

SD1Managing Northern Kentucky's  
Wastewater and Storm Water

August 29, 2023

Director of the Division of Enforcement  
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Via U.S. Mail and  
Email: sayre.dennis@epa.com

Re: Amended Consent Decree Case No. 2:05-CV-199-(WOB)

To Whom It May Concern:

Pursuant to the above-referenced Amended Consent Decree, Sanitation District No. 1 (SD1) is required to submit annual reports that demonstrate SD1's compliance with the Amended Consent Decree:

**48. Annual Reports.** The District shall submit each year to the Cabinet/EPA an Annual Report that describes the District's progress in complying with this Amended Consent Decree during the previous fiscal year ending June 30. The Annual Report shall be submitted no later than 60 days after the end of each fiscal year period.

Information contained within the enclosed Annual Report No. 1 describes SD1's compliance with Amended Consent Decree Case No. 2:05-CV-199-(WOB) for the period of July 1, 2022 through June 30, 2023.

A certification, as required by the Amended Consent Decree (paragraph 70), is also enclosed.

To Whom It May Concern

Page 2

August 29, 2023

To the best of my knowledge and belief, the enclosed report is true, accurate, and complete, and further demonstrates SD1's commitment to the mission of protecting and enhancing the water resources and quality of life in Northern Kentucky.

If you have any questions or concerns, do not hesitate to contact me at 859-578-7465 or by e-mail at [achaney@sd1.org](mailto:achaney@sd1.org).

Best regards,



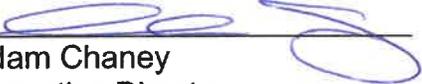
Adam Chaney  
Executive Director

AC/jb  
Enclosures

**CERTIFICATION**

Amended Consent Decree Annual Report No. 4  
Consent Decree Case No. 2:05-CV-199-(WOB)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

  
\_\_\_\_\_  
Adam Chaney  
Executive Director

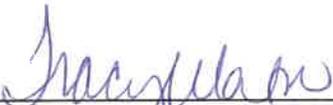
8-29-2023  
\_\_\_\_\_  
Date

COMMONWEALTH OF KENTUCKY

)ss.

COUNTY OF Kenton

The foregoing instrument was acknowledged before me this 29 day of August, 2023 by Adam Chaney, Executive Director of Sanitation District No. 1.

  
\_\_\_\_\_  
NOTARY PUBLIC

State at Large County, Kentucky

TRACY L WATSON  
NOTARY PUBLIC  
COMMONWEALTH OF KENTUCKY  
ID # KYNP33524  
MY COMMISSION EXPIRES July 26, 2025

My commission expires: 7-26-25

# AMENDED CONSENT DECREE ANNUAL REPORT NO. 5

August 29, 2023



**Sanitation District No. 1**

1045 Eaton Drive  
Ft. Wright, KY 41017

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## LIST OF ACRONYMS AND ABBREVIATIONS

ACD	Amended Consent Decree
Cabinet	Kentucky Energy and Environment Cabinet
CIPP	Cured In Place Pipe
CSAP	Continuous Sewer Assessment Program
CMOM	Capacity, Management, Operations, and Maintenance
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
District	Sanitation District No. 1
EPA	U.S. Environmental Protection Agency
EQ	Equalization
FOG	Fats, Oils, and Grease
FSE	Food Service Establishment
FY	Fiscal Year
GCE	Grease Control Equipment
I/I	Inflow and Infiltration
MG	Million Gallons
MGD	Million Gallons per Day
MH	Manhole
NOV	Notice of Violation
PM	Preventative Maintenance
PS	Pump Station
SD1	Sanitation District No. 1
SL-RAT	Sewer Line Rapid Assessment Tool
SIU	Significant Industrial User
SSO	Sanitary Sewer Overflow
TCF	Total Combined Flow
TY	Typical Year
UWSP	Updated Watershed Plan

## **SECTION 1. INTRODUCTION**

This Annual Report is submitted to fulfill the requirements of Sanitation District No. 1's (SD1) Amended Consent Decree, as entered on May 22, 2019. The Amended Consent Decree is a legal agreement with the U.S. Environmental Protection Agency (EPA) and the Kentucky Energy and Environment Cabinet (Cabinet). The purpose of the Amended Consent Decree is to address sanitary sewer overflows (SSOs) in SD1's sanitary sewer system and combined sewer overflows (CSO)s in the combined sewer system (CSS), in an effort to improve water quality throughout SD1's service area. Specifically, Section V Reporting Requirements, states:

**48. Annual Reports.** The District shall submit each year to the Cabinet/EPA an Annual Report that describes the District's progress in complying with this Amended Consent Decree during the previous fiscal year ending June 30. The Annual Report shall be submitted no later than 60 days after the end of each fiscal year period.

Information contained within this report describes SD1's compliance with Amended Consent Decree Case No. 2:05-CV-199 (WOB) for Fiscal Year (FY) 2023.

## **SECTION 2. UPDATED WATERSHED PLAN**

The US Environmental Protection Agency (USEPA) and the Kentucky Division of Environmental Protection (KDEP) conducted a review of the Updated Watershed Plan (UWSP) initially submitted by SD1 on April 15, 2020, with revision dated May 13, 2021, and December 3, 2021, as required by Paragraph 41 of the Amended Consent Decree (ACD).

On June 15, 2022, SD1 received USEPA and KDEP approval of the UWSP. Per Paragraph 50 of the ACD, upon this approval the UWSP shall be incorporated into the ACD and shall become an enforceable requirement of the ACD.

The UWSP provides SD1's improvement program for achieving compliance with the typical year CSO and SSO mitigation requirements of the four milestone dates outlined in the Amended Consent Decree (ACD). In some cases, UWSP projects supersede

projects outlined in Appendix C of the ACD, as better alternatives were identified during the development of the UWSP.

## SECTION 3. COMPLETED PROJECTS IN FY 2023

The first reporting requirement of the Annual Report, per paragraph 48 of the Amended Consent Decree, is to provide:

**48. (a)** A description of the projects and activities conducted during the previous year to comply with the requirements of the Amended Consent Decree, in Gantt chart or similar format.

### 3.1 Completed Projects Listed in the Updated Watershed Plan / Amended Consent Decree

Table 3.1 details projects listed in the UWSP that were completed in the previous year.

NOTE: All project phase completion requirements listed in Appendix C of the Amended Consent Decree had been completed prior to FY2023. See Table 7.1 All subsequent projects and their respective due dates detailed in this report will be in reference to the Updated Watershed Plan.

**Table 3.1 FY2023 Completed Projects Listed in the UWSP**

Project Title	Project Description	UWSP Completion Date	Completion Date
<b>COMBINED SEWER OVERFLOW PROJECTS</b>			
River Water Intrusion Program Phase II	Outfall flap gates or gated chambers at 21 locations. This project will reduce CSOs on the Ohio River west of the Licking River. CSO diversions to receive RWI protection include: 1480103, 1480097, 1480108, 1480012, 1480116, 0910064, 1420028, 0880017, 0930041, 0930014, 0930075, 0980036, 0880004, 1420032, 0910005, 0930026, 0960032, 1720005, 1710003, 1710068, 1440156.	2023	2023
River Water Intrusion Program Phase III	Outfall flap gates or gated chambers at 21 locations. This project will reduce CSOs on the Ohio River east of the Licking River. CSO diversions to receive RWI protection include: 0820001, 0820001, 0640081, 0790015, 0650084, 0620031, 0770006, 0610006, 0630001	2029	2023

Project Title	Project Description	UWSP Completion Date	Completion Date
Ohio River Gray Components - Diversion Weir Adjustment	Strategic diversion weir adjustments at several diversions consisting of raising the overflow elevation to provide CSO volume reduction. CSOs addressed include: 0960064, 0980081, 1440206, 1490132, 1870193.	2034	2023
<b>SEPARATE SEWER OVERFLOW PROJECTS</b>			
Licking River Double Siphon	A second 12-inch siphon under the Licking River to the combined system with horizontal directional drilling. The parallel siphon is required to accommodate future conveyance improvements in the Licking River Siphon sewershed and will work in conjunction with an EQ. The new siphon alone will reduce TY SSO volume by 42 MG at 0860001.	2023	2023
Licking River Siphon EQ Tank	An above ground 7.3 MG EQ tank near Andrews Way and Three Mile Creek to store flows in excess of the Licking River Siphon downstream. The project works with the Licking River double siphon project (included in the 2023 improvements) by lowering the hydraulic grade line in the existing sewers, mitigating CSO impacts, and eliminating the LRS SSO. The tank is sized to accommodate additional flow from conveyance projects upstream to be completed by 2040.	2029	2023
Bromley Crescent Springs Conveyance Phase 1	This conveyance upsizing addresses ongoing maintenance and safety issues by preventing displacement of manhole covers in the roadway due to system surcharge. This phase of BCS Conveyance includes installation of 36 – 42” sewer upsizing from MH 1730087-1730027.	2029	2022
Waterworks Road Conveyance Phase 2	This phase of the conveyance upsizing consists of installation of 1,450 LF of 27-42” sewer and 5,090 LF of 18-24” sewer along Waterworks Rd. This project has an estimated TY overflow reduction of 1.0 MG.	2029	2023

## SECTION 4. ACCOUNTING OF TYPICAL YEAR OVERFLOWS

The second reporting requirement of the Annual Report, per paragraph 48 of the Amended Consent Decree, is to provide:

**48. (b)** An accounting, both for the current calendar year and cumulatively, of the reduction in volume and in number of occurrences of SSOs and unpermitted discharges and the volumes of combined sewage in the CSS, including the District’s progress towards achieving the requirements for percentage of volumes of combined sewage in the CSS eliminated and/or captured for treatment and the percentage of capacity-related SSO volumes eliminated as set forth in Paragraph 43 of this Amended Consent Decree.

