# Clean Water 2020 Program

## CONSENT DECREE
## ANNUAL REPORT

January 1, 2020 – December 31, 2020

We Are Columbia

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# Acronyms & Abbreviations

**CAP** – Capacity Assurance Program

**CCTV** – Closed Circuit Television

**CD** – Consent Decree

**CE** – City Engineer

**CERP** – Contingency Emergency Response Plan

**CFO** – Chief Financial Officer

**CIP** – Capital Improvements Program

**City** – City of Columbia

**CMOM** – Capacity, Management, Operations and Maintenance

**CSAP** – Continuing Sewer Assessment Program

**CW2020** – City's Program to Manage the Consent Decree Compliance

**CY** – Calendar Year

**DOJ** – United States Department of Justice

**DUE** – Department of Utilities and Engineering

**EACIP** – Early Action Capital Improvement Projects

**EPA** – United States Environmental Protection Agency

**ERG** – Emergency Response Guide

**FOG** – Fats, Oils and Grease

**FSE** – Food Service Establishment

**GIS** – Geographic Information System

**GLPMP** – Gravity Line Preventive Maintenance Plan

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

**IMS** – Information Management System

**IR** – Infrastructure Rehabilitation [Program]

**IRR** – Infrastructure Rehabilitation Report

**LGIM** – Local Government Information Model

**MAC** – Maintenance and Compliance

**NTP** – Notice to Proceed

**PTO** – Permit to Operate

**RFP** – Request for Proposal

**SCDHEC** – South Carolina Department of Health and Environmental Control

**SMP** – Sewer Mapping Program

**SOP** – Standard Operating Procedure

**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 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 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 IR Report required under Section V.16 of the CD.

**Section 4 – Sanitary Sewer Overflow (SSO) 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 Consent Decree. 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 (SORP)

The City continues to implement the 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 2020).

## 2.2 Contingency and Emergency Response Plan (CERP)

In consultation with SCDHEC, the City developed and submitted to EPA and SCDHEC a 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:

- Implemented and trained on CERP procedures prior to and during major weather events using the Incident Command System (ICS).

## 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 of the Apprenticeship program in 2020. Employees within the WCTS are meeting program certification requirements.

## 2.4 Information Management System (IMS) 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 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, financial information and GIS into a reporting dashboard.
- Sewer basin electronic mapping has continued to be implemented in accordance with the submitted and EPA approved Sewer Mapping Plan (SMP). As of November 23, 2018, all WCTS Major Gravity Mapping was completed. As of December 31, 2020, the WCTS Minor Gravity Mapping is 68% complete.

## 2.5 Capacity Assurance Program (CAP)

In accordance with the requirements of the CD, the City is to submit to EPA and SCDHEC a CAP within 180 days after approval of the Hydraulic Model Report. Additionally, within 90 days after the Date of Entry of the CD, Columbia 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. Columbia 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, Columbia 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 test and refine the CAP Tool to be utilized upon approval of the CAP by EPA.
- Began review of User's Guide for the CAP tool.

## 2.6 Sewer Mapping Program

In accordance with the requirements of the CD, the City submitted a Sewer Mapping Program (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 – 89% complete
    - Saluda River Basin – 97% complete
    - Rocky Branch Basin – 82% complete
    - Mill Creek Basin – 28% complete
    - Gills Creek Basin – 56% complete
    - Crane Creek Basin – 71% complete
    - Broad River Basin – 47% complete

## 2.7 Fats, Oils, and Grease (FOG) Management Program

The City continues to implement its 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:

- Implementation of a cloud-based FOG management software.
- 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.

## 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 is currently underway with surveying the limits of these easements and initial clearing. Project is on schedule.
- Corrosion control program for 2020 was completed by Columbia Water staff in conjunction with Clean Water 2020 staff. The work involved sampling the WCTS and identifying areas that are indicating high levels of H2S that may cause health and safety issues and potential corrosion to the City's WCTS infrastructure.

