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December 30, 2019

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Subject: Annual Report
July 1, 2018 through June 30, 2019
Civil Action No. 3:08-cv-00608-CRS
DOJ Case No. 90-5-1-1-08254

Attention Director and Chiefs:

Please find attached our Annual Report, prepared in accordance with Paragraph 30 of our Amended Consent Decree. This report is for the period July 1, 2018, through June 30, 2019.

I certify under penalty of law that this document and all attachments were prepared under our 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.

If you have questions or need additional information, please contact me at (502) 540-6136.

Sincerely,

Angela Akridge, PE
MSD Chief Engineer

cc: James A. Parrott
Paula Purifoy
File

Louisville and Jefferson County Wet Weather Consent Decree Annual Report



Reporting Period:

July 1, 2018 through June 30, 2019

Submitted To:

Kentucky Department of Environmental Protection
United States Environmental Protection Agency
United States Department of Justice

Submitted By:

Louisville and Jefferson County Metropolitan Sewer District
700 W. Liberty Street
Louisville, Kentucky 40203-1911

Submittal Date:

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Louisville and Jefferson County Wet Weather Consent Decree Annual Report



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INTRODUCTION

The Louisville and Jefferson County Metropolitan Sewer District (MSD) has entered into an Amended Consent Decree with the Kentucky Department of Environmental Protection (KDEP) and the United States Environmental Protection Agency (EPA). The Amended Consent Decree was signed by United States District Judge Simpson on April 10, 2009, and filed in United States District Court, Western Division of Kentucky, Louisville Division, on April 15, 2009.

This is the fourteenth Annual Report submitted in accordance with Paragraph 30 of the Amended Consent Decree. This report covers the time period from July 1, 2018, through June 30, 2019, and references data presented in Quarterly Reports 52 through 55. The structure for this report is outlined as follows:

Section 1: Project WIN Performance Overview – This section provides an accounting of the number of overflow occurrences, including unauthorized discharges from the separate sanitary sewer and combined sewer system, and the estimated volumes of each. A discussion of the probable reductions that are expected as a result of MSD's projects and activities during the reporting period is also contained in this section. These include both unauthorized discharge points and the discharges from MSD's Combined Sewer Overflow (CSO) locations, as identified in the Morris Forman Water Quality Treatment Center (WQTC) Kentucky Pollutant Discharge Elimination System (KPDES) permit.

Section 2: Program Activities for Nine Minimum Controls – This section describes the scope, schedule and status for projects and other activities that were active during the reporting period, as well as the anticipated projects and activities scheduled to be performed during the next reporting period (July 1, 2018, through June 30, 2019) for continued compliance with the Amended Consent Decree.

Section 3: Program Activities for Sewer Overflow Response Protocol – This section describes the scope, schedule and status for activities that were active during the reporting period, and the anticipated activities that are scheduled to be performed during the next reporting period for continued compliance with the Amended Consent Decree.

Section 4: Program Activities for Discharge Abatement Plans – This section describes the scope, schedule and status for projects and other activities that were active during the reporting period, as well as the anticipated projects and activities that are scheduled to be performed during the next reporting period for continued compliance with the Amended Consent Decree.

Section 5: Public Outreach, Education, Notification and Participation – This section describes the activities related to public outreach, education, notification and participation that were active during the reporting period, and the anticipated activities that are scheduled to be performed during the next reporting period for continued compliance with the Amended Consent Decree.

Section 6: Capacity Management Operations and Maintenance Report – The program activities performed during the reporting period, and activities planned for the next reporting period are included in this section for continued compliance with the Amended Consent Decree.

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SECTION 1: PROJECT WIN PERFORMANCE OVERVIEW

This section presents an overview of IOAP progress during the reporting period as well as performance measures related to permit compliance, discharges, and other related data.

1.1. COMBINED SEWER OVERFLOW REDUCTION AND SANITARY SEWER OVERFLOW ABATEMENT ACTIVITIES

The following sections outline the activities performed during the reporting period to reduce or control Combined Sewer Overflow (CSOs) and eliminate Sanitary Sewer Overflows (SSOs).

1.1.1. COMBINED SEWER OVERFLOW REDUCTION AND CONTROL ACTIVITIES

MSD completed five IOAP projects during the reporting period that mitigated permitted CSOs, as detailed in Table 1.1.

Table 1.1. Completed Combined Sewer Overflow Reduction and Control Activities – Current Reporting Period

PROJECT	CERTIFIED COMPLETION DATE	LEVEL OF CONTROL (TYPICAL YEAR)
Southern Outfall In-Line Storage at 43 rd Street (SOR1)	November 30, 2018	8
Morris Forman WQTC Headworks	December 17, 2018	8
Central Relief Drain CSO In-Line Storage, Green Infrastructure and Distributed Storage	December 20, 2018	8
Clifton Heights Storage Basin	December 21, 2018	4
Southwestern Parkway Storage Basin	March 29, 2019	8

The Annual Average Overflow Volume (AAOV), derived from the InfoWorks CSO hydraulic model, includes the modeled AAOV for the permitted CSOs and is included as Appendix B. The observed CSO data for the reporting period for each monitored overflow has been tabulated, along with rainfall information from the nearest rain gauge, to facilitate review of the overflows that occurred, and is included as Appendix C.

Refer to Section 4.5 for information regarding system monitoring and performance.

1.1.2. SANITARY SEWER OVERFLOW ELIMINATION ACTIVITIES

Per the current approved schedule, there were no IOAP projects which eliminated SSOs during the reporting period.

Estimation of SSO volume is not available in the same manner as it is for the CSO locations. The SSO volume reductions are estimates based on actual observations or from flow monitoring and modeling information where available.

Refer to Section 4.5 for information regarding system monitoring and performance. Refer to Appendix D for a listing of discharges.

1.2. COMBINED AND SANITARY SEWER SYSTEM PERFORMANCE

MSD has developed performance measures to monitor the operation of the collections system and WQTCs, with the goal of reducing sewer overflows and improving surface water quality. The data reported in this document is the best, most up-to-date data available as of the document date. There may be changes to historic data as the data is reviewed for quality and accuracy and updated on a continuous basis by MSD administrative and field staff.

1.2.1. SYSTEMWIDE PERFORMANCE

1.2.1.1. RAINFALL

The number and the volume of wet weather overflows are directly related to the amount of rain that has fallen during the reporting period. No new rain gauges have been installed by MSD during the reporting period, and the total network currently has 46 rain gauges, as shown in Figure 1.1. Nine gauges are located within Indiana, eight within adjacent Kentucky counties and the remaining 29 are within Jefferson County. MSD plans to continue to expand the rain gauge network as appropriate sites are identified.

Figure 1.1. MSD Rain Gauge Network

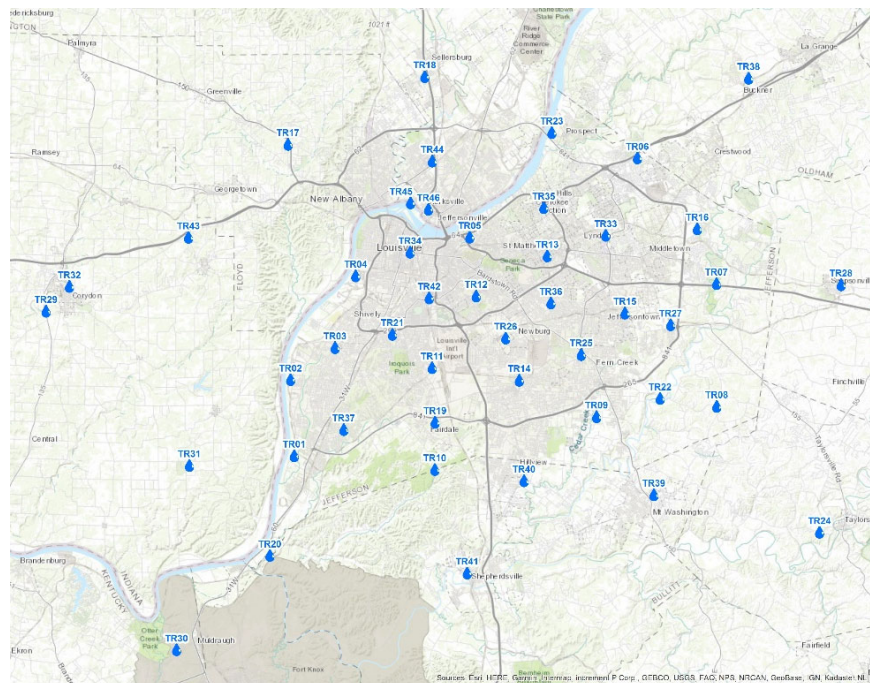


Figure 1.2 shows the Jefferson County average daily rainfall amounts by month for the reporting period, based on the monthly average of all MSD rain gauges, compared with the average since FY08. Figure 1.3 presents the same data as an average monthly rainfall amount by month and fiscal year. These figures show that while the total rainfall for the year was just below the average annual rainfall since FY08, FY19 had significantly higher than average rainfall in February, and slightly higher than average rainfall in September, October, and June. The discharge data reflects this occurrence.

Figure 1.2. Daily Average Rainfall by Month

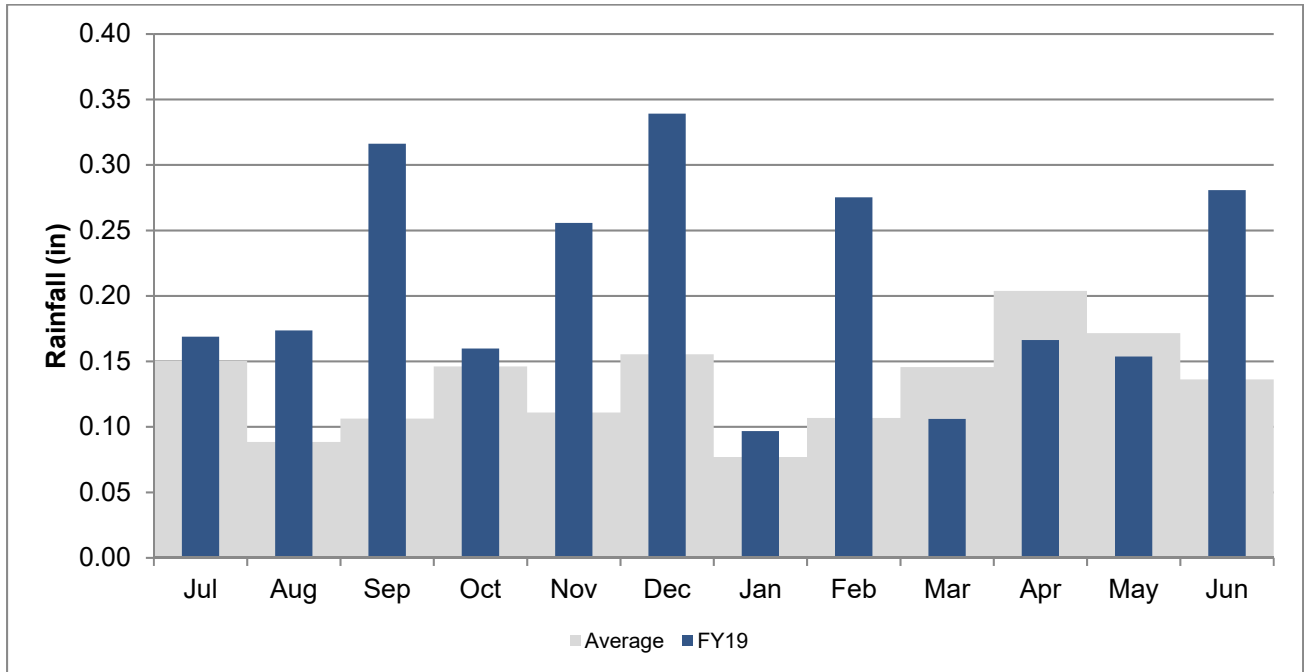
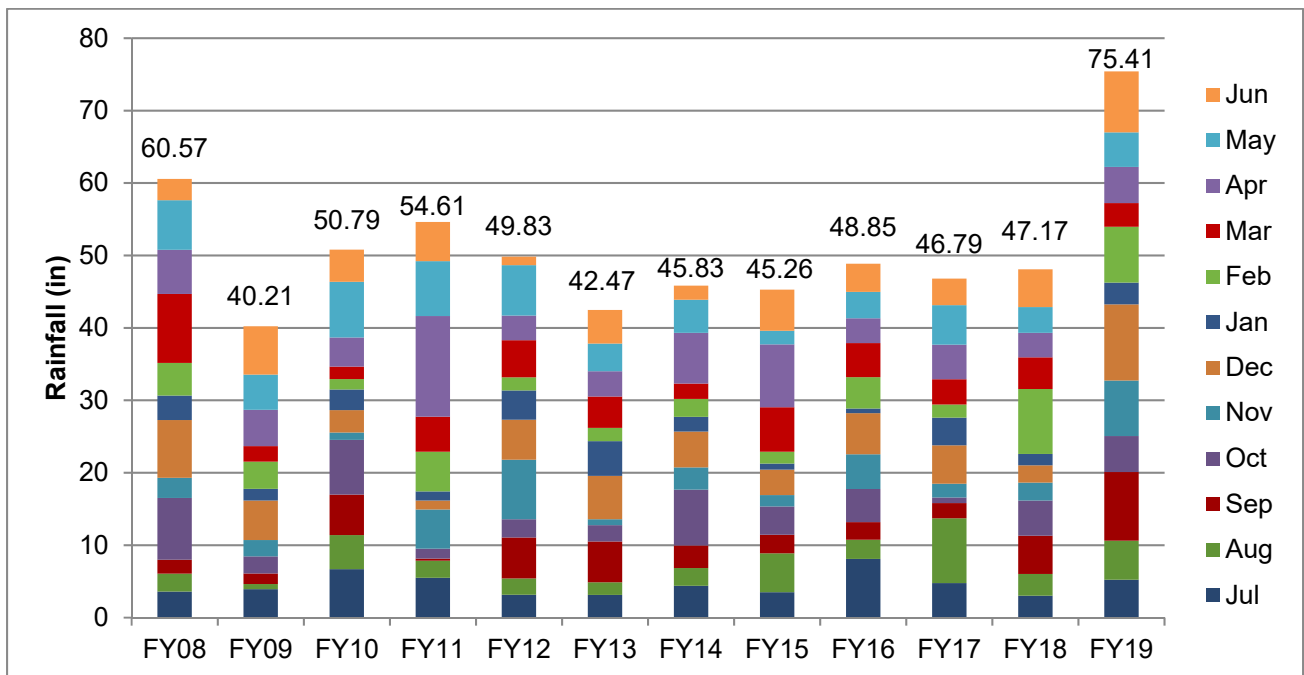


Figure 1.3. Monthly Average Rainfall by Fiscal Year



1.2.1.2. DISCHARGES

MSD enters and maintains information related to discharges and overflows that are observed by MSD staff in the Hansen Information Management System (Hansen) utilizing procedures reviewed and improved through efforts associated with components of the Sewer Overflow Response Protocol (SORP), as required under the Amended Consent Decree. These discharges are categorized using the following categories:

- Asset Type
 - Water Quality Treatment Center (WQTC)
 - Combined Sewer Overflow (CSO)
 - Collections System Assets associated with a Sanitary Sewer Overflow (SSO)
 - Pump Stations –sanitary, flood and viaduct pump stations
 - Access Points – manholes, valves and inlets
 - Mains – sanitary and combined system mains
 - Service Connections – customer service lines
- Weather – Dry or wet
- Result – Waters of the United States (WUS), Exterior (i.e., to the ground), or Interior (i.e., inside a building)
- Problem – The issue that caused the discharge, including the following groups:
 - Bypass / Upset at a WQTC (or Blending at Jeffersontown WQTC, for discharges that occurred prior to WQTC elimination) as defined by permit
 - Capacity – Lack of Capacity or Pumped Overflow during wet weather
 - Maintenance & Operations Issue – Electrical Problem at MSD, Grease Blockage, Mechanical Failure, Obstruction (Not Grease or Roots), Power Outage, Pumped due to USACE Manual Requirements, Roots, Structural Issue, or Utility Damage

Unauthorized discharges to the Waters of the United States (WUS) have been reported to the Kentucky Department of Environment Protection (KDEP) and the Environmental Protection Agency (EPA) per the approved SORP. Overflows to the ground and backups into buildings are reported in the Consent Decree Annual Report. All overflow reporting documentation is stored in MSD's asset management system, Hansen.

Table 1.2 details the observed discharges by weather and result since FY08. Appendix D includes information related to MSD's observed unauthorized discharges and overflows for the reporting period. During the upcoming reporting period, this data will be reviewed to determine if anomalies are present and if additional quality control or process improvements are warranted.

Discharges at permitted CSO locations that are observed by telemetry only are recorded with MSD's flow monitoring data and included in Appendix C.

Table 1.2. Observed Discharges by Weather and Result - All Assets

FY	UNAUTHORIZED DISCHARGE - WATERS OF US		OVERFLOW TO INTERIOR		OVERFLOW TO EXTERIOR (GROUND)	
	WET WEATHER	DRY WEATHER	WET WEATHER	DRY WEATHER	WET WEATHER	DRY WEATHER
FY08	553	42	692	122	21	42
FY09	129	64	147	154	9	61
FY10	394	47	706	151	21	48
FY11	789	45	610	170	28	62
FY12	493	43	106	141	20	48
FY13	296	27	38	127	5	37
FY14	417	38	130	127	7	26
FY15	422	38	305	757	22	84
FY16	335	32	84	86	17	39
FY17	76	29	8	273	6	69
FY18	204	23	37	61	14	49
FY19	430	39	83	28	10	31

1.2.2. WATER QUALITY TREATMENT CENTER PERFORMANCE

The following sections summarize performance compliance measures and trends at the water quality treatment centers (WQTCs) for the reporting period, including overflows attributed to the WQTC asset, bypasses, and effluent parameter exceedances.

1.2.2.1. OVERFLOWS TO THE EXTERIOR

Table 1.3 and Figure 1.4 detail the observed discharges by weather since FY08 at all WQTCs from manholes on WQTC property. The decreasing trend in number of discharges can in part be attributed to reduction in number of operational WQTCs, discussed further in Section 1.2.2.4.4. Table 1.4 and Figure 1.5 show discharges by problem.

1.2.2.2. BYPASSES

Project WIN Quarterly Report 18 included a memorandum, included as Appendix K in that report, which described the analysis of 44 bypass events that occurred between July 1, 2008, and December 31, 2009. This analysis delineated bypasses into the four categories, including Capacity, External Power Failures, Equipment Failure (Mechanical, Electrical, or Structural), and Human Error. An assessment of bypasses is performed in each subsequent quarterly report to determine the root cause of each bypass, the failure category, corrective actions to be taken, possible programmatic solutions, and a corrective action completion date. Refer to quarterly reports for the reporting period for detailed analysis of bypasses.

Table 1.5 and Figure 1.6 show the WQTC bypass events by weather since FY08. Table 1.6 and Figure 1.7 show the WQTC bypass events by cause since FY09.

Table 1.3. Observed Overflows to the Exterior by Weather – All WQTCs

FY	OVERFLOW TO EXTERIOR (GROUND)	
	WET WEATHER	DRY WEATHER
FY08	3	12
FY09	0	9
FY10	3	9
FY11	3	17
FY12	5	13
FY13	1	21
FY14	2	10
FY15	2	7
FY16	1	6
FY17	0	5
FY18	0	8
FY19	2	6

Figure 1.4. Trend of Observed Overflows to the Exterior by Weather – All WQTCs

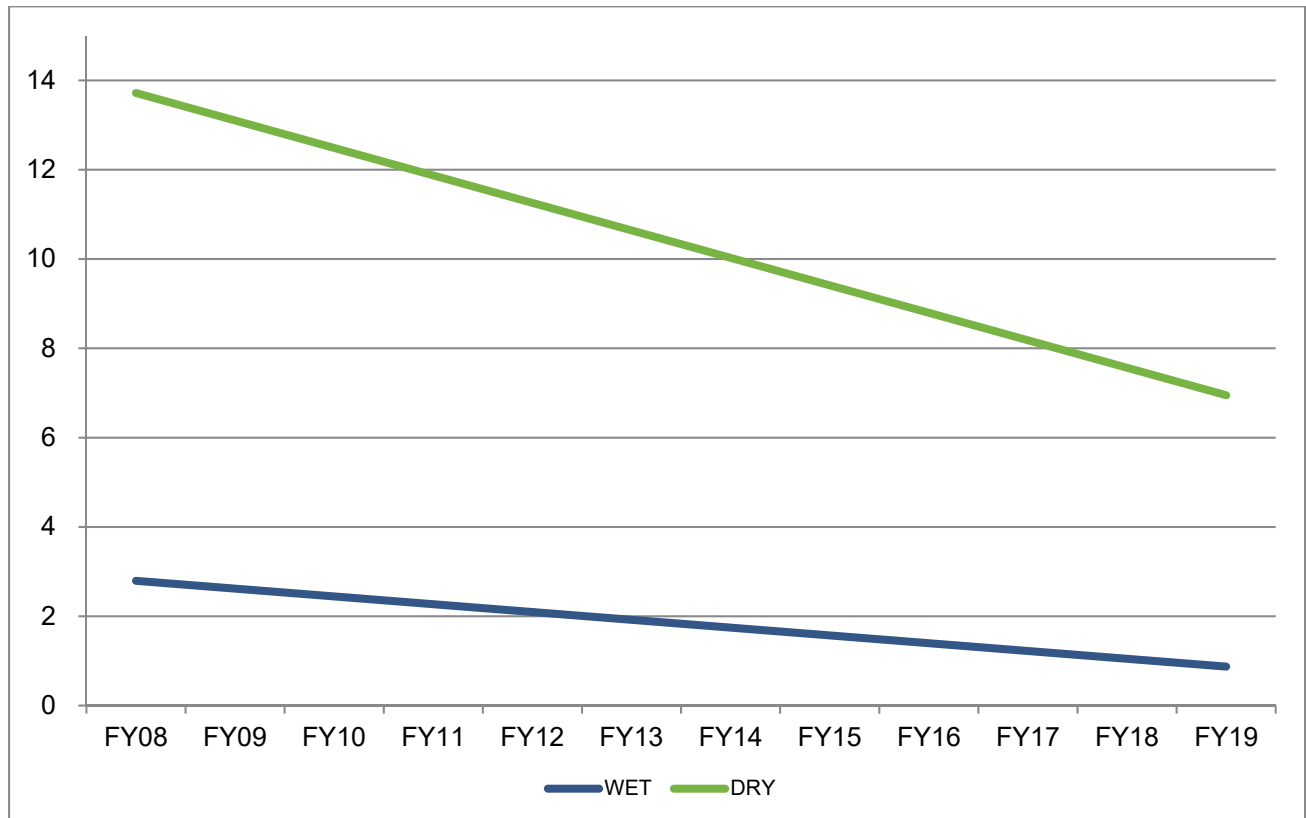


Table 1.4. Observed Overflows to the Exterior by Problem – All WQTCs

FY	ELECTRICAL PROBLEMS AT MSD	LACK OF SYSTEM CAPACITY	MECHANICAL FAILURE	OBSTRUCTION- NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	STRUCTURAL FAILURE
FY08	0	2	11	0	0	2
FY09	0	0	9	0	0	0
FY10	0	1	8	0	1	2
FY11	0	1	11	1	0	7
FY12	2	2	9	1	0	4
FY13	3	1	6	1	0	11
FY14	1	1	5	2	0	3
FY15	1	0	3	0	0	5
FY16	0	0	6	0	0	1
FY17	0	0	2	0	0	3
FY18	0	0	5	0	0	3
FY19	0	0	6	1	0	1

Figure 1.5. Trend of Observed Overflows to the Exterior by Problem – All WQTCs

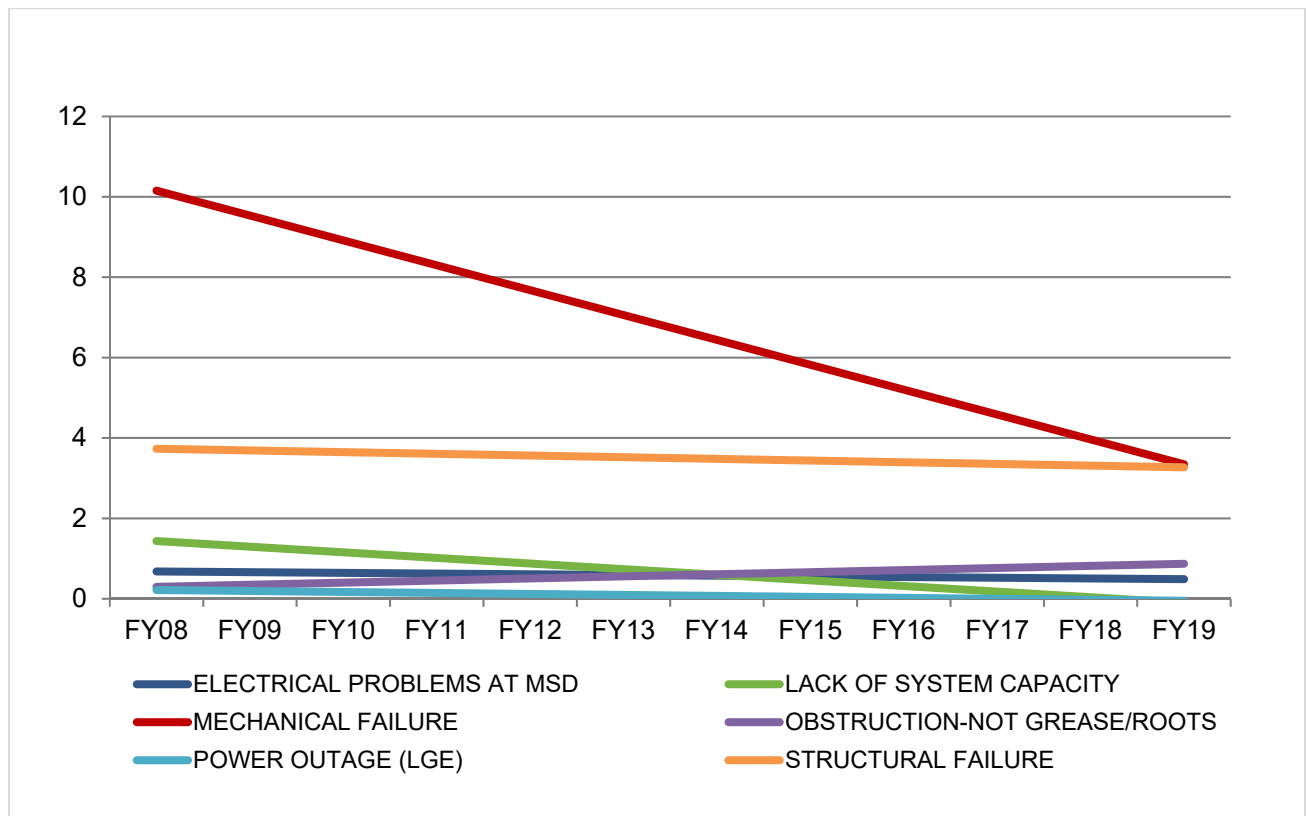


Table 1.5. Bypass Events by Weather – All WQTCs

FY	WET WEATHER	DRY WEATHER
FY08	19	9
FY09	11	21
FY10	20	13
FY11	29	3
FY12	12	8
FY13	17	8
FY14	19	8
FY15	10	0
FY16	8	4
FY17	4	1
FY18	1	1
FY19	1	1

