

---

# Annual Report No. 10

January 1, 2021, to December 31, 2021

Civil Action No. 1:10cv4039 - SDG

**DeKalb County  
Department of Watershed Management**



DeKalb County  
G E O R G I A

March 1, 2022

## Table of Contents

Acronyms .....	iii
Introduction .....	1
Executive Summary .....	1
<b>Part I – Capacity, Management, Operations and Maintenance (CMOM) Programs’ Implementation</b>	
<b>Activities Completed .....</b>	<b>3</b>
1. CERP (CD VI.B.i) .....	3
2. FOG Management Program (CD VI.B.ii) .....	4
3. Sewer Mapping Program (CD VI.B.iii) .....	5
4. Maintenance Management System Program (CD VI.B.iv) .....	6
5. Collection and Transmission Systems Training Program (CD VI.B.v).....	7
6. System-Wide Flow and Rainfall Monitoring Program (CD VI.B.vi).....	7
7. System-Wide Hydraulic Model (CD VI.B.vii).....	8
8. Financial Analysis Program (CD VI.B.viii) .....	8
9. Infrastructure Acquisitions Program (CD VI.B.ix) .....	9
10. Priority Areas Sewer Assessment and Rehab Program (CD VI.B.x).....	9
11. Ongoing Sewer Assessment and Rehabilitation Program (CD X 38.) .....	15
12. Supplemental Environmental Project (CD VIII) .....	15
Attachment A MMS KPIs.....	16
Attachment B Priority Fix List Status.....	19
<b>Part II Sanitary Sewer Overflow Trends Analysis .....</b>	<b>27</b>
<b>Executive Summary .....</b>	<b>27</b>
1. Classification of SSO Types and Causes.....	30
2. Number and Volume of SSOs.....	32
3. Average Duration of SSOs.....	35
4. Causes of SSOs .....	37
5. Other Trends .....	40
6. Summary.....	50

## Acronyms

ARV	air release valve
CAP	Capacity Assurance Program
CCTV	closed-circuit television
CD	Consent Decree
CERP	contingency and emergency response plan
CIP	capital improvement program
CM	corrective maintenance
CMMS	computerized maintenance management system
CMOM	capacity, management, operations, and maintenance
DWM	Department of Watershed Management (DeKalb County)
EM	emergency maintenance
EPA	U.S. Environmental Protection Agency
FOG	Fats, Oils, and Grease
FSE	food service establishment
EPD	Environmental Protection Division (Georgia)
GIS	geographic information system
GSRR	Gravity Sewer Rehabilitation and Replacement
I/I	infiltration/inflow
KPI	key performance indicator
LF	linear feet
MCA	manhole condition assessment
MCD	Modification to Consent Decree
MMADF	maximum month average daily flow
MMS	maintenance management system
O&M	operations and maintenance
OSARP	Ongoing Sewer Assessment and Rehabilitation Program
PACP	Pipeline Assessment and Certification Program
PASARP	Priority Areas Sewer Assessment and Rehabilitation Program
PFL	Priority Fix List
PM	preventive maintenance
PMT	Program Management Team
QA/QC	quality assurance and quality control
SSO	sanitary sewer overflow
TISCIT	Totally Integrated Sonar and Camera Inspection Technology
WAM	work and asset management
WCTS	wastewater collection and transmission system



## Introduction

DeKalb County (the “County”) Department of Watershed Management (DWM) submits this 10th Annual Report in accordance with Section IX, Paragraph 58 of the Consent Decree (CD) (Civil Action 1:10cv4039-SDG) to provide:

- a) “A narrative summary of progress made, including key accomplishments and significant activities, under the Capacity, Management, Operations, and Maintenance (CMOM) programs implemented or modified pursuant to this Consent Decree for the most recent twelve (12) month period.”
- b) “A trends analysis of the number, volume, average duration, and cause of the County’s Sanitary Sewer Overflows (SSOs) for the previous twenty-four (24) month period.”

On September 22, 2021, a Modification to Consent Decree (MCD) was entered, which among other things, extends the timeline to complete the assessment and rehabilitation work under the Priority Areas Sewer Assessment and Rehabilitation Program (PASARP) to December 20, 2027. The MCD also modified the County’s reporting obligations, including the provisions governing annual reports. According to the MCD, the annual reports should additionally provide:

- c) “The Minimum Linear Footage of Pipe Review, Design, and Rehabilitation completed in each Project Category for that calendar year, a detailed written description of the work that was done to complete such rehabilitation, and a detailed written description of how the County calculated the Minimum Linear Footage of Pipe Review, Design and Rehabilitation completed and how it apportioned such rehabilitation to each Project Category.”
- d) “A description of any lift station rehabilitation and/or construction and construction of additional storage undertaken and/or completed pursuant to modified paragraph 35(i).”
- e) “A detailed written description of all ongoing or completed work at the locations on the Priority Fix List and a list of such locations that have been adequately rehabilitated, relieved, fixed, or otherwise addressed so that no future SSOs are predicted to occur at any such locations as a result of a representative two (2) year twenty-four (24) hour storm event.”

## Executive Summary

The report that follows is divided into two sections as required by the CD. Part I reports on the CMOM Programs’ Implementation Activities. Part II, the Sanitary Sewer Overflow (SSO) Trends Analysis, is intended to meet the County’s reporting obligations as referenced above. This document details, in narrative form, progress made in the 2021 timeframe as well as significant program accomplishments and SSO trends analysis. Any revised milestones and the associated corrective implementation plans are noted in the previously submitted Semi-Annual Report.

During the period from January 1, 2021, to December 31, 2021, the following reports and deliverables were submitted to the U.S. Environmental Protection Agency (EPA) and Georgia Department Environmental Protection Division (EPD), as noted in Table ES-1.

**Table ES-1 Consent Decree Submittals – Schedule and Status**

Consent Decree #	Title	DWM Final Submittal
IX.(56)	4th Quarterly Report 2020	1/30/21
IX.(57)	18th Semi-Annual Report	1/30/21
IX.(58)	Annual Report #9	3/1/21
IX.(56)	1st Quarterly Report 2021	4/30/21
IX.(57)	19th Semi-Annual Report	7/30/21
IX.(56)	2nd Quarterly Report 2021	7/30/21
IX.(56)	3rd Quarterly Report 2021	10/30/21

Table ES-2 summarizes the major activities and key milestones completed in 2021.

**Table ES-2 2021 Major Consent Decree Milestones and Accomplishment Summary**

Program or Project	Milestones and Accomplishments
Contingency and Emergency Response Plan (CERP)	<ul style="list-style-type: none"> <li>✓ Trained DWM personnel and CD contractors in CERP definitions, responses, and reporting.</li> <li>✓ For all SSOs, even after the initial response, follow-up actions included a combination of closed-circuit television (CCTV); FOG education; root control; system cleaning; etc.</li> </ul>
Fats, Oils, and Grease (FOG) Management Program	<ul style="list-style-type: none"> <li>✓ Increased FOG enforcement for non-compliant food service establishments (FSE) and increased public education of facilities located around grease-related spills.               <ul style="list-style-type: none"> <li>– Delivered 1,086 warning notices</li> <li>– Delivered 29 court summons</li> </ul> </li> <li>✓ Performed FOG inspections, evaluations, and tracked data:               <ul style="list-style-type: none"> <li>– Total number of FOG inspections: 5,281</li> <li>– Total number of FOG permits issued: 2,618</li> </ul> </li> <li>✓ 2021 monthly average permitted active FSEs: 218</li> </ul>
Sewer Mapping Program	<ul style="list-style-type: none"> <li>✓ Continued to update the geographic information system (GIS) with sanitary sewer easement information to facilitate a more efficient access process for maintenance and capital projects.</li> <li>✓ Used heat maps of root-caused SSOs to identify areas for chemical root control.</li> <li>✓ Used GIS aerials to accurately estimate easement clearing areas for root intrusion prevention and efficient access during maintenance activities.</li> <li>✓ Used database of project as-built construction drawings to facilitate updates to GIS for completed sewer projects.</li> </ul>
Maintenance Management System (MMS) Program	<ul style="list-style-type: none"> <li>✓ Performed 1,720 sewer creek crossing inspections to monitor and maintain the structural integrity of sewer assets near waterways.</li> <li>✓ Treated 1,071,840 linear feet (LF) of sewer to remove root intrusions and prevent blockages.</li> <li>✓ Performed easement clearing to minimize root intrusion and allow efficient access to assets during maintenance activities. A total of 6,046,595 square feet of sewer easements were cleared.</li> </ul>
Collection and Transmission Systems Training Program	<ul style="list-style-type: none"> <li>✓ Completed 4,960 hours of technical, leadership, managerial, and skills training.</li> <li>✓ Generated training reports to ensure employees completed scheduled training sessions within a specified timeframe.</li> </ul>
System-Wide Flow and Rainfall Monitoring Program	<ul style="list-style-type: none"> <li>✓ Completed installation of County-wide flow monitoring and rain gauge system to be used for the development of the dynamic model and system flow analysis; supported monthly average of 307 flow monitors and 41 rain gauges; and performed flow meter maintenance visits.</li> <li>✓ Placed temporary monitors in the system, as needed, to assist in determining available sewer capacity for specific projects.</li> </ul>
System-Wide Hydraulic Model	<ul style="list-style-type: none"> <li>✓ Developed standard operating procedure for Sewer Capacity Evaluation using dynamic models.</li> <li>✓ Completed the development of preliminary Capital Improvement Program (CIP) project recommendations in the model for Intrenchment Creek, Nancy Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous Sewersheds.</li> <li>✓ Revised and resubmitted dynamic hydraulic models and reports to EPA/EPD for Nancy Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous model areas.</li> </ul>

**Table ES-2 2021 Major Consent Decree Milestones and Accomplishment Summary**

Program or Project	Milestones and Accomplishments
	<ul style="list-style-type: none"> <li>✓ Conducted dynamic model runs to verify various capacity improvement projects and identify comprehensive rehabilitation areas.</li> </ul>
Financial Analysis Program	<ul style="list-style-type: none"> <li>✓ Tracked expenditures for both the operations and maintenance (O&amp;M) budgets and CIP budgets.</li> <li>✓ Continued use of work order management system (see MMS section) to track costs of emergency, corrective, and preventive work by asset.</li> </ul>
Infrastructure Acquisitions Program	<ul style="list-style-type: none"> <li>✓ Evaluated and/or acquired 29,541 LF of pipe.</li> <li>✓ Reviewed 1,774 plans and received 500 sewer capacity requests.</li> </ul>
PASARP	<ul style="list-style-type: none"> <li>✓ Construction ongoing through design-build rehabilitation packages, Annual Construction Contracts, and two Cooperative Agreements, completing 411,215 LF of sewer rehabilitation. Procured Gravity Sewer Rehabilitation and Replacement (GSRR) Sections 1 and 2 contract. Under GSRR Section 1, completed 29,259 LF lining. Under GSRR Section 2, completed 1,922 LF of pipe replacement.</li> </ul>
Ongoing Sewer Assessment and Rehabilitation Program (OSARP)	<ul style="list-style-type: none"> <li>✓ Completed CCTV and associated pipeline cleaning and manhole condition assessment (MCA) in the OSARP areas, including: 731,782 LF (138.6 miles) of acoustic inspection; 1,020,089 LF (193.2 miles) of smoke testing; 451,9861 LF (85.6 miles) of CCTV; 104,544 LF (19.8 miles) of Totally Integrated Sonar and Camera Inspection Technology (TISCIT) surveys; and 1,511 MCAs.</li> </ul>
Supplemental Environmental Project	<ul style="list-style-type: none"> <li>✓ Completed program in 2014.</li> </ul>
SSO Trend Analysis	<ul style="list-style-type: none"> <li>✓ Completed a detailed SSO trends analysis and major spill analysis for the period from 2019 through 2021.</li> </ul>

## Part I – Capacity, Management, Operations and Maintenance (CMOM) Programs’ Implementation Activities Completed

### 1. CERP (CD VI.B.i)

DWM continued to implement the CERP in 2021 using the approved revised CERP CMOM plan to mobilize labor, materials, tools, and equipment to respond to and appropriately remedy conditions that may cause or contribute to an SSO. Considerable effort was made in 2021 to train DWM personnel in the CERP CMOM document and to verify that personnel were consistently and accurately applying the policies and procedures of the document through new employment orientation and refresher training. In March 2020, a Socially Distant Service Delivery Strategy was implemented in response to the COVID-19 pandemic. As a result, training sessions were adapted for smaller groups to allow appropriate distancing while virtual sessions were developed. During that time, DWM employees and contractors were continuously provided with necessary documents to understand the CERP response plan.

#### Key Accomplishments and Significant Activities:

1. Completed the following activities to resolve and remedy current and potential SSOs:
  - a. Cleaning total 4,096,727 LF
    - i. First response and follow up 67,080 LF
    - ii. Contractor cleaning 4,029,647 LF<sup>1</sup>

<sup>1</sup>Total encompasses all cleaning performed for SSO response as well as prevention of potential SSOs.

- b. Point repairs 38<sup>2</sup>
- c. CCTV 128,866 LF<sup>3</sup>

2. Responded to 228 reportable spill events and performed spill follow-up actions.
3. Conducted monthly SSO meetings with program area managers to review the previous month’s SSOs and discuss any emerging trends and possible mitigation efforts.
4. Distributed more than 213,873 FOG education flyers in areas where grease was identified as the cause of a spill to increase awareness of the impact of allowing grease to enter the sewer system and thus, potentially averting future SSOs.
5. Amplified community awareness and education efforts related to FOG as well as other causes of SSOs. Approximately 640,674 educational flyers were distributed by Nextdoor directly to the community.
6. Discovered and resolved two minor spills from in-stream monitoring.
7. Discovered and potentially prevented seven overflows from occurring using flow monitoring technology. High level alarms and data assessment alerted personnel to potential overflows at lift stations. Crews were able to respond before an actual overflow occurred.

## 2. FOG Management Program (CD VI.B.ii)

The DeKalb County FOG Management Program has met all major program milestones. However, to support the County’s ongoing implementation of the CD, the FOG program has taken on a greater role in the ongoing trends analysis efforts and in developing cleaning protocols pursuant to the MMS program. While the FOG program is designed to reduce the amount of FOG that enters the wastewater collection and transmission system (WCTS), the cleaning instituted under the MMS program is designed to remove FOG from the system. Together, these programs represent a fully integrated FOG prevention and elimination program.

In 2021, DWM continued its enforcement of the FOG ordinance and unregistered FSEs, as described below. DWM also increased the amount of public education about FOG and the effects of FOG on the sewer system through social media, media advertisements, and press releases. DWM successfully continued efforts to engage the municipalities within the County to ensure implementation of the FOG Management Program throughout the County.

### Key Accomplishments and Significant Activities:

1. Distributed educational materials at multi-family apartment complexes and residential neighborhoods that have been identified as located near sewer spills, and investigated nearby FSEs for grease violations.
2. Reviewed pump-out manifests as part of the Hauler Company Assessment program to ensure that haulers are properly disposing of FOG. A total of 5.8 million gallons of FOG was recorded as being removed from the system through this program.
3. Delivered 1,086 warning notices and 29 court summonses to non-compliant FSEs.
4. Performance Measures:
  - a. Total number of FOG inspections: 5,281
  - b. Total number of FOG evaluations: 229
  - c. 2021 monthly average permitted active FSEs: 218

<sup>2</sup>Total reported reflects Point Repairs completed to address SSOs and are coordinated with PASARP construction.

<sup>3</sup>The total reported for CCTV activities in this section is limited to CCTV work performed as a follow up to an identified SSO and does not include CCTV work performed as a part of the assessment of the WCTS.



5. Issued 2,618 permits.
6. Continued to sponsor the “No FOG, No Clog” campaign to educate students and adults about the hazards of grease clogs in sewer systems and provide information about FOG and its effect on the sewer system. Conducted 16 school events with 34 presentations reaching approximately 2,068 students. Conducted 8 events at schools, senior centers, and recreation centers reaching approximately 425 students and adults. Sponsored 1 in-person, 4 virtual, and 37 public outreach events reaching approximately 1,982 citizens.
7. While continued revision of the FOG ordinance is not a CD requirement, the FOG ordinance was revised beyond the scope of the CD to include multi-family residences and was passed by the Board of Commissioners on December 11, 2018. This ordinance extends the application of existing FOG-related regulations to certain multi-family dwelling units. For 2021, no sites qualified to be under the FOG ordinance.

### 3. Sewer Mapping Program (CD VI.B.iii)

The purpose of the Sewer Mapping Program is to provide an integrated system capable of mapping, inventorying, and depicting system assets. In 2015, the Sewer Mapping Program enhancements and milestones were substantially completed, thus allowing the County in 2021 to: 1) produce certain maps using GIS technology, 2) integrate sewer system locations and attribute data with the hydraulic model and the computerized CMMS, 3) reproduce maps in a manner that will allow use by O&M crew leaders in the field, and 4) identify and track problems geographically.

Though the County has achieved completion of the major components of the program, data updates to the GIS system continue for new developments or system changes that have been reported by DeKalb County personnel in the regular course of business or by non-DeKalb County personnel engaged in assessment and rehabilitation projects. Moreover, the information from the Sewer Mapping Program is being used in other CD-related programs including the hydraulic model, flow and rainfall monitoring, PASARP, OSARP, CERP, FOG, Infrastructure Acquisitions, and MMS programs.

#### **Key Accomplishments and Significant Activities:**

1. Captured sanitary sewer easement information from record drawings and subdivision plats to augment existing data and facilitate a more efficient access process for maintenance and capital projects. Maps of easements were scanned into GIS software and digitized into the GIS layer. Attributes of the easement were recorded for future use. Approximately 1,279 easements have been identified from drawings and subdivision plats, scanned into GIS software, and added to the GIS layer.
2. Used heat maps of root-caused SSOs to prioritize areas needing chemical root control, address known root intrusions, and prevent potential future root-caused SSOs.
3. Used GIS aerial photographs to: 1) identify areas where sanitary sewer easements need clearing for maintenance access; 2) make accurate estimates of the work needed; and 3) provide contractors with precise areas to clear.
4. Installed and implemented FME Desktop and Sewer tools to connect applications and transform GIS data. This tool allows a robust QA/QC process with workflows on a schedule or when an event is triggered to ensure data is incorporated into GIS efficiently.
5. Created applications and workflows to streamline and organize the submission and retention of as-built drawings as the GIS is updated.
6. Continued to use GIS tools, such as dashboards, web-accessible maps, and web-accessible apps, to provide data to users throughout the County.

7. Continued updates to GIS to reflect new developments, connectivity issues, sewer system improvements, and maintenance revisions. As assets are added to GIS, they are also added to the MMS program for maintenance and evaluation. Maintenance activity is regularly updated to the GIS and used in planning for continuing maintenance.

#### **4. Maintenance Management System Program (CD VI.B.iv)**

The County's MMS program involves a combination of preventive, corrective, and predictive inspection and maintenance activities to maintain the WCTS. The Program is divided into two key areas: 1) tools that support the maintenance activities and 2) specific maintenance activities performed for the County's gravity system, lift stations, and force mains. Communication systems, physical inspection and testing, information management systems, and inventory management are tools used to support maintenance activities. Gravity system maintenance and lift stations, force mains, and air release valve (ARV) maintenance describe the County's maintenance activities established under the MMS program. Finally, the MMS provides key performance indicators (KPIs) that will enable the County to measure its performance.