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 2020 Lift Station Work Order Summary**

| Wastewater Collection System (WCTS) Maintenance | Percentage of Work Orders |
|---|---|
| Corrective Maintenance | 4.2% |
| Preventive Maintenance | 95.6% |
| Emergency Maintenance | 0.2% |
| Total | 100% |

SSO KPIs related to Force Main and/or SSOs per number of Pump Stations are provided under Section 4 Sanitary Sewer Overflow (SSO) 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 Main and Easement Maintenance is currently underway with surveying the limits of these easements and initial clearing. Project is on schedule.
- Corrosion control program for 2020 was completed by Columbia Water Staff in conjunction with Clean Water 2020 staff. The work involved sampling the WCTS and identifying areas that are indicating high levels of H2S that may cause health and safety issues and potential corrosion to the City's WCTS infrastructure.

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 2020 WCTS Work Order Summary**

| Wastewater Collection System (WCTS) Maintenance | Percentage of Work Orders |
|---|---|
| Corrective Maintenance | 20% |
| Preventive Maintenance | 78% |
| Emergency Maintenance | 2% |
| Total | 100% |

**Table 3: CY 2020 WCTS Key Performance Indicators (KPIs)**

| Reportable Consent Decree Key Performance Indicators (KPIs) for Wastewater Collection System (WCTS) | Annual Projection | As of 12/31/20 | % Completed vs Projected |
|---|---|---|---|
| Linear footage of gravity sewer inspections (linear feet) | 564,960 | 305,759 | 54.1%[1] |
| Linear footage of gravity sewers cleaned (linear feet) | 1,129,920 | 224,334 | 19.9%[1] |
| Number of manholes inspected (each) | 2,799 | 5,432 | 194.1% |
| Number of manholes cleaned/maintained (each) | 2,799 | 551 | 19.7%[1] |
| Number of inverted siphons inspected (each) | 2 | 2 | 100.0% |
| Number of inverted siphons cleaned/maintained (each) | 2 | 1 | 50.0% |

[1] The ongoing COVID-19 pandemic has had a direct impact on the City's day-to-day WCTS operations and maintenance. Employee absenteeism is higher due to the pandemic resulting in a reduction in maintenance being performed on the system. The reduction in maintenance is reflected in the WCTS Key Performance Indicators.

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

## 2.10 Financial Analysis Program

In accordance with the requirements of the CD, the City submitted a Financial Analysis Program 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 FY20/21 and FY21/22 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 rate study update was presented to City Council on February 4, 2020. The next rate study update was approved by City Council on January 5, 2021 and started thereafter.
- IFAS (Integrated Financial and Administrative Solution) continues to be in use and is used to track and report capital improvement costs as well as third-party contracts by O&M category.
- Continued assessment of an updated/rolling 5-year CIP plan.
- Created business cases for projects for the FY20/21 Capital Projects Budget.
- Completed work on the consolidated report, tracking O&M (by category) plus Capital costs for FY18-19.
- Began work on consolidated report, tracking O&M (by category) plus Capital costs for FY19-20.

# 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 Consent Decree.

## 3.1 Infrastructure Rehabilitation Report (IRR) Projects

In accordance with Section V.16 of the CD, the City was to submit an Infrastructure Rehabilitation Report (IRR) summarizing the results of the Continuing Sewer Assessment Program (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 operations and maintenance, 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 |
|---|---|---|
| SS7261 | Lake Katherine Sewer Line Capacity Enhancement | Construction NTP issued on April 2, 2019. Construction ongoing throughout 2020. |
| SS7301 | Bull Street | City Council approved project on April 21, 2015. Construction ongoing throughout 2020. |
| SS733702 | East Rocky Branch Improvements Phase 2 | Construction NTP issued on September 21, 2020. Construction ongoing throughout remainder of 2020. |