Figure 1.6. Trend of Bypass Events by Weather – All WQTCs

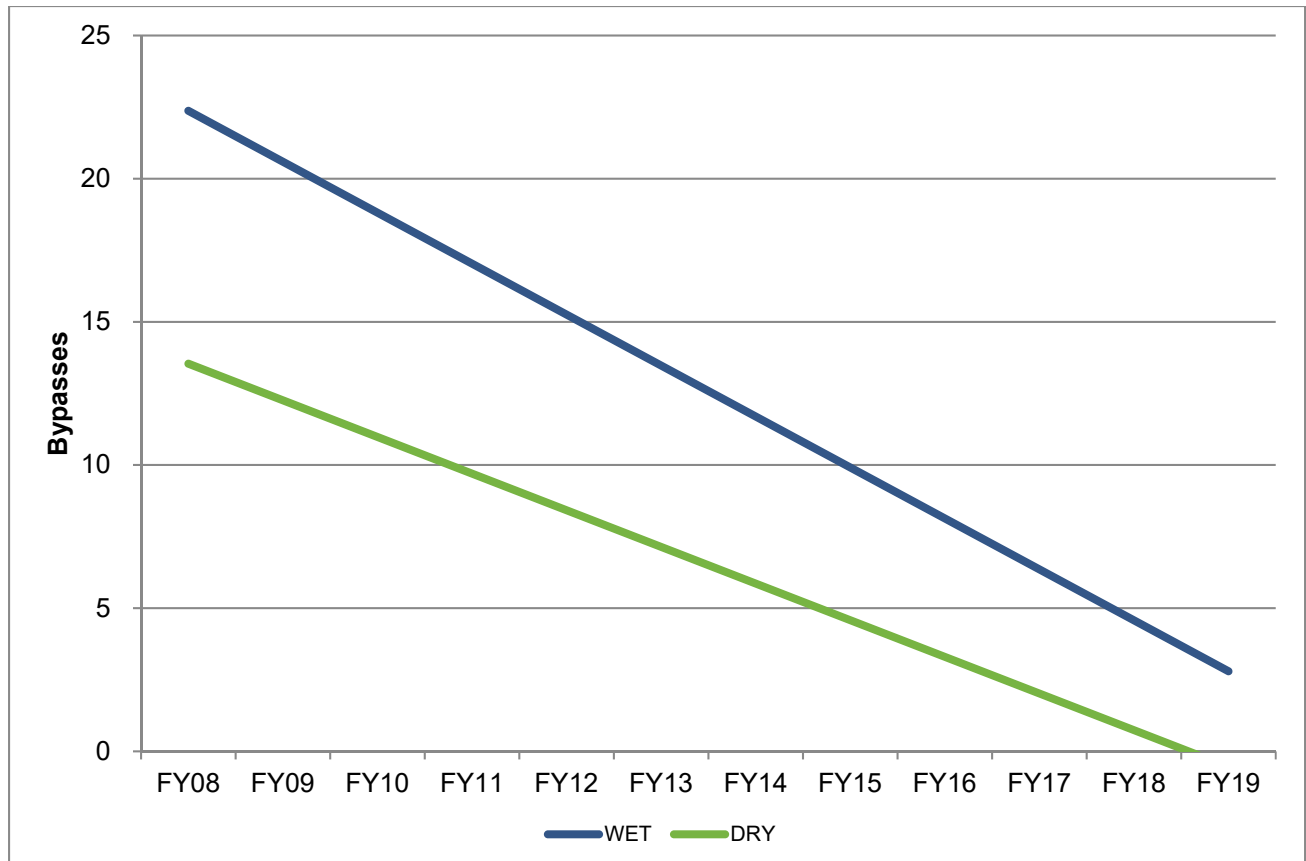
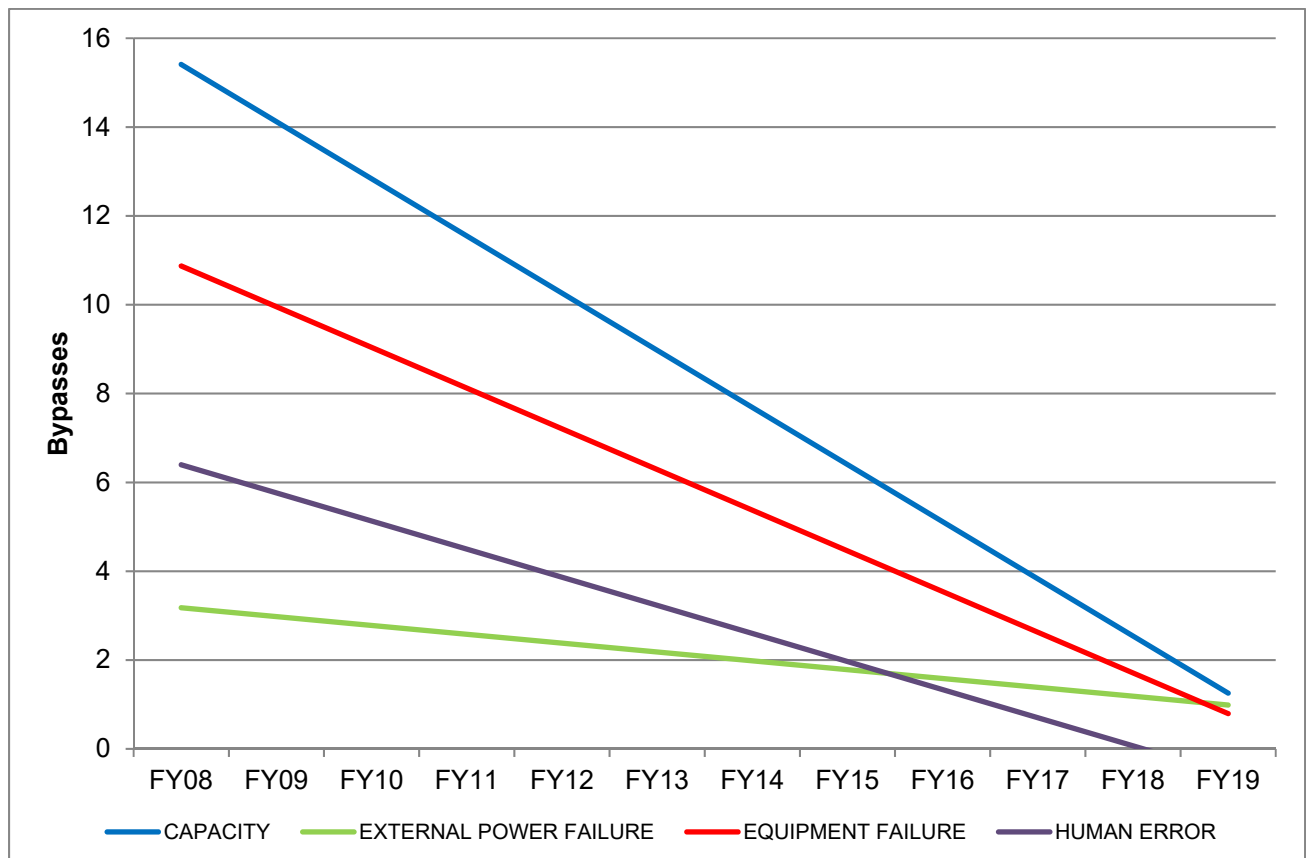


Table 1.6. Bypass Events by Cause – All WQTCs

FY	CAPACITY		EXTERNAL POWER FAILURE		EQUIPMENT FAILURE		HUMAN ERROR	
	NUMBER	%	NUMBER	%	NUMBER	%	NUMBER	%
FY09	4	13%	6	19%	12	38%	10	31%
FY10	13	39%	2	6%	10	30%	8	24%
FY11	18	56%	5	16%	8	25%	1	3%
FY12	8	40%	5	25%	6	30%	1	5%
FY13	12	44%	0	0%	11	44%	4	12%
FY14	15	56%	0	0%	7	26%	5	19%
FY15	7	70%	1	10%	2	20%	0	0%
FY16	7	58%	1	8%	1	8%	3	25%
FY17	0	0%	2	40%	3	60%	0	0%
FY18	0	0%	0	0%	2	100%	0	0%
FY19	0	0%	0	0%	1	50%	1	50%

Figure 1.7. Trend of Bypass Events by Cause – All WQTCs



1.2.2.3. MORRIS FORMAN WATER QUALITY TREATMENT CENTER

Originally constructed in 1958, Morris Forman WQTC is MSD's largest, oldest WQTC. The following sections provide details related to this facility.

1.2.2.3.1. OVERFLOWS TO THE EXTERIOR

Observed overflows from manholes on WQTC property during the reporting period are shown in Table 1.7 and Table 1.8.

Table 1.7. Observed Overflows to the Exterior by Weather – Morris Forman WQTC

FY	OVERFLOW TO EXTERIOR (GROUND)	
	WET WEATHER	DRY WEATHER
FY08	0	0
FY09	0	0
FY10	0	2
FY11	0	0
FY12	1	1
FY13	0	0
FY14	0	0
FY15	0	0
FY16	0	0
FY17	0	0
FY18	0	7
FY19	2	5

Table 1.8. Observed Overflows to the Exterior by Problem – Morris Forman WQTC

FY	ELECTRICAL PROBLEMS AT MSD	LACK OF SYSTEM CAPACITY	MECHANICAL FAILURE	OBSTRUCTION- NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	STRUCTURAL FAILURE
FY08	0	0	0	0	0	0
FY09	0	0	0	0	0	0
FY10	0	0	2	0	0	0
FY11	0	0	0	0	0	0
FY12	0	0	1	0	0	1
FY13	0	0	0	0	0	0
FY14	0	0	0	0	0	0
FY15	0	0	0	0	0	0
FY16	0	0	0	0	0	0

Table 1.8. Observed Overflows to the Exterior by Problem – Morris Forman WQTC

FY	ELECTRICAL PROBLEMS AT MSD	LACK OF SYSTEM CAPACITY	MECHANICAL FAILURE	OBSTRUCTION- NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	STRUCTURAL FAILURE
FY17	0	0	0	0	0	0
FY18	0	0	4	0	0	3
FY19	0	0	6	1	0	0

1.2.2.3.2. BYPASSES

One unauthorized wet weather bypass occurred during the reporting period, as shown in Table 1.9 summarizes bypass events by weather since FY08, and Table 1.10 summarizes bypasses by cause since FY08. Refer to quarterly reports for the reporting period for details of the bypasses that occurred at Morris Forman WQTC.

Table 1.9. Bypass Events by Weather – Morris Forman WQTC

FY	WET WEATHER	DRY WEATHER
FY08	0	0
FY09	0	0
FY10	0	0
FY11	1	0
FY12	1	2
FY13	0	2
FY14	0	0
FY15	1	0
FY16	0	1
FY17	4	0
FY18	1	0
FY19	0	0

Table 1.10. Bypass Events by Cause – Morris Forman WQTC

FY	CAPACITY	EXTERNAL POWER FAILURE	EQUIPMENT FAILURE	HUMAN ERROR
FY09	0	0	0	0
FY10	0	0	0	0
FY11	0	0	1	0
FY12	2	0	1	0
FY13	0	0	2	0

Table 1.10. Bypass Events by Cause – Morris Forman WQTC

FY	CAPACITY	EXTERNAL POWER FAILURE	EQUIPMENT FAILURE	HUMAN ERROR
FY14	0	0	0	0
FY15	0	0	1	0
FY16	0	0	0	1
FY17	0	1	3	0
FY18	0	0	1	0
FY19	0	0	0	0

1.2.2.3.3. EXCEEDANCES

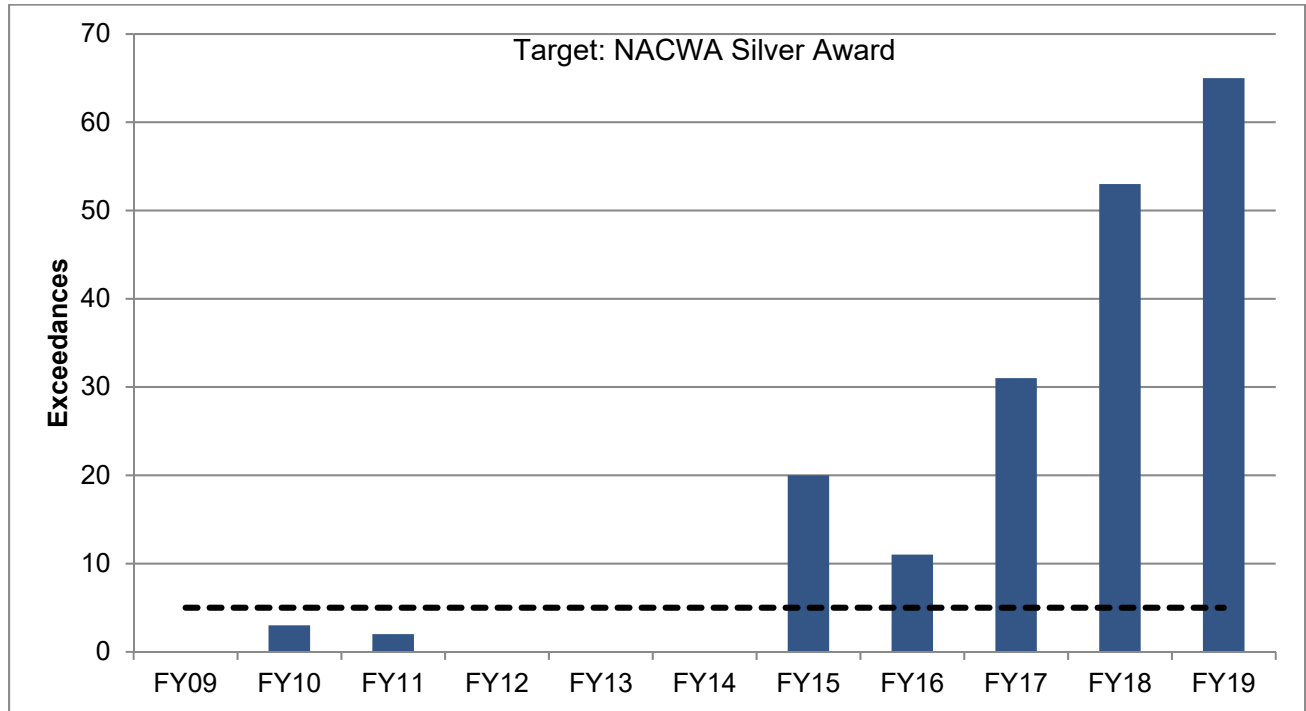
MSD's policy is to operate WQTCs in full compliance with the permitted effluent water quality standards. However, circumstances sometimes arise that may cause WQTCs to exceed the permitted effluent limits. This reality is recognized by the National Association of Clean Water Agencies (NACWA), which gives awards at different levels based on the number of effluent parameter exceedances during the calendar year:

- Silver – Five or fewer exceedances per year
- Gold – Zero exceedances per year
- Platinum – Zero exceedances per year for five years

Based on past operating history, MSD has established the target for all treatment centers of receiving at least the NACWA Silver Award. This goal is discussed under Section 1.2.2.4.4 related to exceedances at the regional WQTCs.

As shown in Figure 1.8, a total of 65 exceedances occurred at Morris Forman WQTC in FY19. Compromised solids processing equipment contributed to the exceedances. MFWQTC continues to employ additional solids processing methods in an effort to meet permit requirements. These methods include dewatered cake, purchase of additional liquid oxygen, and externally contracted solids handling assistance.

Figure 1.8. Exceedances by Fiscal Year – Morris Forman WQTC



1.2.2.4. REGIONAL WATER QUALITY TREATMENT CENTERS

In December 2015, MSD successfully eliminated Jeffersontown WQTC, bringing the regional WQTC count to four. The following sections provide details related to the remaining regional WQTCs.

1.2.2.4.1. OVERFLOWS TO THE EXTERIOR

Observed overflows from manholes on WQTC property during the reporting period are shown in Table 1.11 and Table 1.12.

Table 1.11. Observed Overflows to the Exterior by Weather – Regional WQTCs

FY	OVERFLOW TO EXTERIOR (GROUND)	
	WET WEATHER	DRY WEATHER
FY08	2	7
FY09	0	7
FY10	2	4
FY11	1	8
FY12	4	9
FY13	1	14
FY14	2	6
FY15	1	3

Table 1.11. Observed Overflows to the Exterior by Weather – Regional WQTCs

FY	OVERFLOW TO EXTERIOR (GROUND)	
	WET WEATHER	DRY WEATHER
FY16	1	6
FY17	0	5
FY18	0	1
FY19	0	1

Table 1.12. Observed Overflows to the Exterior by Problem – Regional WQTCs

FY	ELECTRICAL PROBLEMS AT MSD	LACK OF SYSTEM CAPACITY	MECHANICAL FAILURE	OBSTRUCTION- NOT GREASE / ROOTS	STRUCTURAL FAILURE
FY08	0	2	7	0	0
FY09	0	0	7	0	0
FY10	0	1	4	0	1
FY11	0	1	4	0	4
FY12	2	2	7	0	2
FY13	1	1	6	1	6
FY14	1	1	5	1	0
FY15	1	0	3	0	0
FY16	0	0	6	0	1
FY17	0	0	2	0	3
FY18	0	0	1	0	0
FY19	0	0	0	0	1

1.2.2.4.2. BYPASSES

Table 1.13 details the results of the current reporting period. Table 1.14 and Figure 1.9 summarize bypass events by weather since FY08, and Table 1.15 and Figure 1.10 summarize bypasses by cause since FY08. Refer to quarterly reports for the reporting period for details of the bypasses that occurred at regional WQTCs.

Table 1.13. Bypass Events by WQTC – Regional WQTCs

WQTC	KPDES PERMIT NUMBER	DRY WEATHER	WET WEATHER
CEDAR CREEK	KY0098540	0	1
DEREK R. GUTHRIE	KY0078956	1	0

Table 1.14. Bypass Events by Weather – Regional WQTCs

FY	WET WEATHER	DRY WEATHER
FY08	6	4
FY09	5	10
FY10	8	6
FY11	7	2
FY12	3	4
FY13	7	1
FY14	2	0
FY15	1	0
FY16	3	1
FY17	0	1
FY18	0	1
FY19	1	1

Figure 1.9. Trend of Bypass Events by Weather – Regional WQTCs

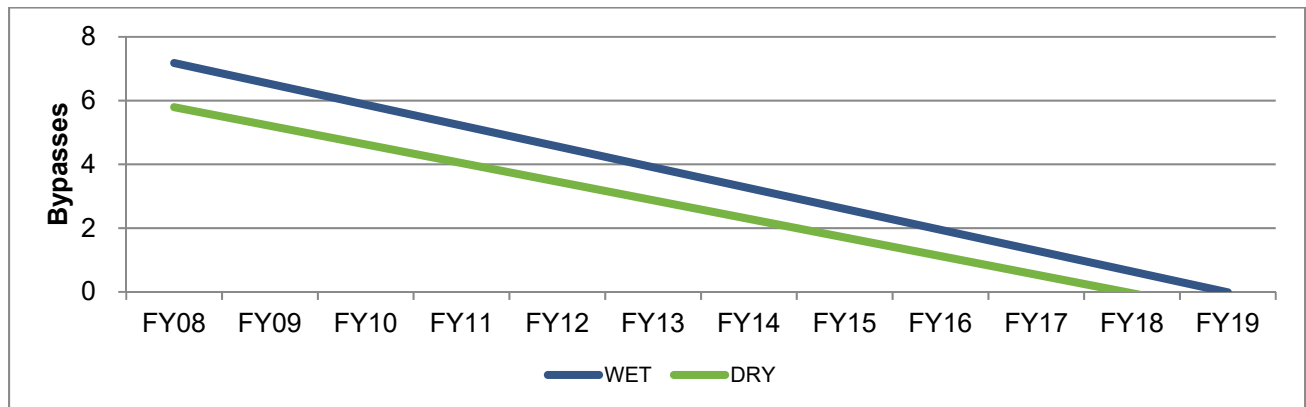


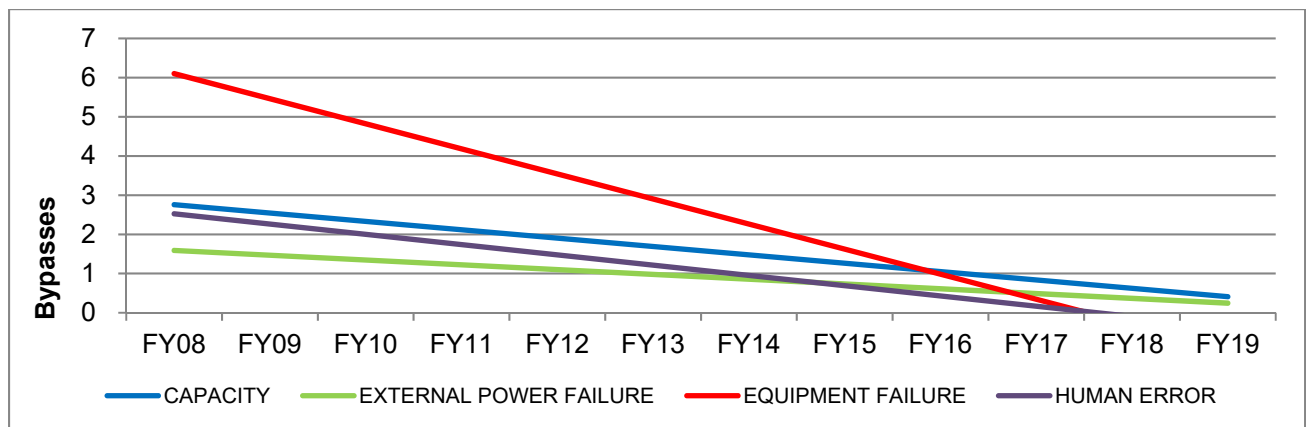
Table 1.15. Bypass Events by Cause – Regional WQTCs

FY	CAPACITY	EXTERNAL POWER FAILURE	EQUIPMENT FAILURE	HUMAN ERROR
FY08	4	0	4	2
FY09	1	2	8	4
FY10	3	2	5	4
FY11	1	3	5	0
FY12	1	2	4	0
FY13	4	0	4	0
FY14	1	0	0	1
FY15	1	0	0	0

Table 1.15. Bypass Events by Cause – Regional WQTCs

FY	CAPACITY	EXTERNAL POWER FAILURE	EQUIPMENT FAILURE	HUMAN ERROR
FY16	2	0	0	2
FY17	0	1	0	0
FY18	0	0	1	0
FY19	0	0	1	1

Figure 1.10. Trend of Bypass Events by Cause – Regional WQTCs



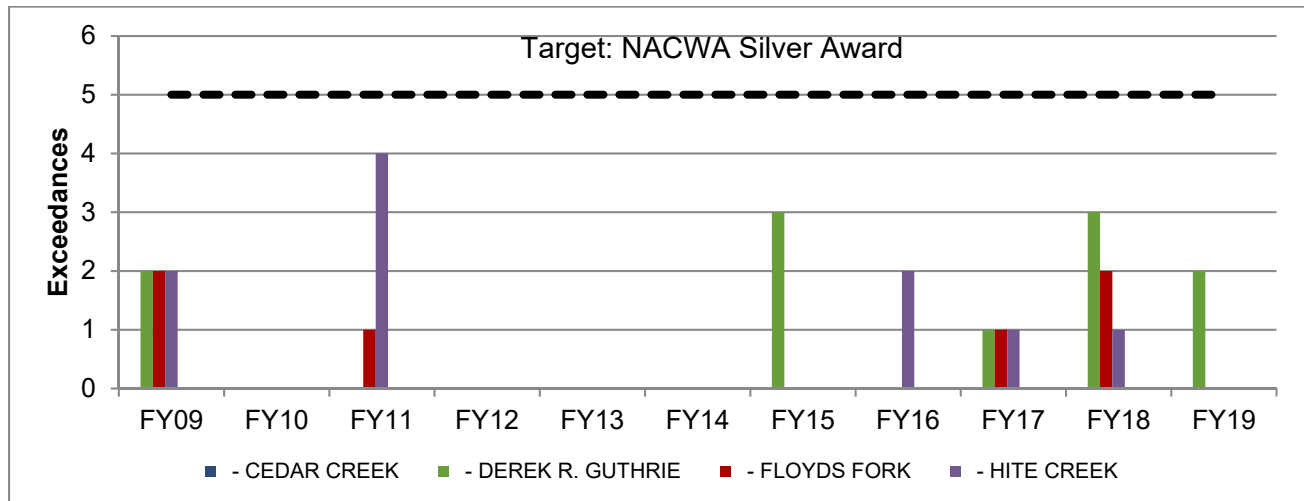
1.2.2.4.3. JEFFERSONTOWN WATER QUALITY TREATMENT CENTER

Jeffersontown WQTC is off-line as of December 2015, as detailed in Section 4.4.1.2. The FY16 Annual Report was the final annual report to include discussion of data at the siphon upstream of the headworks at Jeffersontown WQTC.

1.2.2.4.4. EXCEEDANCES

As shown in Figure 1.11, all four operational regional WQTCs have achieved the NACWA Silver Award goal since FY08. Cedar Creek WQTC has maintained NACWA Platinum Award status since FY09.

Figure 1.11. Exceedances by Fiscal Year – Regional WQTCs



1.2.2.5. NON-REGIONAL WQTCs

Since 1985, MSD has acquired and/or eliminated more than 300 privately owned non-regional WQTCs (“package plants”). The non-regional WQTCs typically had very limited operating flexibility, and were subject to high levels of variability in loads. Most of the non-regional WQTCs had been in operation over 35 years and typically had much poorer records of compliance compared to MSD’s regional WQTCs. Therefore, MSD worked aggressively to eliminate the non-regional WQTCs. The last non-regional WQTC within the MSD service area was taken off-line on May 27, 2016. The FY16 Annual Report was the final annual report to include discussion of data associated with non-regional WQTCs. Should MSD acquire and/or eliminate any WQTCs in the future through service area expansion, their performance will be discussed here.

1.2.3. COMBINED SEWER OVERFLOW PERFORMANCE

1.2.3.1. AUTHORIZED DISCHARGES – WET WEATHER CSOs

At the end of the reporting period, MSD maintained 98 CSOs in operation. The modeled AAOV for the permitted CSOs is included as Appendix B. The observed CSO data for the reporting period for each monitored overflow has been tabulated, along with rainfall information from the nearest rain gauge, to facilitate review of the overflows that occurred, and is included as Appendix C. Refer to Section 4.5 for information regarding system monitoring and performance as CSO reduction projects are completed.

