

# Clean Water 2020 Program

## CONSENT DECREE ANNUAL REPORT

January 1, 2023 – December 31, 2023



## 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.....	9
2.10 Financial Analysis Program .....	10
Section 3 Capital Projects Update .....	12
3.1 Infrastructure Rehabilitation Report Projects .....	12
Section 4 Sanitary Sewer Overflow Trends Analysis.....	15
4.1 SSO Frequency and Volume by Cause.....	15
4.2 SSO Frequency and Volume by Month .....	18
4.3 SSO Duration .....	19
4.4 SSOs per 100 Miles of Pipe .....	19
4.5 Building Backup Frequency, Volume, and Causes .....	20

## List of Tables

Table 1: CY 2023 Lift Station Work Order Summary.....	8
Table 2: CY 2023 WCTS Work Order Summary.....	9
Table 3: CY 2023 WCTS Key Performance Indicators (KPIs).....	10
Table 4: IRR Projects (V.16).....	12
Table 5: SIRR Projects (V.16.c) .....	13
Table 6: Total SSO Frequency and Volume by Cause, CY 2022 & 2023 .....	15
Table 7: Monthly SSO Frequency by Cause, CY 2022 & 2023 .....	16
Table 8: Total Building Backup Frequency and Volume by Cause, CY 2022 & 2023.....	20
Table 9: Monthly Building Backup Frequency by Cause, CY 2022 & 2023.....	21

## List of Figures

Figure 1: CY 2022 SSOs by Cause .....	17
Figure 2: CY 2023 SSOs by Cause .....	17
Figure 3: SSO Frequency by Month.....	18
Figure 4: SSO Volume by Month .....	18
Figure 5: SSOs per 100 Miles of Pipe .....	19

## 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** – Clean Water 2020, the 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

**FE** – Finance Enterprise

**FOG** – Fats, Oils, and Grease

**FSE** – Food Service Establishment

**FY** – Fiscal Year

**GIS** – Geographic Information System

**GSOMP** – Gravity Sewer System Operation and Maintenance Program

**H<sub>2</sub>S** – Hydrogen Sulfide

**IFAS** – Integrated Financial and Administrative Solution

**IMS** – Information Management System

**IR** – Infrastructure Rehabilitation [Program]

**IRR** – Infrastructure Rehabilitation Report

**KPI** – Key Performance Indicator

**O&M** – Operations & Maintenance

**NTP** – Notice to Proceed

**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

**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 2023).

### 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 2023. 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 Finance Enterprise (FE), 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 been 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 June 9, 2023, the WCTS Minor Gravity Mapping was completed.

## 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.
- Continued to use the CAP Tool in addition to the desktop analyses for CAP reviews.
- Completed a draft of the detailed CAP Standard Operating Procedure (SOP) that explains the step-by-step tasks required to complete a capacity analysis.
- Began writing supplemental SOPs that explain in detail the recurring tasks of the CAP Manager. To date, seven supplemental SOPs have been completed.
- 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 approximately 20 subbasins were reviewed in 2023.

## 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 completed 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 – 100% complete (Mapping complete as of June 9, 2023)
  - Gills Creek Basin – 100% complete (Mapping complete as of June 9, 2023)
  - Crane Creek Basin – 100% complete (Mapping complete as of June 9, 2023)
  - Broad River Basin – 100% complete (Mapping complete as of June 9, 2023)

As of June 9, 2023, all activities under the Sewer Mapping Program have been completed.

## 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 hospitality tax rebate program for all Commercial food establishments.

## 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.
- Sulfide and Corrosion Control program for 2023 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 H<sub>2</sub>S that may cause health and safety issues and potential corrosion to the City’s WCTS infrastructure. Continuous H<sub>2</sub>S monitors were deployed throughout the system at locations identified through a desktop assessment, such as lift stations and discharge manholes.
- As part of the Sulfide and Corrosion Control program, a permanent chemical feed system using magnesium hydroxide was approved by SCDHEC and implemented at the Saluda River Lift Station in 2023 to mitigate high H<sub>2</sub>S levels.
- Air Release Valves (ARVs) continue to be inspected on a semiannual basis to ensure they are operational.

