) as well as the City's WCTS.

2.1 Sewer Overflow Response Program

The City continues to implement the Sewer Overflow Response Program (SORP) as required under Section V.12.a of the CD.

Projects and significant activities completed during the current reporting period:

- Trained new hires and existing personnel on the use of the SORP (completed December 2022).

2.2 Contingency and Emergency Response Plan

In consultation with SCDHEC, the City developed and submitted to EPA and SCDHEC a Contingency Emergency Response Plan (CERP) within 18 months of the Date of Entry of the CD. The City received final approval of the CERP from EPA and SCDHEC on May 23, 2016. As of March 6, 2017, all implementation items associated with the CERP were completed.

Projects and significant activities completed during the current reporting period:

- Continue to implement and train on CERP procedures prior to and during major weather events.

2.3 WCTS Training Program

In accordance with the requirements of the CD, the City submitted a WCTS Training Program to EPA and SCDHEC by January 5, 2016. The City received final approval of the WCTS Training Program from EPA and SCDHEC on May 23, 2016. As of November 20, 2017, all implementation items associated with the WCTS Training Program were completed.

Projects and significant activities completed during the current reporting period:

- Continued implementation and tracking of the Apprenticeship program in 2022. Employees are advised quarterly of their status in meeting program certification requirements. Program continues to be successful in training new and existing employees on the operation and maintenance of the WCTS.

2.4 Information Management System Program

In accordance with the requirements of the CD, the City submitted an Information Management System (IMS) Program to EPA and SCDHEC by January 5, 2016. The City received final approval of the IMS Program from EPA and SCDHEC on May 23, 2016.

Projects and significant activities completed during the current reporting period:

- The City continues to use Cityworks as their Computerized Maintenance Management System (CMMS) for service request and work order management for corrective and preventive maintenance activities.
- The City continues to use a series of Microsoft Excel spreadsheets, as well as IFAS, to track its Capital Improvements Program (CIP) throughout the lifecycle of the project.
- The City continues to use the Storeroom module as part of the Cityworks software. As of September 30, 2018, 100% implementation of the Storeroom component was achieved.
- The City continues to obtain metrics and reports directly from their CMMS regarding the frequency of work performed on the WCTS.
 - In addition, the City is using a prototype business intelligence system utilizing dashboard technology that integrates Cityworks, SCADA (Supervisory Control and Data Acquisition), financial information and geographic information system (GIS) data into a reporting dashboard.
- Sewer basin electronic mapping has continued to be implemented in accordance with the submitted and EPA approved Sewer Mapping Program (SMP). As of November 23, 2018, all WCTS Major Gravity Mapping was completed. As of December 31, 2022, the WCTS Minor Gravity Mapping is 89% complete.

2.5 Capacity Assurance Program

In accordance with the requirements of the CD, the City is to submit to EPA and SCDHEC a Capacity Assurance Program (CAP) within 180 days after approval of the Hydraulic Model Report. Additionally, within 90 days after the Date of Entry of the CD, the City was required to establish a list of all authorized new sewer service connections or increases in flow from existing service connections, which flows have not yet been introduced into the WCTS. The City is required to update and maintain this list as necessary until full implementation of the CAP, as approved by EPA. In addition, upon execution of the CD and until EPA approves the CAP as required by Section 12.e, the City agreed to continue to implement its current capacity program.

Projects and significant activities completed during the current reporting period:

- Continued to collect and process CAP requests received from developments within the City's Service Area in accordance with the current capacity program.
- Began using the CAP Tool in addition to the desktop analyses for CAP reviews.
- Completed review of CAP Tool Development Guide.
- Continued to review minor gravity lines (less than 15" in diameter) that are greater than 80% full according to the CAP Tool. This is an ongoing process, and 50 subbasins have been reviewed.
- Developed a draft of a detailed Standard Operating Procedure for the CAP Review process.

2.6 Sewer Mapping Program

In accordance with the requirements of the CD, the City submitted an SMP to EPA and SCDHEC within 60 days of the date of entry of the CD. The City received final approval of the SMP from EPA and SCDHEC on December 9, 2014. As of November 23, 2018, all WCTS Major Gravity Mapping requirements associated with the SMP have been completed.