1.2.3.2. UNAUTHORIZED DISCHARGES – DRY WEATHER CSOs

MSD has implemented the Nine Minimum Controls (NMC) programs and provided resources to reduce dry weather CSOs as part of the CSO Long Term Control Plan (LTCP). During the reporting period, there were six observed dry weather overflows from a permitted CSO location as detailed in Table 1.16. The dry weather CSOs were analyzed by location and problem to identify issues that can be corrected.

CSO022 accounted for over 53% of the total overflow volume of FY19 due to structural failure and subsequent emergency repair of the Ohio River Interceptor.

On February 27, 2019, an overflow occurred at CSO132 due to a significant river flood event combined with heavy rains. The Beargrass Flood Pump Station was in service mode and flood gates were closed per USACOE Protocol during elevated river levels. The CSO was pumped over the floodwall to prevent interior overflows.

Table 1.17 and. Figure 1.12 show dry weather overflow volumes and trend since FY08.

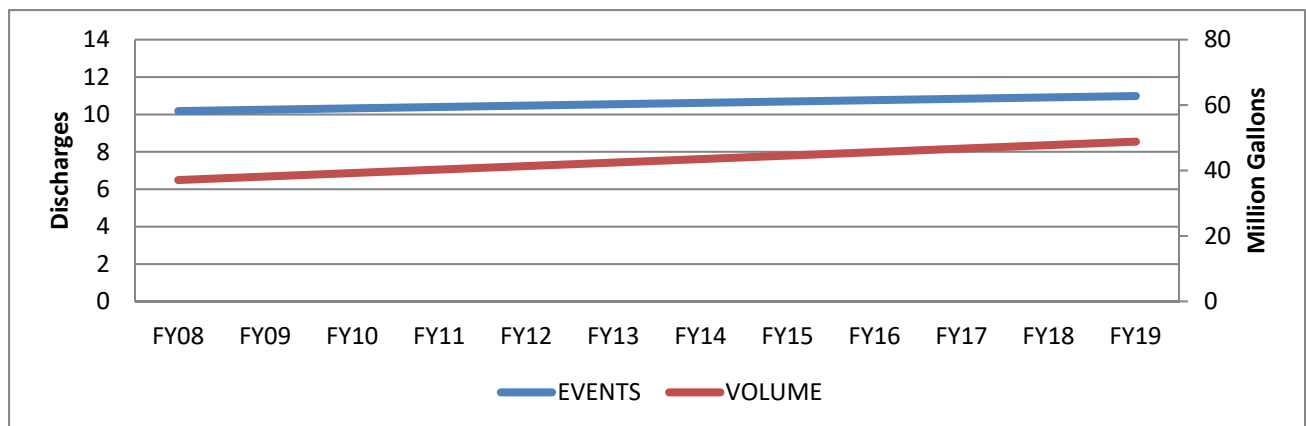
Table 1.16. Dry Weather CSOs

DATE	CSO	PROBLEM	DESCRIPTION	VOLUME (GAL)
August 10, 2018	CSO020	Structural Failure	Planned outage to install temporary bulkhead in ORI for repairs.	883,123
August 10, 2018	CSO022	Structural Failure	Discharging at CSO022 during recovery from overnight shutdown related to ORI emergency repair. Discharge up to 1 ft over weir, est 2-4 mg.	21,994,374
August 14, 2018	CSO022	Structural Failure	Temporary pump station at 4th and River Road. Flow overtopped diversion structure.	5,700
August 15, 2018	CSO022	Structural Failure	Temporary pump station related to ORI repair, lost a VFD.	782,000
August 30, 2018	CSO200	Obstruction-Not Grease/Roots	CSO crews completing weekly NMC maintenance.	366
September 4, 2018	CSO197	Obstruction-Not Grease/Roots	Line obstructed with debris & sediment.	23,620
September 19, 2018	CSO197	Obstruction-Not Grease/roots	Obstruction	225,967
October 3, 2018	CSO166	Obstruction-Not Grease/roots	Obstruction	137
October 8, 2018	CSO166	Obstruction-Not Grease/roots	Obstruction	10,000
December 4, 2018	CSO108	Mechanical Failure	PLC mechanical malfunction. Erroneous signal sent from the plc activated the pumps.	42,667
December 5, 2018	CSO055	Obstruction-Not Grease/Roots	Obstruction in low flow line, piped through ORI project. Unable to flush as a safety issue for workers in ORI. Piping to be dismantled within 24 hrs.	64,000
December 11, 2018	CSO020	Structural Failure	Planned outage to remove temporary bulkhead installed in ORI for repairs.	3,675,000
February 27, 2019	CSO132	Pumped Due to COE Manual	Beargrass FPS placed in flood pumping mode per USACOE protocol during elevated river levels. Flood gate is closed.	13,680,000
June 28, 2019	CSO019	Electrical Problems at MSD	Interior building power fail at 34th Street FPS.	9,000

Table 1.17. Dry Weather CSOs by Fiscal Year

FY	EVENTS	VOLUME (GAL)
FY08	11	197,303,690
FY09	3	488,254
FY10	16	13,321,419
FY11	14	5,225,399
FY12	15	5,108,532
FY13	8	100,162
FY14	13	13,807,294
FY15	6	57,815
FY16	5	265,425
FY17	7	540,253
FY18	10	237,638,808
FY19	14	41,387,937

Figure 1.12. Trend of Dry Weather CSOs by Fiscal Year



1.2.3.3. CSO FLOW MONITORING QUALITY IMPROVEMENT

MSD has been working to improve CSO flow monitoring quality since a potential for inaccurate volume reporting at some CSOs was identified during the July 2016 – September 2016 reporting period. This was identified by comparing measured overflow volumes against modeled overflow volumes for similar storms. It was determined that several CSO flow monitors are affected by backwater levels from the receiving streams causing a discrepancy actual overflow volume, along with other potential variables at some locations. MSD notified EPA and KDEP of data discrepancies on September 29, 2016. The following section describes the timeline of work completed from the time the issue was identified in 2016 through June 30, 2019.

A workgroup was established in 2016 to review CSO flow monitoring and resolve potential over/under reporting of overflow volumes. Initial findings indicated that potentially significant discrepancies between modeling and monitoring data existed at 33 of MSD's 98 CSO locations. This set of 33 CSOs was the highest priority to review, correct data, document SOPs, and implement changes. A summary for the initial 33 CSO locations was included in the FY17 ACD Annual Report. MSD will continue working to procure and replace equipment as required and update the programming at the PLC or with monitoring program logic, as summarized in Figure 1.13, to complete implementation of the SOPs.

For the remaining 65 CSO locations, MSD performed site visits including elevation surveys, performed detailed analysis, investigated equipment configurations, and investigated PLC programming or monitoring program logic. MSD has also identified two inactive sites with historic data that were reviewed. MSD began calculation review, SOP development, and implementation of changes during this reporting period. This has led to the development of an SOP for each remaining CSO that describes the existing monitoring equipment, configuration, and flow calculation in use as of June 30, 2019, and evaluates the effectiveness of the existing setup. If a more effective arrangement was recommended, MSD added the proposed arrangement to the SOP for implementation and determined if historical data could be updated. In cases where the historical data could be updated, MSD has developed revised volumes for reporting. In some cases, historical volumes could not be recalculated based on the available data. For instance, CSOs influenced by river or creek elevation for which there was no available historic level data could not be recalculated for historical volumes but will be calculated or measured according to the revised SOPs as they are implemented.

As of June 30, 2019, SOPs have been drafted for all CSO locations that were not previously eliminated and historical volume data corrections (where possible) have been made. Multiple SOPs require programming or equipment changes in order to implement the final SOPs. During the upcoming reporting period, MSD will continue working to procure and replace equipment as required and update the programming at the PLC or with monitoring program logic for the remaining 65 CSOs, as summarized in Figure 1.14 to complete implementation of the SOPs.

Until the review is complete, CSO flow monitoring data will continue to be included as an appendix to each quarterly report, will be listed as "Draft", and will include the statement "CSO data monitoring procedures are currently being revised". As changes are made to flow meter locations and or flow meter calculation algorithms, MSD will provide status updates in the quarterly reports on progress to evaluate data accuracy, revise monitoring data records, update monitoring procedures, and implement recommendations. CSO flow monitoring data reported quarterly will include updated volumes based on completion of the review and update of the reporting standards for each CSO. Any revised volumes for FY19 are included with FY19 CSO flow monitoring for all CSO locations in Appendix C. Any subsequently developed revised volumes for previous reporting periods up to and including FY20 will be included in the appendices to the FY20 Consent Decree Annual Report.

Figure 1.13. CSO Flow Monitoring Quality Improvement Status – Phase 1 – 33 CSOs – FY16 to Present



Figure 1.14. CSO Flow Monitoring Quality Improvement Status – Phase 2 – 65 CSOs – FY18 to Present



¹Draft SOPs are completed and under review.

1.2.4. COLLECTIONS SYSTEM OVERFLOW PERFORMANCE

At the end of the reporting period, MSD maintained 3,348 miles of sanitary and combined sewer mains in operation, including associated pump stations, manholes and other access points, and service lines.

1.2.4.1. UNAUTHORIZED DISCHARGES TO WATERS OF US – WET WEATHER SSOs

Table 1.18 and Figure 1.15 detail unauthorized discharges to WUS from the collections system by asset. Table 1.19 and Figure 1.16 detail unauthorized discharges to WUS from the collections system by cause.

Table 1.18. Wet Weather SSOs by Fiscal Year and Asset – Unauthorized Discharges to Waters of US

FY	PUMP STATION	ACCESS POINT	MAIN	SERVICE CONNECTION
FY08	109	402	1	9
FY09	21	84	0	1
FY10	53	277	0	26
FY11	89	614	2	37
FY12	44	397	1	22
FY13	19	226	1	17
FY14	34	322	1	26
FY15	43	330	2	19
FY16	12	286	5	15
FY17	1	68	1	0
FY18	16	174	2	10
FY19	16	391	4	12

Figure 1.15. Trend of Wet Weather SSOs by Fiscal Year and Asset – Unauthorized Discharges to Waters of US

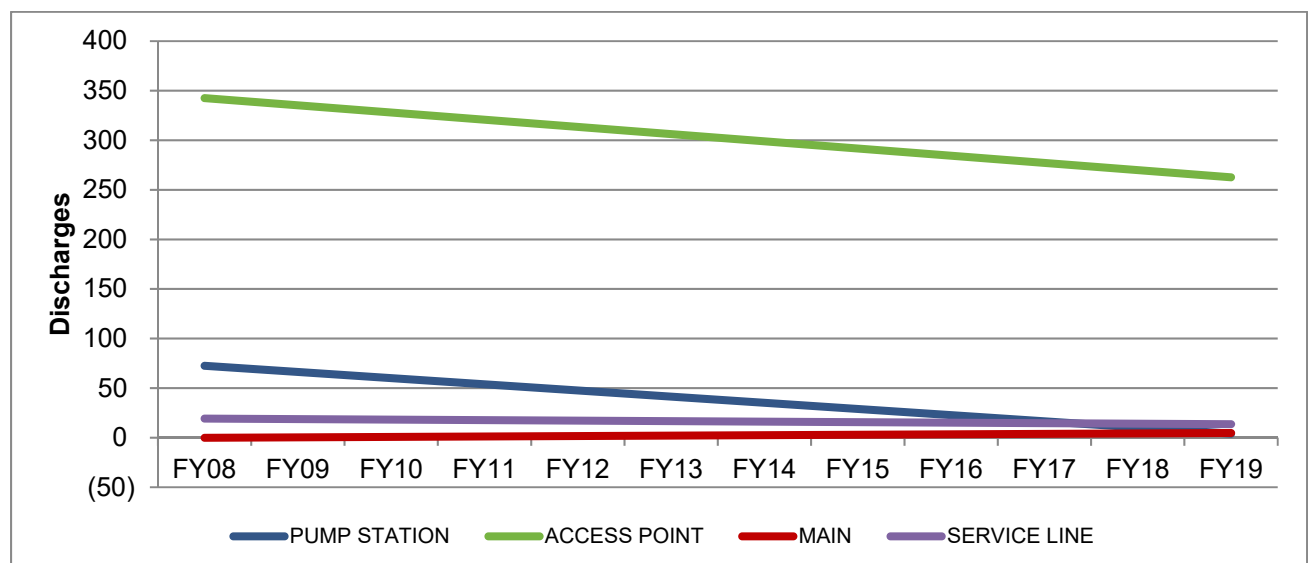
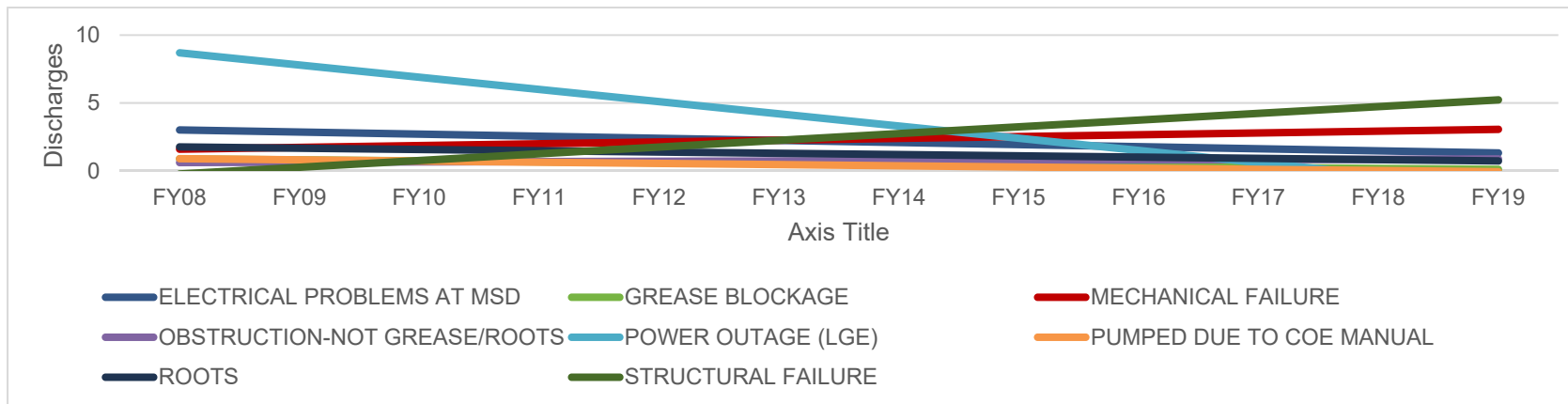


Table 1.19. Wet Weather SSOs by Fiscal Year and Cause – Unauthorized Discharges to Waters of US

FY	ELECTRICAL PROBLEMS AT MSD	GREASE BLOCKAGE	MECHANICAL FAILURE	OBSTRUCTION-NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	PUMPED DUE TO COE MANUAL	ROOTS	STRUCTURAL FAILURE	LACK OF SYSTEM CAPACITY	PUMPED OVERFLOW
FY08	2	2	3	0	3	0	3	1	371	136
FY09	4	1	1	0	20	0	1	0	53	26
FY10	4	0	0	0	8	0	0	0	289	55
FY11	3	0	1	2	5	5	2	2	623	99
FY12	2	1	5	0	1	0	0	1	424	30
FY13	1	0	2	0	1	0	3	1	250	5
FY14	0	0	3	5	2	0	1	2	360	10
FY15	3	1	2	1	1	0	3	2	374	7
FY16	1	0	0	0	0	0	0	5	309	3
FY17	2	0	3	0	1	0	0	1	63	0
FY18	2	0	2	1	2	0	2	2	190	1
FY19	1	1	3	0	1	0	0	6	410	1

Figure 1.16. Trend of Non-Capacity Related Wet Weather SSOs by Fiscal Year and Cause – Unauthorized Discharges to Waters of US



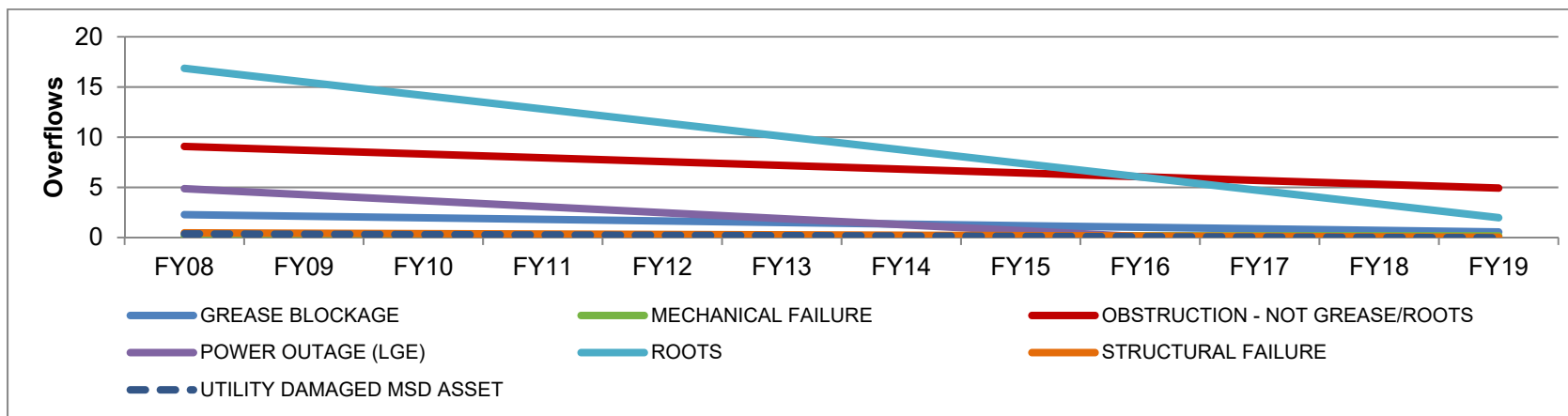
1.2.4.2. WET WEATHER OVERFLOWS TO THE INTERIOR

Table 1.20 and Figure 1.17 detail wet weather overflows to the interior from the collections system by cause.

Table 1.20. Wet Weather Overflows to the Interior by Fiscal Year and Cause

FY	GREASE BLOCKAGE	MECHANICAL FAILURE	OBSTRUCTION- NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	ROOTS	STRUCTURAL FAILURE	UTILITY DAMAGED MSD ASSET	LACK OF SYSTEM CAPACITY
FY08	2	1	5	0	33	0	1	650
FY09	6	0	17	19	10	1	0	94
FY10	1	0	12	0	15	0	0	678
FY11	1	0	7	0	10	0	0	592
FY12	0	0	1	0	2	1	0	102
FY13	1	0	5	0	1	0	0	31
FY14	1	0	3	0	6	1	1	118
FY15	1	0	17	0	16	0	0	271
FY16	0	0	0	0	5	0	0	79
FY17	1	0	0	0	6	0	0	1
FY18	0	0	8	0	7	0	0	22
FY19	2	1	11	0	7	0	0	62

Figure 1.17. Trend of Non-Capacity Related Wet Weather Overflows to the Interior by Fiscal Year and Cause



1.2.4.3. WET WEATHER OVERFLOWS TO THE EXTERIOR

Table 1.21 and Figure 1.18 detail wet weather overflows to the exterior from the collections system by cause. Table 1.22 and Figure 1.19 detail wet weather overflows to the exterior from the collections system by asset.

1.2.4.4. WET WEATHER HAULING EVENTS

To reduce the number of overflows in wet weather, MSD hauls sewage from multiple locations. MSD proactively monitors known and suspected locations that have wet weather capacity issues which may cause sewer line surcharging, basement back-ups, and sanitary sewer overflows (SSOs). MSD staff only hauls from these locations as necessary and as resources allow. Hauling efforts are summarized in Table 1.23 and Figure 1.20 by month and in Table 1.24 and Figure 1.21 by asset.

Table 1.21. Wet Weather Overflows to the Exterior by Fiscal Year and Cause

FY	ELECTRICAL PROBLEMS AT MSD	GREASE BLOCKAGE	MECHANICAL FAILURE	OBSTRUCTION- NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	PUMPED DUE TO COE MANUAL	ROOTS	STRUCTURAL FAILURE	UTILITY DAMAGED MSD ASSET	LACK OF SYSTEM CAPACITY	PUMPED OVERFLOW
FY08	0	0	1	0	0	0	4	0	1	12	0
FY09	0	0	0	3	3	0	1	2	0	0	0
FY10	0	0	0	2	0	0	2	0	0	13	1
FY11	0	0	0	1	0	0	0	0	0	24	0
FY12	0	0	1	2	3	0	0	1	0	8	0
FY13	0	0	0	1	0	0	0	0	0	3	0
FY14	0	0	0	0	0	1	1	1	0	2	0
FY15	0	0	1	1	0	1	0	0	0	17	0
FY16	0	0	0	0	0	0	2	0	0	13	0
FY17	1	0	0	0	0	0	0	1	0	3	0
FY18	0	1	2	1	0	0	3	1	0	6	0
FY19	0	0	0	2	0	0	0	0	1	5	0

Figure 1.18. Trend of Non-Capacity Related Wet Weather Overflows to the Exterior by Fiscal Year and Cause

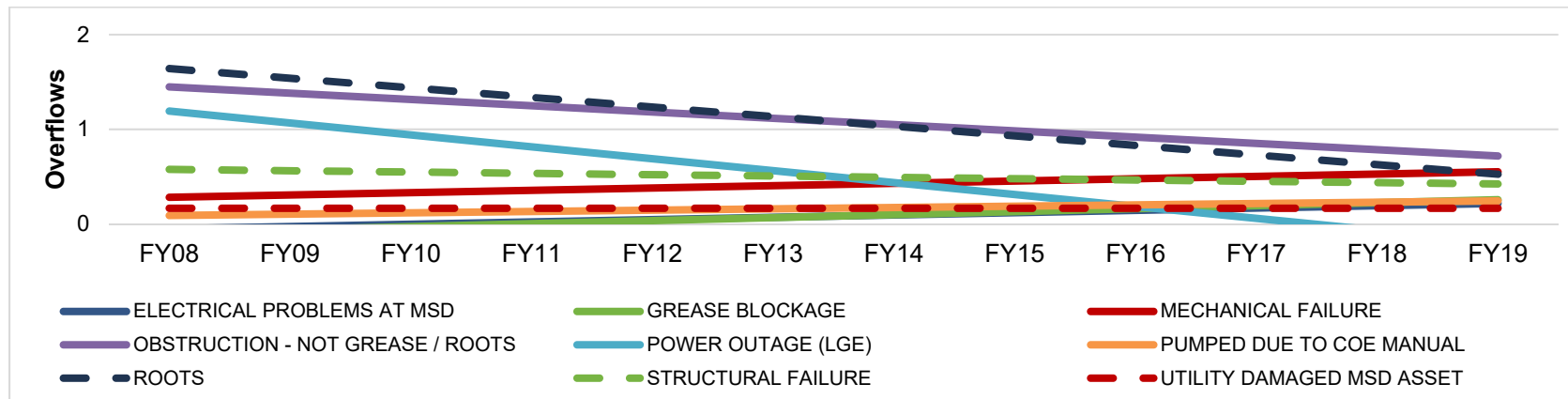


Table 1.22. Wet Weather Overflows to the Exterior by Fiscal Year and Asset

FY	PUMP STATION	ACCESS POINT	MAIN	SERVICE CONNECTION
FY08	2	14	1	1
FY09	3	2	1	3
FY10	1	12	1	4
FY11	0	23	0	2
FY12	1	9	2	3
FY13	0	3	1	0
FY14	0	3	0	2
FY15	1	9	1	9
FY16	1	5	2	7
FY17	3	1	1	0
FY18	4	2	4	4
FY19	0	4	1	3

Figure 1.19. Trend of Wet Weather Overflows to the Exterior by Fiscal Year and Asset

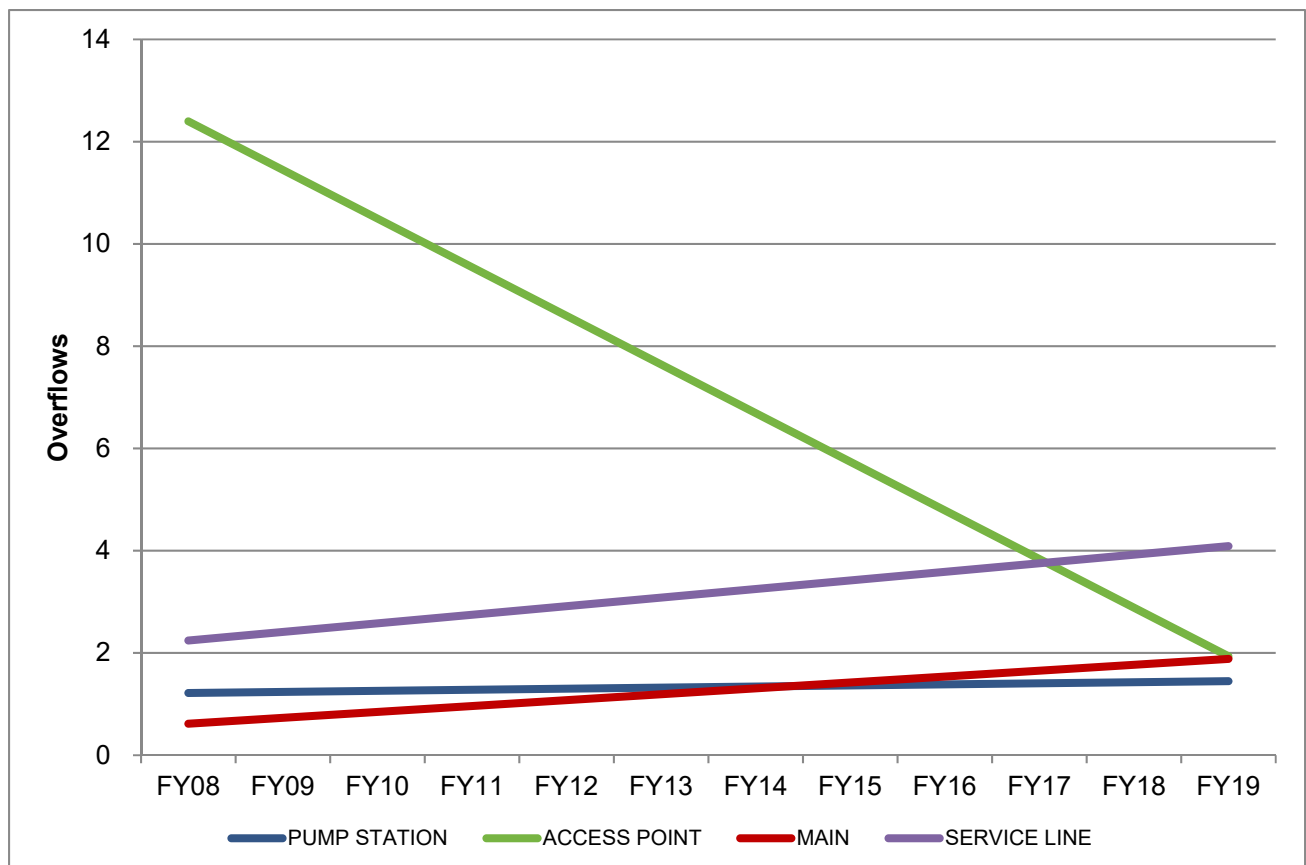


Table 1.23. Hauled Volumes in Gallons by Fiscal Year and Month

MONTH	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
FY08	22,200	0	13,900	1,168,150	41,500	1,470,550	164,300	857,950	4,016,003	1,752,920	1,049,000	19,000
FY09	62,000	24,500	1,834,650	10,000	13,600	550,800	1,330,700	785,280	34,300	634,500	572,400	337,400
FY10	1,367,135	1,794,300	426,300	1,581,950	13,900	452,850	897,800	451,400	100,050	178,650	2,245,750	162,900
FY11	199,500	112,500	571,750	63,622	944,900	76,400	111,500	1,034,200	868,650	2,541,850	1,524,000	660,400
FY12	72,600	146,500	261,800	3,500	938,050	738,700	196,700	12,500	267,100	162,800	604,400	62,700
FY13	33,000	0	77,500	39,300	0	568,700	444,500	0	753,600	58,400	235,500	178,100
FY14	287,600	15,500	320,500	366,100	165,300	167,600	90,400	125,000	22,600	556,710	167,300	0
FY15	41,000	66,500	133,200	58,500	5,000	194,000	0	9,500	509,400	250,300	3,000	58,100
FY16	130,900	3,650	76,000	42,500	95,000	176,100	3,500	115,500	24,700	4,001	0	0
FY17	34,000	0	0	11,500	3,000	123,000	9,200	18,000	10,000	8,000	12,800	6,000
FY18	300	50	15,660	3,000	34,200	0	0	360,700	29,000	3,000	216,500	0
FY19	29,302	187,501	476,500	0	121,900	64,501	86,000	296,750	26,250	78,200	36,800	97,700