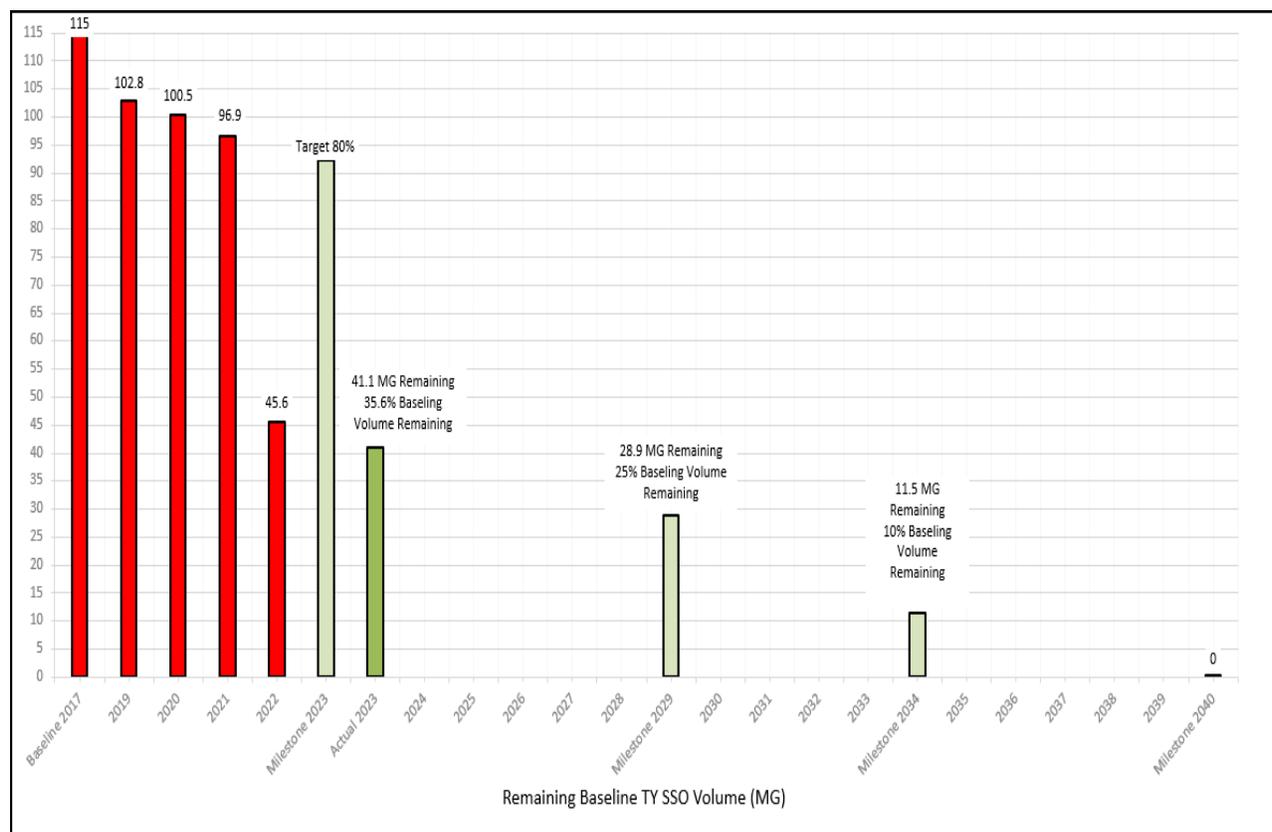
### 4.1 Typical Year SSOs

As described in the Amended Consent Decree (ACD), SD1’s baseline SSO volume of 115.4 MG was established with the October 2017 hydraulic model and the 1970 typical year (TY) rainfall, adjusted with areal reduction factors.

Since the establishment of the baseline TY SSO volume, SD1 has completed multiple model calibrations and planned capital projects in the separate sewer system. Figure 6.2 illustrates where model updates have been made in the past year. As of August 2023, SD1’s hydraulic model predicts TY SSO volume to be 41.1 MG, or 35.6 percent of the established baseline in the ACD. See Table 3.1 for FY 2023 Complete Projects.

Figure 4.1 illustrates the current TY SSO volume, and the baseline volume reduction trend toward the milestones established in the ACD.

**Figure 4.1 Remaining Baseline Typical Year SSO Volume**



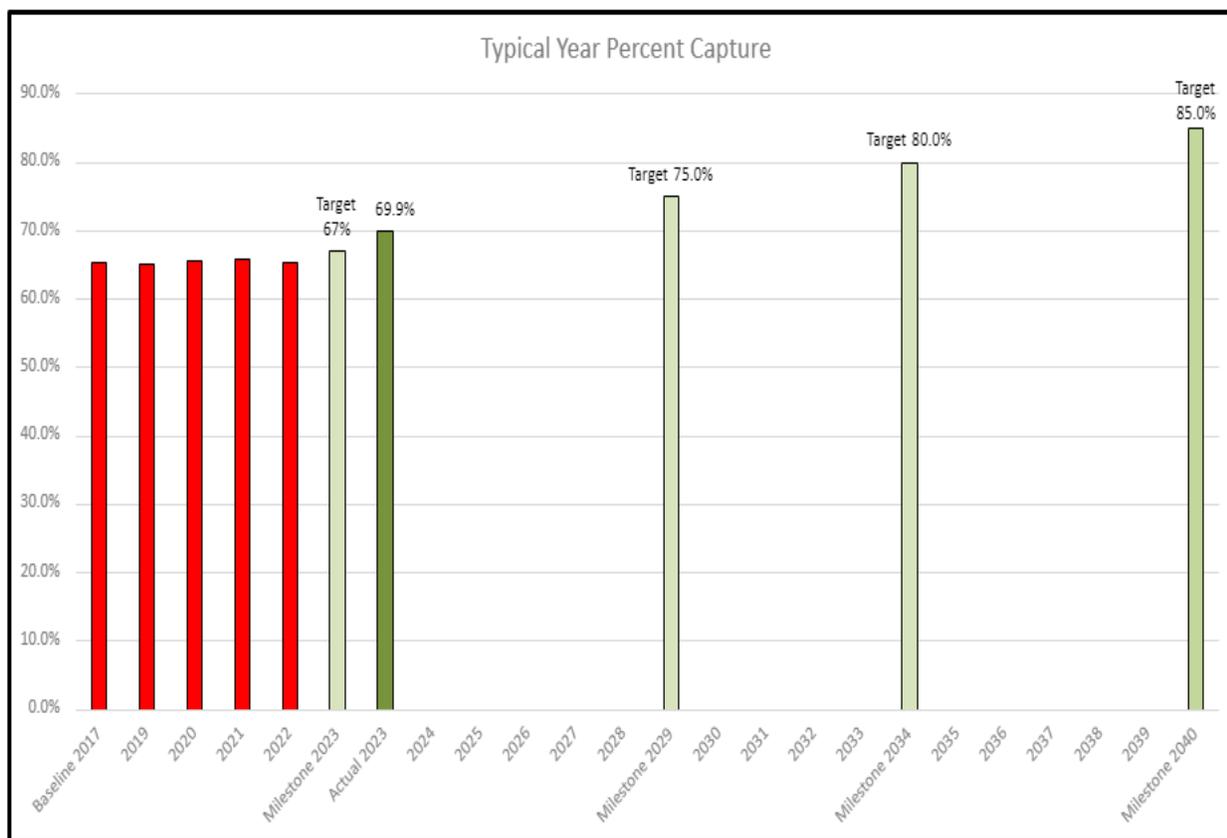
## 4.2 Typical Year CSOs

As described in the Amended Consent Decree (ACD), SD1's baseline CSO volume of 1,516 MG was established with the October 2017 hydraulic model and the 1970 typical year rainfall, adjusted with areal reduction factors.

In FY 2023, SD1 finalized model calibration related to River Water Intrusion Phases I, II, and III as well as the CSO Diversion Weir adjustments. The model calibration updates that have been made in the past year are illustrated in Figure 6.2. As of August 2023, SD1's hydraulic model predicts TY CSO volume to be 1,481 MG, with a resulting percent capture is 69.9 percent.

Figure 4.2 illustrates a timeline of the baseline and current TY percent capture, along with the milestone targets established in the ACD.

**Figure 4.2 Increase in Percent Capture of Typical Year Total Combined Flow**



## SECTION 5. ANTICIPATED PROJECT ACTIVITY IN FY 2023

The third reporting requirement of the Annual Report, per paragraph 48 of the Amended Consent Decree, is to provide:

**48. (c)** The anticipated projects and activities that will be performed in the successive calendar year to comply with the requirements of this Amended Consent Decree, in Gantt chart or similar.

On the following pages, Table 5.1 provides updates for ongoing projects that are listed in Appendix C of the Amended Consent Decree, which are currently under construction or in design.

**Table 5.1 Projects Listed in the Updated Watershed Plan that are Under Construction or in Design in FY 2024**

Project Title	Project Description	UWSP Completion Date	Current Status	Anticipated Activity by End of FY24
<b>COMBINED SEWER OVERFLOW CONSTRUCTION PHASE PROJECT</b>				
Willow Run Pilot Detention Basins	Installation of dynamic coordinated controls on 10 detentions basins (9 existing and 1 proposed) in the Willow Run sewershed. Pilot projects will focus on establishing automated control logic to throttle an outlet valve by incorporating wet weather forecasting and downstream capacity sensors at the CSO regulators.	2029	Dynamic controls are currently under development.  Construction on the one proposed basin (Amsterdam Valley) is complete.	Design

Project Title	Project Description	UWSP Completion Date	Current Status	Anticipated Activity by End of FY24
Bromley Pump Station Upgrades	The UWSP revised the target pumping capacity to 45 MGD by making upgrades to allow for two large pumps to run concurrently, which would reduce TY CSO by 60 MG. After further alternative analysis in the planning of the upgrades described in the UWSP, it has been determined SD1 can instead upgrade the existing Bromley PS to increase capacity from 40 MGD to 45 MGD and build a diversion structure and second parallel pump station with an additional 30 MGD capacity. Each pump station will utilize the same force main. Therefore, when pumping together, there will be a combined 50 MGD pumping capacity. This major improvement will reduce TY CSO by 114 MG, provide greater operational resiliency in the event of failure, and will potentially allow for some smaller projects identified in the UWSP to be eliminated.	2029	Construction	Construction
SR9 Sewer Separation	This project includes sewer separation in Newport, KY along the State Route 9 corridor, separating a total of approximately 32 acres of pervious and impervious area and removing approximately 15 MGs of runoff from the combined system in the typical year. In conjunction with the KYTC State Route 9 Realignment project, approximately 9,700 feet of 15-inch through 66-inch separate storm sewer has already been installed, with the remaining work including installation of approximately 400 feet of 66-inch storm sewer through the earthen levee to discharge separated stormwater to the Licking River.	2029	Construction	Construction
Taylor Creek EQ Tank	The Taylor Creek EQ Tank is a major storage facility that effectively anchors the CSO control program along the upper Ohio River Interceptor. This EQ tank will reduce TY CSO volume of 29.4 MG.	2034	Design	Design
Taylor Creek Consolidation Piping – Newport Festival / Bellevue Riverfront	Consolidation piping along the Ohio River east of the Licking River to EQ.	2034	Design	Design
<b>SEPARATE SEWER OVERFLOW CONSTRUCTION PHASE PROJECT</b>				
Licking River Siphon Conveyance Piping Phase I	This project consists of 6,050 feet of 24-inch through 48-inch sanitary sewer upsizing. This conveyance upsizing will convey additional flow to the LRS EQ Tank and is sized for additional upstream improvements to be constructed by 2040.	2029	Construction	Complete