##### **Key Accomplishments and Significant Activities:**

###### **1. Inventory Management**

- a. Successfully performed physical inventory at each warehouse location. The DWM Operations' warehouse location achieved outstanding audit results of 106 percent for 2021, demonstrating that DWM is accurately tracking and maintaining the computerized inventory of the warehouse.
- b. DWM warehouse inventory value was \$6,115,000 for 2021, thus providing assets as needed to ensure efficient maintenance and repair activities.

###### **2. Gravity System Maintenance**

- a. Performed 1,720 sewer creek crossing inspections.
- b. Continued chemical root control application in the system to remove root intrusions identified during assessment. A total of 1,071,840 LF of sewer mains were treated for roots.
- c. Continued sewer easement clearing in the system to allow efficient access to assets during maintenance activities. A total of 6,046,595 square feet of sewer easements were cleared.
- d. Continued to input repair and maintenance data into CMMS, including lining, point repairs, cleaning, etc., to track these maintenance activities and their effectiveness on system operation.
- e. Completed 746 miles of small-diameter sanitary sewer cleaning.

###### **3. Lift Station, Force Main, and ARV Maintenance**

- a. Working statistics:
  - i. Completed 3,921 preventive maintenance work orders (327/month) to ensure proper maintenance and continued functioning of the assets.
  - ii. Maintained a backlog of two or less work orders per month for 12 months to ensure work is being conducted efficiently and within a short time after being identified and planned. Three months had zero backlogged work orders.
  - iii. Averaged one lift station per month with one pump out for service to minimize the risk of an entire station being without pumping capacity.
  - iv. Inspected all 66 force main easements to ensure continued access for maintenance and assess if any vegetative growth could potentially affect the structural integrity of the force main.
  - v. Inspected all 64 discharge manholes for structural integrity.

- vi. Performed force main pressure testing at 66 stations to test for any pipe leakage.
  - vii. Inspected 43 of 55 ARVs to ensure they were operating automatically to release air pockets in the force main.
  - viii. Completed lift station work orders:
    - 1. 97 percent preventive maintenance
    - 2. 3 percent corrective maintenance
    - 3. 0 percent emergency maintenance
  - b. DWM performed electrical ground testing (amp and volt readings) and thermal scans of all 66 lift stations as a preventive measure to ensure proper operation and identify any potential developing electrical problems.
4. Tracked KPIs (refer to Attachment A).

## 5. Collection and Transmission Systems Training Program (CD VI.B.v)

In 2021, the County continued to deliver technical and skills training to DWM personnel related to applicable job responsibilities. CERP training is a focus each year and included coordination with New Employee Orientation classes to train all new DWM personnel on CD responsibilities (in earlier years, only new Operations personnel received CERP training).

### Key Accomplishments and Significant Activities:

1. Continued to implement the updated Training Program Plan (2018) using the Training Matrix, Training Calendar, and Compliance Software.
2. Completed 4,960 hours of technical, leadership, managerial, and skills training.
3. Developed training reports to ensure employees completed scheduled training sessions within a specified timeframe.

## 6. System-Wide Flow and Rainfall Monitoring Program (CD VI.B.vi)

The program's goal is to provide an efficient and effective data monitoring network to assess capacity and infiltration/inflow (I/I) issues within the WCTS. All major milestones for this program have been completed. The ongoing program's focus is on data collection for analysis of capacity requests and I/I reduction efforts. Moreover, the County continues to use the program for SSO reduction efforts and identification of areas that could possibly lead to an SSO.

### Key Accomplishments and Significant Activities:

1. Maintained the County-wide flow monitoring and rain gauge system for the dynamic model and system flow analysis.
2. Continued implementing a maintenance and calibration program, supporting a monthly average of 307 flow monitors and 41 rain gauges. Maintenance field operations are supported by daily, weekly, and monthly QA/QC measures to identify meters in need of additional attention. Flow monitoring field crews performed maintenance site visits. The County engaged contractors to support flow monitoring operations and to supplement County resources, which were reduced because of the pandemic.
3. Maintained and deployed temporary flow monitors in the system to assist in determining available sewer capacity and collecting additional data on known collection system issues.
4. Continued to deploy manhole-mounted I/I monitoring system in new areas. Additional location candidates have been identified for future deployments in 2022.

5. Continued collecting data to support multiple CMOM programs and engineering studies.
  - a. Generated reports for intergovernmental billing.
  - b. Determined spill volumes, where possible, as part of CERP.
  - c. Performed I/I studies for areas with suspected new or changing system flow.
  - d. Investigated other non-ideal flow, including backwater and surcharge conditions.
6. Implemented an audit program to quantify and track data quality. The audit program includes consideration for timeliness of maintenance visits, consistency, and timeliness of QA/QC communications and minimizing data loss.
7. Used system depth information from flow meters, combined with manhole-specific level alarms, to alert field personnel of possible operational issues that could result in an SSO.

## **7. System-Wide Hydraulic Model (CD VI.B.vii)**

The County revised and resubmitted the dynamic hydraulic model reports to EPA/EPD for all model areas. EPA/EPD approved the model reports on September 23, 2021, allowing the County to begin using the dynamic hydraulic models to approve new connections.

Since completion of the CD requirements, the modeling team has focused on updating the models with new GIS and survey data, as well as improving the calibration using the full groundwater infiltration module in InfoWorks ICM. The calibrated models have been used to identify capacity relief projects County-wide as well as to verify planned capacity improvement projects.

### **Key Accomplishments and Significant Activities:**

1. Revised and resubmitted dynamic hydraulic model reports to EPA/EPD for Intrenchment Creek, Nancy Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous model areas.
2. Completed updating Intrenchment Creek and Pole Bridge models with current GIS and survey data.
3. Continued to update Snapfinger, North Fork Peachtree Creek, South Fork Peachtree Creek, and Nancy Creek models with current GIS and survey data.
4. Conducted dynamic model runs to verify various capacity improvement projects and confirmed comprehensive rehabilitation areas.
5. Developed standard operating procedure for Sewer Capacity Evaluation using dynamic models.
6. Completed sewer capacity evaluations for previously submitted sewer capacity request backlog through November 2021 requests using the dynamic models.
7. Completed the development of preliminary CIP project recommendations in the models for Intrenchment Creek, Nancy Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, Pole Bridge, and Miscellaneous sewersheds.

## **8. Financial Analysis Program (CD VI.B.viii)**

The Financial Analysis Program incorporates aspects of revenue estimating, budgeting, costs analysis, and customer rate setting such that DWM provides the desired level of service to its customers while meeting its regulatory requirements. DWM continues to monitor its revenue and expenditure budgets and is on track to meet its revenue target and stay within its expenditure budget.

### Key Accomplishments and Significant Activities:

1. Continued tracking of maintenance costs associated with work done on assets through a work-order-based CMMS software in the Operations Division. The software tracks equipment, labor, and material costs, and classifies work order type as corrective, preventive, or emergency maintenance. All work associated with design and construction of sewer rehabilitation projects are tracked in the PASARP and OSARP tasks.
2. Table 8-1 lists the costs associated with work orders and maintenance type.

**Table 8-1 2021 Sewer System Costs by Work Order Type**

Work Order Type	Sewer System Costs (\$)	Sewer System Costs (%)
Corrective Maintenance	\$547,024	28%
Preventive Maintenance	\$48,083	3%
Emergency Maintenance	\$1,315,210	68%
Miscellaneous Maintenance	\$12,050	1%
<b>Total</b>	<b>\$1,922,366</b>	<b>100%</b>

## 9. Infrastructure Acquisitions Program (CD VI.B.ix)

The goals of the Infrastructure Acquisitions Program are to acquire infrastructure that meets County standards for design, construction, capacity, and efficiency, and to maintain a program that properly monitors the acquisition process, encourages input, and is efficient for contractors, developers, property owners, and the County. During 2016 through 2019, DWM saw large increases in the number of development applications in the County. Though a decrease was recorded in 2020, presumably because of the pandemic, 2021 saw a slight increase in development applications. Additional resources were added to the program to handle the increased workload and to coordinate with the municipalities within the County.

With the approval of the dynamic hydraulic model on September 23, 2021, the County discontinued use of the steady state hydraulic model for capacity review requests and began using the dynamic hydraulic model under the Capacity Assurance Program (CAP) included in the MCD for all pending requests remaining from prior steady state model review as well as new requests. Development of an I/I banking credit system as a potential alternative for processing sewer capacity approvals was also completed.

### Key Accomplishments and Significant Activities:

1. Evaluated and/or acquired 29,541 LF of pipe, thereby ensuring adherence with the County's design standards.
2. Reviewed 1,774 plans.
3. Reviewed 39 plats.
4. Received 500 sewer capacity requests.
5. Issued 344 sewer capacity letters either confirming available capacity, requiring a sewer action plan, or noting that the capacity request resulted in a zero or less impact to system capacity.
6. Reevaluated 564 sewer capacity approval requests under CD modification.

## 10. Priority Areas Sewer Assessment and Rehab Program (CD VI.B.x)

The main purpose of the PASARP is to provide for the identification, delineation, assessment, prioritization, and rehabilitation of Priority Areas (both Initial Priority Areas and Additional Priority Areas)

as explained in the CD within the County WCTS. The Initial and Additional Priority Areas total approximately 825 miles of sewers (approximately 33 percent of the WCTS).<sup>4</sup> In implementing the PASARP, the County is undertaking certain condition, structural, and hydraulic assessments within the Priority Areas to identify, prioritize, and complete appropriate rehabilitation measures within those areas. As part of the implementation process, the County is tracking rehabilitation measures completed within the Priority Areas and will determine the effectiveness of those measures, using selected KPIs.

In 2017, the County substantially completed the 2-year condition assessment phase of the PASARP, using a wide range of evaluative tools and programs including private lateral investigations, corrosion defect identifications, MCA, flow monitoring, CCTV inspection, gravity sewer line defect analysis, TISCIT, acoustical testing, and smoke testing. Since completing the PASARP assessment, the focus is on continuing to package and prioritize cost-effective rehabilitation recommendations. The first of many prioritized rehabilitation contracts resulting from the assessment phase began in 2017.

Appendix E of the MCD includes additional definitions and milestones for the PASARP. As the assessment is complete in Priority Areas, the remaining design and construction is further categorized as “Simple Pipe Review,” “Simple Pipe Rehabilitation,” “Complex Pipe Design,” and “Complex Pipe Rehabilitation” with required Minimum Linear Footages to be completed annually per Table E-1. Specific projects were also to be completed by December 31, 2021, as listed in Tables E-2 and E-3.

### Simple Pipe Review

Simple pipe review consists of conducting a visual review of Pipeline Assessment and Certification Program (PACP)-certified coded CCTV of the pipe segments and developing simple pipe rehabilitation recommendations to address severe defects noted during condition assessment. A total of 780,000 LF of simple pipe review was required to be completed by December 31, 2021. The County exceeded this requirement and completed 883,835 LF through 2021. Under the MCD, the excess 103,835 LF may be applied to 2022 and future Minimum Linear Footage requirements. The majority of the footage was reviewed prior to 2021. The total footage was calculated by taking the GIS length (verified by the CCTV length) of each pipe asset that was reviewed. Table 10-1 details the total length of pipe review by final rehabilitation recommendation.

**Table 10-1 2021 Simple Pipe Review**

Rehabilitation Recommendation	Pipe Length Reviewed (LF)
<b>Simple Pipe Review Prior to 2021</b>	
Replacement, Lining, Point Repairs	882,021
<b>Simple Pipe Review in 2021</b>	
Lining	1,814
Total through 2021	883,835

### Simple Pipe Rehabilitation

Simple pipe rehabilitation addresses structural issues identified during simple pipe review and may include lining, point repairs, and same-size pipe replacement. Simple pipe rehabilitation is not intended to provide a comprehensive capacity solution but to extend the life of the asset. A total of 385,000 LF of simple pipe rehabilitation was required to be completed by December 31, 2021. The County exceeded

<sup>4</sup>Updated mileage based on DWM’s 2020 GIS database update that removed assets found during survey to be abandoned or not owned by the County.

this requirement and completed 511,588 LF. Under the MCD, the excess 126,588 LF may be applied to 2022 and future Minimum Linear Footage requirements.

**Table 10-2 2021 Simple Pipe Rehabilitation**

Project Information	Rehabilitation Completed	Pipe Length Rehabilitated (LF)
<b>Simple Pipe Rehabilitation Prior to 2021</b>		
On-Call Emergency (RGI), DB1, DB2, DB3, AWS (RGI), AWS (Granite), Coop (Insituform), Coop (IPR)	Replacement, Lining, Point Repair	441,407
<b>Simple Pipe Rehabilitation in 2021</b>		
DB3	Lining	1,758
	Point Repair	1,100
	Point Repair and Lining	623
	Replacement	167
Annual Water and Sewer (RGI)	Lining	781
Coop (IPR)	Lining	12,155
Coop (Insituform)	Lining	17,874
GSRR (RGI)	Lining	23,530
	Point Repair	374
GSRR (IPR)	Lining	5,565
Subtotal for 2021		70,181
<b>Total through 2021</b>		<b>511,588<sup>5</sup></b>

### Complex Pipe Design

Complex pipe design includes determining how to address capacity limitations within the WCTS. This can be done by reducing flow through the existing system with comprehensive rehabilitation to remove I/I or by increasing physical capacity of the system through upsizing existing pipes, adding relief sewers, or adding storage. A total of 100,000 LF of complex pipe design was required to be completed by December 31, 2021. The County exceeded this requirement and completed 110,823 LF. Under the MCD the excess 10,823 LF may be applied to 2022 and future year Minimum Linear Footage requirements. Table 10-3 below provides the amount of complex pipe design completed per project. As noted above, there are various methods to address capacity limitations and based on the method, the applicable footage was calculated differently. The County’s method for calculating footage based on different projects includes:

- Pipe upsizing, existing alignment – actual footage of pipe designed for replacement
- Pipe upsizing, new alignment – footage of the existing alignment that is abandoned
- Relief sewers – footage of the existing pipe segments that are being relieved by the parallel sewer

<sup>5</sup> In the County’s February 1, 2022 submittal on Minimum Linear Footage, total footage of Simple Pipe Rehabilitation was incorrectly reported as 513,999 LF. The total in this report, 511,588 LF, is the corrected footage that exceeds the minimum linear footage requirements for 2021.

- Storage tanks – footage of the pipe upsizing and/or relief sewer that does not have to be designed due to the storage tank
- Comprehensive rehabilitation – footage of the pipe upsizing needed that the comprehensive rehabilitation is replacing

**Table 10-3 2021 Complex Pipe Design**

<b>Contract Package</b>	<b>Project Description</b>	<b>Pipe Length Designed (LF)</b>
<b>Complex Pipe Design Prior to 2021</b>		
DB1, DB2, DB3	Pipe upsizing, comprehensive rehabilitation	51,441
<b>Complex Pipe Design in 2021</b>		
Package 2, Component 12	South Fork Peachtree Creek, I-IG16 – Comprehensive Rehab 9,562 LF	2,473
Package 4, Component 2	Shoal Creek, I-SF3 – Comprehensive Rehab 7,600 LF	2,447
Package 5, Component 4	Shoal Creek, I-SF2 – Comprehensive Rehab 2,950 LF	480
Package 5, Component 9	Shoal Creek, I-SF3 – Comprehensive Rehab 3,600 LF	1,031
Package 5, Component 11	Cobb Fowler Creek, I-SF2 – Comprehensive Rehab 5,150 LF	776
Package 5, Component 12	Cobb Fowler Creek, I-SF2 – Pipe upsizing	20,262
Package 5, Component 14	South Fork Peachtree Creek, I-IG13 – Pipe Upsizing	2,401
Package 6, Component 2	North Fork Peachtree Creek, A-IG5 – Comprehensive Rehab 75,000 LF	9,410
Package 6, Component 3	North Fork Peachtree Creek, A-IG5 – Comprehensive Rehab 20,000 LF	978
Package 7, Component 1	Doolittle Creek, A-SF8 – Comprehensive Rehab 5,933 LF	1,049
Package 7, Component 5	South Fork Peachtree Creek, I-IG13 – Comprehensive Rehab 2,243 LF	2,243
Package 7, Component 8	North Fork Peachtree Creek, I-IG14 – Pipe Upsizing	3,215
Package 8, Component 4	North Fork Peachtree Creek, I-IG5 – Comprehensive Rehab 11,949 LF	4,405
Package 8, Component 5	Nancy Creek, I-IG2 – Pipe Upsizing	4,511
Package 8, Component 7	Nancy Creek, I-IG1 – Comprehensive Rehab 13,811 LF	3,701



**Table 10-3 2021 Complex Pipe Design**

<b>Contract Package</b>	<b>Project Description</b>	<b>Pipe Length Designed (LF)</b>
Subtotal for 2021		59,382
<b>Total through 2021</b>		<b>110,823</b>

**Complex Pipe Rehabilitation**

Complex pipe rehabilitation is the construction of the design solutions to address capacity limitations within the WCTS. Comprehensive rehabilitation, pipe upsizing, relief sewers, and storage are all potential solutions the County is evaluating for construction. A total of 58,000 LF of complex pipe rehabilitation was required to be completed by December 31, 2021. The County exceeded this requirement and completed 66,799 LF. Under the MCD the excess 8,799 LF may be applied to 2022 and future year Minimum Linear Footage requirements. Table 10-4 below provides the amount of complex pipe rehabilitation completed per project. As noted above, there are various methods to address capacity limitations and based on the method, the applicable footage was calculated differently.

**Table 10-4 2021 Complex Pipe Rehabilitation**

<b>Contract Package</b>	<b>Project Description</b>	<b>Pipe Length Rehabilitated (LF)</b>
<b>Complex Pipe Rehabilitation Prior to 2021</b>		
DB1, DB2, DB3	Pipe upsizing, comprehensive rehabilitation	48,505
<b>Complex Pipe Rehabilitation in 2021</b>		
Package 2, Component 12	South Fork Peachtree Creek, I-IG16 – Comprehensive Rehab 9,562 LF	2,473
Package 3, Component 5	Indian Creek, A-SF3 – Pipe upsizing	1,662
Package 4, Component 2	Shoal Creek, I-SF3 – Comprehensive Rehab 7,600 LF	2,447
Package 5, Component 14	South Fork Peachtree Creek, I-IG13 – Pipe Upsizing Phase 1	1,922
Package 5, Component 9	Shoal Creek, I-SF3 – Comprehensive Rehab 3,600 LF	1,031
Package 7, Component 1	Doolittle Creek, A-SF8 – Comprehensive Rehab 5,933 LF	1,049
Package 7, Component 5	South Fork Peachtree Creek, I-IG13 – Comprehensive Rehab 1,170 LF Phase 1	1,170
Package 8, Component 4	North Fork Peachtree Creek, I-IG5 – Comprehensive Rehab 9,611 LF Phase 1	3,543
Package 8, Component 7	Nancy Creek, I-IG1 – Comprehensive Rehab 11,109 LF Phase 1	2,977
Subtotal for 2021		18,274
<b>Total through 2021</b>		<b>66,799</b>

## Lift Station and Additional Storage

There has been no rehabilitation or construction undertaken on lift stations or additional storage pursuant to modified Paragraph 35(i) of the MCD.