Projects and significant activities completed during the current reporting period:

- The City continues to complete the electronic mapping of each Sewer Basin in accordance with the approved SMP implementation plan. Progress for each WCTS Minor Gravity Mapping basin is as follows:
 - West Columbia Basin – 100% complete (Mapping complete as of June 9, 2020)
 - Smith Branch Basin – 100% complete (Mapping complete as of June 9, 2021)
 - Saluda River Basin – 100% complete (Mapping complete as of June 9, 2021)
 - Rocky Branch Basin – 100% complete (Mapping complete as of June 9, 2021)
 - Mill Creek Basin – 64% complete
 - Gills Creek Basin – 90% complete
 - Crane Creek Basin – 98% complete
 - Broad River Basin – 75% complete

2.7 Fats, Oils, and Grease Management Program

The City continues to implement its Fats, Oils, and Grease (FOG) Management Program. The FOG Management Program was submitted to the EPA on July 2, 2013 and incorporated into the CD as Appendix G.

Projects and significant activities completed during the current reporting period:

- Public education program and website information are available to the public to promote FOG awareness throughout the City of Columbia.
- The City continues to implement the existing FOG Program to include quarterly inspections of Food Service Establishments (FSEs) and Public Outreach Programs.
- The City established a Commercial FOG Forgivable Loan Program for locally owned businesses to offset costs for upgrading any preexisting or failing grease management devices to the current City standards; funding and administration of the program is still to be determined.

2.8 Transmission System Operations and Maintenance Program

In accordance with the requirements of the CD, the City submitted to EPA and SCDHEC a Transmission System Operations and Maintenance Program (TSOMP) within one year after the Date of Entry of the CD. The City received final approval of the TSOMP from EPA and SCDHEC on September 2, 2016.

Projects and significant activities completed during the current reporting period:

- Force Main and Easement Maintenance including initial clearing to survey the limits, where practical, continues to be completed on an annual basis. This work also includes the inspection of these easements for any potential problems.
- Corrosion control program for 2022 was completed by Columbia Water staff in conjunction with Clean Water 2020 staff. The work involved sampling the WCTS and identifying areas that indicate high levels of H₂S that may cause health and safety issues and potential corrosion to the City’s WCTS infrastructure. Continuous H₂S monitors were deployed throughout the system at locations identified through a desktop assessment, such as lift stations and discharge manholes.

The Key Performance Indicators (KPIs) that are tracked by the City to measure the performance of the WCTS include the number of Force Main related SSOs per mile of Force Main and/or number of SSOs per number of Pump Stations; and maintenance activities tracked by type (corrective, preventive, and emergency).

Table 1: CY 2022 Lift Station Work Order Summary

WCTS Maintenance	Percentage of Work Orders
Corrective Maintenance	10.5%
Preventive Maintenance	89.4%
Emergency Maintenance	0.1%
Total	100%

SSO KPIs related to Force Main and/or SSOs per number of Pump Stations are provided under Section 4 Sanitary Sewer Overflow Trends Analysis.

2.9 Gravity Sewer System Operation and Maintenance Program

In accordance with the requirements of the CD, the City submitted to EPA and SCDHEC a Gravity Sewer System Operation and Maintenance Program (GSOMP) within 18 months of the Date of Entry of the CD. The City received final approval of the GSOMP from EPA and SCDHEC on May 23, 2016.

Projects and significant activities completed during the current reporting period:

- Gravity Sewer Easement survey and marking, and initial clearing to survey the limits, where practical, continues to be completed on annual basis. This work also includes the inspection of these easements for any potential problems.

- Continuing Sewer Assessment Program (CSAP) Preventive Maintenance Program contract has been initiated to perform ongoing preventive maintenance as needed to inspect, clean and document the condition of the sanitary sewer piping, manholes and service laterals for the City. This program will begin to supplement in-house personnel in the preventive maintenance of the WCTS.

The KPIs that are tracked by the City to measure the performance of the WCTS include the linear footage of Gravity Sewer inspected, the linear footage of Gravity Sewer cleaned, the number of manholes inspected, the number of manholes cleaned/maintained, the number of inverted siphons inspected, the number of inverted siphons cleaned/maintained, the number of SSOs per mile of Gravity Sewer, and maintenance activity tracked by type (corrective, preventive, and emergency).