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 2023 Lift Station Work Order Summary**

WCTS Maintenance	Percentage of Work Orders
Corrective Maintenance	8.1%
Preventive Maintenance	91.8%
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 continues 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 is currently supplementing 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 2023 WCTS Work Order Summary**

WCTS Maintenance	Percentage of Work Orders
Corrective Maintenance	52.3%
Preventive Maintenance	46.3%
Emergency Maintenance	1.4%
Total	100%

**Table 3: CY 2023 WCTS Key Performance Indicators (KPIs)**

Reportable Consent Decree KPIs for WCTS	Annual Projection	As of 12/31/23	% Completed vs. Projected <sup>1</sup>
Linear footage of gravity sewer inspections (linear feet)	564,960	406,274	71.9%
Linear footage of gravity sewers cleaned (linear feet)	1,129,920	913,073	80.8%
Number of manholes inspected (each)	2,799	2,704	96.6%
Number of manholes cleaned/maintained (each)	2,799	2,443	87.3%
Number of inverted siphons inspected (each)	2	2	100.0%
Number of inverted siphons cleaned/maintained (each)	2	2	100.0%

<sup>1</sup> Although the City continues to experience difficulties with employee retention and hiring, overall staffing levels have improved in 2023. Increased staff combined with the use of outside contractor resources have allowed the City to improve KPIs compared to previous years.

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 FY23/24 and FY24/25 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 2023 and continued with a rate study contract renewal that was approved by City Council on June 20, 2023, and started thereafter.
- Continued assessment of an updated/rolling 5-year CIP plan.
- Created business cases for projects for the FY23/24 Capital Projects Budget.
- Transition of financial reporting software across all City departments from Integrated Financial and Administrative Solution (IFAS) to Finance Enterprise (FE).

- FE is now in used to track and report capital improvement costs as well as third-party contracts by Operations & Maintenance (O&M) category in the same manner as previously achieved through IFAS.
- Completed consolidated report, tracking O&M (by category) plus Capital costs for FY20/21.
- Completed consolidated report, tracking O&M (by category) plus Capital costs for FY21/22.

## 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 2023.
SS7301	Bull Street	City Council approved project on April 21, 2015. Construction ongoing throughout 2023.
SS733702	East Rocky Branch Improvements Phase 2	Construction NTP issued on September 21, 2020. Construction ongoing throughout 2023.
SS735003	Crane Creek Lower North Branch Capacity Upgrade Phase 1	Construction NTP issued on November 6, 2023. Construction ongoing throughout remainder of 2023.
SS7428	Lower Saluda River Relief Sewer and Major Pipe Rehabilitation	Construction NTP issued on April 12, 2021. Construction ongoing throughout 2023.
SS7450	Crane Creek Lower North Branch Capacity Upgrade Phase 2	Construction NTP issued on March 27, 2023. Construction ongoing throughout remainder of 2023.
SS7467	North Columbia Pump Station Upgrade	Construction NTP issued on March 28, 2023. Construction ongoing throughout remainder of 2023.
SS7502	Summerlea SS Flood Project	Construction NTP issued on September 19, 2022. Construction ongoing throughout 2023.
SS7564	West Columbia PS 2020 Upgrades	Construction NTP issued on January 9, 2023. Construction ongoing throughout remainder of 2023.

CIP #	Project Name	Project Status/Summary
SS7568	Saluda River Force Main Extension Phase 1	Construction NTP issued on September 5, 2023. Construction ongoing throughout remainder of 2023.

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	FY2022 construction began in July 2022. Construction was completed in December 2023. FY2024 construction began in December 2023. Construction ongoing throughout the remainder of 2023.
SS6966	Annual Rehab on Lines less than 15"	FY2023 construction began in January 2023. Construction ongoing throughout the remainder of 2023.
SS7363	Smith Branch 03 SSES	Construction NTP issued on January 16, 2019. Construction was completed in January 2023.
SS7424	SSES Rehabilitation Implementation BR02	Construction NTP issued on July 18, 2022. Construction ongoing throughout remainder of 2023.
SS7425	SSES and Sewer Rehabilitation Implementation RB03	Construction NTP issued on January 11, 2021. Construction was completed in May 2023.
SS7432	Starlite PS Decommissioning and Basin Rehabilitation Related Works	Construction NTP issued on December 5, 2022. Construction ongoing throughout 2023.
SS7435	Wexford and Windsong Lift Stations Evaluation and Rehabilitation Project	Construction NTP issued on November 20, 2023. Construction ongoing throughout remainder of 2023.
SS7437	Miscellaneous Lift Station Improvements and Backup Power Addition Project	Construction NTP issued on September 11, 2023. Construction ongoing throughout remainder of 2023.