## Priority Fix List

The MCD also introduces a Priority Fix List (PFL) of repeat SSOs with the original 103 sites listed in Appendix F of the MCD. Sites can be added to the PFL if a site experiences in any 12-month period either two capacity-related or two non-capacity-related SSOs within a 500-foot-radius area. Attachment B provides details of ongoing and completed work at PFL sites.

## Key Accomplishments and Significant Activities:

1. Continued construction in Design-Build Packages 2 and 3 to address structural defects identified from assessment activities and improve conveyance capacity. This includes sewer rehabilitation of 11,643 LF, of which 4,761 LF involved pipe replacement.
2. Under Annual Construction Contracts 1–4 and Cooperative Agreements with two contractors continued construction of lining and point repairs, including 411,215 LF of sewer rehabilitation.
3. Procured GSRR contract Sections 1 and 2.
4. Under GSRR Section 1 began construction of lining and point repair including 29,259 LF of sewer rehabilitation.
5. Under GSRR Section 2 began construction of Packages No. 5 and 8 projects including 1,922 LF of pipe replacement.
6. Completed siting study and continued design-build bridging documentation for Shoal Creek and Snapfinger East wet weather storage tanks.
7. Continued execution of project communications and community outreach for ongoing projects.
8. Tracked KPIs as shown in Table 10-5.

**Table 10-5 2021 PASARP KPIs**

KPI	2021 Performance
SSOs per 100 miles of WCTS within the Priority Areas per year	13.9 per 100 miles within the Priority Areas per year
SSOs per 100 miles of WCTS within the Priority Areas per year per inch of rain within the Priority Areas	0.26 per 100 miles per year per inch of rain within the Priority Areas
Total volume <sup>a</sup> of spills per 100 miles of WCTS within the Priority Areas	1,375,484 gallons per 100 miles within the Priority Areas
Total volume <sup>b</sup> of spills per 100 miles per inch of rain within the Priority Areas	25,562 gallons per 100 miles per inch of rain within the Priority Areas
Number of dry weather SSOs <sup>b</sup> within the Priority Areas	68 dry weather SSOs <sup>b</sup> within the Priority Areas

<sup>a</sup> For the year 2021, volume was recorded for 100 percent of the spills.

<sup>b</sup> Dry weather SSO KPI; removed the SSOs with cause listed as STORM or I/I (assumed others were dry weather SSOs).

## 11. Ongoing Sewer Assessment and Rehabilitation Program (CD X 38.)

The main purpose of the OSARP is to ensure continuous assessment and rehabilitation of the County's WCTS. The OSARP governs assessment and rehabilitation of those areas outside the Priority Areas while the CD is in effect and will continue to exist after the CD expires. This program enables the County to continuously and proactively identify, delineate, and prioritize areas or sewer segments in the WCTS for condition assessment and rehabilitation, as appropriate, starting with areas not being addressed under the PASARP. The implementation of the OSARP takes into consideration data obtained through other ongoing County programs and operations including:

- CMOM programs, information obtained from customers and the public
- Assessment and rehabilitation work performed under the PASARP
- Hydraulic modeling results
- Knowledge and experience of County personnel
- Best engineering practices and/or best management practices

### Key Accomplishments and Significant Activities:

1. Performed assessments and cleaning that included approximately:
  - a. 731,782 LF (138.6 miles) of acoustic inspection
  - b. 1,020,089 LF (193.2 miles) of smoke testing
  - c. 451,986 LF (85.6 miles) of CCTV and associated cleaning
  - d. 104,544 LF (19.8 miles) of TISCIT assessments
  - e. 1,511 manhole condition assessments
2. Tracked KPIs as shown in Table 11-1.

**Table 11-1 2021 OSARP KPIs**

KPI	2021 Performance
SSO per 100 miles of WCTS per year within the OSARP areas	10.9 per 100 miles per year
SSO per 100 miles of WCTS per year per inch of rain within the OSARP areas	0.20 per 100 miles per year per inch of rain
Total volume <sup>a</sup> of spills per 100 miles of WCTS within the OSARP areas	630,686 gallons per 100 miles
Total volume <sup>a</sup> of spills per 100 miles per inch of rain in the OSARP areas	11,721 gallons per 100 miles per inch of rain
Number of dry weather SSOs <sup>b</sup> in the OSARP areas	149 dry weather SSOs <sup>b</sup>

<sup>a</sup> For the year 2021, volume was recorded for 100 percent of the spills.

<sup>b</sup> Dry weather SSO KPI; removed the SSOs with cause listed as STORM or I/I (assumed others were dry weather SSOs).

## 12. Supplemental Environmental Project (CD VIII)

The Supplemental Environment Project was completed in 2014.

**Attachment A**  
**MMS KPIs**

---

KPI	Formula	2021 Results
<b>Communication System Program</b>		
Landline abandoned calls—no reason available for why caller abandoned call	Number of dropped calls	Average of 495 abandoned calls per month
Call Duration	Duration of calls in minutes divided by the number of calls	Average duration of call: 3 minutes 26 seconds Total number of calls in 2021: 58,632
<b>Information Management</b>		
Active SSO-Driven Sewer Work Order Percentage	Number of active SSO-driven sewer work orders ÷ number of completed sewer work orders in the reporting period x 100	7.52% SSO-driven sewer work orders
<b>Inventory Management</b>		
Percentage of out-of-stock items	For the reporting period, the number of parts out of stock when requested ÷ total number of parts requested x 100	< 1% of out-of-stock items
Percentage of Physical Inventory Performance	The percentage of items whose quantity on hand does match the quantity in Oracle Work and Asset Management (WAM)	95.0% of items match the quantity in Oracle WAM
Percentage of Physical Inventory Audit	The net cost difference in the value of the physical count vs. the value of inventory shown in Oracle WAM	6.0% net cost difference
<b>Gravity System</b>		
Percentage of Preventive Maintenance (PM): CCTV Inspection of Sewer Lines, Operations and Contractors	Number of miles inspected ÷ total miles of sewer line x 100	3.7% sewer lines inspected by CCTV
PM: Percentage of Sewer Lines Cleaned	Number of miles cleaned ÷ total miles x 100	31.7% sewer lines cleaned
PM: Linear feet of Root Treatment per Year	Number of feet of roots removed ÷ number of linear feet of sewer system x 100 Conversion factor: 5,280 feet/mile	8.1% of system (1,071,840 LF of root treatment)
PM: Percentage of manholes inspected per year	Number of manholes inspected ÷ total number of manholes in system x 100	2.3% manholes inspected
Emergency Maintenance (EM): Number of sanitary sewer overflows (SSOs) per mile of gravity sewer line	Number of SSOs ÷ WCTS total miles of gravity lines x 100	11.9 SSOs per 100 miles of gravity sewer line

KPI	Formula	2021 Results
<b>Lift Stations, Force Mains, and Appurtenances</b>		
PM: Percentage of PM Hours Worked versus Corrective Maintenance (CM) and EM Hours Worked	Oracle WAM Value: PM hours total ÷ total hours worked CM and EM hours total ÷ total hours worked. Each Number x 100 to show percentage. Display as ratio.	PM: 97% Corrective and Emergency Maintenance: 3%
PM: Percentage of Backlogged PM Work Orders	Number of work orders not completed ÷ total number of work orders (x 100)	< 1% backlogged PM work orders
PM: Completed PM Work Orders (based on timeframe specified)	Number of work orders completed by timeframe	> 60 days: 0 annually
CM: Percentage of lift stations with pumps out of service	Percent Value: Number of stations with pumps out of service ÷ total number of stations (x 100)	1.0% lift stations with pumps out of service
PM: Percent of ARVs inspected, flushed, and serviced	Number of ARVs inspected, flushed, and serviced per year ÷ total number of ARVs (x 100)	78% ARVs inspected, flushed, and serviced

## **Attachment B**

### **Priority Fix List Status**

---

<b>PFL Site #</b>	<b>Address</b>	<b>Capacity Related</b>	<b>Date of Adequate Fix<sup>6</sup></b>	<b>Ongoing/Complete Work</b>
1	1078 Beech Haven Road	Yes		
2	125 Beaumont Avenue	No	pre-DOE	Cleaned line as a temporary measure. Abandoned line as part of sewer realignment project in DB3.
3	1313 Stone Mill Way	No	pre-DOE	Sealed crack in pipe
4	1433 Deerwood Drive	Yes		
5	1440 Sowell Estate	Yes		Design of capacity relief project complete
6	1462 Lively Ridge Road	No	pre-DOE	Cleaned line as a temporary measure then repaired break in pain
7	1496 Country Squire	Yes		Construction of capacity relief project has started
8	157 Hood Circle	Yes	pre-DOE	Completed realignment of pipe
9	1600 Autumn Hurst Court	No	pre-DOE	Performed routine chemical root control on these pipe segments
10	161 Hood Circle	Yes	pre-DOE	Completed realignment of pipe
11	1615 Melanie Court	Yes		
12	1707 Childerlee Lane	Yes		
13	1787 Whitehall Forest Court	No	pre-DOE	Cleaned main and lateral, educated customer on not pouring grease down the drain
14	1942 East Starmount Way	Yes		
15	1964 East Starmount Way	Yes		
16	1970 East Starmount Way	Yes		
17	2052 Grand Prix Drive	Yes		Design of capacity relief project is underway
18	2060 Keheley Drive	Yes		
19	2089 Garden Circle	Yes		
20	2301 Mountain Industrial Blvd	No	pre-DOE	Cleaned lines and provide FOG outreach in upstream area
21	2480 Miriam Lane	Yes		Design of local capacity relief project complete
22	2562 Tilly Mill Road	Yes		Design of capacity relief project complete
23	2804 Millwood Way	Yes		Design of capacity relief project complete
24	2967 Henderson Mill Road	No		

---

<sup>6</sup>pre-DOE denotes PFL sites confirmed as Adequately Fixed in connection with the 3Q2021 reporting process  
Annual Report No. 10 – January 1, 2021, to December 31, 2021 Page 20



PFL Site #	Address	Capacity Related	Date of Adequate Fix <sup>6</sup>	Ongoing/Complete Work
25	307 2nd Avenue	Yes		
26	3075 Thrasher Circle	Yes		
27	3230 Boring Road	Yes		
28	3330 Northlake Parkway	No		
29	3433 Brookfield Lane	Yes		Design of local capacity relief project complete
30	3449 Brookfield Lane	Yes		Design of local capacity relief project complete
31	3488 Keswick Drive	No	pre-DOE	Cleaned lines of grease, cut roots, and performed point repair where roots intruded
32	3496 Panthersville	Yes		
33	3540 Buford Highway	No	pre-DOE	Cleaned lines and performed pipe repair
34	3831 East Avenue	No	pre-DOE	Cleaned debris entering from break in pipe and performed point repair
35	3892 Buford Highway	No	pre-DOE	Cleaned lines and provide FOG outreach in upstream area
36	3924 Roman Court	Yes		
37	3954 Memorial College Avenue	No		
38	4004 Gladesworth Lane	No	pre-DOE <sup>7</sup>	Cleaned lines and provide FOG outreach in upstream area
39	4075 Memorial Drive	No	pre-DOE	Cleaned lines and provided FOG outreach in upstream area. Lines are on PM cleaning schedule.
40	4124 Flakes Mill Road	Yes		
41	4347 Flat Shoals Parkway	Yes		
42	4437 Wesleyan Point	Yes		
43	4557 Meadow Creek Path	Yes		
44	4664 Flat Bridge Road	No	pre-DOE	Installed generator systems at plant
45	4776 Snapfinger Woods Drive	No		
46	4900 Central Drive	No		
47	4905 Wind Cove Court	No	pre-DOE	Cleaned lines and placed area on PM cleaning schedule. Performed point repairs on offset joints.

<sup>7</sup>Initial Analysis indicates this sites is Adequately Fixed. County is confirming and will verify in future reporting.

<b>PFL Site #</b>	<b>Address</b>	<b>Capacity Related</b>	<b>Date of Adequate Fix<sup>6</sup></b>	<b>Ongoing/Complete Work</b>
48	5459 Bunky Way	No		
49	5726 Southland Drive	No	pre-DOE	Cleaned lines, cut roots. Pipe was lined, FOG outreach provided to upstream area, and lines placed on PM cleaning schedule.
50	583 Rays Road	No	pre-DOE	Rodded the lateral to clean the blockage and performed point repair on lower lateral for fix offset joint
51	607 3rd Avenue	Yes		
52	608 South McDonough Street	Yes		Construction of initial phases of capacity relief project complete
53	6545 Swift Creek Drive	No	pre-DOE	Cleaned the lines and placed on PM cleaning schedule.
54	6591 Tribble Street	No	pre-DOE	Cleaned the lines, FOG outreach provided to upstream area, and lines placed on PM cleaning schedule.
55	101 Green Street	Yes		Construction of initial phases of capacity relief project complete
56	1580 Roadhaven Drive	No		
57	1635 Sugar Downs Court	No	pre-DOE	Repaired creek crossing and cleaned lines. Placed on PM cleaning schedule
58	1831 Briarcliff Circle	No	pre-DOE	Cleaned the lines, FOG outreach provided to upstream area, and lines placed on PM cleaning schedule.
59	217 Green Street	Yes		Construction of initial phases of capacity relief project complete
60	2190 Meadowcliff Drive	No	pre-DOE <sup>7</sup>	Cleaned the lines, repaired bypass pump
61	2396 Miriam Lane	No	pre-DOE	Repaired broken lateral, cleaned main line and placed on PM cleaning schedule, performed FOG outreach to upstream area
62	3546 Stanford Circle	No	pre-DOE	Cleaned the lines and placed on PM cleaning schedule.
63	3731 Buford Highway	No	pre-DOE	Cleaned the lines and placed on PM cleaning schedule.
64	4980 Hammermill Road	No	pre-DOE <sup>7</sup>	Repaired breaker at lift station
65	8304 Union Grove Road	No	pre-DOE	Contractor bored through sewer line and performed point repair
66	1397 Witham Drive	No		Replaced 34 LF of 8-inch sewer main
67	1430 Country Squire Drive	Yes		Construction of capacity relief project has started

PFL Site #	Address	Capacity Related	Date of Adequate Fix <sup>6</sup>	Ongoing/Complete Work
68	2005 Bencal Drive	Yes		
69	2311 Dunwoody Crossing	No	pre-DOE <sup>7</sup>	Bypass pumping and repaired creek crossing
70	294 Pine Tree Circle	No	pre-DOE	Cleaned main line and placed on PM cleaning schedule, performed FOG outreach to upstream area
71	3360 Mountain Drive	No	pre-DOE	Repaired downstream pipe, cleaned upstream pipe of grease, placed on PM cleaning schedule, performed FOG outreach to upstream area
72	3480 Mill Creek Road	No	pre-DOE	Repaired broken pipe
73	3528 Misty Valley Road	Yes		Design of local capacity relief project complete
74	3643 Glenwood Road	No		
75	3724 Eagles Beek Circle	No	pre-DOE	Repaired broken pipe
76	4203 Clevefont Road	No	pre-DOE	Removed 4" pipe obstructing flow in sewer main
77	4495 Village Spring Run	No	pre-DOE <sup>7</sup>	Cleaned lines
78	4711 Bishop Ming Blvd	No	pre-DOE	Cleaned lines
79	506 South McDonough Street	Yes		Construction of initial phases of capacity relief project complete
80	5083 Biffle Road	No	pre-DOE	Cleaned main line and performed FOG outreach to upstream area
81	6701 Peachtree Industrial Blvd	No	pre-DOE	Performed point repair
82	2902 Mount Olive Drive	No	pre-DOE	Repaired sewer main
83	1410-1416, 1422 Cobb Branch Drive	Yes		Design of capacity relief project complete
84	1420 South Hairston Road	No		
85	1690 Chantilly Drive	No	pre-DOE	Cleaned main line and placed on PM cleaning schedule, performed FOG outreach to upstream area
86	2000, 2200 Lithonia Industrial Boulevard	No		
87	2175 Lawrenceville Highway	No		
88	2277 Munday Drive	No	pre-DOE	Cleaned debris and replaced pipe
89	2614 Lake Erin Drive	Yes		
90	2711 Fairlee Drive	Yes		
91	3037 Toney Drive	Yes		Design of local capacity relief project complete

<b>PFL Site #</b>	<b>Address</b>	<b>Capacity Related</b>	<b>Date of Adequate Fix<sup>6</sup></b>	<b>Ongoing/Complete Work</b>
92	3046 East Ponce de Leon Avenue	No	pre-DOE	Cleaned main line and placed on PM cleaning schedule
93	352 Northern Avenue	No	pre-DOE	Cleaned grease, removed roots and performed repair on main
94	3548 Brookfield Lane	Yes		Design of local capacity relief project complete
95	3549 Panthersville Road	Yes		
96	3765 Foxford Drive	No	pre-DOE	Cleaned line and cut roots
97	3907 Jerusalem Court	Yes		
98	3911 Roman Court	Yes		
99	4561 Amberly Court South	No	pre-DOE	Cleaned grease, most recent SSO was caused by contractor leaving plug in for flow control
100	4584 Lawrenceville Highway	No		
101	4948 Ardsley Drive	No		
102	5495 East Mountain Street	No		
103	5557 Martina Way	No		
104	5224 North Peachtree Road	No	pre-DOE	Cleaned lines and repaired broken lateral
105	3305 Lavista Road	No	pre-DOE	Cleaned lateral to restore flow
106	4547 Birch Ridge Trail	No	pre-DOE	Cleaned main of debris, building backup occurred from contractor cleaning main
107	4300 Carrollwood Drive	No	pre-DOE	Bypass pump from outside contractor failed
108	1995 Lithonia Industrial Blvd	No	pre-DOE	Cleaned main of debris and repaired break in sewer main
109	1427 Mockwell Court	No		
110	1945 Ponce De Leon Avenue	No		Cleaned main of bricks, debris
111	221 North Candler Street	No		Repaired lateral
112	116 Clairemont Avenue	No		Cleaned main, performed FOG education upstream
113	2685 Milscott Drive	No		Performed point repairs
114	3854 West Nancy Creek Place	No		Repaired creek crossing
115	1125 Mayfield Drive	No		Cleaned main
116	2427 Briarcliff Road	No		Performed point repair
117	3765 Brown Drive	No		Cut roots from line
118	5005 Leeshire Trail	No		Cleaned main