Table 2: CY 2022 WCTS Work Order Summary

WCTS Maintenance	Percentage of Work Orders
Corrective Maintenance	52.3%
Preventive Maintenance	45.6%
Emergency Maintenance	2.1%
Total	100%

Table 3: CY 2022 WCTS Key Performance Indicators (KPIs)

Reportable Consent Decree KPIs for WCTS	Annual Projection	As of 12/31/22	% Completed vs. Projected
Linear footage of gravity sewer inspections (linear feet)	564,960	189,274	33.5% ¹
Linear footage of gravity sewers cleaned (linear feet)	1,129,920	466,158	41.3% ¹
Number of manholes inspected (each)	2,799	2,150	76.8% ¹
Number of manholes cleaned/maintained (each)	2,799	843	30.1% ¹
Number of inverted siphons inspected (each)	2	2	100.0%
Number of inverted siphons cleaned/maintained (each)	2	1	50.0%

¹ The City is experiencing significant difficulties with employee retention and hiring. These staffing issues have resulted in a reduction in maintenance being performed on the system, which is reflected in the WCTS Key Performance Indicators.

SSO KPIs related to WCTS are provided under Section 4 Sanitary Sewer Overflow Trends Analysis.

2.10 Financial Analysis Program

In accordance with the requirements of the CD, the City submitted a Financial Analysis Program (FAP) to EPA and SCDHEC by January 5, 2016. The City received final approval of the FAP from EPA and SCDHEC on May 23, 2016.

Projects and significant activities completed during the current reporting period:

- Continued assessing staffing impacts connected to CD programs and included needs and levels in both FY22/23 and FY23/24 budget plans.
- Continued planning for costs of equipment and materials needed for the proper management, operation and maintenance of the WCTS and WWTP (based on an evaluation of past needs, recent budgeting levels and costs, and projected needs) and for implementing CD programs.
- Continued planning for outsourcing needs based on past budgeting levels and costs, and on specific requirements for implementing CD programs.
- A previous rate study contract was in effect during the early portion of 2022 and continued with a rate study contract renewal that was approved by City Council on October 4, 2022 and started thereafter.
- Continued assessment of an updated/rolling 5-year CIP plan.
- Created business cases for projects for the FY22/23 Capital Projects Budget.
- Integrated Financial and Administrative Solution (IFAS) continues to be in use and is used to track and report capital improvement costs as well as third-party contracts by Operations & Maintenance (O&M) category.
- Continued data retrieval for FY20/21 O&M (by category) plus Capital costs as needed and continued preparation of the consolidated report, tracking O&M (by category) plus Capital costs for FY20/21.
- Began planning for consolidated report, tracking O&M (by category) plus Capital costs for FY21/22 for planned completion in CY 2023.

Section 3 Capital Projects Update

In accordance with Section IX.39.c.(ii) of the CD, the following section provides a summary and update on the remedial measures and capital projects implemented as a part of the CD.

3.1 Infrastructure Rehabilitation Report Projects

In accordance with Section V.16 of the CD, the City was to submit an IRR summarizing the results of the CSAP of the major components of the WCTS and a description of proposed rehabilitation projects. The IRR was to be submitted within six months after the City has assessed the major components of the WCTS once pursuant to the CSAP.

The deadline for submittal of the IRR to EPA and SCDHEC was November 23, 2019. The IRR was submitted to EPA and SCDHEC on November 22, 2019.

As rehabilitation projects are identified through the CSAP and in the normal course of O&M, the City is proceeding with those projects. The following projects have already been identified and are currently in progress.

Table 4: IRR Projects (V.16)

CIP #	Project Name	Project Status/Summary
SS725802	Greenlawn Drive to Burnside #1 PS (Hampton Forest) Phase 2	Construction Notice to Proceed (NTP) issued on October 17, 2022. Construction ongoing throughout remainder of 2022.
SS7301	Bull Street	City Council approved project on April 21, 2015. Construction ongoing throughout 2022.
SS733702	East Rocky Branch Improvements Phase 2	Construction NTP issued on September 21, 2020. Construction ongoing throughout 2022.
SS7428	Lower Saluda River Relief Sewer and Major Pipe Rehabilitation	Construction NTP issued on April 12, 2021. Construction ongoing throughout remainder of 2022.
SS7433	Cunningham Rd/Johnson Ave/Cramer Dr/Summerlea Dr Sewer Relocation	Construction NTP issued on February 28, 2022. Construction was completed in November 2022.
SS7502	Summerlea SS Flood Project	Construction NTP issued on September 19, 2022. Construction ongoing throughout remainder of 2022.