Figure 1.20. Hauled Volumes by Fiscal Year and Month

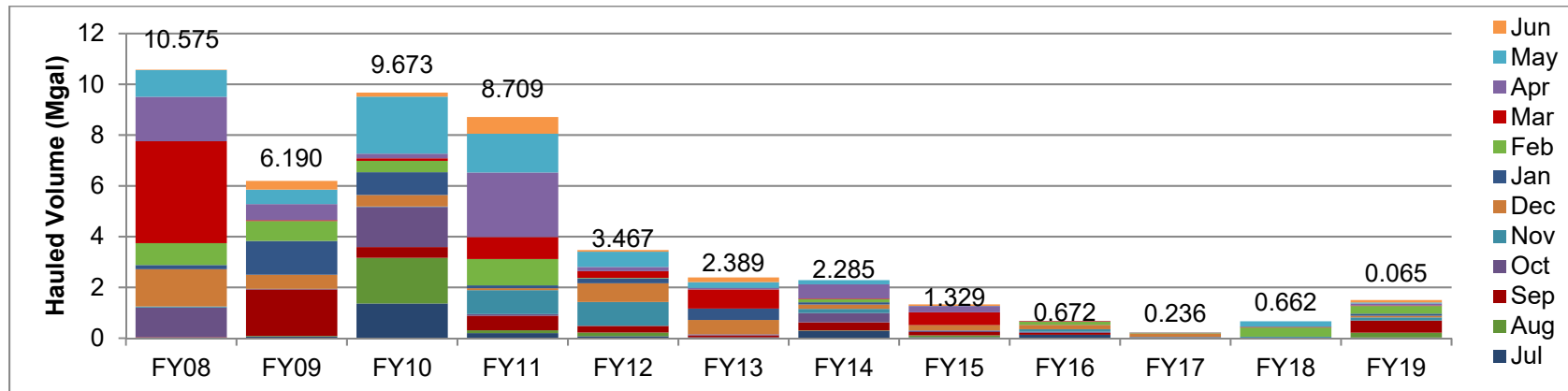
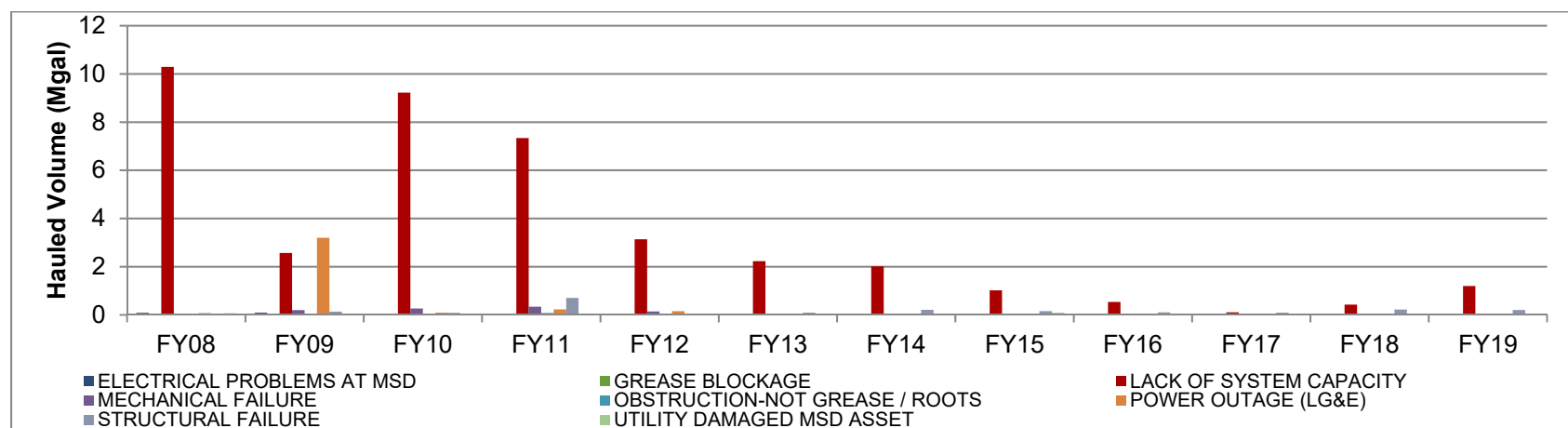


Table 1.24. Hauled Volumes in Gallons by Fiscal Year and Problem

FY	ELECTRICAL PROBLEMS AT MSD	GREASE BLOCKAGE	LACK OF SYSTEM CAPACITY	MECHANICAL FAILURE	OBSTRUCTION-NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	STRUCTURAL FAILURE	UTILITY DAMAGED MSD ASSET
FY08	86,000	0	10,289,273	50,000	0	71,700	11,500	67,000
FY09	92,100	0	2,569,480	198,200	1,000	3,195,550	133,800	0
FY10	150	0	9,221,250	260,850	8,300	90,135	85,300	7,000
FY11	22,422	8,000	7,339,450	334,800	75,000	227,400	700,950	0
FY12	1,700	0	3,138,250	138,100	7,100	150,000	32,200	0
FY13	0	0	2,225,100	51,900	14,000	7,000	90,600	0
FY14	0	0	2,011,910	12,200	44,000	7,800	208,700	0
FY15	12,500	0	1,019,100	10,000	0	42,800	154,100	90,000
FY16	0	0	534,300	38,000	0	0	99,550	0
FY17	18,500	0	104,800	13,700	0	0	92,500	4,000
FY18	7,050	0	423,360	7,500	0	0	219,500	0
FY19	25,000	0	1,197,653	25,001	0	38,700	200,050	0

Figure 1.21. Hauled Volumes by Fiscal Year and Problem



1.2.4.5. UNAUTHORIZED DISCHARGES TO WATERS OF US – DRY WEATHER SSOs

Table 1.25 and Figure 1.22 detail unauthorized discharges to WUS from the collections system by cause. Table 1.26 and Figure 1.23 detail unauthorized discharges to WUS from the collections system by asset.

1.2.4.6. DRY WEATHER OVERFLOWS TO THE INTERIOR

Table 1.27 and Figure 1.24 detail dry weather overflows to the interior by cause.

1.2.4.7. DRY WEATHER OVERFLOWS TO THE EXTERIOR

Table 1.28 and Figure 1.25 detail dry weather overflows to the exterior by cause. Table 1.29 and Figure 1.26 detail dry weather overflows to the exterior by asset.

Table 1.25. Dry Weather SSOs by Fiscal Year and Cause – Unauthorized Discharges to Waters of US

FY	ELECTRICAL PROBLEMS AT MSD	GREASE BLOCKAGE	MECHANICAL FAILURE	OBSTRUCTION-NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	PUMPED DUE TO COE MANUAL	ROOTS	STRUCTURAL FAILURE	UTILITY DAMAGED MSD ASSET
FY08	0	0	4	2	0	3	7	3	2
FY09	2	4	5	4	11	0	3	11	0
FY10	1	1	3	5	1	0	3	2	2
FY11	1	1	5	4	0	1	3	12	0
FY12	1	0	2	8	0	0	2	7	0
FY13	0	1	2	2	0	0	2	2	0
FY14	0	4	1	1	0	0	4	6	1
FY15	0	6	3	5	1	0	3	8	7
FY16	1	2	2	1	0	0	1	16	0
FY17	0	1	2	7	0	0	0	8	3
FY18	0	1	1	4	0	0	1	4	0
FY19	0	1	3	5	0	0	1	11	2

Figure 1.22. Trend of Dry Weather SSOs by Fiscal Year and Cause – Unauthorized Discharges to Waters of US

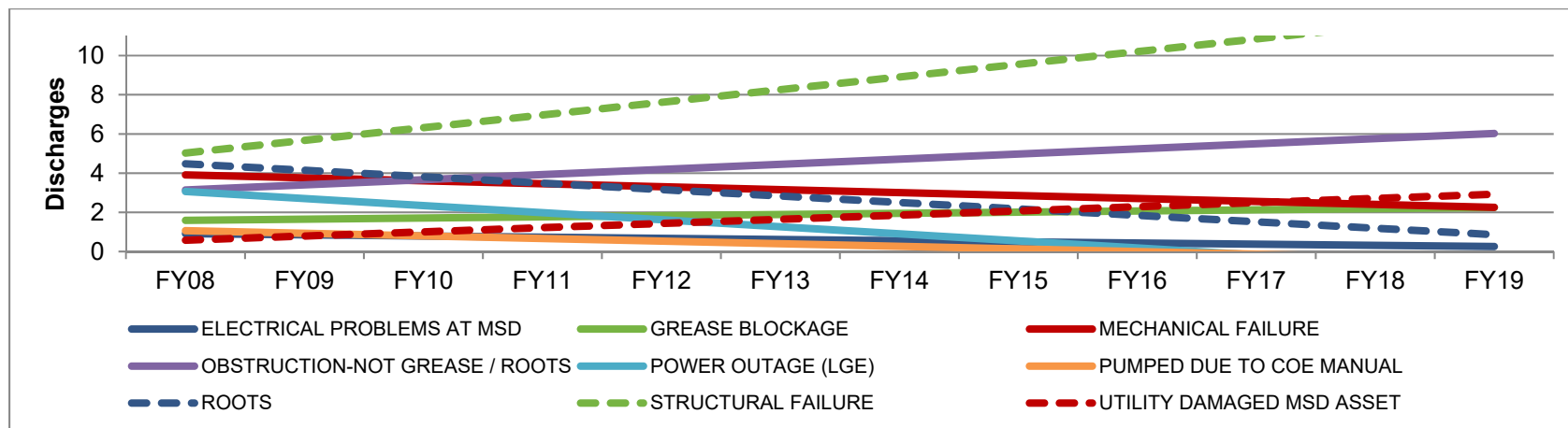


Table 1.26. Dry Weather SSOs by Fiscal Year and Asset – Unauthorized Discharges to Waters of US

FY	PUMP STATION	ACCESS POINT	MAIN	SERVICE CONNECTION
FY08	8	9	5	0
FY09	13	16	9	2
FY10	2	12	2	2
FY11	4	11	12	0
FY12	2	14	3	1
FY13	0	6	3	0
FY14	1	7	7	2
FY15	7	15	9	2
FY16	4	2	16	1
FY17	1	8	12	0
FY18	0	7	4	0
FY19	2	10	11	1

Figure 1.23. Trend of Dry Weather SSOs by Fiscal Year and Asset – Unauthorized Discharges to Waters of US

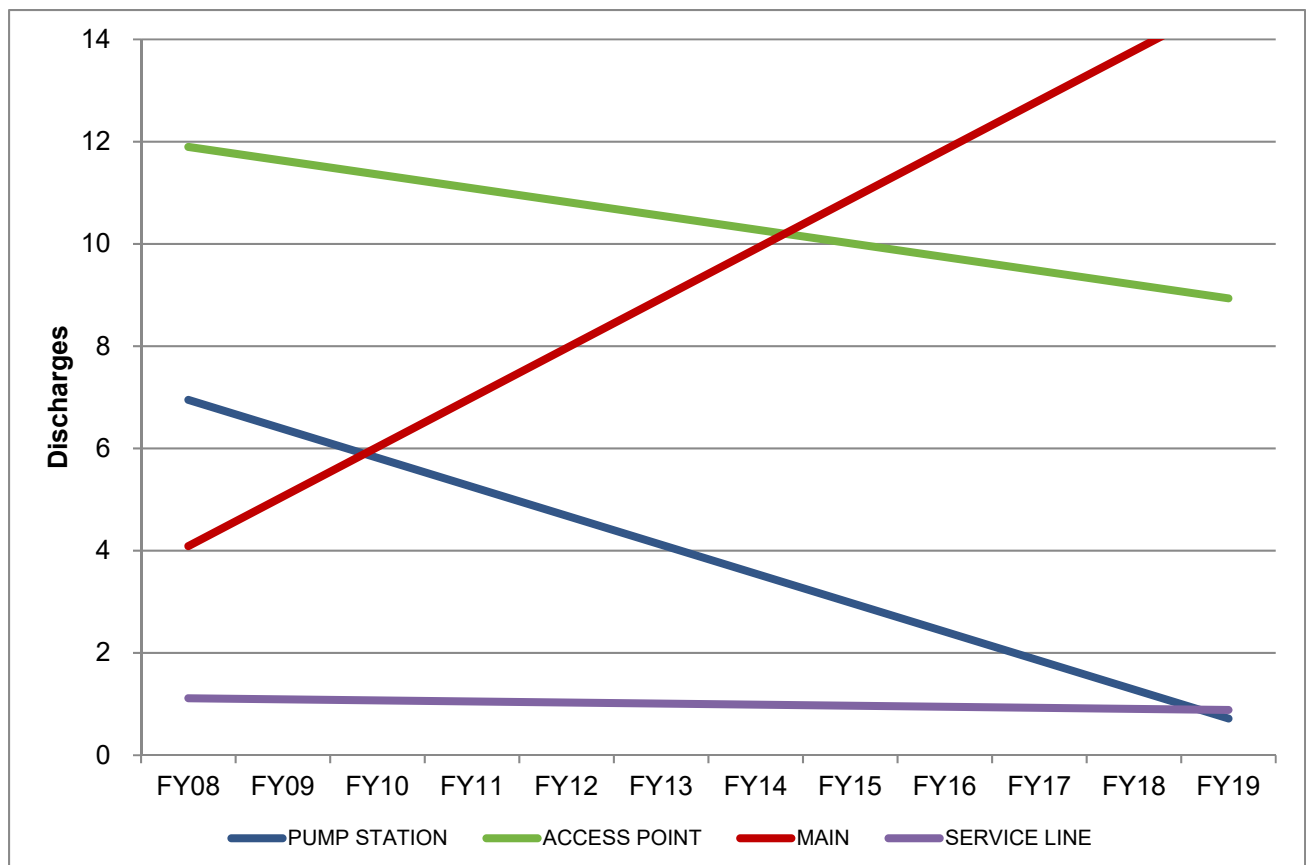


Table 1.27. Dry Weather Overflows to the Interior by Fiscal Year and Cause

FY	GREASE BLOCKAGE	MECHANICAL FAILURE	OBSTRUCTION- NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	ROOTS	STRUCTURAL FAILURE	UTILITY DAMAGED MSD ASSET
FY08	7	1	38	0	71	3	2
FY09	8	0	74	14	55	1	2
FY10	9	1	72	0	61	1	7
FY11	16	0	79	0	70	3	2
FY12	19	0	66	0	48	8	0
FY13	21	0	46	0	55	1	4
FY14	19	0	45	0	49	5	9
FY15	36	1	354	0	359	5	2
FY16	22	1	20	0	43	0	0
FY17	18	0	96	0	155	3	1
FY18	7	0	31	0	20	3	0
FY19	6	0	16	0	6	0	0

Figure 1.24. Trend of Dry Weather Overflows to the Interior by Fiscal Year and Cause

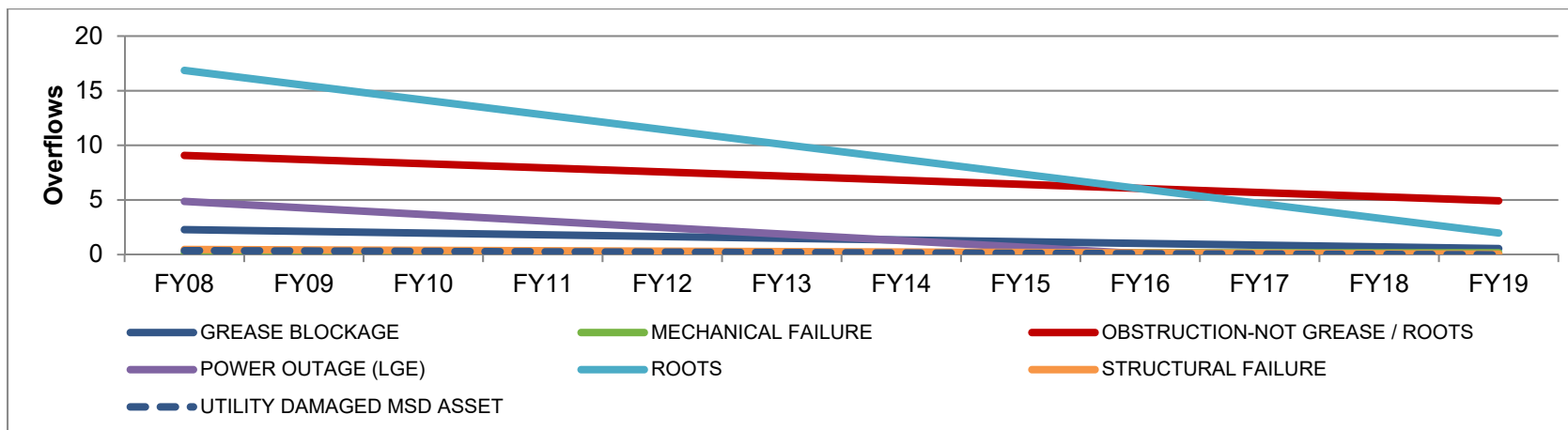


Table 1.28. Dry Weather Overflows to the Exterior by Fiscal Year and Cause

FY	ELECTRICAL PROBLEMS AT MSD	GREASE BLOCKAGE	MECHANICAL FAILURE	OBSTRUCTION-NOT GREASE / ROOTS	POWER OUTAGE (LG&E)	ROOTS	STRUCTURAL FAILURE	UTILITY DAMAGED MSD ASSET
FY08	0	4	8	8	0	6	4	0
FY09	4	4	10	9	16	2	7	0
FY10	2	0	11	14	1	4	4	3
FY11	2	4	8	11	1	9	10	0
FY12	1	7	2	10	0	8	5	2
FY13	0	0	2	5	0	1	8	0
FY14	0	5	1	5	0	0	4	1
FY15	1	4	2	35	0	22	7	5
FY16	0	5	4	11	0	7	4	2
FY17	0	10	3	23	0	22	6	0
FY18	0	5	8	15	0	6	6	1
FY19	0	1	7	16	0	5	6	0

Figure 1.25. Trend of Dry Weather Overflows to the Exterior by Fiscal Year and Cause

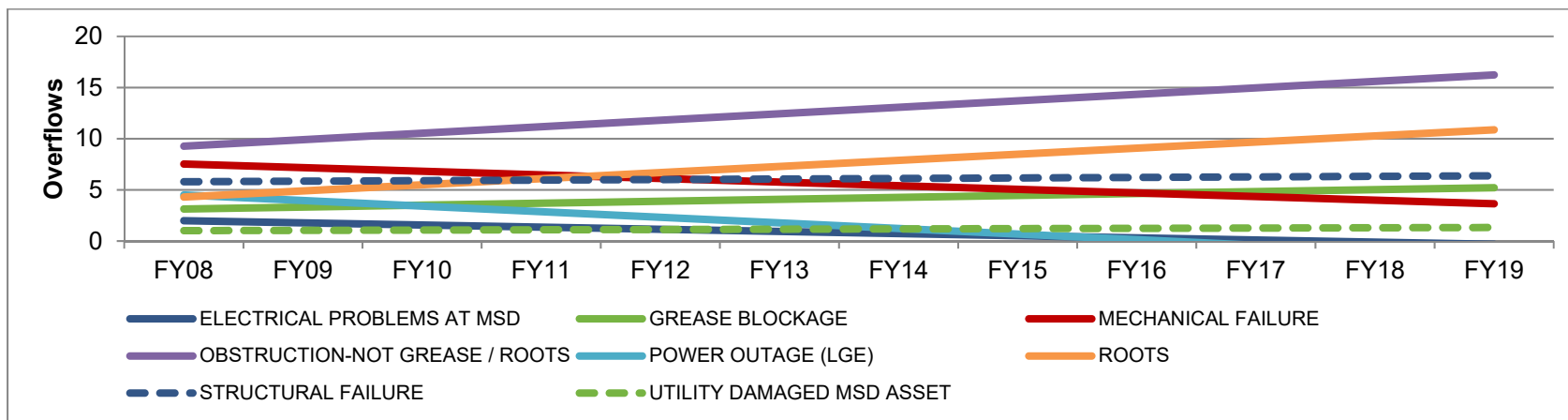
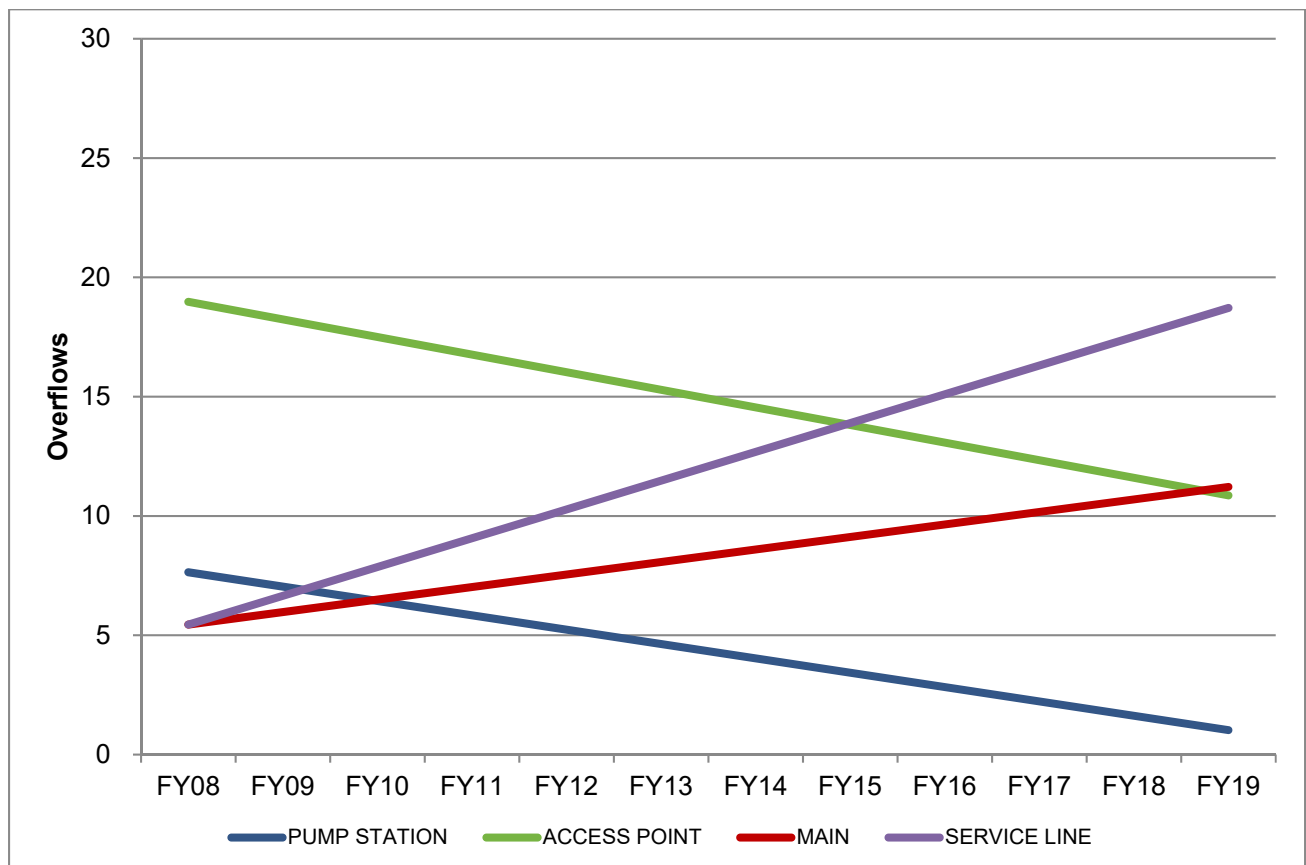


Table 1.29. Dry Weather Overflows to the Exterior by Fiscal Year and Asset

FY	PUMP STATION	ACCESS POINT	MAIN	SERVICE CONNECTION
FY08	3	16	3	8
FY09	18	18	10	6
FY10	5	25	6	3
FY11	8	25	7	5
FY12	2	19	6	8
FY13	0	6	7	3
FY14	0	7	4	5
FY15	5	7	14	50
FY16	1	11	8	13
FY17	3	12	17	32
FY18	4	18	11	8
FY19	2	14	5	4

Figure 1.26. Trend of Dry Weather Overflows to the Exterior by Fiscal Year and Asset



1.2.4.8. SSOS PER 100 MILES OF SEWER

Per the request of EPA, and in keeping with benchmarks from other utilities, MSD has prepared the following analysis of SSOs per 100 Miles of sewer by cause for the reporting period, as well as by year and compared to national benchmarks. The background shading on the following chart represents benchmarking from other utilities and EPA studies of overflows per 100 miles of sewer. Although overflow occurrences are significantly influenced by rainfall, it is shown that MSD is trending favorably against benchmarks, and efforts documented in this Annual Report are proving effective at reducing overflows.