<b>PFL Site #</b>	<b>Address</b>	<b>Capacity Related</b>	<b>Date of Adequate Fix<sup>6</sup></b>	<b>Ongoing/Complete Work</b>
119	5211 Peachtree Industrial Blvd	No		
120	700 George Luther Drive	No		Contractor adjusted bypass pump
121	2801 Candler Road	No		Cleaned main
122	446 Clairemont Ave	No		Cleaned main, provided FOG outreach in upstream area.
123	2012 Glenwood Avenue	No		Cleaned main, performed point repairs, provided FOG outreach to upstream area.
124	4037 Glenwood Road	No		Cleaned lateral
125	3799 Buford Highway	No		Cleaned main
126	3700 Buford Highway	No		Cleaned main
127	808 Stonebridge Crescent	No		Cleaned main, provided FOG outreach in upstream area.
128	1442 Canoochee Drive	No		Cleaned main, provided FOG outreach in upstream area.
129	949 Church Street	No		Cleaned main of rocks and debris
130	2649 Tanglewood Road	No		
131	149 Norris Street	No		
132	2881 West Fairington Parkway	No		Cleaned main, provided FOG outreach in upstream area.
133	6202 Peachtree Industrial Blvd	No		Performed point repair to remove blockage
134	4053 Bosenberry Way	No		Cleaned main, provided FOG outreach in upstream area.
135	5393 Greenhedge Court	No		
136	3391 Warbler Drive	Yes		
137	1764 Dresden Drive	No		Cut roots, cleaned sand and gravel
138	4570 Memorial Drive	No		
139	1129 Biltmore Drive	No		Repaired broken main
140	4070 Greenstone Court	No		
141	886 Granite Springs Lane	No		
142	1846 Meadow Lane	No		Cleaned main, provided FOG outreach in upstream area.
143	212 Adair Street	No		Cleaned rags from main
144	2443 East Club Drive	No		Cleaned main of bricks, rags, and grease

<b>PFL Site #</b>	<b>Address</b>	<b>Capacity Related</b>	<b>Date of Adequate Fix<sup>6</sup></b>	<b>Ongoing/Complete Work</b>
145	3569 Springside Drive	No		Cleared deodarant block holding flow
146	2716 Clairmont Road	No		Cleaned main, provided FOG outreach in upstream area.
147	2849 Oakcliff Road	No		Cleaned main
148	2495 Marsh Rabbit Bend	No		
149	4415 Memorial Drive	No		

## Part II Sanitary Sewer Overflow Trends Analysis

### Executive Summary

As required by Section IX, Reporting Requirements 58(b) of the CD, a trends analysis is to be submitted on an annual basis, as follows:

*“A trends analysis of the number, volume, average duration, and cause of the County’s Sanitary Sewer Overflows (SSOs) for the previous twenty-four (24) month period.”*

This trends analysis includes the 24-month period of 2020 and 2021, but also includes data from 2019 for reference. 2017 is the first year the County implemented an updated SSO reporting process that has been consistently applied through 2021. As required by the CD, the report addresses SSO types (spills, overflows, and building backups) as applied to the various data and trends. This analysis consists of the following sections:

- Section 1 – Classification of SSO Types and Causes
- Section 2 – Number and Volume of SSOs
- Section 3 – Average Duration of SSOs
- Section 4 – Causes of SSOs
- Section 5 – Other Trends

Of the SSOs occurring in the County during 2021, 79 were wet weather SSOs, 48 of which were attributed to four severe wet weather events exceeding a 2-year recurrence level, with stream gauges also recording flooding for two of these events. The first event, which occurred on May 3, 2021<sup>8</sup>, involved severe thunderstorms generating rainfall totals of 2 to 4 inches locally with higher totals (over 5 inches) leading to localized flooding. The second event occurred between the late evening of July 19, 2021 and the morning of July 20, 2021. The third event, which occurred on August 17, 2021, was remnants of Tropical Storm Fred and resulted in rainfall totals between 2 and 4 inches with localized amounts exceeding 6 inches. The fourth event occurred on December 30, 2021.

The County has identified that many of these wet weather SSOs are due to capacity limitations within the large-diameter trunks and has begun to develop projects to address these limitations and provide additional capacity. In 2021, 27 of the wet weather SSOs occurred along the Shoal Creek Trunk. Capacity upgrades for this sewer are proposed for completion at the end of 2027. Other sewer rehabilitation and smaller diameter capacity projects will be completed in the interim.

Overall, the number of SSOs per year has decreased by 42 percent since the CD was lodged in 2012. For maintenance-related SSOs, this is largely attributable to the County’s MMS program including sewer cleaning, the FOG program, and extensive public education campaigns. Figure ES-1 shows the number of SSOs from 2019 to 2021. Wet weather events greater than 2-year recurrence levels are distinguished to better understand the SSO trends with or without severe wet weather events. From 2019 to 2021 there was a decrease in overall occurrence of SSOs.

---

<sup>8</sup> On Nov 9, 2021 the County provided notice pursuant to the MCD of its determination that the May 3-5, 2021 event constituted a severe natural condition, based on rainfall and stream gauge analysis.

**Figure ES-1**      **Reported SSOs per Year (2019–2021)**

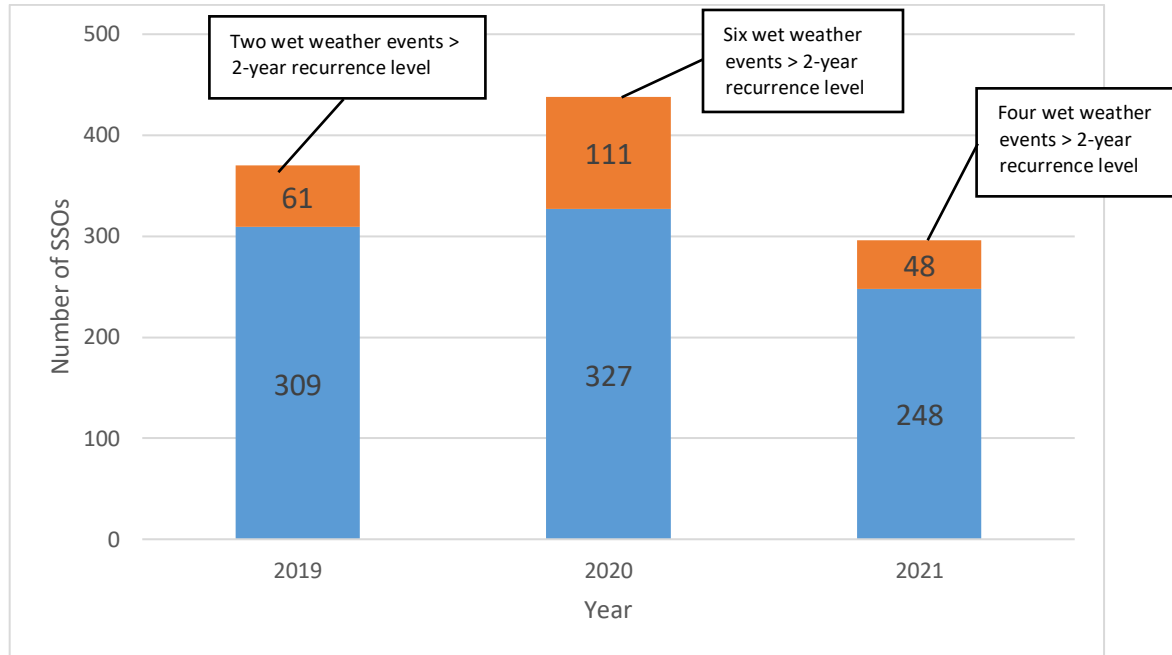
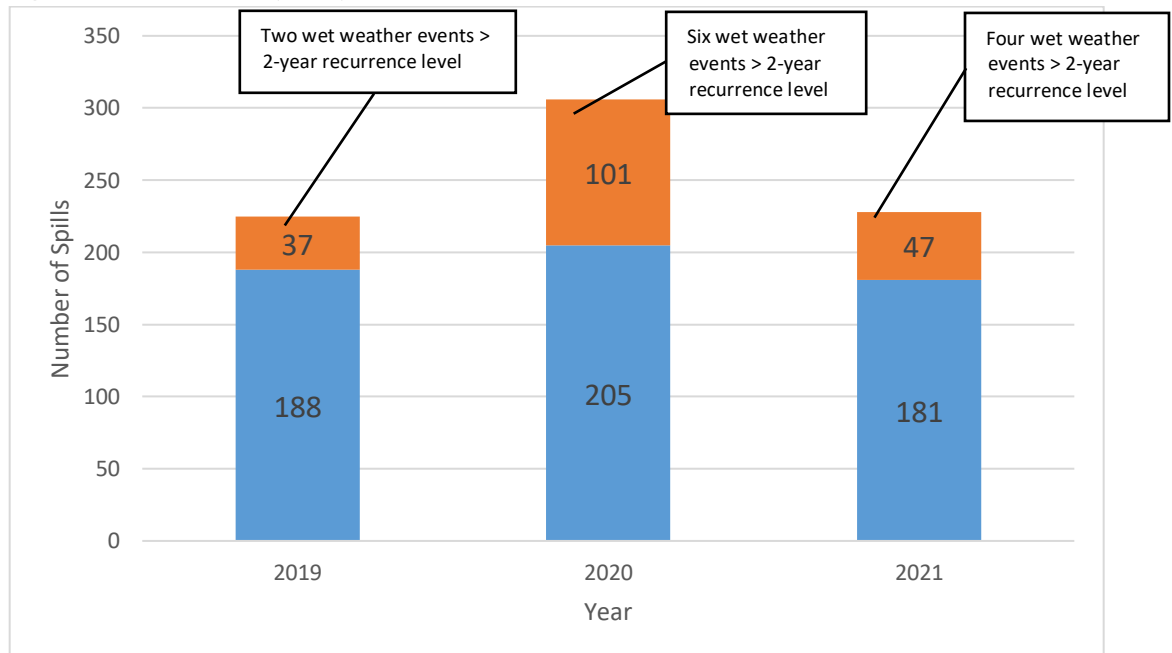


Figure ES-2 shows the number of spills, or discharges of wastewater, that reached waters of the United States or the State. The number of spills decreased from 306 in 2020 to 228 in 2021. Of the 228 spills reported in 2021, 21 percent (47 spills) were reported from four wet weather events: May 3, July 19, August 17 (Tropical Storm Fred), and December 30. Excluding these wet weather events, a total of 181 spills would have occurred, which demonstrates a downward trend from 2019 and 2020 totals.

**Figure ES-2**      **Total Spills by Year (2019–2021)**



As shown on Figure ES-3, the number of spills attributable to structural causes increased from 2020 to 2021. Spills attributable to grease decreased slightly by 10 percent from 2020 to 2021. The number of spills attributable to wet weather decreased in 2021 compared to 2020 by 49 percent, in part because of a fewer significant wet weather events that occurred in 2021, and in part because of improvements in the capacity of the conveyance system. Spills attributable to debris increased by 52 percent in 2021 from 2020



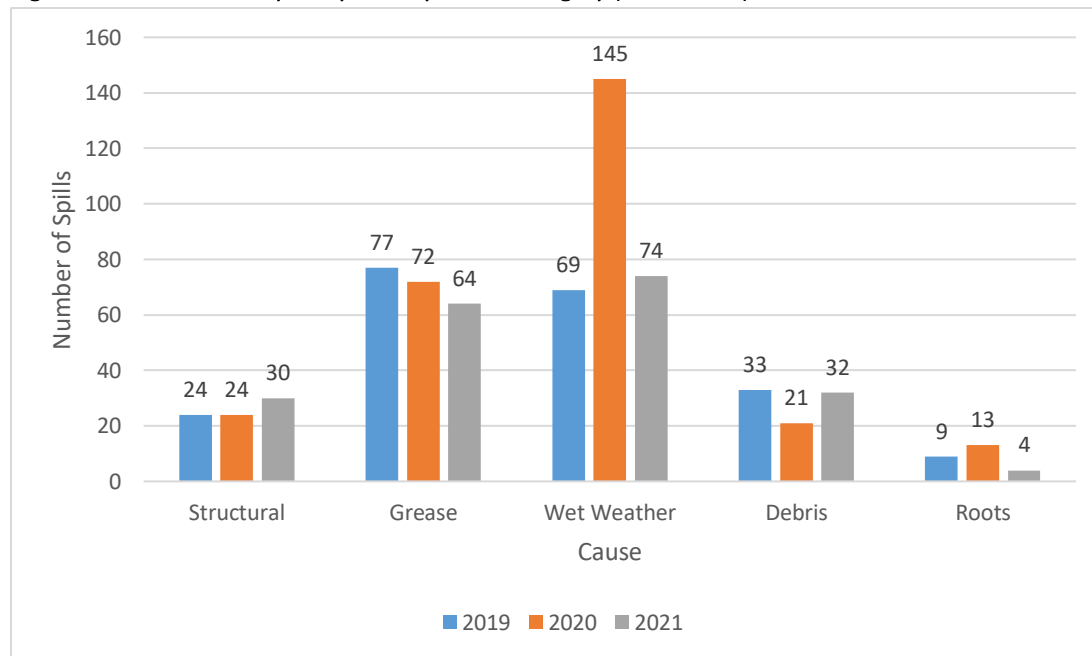
but remained comparable to 2019 levels. Spills attributable to roots decreased by 69 percent in 2021 from 2020. The significant overall improvement demonstrates that the ongoing root cleaning as well as the County’s existing small-diameter sewer cleaning contracts and a large-diameter sewer cleaning contract in place are working.

Furthermore, as the County maintains an extensive flow monitoring network, continues its efforts to conduct sewer condition assessment, and continues to implement MMS programs, the County can more readily identify SSOs. With a flow monitoring network of more than 200 flow meters throughout the County that provides data that can be reviewed on a daily, weekly, and monthly basis, any sudden changes in flow behavior which may indicate a possible SSO are called in for further investigation. This has resulted in prevention of potential SSOs. On September 30, 2021, the flow monitoring team noticed steadily increasing depth in a flow meter upstream of a lift station. A crew visited the lift station and noticed an issue with the screens being blocked. They were able to resolve it quickly and verified that flow returned to normal.

Sewer condition assessment work identifies defects that can contribute to SSOs as well. Since 2016, as part of the MMS program, DWM increased the number of inspections and put resources into the field in remote places, such as along streams and in ravines that are generally out of sight. If SSOs were found, DWM subsequently reported the findings appropriately.

DWM’s increased stream sampling effort also continues to help identify SSOs that would have previously remained unknown. Source tracking from elevated fecal counts in stream samples identified two SSOs that DWM was able to locate and address.

**Figure ES-3 Total Spills by Year by Cause Category (2019–2021)**



**Notes:**

Cause Categories may include more than one cause.

Some spills appear in more than one Cause Category.

Other causes for spills not shown in this figure include pump failure, vandalism, contractor-related, etc.

## 1. Classification of SSO Types and Causes

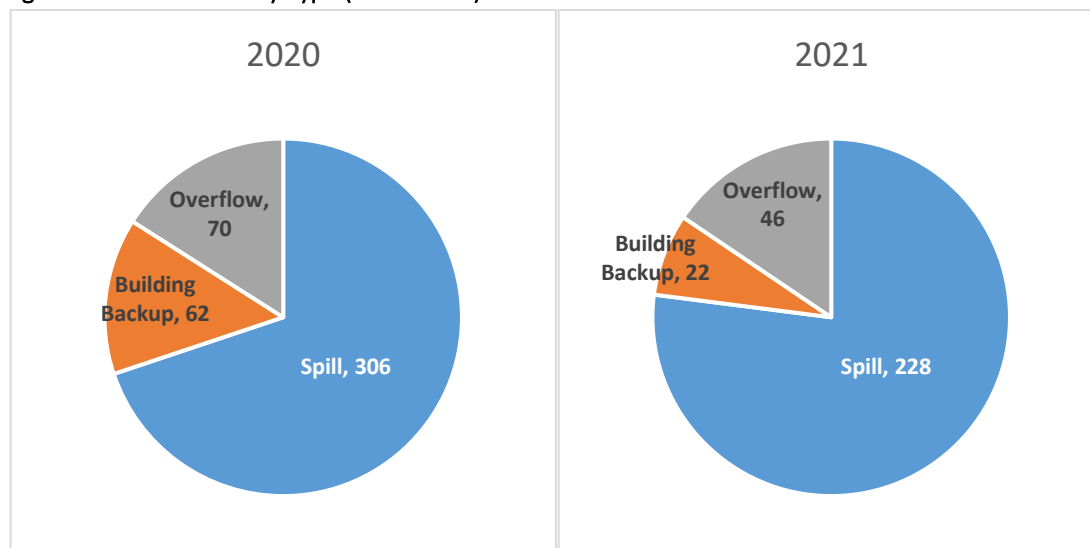
The CD requires a trend analysis of the prior 24-month period. Although 2017 was the first year the County implemented an updated SSO reporting process that has been consistently applied through 2021, this report focuses on trends from 2019 through 2021.

DWM categorizes each SSO that occurs as one of three types as defined in the CD. This initial categorization is based on multiple factors, including details provided by the reporting party, details provided by County response crews, and reports from County labs. As details of each SSO are learned, an SSO might be re-categorized accordingly. Definitions from the CD of each type of SSO are as follows:

- **Spill:** a discharge of wastewater from the WCTS, or from a wastewater treatment facility caused by problems in the WCTS, that reaches waters of the United States or the State, including a prohibited bypass, but not including other discharges from a point source that is specified in the National Pollutant Discharge Elimination System permits.
- **Overflow:** a release of wastewater from the WCTS, or from a wastewater treatment facility caused by problems in the WCTS that does not reach waters of the United States or the State.
- **Building Backup:** a wastewater backup into a building that is caused by blockages, malfunctions, or flow conditions in the WCTS; however, provided that a wastewater backup into a building that is caused by a blockage or other malfunction of a Private Lateral, or other piping or conveyance system that the County does not own or operate, is not a Building Backup.

Figure 1-1 shows the distribution of SSOs by type for 2021 as compared to 2020. Spills account for the majority of the SSOs followed by overflows then building backups. From 2020 to 2021, the number of occurrences of each SSO type decreased primarily because of a reduction in extreme wet weather events in 2021 as well as improvements in the WCTS implemented under the CD program.

Figure 1-1 SSOs by Type (2020–2021)



In addition to categorizing SSOs based on type, the County investigates the root cause of SSOs and classifies the events accordingly. Table 1-1 lists the types of causes used by DWM for the period of 2017 to 2021. This investigation and classification includes a review of the results of assessment tools, such as CCTV, and includes consideration of whether other sections of the WCTS might be vulnerable to a similar SSO event. To identify and prevent future SSOs, a portion of this analysis focuses on causes determined to be maintenance-related. For this trends analysis, the following terms are defined:

- Maintenance-Related: an SSO caused by grease, roots, debris, or any combination thereof.
- Other: an SSO caused by anything other than grease, roots, debris, or any combination thereof.