In accordance with Section V.16.c of the CD, the City shall submit a Supplemental Infrastructure Rehabilitation Report (SIRR) to EPA and SCDHEC which shall update all portions of the IRR to reflect additional information developed by the City through completion of the CSAP of the minor components of the WCTS.

The deadline for submittal of the SIRR to EPA and SCDHEC was November 23, 2022. The SIRR was submitted to EPA and SCDHEC on November 22, 2022.

As rehabilitation projects are identified through the CSAP and in the normal course of O&M, the City is proceeding with those projects. The following projects have already been identified and are currently in progress.

Table 5: SIRR Projects (V.16.c)

CIP #	Project Name	Project Status/Summary
SS6786	Annual Gravity Sewer Manhole Lining and Replacement	FY2021 construction began in July 2021. Construction was completed in June 2022. FY2022 construction began in July 2022. Construction ongoing throughout remainder of 2022.
SS6966	Annual Rehab on Lines less than 15"	FY2021 construction began in August 2021. Construction was completed in December 2022.
SS7363	Smith Branch 03 SSES	Construction NTP issued on January 16, 2019. Construction ongoing throughout 2022.
SS7424	SSES Rehabilitation Implementation BR02	Construction NTP issued on July 18, 2022. Construction ongoing throughout remainder of 2022.
SS7425	SSES and Sewer Rehabilitation Implementation RB03	Construction NTP issued on January 11, 2021. Construction ongoing throughout remainder of 2022.
SS7432	Starlite PS Decommissioning and Basin Rehabilitation Related Works	Construction NTP issued on December 5, 2022. Construction ongoing throughout remainder of 2022.
SS7487	Hickory Ridge Drive Sewer Rehab	Construction NTP issued on November 14, 2022. Construction ongoing throughout remainder of 2022.
SS7546	Mallard Pointe Force Main Replacement	Construction NTP issued on January 17, 2022. Construction was completed in May 2022.
SS7547	Yacht Cove Force Main Replacement	Construction NTP issued on January 3, 2022. Construction was completed in March 2022.
SS7548	Shady Lane Force Main Replacement	Construction NTP issued on October 31, 2022. Construction ongoing throughout remainder of 2022.
SS7583	SR02 and BR04 Engineer Led Find and Fix Rehabilitation	Construction NTP issued on May 2, 2022. Construction ongoing throughout remainder of 2022.

Section 4 Sanitary Sewer Overflow Trends

Analysis

In accordance with Section IX.39.c.(iii) of the CD, the following section provides a trends analysis of the number, volume, duration, and cause of the City’s SSOs for the previous twenty-four month period.

Items required include the detailed number (frequency) and volume, by cause, of reportable spills as well as a trend analysis of the number, volume, and cause of the City’s SSOs, by month, for the previous twenty-four month period.

4.1 SSO Frequency and Volume by Cause

The detailed number and volume, by cause, for reportable spills is presented for review. The following table represents the SSO volume spilled by cause, frequency and volume for calendar years 2021 and 2022.

Table 6: Total SSO Frequency and Volume by Cause, CY 2021 & 2022

SSO Cause	Frequency	Volume (gal)
Collapsed Line	80	182,804
Grease	23	23,769
3 rd Party	12	67,993
Pump Station Failure	5	250,760
Roots	64	57,935
Debris	61	112,856
Wet Weather	23	815,601
Force Main	3	786
Equipment Failure	12	220,528
Wastewater Treatment Plant	6	206,807

The following table shows the SSO category (cause), number of SSOs of that category by month, and the total for each month in CY 2021 and CY 2022. The total number of SSOs by category is then calculated as a percentage of all SSOs for the overall time period.