Figure 1.27. SSOs per 100 Miles of Sewer



SECTION 2: PROGRAM ACTIVITIES FOR NINE MINIMUM CONTROLS

2.1. NINE MINIMUM CONTROLS PROGRAM BACKGROUND

Per Paragraph 24.a. of the Amended Consent Decree, the Nine Minimum Controls (NMC) Compliance Report was initially submitted to the Environmental Protection Agency (EPA) and to Kentucky Department of Environment Protection (KDEP) on February 10, 2006. MSD received an approval letter, dated February 22, 2007, for the NMC Compliance Report. The approved NMC Compliance document can be viewed on the MSD Project WIN website www.msdlouky.org/projectwin. Highlights of NMC program implementation are outlined below.

2.2. NMC 1: PROPER OPERATION AND MAINTENANCE PROGRAMS

FY19 Program

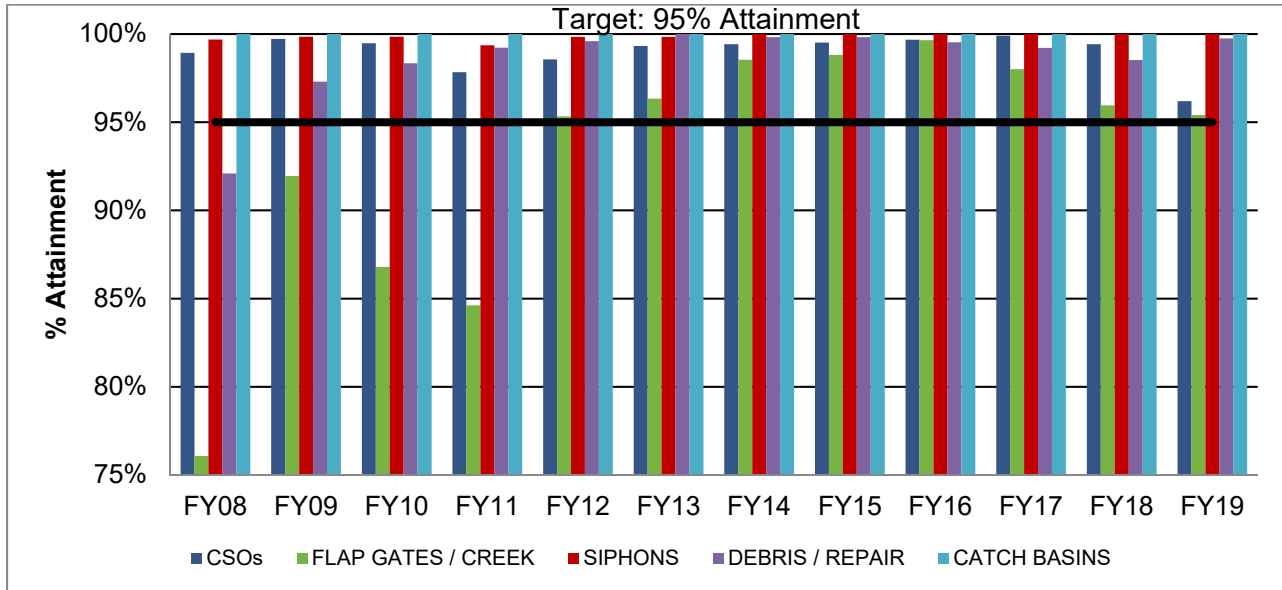
Program Implementation

- Inspected and cleaned 19,096 Catch Basins within the Combined Sewer System (CSS).
- Performed 5,060 weekly inspections on Combined Sewer Overflows (CSOs), 1,109 flap gate / creek inspections, 583 siphon inspections, and initiated 773 work orders for catch basin debris removal and/or repairs as determined to be necessary to allow proper system operation.
- Flushed 80 sewer line segments in the CSS, including 11,950 linear feet (2.3 miles) of sewer lines ranging in size from six to 54 inches. Performed formula-based PACP Television (TV) inspection on 182,949 feet (34.7 miles) of sewer lines.
- Continued to inspect, maintain and properly operate the CSS pump stations and the Morris Forman Water Quality Treatment Center (WQTC).
- Chemically treated 20,033 feet (3.8 miles) of combined sewer for roots.
- Achieved the 95% attainment program goals listed below, as shown in Figure 2.1.
 - 96% of CSOs inspected weekly.
 - 95% of flap gates inspected weekly.
 - 100% of siphons inspected monthly.
 - 100% of Debris or Repair Work Orders on CSO assets created the next workday after the inspection of the asset and open for no more than 5 days.
 - 100% catch basins within the CSS cleaned every 15 months.

Annual Training

- Conducted one CSO/Siphon Preventative Maintenance Training class on November 29, 2018.

Figure 2.1. NMC 1 Programmatic Implementation Attainment



Annual Asset Review and Documentation

- Continued projects to create improved access to selected CSO sites to facilitate cleaning activities.
- Continued to review catch basin areas against the CSS and explored re-alignment to confirm that the 15-month cleaning cycle is achieving regulatory commitments.

FY20 Program

Program Implementation

- Continue cleaning and inspection programs, and reporting on programmatic implementation goals.

Annual Training

- Incorporate the results of the annual field investigation to adjust and enhance the annual CSO Field Training modules.
- Schedule and conduct the annual CSO Field Training with the MSD Operations Division CSO/NMC staff and Morris Forman WQTC personnel.
- Develop online CSO & Siphon Training modules for MSD Operations Division CSO/NMC staff and Morris Forman WQTC personnel to supplement CSO Field Training.

Asset Review and Documentation

- Continue implementation of field verification efforts to determine operation and maintenance enhancements to be incorporated into annual training.
- Review the CSO inventory schematics and revise as necessary.
- Update the CSO characterization sheets to reflect the updated and calibrated hydraulic model.

2.3. NMC 2: MAXIMIZATION OF STORAGE IN THE COLLECTIONS SYSTEM

FY19 Program

Real Time Control (RTC) Optimization

- Continued operation of Phase 1, 2, and 3 of the RTC system. During the reporting period, over 1,911 MG were stored in the system during rain events and routed to the Morris Forman WQTC once the system was able to handle the flow. See Table 2.1. for a detailed report.
- Continued review of CSOs upstream of Morris Forman WQTC, and noted that flow through the plant is optimized prior to overflows occurring, as shown in quarterly reports for the reporting period.
- Continued utilization of “RTC Active Storage” to standardize the calculation of the volume of flow stored during wet weather events by RTC facilities.
- Continued Csoft maintenance and service agreement contract with RTC consultant.
- Completed construction of the Southern Outfall Retention #1 (SOR1) In-Line Storage Facility.
- Reprogrammed the Ashland In-line Storage Facility PLC to reflect the upgrade to a dual gate within a gate system.
- Completed the local site startup and integration of the phase 4 sites; SOR1 In-Line Storage Facility, the Logan and Breckinridge CSO Basin, the Clifton Heights CSO Basin, the Nightingale Pump Station (NGPS) into the RTC system.
- Initiated update and finalization of SOPs for the SOR1 In-Line Storage Facility, the Logan and Breckinridge CSO Basin, the Clifton Heights CSO Basin, Ashland In-Line Storage Facility, and the NGPS based on final programming and validation during manual operations.
- Completed the final Draft of the Portland Wharf CSO Basin SOP.
- Migrated RTC communications to Open Platform Communication (OPC) server to improve stability and reliability of real time data transfer to the RTC system.
- Replaced existing Autoreport tool utilized in determining storage volumes with HydroWeb Dashboard
- Developed site by site RTC mode summary guide to assist operators with system management.
- Began utilizing Nagios software to monitor RTC system to assist with identification of system failures and disruption occurrences and causes.
- Continued to implement recommendations for improvements designed to optimize the utilization and performance of the existing RTC system including the adjustment of RTC configurations and Pilot to improve optimization and management of the RTC system.
- Refined the Csoft model of the Starkey PS and CSO020 to improve dewatering optimization of the Clifton Heights and Logan CSO basins.
- Designed a flow meter installation between the Main Diversion Structure and the Morris Forman WQTC to improve optimization of treatment plant utilization.

- Completed the replacement of the PLC at the Brady Lake and Executive Inn storage facilities to improve communications and reliability.

Storage Optimization

- Continued to monitor the performance of the CSO108 Dam Modification, a bending weir installed at CSO108. Flow monitoring improvements, hydraulic model calibration, and field investigations were completed in FY18 to evaluate performance and determine the need for additional mitigation in this CSO area. Updates provided to KDOW and EPA relayed that green infrastructure as a source mitigation option was not viable, and the approved IOAP benefit-cost methodology was applied to remaining potential solution alternatives. This assessment demonstrated that the most effective solution was inline storage via the existing bending weir, as implemented, at a level of control of eight overflows per typical year. A minor project modification was accepted on September 27, 2018, requesting a change in the level of control from four to eight overflows per year. While modeling data shows a nominal (0.2 MG) increase to the project's projected residual AAOV, this volume will be offset in other areas to maintain the expected system-wide capture when IOAP implementation is complete. CSO108 is one of several LTCP projects whose post-construction compliance results are dependent on the completion of upstream SSDP projects between 2020 and 2024. Flows will continue to be monitored as these projects are implemented.
- Continued to monitor and review the performance of the RTC sites and system under Csoft 4, developing recommendations for improvements, and implementing these recommendations as needed to optimize the utilization and performance of the RTC system.
- Placed the Clifton Heights CSO Basin into service and operated manually to confirm operational parameters in advance of integration into RTC.
- Completed construction and placed the Southern Outfall Retention #1 (SOR1) In-Line Storage Facility in service.
- Upgraded the Ashland In-Line Storage Facility by replacing the gate with a dual gate within a gate system and flap valves to improve site operations.
- Continued construction of the Southwestern Parkway and the Portland Wharf CSO basin and began local and RTC programming of the facilities. Southwestern Parkway attained substantially complete status.
- Continued improving operations and mechanical performance at the Southwestern Outfall Retention #1 (SWOR1) / Southwest Sluice Gates (SWSG), Southwestern Pump Station (SWPS), and Bells Lane Wet Weather Treatment Facility during the period of manual operation and SOP implementation in advance of RTC integration.

Table 2.1. Wet Weather Storage in the Morris Forman Sewer System via the RTC System

EVENT NUMBER	WET WEATHER EVENT			RAINFALL			CSO SAVED VOLUME (MG)											HIGH RIVER LEVELS	COMMENTS
	START DATE	END DATE	DURATION	AVG*	MAX**		SWPS SG CHAMBER (14.5)*	SWOR2 (4.1)	BRADY LAKE AND EXECUTIVE INN STORAGE (13.4)	SOUTHERN OUTFALL (3.5) OR SOR1 (20.6)	ASHLAND (1.0)	OHIO RIVER INTERCEPTOR (4.1)	SNEADS BRANCH (2.5)	LOGAN (17)	NGPS (8.0)	CLIFTON HEIGHTS (7.0)	TOTAL (92.2)		
				TRFD (IN)	TRFD (IN)	RAIN GAUGE													
2018-055	7/2/18 17:20	7/3/18 14:10	20:50:00	0.53	1.28	TR05	8.50	2.65	5.15	2.40	0.65	2.85	0.50	-	-	-	22.70	0	Moderate back-to-back storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.
2018-056	7/3/18 14:10	7/5/18 10:40	44:30:00	0.47	1.07	TR13	9.60	3.00	1.70	2.50	0.75	2.95	0.75	-	-	-	21.25	0	Moderate storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-058	7/15/18 14:15	7/17/18 23:50	57:35:00	0.51	1.00	TR13	1.95	2.30	1.95	1.20	1.15	3.20	1.00	-	-	-	12.75	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-059	7/20/18 4:20	7/22/18 4:25	48:05:00	2.03	2.86	TR11	6.45	5.05	5.25	5.25	1.25	6.10	0.95	-	-	-	30.30	0	Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-060	7/22/18 12:30	7/23/18 3:45	15:15:00	0.25	0.81	TR05	0.00	0.25	0.15	0.00	0.05	1.75	0.10	-	-	-	2.30	0	Small back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-065	8/7/18 16:55	8/8/18 15:45	22:50:00	0.32	0.49	TR15	2.40	0.80	0.65	0.30	0.10	2.10	0.20	-	-	-	6.55	0	Small back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-066	8/15/18 12:40	8/17/18 11:35	46:55:00	3.37	4.00	TR12	9.30	2.65	8.05	3.65	0.65	4.30	1.65	-	-	-	30.25	0	Events 2018-066 and 2018-067 were accounted for together. Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-067	8/17/18 11:35	8/18/18 2:50	15:15:00	0.00	0.00		-	-	-	-	-	-	-	-	-	-	0.00	0	Analyzed as part of event 2018-066.
2018-068	8/18/18 15:15	8/19/18 3:40	12:25:00	0.03	0.08	TR12	1.40	0.35	0.30	0.00	0.10	0.45	0.00	-	-	-	2.60	0	Small storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.

Table 2.1. Wet Weather Storage in the Morris Forman Sewer System via the RTC System

EVENT NUMBER	WET WEATHER EVENT			RAINFALL			CSO SAVED VOLUME (MG)											HIGH RIVER LEVELS	COMMENTS
	START DATE	END DATE	DURATION	AVG*	MAX**		SWPS SG CHAMBER (14.5)*	SWOR2 (4.1)	BRADY LAKE AND EXECUTIVE INN STORAGE (13.4)	SOUTHERN OUTFALL (3.5) OR SOR1 (20.6)	ASHLAND (1.0)	OHIO RIVER INTERCEPTOR (4.1)	SNEADS BRANCH (2.5)	LOGAN (17)	NGPS (8.0)	CLIFTON HEIGHTS (7.0)	TOTAL (92.2)		
				TRFD (IN)	TRFD (IN)	RAIN GAUGE													
2018-069	8/19/18 20:50	8/22/18 4:35	55:45:00	1.02	4.26	TR12	9.80	2.90	0.55	2.75	0.55	3.25	2.15	-	-	-	21.95	0	Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-073	8/31/18 15:35	9/1/18 5:50	14:15:00	0.79	1.45	TR13	2.05	1.05	1.40	0.60	0.10	1.75	0.20	-	-	-	7.15	0	Moderate storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-074	9/6/18 11:10	9/6/18 21:05	9:55:00	0.37	0.65	TR11	9.60	2.25	1.25	0.60	0.65	1.60	0.20	-	-	-	16.15	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-075	9/7/18 19:50	9/10/18 1:25	53:35:00	3.66	4.01	TR04	14.00	3.95	12.95	3.45	0.95	4.05	1.30	-	-	-	40.65	0	Very large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-078	9/21/18 14:35	9/22/18 3:25	12:50:00	0.31	0.49	TR12	0.05	0.15	0.10	1.20	0.00	2.55	0.50	-	-	-	4.55	0	Small back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-079	9/22/18 15:00	9/27/18 13:55	118:55:00	5.56	6.48	TR14	21.95	6.20	20.25	14.60	1.50	17.10	5.90	-	-	-	87.50	0	Events 2018-079 and 2018-080 were accounted for together. Very Large back-to-back storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.
2018-080	9/27/18 13:55	9/28/18 8:30	18:35:00	0.04	0.07	TR14	-	-	-	-	-	-	-	-	-	-	0.00	0	Analyzed as part of event 2018-079
2018-082	10/10/18 15:45	10/11/1 8 1:30	9:45:00	0.18	0.65	TR04	0.70	0.60	0.30	0.90	0.15	2.20	0.00	-	-	-	4.85	0	Small storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.
2018-083	10/12/18 21:10	10/13/1 8 6:05	8:55:00	0.13	0.15	TR12	0.00	0.20	0.25	0.00	0.10	0.90	0.00	-	-	-	1.45	0	Small back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.

Table 2.1. Wet Weather Storage in the Morris Forman Sewer System via the RTC System

EVENT NUMBER	WET WEATHER EVENT			RAINFALL			CSO SAVED VOLUME (MG)											HIGH RIVER LEVELS	COMMENTS
	START DATE	END DATE	DURATION	AVG*	MAX**		SWPS SG CHAMBER (14.5)*	SWOR2 (4.1)	BRADY LAKE AND EXECUTIVE INN STORAGE (13.4)	SOUTHERN OUTFALL (3.5) OR SOR1 (20.6)	ASHLAND (1.0)	OHIO RIVER INTERCEPTOR (4.1)	SNEADS BRANCH (2.5)	LOGAN (17)	NGPS (8.0)	CLIFTON HEIGHTS (7.0)	TOTAL (92.2)		
				TRFD (IN)	TRFD (IN)	RAIN GAUGE													
2018-084	10/14/18 2:50	10/15/18 17:10	38:20:00	0.48	0.60	TR12	2.20	0.90	0.75	0.30	0.15	1.35	0.10	-	-	-	5.75	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-086	10/26/18 13:20	10/27/18 7:05	17:45:00	0.22	0.26	TR11	0.00	1.05	0.55	0.05	0.40	2.05	0.05	-	-	-	4.15	0	Small storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-087	10/31/18 10:55	11/3/18 6:00	67:05:00	2.23	2.42	TR11	22.65	6.40	14.65	7.40	1.55	8.70	2.50	-	-	-	63.85	0	Very Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-089	11/5/18 17:55	11/8/18 11:45	65:50:00	1.26	1.57	TR14	18.10	5.10	11.55	3.45	1.25	4.05	1.55	-	-	-	45.05	0	Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-091	11/12/18 18:00	11/13/18 12:20	18:20:00	0.10	0.12	TR14	0.00	0.10	0.00	0.00	0.00	0.60	0.00	-	-	-	0.70	0	Small storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-092	11/14/18 20:45	11/16/18 18:10	45:25:00	0.43	0.87	TR05	11.85	3.55	5.50	3.15	0.85	3.70	0.70	-	-	-	29.30	0	Moderate back-to-back storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.
2018-094	11/23/18 20:20	11/24/18 11:35	15:15:00	0.35	0.43	TR14	0.00	0.50	0.10	0.00	0.10	1.45	0.00	-	-	-	2.15	0	Moderate storm cells homogeneously distributed over the service area.The SWSG site was controlled manually.
2018-095	11/25/18 22:00	11/26/18 6:55	8:55:00	0.12	0.13	TR11	0.00	1.65	0.15	0.00	0.15	1.15	0.05	-	-	-	3.15	0	Small storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-097	12/1/18 1:25	12/3/18 21:30	68:05:00	1.59	1.72	TR12	13.05	3.85	8.50	3.05	0.95	3.60	1.75	-	-	-	34.75	0	Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.

Table 2.1. Wet Weather Storage in the Morris Forman Sewer System via the RTC System

EVENT NUMBER	WET WEATHER EVENT			RAINFALL			CSO SAVED VOLUME (MG)											HIGH RIVER LEVELS	COMMENTS
	START DATE	END DATE	DURATION	AVG*	MAX**		SWPS SG CHAMBER (14.5)*	SWOR2 (4.1)	BRADY LAKE AND EXECUTIVE INN STORAGE (13.4)	SOUTHERN OUTFALL (3.5) OR SOR1 (20.6)	ASHLAND (1.0)	OHIO RIVER INTERCEPTOR (4.1)	SNEADS BRANCH (2.5)	LOGAN (17)	NGPS (8.0)	CLIFTON HEIGHTS (7.0)	TOTAL (92.2)		
				TRFD (IN)	TRFD (IN)	RAIN GAUGE													
2018-098	12/14/18 12:05	12/17/1 8 10:20	70:15:00	1.53	1.72	TR12	19.95	5.65	11.60	16.30	1.40	3.50	2.25	16.65	-	-	77.30	0	The SOR1 RTC site replaces the MDS Southern Outfall RTC site and it will remain so for future events. The Logan site is also add to the analysis and will remain so for future events. Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-099	12/20/18 11:00	12/21/1 8 14:20	27:20:00	0.60	0.65	TR12	7.05	3.85	1.45	0.00	0.85	1.95	0.05	3.50	-	-	18.70	0	Moderate storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-100	12/27/18 8:50	12/28/1 8 14:55	30:05:00	0.41	0.49	TR11	8.90	2.75	1.85	3.90	0.80	3.55	0.45	4.60	-	-	26.80	1	Moderate storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2018-101	12/31/18 3:15	1/2/19 10:10	54:55:00	1.41	1.56	TR04	12.25	3.45	6.45	18.10	0.85	4.50	1.90	16.55	-	-	64.05	0	Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-001	1/4/19 12:50	1/6/19 7:25	42:35:00	0.62	0.71	TR11	11.60	3.25	3.15	4.70	0.80	3.30	0.50	7.50	-	-	34.80	1	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-002	1/12/19 14:15	1/13/19 15:40	25:25:00	0.41	0.48	TR11	0.00	0.25	0.70	0.00	0.05	1.95	0.00	0.00	-	-	2.95	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-003	1/17/19 11:10	1/17/19 23:45	12:35:00	0.11	0.13	TR13	0.00	0.05	0.05	0.00	0.00	1.30	0.00	0.00	-	-	1.40	0	Small storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.
2019-004	1/19/19 5:20	1/20/19 12:45	31:25:00	0.93	1.01	TR04	3.95	1.15	1.05	1.80	0.30	4.25	0.30	8.00	-	-	20.80	0	Moderate storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.

Table 2.1. Wet Weather Storage in the Morris Forman Sewer System via the RTC System

Event Number	Wet Weather Event			Rainfall			CSO Saved Volume (MG)											High River Levels	Comments
	Start Date	End Date	Duration	AVG*	MAX**		SWPS SG Chamber (14.5)*	SWOR2 (4.1)	Brady Lake and Executive Inn Storage (13.4)	Southern Outfall (3.5) or SOR1 (20.6)	Ashland (1.0)	Ohio River Interceptor (4.1)	Sneads Branch (2.5)	Logan (17)	NGPS (8.0)	Clifton Heights (7.0)	Total (92.2)		
				TRFD (in)	TRFD (in)	Rain Gauge													
2019-005	1/22/19 11:45	1/25/19 10:55	71:10:00	0.97	1.12	TR04	8.70	2.45	3.25	3.15	0.60	2.95	0.50	11.40	-	-	33.00	1	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-007	2/4/19 12:40	2/5/19 11:20	22:40:00	0.10	0.17	TR04	0.00	0.00	0.15	0.00	0.20	1.65	0.00	0.00	-	-	2.00	0	Small storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.
2019-008	2/5/19 21:20	2/9/19 10:35	85:15:00	1.81	2.38	TR12	16.65	4.70	11.55	32.70	1.15	8.95	3.10	0.75	-	-	79.55	1	Very large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-009	2/10/19 12:45	2/16/19 21:00	152:15:00	2.88	3.07	TR05	8.30	2.35	6.95	22.40	0.55	4.45	1.55	16.75	-	-	63.30	1	Very large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-010	2/19/19 23:10	2/23/19 7:35	80:25:00	0.12	0.13	TR05	12.60	3.55	9.50	12.30	0.85	3.60	1.20	0.40	-	-	44.00	1	Small back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-011	2/23/19 7:35	2/28/19 3:15	115:40:00	0.84	0.96	TR04	12.40	3.50	7.85	5.00	0.85	3.75	2.10	16.65	-	-	52.10	1	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-012	2/28/19 14:50	3/1/19 1:00	10:10:00	0.05	0.13	TR05	-	-	-	-	-	-	-	-	-	-	0.00	1	Analyzed as part of rainfall event #2019-011.
2019-014	3/9/19 11:45	3/10/19 22:25	34:40:00	0.57	1.20	TR04	11.70	3.30	7.25	3.65	0.80	3.05	1.65	15.60	-	-	47.00	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-015	3/14/19 4:45	3/15/19 19:20	38:35:00	0.42	1.15	TR04	14.85	4.20	8.10	6.75	1.00	4.70	1.45	12.85	-	-	53.90	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.

Table 2.1. Wet Weather Storage in the Morris Forman Sewer System via the RTC System

EVENT NUMBER	WET WEATHER EVENT			RAINFALL			CSO SAVED VOLUME (MG)											HIGH RIVER LEVELS	COMMENTS
	START DATE	END DATE	DURATION	AVG*	MAX**		SWPS SG CHAMBER (14.5)*	SWOR2 (4.1)	BRADY LAKE AND EXECUTIVE INN STORAGE (13.4)	SOUTHERN OUTFALL (3.5) OR SOR1 (20.6)	ASHLAND (1.0)	OHIO RIVER INTERCEPTOR (4.1)	SNEADS BRANCH (2.5)	LOGAN (17)	NGPS (8.0)	CLIFTON HEIGHTS (7.0)	TOTAL (92.2)		
				TRFD (IN)	TRFD (IN)	RAIN GAUGE													
2019-017	3/24/19 17:05	3/25/19 13:35	20:30:00	0.15	0.38	TR14	3.45	0.50	0.50	0.00	0.80	1.95	0.10	0.00	-	-	7.30	0	Small back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-019	3/30/19 15:20	3/31/19 16:55	25:35:00	0.56	1.14	TR14	9.85	2.80	5.95	4.25	0.70	3.25	1.50	16.45	-	-	44.75	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-021	4/5/19 0:40	4/5/19 11:15	10:35:00	0.11	0.21	TR14	0.00	0.55	0.20	0.00	0.00	1.85	0.00	0.00	-	-	2.60	0	Small storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-022	4/7/19 6:25	4/8/19 11:40	29:15:00	0.28	0.67	TR04	12.00	3.55	4.40	5.05	0.00	3.95	1.30	9.95	-	-	40.20	0	Small back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-024	4/12/19 6:30	4/12/19 14:40	8:10:00	0.05	0.16	TR05	0.00	0.40	0.35	0.00	0.00	1.35	0.10	0.30	-	-	2.50	0	Small storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-025	4/13/19 22:30	4/15/19 4:50	30:20:00	0.64	1.31	TR14	12.80	3.65	7.90	3.95	0.00	3.15	2.05	16.50	-	-	50.00	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-026	4/18/19 21:30	4/22/19 13:00	87:30:00	0.41	0.80	TR04	16.75	4.75	13.70	11.35	0.00	7.25	2.00	15.40	-	-	71.20	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-027	4/22/19 13:00	4/23/19 15:30	26:30:00	0.00	0.00	TR04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0	Analyzed as part of rainfall event #2019-026.
2019-028	4/25/19 16:50	4/26/19 20:50	28:00:00	0.00	0.00	TR04	12.65	3.85	6.90	13.30	0.00	4.90	1.30	16.75	-	-	59.65	0	Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.