**Table 1-1 SSO Causes Used by DWM**

Cause Code	Cause Title	Description
BRK LN/STR	Broken line/structure	Broken pipe, manhole, force main, or other appurtenance.
CC	County contractor	Caused by a contractor performing work for the County.
CRK BRK	Creek crossing break	Structural failure of sewer infrastructure at a creek crossing.
DB	Debris	Solids that have collected in a pipe or manhole.
GR	Grease	Build-up of grease in a pipe or manhole.
GRDB	Grease and debris	Combination of grease and solids build-up in a pipe or manhole.
GRRT	Grease and roots	Combination of grease build-up and root intrusion in a pipe or manhole.
GRRTDB	Grease, roots, and debris	Combination of grease and solids build-up and root intrusion in a pipe or manhole.
I&I	Infiltration and Inflow	Occurs when I/I enters the system and uses existing capacity, not necessarily associated with a wet weather event.
LFT STN FLR	Lift station failure	Failure at a lift station.
MH	Manhole	Caused by structural defect at or in manhole.
OTH	Other	Use of this code requires a detailed description.
OUTSIDE CON	Outside contractor	Caused by a contractor not performing work for the County.
PMP FLR	Pump failure	Caused by failure during bypass pumping.
RT	Roots	Intrusion of roots into a pipe or manhole.
RTDB	Roots and debris	Combination of root intrusion and solids build-up in a pipe or manhole.
STORM	Storm	Caused by a storm. Includes wet weather capacity, failures at lift stations resulting from lightning strikes or storm-induced power outages, and maintenance-related SSO during storm events.
TREE	Tree (fallen)	Damaged caused by falling trees.
UNK	Unknown	Used when no clear cause can be identified. The in-depth data review previously conducted in 2016 identified additional SSOs where the cause could not be determined retroactively. For those instances, the UNK code was used.
VAND	Vandalism	Intentional damage caused by vandals.

## 2. Number and Volume of SSOs

As shown on Figure 2-1, the number of SSOs per year decreased from 2019 to 2021, which can be partially attributed to a decrease in extreme wet weather events, from 6 in 2020 to 4 weather events that exceeded 2-year recurrence levels. Of the total spills in 2021, 21 percent (47 spills) were reported from four wet weather events: May 3 (Severe Thunderstorm), July 19–20, August 17 (Tropical Storm Fred), and December 30 (Severe Thunderstorm). These four events account for 48 of the reported SSOs for the year. Overall, the number of SSOs decreased 42 percent since the CD was lodged in 2012. The overall decreasing trend in the number of SSOs since 2012 can be attributed to the County’s MMS programs including sewer cleaning, root control, the FOG program, and extensive public education campaigns. Multiple program improvements have allowed the County to more readily respond to and identify SSOs. These improvements include expansion of the County’s flow monitoring network, further progress of sewer system investigation activities, new stream sampling protocols to detect spills, and implementation of the Cityworks work order management system to track identification and response to SSOs.

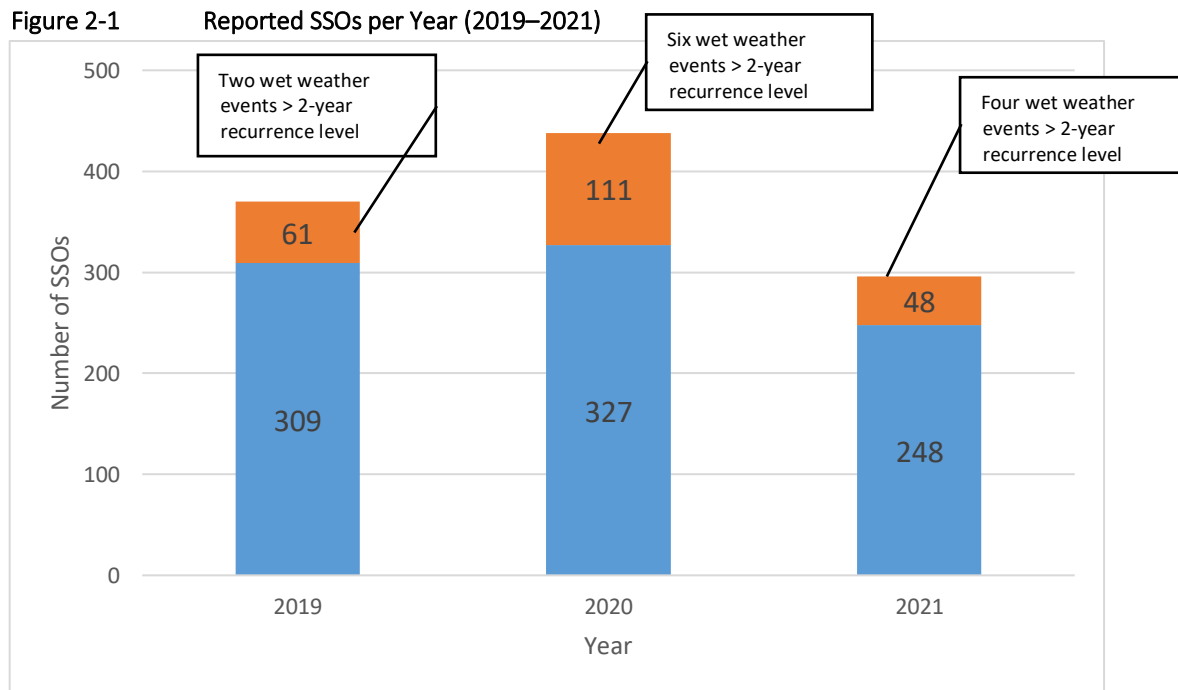


Figure 2-2 shows annual rainfall for the same period of record (2019–2021). Total rainfall for the year increased from 2019 to 2020 but then decreased from 2020 to 2021. Although the total rainfall recorded in 2021 is 13 inches less than that of 2020, 2021 experienced four severe wet weather events that exceeded a 2-year recurrence level.

Figure 2-2 Annual Precipitation (inches) (2019–2021)

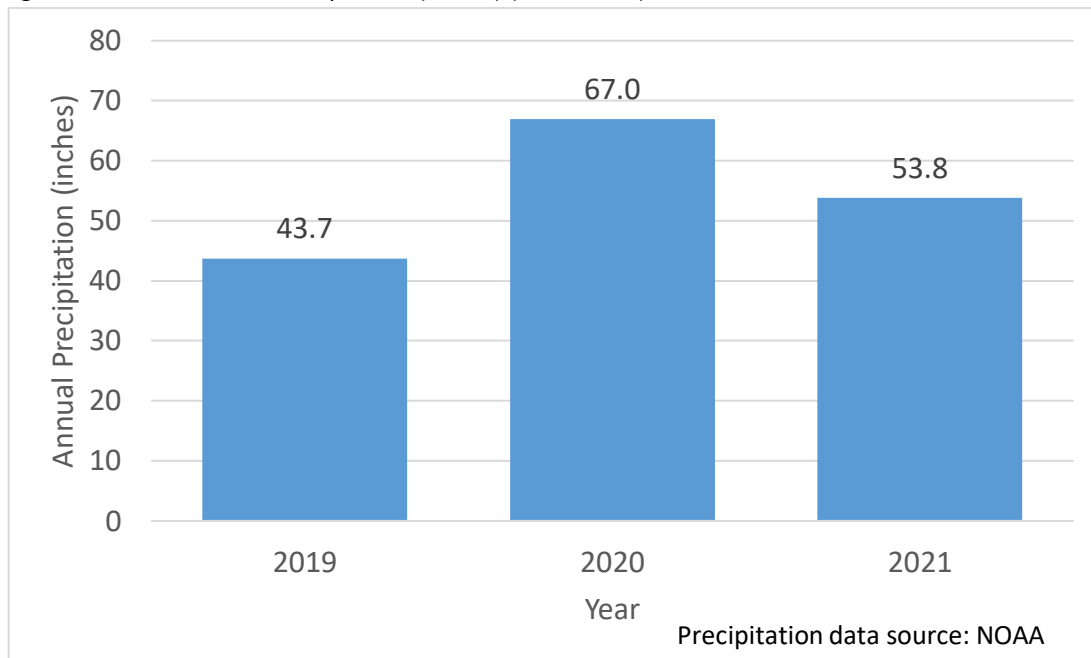
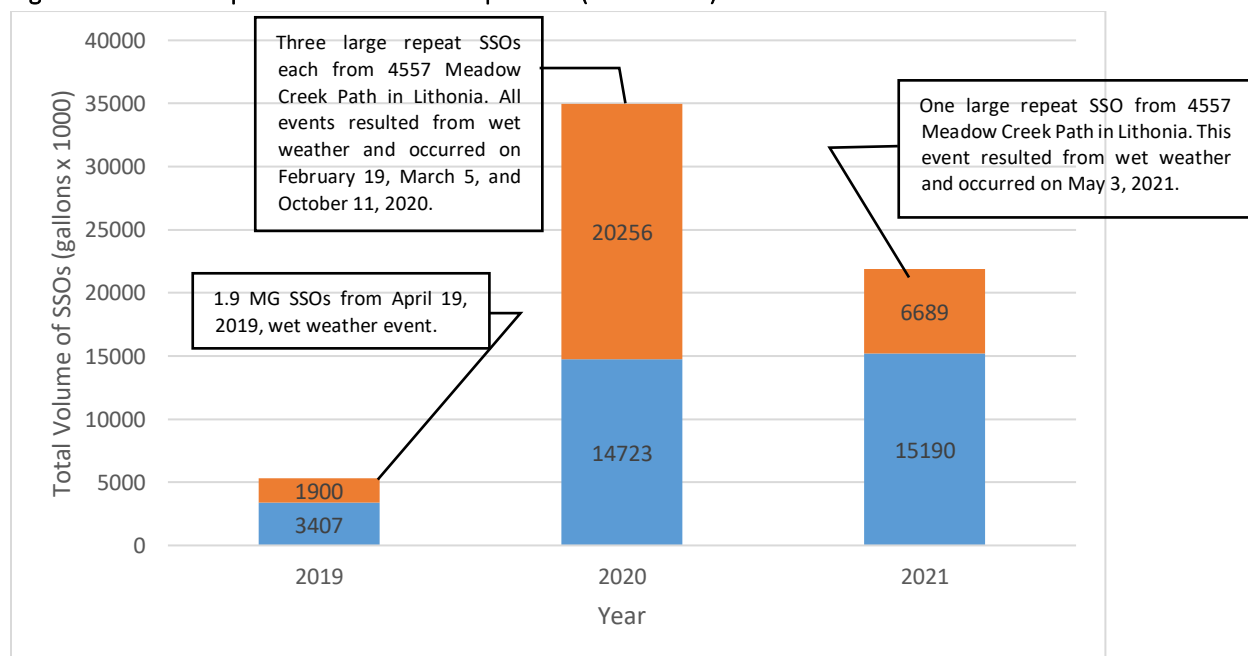


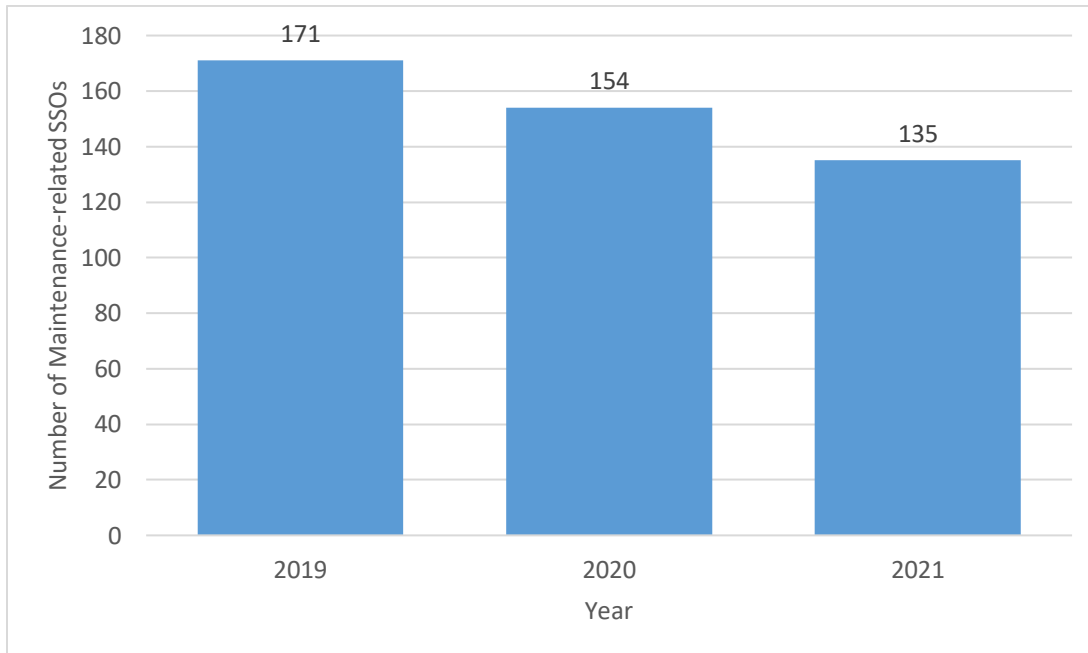
Figure 2-3 presents the total volume (gallons) of SSOs for each year. Prior to 2019 and until 2020, an overall trend in decreasing volume was observed, especially when considering outliers. However, the major storm events of 2020 resulted in a significant increase in SSO volumes, with the three largest outliers all occurring at repeat SSO site, Meadow Creek Path. The trend is back on a downward trajectory this year, though one outlier recorded was still associated with the Meadow Creek Path repeat SSO site. A project is being developed to address the Meadow Creek SSO with a proposed completion in December 2025. While cleaning and FOG program enforcement have decreased maintenance-related SSOs overall, wet-weather-related SSOs are expected to decrease as the County begins construction on large capacity projects.

Figure 2-3 Reported Volume of SSOs per Year (2019–2021)



Figures 2-4 and 2-5 show the number of maintenance-related SSOs and the associated annual volumes, respectively, from 2019 through 2021. From a peak of 265 SSOs in 2013 to 135 SSOs in 2021, DWM has reduced maintenance-related SSOs by 46 percent through a steady downward trend since 2019. With increased educational programs, maintenance-related SSOs decreased by approximately 12 percent from 2020 to 2021.

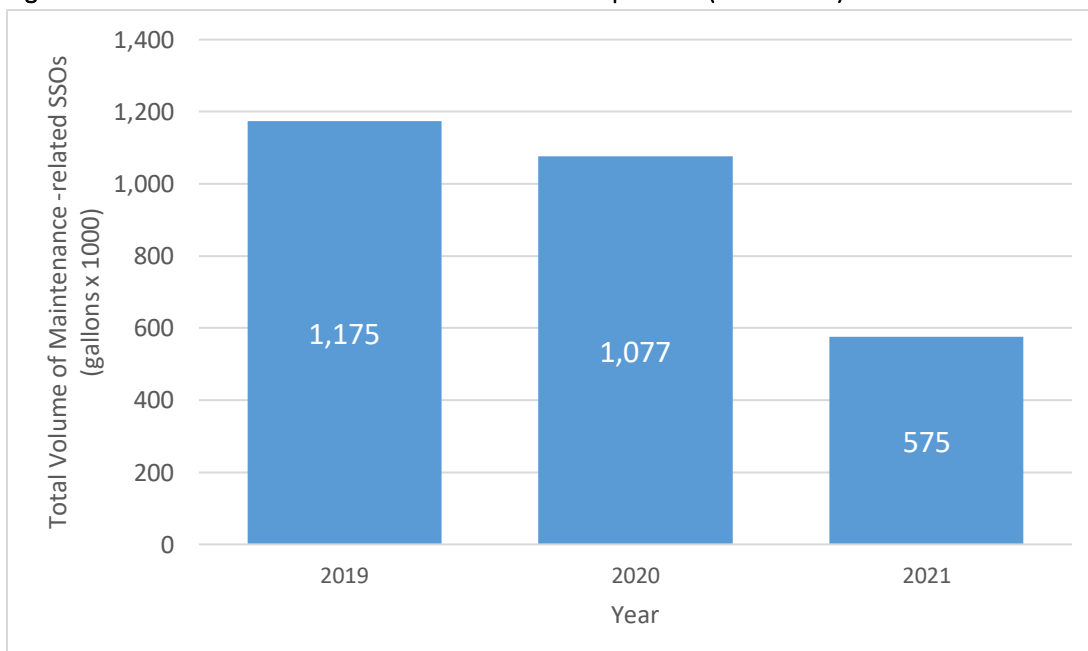
**Figure 2-4 Maintenance-Related SSOs per Year (2019–2021)**



Note: Maintenance-related SSOs are caused by grease, roots, debris, or any combination thereof.

The volume of maintenance-related SSOs for 2021 decreased significantly by about 47 percent from prior years. As discussed previously, DWM believes this is attributable to the County’s implementation of MMS programs, such as sewer cleaning, root control, Cityworks, and the effectiveness of the FOG Management Program and public education campaigns.

**Figure 2-5 Volume of Maintenance-Related SSOs per Year (2019–2021)**

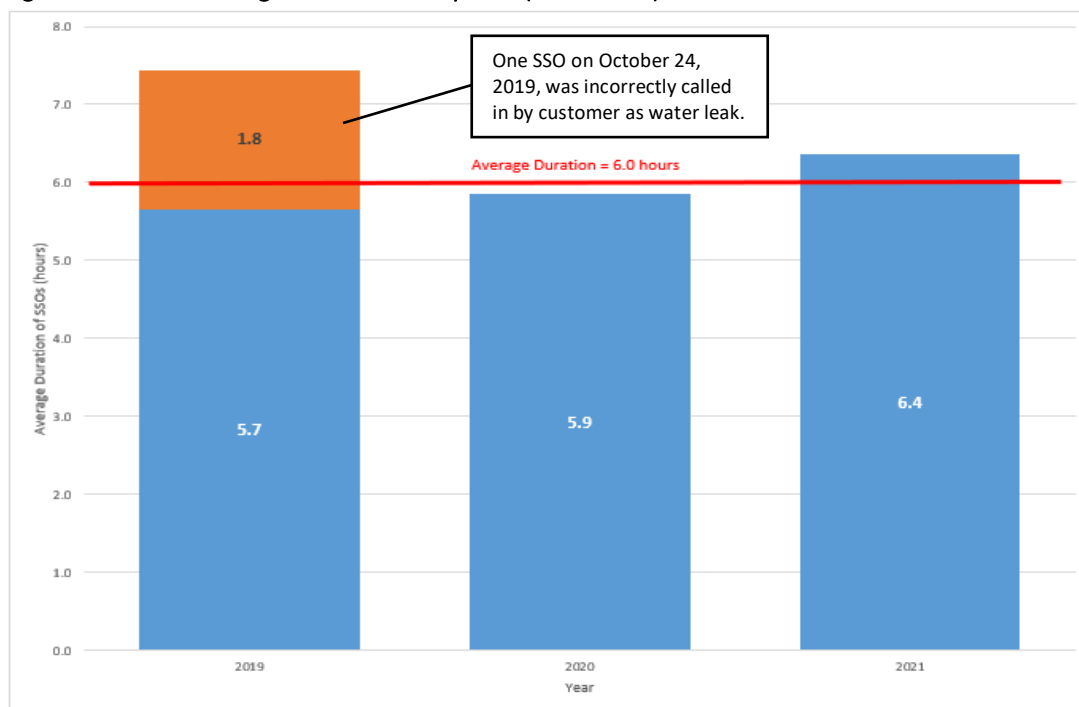


DWM’s continued focus on its comprehensive cleaning program has resulted in the decrease in volume of maintenance-related SSOs in 2021. Because the assessment of the PASARP areas was substantially completed in 2017, a new focus on rehabilitation can be seen in 2018 as DWM procured two design-build rehabilitation contracts, issued Task Orders to engineering firms with existing contracts for the design of four additional rehabilitation packages, and has also started rehabilitation construction in the PASARP areas. In 2019 a third design-build rehabilitation contract was procured in addition to Annual Construction Contracts and Cooperative Agreements for two additional rehabilitation contractors. In 2021 two large GSRR contracts were procured that will continue pipe rehabilitation as needed as well as upsize pipes to improve capacity within the system. While addressing the structural integrity of the sewer assets, rehabilitation will address and reduce sources of I/I to help minimize SSOs that occur because of wet weather.