Project Title	Project Description	UWSP Completion Date	Current Status	Anticipated Activity by End of FY24
Lakeview EQ	The Lakeview EQ tank is an 8.6 million gallon above ground tank designed to store flows in excess of the downstream Lakeview PS capacity. The tank is sized to accommodate additional flow from storage and conveyance projects upstream to be completed by 2040. Flow would be diverted from the Lakeview Interceptor near 1990005 to a 36 MDG wet weather PS, which would pump flow into the tank. This project will reduce TY SSO volume by 6.5 MG.	2029	Design	Design
W6 Pump Station & Force Main	New pump station & force main located in Southern Kenton County along the Banklick Creek. This project will remove approximately 4,000 acres of tributary area to the Lakeview Pump Station and redirect the flow to Western Regional.	2029	Design and Construction	Design and Construction
Bullittsville Pump Station Improvements – Phase 2, 3, and 4	The Bullittsville PS improvements consist of upgrading the existing Bullittsville PS to a capacity of 3.0 MGD, and constructing 1.3 MGs of EQ storage upstream of the PS. The existing PS upgrade would include larger pumps to increase capacity, as well as new station piping, new valve vault, electrical improvements, additional air release valves, and force main pigging. Flow would be diverted just upstream of manhole 2370005 to a 7.7 MGD wet weather pump station, which would pump flow into the tank. This project will eliminate SSO volume upstream of Bullittsville through 2040 and provide capacity to support future development.	2029	Design	Design
Waterworks Road Conveyance Phase 3	This project consists of 11,020 feet of 10-inch through 24-inch and 1,450 feet of 42-inch sanitary sewer upsizing. This conveyance upsizing will convey additional flow to the combined system and the planned Taylor Creek EQ tank downstream. The downstream combined system solution has been configured to accommodate the additional flow. This project will reduce TY SSO by 1 MG and eliminate TY SSOs at 0370001, 0380005, 0400002, 0400034, 0410037, and 0410039.	2029	Design	Design
US 27/AA Highway PH II	6,200' of 12" force main and New Rocky View PS. New gravity pipe from Cold Spring Crossing PS to the New Rocky View PS.	2034	Construction	Complete
US 27/AA Highway PH III	3,900' of 12" force main, 3,400' of 12" gravity sewer, and upgrade Wolpert PS capacity and new force main and gravity pipe from the Wolpert PS to Cold Springs Crossing site.	2034	Construction	Complete
Lakeview EQ Tank 1	Lakeview EQ 1 is a strategically located EQ facility to address remaining SSOs in the Lakeview Sewershed. Lakeview EQ Tank 1 will reduce TY SSOs by 3.7 MG.	2034	Design	Design

## SECTION 6. FY 2023 CMOM UPDATES

The fourth reporting requirement of the Annual Report, per paragraph 48 of the Amended Consent Decree, is to provide:

**48. (d)** A summary of the CMOM and asset management program implementation shall be included in the fiscal year report, including a comparison of actual performance measures that have been established in those programs.

### 6.1 CMOM Introduction

SD1 received regulatory approval of its Capacity, Management, Operations, and Maintenance (CMOM) programs on May 14, 2008, and has provided extensive annual reporting that covered 32 approved programs, since 2009. This report describes some of the more important CMOM program activities that are directly related to capacity assurance and asset management for FY 2023.

### 6.2 Major Components of SD1's Collection and Treatment Systems

SD1's sanitary service area currently covers approximately 200 square miles, and its storm service area covers approximately 170 square miles. SD1 serves approximately 111,820 sanitary accounts and approximately 86,200 storm water accounts. SD1 manages a collection system that serves more than 380,000 residents and is approximately comprised of:

- 42,571 SD1 owned sanitary MHs
- 1,449 SD1 owned catch basins and inlets in the CSS
- 1,704 miles of SD1 owned and operated gravity sewer lines and force mains
- 133 miles of Florence owned sewer lines and force mains
- 89 miles of privately owned sewer lines
- 454 miles of SD1 owned and operated separate storm water lines
- 128 (124 SD1 Owned 4 SD1 Maintained) pump stations
- 93 floodgate structures
- 15 flood pump stations
- 10 (SD1 owned 4 SD1 Maintained 6) small wastewater treatment plants

- 3 regional water reclamation facilities

During FY 2023, SD1 acquired approximately 70,844 feet of privately developed sewer and approximately 381 new MHs. All newly acquired assets passed inspection and met the technical specifications and construction standards of SD1, as well as passed a follow up inspection associated with the one-year warranty period.

### **6.3 Capacity Assessment & Assurance**

The purpose of SD1's Capacity Assessment and Assurance Program is to continuously understand the overall capacity of the collection and treatment components of the system, and to identify problem areas that lack adequate wet-weather capacity, so solutions can be developed to provide sufficient service. This program provides staff with a comprehensive understanding of SD1's current capacity, which allows for better management, design, and control of the systems.

#### **6.3.1 Overflow Inspections and Hydraulic Modeling**

SD1's CSO investigation crew continues to perform routine CSO inspections after storms that produced more than half an inch of rain and routine dry-weather inspections at sites susceptible to blockages. SSO investigation crews also continue to perform routine inspections and clean-ups after qualifying rain events at known recurring or suspected wet-weather SSO locations. The purpose of these routine inspections is to verify overflow activity due to a lack of capacity, assess the causes of overflows, and initiate the proper procedures for overflow containment and cleanup. SD1's continuous effort to characterize, verify, and respond to overflows throughout its collection system ensures that CSOs and SSOs are appropriately categorized and prioritized for elimination. Additionally, proper overflow characterization from field inspections reinforces the accuracy of the hydraulic models that are used by SD1 to understand system capacity and helps identify effective solutions for overflow reduction and elimination.

SD1 conducted approximately 4,284 CSO diversion inspections in FY 2023. Approximately 2,681 of the wet-weather CSO inspections were performed within 48

hours of a storm that produced at least half an inch of rain, or after a high-river event. Approximately 763 routine dry-weather CSO inspections were also performed. Additionally, following at least one inch of rain, SD1 performed approximately 214 inspections at known recurring SSO locations in FY 2023.

### **6.3.2 Flow Monitoring and Hydraulic Modeling**

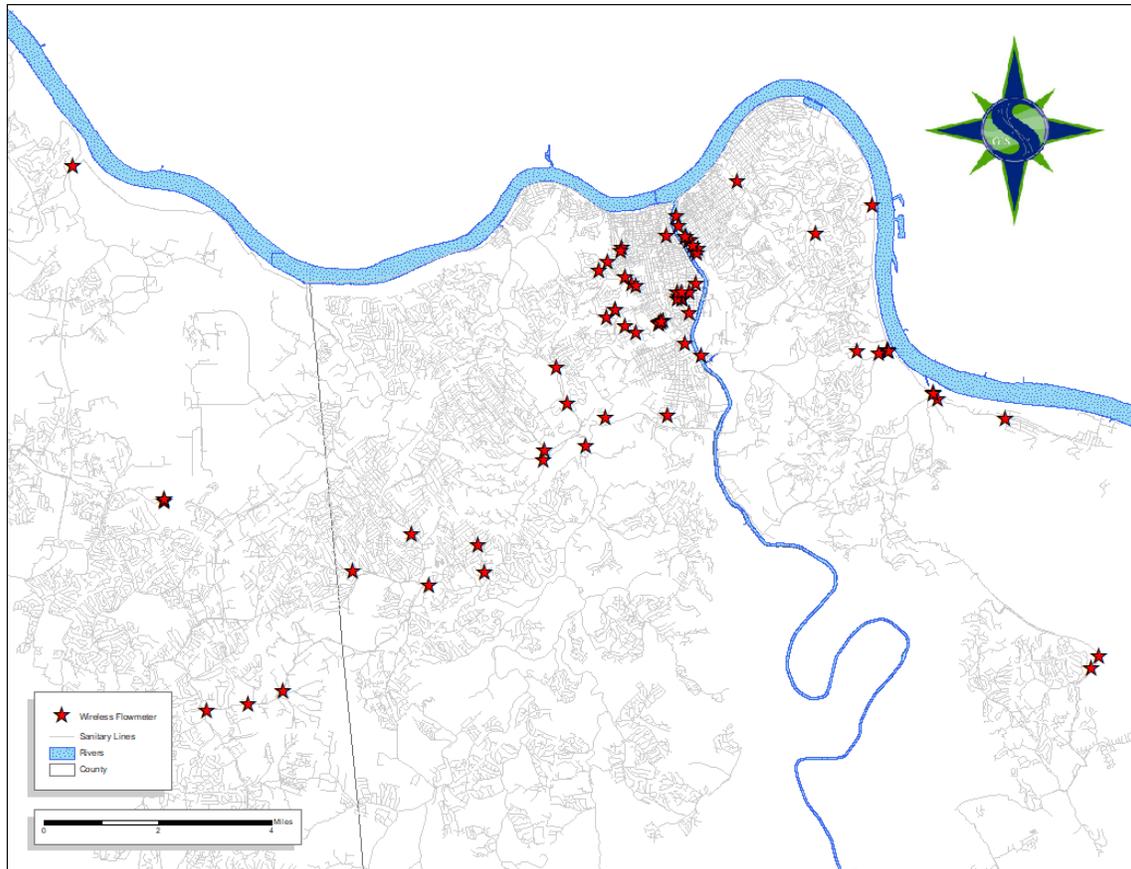
#### Flow Monitoring Activity

SD1's flow monitoring crew continuously utilizes remote-sensing devices, such as, flow meters, levels sensors, cameras, and rain gauges to collect various data in targeted areas of the collection system. These data are used to understand wet weather impacts on the collection system, continuously improve model confidence, identify and confirm areas that are suspected of high inflow and infiltration (I/I), inform reservation of capacity decisions, and quantify the benefits of completed capital projects.