Table 7: Monthly SSO Frequency by Cause, CY 2021 & 2022

Month / Year	Collapsed Line	Grease	3rd Party	Pump Station Failure	Roots	Debris	Wet Weather	Force Main	Equipment Failure	Wastewater Treatment Plant	Total
Jan-21	5	1	1	1	4	2	4	1	1	0	20
Feb-21	3	4	0	1	2	4	10	0	0	0	24
Mar-21	9	2	0	0	1	3	0	0	0	0	15
Apr-21	4	1	2	0	3	4	0	0	2	0	16
May-21	2	2	0	0	3	2	0	1	1	0	11
Jun-21	3	1	0	0	4	2	1	0	0	1	12
Jul-21	1	3	0	0	1	2	0	1	1	0	9
Aug-21	2	0	2	1	0	2	0	0	0	0	7
Sep-21	2	1	0	0	1	0	0	0	0	0	4
Oct-21	3	2	1	0	0	2	0	0	0	0	8
Nov-21	4	0	0	0	1	1	0	0	0	0	6
Dec-21	7	2	2	1	4	2	0	0	0	0	18
CY 2021 Total	45	19	8	4	24	26	15	3	5	1	150
Jan-22	3	0	1	0	4	4	0	0	0	1	13
Feb-22	1	2	0	0	6	3	0	0	0	1	13
Mar-22	6	0	1	0	8	3	0	0	0	0	18
Apr-22	0	1	1	0	2	5	0	0	2	0	11
May-22	4	0	0	0	2	0	3	0	0	1	10
Jun-22	4	0	1	0	3	4	2	0	1	1	16
Jul-22	1	0	0	0	1	3	3	0	1	0	9
Aug-22	2	0	0	0	2	4	0	0	0	0	8
Sep-22	2	1	0	0	3	4	0	0	0	0	10
Oct-22	4	0	0	0	1	3	0	0	2	0	10
Nov-22	5	0	0	1	2	1	0	0	0	0	9
Dec-22	3	0	0	0	6	1	0	0	1	1	12
CY 2022 Total	35	4	4	1	40	35	8	0	7	5	139
Grand Total	80	23	12	5	64	61	23	3	12	6	289
% of Total	27.7%	8.0%	4.2%	1.7%	22.1%	21.1%	8.0%	1.0%	4.2%	2.1%	

In CY 2021, the highest number of reportable spills were due to collapsed lines (30%), debris (17%) and roots (16%). In CY 2022, the highest number of reportable spills were due to roots (29%). The next highest areas of reportable spills were attributable to collapsed lines (25%) and debris (25%). Overall, collapsed lines, roots, and debris combined to represent a significant majority (71%) of the reportable spills for the period.