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. As rehabilitation projects are identified through the CSAP and in the normal course of operations and maintenance, 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 |
|---|---|---|
| SS6966 | Annual Rehab on Lines less than 15” | FY 2019 construction began in February 2019 and was completed in August 2020. Construction for projects to be performed in FY 2021 is anticipated to begin in 2021. |
| SS7172 | Rehabilitation/Replacement Harbison #2, Mallard Point and Animal Shelter PS | Construction NTP issued on October 15, 2018. Construction was completed in February 2020. |
| SS7280 | Rocky Branch-01 SSES and Rehabilitation | Construction NTP issued on August 22, 2016. Construction was completed in September 2020. |
| SS7323 | Food Lion PS Improvements | Construction NTP issued on August 6, 2020. Construction ongoing throughout remainder of 2020. |
| SS7362 | Smith Branch 01 SSES | Construction NTP issued on June 1, 2018. Construction was completed in June 2020. |
| SS7363 | Smith Branch 03 SSES | Construction NTP issued on January 16, 2019. Construction ongoing throughout 2020. |

# Section 4 Sanitary Sewer Overflow (SSO) 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 Sanitary Sewer Overflows (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 2019 and 2020.

**Table 6: Total SSO Frequency and Volume by Cause, CY 2019 & 2020**

| SSO Cause | Frequency | Volume (gal) |
|---|---|---|
| Collapsed Line | 83 | 450,672 |
| Grease | 29 | 23,281 |
| 3rd Party | 15 | 147,415 |
| Pump Station Failure | 6 | 35,822 |
| Roots | 95 | 92,551 |
| Debris | 77 | 136,599 |
| Wet Weather | 35 | 373,703 |
| Force Main | 6 | 23,064 |
| Equipment Failure | 11 | 76,904 |
| Wastewater Treatment Plant | 8 | 1,000,475[1] |

[1] Includes overflow of 1,000,000 gallons on February 9, 2020. In response to the historic river levels caused by heavy rainfall in the preceding days, which prevented normal discharge from the WWTP, influent flow set points were decreased temporarily to regain hydraulic control of the secondary clarifiers. Train 1 Aeration was shut down, RAS was shut down. Influent flow set points were then increased to limit the volume of wastewater sent to storage. Lime was applied to the area around the Train 1 Disinfection Splitter.