Table 2.1. Wet Weather Storage in the Morris Forman Sewer System via the RTC System

Event Number	Wet Weather Event			Rainfall			CSO Saved Volume (MG)											High River Levels	Comments
	Start Date	End Date	Duration	AVG*	MAX**		SWPS SG Chamber (14.5)*	SWOR2 (4.1)	Brady Lake and Executive Inn Storage (13.4)	Southern Outfall (3.5) or SOR1 (20.6)	Ashland (1.0)	Ohio River Interceptor (4.1)	Sneads Branch (2.5)	Logan (17)	NGPS (8.0)	Clifton Heights (7.0)	Total (92.2)		
				TRFD (in)	TRFD (in)	Rain Gauge													
2019-029	5/1/19 19:45	5/5/19 6:20	82:35:00	0.20	0.40	TR12	17.10	4.85	9.95	18.30	0.00	3.95	1.65	18.05	-	-	73.85	0	Large back-to-back storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.
2019-031	5/5/19 18:15	5/6/19 17:55	23:40:00	0.00	0.00	TR04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0	Analyzed as part of rainfall event #2019-029.
2019-032	5/11/19 19:50	5/12/19 20:15	24:25:00	0.27	0.33	TR11	0.70	0.50	0.35	0.00	0.00	1.45	0.05	0.20	-	-	3.25	0	Small storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-034	5/19/19 13:40	5/20/19 8:35	18:55:00	0.35	0.47	TR13	4.85	1.60	2.20	2.20	0.00	2.90	0.40	3.10	-	-	17.25	0	Moderate back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-036	5/23/19 10:05	5/24/19 3:50	17:45:00	0.07	0.16	TR14	0.00	0.00	0.05	0.00	0.00	1.95	0.05	0.85	-	-	2.90	0	Small back-to-back storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.
2019-037	5/26/19 14:25	5/27/19 3:30	13:05:00	0.53	0.77	TR05	2.25	1.40	2.35	9.25	0.00	3.45	0.30	6.10	-	-	25.10	0	Moderate storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-039	5/29/19 9:50	5/31/19 1:25	39:35:00	1.00	1.62	TR14	11.15	2.45	4.45	15.90	0.00	4.10	0.65	11.50	-	-	50.20	0	Large back-to-back storm cells homogeneously distributed over the service area. The SWSG site was controlled manually.
2019-040	6/5/19 3:20	6/7/19 14:10	58:50:00	0.78	0.96	TR14	8.75	2.60	4.35	14.45	0.00	3.15	0.70	6.25	2.90	-	43.15	0	Large back-to-back storm cells homogeneously distributed over the service area. The NGPS site was added to the RTC system. The SWSG site was controlled manually.
2019-041	6/7/19 21:25	6/11/19 15:40	90:15:00	2.11	2.86	TR12	13.05	3.70	7.00	27.10	0.00	5.55	1.50	16.90	5.30	-	80.10	0	Very Large back-to-back storm cells heterogeneously distributed over the service area. The SWSG site was controlled manually.

Table 2.1. Wet Weather Storage in the Morris Forman Sewer System via the RTC System

EVENT NUMBER	WET WEATHER EVENT			RAINFALL			CSO SAVED VOLUME (MG)											HIGH RIVER LEVELS	COMMENTS
	START DATE	END DATE	DURATION	AVG*	MAX**		SWPS SG CHAMBER (14.5)*	SWOR2 (4.1)	BRADY LAKE AND EXECUTIVE INN STORAGE (13.4)	SOUTHERN OUTFALL (3.5) OR SOR1 (20.6)	ASHLAND (1.0)	OHIO RIVER INTERCEPTOR (4.1)	SNEADS BRANCH (2.5)	LOGAN (17)	NGPS (8.0)	CLIFTON HEIGHTS (7.0)	TOTAL (92.2)		
				TRFD (IN)	TRFD (IN)	RAIN GAUGE													
2019-044	6/16/19 6:05	6/21/19 19:40	133:35:00	2.94	3.63	TR05	13.00	3.65	8.80	14.35	0.90	2.95	1.90	19.45	1.75	6.35	73.10	0	Very Large back-to-back storm cells heterogeneously distributed over the service area. The Clifton Heights site was added to the RTC system. The SWSG site was controlled manually.
2019-045	6/21/19 19:40	6/23/19 16:35	44:55:00	0.88	1.30	TR04	32.00	9.05	16.55	34.45	2.20	7.60	2.20	28.60	1.45	7.25	141.35	0	Large back-to-back storm cells heteroeneously distributed over the service area. The SWSG site was controlled manually.
2019-046	6/23/19 16:35	6/27/19 15:45	95:10:00	1.11	1.55	TR14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	Analyzed as part of rainfall event #2019-045.
TOTAL							484.85	151.75	278.85	361.45	29.75	205.85	56.85	317.55	11.40	13.60	1911.90		

* Average total rainfall depth based on rain gauge TR04, TR05, TR11, TR12, TR13, TR14 and TR15.

** Maximum total rainfall depth measurement and measurement location during the wet weather event.

*** MDS is always controlled manually by operators.

FY20 Program

RTC Optimization

- Continue to work with the RTC consultant to review RTC system performance and identify means to improve system operability in the automated mode under Csoft 4. The Operations Division will continue to implement operational set point control changes for individual components and then incorporate programming into the overall RTC system as deemed appropriate.
- Begin operating the Southwestern Parkway (Shawnee) and Portland Wharf CSO basins manually to validate the control assumptions for each site, followed by increasing levels of system automation as the automated controls for individual components are implemented, validated, and then incorporated into the overall RTC system.
- Finalize SOPs for the Nightingale Pump Station (NGPS), SWOR1, SWPS, Bells Lane Wet Weather Treatment Facility, Logan CSO Basin, Clifton Heights CSO Basin, Southwestern Parkway (Shawnee) CSO Basin, Portland Wharf CSO Basin, and SOR1 sites to incorporate modifications to operations stemming from periods of manual operations and local site startup in RTC and update the Master RTC SOP Manual.
- Prepare the preliminary SOP for the 13th and Rowan PS and the Waterway Protection Tunnel.
- Continue Developing the RTC Programming and Modules guide to document existing and new site RTC programming and modules including local site variables and parameters utilized for site management.
- Continue the development of educational presentations for MSD operations and engineering staff focused on the fundamentals of the RTC system operations and the role of RTC in the MSD system and IOAP projects.
- Install a flow meter between the Main Diversion Structure and the Morris Forman WQTC and incorporate data into the RTC system to improve optimization of flow to the plant.

Storage Optimization

- Complete construction of the Southwestern Parkway (Shawnee) CSO Basin and Portland Wharf CSO Basin and PLC programming. Begin operating the sites under manual/local controls to validate operational assumptions and tune operational parameters.
- Integrate the SWOR1, SWPS, Bells Lane Wet Weather Treatment Facility, Southwestern Parkway (Shawnee) CSO Basin, and Portland Wharf CSO basin into the RTC system once performance is seemed satisfactory during period of manual operation and increased local automatic control.

2.4. NMC 3: REVIEW AND MODIFICATION OF PRETREATMENT REQUIREMENTS

FY19 Program

- Completed FY19 NMC 3 Trunk Sewer Water Quality Data Collection in August 2018. Finalized pollutants of concern (POCs) and trunkline sewer data (contributory to CSOs) for FY19 Dry Weather Sampling Result Report. Reviewed and evaluated FY19 trunk sewer data against prior trunk sewer data to

determine if changes in pollutants warrant review of contributory Non-Domestic Dischargers (NDDs). Determined POCs and trunkline sewer (contributory to CSOs) dry weather sampling strategy for FY20. Prepared a report to document the findings and recommendations resulting from sampling efforts.

- Continued to send wet weather alerts to NDDs of concern prior to rain events, reminding them of their commitment to implement voluntary controls during wet weather events. During this reporting period, the MSD service area experienced 65 measurable rain events and 44 events with only trace rainfall. MSD sent email notices to NDDs 67 times prior to precipitation events. The email notices contain information regarding expected precipitation expected for a one- to four-day period. There are currently nine NDDs that voluntarily implement controls during wet weather by alternating their cleaning schedule and/or by storing wastewater during a rain event.
- Continued to track performance measures to quantify the effectiveness of voluntary controls during wet weather events. The pollutant loading kept out of the CSS per typical rain event in previous fiscal years has been quantified with the data from the wet weather logs submitted by NDDs and is shown in Table 2.2. The typical results of pollutants kept out of the CSS when all NDDs participate are presented Table 2.3, quantified based on the actual rain events when NDDs detained their flow or otherwise reduced their discharge. One industry (Dean Milk) was removed from the program when it ceased operation during the FY19 reporting period.
- Continued to include specific NMC 3 related language, as appropriate, in new and re-issued wastewater discharge permits to facilities located in the CSS, as well as in all Unusual Discharge Requests (UDRs) approved for discharge to the CSS. MSD re-issued 24 wastewater discharge permits to users discharging to or immediately upstream of the CSS. There were 30 UDRs processed for discharges to Morris Forman WQTC in FY19. The UDRs included 12 locations in the CSS and 18 locations in the SSS which ultimately discharge to Morris Forman WQTC. To avoid the risk of an overflow occurring, UDR permits contain standard condition requirements which restrict discharges into the collection system when wet weather conditions are expected.
- Conducted two NMC 3 site inspections at NDD facilities as part of the permit renewal process.
- Conducted twenty-three NMC 3 site inspections at Industrial User facilities not currently in the formal NMC 3 program as part of the initial permitting or permit renewal process. These facilities were found to have little to no impact during rain events. MSD elected not to request implementation of voluntary controls by these facilities at this time because of the limited benefit to be gained. MSD heightened the understanding of the CSS operation during wet weather for these industries during the inspections.
- Continued to include hold and release requirements in permits for all new industrial users in the combined sewer system and for existing industrial customers that expand production in the combined sewer system. The volume and duration of each hold and release requirement were determined through use of MSD's hydraulic model. MSD applied this requirement to two permits during the reporting period. MSD also documented which permitted industries have 'hold and release' permit requirements.
- Continued to seek out green infrastructure opportunities at NDDs discharging to the CSS and documented the permitted industries that use green infrastructure to reduce flow contributions during wet weather.
- Documented which NDDs have ceased operation during the reporting period.

- Reviewed improvements made to the combined sewer system infrastructure and the potential impact on the NMC 3 program. Updated CSS flows from the most recent calibrated hydraulic model.

FY20 Program

- Complete FY20 NMC 3 Trunk Sewer Water Quality Data Collection effort. Compare FY20 trunk sewer data against prior trunk sewer data to determine if changes in pollutants warrant review of contributory NDDs. Determine POCs, NDDs (based on historical data), and trunkline sewers (contributory to CSOs) for FY20. Review NDDs (based on historical data) to identify those that may be removed from the program, as well as any that may need to be added. Prepare a file report to document the findings and recommendations resulting from FY20 NMC 3 trunk sewer collection data.
- Continue to send wet weather alerts to NDDs of concern prior to rain events, reminding them of their commitment to implement voluntary controls during wet weather events.
- Continue to include specific NMC 3 related language, as appropriate, in new and re-issued wastewater discharge permits to facilities located in the CSS, as well as in all Unusual Discharge Requests approved for discharge to the CSS.
- Conduct NMC 3 site inspections at Industrial User permitted facilities not currently in the formal NMC 3 program as part of the permit renewal process.
- Discuss NMC 3 program participation at each annual site inspection for Industrial Users who are currently in the NMC 3 program.
- Track performance measures to monitor the effectiveness of the implementation of NMC 3 within the Pretreatment Program.
- Review new industrial users and existing industrial users with increased discharges in the combined sewer system to determine if hold and release requirements need to be added into their permits. Continue to document which permitted industries have hold and release permit requirements. Continue to document which permitted industries use green infrastructure to trade off for their 'hold and release' program.
- Document which NDDs have ceased operation and quantify the impact/reduction on CSS operation.
- Continue to review improvements made to the combined sewer system infrastructure and their potential impact on the NMC 3 program. Consider updated flows from the most recent calibrated hydraulic model. Some CSS improvements may result in changes to the ongoing NMC 3 program. Document the changes and impacts in a memo to the file.

Table 2.2. Typical Pollutants Kept Out of the CSS per Rain Event

FISCAL YEAR	NUMBER OF NDDS PARTICIPATING²	VOLUME¹ (GAL)	BOD¹ (LBS)	TSS¹ (LBS)
FY11	9	139,000	4,310	2,490
FY12	9	110,000	3,910	1,690
FY13	8	170,000	5,430	3,370
FY14	7	170,000	5,500	4,060
FY15	7	235,000	6,830	5,770

Table 2.2. Typical Pollutants Kept Out of the CSS per Rain Event

FISCAL YEAR	NUMBER OF NDDS PARTICIPATING ²	VOLUME ¹ (GAL)	BOD ¹ (LBS)	TSS ¹ (LBS)
FY16	6	239,000	7,190	6,220
FY17	7	255,000	7,950	6,850
FY18	9	313,000	4,900	2,020
FY19	8	415,000	4,270	1,830

¹ When all NDDs participate.

² Change due to NDD operational changes: Solae (FY13 - cessation); Kent Feed (FY14 - cessation); Canadian Harvest (FY16 - cessation); Diageo (FY17 - commencement); Michter's Distillery (FY18 – commencement); AAK (FY18 – commencement); Dean Milk (FY19 – cessation).

Table 2.3. Total Quantity Pollutants Kept Out of the CSS

FISCAL YEAR	NUMBER OF WET WEATHER DAYS	VOLUME (GAL)	BOD (LBS)	TSS (LBS)
FY11	130	7,909,000	265,000	160,000
FY12	68	3,524,000	109,000	51,000
FY13	72	9,143,000	290,000	213,000
FY14	46	5,721,000	181,000	147,000
FY15	58	14,838,000	448,000	385,000
FY16	78	14,747,000	453,000	396,000
FY17	104	21,065,000	659,000	575,000
FY18	69	16,413,000	179,000	112,000
FY19	65	19,939,000	142,000	99,000

2.5. NMC 4: MAXIMIZATION OF FLOW AT THE MORRIS FORMAN WATER QUALITY TREATMENT CENTER

FY19 Program

- Bells Lane Wet Weather Treatment Facility – The project achieved final completion during the reporting period.
- Morris Forman WQTC Headworks – MSD targeted this project for completion before the commissioning of the major off-line storage basins and the Ohio River Tunnel project, in anticipation of increased grit and screenings loading to the Morris Forman WQTC when the new storage basins are cleaned following wet weather events. The project achieved final completion during the reporting period.
- Morris Forman WQTC Wet Cake Pump Phase II – The design phase of this project was completed during the reporting period.
- Morris Forman WQTC Primary Sludge Pipe Replacement – This project was designed and bid during this reporting period.

- SWPS Flood Repair - This project was completed during the reporting period.
- Lock Out Tag Out – This project was completed during the reporting period.
- Truck Unloading Station – This project was designed during the reporting period.
- Bells Lane Disinfection Process Improvements – MSD investigated the use of Peracetic Acid (PAA) in a pilot project to improve the disinfection system at Bells Lane Wet Weather Treatment Facility. This pilot project testing was ongoing during this reporting period.

FY20 Program

- Morris Forman WQTC Primary Sludge Pipe Replacement – This project is expected to be completed during the reporting period.
- Morris Forman WQTC Wet Cake Pump Phase II – This project is expected to be completed during the reporting period.
- Truck Unloading Station – This project is expected to be bid during the reporting period.
- Bells Lane Phase II – MSD is targeting the design and completion of the Peracetic Acid (PAA) disinfection system and other minor improvements during this reporting period.

2.5.1. MORRIS FORMAN WATER QUALITY TREATMENT CENTER

FY19 Program

Flows

Continued to maximize flow to the Morris Forman WQTC. Charts that compare plant flow at the Morris Forman WQTC during the reporting period with the occurrence of CSOs at the Main Diversion Structure and the Southwestern Pump Station have been previously included in Consent Decree quarterly reports. Refer to Figure 2.2 for location of the CSOs closest to Morris Forman WQTC.

Figure 2.2. CSO Locations Relative to Morris Forman WQTC

Outages

- To facilitate the completion of the High Yard Project, short term plant outages occurred at various times throughout the reporting period.
- The Morris Forman Headworks Replacement Project continued. The West Headworks Channels were in service without grit removal due to construction related issues.
- The Final Effluent Pump Station was in service 186 days during the reporting period.

Violations

Morris Forman WQTC experienced plant violations throughout the reporting period due to continuing failure of the solids



handling equipment and the limited availability of alternate solids disposal.

FY20 Program

The FY20 program for the Morris Forman WQTC is as described in Section 2.5.

2.5.2. WET WEATHER CAPTURE

Historically, the long term trend continues to show that MSD has increased the amount of wet weather flow diverted at the Morris Forman WQTC. The wet weather capture is the difference between the annual average flow treated and the base wastewater flow (defined in state regulations as the lowest monthly average day flow during the calendar year). CY19 (through June 30) shows a significant increase in base flow compared to CY18, as seen in Figure 2.3. Overall, the long term base flow trend is dropping slightly, reflective of a trend toward lower per capita water use as identified by the Louisville Water Company records, and also some loss of customers in the industrial/commercial and residential customer base in the Morris Forman WQTC service area. The increasing trend in wet weather capture is largely attributed to a combination of capital improvements within the Morris Forman WQTC service area, implementation of RTC facilities in the CSS, and construction and integration of CSO control basins into the RTC system.

The long term trend in the peak daily flow treated at the Morris Forman WQTC also shows improvement, as shown in Figure 2.4. Each data point represents the maximum daily flow treated during the year. Although the instantaneous peak hydraulic capacity of the Morris Forman WQTC is 350 MGD, the sustained flow that can be treated on a daily basis is governed by a number of other factors, including the performance of the biological treatment processes. While individual years are highly variable due to weather impacts, the long-term trend continues to be up. Factors contributing to this long-term positive trend are implementation of the new wet weather SOP and better wet weather process control at the Morris Forman WQTC. However, CY16 through CY18 show decreases in peak daily flow, as recent repair work has reduced the ability of the plant to operate at high flow for extended periods. MSD is currently evaluating whether additional work needs to be performed in order to treat elevated flows for a longer period of time without jeopardizing permit compliance.

Figure 2.3. Morris Forman WQTC Wet Weather Capture Trend

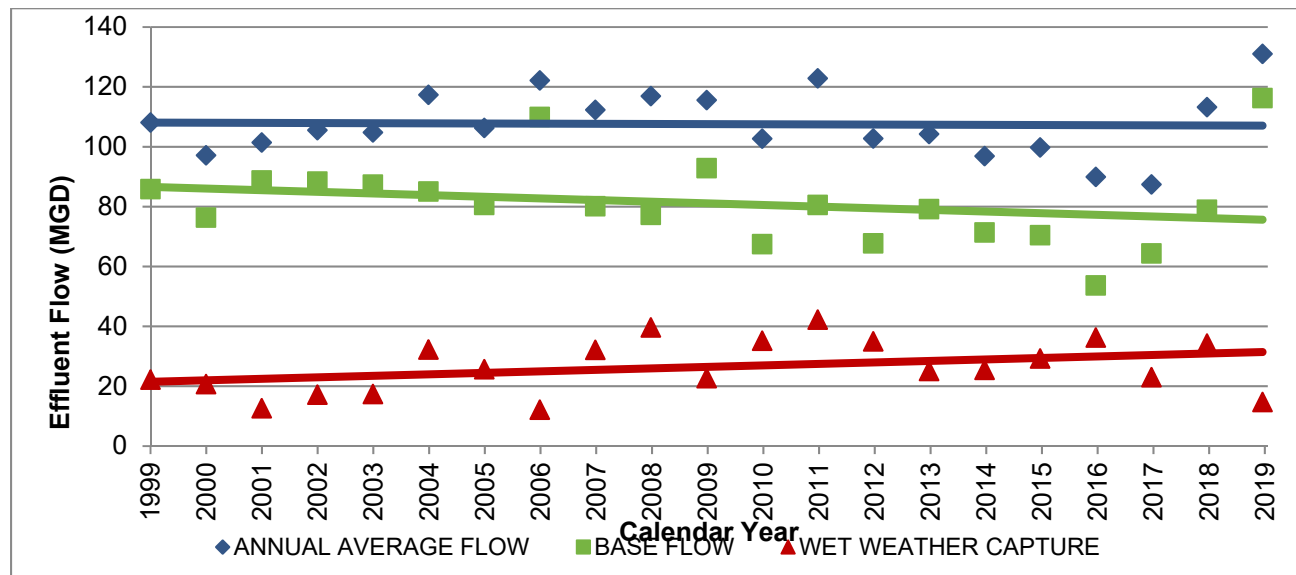
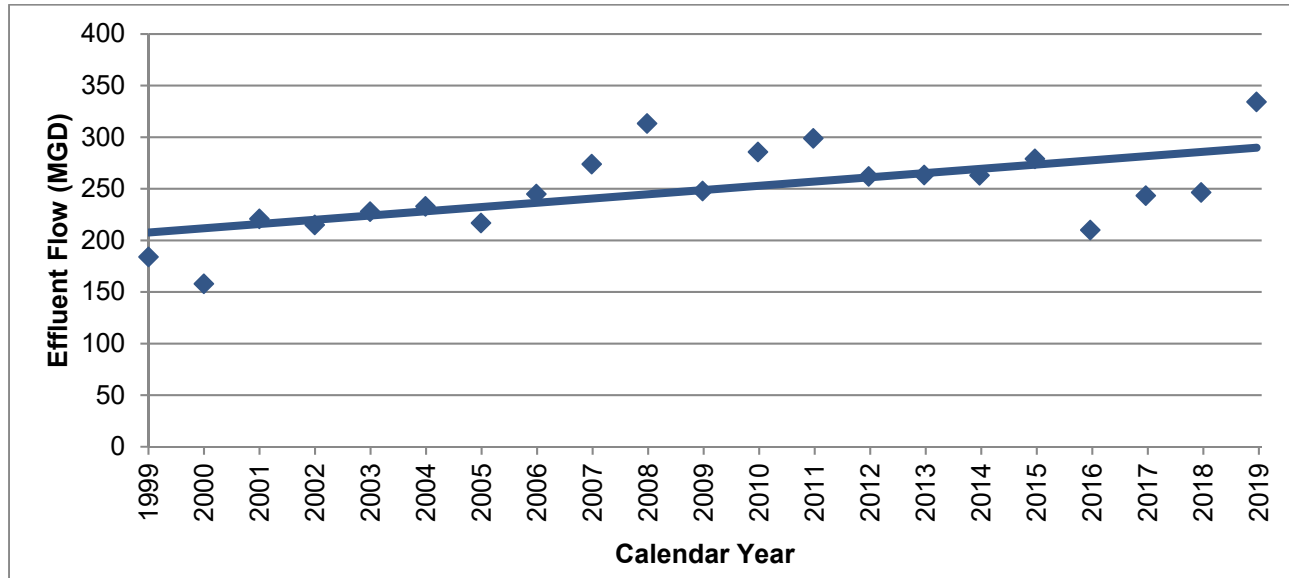


Figure 2.4. Morris Forman WQTC Peak Daily Flow



2.6. NMC 5: ELIMINATION OF COMBINED SEWER OVERFLOWS DURING DRY WEATHER

FY19 Program

Flood Pump Stations

- Continued updates of the U.S. Army Corps of Engineers (USACE) Flood Operations and Maintenance Manual to reflect changes in operations that have occurred with the IOAP projects and operational SOP improvements. This will be an ongoing task until all the projects in the IOAP are completed and an ongoing task as NMC programmatic activities are completed.
- Monitored flood pump stations (FPSs) for opportunities to pump trapped flow back into the combined sanitary sewer system to avoid dry weather overflows as a result of operation of the flood protection system from the 34th Street, Starkey and 4th Street FPSs. This practice and inspection have been put into place and is accomplished from the associated floodgate in-service work order located in-line with the related CSOs.

Asset Analysis

- Performed the quarterly evaluation of dry weather unauthorized discharges to the WUS, with emphasis on the CSS, to determine causes and to determine if there is a need for corrective activities. It was determined that the number and volume of discharge events will be significantly decreased after the completion of Ohio River Interception and other rehab project improvements. Additionally, CSO training was provided in November 2018 with emphasis on CSO failure modes and debris removal.
- Performed a source control analysis with recommendations for improvements for all upstream catch basins to address clogging of the siphon downstream of CSO153.

- Performed inspection and cleaning of fats, oils and grease (FOG) hotspots within the CSS, in accordance with Capacity Management, Operations and Maintenance (CMOM) commitments.

FY20 Program

Flood Pump Stations

- Continue to implement additional operational modifications at FPSs within the CSS to prevent dry weather overflows. Discussions with the USACE to continue regarding proposed modifications to these pumping stations that will minimize dry weather CSOs due to high river levels. This will be an ongoing activity until all the IOAP projects are completed and as staff implements programmatic NMC activities. At the time this report, in-service basins with scheduled PM work orders include Logan, Clifton Heights, Southwestern Parkway, and Portland. The Tunnel project with Rowan Pump Station is scheduled to be completed FY21.
- Continue to review SOPs for the FPSs to reflect ongoing operational changes that occur as capital projects and NMC programmatic activities are completed. This work is in progress and will be linked and carried over with the O&M project from FY19 that is scheduled for FY20.

Asset Analysis

- Perform a quarterly evaluation of dry weather overflows to the WUS, with emphasis on the CSS, to determine causes and to determine if there is a need for corrective activities.
- Perform inspection and cleaning of FOG hotspots within the CSS, in accordance with CMOM commitments.
- Implement source control at all upstream catch basins to address clogging of the siphon downstream of CSO153.

2.7. NMC 6: CONTROL OF SOLIDS AND FLOATABLE MATERIALS IN COMBINED SEWER OVERFLOWS

FY19 Program

- Continued to monitor and document performance of the CSO108 S&F Control Continuous Deflection Separator (CDS) operation in accordance with the Memorandum of Understanding (MOU) with the Kentucky Nature Preserve. Copies of the semi-annual CSO108 efficacy report are provided in quarterly reports for the reporting period (January and July).
- Continued to review new S&F technologies for potential incorporation into the program.
- Continued inspection and maintenance procedures for the S&F structures as part of the weekly CSO inspections and PM cleaning routines, outlined under NMC 1. During the reporting period, 750 work orders were issued for debris removal at the S&F structures.
- Completed construction on dam raises and new S&F controls for the following CSOs: CSO029, CSO036, CSO178, CSO181, CSO193, CSO195, CSO196, CSO197, CSO198, CSO199, CSO201, and CSO202.

- Continued working with staff to determine the quantity of debris and floatables captured by street sweeping, catch basin cleaning, at the Headworks of the Morris Forman WQTC, and at the end of line S&F controls. Reports have been developed to capture the amount of material removed through catch basin cleaning and at the end of the line S&F controls. Results for the reporting period are shown in Table 2.3 and Figure 2.6. The results are trending downward due to removal of S&F upstream of the facility at new CSO basins.