### 3. Average Duration of SSOs

Duration of SSOs are calculated from the time that the SSO was reported until it is resolved. This parameter depends on how the SSO was identified, how quickly the source can be located and accessed, and the cause of the SSO. The average SSO duration from 2019 through 2021 was approximately 6.0 hours, as shown on Figure 3-1. The increase in SSO duration since 2018 can largely be attributed to SSOs located by self-reporting, as described below.

Figure 3-1 Average SSO Duration by Year (2019–2021)



While receiving calls is the primary source of SSO reporting, DWM also locates spills using in-house programs, including flow monitoring and stream sampling. As data is collected that indicates a possible SSO, whether through a sudden, significant change in metered flows or an increase in fecal count in waterways, DWM investigates through site visits and creek walks. The investigation to locate the SSO source can significantly increase the total duration. In 2021, DWM identified two SSOs from stream sampling. The duration of a spill also heavily depends on the flow restoration actions needed to address the SSO. Evaluating the duration of SSOs is more effectively done by grouping causes together that have the same general flow restoration action. Table 3-1 lists all causes noted in Table 1-1 and maps them to a broader group.

**Table 3-1 Mapping Cause to Cause Groups**

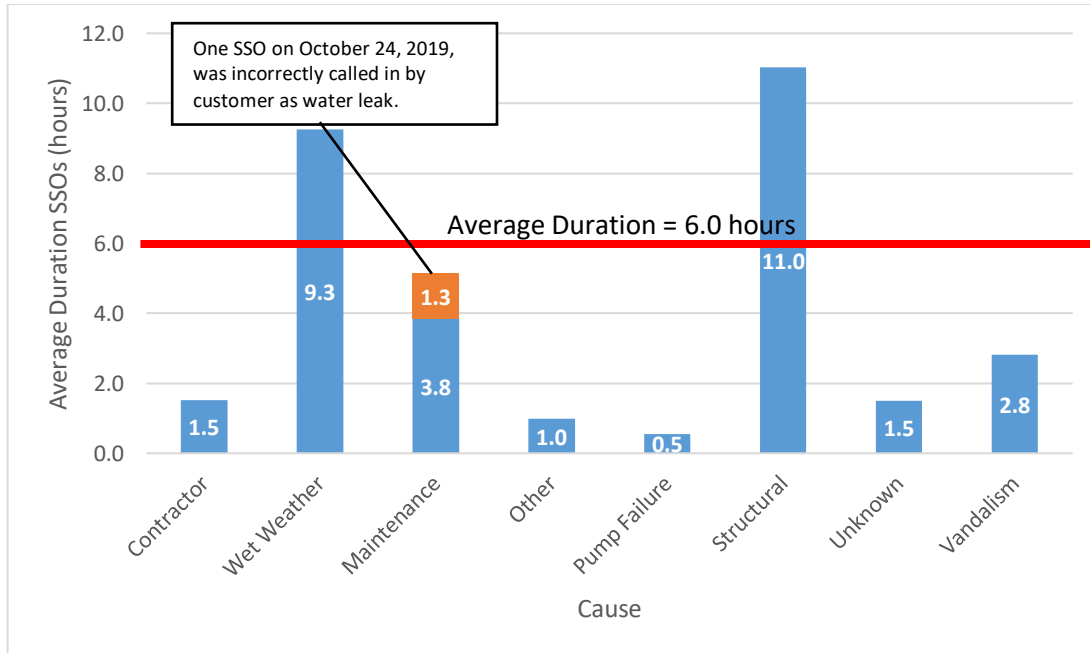
Cause	Group
BRK LN/STR	Structural
CC	Contractor
CRK BRK	Structural
DB	Maintenance
GR	Maintenance
GRDB	Maintenance
GRRT	Maintenance
GRRTDB	Maintenance
I/I <sup>a</sup>	Wet Weather
LFT STN FLR	Pump Failure

Cause	Group
MH	Structural
OTH	Other
OUTSIDE CON	Contractor
PMP FLR	Pump Failure
RT	Maintenance
RTDB	Maintenance
STORM	Wet Weather
TREE	Structural
UNK	Unknown
VAND	Vandalism

<sup>a</sup> All I/I SSOs recorded to date were wet-weather-related.

Figure 3-2 presents average durations for all SSOs from 2019 through 2021. Two causes had durations that were greater than average: wet weather and structural.

**Figure 3-2 Average SSO Duration by Cause (2019–2021)**

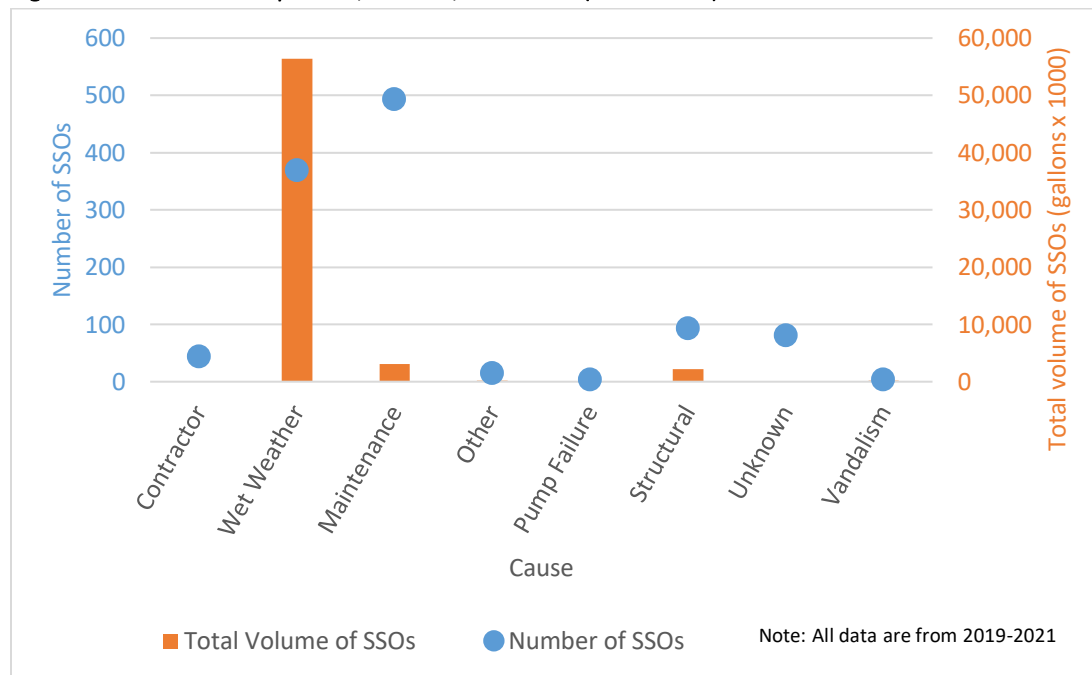




## 4. Causes of SSOs

Maintenance-related SSOs, including grease, roots, and debris, decreased from 2012 to 2021 by 43 percent, resulting in part from increased sewer cleaning and the County’s commercial FOG Management Program and Public Education Programs. In reviewing data from the past 3 years, blockages continue to account for more SSOs than any other cause (45 percent) and represent the second greatest volume (5 percent) of all SSO causes (refer to Figure 4-1). The cause with the greatest volume is storms, and the County has taken steps to address impacts from storm-related events. Specifically, the County has undertaken follow-up and corrective action for private I/I and stormwater connections to the sanitary sewer in the Priority Areas. In 2021, 371 cleanout caps were replaced by DWM in the field. The continuation of these programs, along with the rehabilitation construction that is now underway, will begin to eliminate sources of I/I within the sewer system and provide additional capacity to help reduce the SSOs that occur because of wet weather.

Figure 4-1 SSOs by Count, Volume, and Cause (2019–2021)



Selected causes can be grouped into categories that help assess the effectiveness of DWM’s efforts to reduce SSOs. These broader categories are grease, structural, wet weather, and debris. Table 4-1 lists the causes assigned to each category. As shown on Figure 4-2, the number of grease, debris, and structural SSOs remained relatively constant from 2019 to 2021 despite a reduced work force as a result of the pandemic. The number of wet weather SSOs were, however, reduced significantly by more than 50 percent compared to 2020, largely in part to decreased rain events but there is also a reduction in wet weather SSOs by 10% in comparison to 2019 even with more recorded rainfall in 2021.

Table 4-1 Mapping Cause to Cause Categories

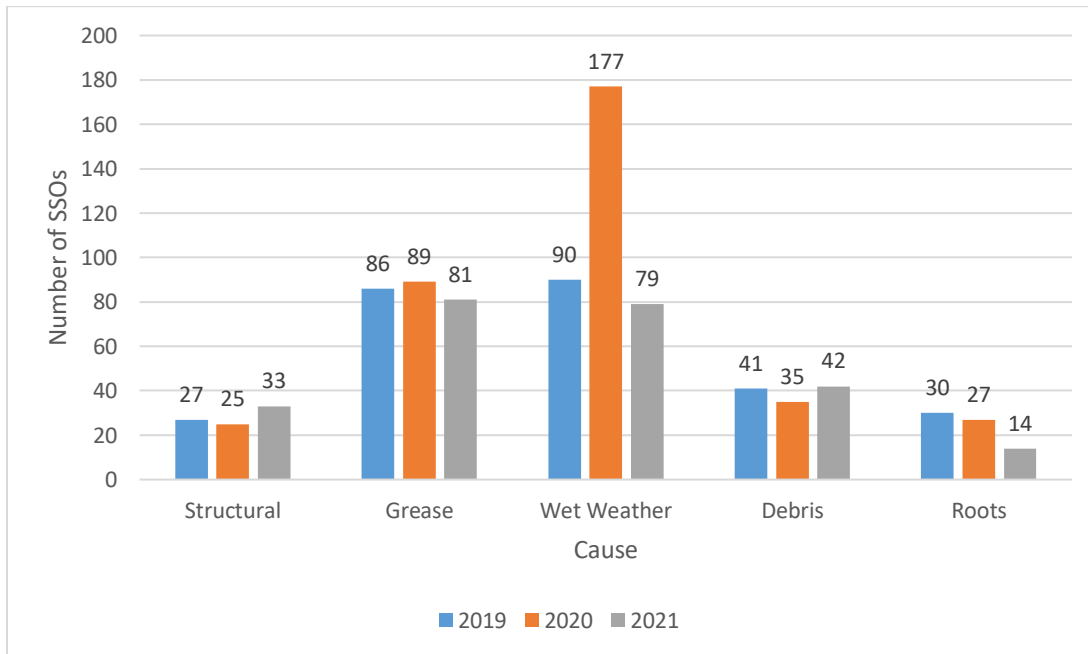
Cause	Grease	Structural	Wet Weather	Debris
BRK LN/STR		STRUC		
CC				
CRK BRK		STRUC		
CRK BRN		STRUC		
DB				DB

**Table 4-1 Mapping Cause to Cause Categories**

Cause	Grease	Structural	Wet Weather	Debris
GR	GR			
GRDB	GR			DB
GRRT	GR	STRUC		
GRRTDB	GR	STRUC		DB
I&I <sup>a</sup>			WET WEATHER	
LFT STN FLR				
MH				
OTH				
OUTSIDE CON				
PMP FLR				
RT		STRUC		
RTDB		STRUC		DB
STORM			WET WEATHER	
TREE				
UNK				
VAND				

<sup>a</sup> All I/I SSOs recorded to date were wet-weather-related.

**Figure 4-2 SSOs by Year by Cause Category (2019–2021)**

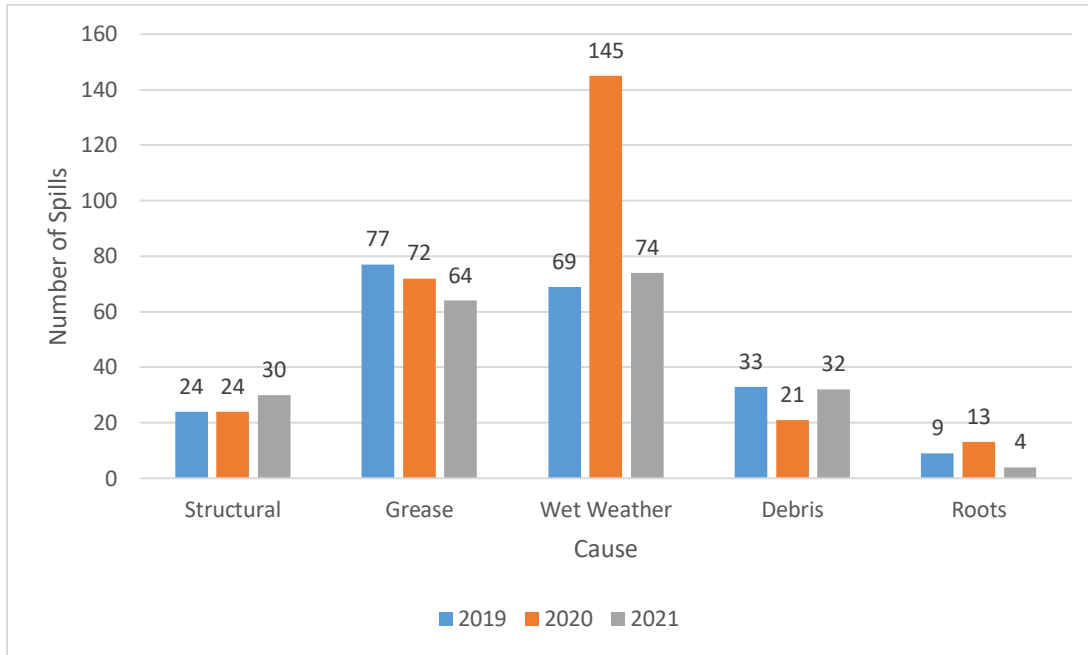


Notes:

Cause Categories may include more than one cause. Some SSOs appear in more than one Cause Category.

These same cause categories, when applied specifically to spills, show similar trends (refer to Figure 4-3).

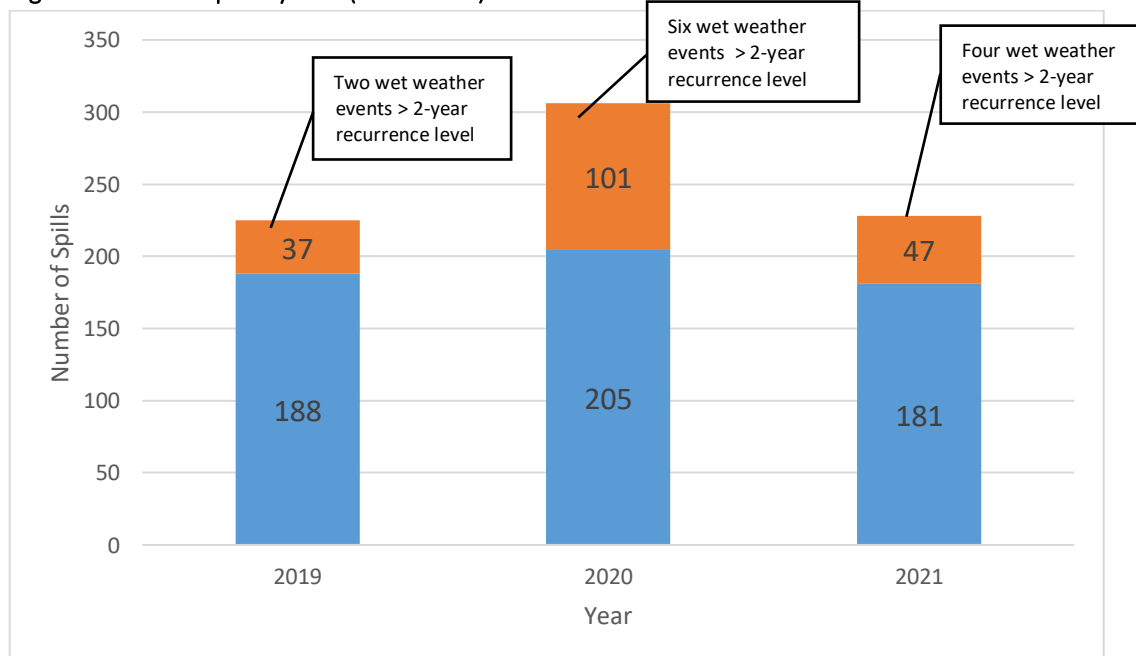
**Figure 4-3 Spills by Year by Cause Category (2019–2021)**



Note: Cause Categories may include more than one cause. Some SSOs appear in more than one Cause Category. Other causes for spills not shown in this figure include pump failure, vandalism, contractor-related, etc.

Figure 4-4 presents the number of spills by year. The number of spills per year increased from 2019 to 2020 but decreased in 2021. This is heavily influenced by the number and type of rain events over the course of the year causing wet weather spills. While the initial years of the CD focused on data gathering, planning, and design, in the last couple of years, construction has started to increase within the County to address capacity constraints. During 2020, construction completed at two historical SSO sites that previously experienced multiple spills per year. In 2021, there has been a continuation of pipe upsizing and rehabilitation construction to work to reduce SSOs.

**Figure 4-4 Spills by Year (2019–2021)**



Overall, spills decreased from 2020 to 2021 because of the decrease in annual rainfall as well as fewer extreme wet weather events. Figure 4-5 shows a month-to-month comparison of spills from 2020 and 2021. In 2020, extreme storm events in February and October resulted in precipitation totals of 10.58 inches and 8.23 inches, respectively, while the rainfall throughout 2021 remained steady, averaging about 4.48 inches with a maximum of 6.96 inches.