The following table shows the SSO category (cause), number of SSOs of that category by month, and the total for each month in CY 2019 and CY 2020. 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 2019 & 2020**

| Month / Year | Collapsed Line | Grease | 3rd Party | Pump Station Failure | Roots | Debris | Wet Weather | Force Main | Equipment Failure | Wastewater Treatment Plant | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan-19 | 6 | 3 | 0 | 0 | 7 | 5 | 0 | 0 | 0 | 0 | 21 |
| Feb-19 | 1 | 1 | 0 | 0 | 3 | 5 | 0 | 0 | 0 | 1 | 11 |
| Mar-19 | 3 | 1 | 1 | 1 | 7 | 3 | 0 | 0 | 1 | 0 | 17 |
| Apr-19 | 4 | 1 | 0 | 0 | 3 | 7 | 0 | 0 | 1 | 3 | 19 |
| May-19 | 4 | 1 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 11 |
| Jun-19 | 1 | 1 | 0 | 0 | 1 | 3 | 2 | 0 | 0 | 2 | 10 |
| Jul-19 | 3 | 0 | 0 | 1 | 0 | 6 | 2 | 1 | 1 | 0 | 14 |
| Aug-19 | 1 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 5 |
| Sep-19 | 6 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 8 |
| Oct-19 | 2 | 0 | 0 | 0 | 4 | 3 | 0 | 0 | 0 | 0 | 9 |
| Nov-19 | 3 | 2 | 3 | 0 | 3 | 3 | 0 | 0 | 1 | 0 | 15 |
| Dec-19 | 7 | 5 | 0 | 2 | 4 | 1 | 10 | 0 | 1 | 1 | 31 |
| **CY 2019 Total** | **41** | **16** | **4** | **4** | **40** | **39** | **14** | **1** | **5** | **7** | **171** |
| Jan-20 | 4 | 3 | 4 | 1 | 8 | 3 | 5 | 1 | 0 | 0 | 29 |
| Feb-20 | 4 | 1 | 0 | 0 | 4 | 7 | 12 | 1 | 2 | 1 | 32 |
| Mar-20 | 2 | 0 | 0 | 0 | 6 | 6 | 2 | 0 | 0 | 0 | 16 |
| Apr-20 | 3 | 2 | 2 | 0 | 3 | 4 | 0 | 0 | 0 | 0 | 14 |
| May-20 | 3 | 1 | 2 | 0 | 4 | 7 | 1 | 0 | 1 | 0 | 19 |
| Jun-20 | 2 | 1 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 8 |
| Jul-20 | 6 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 11 |
| Aug-20 | 5 | 0 | 0 | 0 | 6 | 5 | 0 | 1 | 0 | 0 | 17 |
| Sep-20 | 5 | 1 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 11 |
| Oct-20 | 1 | 2 | 0 | 0 | 6 | 2 | 0 | 1 | 2 | 0 | 14 |
| Nov-20 | 3 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 9 |
| Dec-20 | 4 | 0 | 3 | 0 | 5 | 1 | 0 | 1 | 0 | 0 | 14 |
| **CY 2020 Total** | **42** | **13** | **11** | **2** | **55** | **38** | **21** | **5** | **6** | **1** | **194** |
| **Grand Total** | **83** | **29** | **15** | **6** | **95** | **77** | **35** | **6** | **11** | **8** | **365** |
| **% of Total** | **22.7%** | **7.9%** | **4.1%** | **1.6%** | **26.0%** | **21.1%** | **9.6%** | **1.6%** | **3.0%** | **2.2%** | |