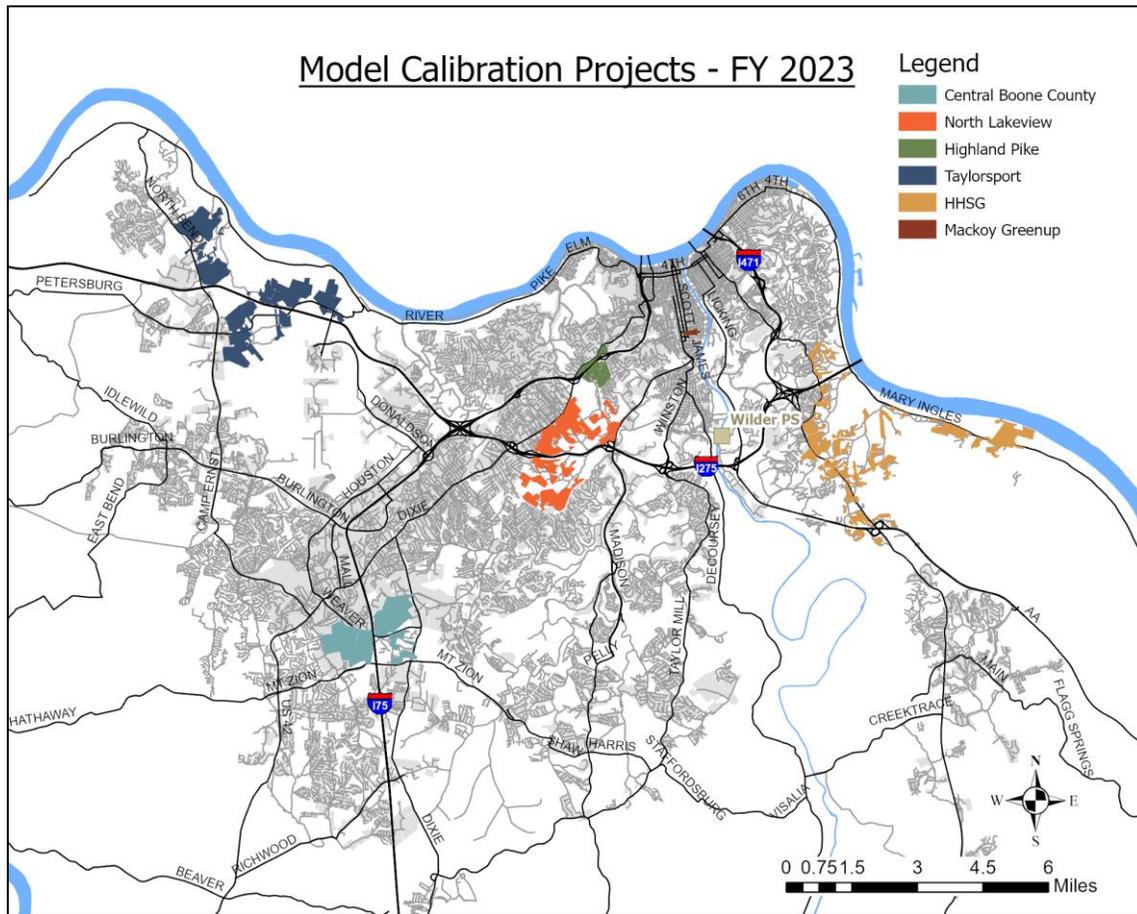
Flow meters are used to gather detailed information on system response to varying antecedent moisture conditions and weather patterns. The data collected with the flow meters address specific conveyance analyses related to the reservation of capacity and the construction of capital improvements, which may alter the system capacity enough to warrant calibration of the models. SD1's flow metering program ensures that SD1's collection system models are continuously verified and up to date.

Figure 6.1 identifies the locations that were monitored with flow meters and Figure 6.2 illustrates the related hydraulic model calibrations that were completed in FY 2023.

Figure 6.1 Flow Monitoring Locations in FY 2023



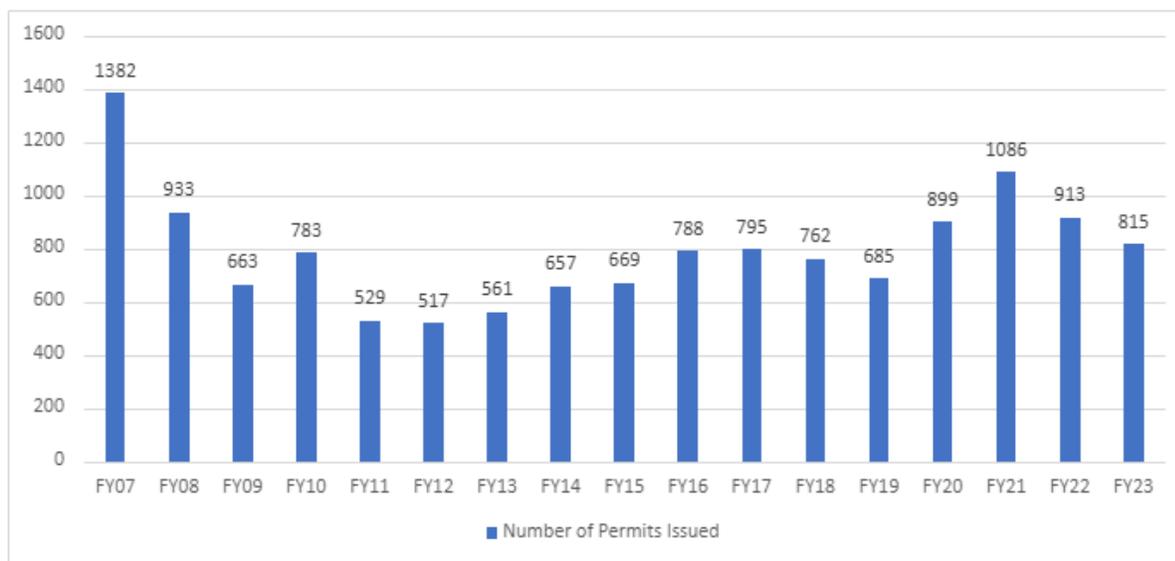
**Figure 6.2 Completed Model Calibrations in FY 2023**



**6.3.3 Reservation of Capacity**

SD1’s Rules and Regulations require developers to submit a written request for the reservation of sanitary sewer capacity, which is reviewed and considered for approval by SD1’s Board of Directors.

A sewer capacity connection permit must be obtained from SD1, prior to connecting to the system. Figure 6.3 shows the number of annual permits issued by SD1 since entering into the original Consent Decree in 2007. In FY 2023, SD1 issued 815 capacity connection permits.

**Figure 6.3 Capacity Connection Permits Issued (FY 2007 – FY 2023)**

## 6.4 Call Before You Dig

The purpose of SD1's Call Before You Dig Program is to protect underground assets by marking the ground where SD1 lines and easements exist, prior to construction activities by contractors, homeowners, or other utilities. By marking these assets prior to construction or any other land disturbance, SD1 prevents unintended damage that could lead to pipe failures and SSOs. In compliance with the American Public Works Association Uniform Color Code, SD1 uses green paint and flags to mark all sewers.

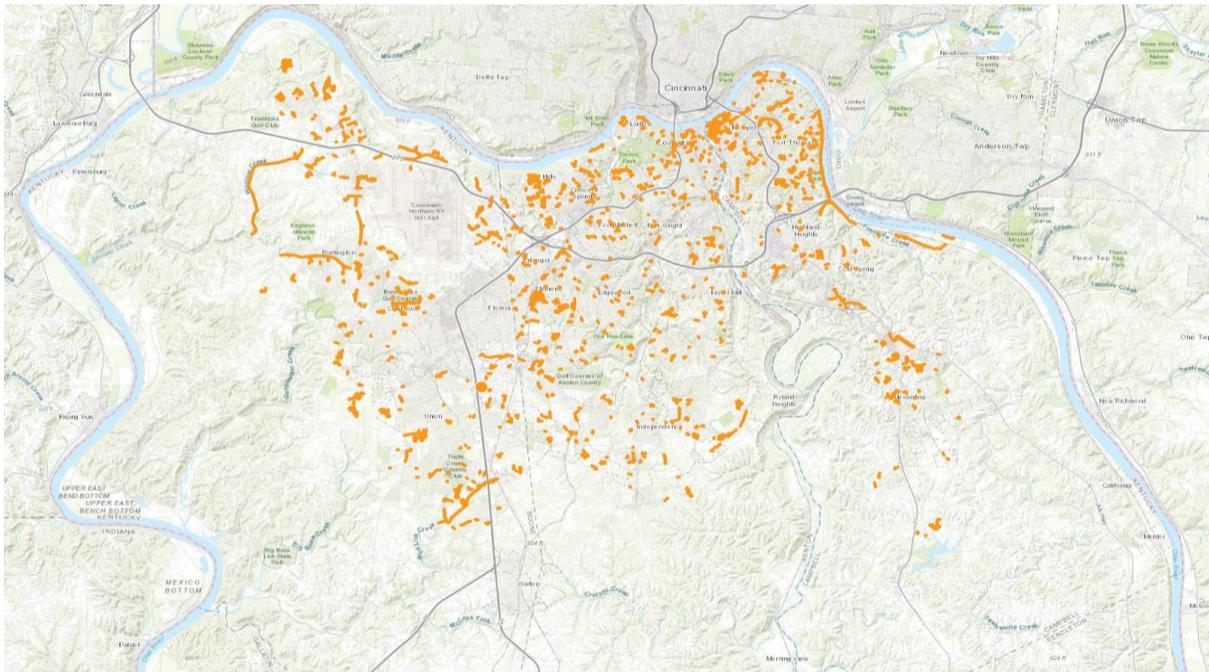
In FY 2023, SD1 responded to 2,388 external requests to locate underground assets. 1,670 work orders were generated from the requests and 4,175 sanitary assets were marked.

Table 6.1 provides the approximate total of line location work orders and assets marked by SD1 in the past eleven years. Figure 6.4 illustrates the sanitary assets, in orange, that were marked in FY 2023.