Figure 1: CY 2021 SSOs by Cause

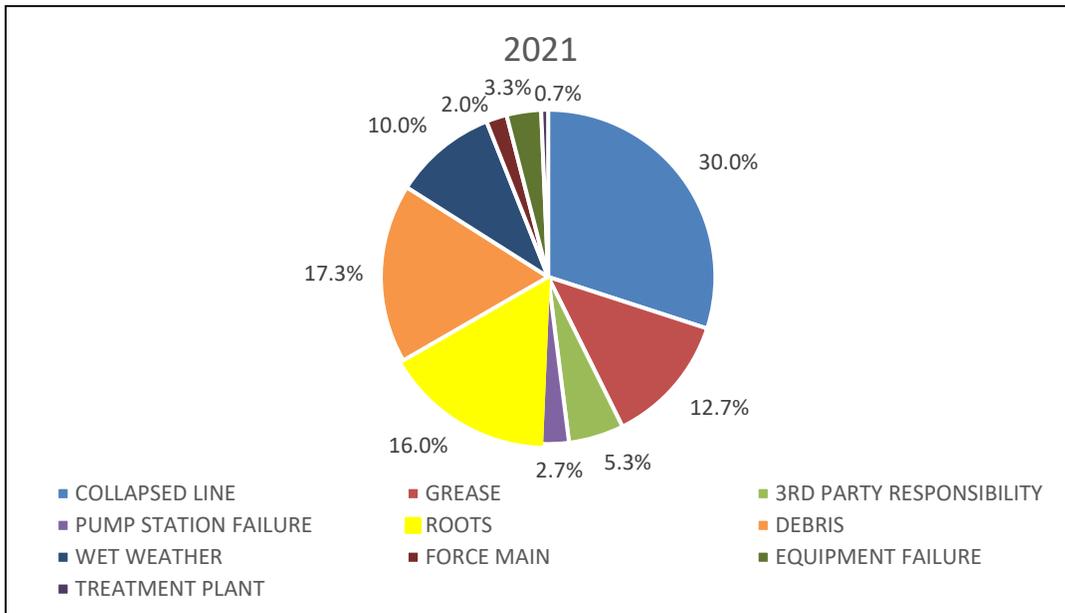
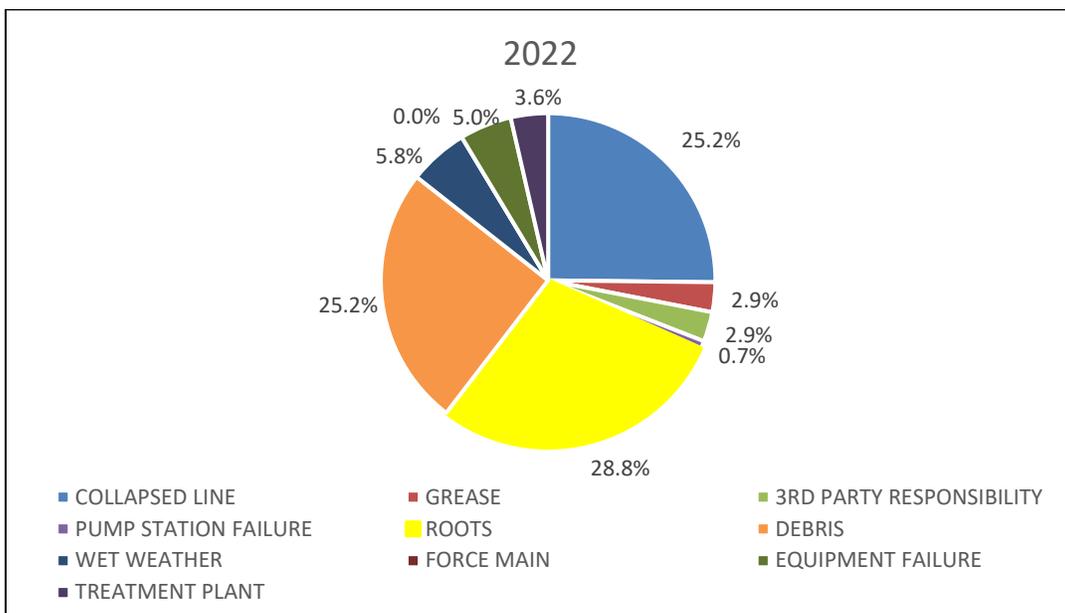