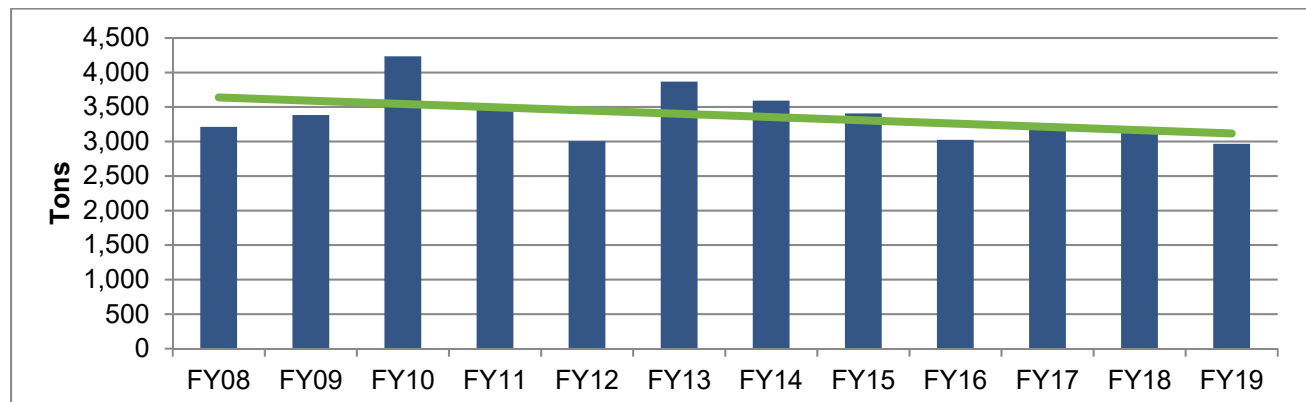
FY20 Program

- Continue to monitor and document performance of the CSO108 S&F structure operation in accordance with the MOU with the Kentucky Nature Preserve by MSD Crews. Reports will be submitted on January 30 and July 30.
- Continue to review new S&F technologies for potential incorporation into the program.
- Continued inspection and maintenance procedures for the S&F structures as part of the weekly CSO inspections and PM cleaning routines, outlined under NMC 1.
- Track the volume of S&F materials removed from the CSS.
- Develop new reports to track S&F removal at CSO basins.
- Perform CSO S&F Efficacy assessments for approximately 20 CSOs including pre- and post-storm site visits to determine where S&F control devices could be improved or replaced.
- Perform a dam raise and install new S&F control device at CSO126.
- Review and refine S&F control operations and maintenance training and administer to appropriate staff.

Table 2.4. Debris Removed from System

ACTIVITY / LOCATION	APPROXIMATE AMOUNT OF DEBRIS REMOVED
Catch Basin and Sewer Cleaning	1,760 CY
Street Sweeping	1,098.3 tons
Morris Forman WQTC Headworks	2,966 tons

Figure 2.5. Solids and Floatables Capture at Morris Forman WQTC



2.8. NMC 7: POLLUTION PREVENTION PROGRAMS TO REDUCE CONTAMINANTS IN COMBINED SEWER OVERFLOWS

FY19 Program

- Continued administration of the Erosion Prevention and Sediment Control (EPSC) Ordinance. Continued use of a tracking system for EPSC Notices of Violation (NOVs) and Field Correction Notices (FCNs) within the CSS.
- Continued administration of the Hazardous Materials Ordinance, which requires users with hazardous materials on site to submit a spill prevention and control plan. Continued response to spills of hazardous materials and incidents involving discharges to the sewer system and provided spill mitigation kits to the Louisville Metro Fire Department to use to absorb vehicle fluids rather than flushing to the sewer.
- Continued issuance of Wastewater Discharge Permits under the Industrial Pretreatment Program.
- Distributed literature to significant industrial users (SIUs) on best management practices for prevention of pollution.
- Continued coordination of activities performed by Louisville Metro, such as street sweeping, Operation Brightside (trash and litter clean-up), and other Metro pollution prevention programs.
- Participated in the Mayor's Give-A-Day week of service on April 15-20, 2019, to perform cleanup within the Beargrass Creek and Ohio River areas, in close proximity to several CSOs.
- Participated in the Annual Ohio River Sweep on June 15, 2019.
- Promoted Green Infrastructure initiatives within Jefferson County, such as guidance on downspout disconnection and rain garden installation.
- Conducted a hands-on workshop on rain gardens promoting awareness of native plants on August 8, 2018.
- Led an informational session on rain garden design, construction, and maintenance at Fern Creek High School on January 22, 2019. The students would eventually use this information to design and construct a rain garden to solve a flooding issue at the High School.
- Facilitated the installation of a rain garden at Fern Creek High School using students and staff as volunteers on April 23, 2019.
- Continued to prepare and distribute informational pieces, targeted to inform customers and residents on activities that can be practiced within their homes to assist in the reduction of overflows within the collections system.
- Continued to enhance and train on Stormwater Pollution Prevention Plans (SWPPPs) for the WQTCs, major pump stations, and the Central Maintenance Facility (CMF).
- Continued enhancement of the framework for the IOAP green infrastructure program tracking in Hansen.
- Utilized and distributed the rain garden handbook to Louisville Metro agencies and to the public in order to encourage green infrastructure.

FY20 Program

- Continue daily inspections and documentation for EPSC NOVs, FCNs, and all enforcement activities within the CSS with an inspection web application for FCN's.
- Continue inspection hazardous materials from facilities. Continue issuance of Wastewater Discharge Permits under the Industrial Pretreatment Program. Continue distribution of literature to SIUs on best management practices for prevention of pollution.
- Utilize and distribute the rain garden handbook to Louisville Metro agencies and to the public in order to encourage green infrastructure.
- Continue to track green infrastructure projects and initiatives in Hansen and SharePoint.
- Continue to prepare and distribute informational pieces, targeted to inform customers and residents on activities that can be practiced within their homes to assist in the reduction of overflows within the collection system.
- Continue planning for rain garden and stream health workshops.

2.9. NMC 8: PUBLIC NOTIFICATION

Refer to Section 5: Public Outreach, Education, Notification and Participation for information regarding public notification.

2.10. NMC 9: MONITORING TO CHARACTERIZE COMBINED SEWER OVERFLOW IMPACTS AND THE EFFICACY OF COMBINED SEWER OVERFLOW CONTROLS

Refer to Section 4.5 for information regarding system monitoring.

2.11. NMC ACTIVITY SCHEDULE

NMC capital project milestones for the current reporting period as well as a look-ahead for the upcoming reporting period are provided in Figure 2.6.