Figure 4-5 Spills by Month (2020–2021)



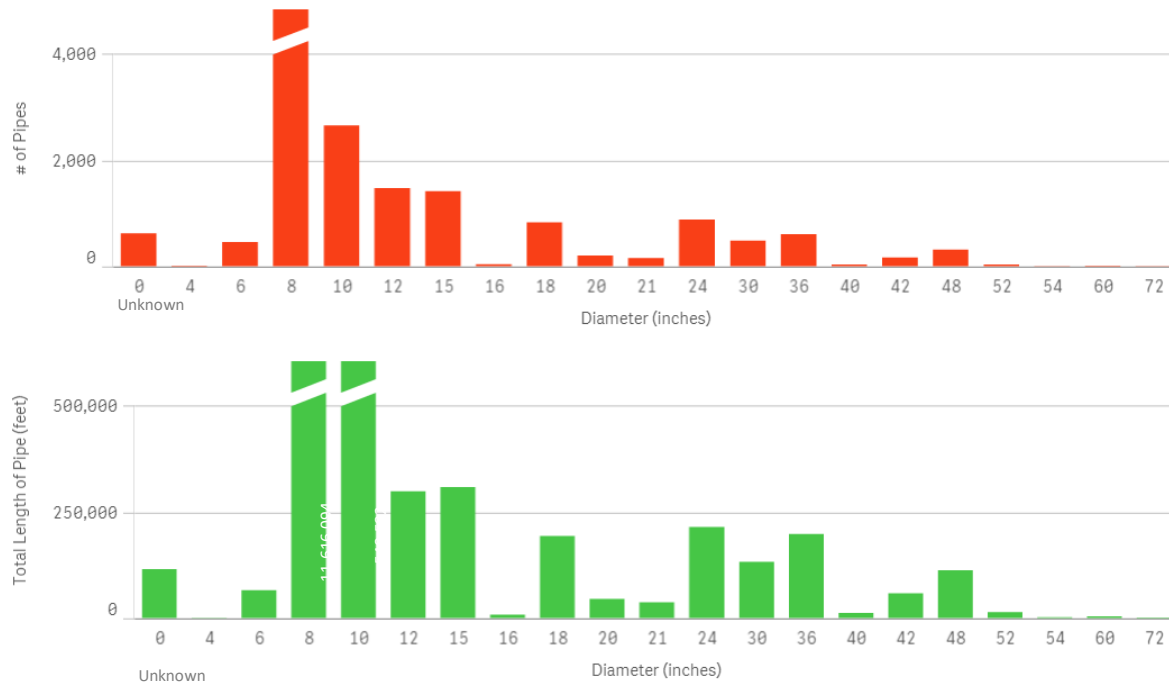
## 5. Other Trends

DWM evaluated other potential trends including those based on pipe size and rainfall.

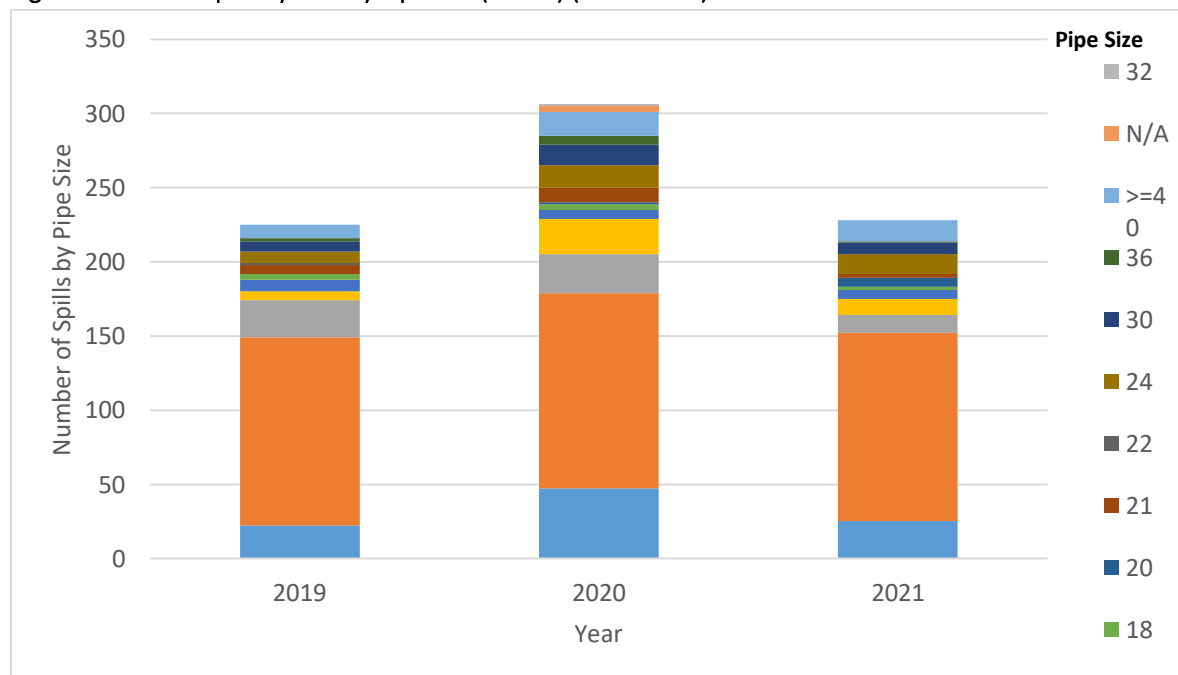
### Pipe Size

The most common pipe diameter in the collection system is 8 inches, as shown on Figure 5-1. Pipes with a diameter of 8 inches account for 85 percent of the total number of pipes and 83 percent of the total length of pipe. Likewise, most spills are associated with pipes of 8 inches in diameter, as shown on Figure 5-2.

**Figure 5-1 Sewer Gravity Main Pipe Count and Length by Diameter**



**Figure 5-2 Spills by Year by Pipe Size (inches) (2019–2021)**

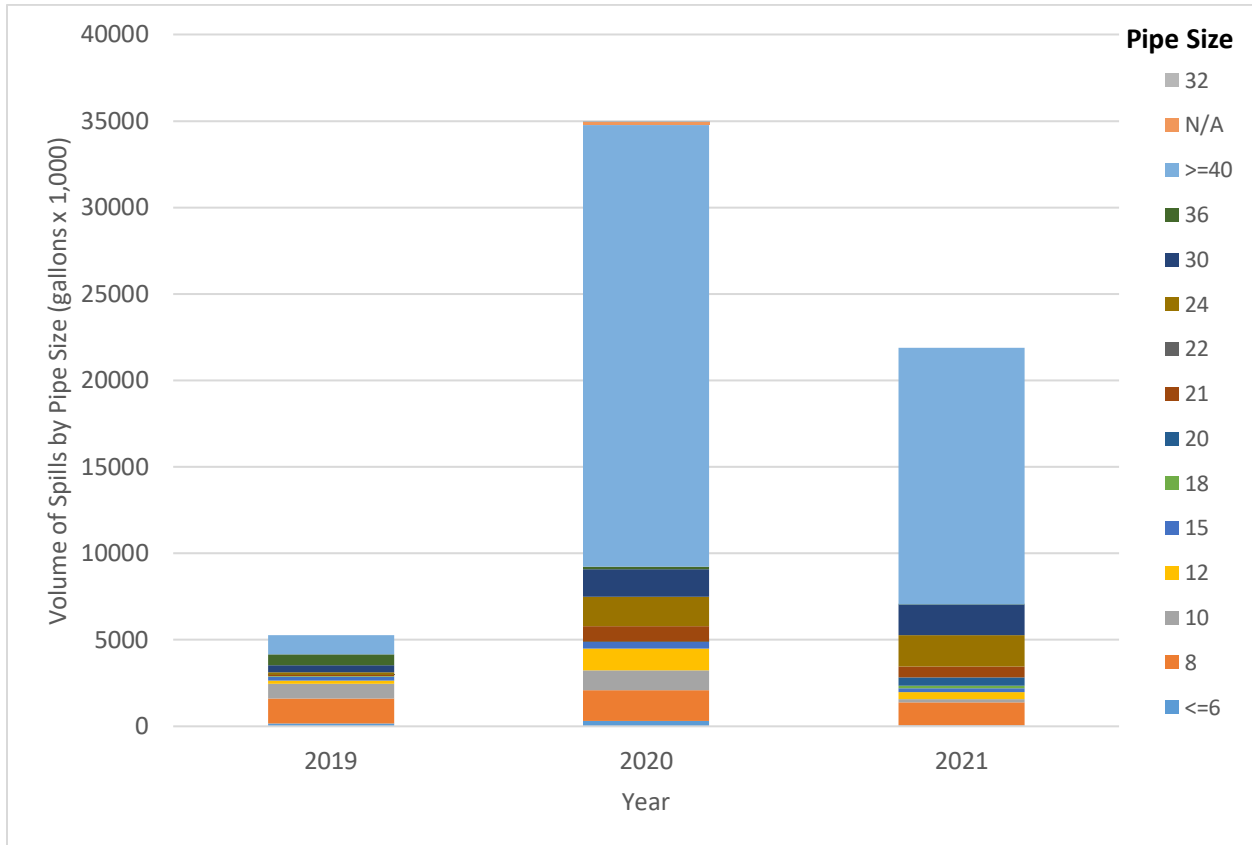


**Notes:**

Only spills have an associated pipe size linked to an SSO, so only spills are included in this figure.

Figure 5-3 shows the volume of spills by pipe size. There is correlation between pipe size and volume of SSO, as larger pipes have greater capacity, generally convey more flow, and in cases of structural repairs, can take longer to restore.

Figure 5-3 Spill Volume by Year by Pipe Size (2019–2021)



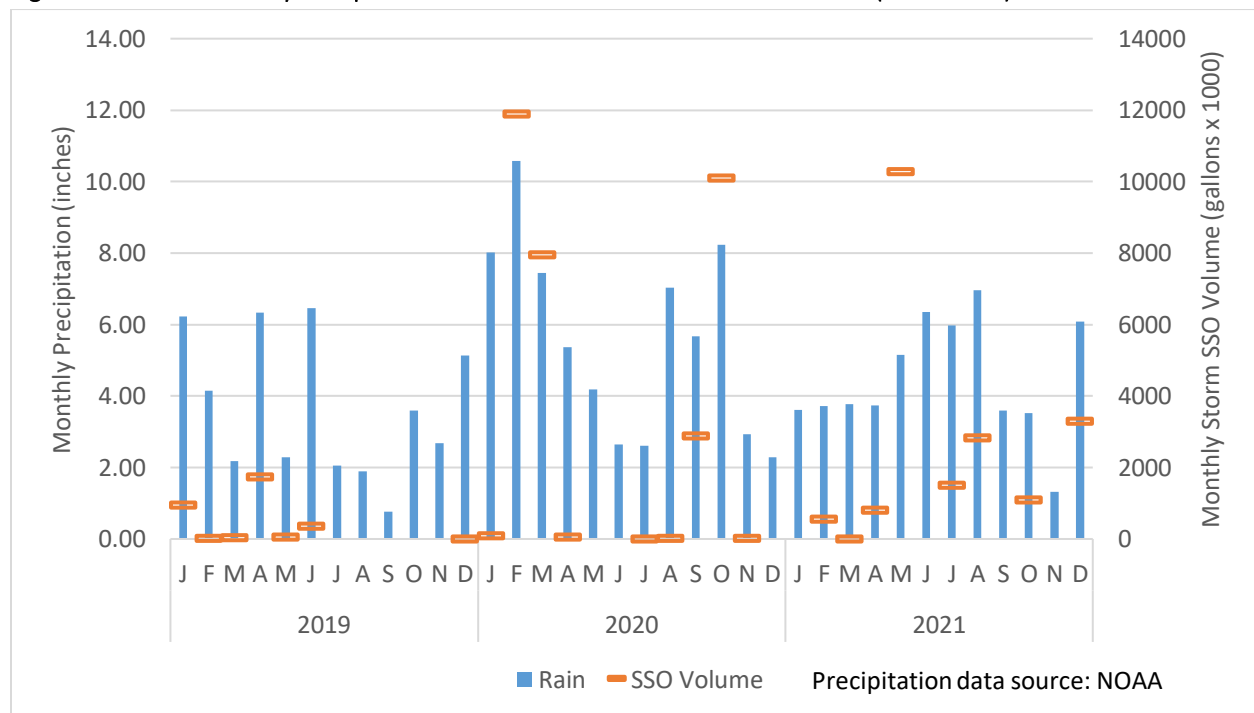
Notes:

Only spills have an associated pipe size linked to an SSO, so only spills are included in this figure. Pipe diameter was not always recorded; thus, some are blank or N/A.

## Rainfall

The difference in rainfall intensity is reflected in the data for SSOs and spills caused by wet weather. In 2019, 69 spills were attributed to wet weather; in 2020, 145 spills were attributed to wet weather (101 occurred on six severe wet weather events that exceeded 2-year recurrence levels), and in 2021 74 spills were attributed to wet weather (47 occurred on four severe wet weather events that exceeded 2-year recurrence levels). The volume for spills caused by wet weather was approximately 32.9 million gallons in 2020 (20.2 million gallons attributed to the six events noted previously) compared to an approximately 20.3 million gallons in 2021 (14.9 million gallons attributed to severe wet weather events that exceeded the 2-year recurrence level). Similarly, there were 17 overflows caused by wet weather in 2020 (10 occurred on April 19) compared to 6 in 2021. There were 15 building backups in 2020 caused by wet weather but none in 2021. Figure 5-4 shows rainfall and SSO volume by month from 2019 through 2021.

Figure 5-4 Monthly Precipitation and Wet-Weather-Induced SSO Volume (2019–2021)



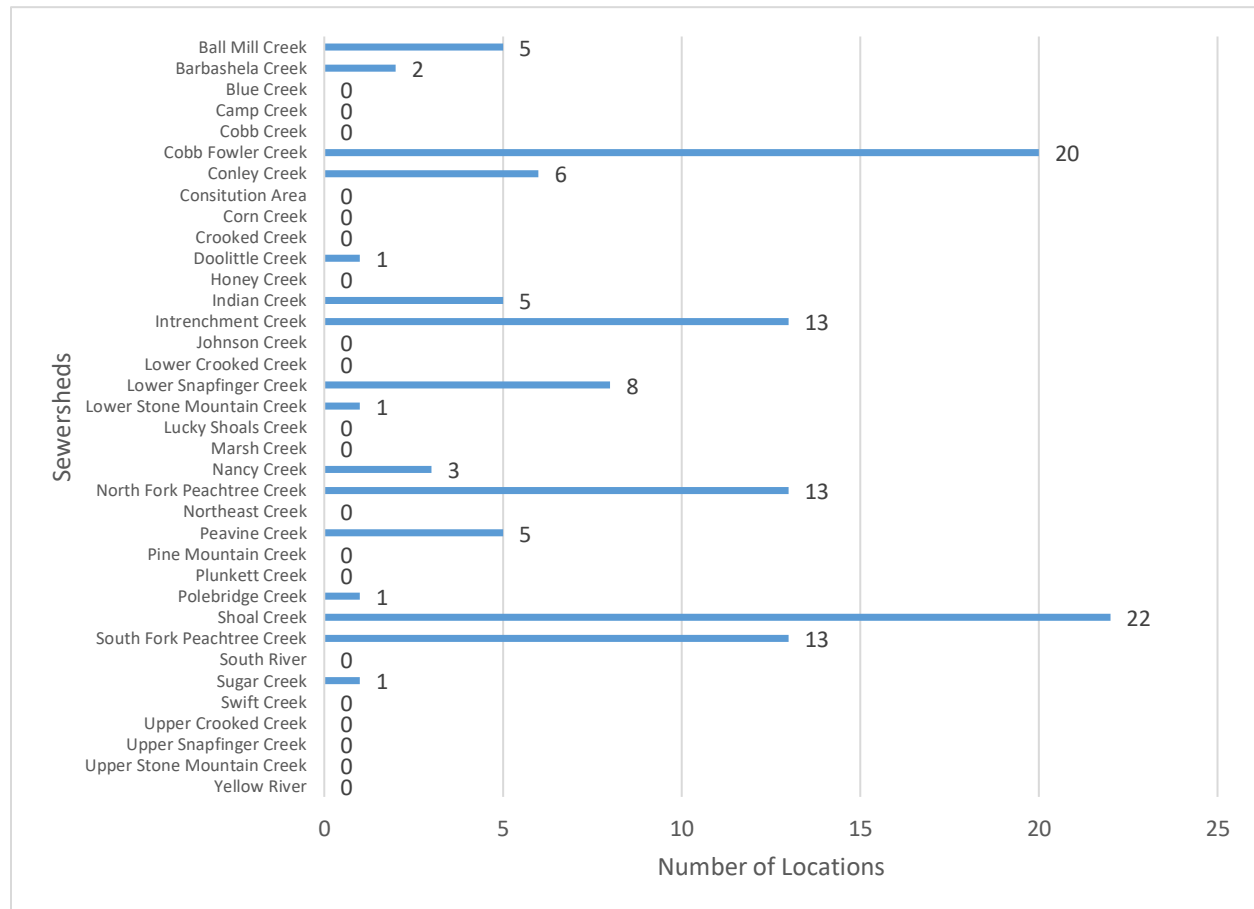
Note: Only spills with a cause of STORM or I/I are represented on this figure.

## Repeat SSOs

DWM reviewed SSOs in their spatial context to identify repeat SSO locations. These locations were recorded and prioritized for further investigation to define solutions to minimize future recurrence of SSOs.

DWM defined 500-foot-radius areas with repeat SSOs and tallied the repeat SSO locations by sewershed (refer to Figure 5-5). For 2021, the total number of repeat SSOs was 119. Cobb Fowler Creek and Shoal Creek had the greatest number of repeat SSO locations.

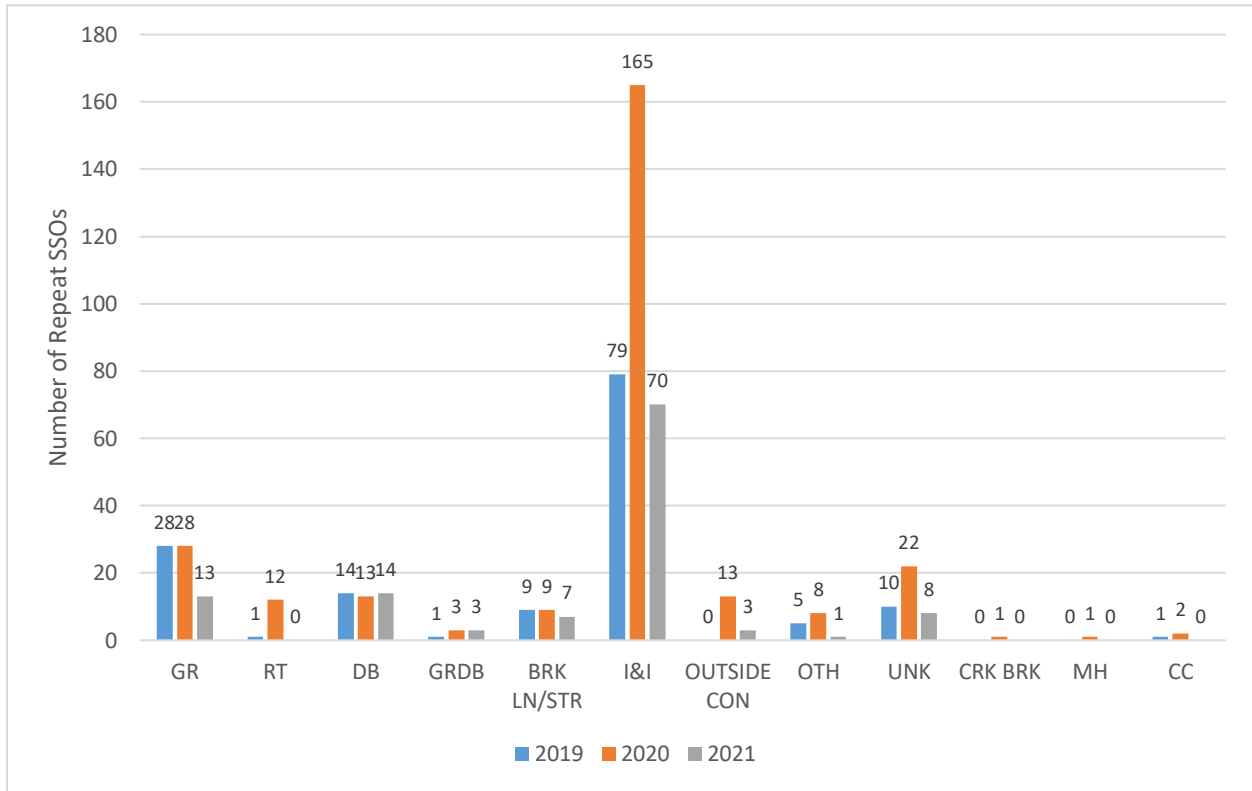
Figure 5-5 Number of Locations with Repeat SSOs by Sewershed





The most common cause of repeat SSOs in 2021 was wet weather (refer to Figure 5-6). Wet-weather-related repeat SSOs decreased from 2019, even though the annual rainfall was higher. As planned rehabilitation measures are constructed to reduce I/I sources and provide capacity in the system, wet-weather SSOs are expected to decrease. DWM has identified historical repeat SSOs and has developed remediation plans to address these issues.