**Table 6.1 Line Locations**

Fiscal Year	Work Orders Completed	Assets Marked
FY 2011	688	1,220
FY 2012	1,194	2,722
FY 2013	955	2,520
FY 2014	966	2,226
FY 2015	1,465	2,701
FY 2016	1,698	2,065
FY 2017	1,794	2,045
FY 2018	1,202	1,716
FY 2019	1,027	1,099
FY 2020	1,191	794
FY 2021	1,504	1,494
FY 2022	1,459	4,400
FY 2023	1,670	4,175
<b>Total</b>	<b>13,684</b>	<b>21,177</b>

**Figure 6.4 Lines Located and Marked in FY 2023**



## **6.5 New Connection Tap-In**

The purpose of SD1's New Connection Tap-in Program is to ensure standard policies and procedures are in place to approve and perform connections to the sanitary and storm sewer systems. The objectives of this program are to:

- Accommodate economic development throughout the Northern Kentucky region.
- Eliminate the number of illegal and improper taps made throughout the collection system.
- Ensure all connection fees are paid and all new connections are put on billing.
- Maintain the integrity of the sanitary sewer system by reducing the amount of I/I that can enter the system through bad taps or improper abandonment of service laterals.
- Protect the integrity of the sanitary and storm sewer systems by enforcing the use of proper materials.
- Provide an avenue for SD1 to keep certified tappers informed about changes to the Rules and Regulations or specifications for tapping the system.
- Provide supplemental training on other critical SD1 programs, such as FOG, illicit discharge and confined space entry safety.

### **6.5.1 Certified Tapper Program**

SD1's formal Certified Tapper Program ensures that connections to the sanitary and storm sewer system are approved by SD1 personnel and are performed accurately based upon written specifications and procedures. Plumbers interested in becoming certified are required to attend training and pass an exam. In addition, Certified Tappers must complete a recertification class offered by SD1 every three years. SD1 currently has 193 Certified Tappers representing 124 plumbing companies.

## 6.5.2 Violations and Fines

SD1 issued 15 violations with fines totaling \$7,750 in FY 2023.

Table 6.2 provides the total amount of documented violations and fines issued for unpermitted connections since FY 2009.

**Table 6.2 Capacity Connection Violations and Fines**

<b>Fiscal Year</b>	<b>Total Violations</b>	<b>Total in Fines</b>
FY 2009	6	\$3,000
FY 2010	8	\$5,250
FY 2011	9	\$5,500
FY 2012	7	\$2,000
FY 2013	19	\$10,500
FY 2014	23	\$15,250
FY 2015	3	\$1,500
FY 2016	7	\$3,500
FY 2017	14	\$8,250
FY 2018	10	\$5,000
FY 2019	0	\$0
FY 2020	6	\$3,000
FY 2021	4	\$2,000
FY 2022	0	\$0
FY2023	15	\$7,750
<b>Total</b>	<b>116</b>	<b>\$72,500</b>

## 6.6 Lateral Repair Program

In 2016, a formal policy was adopted by the SD1 Board of Directors to assist homeowners with the rehabilitation of failed service laterals that are in the public right-of-way. A full summary of the legal authority, the community's need for this program, and the program eligibility requirements was documented in the CMOM FY 2016 Annual Report.

Table 6.3 provides the total number of reviewed and repaired service laterals in the public right-of-way, since the formal establishment of the program.

**Table 6.3 SD1 Repairs of Failed Private Laterals in the Public Right-of-Way**

<b>Fiscal Year</b>	<b>Lateral Failures Reviewed</b>	<b>Lateral Repairs Approved</b>
FY 2016	114	94
FY 2017	92	45
FY 2018	69	61
FY 2019	68	55
FY 2020	65	53
FY 2021	82	67
FY 2022	78	62
FY 2023	71	55
<b>Total</b>	<b>568</b>	<b>437</b>

## 6.7 Continuous Sewer Assessment

The purpose of the Continuous Sewer Assessment Program (CSAP) is to provide a proactive and coordinated asset management-based approach to assessing the condition and life cycle of SD1's infrastructure and managing a cost-effective rehabilitation/replacement of the system. Implementation of this program has enabled SD1 to more effectively and proactively prioritize and implement system inspection, cleaning, and rehabilitation/replacement of its assets.

SD1's CSAP classifies pipes by using the Sewer Condition Risk Evaluation Analysis Model™ (SCREAM) to generate structural and maintenance scores for each pipe inspected. The structural and maintenance scores are used to identify appropriate schedules for recommended next actions, such as: re-inspection, cleaning, repair, rehabilitation, or replacement. The remaining portions of this section highlight the collective progress of various SD1 operations and maintenance programs in meeting the performance goals and projected targets of the overall CSAP.

### 6.7.1 Collection System Condition Assessment

#### Sewer Inspections

On the following page, Table 6.4 provides the amount of the collection system that has been assessed since the implementation of the CSAP through the end of the current reporting period. The table provides the initial and follow-up inspection footage of pipe inspected over the consent decree period. Initial inspections reflect the amount of the system that has been inspected for the first time. Follow-up inspections are for pipes that have already been initially inspected and found to need maintenance, which required follow-up inspections for post-maintenance assessment scoring.

**Table 6.4 Sewer Inspection Footage**

<b>Fiscal Year</b>	<b>Initial Inspection Footage</b>	<b>Follow-Up Inspection Footage</b>	<b>Total Cumulative Footage</b>
FY 2008	374,068	46,898	420,966
FY 2009	1,340,874	498,113	1,838,987
FY 2010	421,130	589,519	1,010,649
FY 2011	600,306	583,389	1,183,695
FY 2012	501,160	483,494	984,654
FY 2013	622,585	788,311	1,410,896
FY 2014	716,278	629,179	1,345,457
FY 2015	1,070,089	623,860	1,693,949
FY 2016	1,304,103	450,934	1,755,037
FY 2017	475,850	654,491	1,130,341
FY 2018	53,048	813,171	866,219
FY 2019	56,132	995,717	1,051,848
FY 2020	49,660	816,250	865,910
FY 2021	104,362	832,881	937,243
FY 2022	52,164	575,660	627,825
FY2023	56,701	591,114	647,815
<b>Total</b>	<b>7,798,510</b>	<b>9,972,981</b>	<b>17,771,491</b>

### Sewer Line Rapid Assessment Tool (SL-RAT)

The Sewer Line Rapid Assessment Tool (SL-RAT) is a portable and efficient assessment tool composed of one transmitter and one receiver, which sends, receives, and interprets acoustic signals in a pipe. The SL-RAT is designed to listen for and assess the presence of blockages in pipes that are 12 inches or less in diameter. Typical assessments take less than three minutes to perform. During FY 2016, SD1 began using the SL-RAT to manually adjust the automated scheduling of maintenance next actions as determined by the CSAP. The SL-RAT provides a more efficient method of adjusting the CSAP scheduling than the conventional deployment of resource-intensive and time-intensive CCTV crews. Additionally, since FY 2018, the SL-RAT inspection records have been incorporated into the CSAP logic to improve the automation of next action scheduling, based on the results of acoustic scores.

Table 6.5 provides approximate annual footages of the acoustic inspections that are used to confirm or adjust CSAP next actions.

**Table 6.5 SL-RAT Inspections**

<b>Fiscal Year</b>	<b>Footage of SL-RAT Acoustic Inspections</b>
FY 2016	290,000
FY 2017	267,087
FY 2018	256,570
FY 2019	312,032
FY 2020	681,957
FY 2021	349,100
FY 2022	496,618
FY2023	358,942
<b>Total</b>	<b>3,012,306</b>

### Catch Basin and Manhole Inspections

SD1 continually reviews its collected inspection data to adjust maintenance strategies. In the past, SD1 aimed to inspect all public CSS catch basins at least once per year, as recommended in the Nine Minimum Controls Guidance. With continuous data analysis, SD1 can now confidently target catch basins for inspections and cleanings where there

are known recurring maintenance issues, without performing annual inspections of all catch basins. Catch basins that are known to not experience recurring maintenance issues are now inspected on a less frequent schedule.

Table 6.6 summarizes the number of catch basins and MHs inspected since the onset of CSAP.

**Table 6.6 Catch Basin & Manhole Inspections**

<b>Fiscal Year</b>	<b>Number of Catch Basin Inspections</b>	<b>Number of Manhole Inspections</b>
FY 2008	986	2,050
FY 2009	1,774	7,238
FY 2010	4,168	1,933
FY 2011	3,401	1,783
FY 2012	4,019	901
FY 2013	4,247	889
FY 2014	3,745	824
FY 2015	3,569	208
FY 2016	986	0
FY 2017	1,937	0
FY 2018	1,103	0
FY 2019	1,160	59
FY 2020	25	0
FY 2021	1	918
FY 2022	14	794
FY2023	4	1,241
<b>Total Inspections</b>	<b>31,125</b>	<b>18,044</b>

## **6.7.2 Collection System Maintenance**

### Sewer Cleaning

Cleaning is critical in maintaining the capacity of the sewer system and preventing overflows. SD1's prioritization process ensures that cleaning activities are done in a

cost-effective manner and only on pipes in need of cleaning. The cleaning program classifies pipes by using SCREAM™ maintenance scores and identifies appropriate schedules for re-inspections, cleaning, and when the pipe should be reviewed for a permanent solution to recurring maintenance issues.

Table 6.7 provides an overview of the total length of pipe cleaned, in accordance with the CSAP cleaning program logic.

**Table 6.7 Sewer Cleaning Footage**

<b>Fiscal Year</b>	<b>Footage of Pipe Cleaned</b>
FY 2008	113,695
FY 2009	439,191
FY 2010	737,613
FY 2011	382,352
FY 2012	370,296
FY 2013	632,825
FY 2014	568,551
FY 2015	600,302
FY 2016	325,798
FY 2017	347,030
FY 2018	368,108
FY 2019	364,570
FY 2020	298,795
FY 2021	405,011
FY 2022	283,890
FY2023	309,199
<b>Total Feet Cleaned</b>	<b>6,547,226</b>

#### Catch Basin and Grit Pit Cleaning

In January 2009 SD1 began tracking the amount of debris removed during catch basin and grit pit cleanings. In FY 2023, SD1 removed approximately 10 cubic yards of debris from catch basins and 185 cubic yards of debris from grit pits. Table 6.8 provides the estimated total cubic yards of debris removed from the collection system since 2009.