CIP #	Project Name	Project Status/Summary
SS7464	Sewer System Evaluation Study and Sewer Rehabilitation Implementation CC02 and CC04	Construction NTP issued on September 25, 2023. Construction ongoing throughout remainder of 2023.
SS7468	Three Rivers Force Main Replacement	Construction NTP issued on October 15, 2023. Construction ongoing throughout remainder of 2023.
SS7487	Hickory Ridge Drive Sewer Rehab	Construction NTP issued on November 14, 2022. Construction was completed in October 2023.
SS7548	Shady Lane Force Main Replacement	Construction NTP issued on October 31, 2022. Construction was completed in April 2023.
SS7583	SR02 and BR04 Engineer Led Find and Fix Rehabilitation	Construction NTP issued on May 2, 2022. Construction ongoing throughout 2023.

## 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 2022 and 2023.

**Table 6: Total SSO Frequency and Volume by Cause, CY 2022 & 2023**

SSO Cause	Frequency	Volume (gal)
Collapsed Line	80	125,166
Grease	11	8,594
3 <sup>rd</sup> Party	10	89,837
Pump Station Failure	3	6,826
Roots	73	58,711
Debris	74	120,566
Wet Weather	11	34,036
Force Main	3	509,055
Equipment Failure	13	7,061
Wastewater Treatment Plant	12	3,751,303 <sup>1</sup>

<sup>1</sup>Total volume includes a 3,435,100 gallon SSO and an unanticipated bypass of 113,146 gallons on April 9, 2023 due to a power failure at the Wastewater Treatment Plant. The power failure led to associated instrumentation and control issues which were resolved by switching screens to manual. The City restored power to the WWTP via an electrical contractor until the electrical utility provider could address the root cause of their power failure.



The following table shows the SSO category (cause), number of SSOs of that category by month, and the total for each month in CY 2022 and CY 2023. 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 2022 & 2023**

Month / Year	Collapsed Line	Grease	3rd Party	Pump Station Failure	Roots	Debris	Wet Weather	Force Main	Equipment Failure	Wastewater Treatment Plant	Total
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
<b>CY 2022 Total</b>	<b>35</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>40</b>	<b>35</b>	<b>8</b>	<b>0</b>	<b>7</b>	<b>5</b>	<b>139</b>
Jan-23	11	0	0	1	3	4	0	0	0	0	19
Feb-23	6	2	0	0	4	4	0	0	1	4	21
Mar-23	8	0	1	0	4	5	0	0	0	0	18
Apr-23	3	1	1	0	8	5	1	0	1	2	22
May-23	4	0	0	0	3	4	0	0	0	1	12
Jun-23	0	1	0	0	0	5	1	1	0	0	8
Jul-23	2	0	0	0	1	2	0	0	1	0	6
Aug-23	1	0	0	0	1	2	0	2	0	0	6
Sep-23	5	0	3	0	3	4	0	0	1	0	16
Oct-23	3	0	1	1	1	2	0	0	2	0	10
Nov-23	1	1	0	0	4	1	0	0	0	0	7
Dec-23	1	2	0	0	1	1	1	0	0	0	6
<b>CY 2023 Total</b>	<b>45</b>	<b>7</b>	<b>6</b>	<b>2</b>	<b>33</b>	<b>39</b>	<b>3</b>	<b>3</b>	<b>6</b>	<b>7</b>	<b>151</b>
<b>Grand Total</b>	<b>80</b>	<b>11</b>	<b>10</b>	<b>3</b>	<b>73</b>	<b>74</b>	<b>11</b>	<b>3</b>	<b>13</b>	<b>12</b>	<b>290</b>
<b>% of Total</b>	<b>27.6%</b>	<b>3.8%</b>	<b>3.4%</b>	<b>1.0%</b>	<b>25.2%</b>	<b>25.5%</b>	<b>3.8%</b>	<b>1.0%</b>	<b>4.5%</b>	<b>4.1%</b>	

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%). In CY 2023, the highest number of reportable spills were due to collapsed lines (30%), debris (26%) and roots (22%). Overall, collapsed lines, roots, and debris combined to represent a significant majority (78%) of the reportable spills for the period.