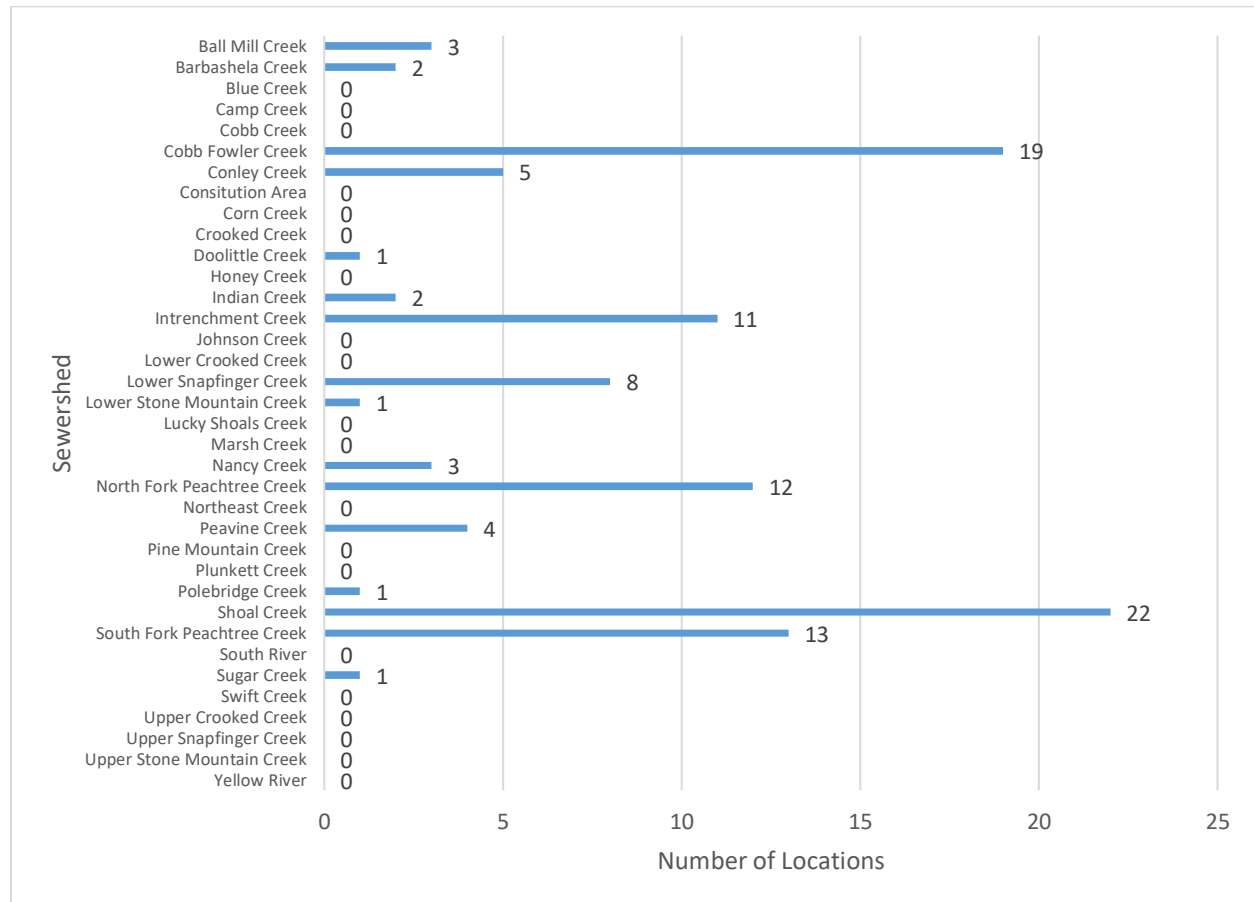
Figure 5-6 Number of Repeat SSOs by Cause



Note: All I/I SSOs recorded to date were wet-weather-related.

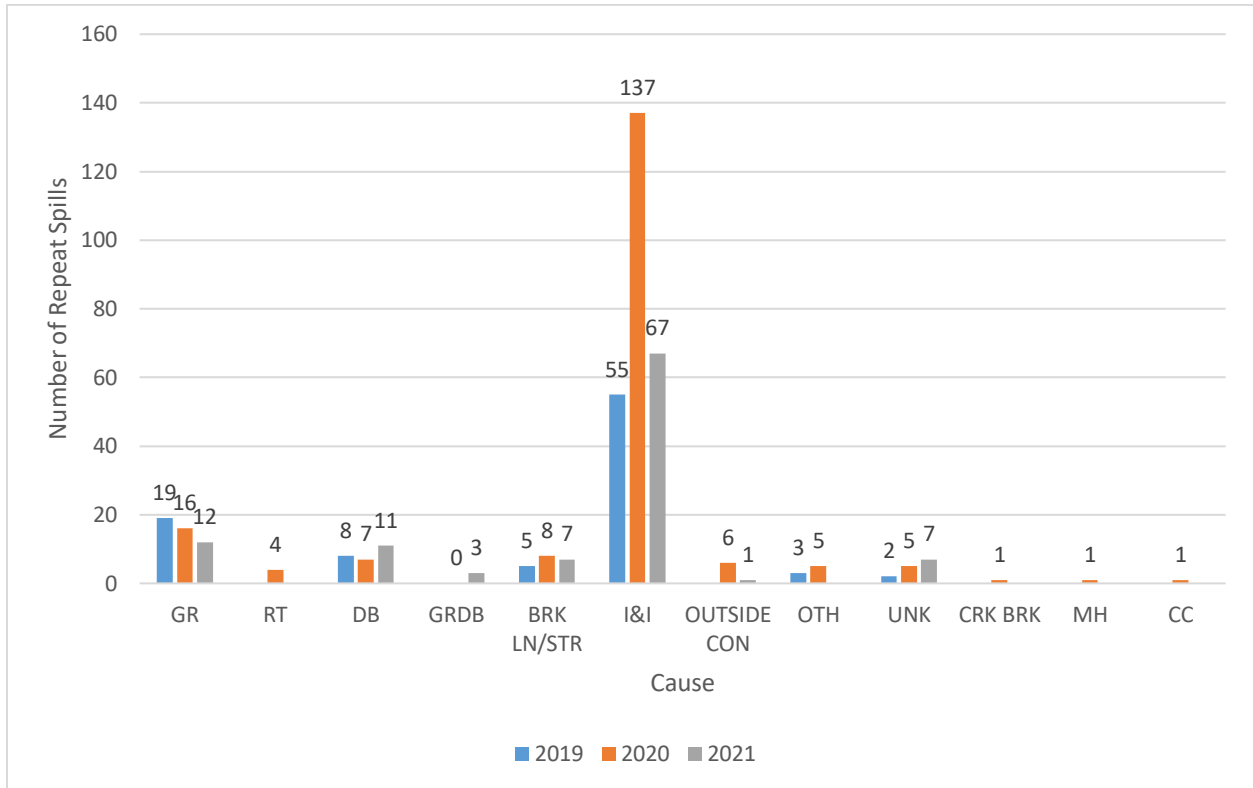
Similarly, DWM analyzed only those SSOs that are categorized as spills. From 2019 to 2021, repeat spills decreased. Cobb Fowler Creek, South Fork Peachtree Creek, and Shoal Creek had the greatest number of repeat spill locations in 2021 (refer to Figure 5-7).

**Figure 5-7 Number of Locations with Repeat Spills by Sewershed**



The most common cause of repeat spills is wet weather (refer to Figure 5-8). Wet-weather-related repeat spills increased from 2019, as increased extreme rain events in 2021 resulted in numerous localized capacity restrictions. As rehabilitation measures are constructed to reduce I/I sources and provide capacity in the system, wet weather SSOs are expected to decrease.

**Figure 5-8** Number of Repeat Spills by Cause



Note: All I/I SSOs recorded to date were wet-weather-related.

The spatial distribution of repeat SSOs and repeat spills are shown on Figures 5-9 and 5-10, respectively.

Figure 5-9 Repeat SSOs

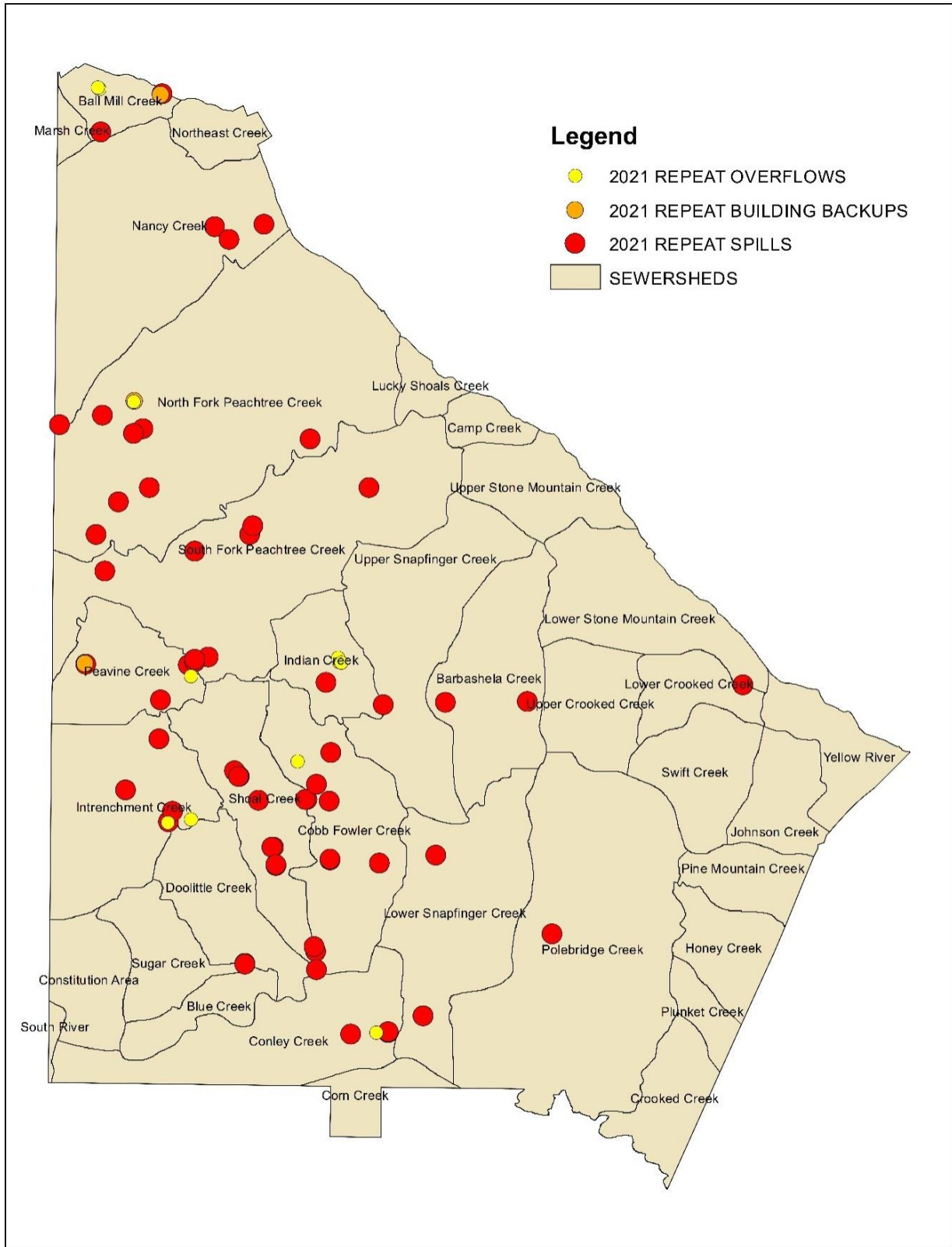
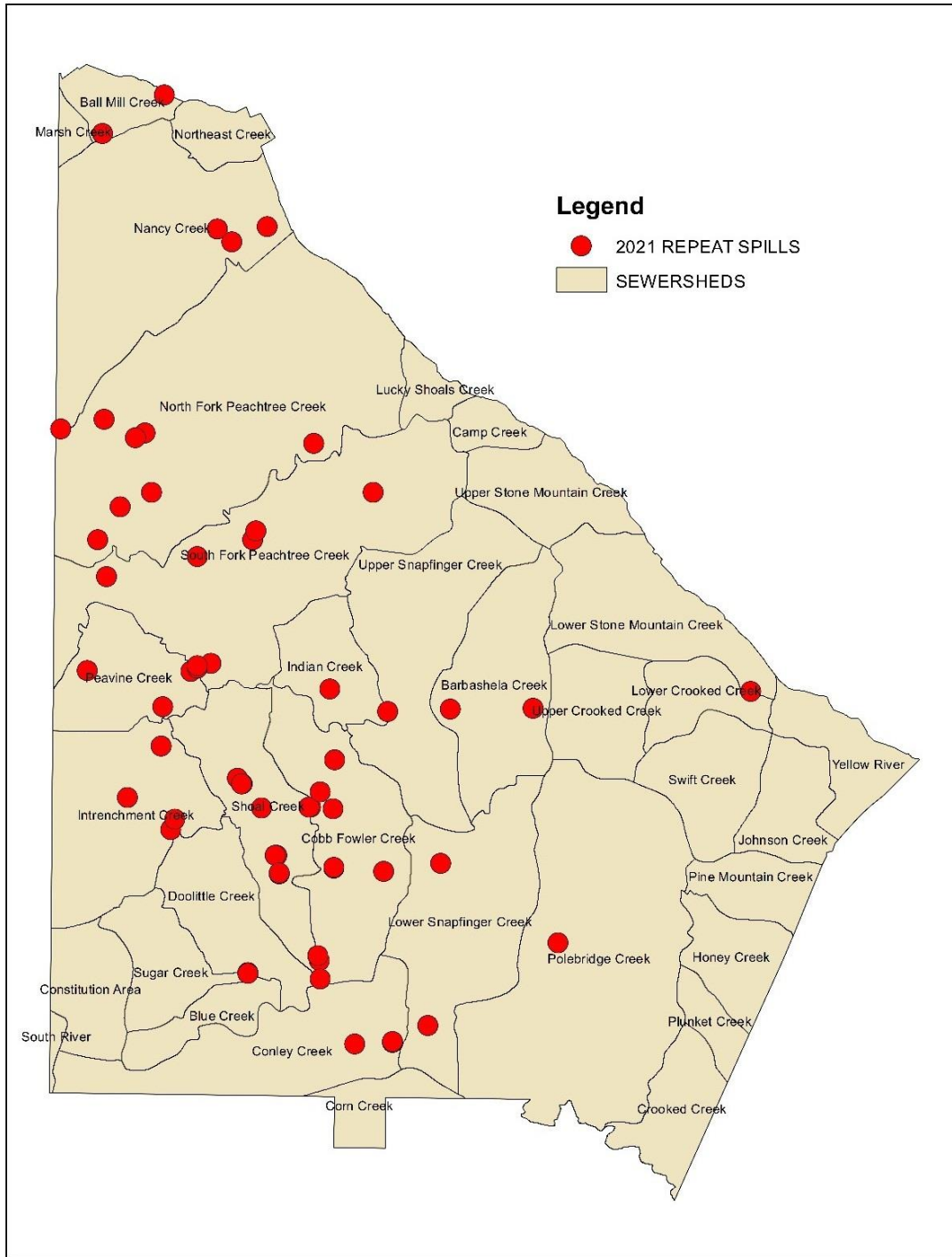


Figure 5-10 Repeat Spills



## 6. Summary

A summary of the trend analysis presented in this report is provided below:

- The number of SSOs per year during the period of record (2012–2021) decreased this year. Incidences of grease, roots, and wet-weather-related SSOs decreased because of a decrease in severe wet weather events and increased maintenance programs including sewer cleaning, the FOG program, and extensive public education campaigns, as well as the sewer rehabilitation program (refer to Figures ES-1 and 2-1).
- Compared to 2020, spills decreased in 2021, from 306 spills to 228 spills (more than 25 percent), which can be attributed to increased maintenance programs, the FOG program, and sewer rehabilitation programs, as well as a decrease of extreme wet weather events.
- The average SSO duration for the last 3 years is approximately 6.0 hours (refer to Figure 3-1). The increase in the average SSO duration for 2021 is attributed to an increase in structural-related SSOs in 2021. Above-average durations are caused by:
  - I/I – SSOs can be contained but will not return to the system until capacity becomes available.
  - Structural – Longest duration because of the time needed to locate the spill, bypass the failure, and perform the repair.
  - Vandalism – Time needed to locate the issue; often includes atypical blockages in the system that cannot be removed during normal cleaning of the line.
- SSOs resulting from maintenance issues (including grease, debris, and roots) accounted for 45 percent of the SSOs occurring from 2019 to 2021. During this same period, maintenance-related SSOs accounted for 5 percent of the estimated volume of SSOs (refer to Figure 4-1). Since the CD program was implemented in 2012, maintenance-related SSOs have accounted for about 49 percent of the SSOs and about 9 percent of the volume of SSOs.
- SSOs caused by sewer line breaks occurred less often than SSOs attributed to other causes but accounted for more SSO volume, except for wet weather SSOs (refer to Figure 4-1).
- The number of SSOs caused by grease declined from 89 in 2020 to 81 in 2021, and were less than the total reported in 2019 (refer to Figure 4-2).
- The months with significant rainfall recorded correlate to a large volume of SSOs, but not singularly because of the amount of rainfall for the month. In January 2020, the rainfall combined with the saturated soil from wet weather in November and December of 2019 resulted in a large number of spills. In May 2021, extreme wet weather conditions caused an unusually high volume of SSO; the resulting volume of SSO accounted for more than 50 percent of the total SSOs for 2021. This outlier SSO was associated with a repeat SSO site. Two more extreme wet weather events occurred in August and December of 2021 but when combined accounted for only about 30 percent of the total SSO volumes for 2021 (refer to Figure 5-4).
- In 2021, there were 119 locations of repeat SSOs and 108 locations of repeat spills within the year (refer to Figure 5-5).
- The main cause of repeat SSOs in 2021 was wet weather (refer to Figure 5-6).