In CY 2019, the highest number of reportable spills were due to collapsed lines (24%). The next highest areas of reportable spills were attributable to roots (23%) and debris (23%). In CY 2020, the highest number of reportable spills were due to roots (28%), collapsed lines (22%) and debris (20%). Overall, collapsed lines, roots, and debris combined to represent a significant majority (70%) of the reportable spills for the period.

**Figure 1: CY 2019 SSOs by Cause**

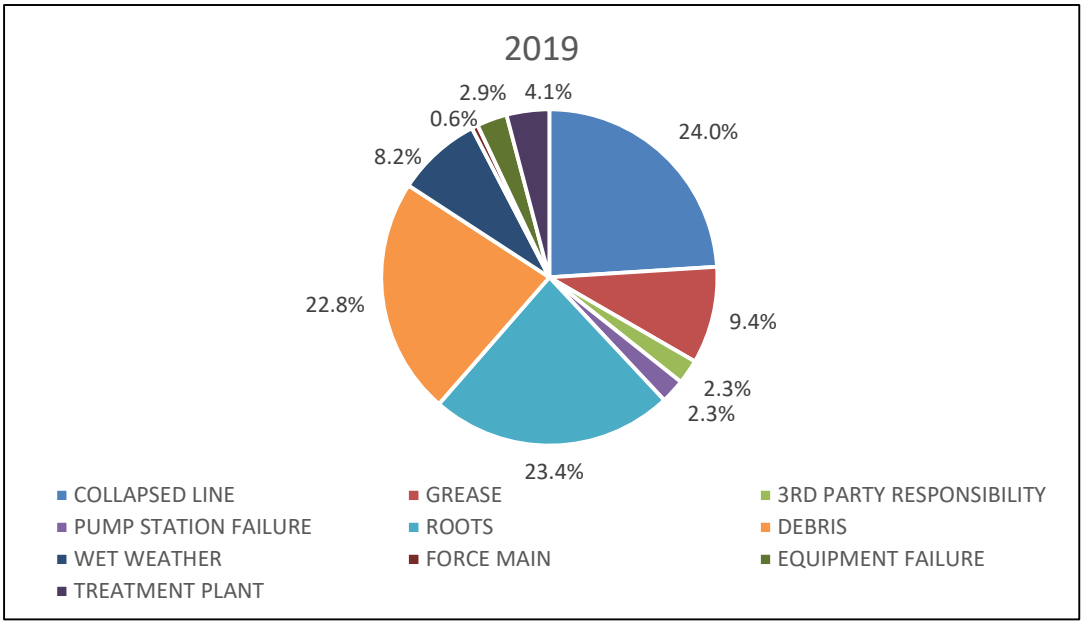
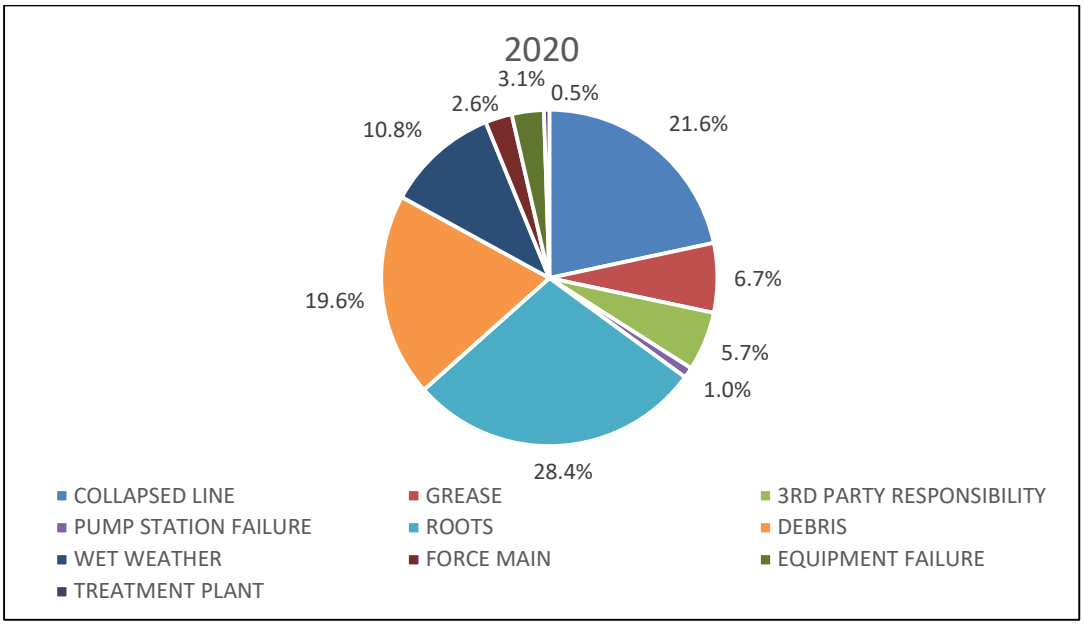