**Table 6.8 Cubic Yards of Debris Removed from Catch Basin & Grit Pit Cleanings**

<b>Fiscal Year</b>	<b>Cubic Yards Removed from Catch Basins</b>	<b>Cubic Yards Removed from Grit Pits</b>	<b>Total Cubic Yards of Grit Removed</b>
FY 2009	149	237	386
FY 2010	433	362	795
FY 2011	629	330	959
FY 2012	527	400	927
FY 2013	367	468	835
FY 2014	455	355	810
FY 2015	486	210	696
FY 2016	985	33	1,018
FY 2017	315	20	335
FY 2018	246	94	340
FY 2019	93	225	318
FY 2020	585	86	671
FY 2021	112	147	259
FY 2022	6*	92	98
FY2023	10	185	195
<b>Total</b>	<b>5,398</b>	<b>3,244</b>	<b>8,642</b>

### Rehabilitation and Replacement

The Asset Renewal group within the SD1 Collection Systems Department manages the internal construction crews and external maintenance contractors that perform repair, replacement, and rehabilitation work. The work schedule is determined by various criticality factors and asset scoring procedures. Pipes requiring emergency work are scheduled for immediate repairs upon discovery. Additional considerations that determine if the rehabilitation schedule should be accelerated are:

- Proximity to known building backups
- Proximity to recurring overflows
- Lack of hydraulic capacity

- Proximity to other assets in need of repair
- High consequence of failure

Table 6.9 provides the rehabilitation and replacement activities performed by SD1's internal construction crews and contractors since the onset of the CSAP through the end of FY 2023. These activities do not include capital improvements managed by SD1's Engineering Division or O/M activities related to MS4 assets.

**Table 6.9 Rehabilitation & Replacement Activities**

Fiscal Year	Feet of Sewer Lines Repaired or Replaced	Feet of Sewer Lines Rehabbed (CIPP)	Number of Manhole Repairs	Number of Manhole Replacements	Number of New Manhole Installations	Number of CSS Catch Basin Repairs	Number of CSS Catch Basin Replacements	Number of New CSS Catch Basin Installs
FY 2008	11,608	1,081	548	35	16	68	81	0
FY 2009	17,944	3,204	370	63	53	115	209	4
FY 2010	29,239	12,872	317	80	40	71	203	2
FY 2011	19,500	64,715	321	60	36	209	116	3
FY 2012	18,508	65,757	774	89	57	292	100	3
FY 2013	21,051	38,129	299	33	34	21	54	3
FY 2014	6,122	43,026	258	19	14	56	28	6
FY 2015	6,371	28,237	154	10	9	63	23	0
FY 2016	6,893	41,185	277	22	30	65	13	0
FY 2017	7,168	58,232	263	10	21	84	15	2
FY 2018	9,877	44,788	241	15	21	35	9	1
FY 2019	8,383	49,078	206	6	29	21	20	0
FY 2020	6,052	29,077	224	15	23	23	15	3
FY 2021	4,331	30,139	206	21	10	16	7	0
FY 2022	1,823	38,312	355	4	9	5	11	0
FY2023	1,031	10,129	198	6	5	3	22	0
<b>Total</b>	<b>176,693</b>	<b>557,961</b>	<b>5,011</b>	<b>488</b>	<b>407</b>	<b>1,147</b>	<b>926</b>	<b>27</b>

## 6.8 Pump Station Operations

The purpose of SD1's Pump Station Operations program is to ensure reliable operations of the pump stations throughout the service area. Routine inspections and preventative maintenance are performed to ensure that all stations are operating at maximum efficiency.

SD1 routinely performs operational inspections and preventative maintenance at all pump stations, flood stations, and associated facilities throughout the service area.

### **6.8.1 Pump Station Inspections**

In FY 2023, SD1 completed approximately 4,997 pump station operational inspections and approximately 212 flood station operational inspections. These routine inspections can vary based on stations size, odor control chemical feed systems, and the back-up power plan. Operational inspections include the following:

- Data Collection - Inspect and record pertinent information on respective inspection forms for equipment, pumps, and facilities, including pump run time, flow meter readings, chemicals remaining, and amp and voltage readings.
- Building, Grounds, and Security - General inspections and cleaning of facilities and grounds, including valve pits, vector pits, and wet wells.
- Critical Systems Checks – Physical inspection of equipment, including valves, bar screens, gates, motors, level control, trash baskets, HVAC systems, and telemetry systems.
- Backup Power - Inspect and record pertinent information on respective inspection forms for generators and back-up pumps, including fuel gauges, coolant, and oil levels, as well as condition of belts, cables, and batteries.
- Odor Control – Inspect odor control chemical feed system for proper operation.

### **6.8.2 Pump Station Preventative Maintenance**

In FY 2023, SD1 completed approximately 3,621 mechanical and electrical preventative maintenance work orders on pumps and equipment. These preventative maintenance work orders generally follow the manufacturer's recommended maintenance guidelines. Pump station preventative maintenance includes, but is not limited to:

- Generator assessments
- Stand-by pumps
- Heating, ventilation, air conditioning
- Electrical components

- Air release valves, gate valves, plug valves
- Motors and motor controls
- Wet wells
- Pneumatics and bubblers
- Float switches for level control
- Telemetry equipment associated with SCADA

## **6.9 Compliance**

The purpose of SD1's Compliance Program is to identify and control residential, commercial, and industrial sources of flow that could adversely affect the collection system. This program encompasses both the Industrial Pretreatment Program and Grease Control Program. This program meets the Clean Water Act pretreatment regulations and complies with the National Pollution Discharge Elimination System permit.

### **6.9.1 Permitting**

The Compliance Program provides the authoritative measures necessary to permit and monitor discharges from commercial and industrial users that may cause corrosion or blockages in the collection system. SD1 ended FY 2023 with a total of 54 permitted Significant Industrial Users (SIU) in its collection system.

### **6.9.2 SIU Monitoring & Enforcement**

The purpose of the Industrial Pretreatment Monitoring Program is to monitor discharges from industrial users throughout the service area to ensure compliance with Section 500 of SD1's Sanitary Rules and Regulations and protect SD1's sanitary sewer system, treatment plants, employees, and the receiving waters. All permitted industries are inspected annually and monitored semi-annually, with additional inspection and sampling performed as needed. In FY 2023, a total of 72 annual inspections were conducted.

SD1 has an Enforcement Response Plan in place to address each violation. Typically, the first Notice of Violation (NOV) issued is verbal. The second NOV is written. Each

subsequent NOV includes a fine. Fines can range anywhere from \$500 to \$1000 depending upon the violation. Most issues are resolved before escalating to fines. If problems persist, an industry will be put on a compliance schedule. In FY 2023, SD1 issued 66 NOVs with fines totaling \$9,750.

### 6.9.3 Food Service Establishments and Grease Control Equipment

The purpose of SD1's Grease Control Program is to prevent the introduction of fats, oils, and grease (FOG) into the sanitary sewer system thereby reducing sewer overflows, maximizing sewer capacity and decreasing sewer maintenance costs. In addition, this program is intended to increase awareness of operators of local food service establishments (FSE) and homeowners about measures they can take to limit or prevent the introduction of FOG into the drains and sanitary sewer system.

SD1's permit requires that all discharges containing grease & oil pass through Grease Control Equipment (GCE) before entering the sanitary sewer. GCE refers to any equipment that removes FOG from wastewater, such as a grease trap which is installed inside the building, or a grease interceptor which is usually installed outside the building and is larger in size. GCE must be well-maintained and in proper operating condition at all times. The design criteria for approved devices are defined in SD1's FOG Management Policy and are enforced with deadlines for installation with SD1's Sanitary Rules and Regulations, which were updated on July 19, 2022.

36 plans for GCE installations were reviewed and 28 new permits were issued by SD1 in FY 2023. Table 6.10 provides an annual summary of plans reviewed and permits issued, since the effective date of the FOG Management Policy.

**Table 6.10 GCE Plans Reviewed & Permits Issued**

<b>Fiscal Year</b>	<b>Plans Reviewed</b>	<b>Permits Issued</b>
FY 2012	10	23
FY 2013	53	52
FY 2014	45	58
FY 2015	36	50
FY 2016	29	30
FY 2017	26	4

FY 2018	9	15
FY 2019	46	11
FY 2020	41	0
FY 2021	37	24
FY 2022	44	1
FY 2023	36	28
<b>Total</b>	<b>412</b>	<b>296</b>

#### 6.9.4 Grease Trap Disposal

All individuals or companies that haul waste to the Dry Creek Wastewater Treatment Plant must apply for and obtain a Domestic Holding Tank Waste Hauler Discharge Permit. Permits are issued on an annual basis and provisions of the permit must be adhered to at all times. Mobile waste haulers disposing GCE waste at the treatment plant are required to submit a Domestic Holding Tank Waste Hauler Manifest, which provides a detailed description of each load on their truck. All FSEs in SD1's jurisdiction shall have an SD1-certified grease waste hauler complete a grease interceptor certification annually. SD1 monitors the method and location of disposal of grease removed from accepted grease control devices through the grease hauler manifest.

In FY 2023, SD1 received and disposed of 105,370 gallons of grease. A summary of the grease hauled and disposed of at the Dry Creek Wastewater Treatment plant since the beginning of the program is provided in Table 6.11.

**Table 6.11 Grease Disposed at Dry Creek Wastewater Treatment Plant**

<b>Fiscal Year</b>	<b>Gallons of Grease</b>
FY 2008	555,833
FY 2009	43,649
FY 2010	108,300
FY 2011	161,150
FY 2012	234,210
FY 2013	185,575
FY 2014	194,325
FY 2015	163,645
FY 2016	203,400

FY 2017	171,250
FY 2018	158,105
FY 2019	183,005
FY 2020	388,795
FY 2021	228,304
FY 2022	127,985
FY 2023	105,370
<b>Total</b>	<b>3,212,901</b>

### 6.9.5 FSE Compliance Inspections

SD1's Industrial Monitoring Department performs inspections of local FSEs that may be contributing to the buildup of FOG in the collection system. Random inspections are conducted to ensure compliance with the permit and with SD1's Rules and Regulations. Additionally, SD1 requires permitted FSEs to report proof of service or cleaning of its GCE. All documentation must be submitted to SD1 by the FSEs within 30 days of the actual cleaning and hauling of grease.

SD1 issued permits to 28 new FSEs in its the service area, and 5 existing FSEs closed during FY 2023, bringing the total of permitted FSEs to 216. No violations for non-compliance were issued in FY 2023.