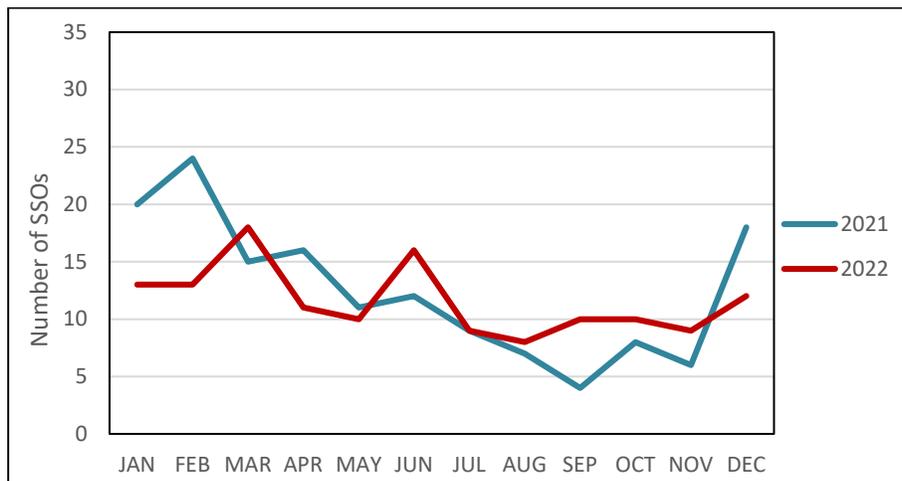
Figure 2: CY 2022 SSOs by Cause



4.2 SSO Frequency and Volume by Month

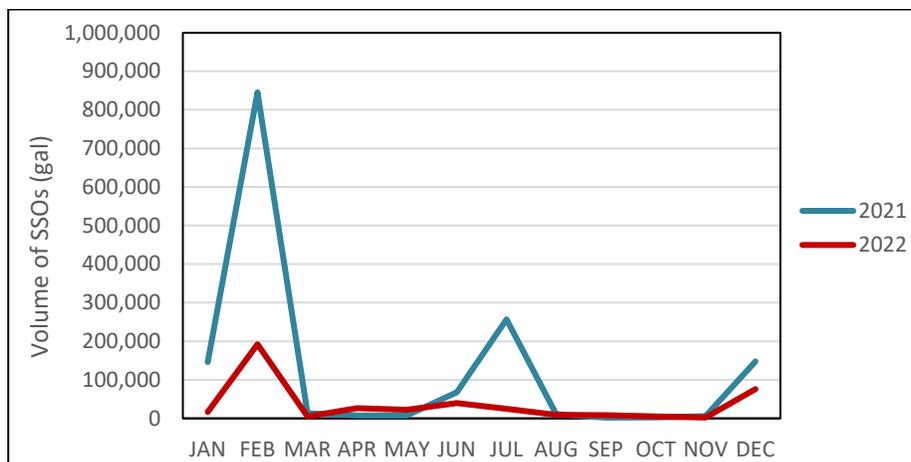
As shown in the tables above, the City experienced a total of 150 SSOs in CY 2021. In CY 2022, the City experienced a total of 139 SSOs for a combined total of 289 SSOs. This number was less than the previous two-year total of 344, a decrease of 16%. The average number of SSOs per month during CY 2021 was 12.5, and 11.6 in CY 2022. The fluctuation in SSOs monthly is caused by a combination of wet weather, roots, debris, and collapsed lines. During CY 2021, January and February averaged 22.0 SSOs per month, well above the annual average of 12.5. In CY 2022, March and June averaged 17.0 SSOs per month, once again well above the annual average of 11.6.

Figure 3: SSO Frequency by Month



During CY 2021, total known volume spilled represented approximately 1.51 million gallons; in CY 2022, total known volume spilled represented approximately 0.43 million gallons, for an estimated combined total known volume of 1.94 million gallons. Wet weather events accounted for 52.0 percent of the known volume spilled in CY 2021 and 6.9 percent of the known volume spilled in CY 2022.

Figure 4: SSO Volume by Month



4.3 SSO Duration

The documented duration of an SSO is the amount of time between the estimated start time of the SSO event (observed) and the estimated end time of the SSO event (observed). In CY 2021, non-wet weather SSOs represented an average duration of 79 minutes per SSO. Wet weather SSOs represented an average duration of 436 minutes per SSO. In CY 2022, non-wet weather SSOs represented an average duration of 51 minutes. Wet weather SSOs represented an average duration of 67 minutes.

Of all SSOs in CY 2021 and 2022, 41 percent of the non-wet weather SSO durations and 13 percent of the wet weather SSO durations were reported as unknown or undetermined due to overflow being unobserved.