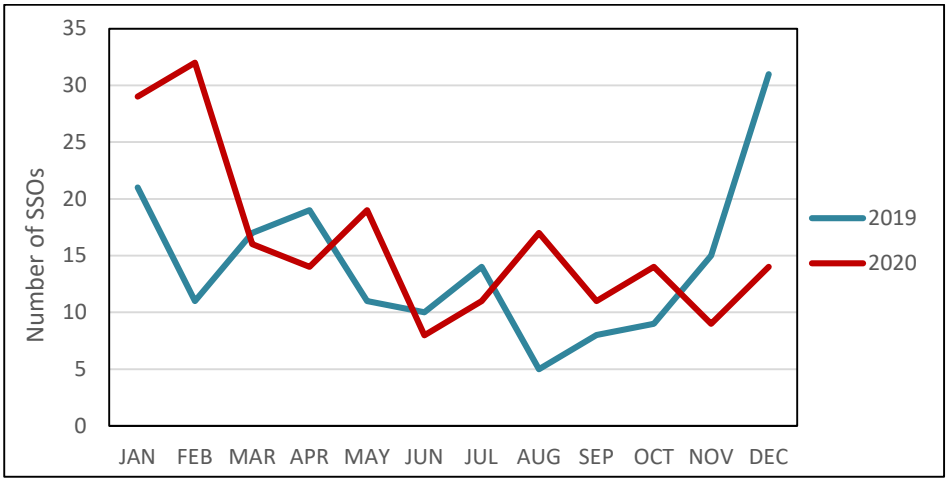

**Figure 2: CY 2020 SSOs by Cause**



## 4.2 SSO Frequency and Volume by Month

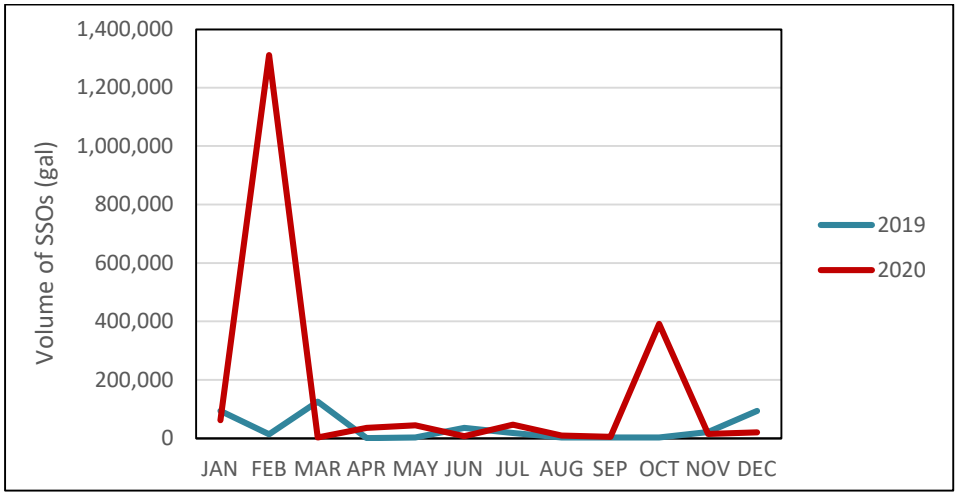
As shown in the tables above, the City experienced a total of 171 SSOs in CY 2019. In CY 2020, the City experienced a total of 194 SSOs for a combined total of 365 SSOs. This number was slightly less than the previous two-year total of 374, a decrease of 2%. The average number of SSOs per month during CY 2019 was 14.3, and 16.2 in CY 2020. The fluctuation in SSOs monthly is caused by a combination of wet weather, roots, debris, and collapsed lines. During CY 2019, January and December averaged 26.0 SSOs per month, well above the annual average of 14.3. In CY 2020, January and February averaged 30.5 SSOs per month, once again well above the annual average of 16.2.

**Figure 3: SSO Frequency by Month**




During CY 2019, total known volume spilled represented approximately 0.41 million gallons; in CY 2020, total known volume spilled represented approximately 1.95 million gallons, for an estimated combined total known volume of 2.36 million gallons. Wet weather events accounted for 20.0 percent of the known volume spilled in CY 2019 and 15.0 percent of the known volume spilled in CY 2020.

**Figure 4: SSO Volume by Month**



Based on an analysis of the wet weather SSO events, there is an identifiable correlation between spill volume and rainfall. Although wet weather volume decreased in 2020 compared to 2019, the City still experienced significant volume of SSOs related to wet weather during major rainfall events.

## 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 2019, non-wet weather SSOs represented an average duration of 92 minutes per SSO. Wet weather SSOs represented an average duration of 120 minutes per SSO. In CY 2020, non-wet weather SSOs represented an average duration of 161 minutes. Wet weather SSOs represented an average duration of 282 minutes.

Of all SSOs in CY 2019 and 2020, 43 percent of the non-wet weather SSO durations and 38 percent of the wet weather SSO durations were reported as unknown or undetermined due to overflow being unobserved.