### 6.9.6 Public Communication

SD1 uses various communication pieces throughout the year to inform and educate private residences and commercial customers on the harmful effects of FOG on sewers and the proper grease handling techniques that can be used to minimize the release of FOG into the collection system. This information is distributed through various channels such as: direct mailings, bill inserts, SD1's website, and community newsletters and newspapers. With the grease observations obtained from CCTV inspections and overflow responses, SD1 focuses its public education efforts primarily in areas that are showing signs of grease problems and applies the appropriate communication strategy to best fit the situation.

#### FOG Letters

In FY 2023, 1 residential grease-related overflow was reported resulting in 623 FOG

letters being sent to residents. This was the largest FOG mailing event since 2014. The large number of mailing recipients was due to the densely populated area in which the single overflow occurred.

### 6.9.7 Grease Control Performance Indicators

Table 6.12 provides a summary of the performance indicators that SD1 has been tracking in relation to its implementation of its formal Grease Control Program.

**Table 6.12 Grease Control Program Performance Indicators**

Performance Indicator	Pipe Footage on PM Cleaning List, due to Grease	Number of SSOs due to Grease	Number of Building Backups due to Grease
FY 2008	82,000	4	2
FY 2009	4,326	17	5
FY 2010	4,336	10	7
FY 2011	4,892	7	7
FY 2012	4,945	5	7
FY 2013	5,465	4	6
FY 2014	7,656	6	4
FY 2015	13,721	12	8
FY 2016	7,958	7	6
FY 2017	3,981	7	1
FY 2018	6,554	8	1
FY 2019	0	2	1
FY 2020	0	2	1
FY 2021	10,851	0	3
FY 2022	12,972	3	5
FY2023	13,552	4	0
<b>Total</b>	<b>183,209</b>	<b>98</b>	<b>64</b>

SD1 has routinely cleaned pipes that were known to be susceptible to grease build up with targeted cleanings on set schedules. In 2018, SD1 made significant programming updates to its CSAP logic, which fully automated prescribed maintenance actions of collection system assets, based on the historical behavior of the system. This was

accomplished by leveraging the extensive condition assessment and work order history information of sanitary sewer assets and refining the automated logic that dictates appropriate maintenance next actions and schedules for each assessed sewer. Additionally, new technologies, such as the SL-RAT acoustic inspections, were fully integrated into the automated CSAP logic. These technologies improved the effectiveness and efficiency, providing more comprehensive maintenance scheduling of the collection system.

SD1 recorded 4 SSOs due to grease blockages in FY 2023. SD1 is determining if there is a correlation between the approximate amount of pipe on a PM cleaning list for grease and the frequency of SSOs and building backups due to grease. Investigation may determine that the automated CSAP logic implemented in 2018 is capable of predicting where maintenance is needed prior to most blockages forming. This performance indicator will continue to evaluate the CSAP's ability to identify blockage risks and produce the desired results of predictive maintenance.

## **SECTION 7. COMPLETED PROJECTS**

The fifth reporting requirement of the Annual Report, per paragraph 48 of the Amended Consent Decree, is to provide:

**48. (e)** Any additional information necessary to demonstrate that the District is adequately implementing its Updated Watershed Plans.

SD1 began completing projects included in the original Watershed Plan in 2005, well before formal Watershed Plan approval in 2014. As a result, SD1 has over 10 years of targeted improvements already completed, with an associated reduction in CSO and SSO overflow volume. Completed improvements, prior to the Updated Watershed Plan (UWSP), had focused on initial high-impact projects such as:

- Initial Watershed Program projects as set out in Exhibit D of the original CD.
  - System-wide projects from the IWSP (i.e. original WSP) Five-Year Program
  - Specific basin projects from the IWSP Five-Year Program.
  - Pump station upgrades as set out in Exhibit E of the original CD.
- benefit.

- CSO Diversion adjustments associated with the Inline Storage Program and the Solids and Floatables Control Program.
- Additional Projects for CSO and SSO Control

Many of the completed improvements described above were an important commitment of the original WSP, and as intended their results have informed selection of projects in the UWSP.

The result of the improvements through 2017 is that SD1 has eliminated approximately 155 MG of typical year CSO discharges and approximately 124 MG of typical year SSO volume, relative to overflow levels that existed before the original CD.

In addition to the eliminated discharges described above, completed projects from 2017 through FY2023 have resulted in further elimination of approximately 196 MG of typical year CSO discharges and approximately 74 MG of typical year SSO volume relative to the established 2017 baseline volume established in the ACD.

## **7.1 Completed Project Summary**

On the following pages, Table 7.1 details the completed projects from the ACD and Table 7.2 details the completed projects from the UWSP as of end of FY 2023.

**Table 7.1 Amended Consent Decree Appendix C Completed Projects**

Project Title	Project Description	ACD Completion Date	Completion Date
River Water Intrusion Program Phase I	Outfall flap gates or gated chambers at 7 locations. This project will reduce CSOs on the Ohio River west of the Licking River. CSO diversions to receive RWI protection are: 1730008,1730029, 1710084, 1710098, 1490027, 1470052, and 1440053.	12/31/20	12/31/20
Jacob Price Sewer Separation	2,700' of 12" thru 30" pipe. This project will install new pipe on 9th and 10th Streets in Covington from Greenup to the Licking River. This project will reduce CSOs along the Licking River by approximately 8 million gallons (MG) in the typical year.	12/31/19	06/30/19
Aqua on the Levee Sewer Separation	1,500' of 48" and 30" pipe sewer separation and direct flow to the Ohio River. Pipe installation is primarily on Washington Street. This project will reduce CSOs on the Ohio River east of the Licking River by approximately 5 MG in the typical year.	12/31/20	1/15/19
Church Street Sewer Separation	Approximately 2,000' sewer separation. New pipe on Gail, Janet, Valley View, Primrose, and sunset Streets. This project will reduce CSOs along the Banklick Creek near the Licking River, by approximately 5 MG in the typical year.	03/31/19	10/25/18
Lakeside Park Sewer Capacity Upgrade	2,500' of 24" and 18" pipe installation on Hudson Ave from Dixie Hwy to the dead end of Hudson. Improvement is expected to address deteriorated infrastructure.	06/30/19	04/30/19
Bullitsville Force Main Capacity Upgrade Phase I & II	2000' of existing 12" force main will be replaced (PH I) and 10,000' of existing force main will be cleaned on the interior (PH II) to increase flow capacity. Improvements address deteriorated infrastructure.	12/31/19	PH I: 07/05/19
Elsmere Corridor Capacity Upgrade	8,700' of 30", 24", and 18" pipe installation. This project is located in Kenton County upstream of the Narrows Rd Pump Station. Gravity upgrade of existing infrastructure will eliminate 3.41 MG of TY SSO and multiple Recurring SSO locations: 2100106, 2100129, 2100002, 2070019, 2090063, 2090008, and 2110001.	12/31/20	6/1/20
Wilder Pump Station Upgrade	Increase capacity of existing pump station and replace deteriorated infrastructure. Replace pumps to increase total pumping capacity from 1.1 MGD to 1.7 MGD.	12/31/20	6/30/19

Project Title	Project Description	ACD Completion Date	Completion Date
Allen Fork Pump Station Upgrade	Increase capacity of existing pump station. Replace pumps to increase total pumping capacity from 3.2 MGD to 4 MGD. Project impacts MH 2390002. Reduction of TY SSO volume of 0.01MG.	12/31/20	10/1/18
US 27/AA Highway PH I	9,600' of 12" and 14" force main, 7,000' of 18" gravity sewer, Centerplex PS capacity upgrade. Initial phase along AA Hwy from Centerplex PS to the Riley Rd PS.	12/31/20	6/21/21

**Table 7.2 Updated Watershed Plan Completed Projects**

Project Title	Project Description	2040 Overflow Eliminated (MG)	Overflows Addressed
<b>COMBINED SEWER OVERFLOW SOLUTIONS</b>			
Targeted Sewer Separation	SD1 completed six opportunistic sewer separation projects in the combined system as part of the 2023 improvements. Jacob Price Phase 2, Church Street Phase 2, Water's Edge, Aqua on the Levee and RiverCenter separation projects separated approximately 65 acres of pervious and impervious area. The Washington/Saratoga will separate approximately 6 acres of pervious.	7	0610071, 0620077, 0640090, 0770096, 1420142, 1470093, 1850158, 1870193, 1880090, 1880091
Ash Street EQ Tank	Construction of a 0.41 MG buried tank and gravity diversion in the City of Silver Grove to store CSO in excess of the downstream sewer capacity. The tank dewater through a controlled drain vault at a rate of 0.25 MGD..	1.5	0010220
River Water Intrusion Program Phase I & II	Outfall flap gates or gated chambers at 21 locations. This project will reduce CSOs on the Ohio River west of the Licking River. CSO diversions to receive RWI protection are: 1480103, 1480097, 1480108, 1480012, 1480116, 0910064, 1420028, 0880017, 0930041, 0930014, 0930075, 0980036, 0880004, 1420032, 0910005, 0930026, 0960032, 1720005, 1710003, 1710068, 1440156.	116	0880081, 0880082, 0910065, 0910068, 0930105, 0960063, 1420142, 1440206, 1440209, 1470093, 1480187, 1490132, 1710116, 1710119, 1710121, 1710124, 1720109, 1730259
River Water Intrusion Program Phase III	Outfall flap gates or gated chambers at 21 locations. This project will reduce CSOs on the Ohio River east of the Licking River. CSO diversions to receive RWI protection are: 0820001, 0820001, 0640081, 0790015, 0650084, 0620031, 0770006, 0610006, 0630001	107	0790086, 0570089, 1480187, 1440206, 1470093, 1710116, 1710119, 1710121, 1710124, 1720109, 0610071, 0620075, 0640090, 0650090, 0790084, 0840112
Ohio River Gray Components - Diversion Weir Adjustment	Strategic diversion weir adjustments at several diversions consisting of raising the overflow elevation to provide CSO volume reduction.	6.2	0960064, 0980081, 1440206, 1490132, 1870193
<b>SEPARATE SEWER OVERFLOW SOLUTIONS</b>			
Vernon Lane RDII Removal	Vernon Lane II Removal is located in the upstream portion of the Licking River Siphon sewershed. This project included both public and private source RDII removal over a 67-acre area and included removal of numerous direct connections from downspouts and area drains. The project included the installation of approximately 2,600 feet of 8-inch to 18-inch sanitary sewer, approximately 650 feet of 6-inch lateral piping, and approximately 1,300 feet of 12-inch to 24-inch storm sewer.	4.4	260002