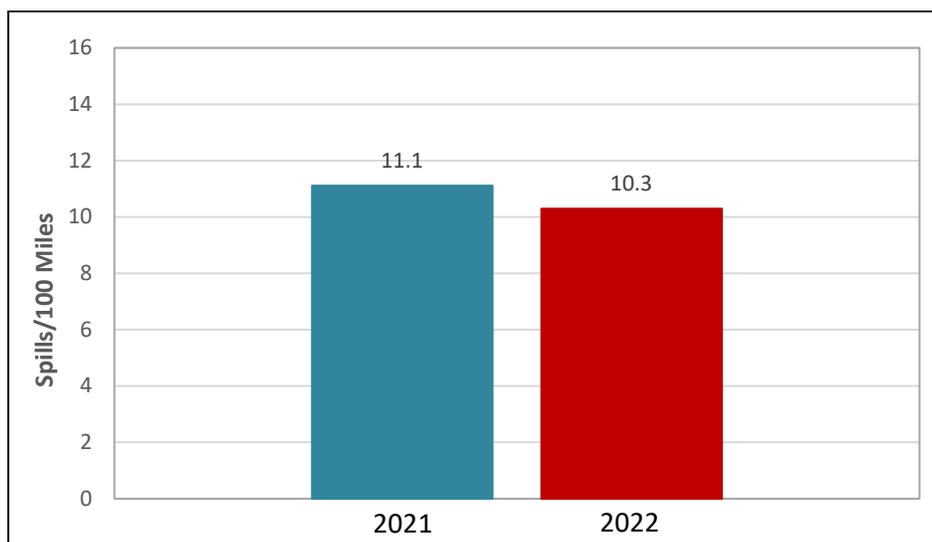
4.4 SSOs per 100 Miles of Pipe

Previous EPA Annual Reports utilized only the mainline pipe length for SSOs per 100 miles metric. Starting with the 2020 Annual Report, the SSOs per 100 miles metric also included an estimated length of City-maintained public laterals. Since lateral and cleanout SSOs have been included in previous years' reporting, including the estimated lateral footage into the overall pipe length improved accuracy in properly estimating the number of SSOs per 100 miles of maintained pipe.

There are approximately 57,000 City-maintained public laterals. With an assumed length of 20 feet per lateral, the approximate total length of City-maintained public laterals is 220 miles. The inclusion of 220 miles of public laterals with the current 1,130 miles of mainline pipe yields a total system length of 1,350 miles.

Based on the calculation methodology described above, in CY 2021 the number of SSOs per 100 miles equaled 11.1 and in CY 2022 10.3. This is a decrease of 0.8 SSOs per 100 miles of pipe.

Figure 5: SSOs per 100 Miles of Pipe



4.5 Building Backup Frequency, Volume, and Causes

As noted in Section IV.8.a of the CD, a Building Backup is defined as a release of wastewater into a building or onto private property that is caused by blockages, flow conditions, or other malfunctions in the WCTS.

Separate from the SSO data noted above in Sections 4.1 through 4.4, the following tables represent the frequency, volume, and causes of building backups within the City’s system during CY 2021 and CY 2022. Building backup claims are investigated by the City in order to determine whether the cause of the building backup is a condition within the City’s system. If so, the City corrects the problem in the City’s WCTS. Issues on private property are documented for the City by a third-party administrator.

The following table represents building backups by cause, frequency, and volume for CY 2021 and 2022.

Table 8: Total Building Backup Frequency and Volume by Cause, CY 2021 & 2022

Building Backup Cause	Frequency	Volume (gal)
Collapsed Line	12	1,493
Grease	0	0
3 rd Party	1	4
Pump Station Failure	0	0
Roots	7	73
Debris	0	0
Wet Weather	0	0
Force Main	0	0
Equipment Failure	0	0
Wastewater Treatment Plant	0	0
TOTAL	20	1,570

The following table shows the building backup category (cause), number of backups of that category by month, and the total for each month in CY 2021 and CY 2022.

Table 9: Monthly Building Backup Frequency by Cause, CY 2021 & 2022

Month / Year	Collapsed Line	3rd Party	Roots	Total
Jan-21	0	0	0	0
Feb-21	0	0	0	0
Mar-21	1	0	0	1
Apr-21	0	0	1	1
May-21	2	0	0	2
Jun-21	0	0	0	0
Jul-21	0	0	2	2
Aug-21	0	1	0	1
Sep-21	0	0	2	2
Oct-21	0	0	0	0
Nov-21	0	0	0	0
Dec-21	0	0	0	0
CY 2021 Total	3	1	5	9
Jan-22	0	0	1	1
Feb-22	0	0	0	0
Mar-22	2	0	0	2
Apr-22	0	0	0	0
May-22	2	0	0	2
Jun-22	3	0	0	3
Jul-22	0	0	0	0
Aug-22	0	0	0	0
Sep-22	0	0	0	0
Oct-22	1	0	0	1
Nov-22	1	0	1	2
Dec-22	0	0	0	0
CY 2022 Total	9	0	2	11
Grand Total	12	1	7	20

All building backups for CY 2021 and 2022 were reported as unknown or undetermined duration due to overflow being unobserved.