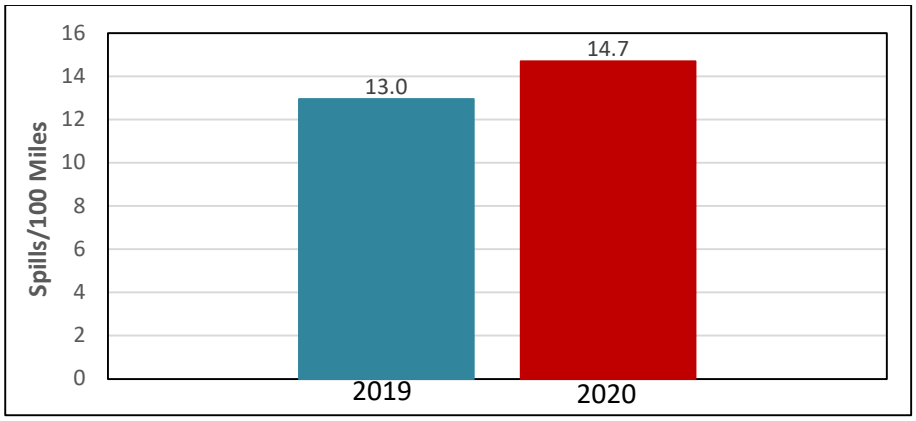
## 4.4 SSOs per 100 Miles of Pipe

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 will also include 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 will improve accuracy in properly estimating the number of SSOs per 100 miles of maintained pipe.

There are approximately 68,000 City sewer customers, which translates to approximately 57,000 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 1,100 miles of mainline pipe yields a total system length of 1,320 miles.

Based on the revised calculation methodology described above, in CY 2019 the number of SSOs per 100 miles equaled 13.0 and in CY 2020 14.7. This is an increase of 1.7 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 2019 and CY 2020. 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 calendar years 2019 and 2020.

**Table 8: Total Building Backup Frequency and Volume by Cause, CY 2019 & 2020**

| Building Backup Cause | Frequency | Volume (gal) |
|---|---|---|
| Collapsed Line | 4 | 55 |
| Grease | 0 | 0 |
| 3rd Party | 3 | 30 |
| Pump Station Failure | 0 | 0 |
| Roots | 3 | 92 |
| Debris | 0 | 0 |
| Wet Weather | 0 | 0 |
| Force Main | 0 | 0 |
| Equipment Failure | 0 | 0 |
| Wastewater Treatment Plant | 0 | 0 |
| **TOTAL** | 10 | 177 |

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 2019 and CY 2020.

**Table 9: Monthly Building Backup Frequency by Cause, CY 2019 & 2020**

| Month / Year | Collapsed Line | 3rd Party | Roots | Total |
|---|---|---|---|---|
| Jan-19 | 0 | 0 | 0 | 0 |
| Feb-19 | 0 | 0 | 0 | 0 |
| Mar-19 | 0 | 0 | 0 | 0 |
| Apr-19 | 0 | 0 | 0 | 0 |
| May-19 | 0 | 0 | 0 | 0 |
| Jun-19 | 0 | 0 | 0 | 0 |
| Jul-19 | 0 | 0 | 0 | 0 |
| Aug-19 | 0 | 0 | 1 | 1 |
| Sep-19 | 1 | 0 | 0 | 1 |
| Oct-19 | 0 | 0 | 0 | 0 |
| Nov-19 | 0 | 0 | 0 | 0 |
| Dec-19 | 0 | 0 | 0 | 0 |
| CY 2019 Total | **1** | **0** | **1** | **2** |
| Jan-20 | 0 | 0 | 0 | 0 |
| Feb-20 | 1 | 0 | 0 | 1 |
| Mar-20 | 0 | 0 | 1 | 1 |
| Apr-20 | 0 | 0 | 0 | 0 |
| May-20 | 0 | 1 | 0 | 1 |
| Jun-20 | 0 | 2 | 0 | 2 |
| Jul-20 | 2 | 0 | 0 | 2 |
| Aug-20 | 0 | 0 | 0 | 0 |
| Sep-20 | 0 | 0 | 1 | 1 |
| Oct-20 | 0 | 0 | 0 | 0 |
| Nov-20 | 0 | 0 | 0 | 0 |
| Dec-20 | 0 | 0 | 0 | 0 |
| CY 2020 Total | **3** | **3** | **2** | **8** |
| Grand Total | **4** | **3** | **3** | **10** |

All building backups for CY 2019 and 2020 were reported as unknown or undetermined duration due to overflow being unobserved.