Project Title	Project Description	2040 Overflow Eliminated (MG)	Overflows Addressed
Elsmere Corridor Capacity Upgrade	Gravity upgrade of existing infrastructure includes 8,700' of 30", 24", and 18" pipe installation. This project is located in Kenton County upstream of the Narrows Rd Pump Station.	3.5	2070019, 2090008, 2090063, 2100002, 2100036, 2100106, 2100129, 2110001, 2110002
Richwood Pump Station & Force Main	Richwood pump station and force main redirectes flows away from the capacity limited Southern Kenton Interceptor and towards the Western Regional Union Sewer. This project was designed to maximize the investment SD1 made in the Western Regional WRF and associated conveyance tunnel which was designed to accommodate these diverted flows. The project consisted of a new 7.5 mgd (firm-capacity) pump station and approximately 18,600 feet of 20-inch through 24-inch force main.	3.6	2280023
Allen Fork Pump Station Upgrade	Allen Fork pump station upgrades were completed to address persistent maintenance issues and provide additional capacity. The pump replacements were designed to increase the station's firm capacity from 2.5 mgd to 3.4 mgd.	0.01	2390002
Highland Heights -Silver Grove EQ Tanks	Construction of an above ground 1.4 MG EQ tank at the Highland Heights PS and an above ground 1.6 MG EQ tank at the Silver Grove PS to contain typical year SSOs that are a result of flows that exceed the pumping capacity of the stations. Each facility utilizes a wet weather pump station to pump excess flows to the EQ tanks, which have controlled gravity lines back to the collection system.	22	0020006, 0020007, 0020008, 0020032
Licking River Double Siphon	Construction of a second 12-inch siphon under the Licking River to the combined system with horizontal directional drilling. The parallel siphon is required to accommodate future conveyance improvements in the Licking River Siphon sewershed and will work in conjunction with the Licking River Siphon EQ tank.	42	860001
Licking River Siphon EQ Tank	Construction of an above ground 7.3 MG EQ tank near Andrews Way and Three Mile Creek to store flows in excess of the Licking River Siphon downstream. The project works with the Licking River double siphon project by lowering the hydraulic grade line in the existing sewers, mitigating CSO impacts, and eliminating the LRS SSO. The tank is sized to accommodate additional flow from conveyance projects upstream to be completed by 2040.	5	860001

Project Title	Project Description	2040 Overflow Eliminated (MG)	Overflows Addressed
<b>Bromley Crescent Springs Conveyance*</b>	This conveyance upsizing is a multi-phase project that addresses ongoing maintenance and safety issues by preventing displacement of manhole covers in the roadway due to system surcharge. The project consists of 6,050 feet of 30-inch through 42-inch sanitary sewer upsizing. The upsizing would begin at manhole 1730027 and would extend upstream to manhole 1790092.	1.3*	1730084, 1730085, 1730086*
<ul style="list-style-type: none"> <li>BCSC Phase 1</li> </ul>	The completed BCSC Phase 1 of this project includes upsizing from MH1730087 – MH1730027.		
<b>Waterworks Road Conveyance Phase II</b>	This multi-phase project consists of 11,020 feet of 10-inch through 24-inch and 1,450 feet of 42-inch sanitary sewer upsizing. The 10-inch through 24-inch upsizing would begin at manhole 0530121 and would extend upstream to manholes 0380005 and 0400034. The 42-inch upsizing extends between manhole 0650097 and 0650022 and discharges to the recently constructed 54-inch sewer along Riveria Drive. This conveyance upsizing will convey additional flow to the combined system and the planned Taylor Creek EQ tank downstream. The downstream combined system solution has been configured to accommodate the additional flow.	3.0*	See Phase Breakdown Below
<ul style="list-style-type: none"> <li>WRC Phase 1</li> </ul>	The completed WRC Phase 1 of this project includes upsizing from MH0410115 – MH0400034.		0370001, 0400002, 0400034, 0410037, 0410039
<ul style="list-style-type: none"> <li>Strathmore / Memorial Parkway</li> </ul>	This completed phase consisted of conveyance upsizing to 30-inch sewers at Strathmore & Rosemont, as well as, conveyance upsizing along Memorial Parkway.		0380005
<b>2034 Lakeview Conveyance*</b>	The Lakeview 2034 solution includes the impact of redirected flow to Western Regional from the Richwood PS/FM project and the W6 pump station to be constructed by 2029. These projects relieve significant flows to the Lakeview system.	1.3*	1940038, 1940039
<ul style="list-style-type: none"> <li>Highland Pike HDD Gravity</li> </ul>	This completed projects consisted of the installation of approximately 2,300 feet to 20-inch HDD gravity sewer along Highland Pike from MH1940039 – MH1940263.		

\*The 3 projects denoted with an asterisk in Table 7.2 consist of future phases. The eliminated overflow volume and addressed overflow locations are in reference to the entire project, not the completed phase.

## **SECTION 8. PROJECT SPOTLIGHT – RIVER WATER INTRUSION**

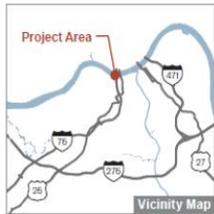
SD1's combined sewer system was impacted on a regular basis by high river levels on both the Ohio River and Licking River. This is not uncommon in combined sewer systems but is especially pronounced in SD1's case given that many of the CSO outfalls were constructed prior to construction of the Markland Dam in the mid-1960s (located downstream from SD1's service area) which raised the pool elevation to 25.4 feet, reaching very close to the elevation of many diversions. River water intrusion has the effect of increasing flows in the CSS during high-river stage conditions, resulting in earlier triggering of CSOs during rainfall events, an increase in CSO volume when flood stations are activated, and utilization of treatment plant capacity to treat river water. To mitigate the effects of river water intrusion, SD1 has completed a multi-phase program to prevent river water intrusion up to a design river elevation.

Phases I & II included the installation of a flap gate or check valve on 19 CSO outfalls along the Ohio River and Licking River as shown in Figure 8-1. These projects allow Bromley PS, 8<sup>th</sup> Street PS, and Patton Street PS to remain in normal operation up to a river stage of 47 feet. Currently, Bromley PS decreases to 2 small pumps for river levels above 41 feet, and 8th Street and Patton Street shut down completely due to significant river water intrusion. By protecting the CSS from river water intrusion for river levels up to 47 feet, these pump stations can remain in operation and not inundate Dry Creek treatment plant with river water and highly dilute sewage.

Phase III built upon this work and protects an additional 8 CSO outfalls along the Ohio River and Licking River as shown in Figure 8-2. This final phase of protection allows the 2nd Street Pump Station to remain in normal operation up to a river stage of 47 feet. Currently, this pump station shuts down above 41 feet due to significant river water intrusion.

Together the 3 completed phases of the River Water Intrusion project will reduce typical year CSO volumes by 230 MG.

Figure 8.1 River Water Intrusion Phase I & II



**RWI Phase I & II Improvements**

**Project Status:** Conceptual Planning  
**Estimated Capital Cost:** \$7,880,000

**Project Metrics**  
 Estimated Overflow Reduction (Typical Year): 116 MG  
 Cost Per Gallon Removed (Typical Year): \$0.07

- NOTE:**
1. SSO benefit is as of the current 2023 model and includes only the overflows listed in this subsection. Confirmation of overflow metric compliance is summarized at the end of this section.
  2. Costs are based on preliminary planning level capital cost estimates in 2019 dollars.
  3. RWI Program shortened to three phases instead of four to more efficiently construct the improvements.

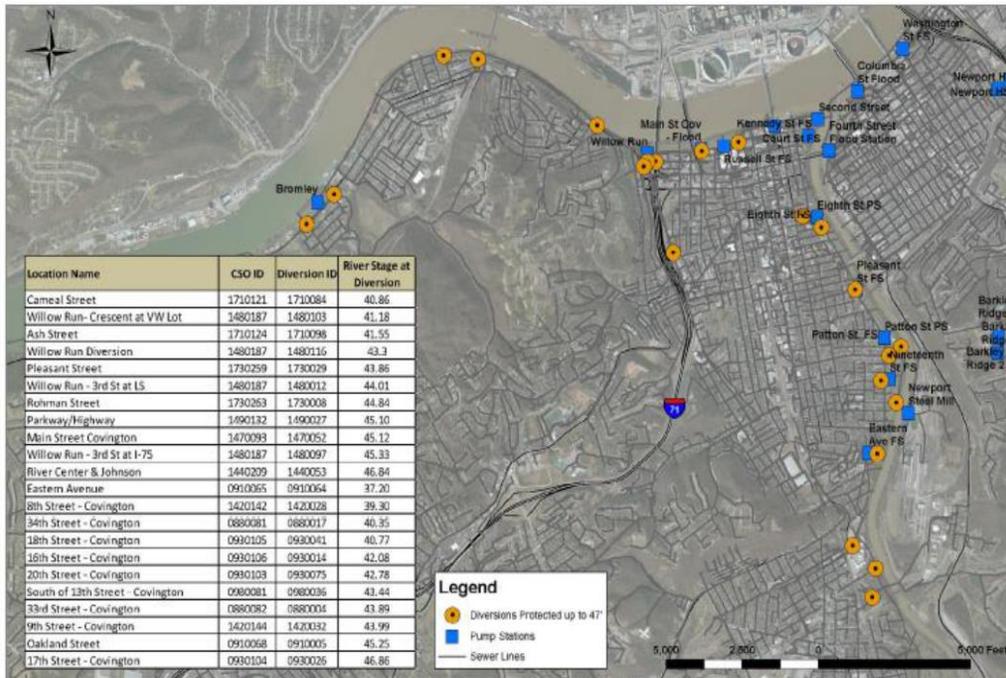


Figure 8.2 River Water Intrusion Phase III

RWI Phase III Improvements

**Project Status:** Conceptual Planning  
**Estimated Capital Cost:** \$6,250,000

**Project Metrics**

Estimated Overflow Reduction (Typical Year): 107 MG  
 Cost Per Gallon Removed (Typical Year): \$0.06

- NOTES:**
1. CSO benefit is as of the current 2029 model and includes only the overflows listed in this subsection. Confirmation of overflow metric compliance is summarized at the end of this section.
  2. Costs are based on preliminary planning level capital cost estimates in 2019 dollars.
  3. RWI Program shortened to three phases instead of four to more efficiently construct the improvements.