Figure 1: CY 2022 SSOs by Cause

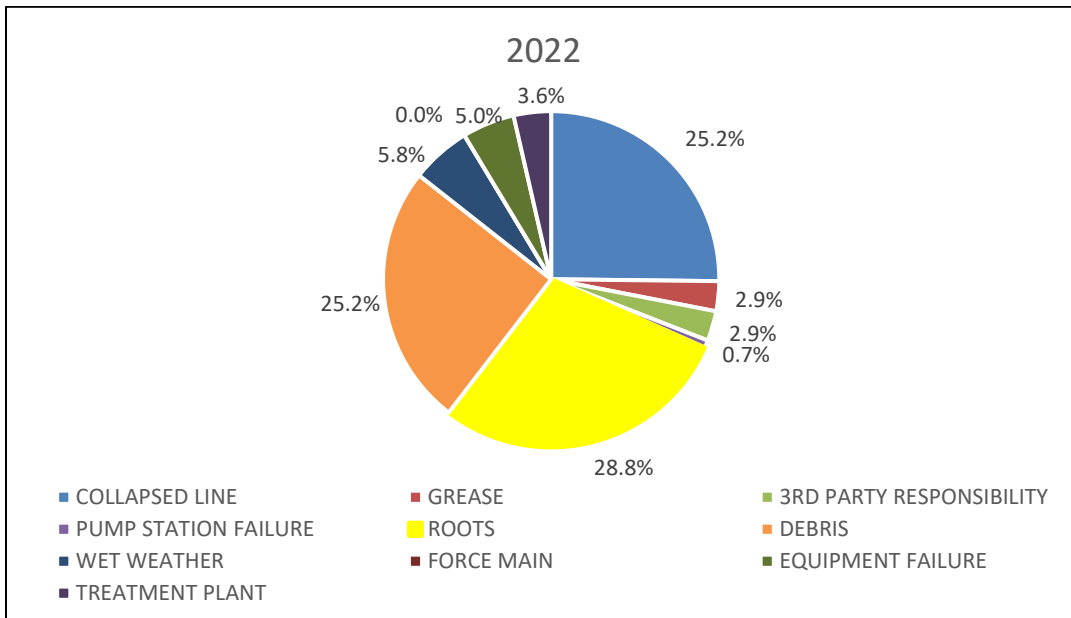
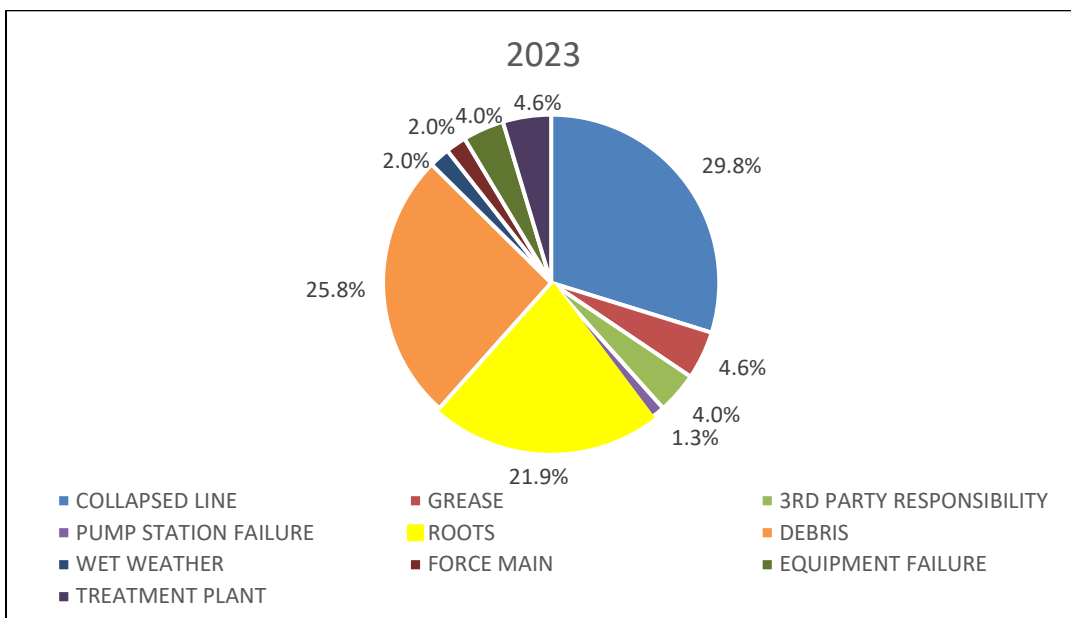


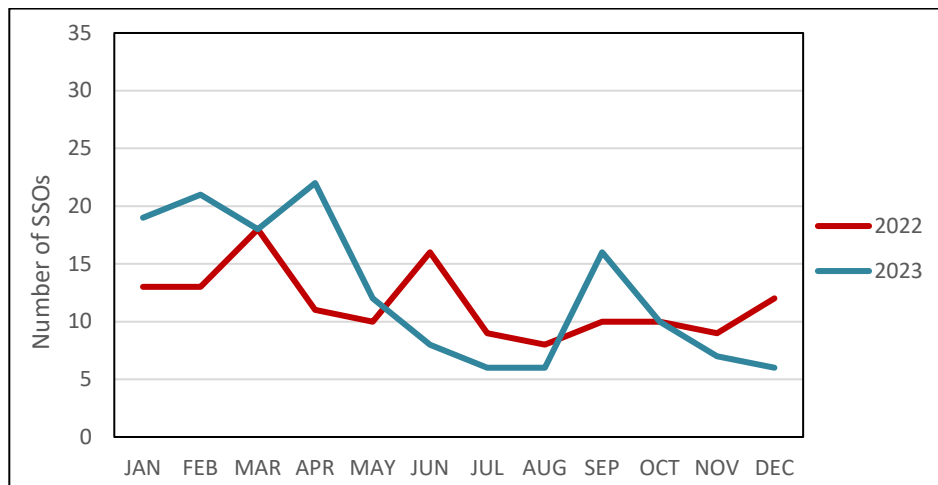
Figure 2: CY 2023 SSOs by Cause



## 4.2 SSO Frequency and Volume by Month

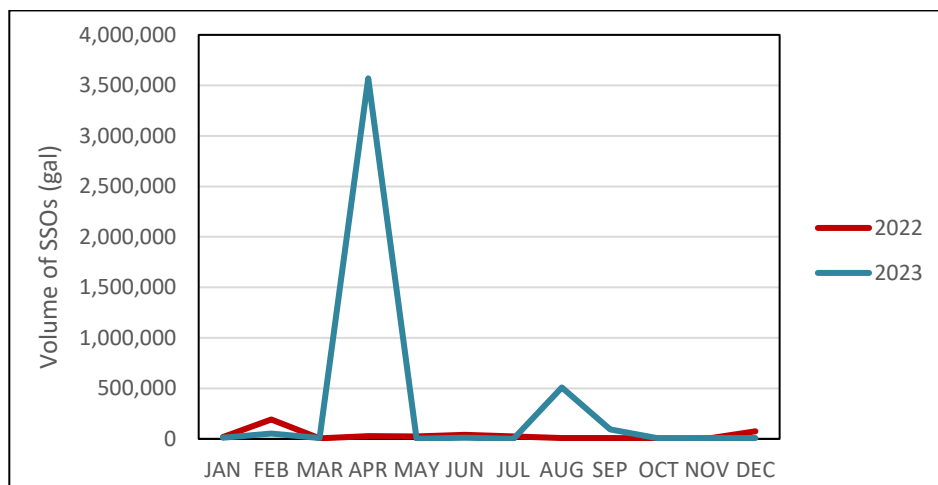
As shown in the tables above, the City experienced a total of 139 SSOs in CY 2022. In CY 2023, the City experienced a total of 151 SSOs for a combined total of 290 SSOs. This number was more than the previous two-year total of 289, an increase of 0.35%. The average number of SSOs per month during CY 2022 was 11.6, and 12.6 in CY 2023. The fluctuation in SSOs monthly is caused by a combination of roots, debris, and collapsed lines. During CY 2022, March and June averaged 17.0 SSOs per month, well above the annual average of 11.6. In CY 2023, February and April averaged 21.5 SSOs per month, once again well above the annual average of 12.6.

Figure 3: SSO Frequency by Month



During CY 2022, total known volume spilled represented approximately 0.43 million gallons; in CY 2023, total known volume spilled represented approximately 4.28 million gallons, for an estimated combined total known volume of 4.71 million gallons. Wet weather events accounted for 6.9 percent of the known volume spilled in CY 2022 and 0.1 percent of the known volume spilled in CY 2023.

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 2022, non-wet weather SSOs represented an average duration of 51 minutes per SSO. Wet weather SSOs represented an average duration of 67 minutes per SSO. In CY 2023, non-wet weather SSOs represented an average duration of 55 minutes. Wet weather SSOs represented an average duration of 1 minute.

Of all SSOs in CY 2022 and 2023, 40 percent of the non-wet weather SSO durations and 27 percent of the wet weather SSO durations were reported as unknown or undetermined due to overflow being unobserved.

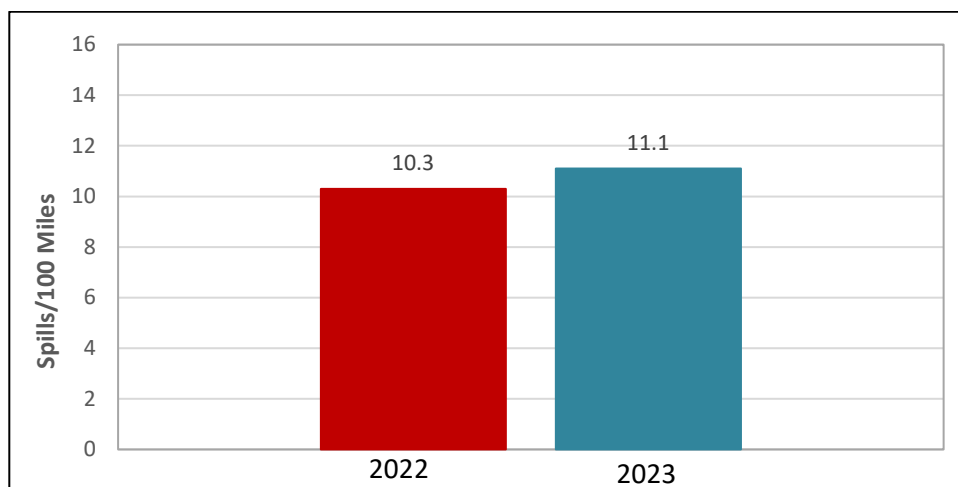
### 4.4 SSOs per 100 Miles of Pipe

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 1,110 miles of mainline pipe yields a total system length of 1,330 miles.

Based on the calculation methodology described above, in CY 2022 the number of SSOs per 100 miles equaled 10.3 and in CY 2023 11.1. This is an increase 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 2022 and CY 2023. 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 2022 and 2023.

**Table 8: Total Building Backup Frequency and Volume by Cause, CY 2022 & 2023**

Building Backup Cause	Frequency	Volume (gal)
Collapsed Line	14	1,566
Grease	0	0
3 <sup>rd</sup> Party	1	33
Pump Station Failure	0	0
Roots	7	152
Debris	1	263
Wet Weather	0	0
Force Main	0	0
Equipment Failure	2	18
Wastewater Treatment Plant	0	0
<b>TOTAL</b>	<b>25</b>	<b>2,032</b>

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 2022 and CY 2023.

Table 9: Monthly Building Backup Frequency by Cause, CY 2022 & 2023

Month / Year	Collapsed Line	3rd Party	Roots	Debris	Equipment Failure	Total
Jan-22	0	0	1	0	0	1
Feb-22	0	0	0	0	0	0
Mar-22	2	0	0	0	0	2
Apr-22	0	0	0	0	0	0
May-22	2	0	0	0	0	2
Jun-22	3	0	0	0	0	3
Jul-22	0	0	0	0	0	0
Aug-22	0	0	0	0	0	0
Sep-22	0	0	0	0	0	0
Oct-22	1	0	0	0	0	1
Nov-22	1	0	1	0	0	2
Dec-22	0	0	0	0	0	0
<b>CY 2022 Total</b>	<b>9</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>11</b>
Jan-23	0	0	0	0	0	0
Feb-23	0	0	1	0	0	1
Mar-23	1	0	0	0	0	1
Apr-23	0	0	0	0	0	0
May-23	0	0	1	1	0	2
Jun-23	1	0	0	0	0	1
Jul-23	0	0	0	0	0	0
Aug-23	0	0	0	0	0	0
Sep-23	0	0	0	0	0	0
Oct-23	0	1	1	0	0	2
Nov-23	3	0	2	0	0	5
Dec-23	0	0	0	0	2	2
<b>CY 2023 Total</b>	<b>5</b>	<b>1</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>14</b>
<b>Grand Total</b>	<b>14</b>	<b>1</b>	<b>7</b>	<b>1</b>	<b>2</b>	<b>25</b>

All building backups for CY 2022 and 2023 were reported as unknown or undetermined duration due to overflow being unobserved.