Figure 2.6. NMC Annual Commitments Schedule

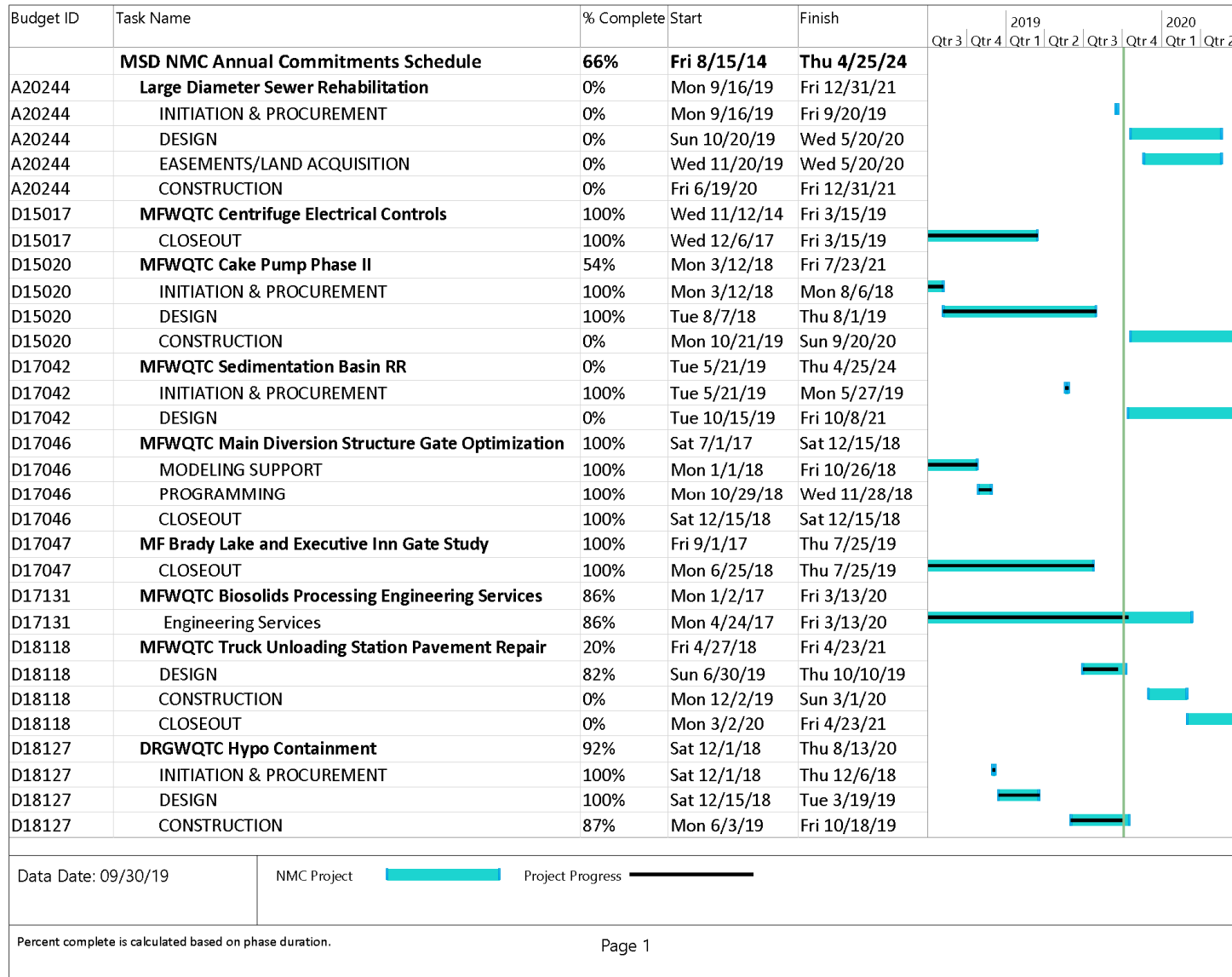


Figure 2.6. NMC Annual Commitments Schedule

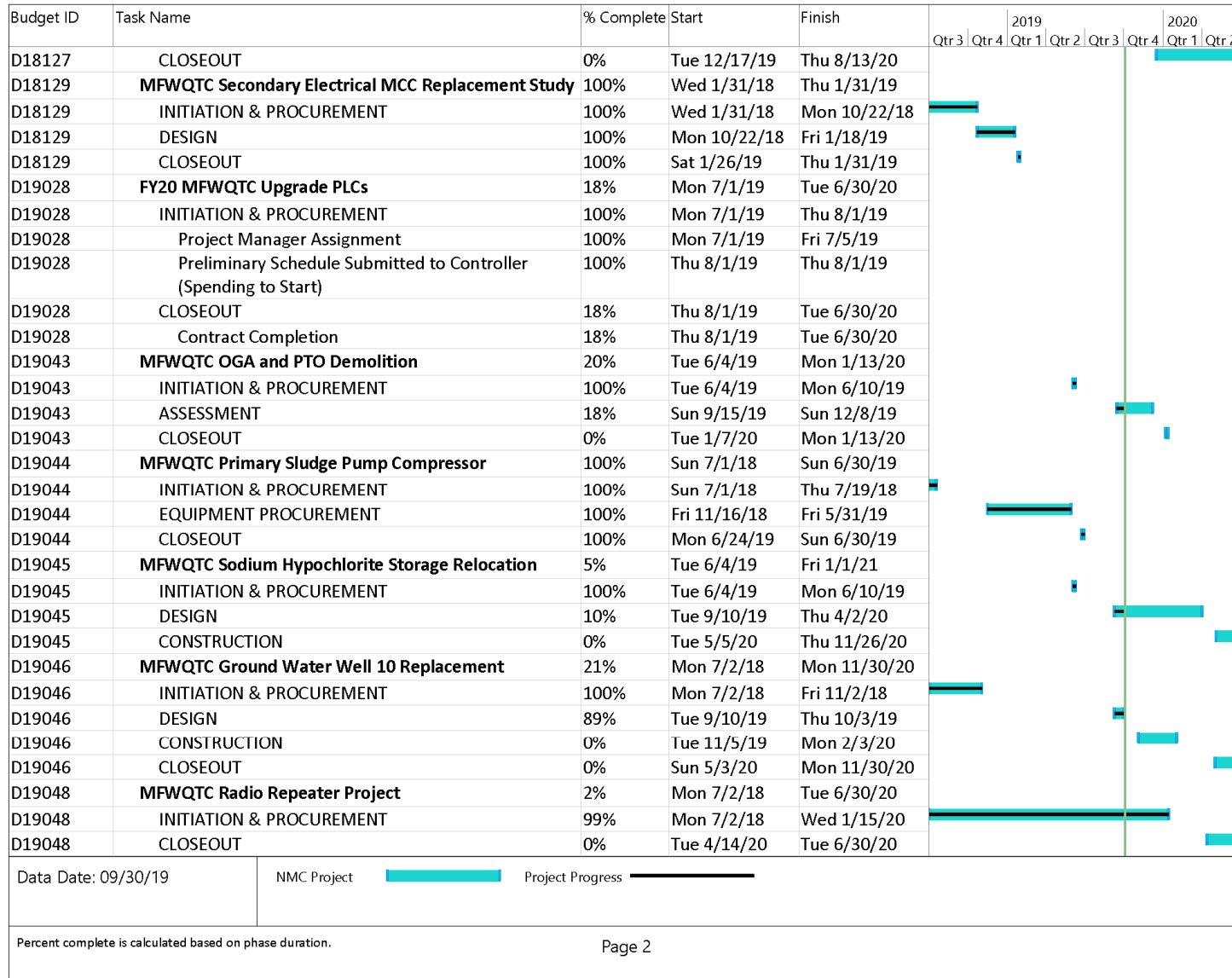


Figure 2.6. NMC Annual Commitments Schedule

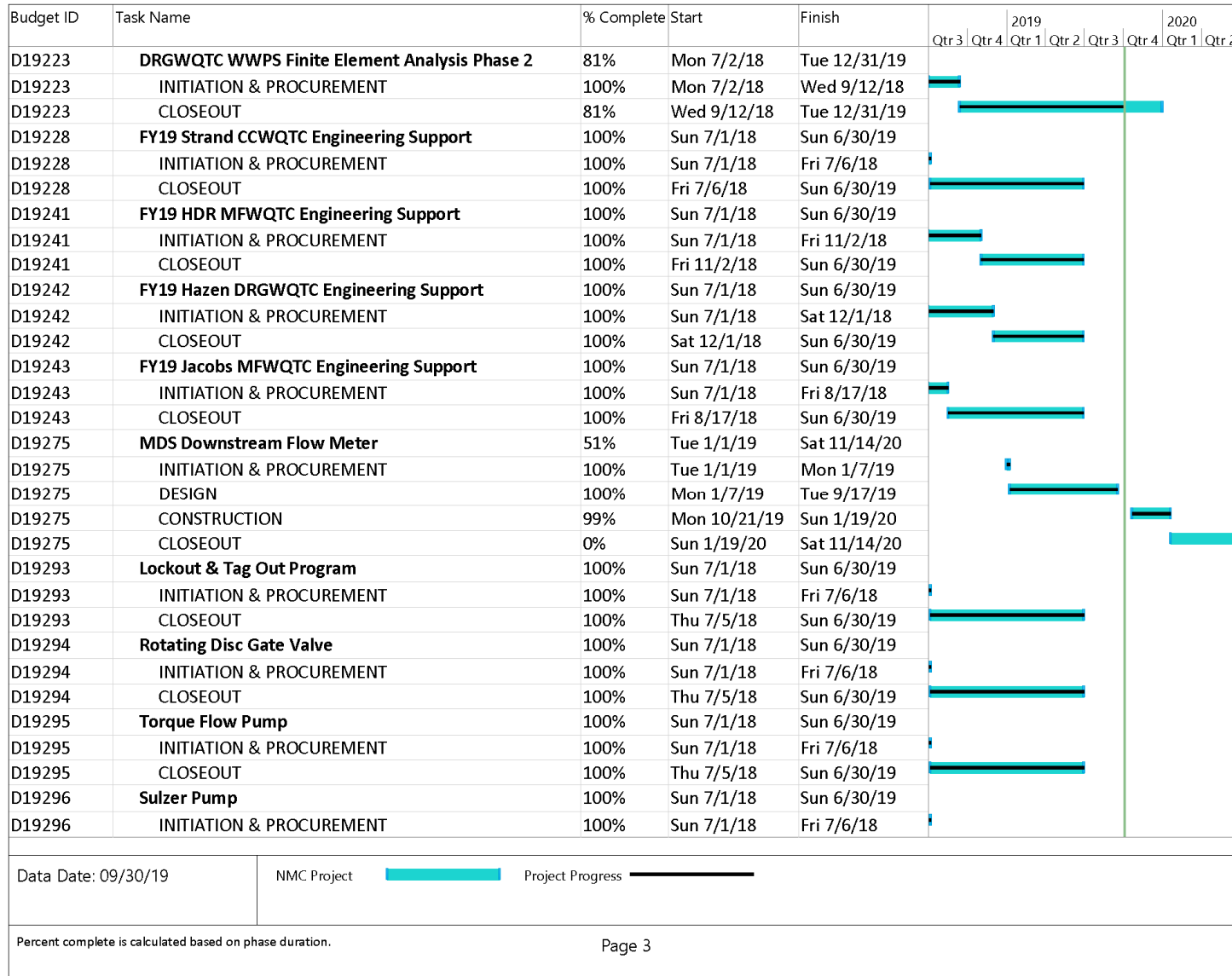


Figure 2.6. NMC Annual Commitments Schedule

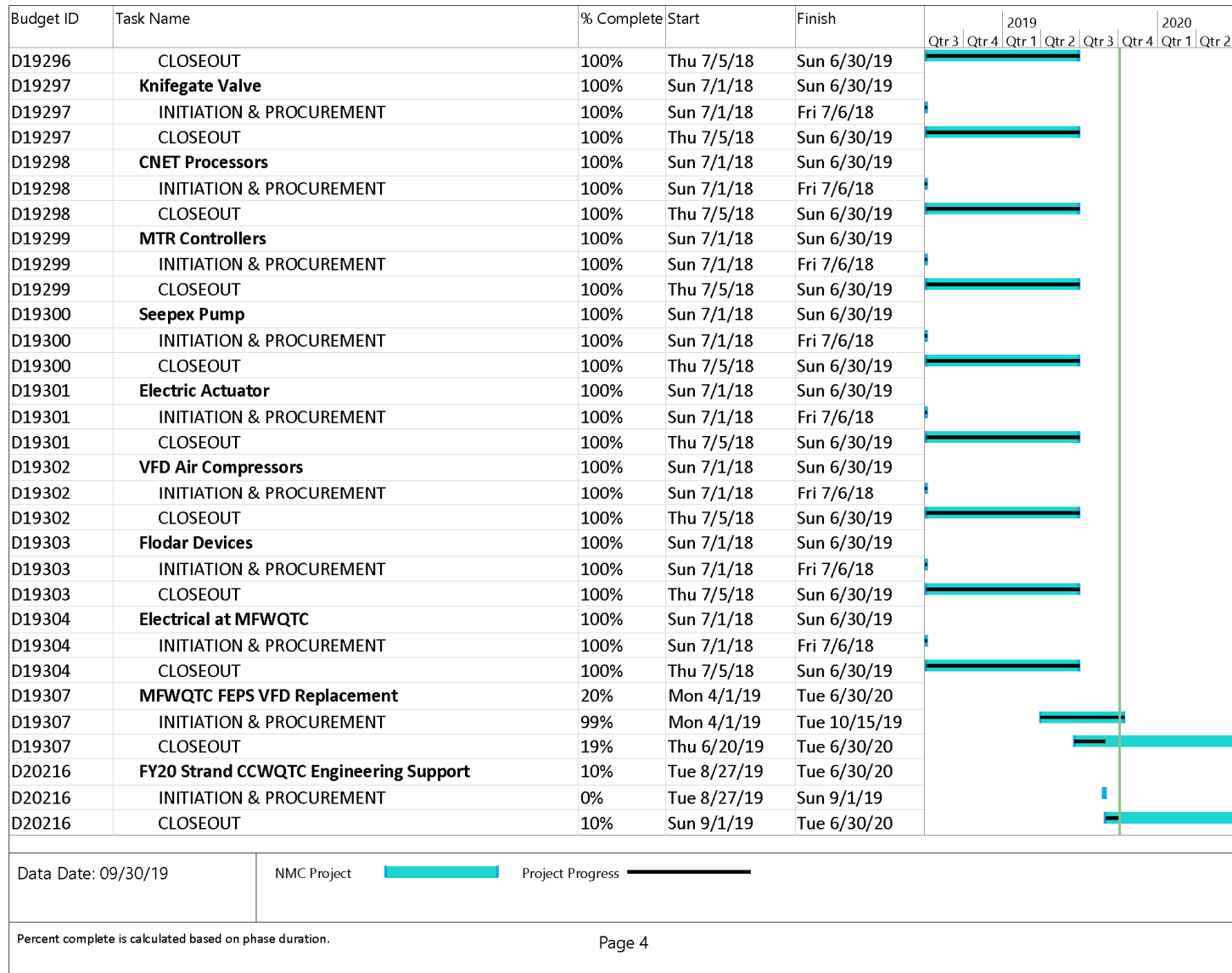


Figure 2.6. NMC Annual Commitments Schedule

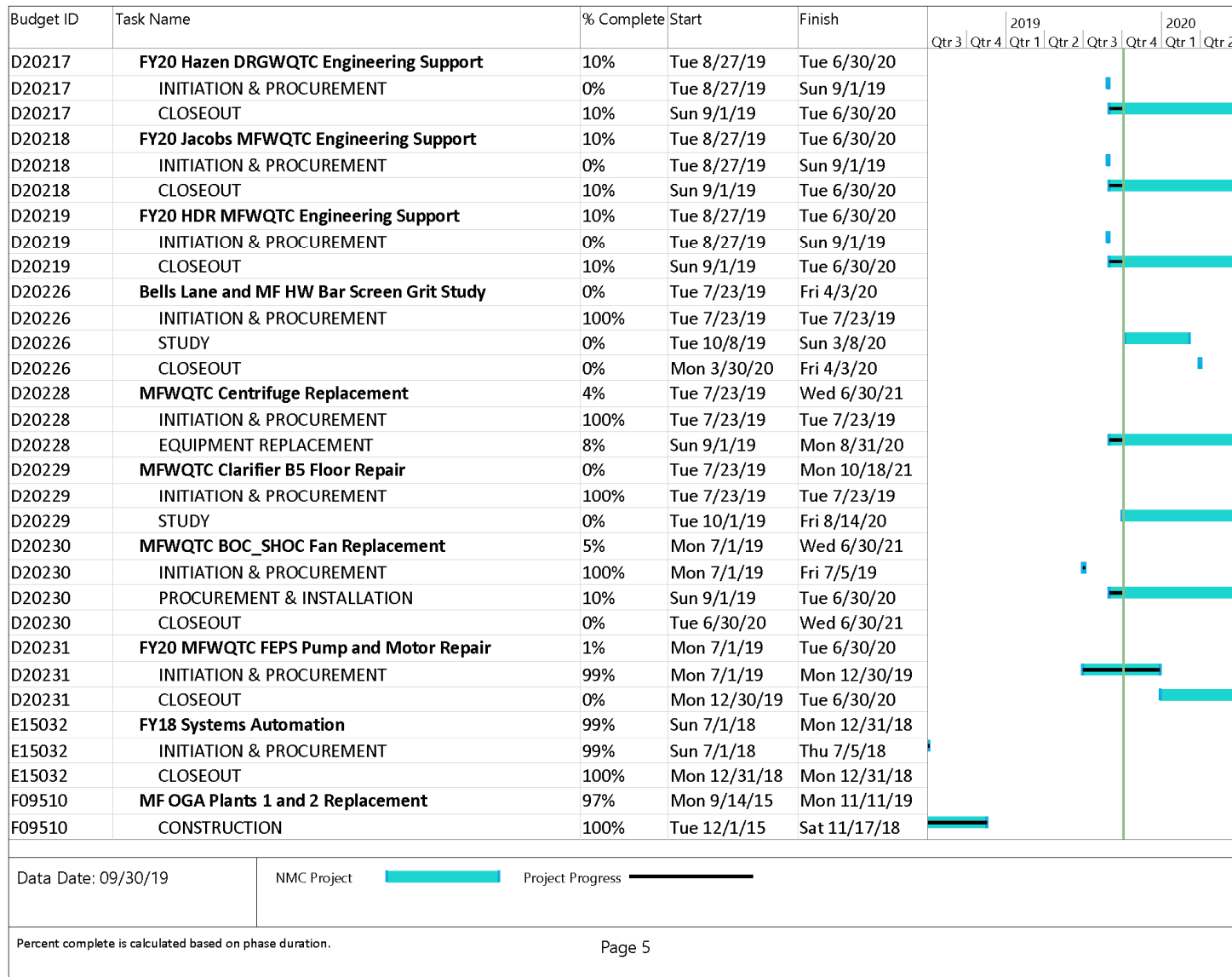


Figure 2.6. NMC Annual Commitments Schedule

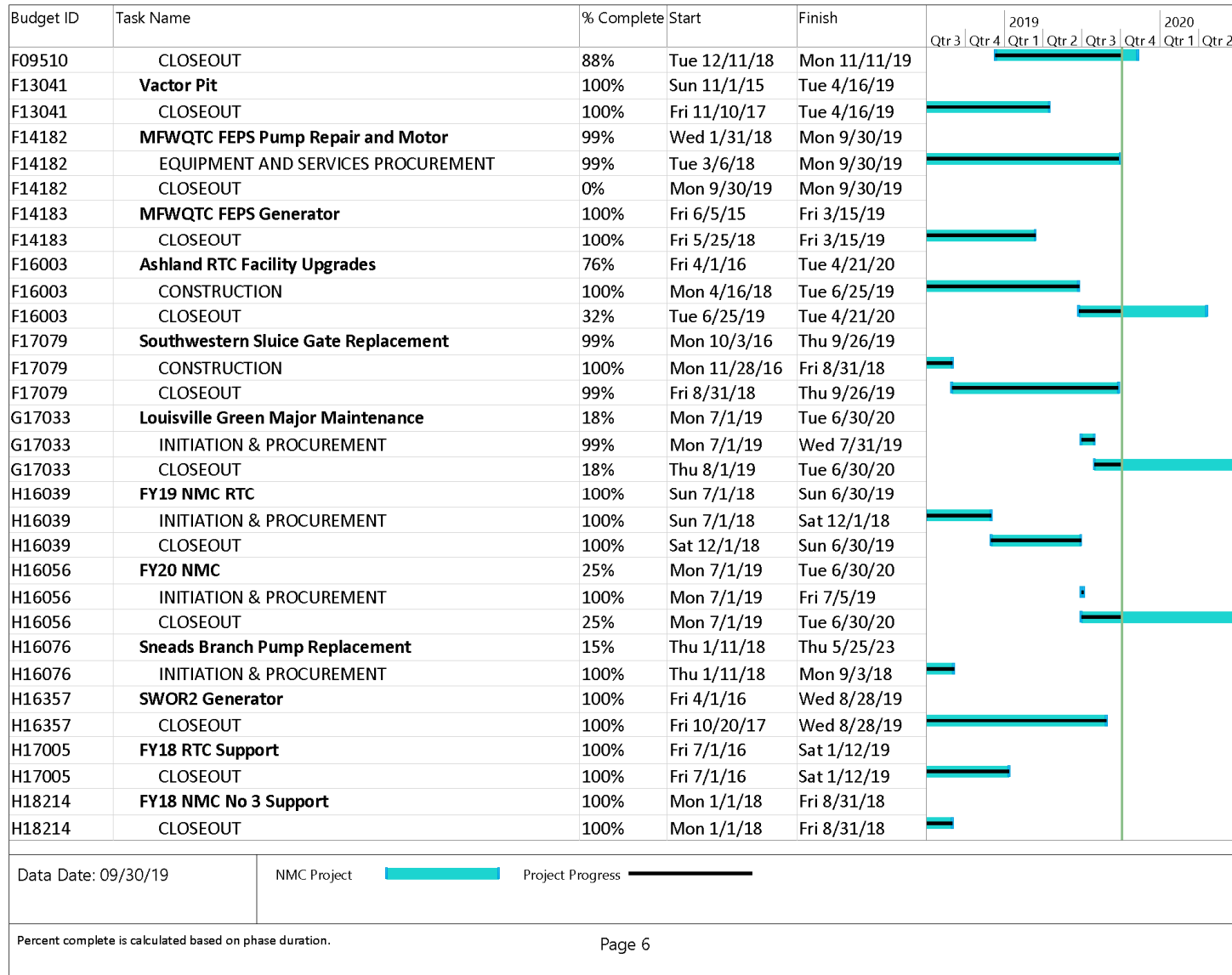
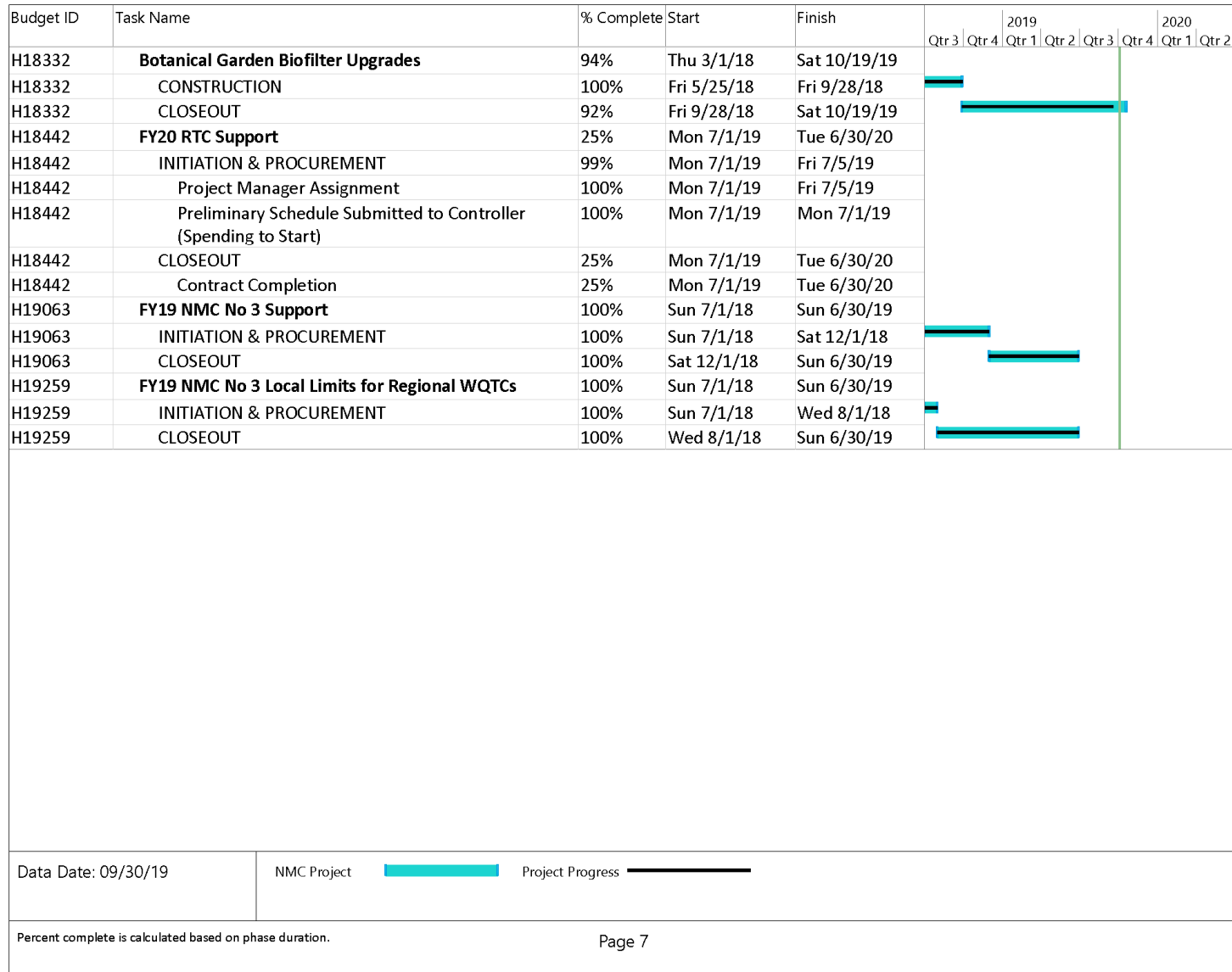


Figure 2.6. NMC Annual Commitments Schedule



SECTION 3: PROGRAM ACTIVITIES FOR SEWER OVERFLOW RESPONSE PROTOCOL

3.1. SEWER OVERFLOW RESPONSE PROTOCOL PROGRAM BACKGROUND

Per Paragraph 24.d. of the Amended Consent Decree, MSD initially submitted the Sewer Overflow Response Protocol (SORP) to the Environmental Protection Agency (EPA) and Kentucky Department of Environmental Protection (KDEP) on February 10, 2006, and received comments on March 13, 2006. MSD resubmitted the revised SORP on May 12, 2006, and received an approval letter for the SORP on August 22, 2006. The most recent version is dated February 12, 2012. The approved SORP document can be viewed on the MSD Project WIN website, available at www.msdlouky.org/projectwin. The following activities were performed during the reporting period.

3.2. OVERFLOW MANAGEMENT AND FIELD DOCUMENTATION

FY19 Program

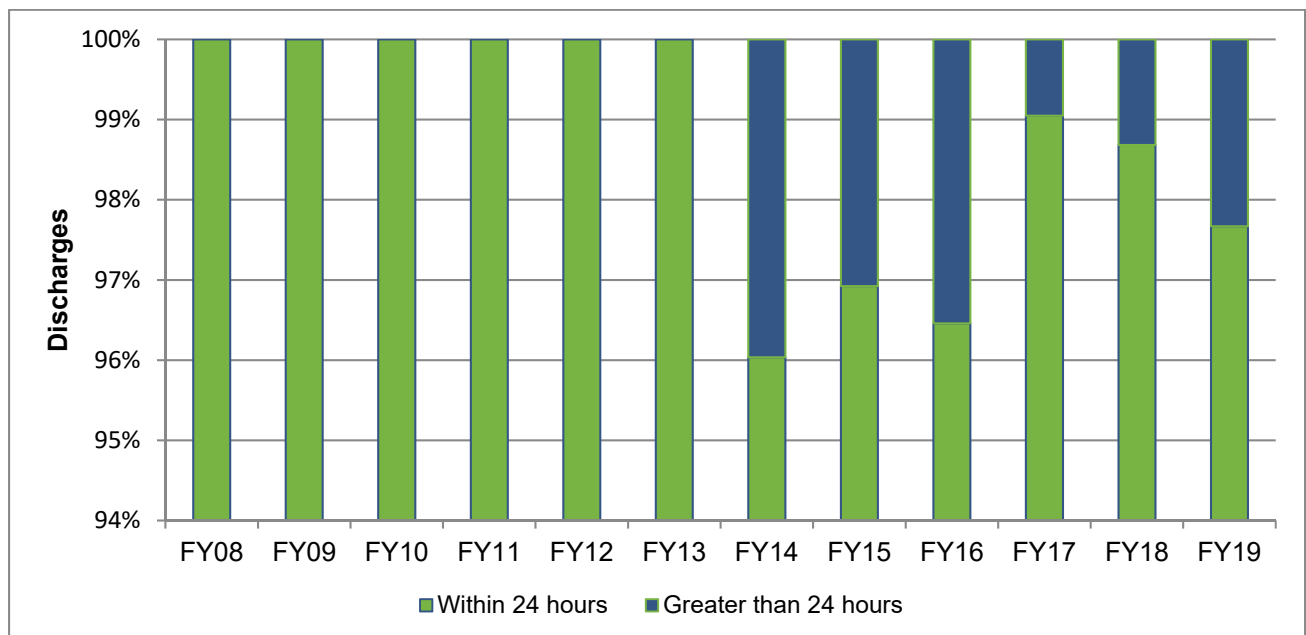
- Documented a total of 621 overflows and unauthorized discharges to waters of the US (WUS) during the reporting period. The charts pertaining to discharges in Section 1.2 show these overflows broken down by result, problem, and asset type. Interior overflows are from MSD main line issues only, and do not include those that are the result of a problem on MSD's portion of the lateral. In addition, any interior overflow that is caused by a private property matter is also excluded from reporting.
- Reported 458 of the 469 discharges that reached the WUS (97.6%) within 24 hours as shown in Figure 3.1.
- Reported 0 of the 1 discharges that reached the WUS (0.0%) as a Bypass event within 24 hours, and 1 of 1 (100%) additional written report within 5 days.
- Reported 13 of the 13 dry weather overflows (100.0%) within 24 hours, each with a volume between 1,000 and 50,000 gallons.
- Reported 8 of the 9 dry weather overflows (88.9%) within 24 hours, each with a volume greater than 50,000 gallons.
- Continued daily, monthly and quarterly reviews with staff from MSD Operations and MSD Engineering Divisions.
- Continued to monitor SSO sites, which have been grouped into routes based on the range of rainfall rates necessary to cause an SSO. These routes were monitored during rain events depending on the magnitude and location of the storm. If an overflow was observed, a discharge work order was created to document the event. MSD staff executed a total of 2,402 wet weather inspections on a total of 17 days, and documented 323 unauthorized discharges (13.4%) through route reconnaissance.
- Continued to monitor over 300 sites via telemetry. There were five sites where sewage was routinely (3 or more times per year) hauled from pump stations to prevent overflows during rain events depending on the

magnitude and location of the storm. Due to capacity issues, MSD staff hauled over 639,000 gallons of sewage. It should be noted that this value is greater than previously reported in the quarterly reports, due to late invoicing by the hauling contractor.

FY20 Program

- Continue to monitor data, train staff and update information as needed.
- Continue to monitor over 300 sites via telemetry.
- Continue to haul to prevent overflows and backups during rain events until system improvements are completed.
- Continue to monitor documented collections system SSO sites, which have been grouped into routes based on the range of rainfall rates necessary to cause a SSO.
- Continue the daily, monthly and quarterly data reviews with staff from Engineering and Operations Divisions to ensure accuracy and consistency in reporting.
- Schedule additional field reviews of SORP procedures after rain events to both ensure successful implementation and to assist with the annual SORP overall review.

Figure 3.1. Reporting Timeframe for Unauthorized Discharges to Waters of the US



3.3. REGULATORY REPORTING AND DATA MANAGEMENT

FY19 Program

- Conducted monthly meetings with staff to perform quality control on discharge work orders.
- Conducted a monthly review of the discharge work orders and updated the associated assets in Hansen as needed.
- Performed a detailed review and trend analysis on the discharge data, incorporated the findings into the quarterly SORP training and the quarterly reports.

FY20 Program

- Continue to perform quality control on discharge work orders with appropriate staff.
- Update assets in Hansen when new overflow locations are identified.
- Continue to review the overflow data for trends. These trends are discussed with staff in the Quarterly SORP training and documented in the Quarterly Reports.

3.4. STAFF TRAINING AND COMMUNICATION

FY19 Program

The online training delivery system continues to allow more flexibility for employees to complete training at convenient times during the quarter and to integrate SORP training with new employee and contractor orientation. The previous training program was reviewed, updated, and repackaged into this enhanced online format, which allows training to be delivered on demand, improves accessibility for staff, and provides more accountability. Modules were also developed to provide continued updates related to progress under the IOAP and projects under the CMOM and NMC programs on a quarterly basis, as well as CSO and SSO abatement and annual trends on an annual basis. The modules were delivered to appropriate staff as detailed in Table 3.1.

Table 3.1. Completed SORP Training Schedule

KEY LEARNING OBJECTIVE	MONTHS	STAFF TRAINED
Public Notification & Overflow Cleanup	July - September	269
Reporting & Followup	October - December	255
Annual Overview	November - March	604
Preparing for Overflows & Monitoring	January - March	261
Assessment, Mitigation & Documentation	April - June	260

FY20 Program

- Integrate SORP training with new employee and contractor orientation.
- Schedule SORP Quarterly and Annual Training as described in Table 3.2.

- Continue to review and update the data associated with overflows.

Table 3.2. Projected SORP Training Schedule

KEY LEARNING OBJECTIVE	MONTHS
Public Notification & Overflow Cleanup	July - September
Reporting & Followup	October - December
Annual Overview	December-June
Preparing for Overflows & Monitoring	January - March
Assessment, Mitigation & Documentation	April - June

3.5. ANNUAL PROGRAM REVIEW

FY19 Program

- Completed the annual SORP document review in August 2018.
- Reviewed and updated routes to include any new SSO locations.

FY20 Program

- Perform the annual SORP document review prior to August 2019. There are no major program updates anticipated at this time. Routes will be reviewed and updated to include any new SSO locations or changes in responsible MSD reporting departments.
- Send new SSO routes to EPA/KDEP by August 22, 2019. New routes will be published once approved by EPA/KDEP.

3.6. PUBLIC NOTIFICATION AND COMMUNICATION

Refer to Section 5: Public Outreach, Education, Notification and Participation for information regarding public notification.

SECTION 4: PROGRAM ACTIVITIES FOR DISCHARGE ABATEMENT PLANS

4.1. INTEGRATED OVERFLOW ABATEMENT PLAN

As a requirement of the Amended Consent Decree, per Paragraph 25, MSD is to prepare and submit, for review and approval, discharge abatement plans. These discharge abatement plans identify the plan for the elimination of unauthorized discharges from the separate sanitary sewer system and the combined sewer system (CSS), the reduction and control of discharges from the Combined Sewer Overflow (CSO) locations identified in the Morris Forman Water Quality Treatment Center (WQTC) KPDES permit, and the improvement of water quality in the receiving waters.

The Final Sanitary Sewer Discharge Plan (SSDP) and the Final CSO Long Term Control Plan (LTCP) were submitted concurrently and certified on December 19, 2008, under the title of the Integrated Overflow Abatement Plan (IOAP). The IOAP was accepted by the Federal Court and incorporated by reference into the Amended Consent Decree by an Order signed February 12, 2010, that was entered into public record February 15, 2010.

MSD submitted an IOAP modification request to the Environmental Protection Agency (EPA) and Kentucky Department of Environmental Protection (KDEP) on September 20, 2012, with approval granted via certified letter on June 19, 2014. The modified project package, program descriptions and progress, and updated supporting text are included in the revised IOAP, submitted to EPA and KDEP on June 14, 2013.

Minor project modifications have been submitted and approved since the 2014 approval of the 2012 IOAP Modification. A summary of these modifications is included in Table 4.1.

4.2. SANITARY SEWER DISCHARGE PLAN

The Sanitary Sewer Discharge Plan (SSDP) addresses the overflows and unauthorized discharges from the separate sanitary sewer system. Three separate plans have been submitted under this program as described below and outlined in Paragraph 25.a. of the Amended Consent Decree.

4.2.1. UPDATED SANITARY SEWER OVERFLOW PLAN IMPLEMENTATION

MSD prepared and submitted the Updated Sanitary Sewer Overflow Plan (SSOP) on February 10, 2006. This plan included an overview of the MSD sanitary sewer overflow abatement program and specific actions taken to reduce/eliminate overflows from the sanitary sewer system. This document included a list of the proposed improvements to be accomplished by December 31, 2008. Activities required under the Updated SSOP have been completed.

4.2.2. INTERIM SANITARY SEWER DISCHARGE PLAN

MSD submitted for approval an Interim Sanitary Sewer Discharge Plan (ISSDP) on September 30, 2007. Comments were received on January 8, 2008. MSD resubmitted the revised ISSDP on March 7, 2008, and received an approval letter for the ISSDP on July 24, 2008. The approved ISSDP document can be viewed on the MSD Project WIN website, available at www.msdlouky.org/projectwin.

4.2.3. FINAL SANITARY SEWER DISCHARGE PLAN

MSD submitted for approval a Final Sanitary Sewer Discharge Plan (SSDP) on December 19, 2008, as Volume 3 of the IOAP. The IOAP was accepted by the Federal Court and incorporated by reference into the Amended Consent Decree by an Order signed February 12, 2010, and was entered into public record February 15, 2010. A revised SSDP was included in the IOAP revision submitted June 14, 2013. On June 19, 2014, MSD received approval of the 2012 IOAP Modification from EPA / KDEP. Per paragraph 25.a.(3)C., the SSDP shall not extend beyond December 31, 2024. A listing of SSDP projects completed and certified during the reporting period, along with the entire schedule of projects, can be found in Section 4.4.

4.3. COMBINED SEWER OVERFLOW LONG TERM CONTROL PLAN

The CSO Long Term Control Plan (LTCP) addresses the overflows and unauthorized discharges from the CSS. Two separate plans have been submitted under this program as described below and outlined in Paragraph 25.b. of the Amended Consent Decree.

4.3.1. INTERIM COMBINED SEWER OVERFLOW LONG TERM CONTROL PLAN

The Interim CSO LTCP was initially submitted to EPA and KDEP on February 10, 2006. MSD received an approval letter dated February 22, 2007, for the Interim LTCP. The approved Interim CSO LTCP can be viewed on the MSD Project WIN website, available at www.msdlouky.org/projectwin.

This plan includes an overview of the MSD program efforts taken to reduce/eliminate discharges from the CSS and the list of proposed improvements to be accomplished by December 31, 2008. All projects associated with this plan have been completed.

4.3.2. FINAL COMBINED SEWER OVERFLOW LONG TERM CONTROL PLAN

MSD submitted for approval the Final CSO LTCP on December 19, 2008, as Volume 2 of the Integrated Overflow Abatement Plan (IOAP). The IOAP was accepted by the Federal Court and incorporated by reference into the Amended Consent Decree by an Order signed February 12, 2010, that was entered into public record February 15, 2010. Per paragraph 25.b.(2), completion of the Final CSO LTCP shall not extend beyond December 31, 2020. A listing of Final CSO LTCP projects completed and certified during the reporting period, along with the entire schedule of projects, can be found in Section 4.4.

4.3.3. GREEN DEMONSTRATION PROJECT UPDATE

The Final CSO LTCP (Volume 2 of the IOAP) included 19 green demonstration projects with schedules for completion in 2010 and 2011. The 19 green demonstration projects have been certified as complete.

Table 4.1. IOAP Project Minor Modifications

SUBMITTAL DATE	APPROVAL DATE	NEW PROJECT NAME	ORIGINAL PROJECT NAME	IOAP ID NUMBER	MODIFICATION DESCRIPTION
February 16, 2015	September 11, 2015	CSO190 Green Infrastructure Project	18th and Northwestern Parkway Storage Basin	L_SO_MF_190_S_09B_B_A_8	Green Infrastructure solutions for CSO190 replaced the storage basin at 18th and Northwestern Parkway.
February 16, 2015	September 11, 2015	Elimination of Chenoweth Hills WQTC, Chenoweth Run PS, and Chippewa PS	Chenoweth Hills WQTC Elimination and PS Improvements	S_JT_JT_NB01A_M_03_C	Project modification to construct new sewers and eliminate rather than upgrade Chenoweth Run and Chippewa Pump Stations
February 16, 2015	September 11, 2015	Goose Creek PS Phase 1 - Devondale Wet Weather Storage	Goose Creek PS Phase 1 - Devondale Wet Weather Storage	S_MI_MF_NB04_M_03_B	New sewer construction and a new Pump Station at Bancroft allowed for the elimination of both the Bancroft and Devondale WQTCs along with eliminating the need for wet weather storage.
February 16, 2015	September 11, 2015	St. Rene Road Pump Station Elimination	St. Rene Road PS Inline Storage	S_FF_CH_NB01_S_09A_C_A	Elimination of the St. Rene Road Pump Station and diverting flow to the Cedar Creek WQTC replaced the in-line storage solution.
February 16, 2015	September 11, 2015	Prospect #3 - ORFM System Improvements	Prospect #3 - ORFM System Improvements	S_OR_MF_NB04_M_03_B_B	Replaced in-line storage upstream of the Muddy Fork Pump Station with an offline covered storage basin.
August 7, 2015	September 11, 2015	Southwestern Parkway Storage Basin	Southwestern Parkway Storage Basin	L_OR_MF_105_M_13_B_A_0	Increased basin size from 11.07 MG to 20 MG, with a level of control of 8 overflows per Typical Year and no net increase in AAOV.
August 7, 2015	September 11, 2015	Portland Storage Basin	Portland Wharf Storage Basin	L_OR_MF_019_S_13_B_A_8	Increased basin size from 6.37 MG to 6.7 MG.
August 7, 2015	September 11, 2015	Lexington Road and Payne Street Storage Basin	Lexington Road and Payne Street Storage Basin	L_OR_MF_083_M_09B_B_A_8	Increased basin size from 8.18 MG to 13.7 MG.
August 7, 2015	September 11, 2015	Story Avenue and Main Street Storage Basin	Story Avenue and Main Street Storage Basin	L_OR_MF_020_S_09B_B_A_8	Increased basin size from 5.4 MG to 8.3 MG.
August 7, 2015	September 11, 2015	13th Street and Rowan Street Storage Basin	13th Street and Rowan Street Storage Basin	L_OR_MF_155_M_09B_B_B_4	Increased basin size from 4.36 MG to 9.8 MG.
December 21, 2015	January 11, 2016	Fairmount Road Pump Station Offline Storage Basin	Fairmount Road Pump Station Offline Storage Basin	S_FF_CC_81316_M_03_C_A	Change completion deadline from December 31, 2015 to March 31, 2016.
September 28, 2016	November 3, 2016	Logan Street and Breckenridge Street CSO Basin	Logan Street and Breckenridge Street CSO Basin	L_SO_MF_092_M_09B_B_D_8	Change design from an at-grade basin with a building above to open space above the basin structure.
September 28, 2016	November 3, 2016	Bells Lane Wet Weather Treatment Facility	Bells Lane Wet Weather Treatment Facility	L_OR_MF_015_M_13_B_B_8	Change completion deadline from December 31, 2016 to September 30, 2017.
September 28, 2016	November 3, 2016	Nightingale Pump Station Replacement and Storage	Nightingale Pump Station Replacement and Storage	L_SO_MF_018_S_03_A_A	Change completion deadline from December 31, 2016 to June 30, 2017.
September 28, 2016	November 3, 2016	Morris Forman WQTC Headworks	Southern Outfall Inline Storage (SOR2)	L_OR_MF_211_M_13_B_A_8	Elimination of SOR2 project and replace with flow control improvements at the Main Diversion Structure and rehabilitation of Morris Forman WQTC Headworks in order to increase maximum sustainable treatment capacity to 330 MGD.
September 27, 2016, with administrative correction submitted on October 17, 2016	November 3, 2016	Ohio River Tunnel	13th Street and Rowan Street Storage Basin	L_OR_MF_155_M_09B_B_B_4	Revise design to a 31.8 MG tunnel solution that consolidates CSO controls for 13th Street and Rowan Street, Story Avenue and Main Street, and Lexington and Payne Street Storage Basins. Tunnel capacity will allow a level of control of eight overflows per Typical Year for 9 CSOs previously associated with 13th and Rowan. Weir raises at 3 CSOs will remain unchanged.
September 27, 2016, with administrative correction submitted on October 17, 2016	November 3, 2016	Ohio River Tunnel	Story Avenue and Main Street Storage Basin	L_OR_MF_020_S_09B_B_A_8	Revise design to a 31.8 MG tunnel solution that consolidates CSO controls for 13th Street and Rowan Street, Story Avenue and Main Street, and Lexington Road and Payne Street Storage Basins. Tunnel capacity will allow a level of control of eight overflows per Typical Year for the one CSO previously associated with Story and Main.
September 27, 2016, with administrative correction submitted on October 17, 2016	November 3, 2016	Ohio River Tunnel	Lexington Road and Payne Street Storage Basin	L_OR_MF_083_M_09B_B_A_8	Revise design to a 31.8 MG tunnel solution that consolidates CSO controls for 13th Street and Rowan Street, Story Avenue and Main Street, and Lexington Road and Payne Street Storage Basins. Tunnel capacity will allow a level of control of zero overflows per Typical Year for the nine CSOs previously associated with Lexington and Payne.

Table 4.1. IOAP Project Minor Modifications

SUBMITTAL DATE	APPROVAL DATE	NEW PROJECT NAME	ORIGINAL PROJECT NAME	IOAP ID NUMBER	MODIFICATION DESCRIPTION
March 22, 2018	May 10, 2018	Middle Fork Relief Interceptor, Wet Weather Storage and UMFLS Diversion – PS Improvements and Diversion	Middle Fork Relief Interceptor, Wet Weather Storage and UMFPS Diversion 2 – PS Diversion and Storage	S_MISF_MF_NB01_M_01_C_A1	Revise design to replace existiong 9.0 MGD pump stationwith a 30.0 MGD pump station and convey wet weather flows in lieu of providing covered storage on site.
March 22, 2018	May 10, 2018	Southwestern Parkway Storage Basin	Southwestern Parkway Storage Basin	L_OR_MF_105_M_13_B_A_0	Revise project deadline to June 30, 2019 and correct inline storage volume submitted with 2015 minor modification fact sheet to 6.3 MG.
September 6, 2018	September 27, 2018	Waterway Protection Tunnel	Ohio River Tunnel	L_OR_MF_020_S_09B_B_A_8, L_OR_MF_155_M_09B_B_A_4, L_SO_MF_083_M_09B_B_A_8	Change project name and revise design to a 52.2 MG tunnel solution that consolidates CSO controls for Ohio River Tunnel and I-64 and Grinstead Drive Storage Basin.
September 6, 2018	September 27, 2018	Waterway Protection Tunnel	I-64 and Grinstead Drive Storage Basin	L_MI_MF_127_M_09B_B_A_8	Revise design to a 52.2 MG tunnel solution that consolidates CSO controls for Ohio River Tunnel and I-64 and Grinstead Drive Storage Basin.
September 6, 2018	September 27, 2018	CSO108 Dam Modification	CSO108 Dam Modification	L_SO_MF_108_S_09A_B_A_4	Revise LOC from four to eight overflows per Typical Year based on additional flow monitoring data and revised modeling. This change slightly increases the projected residual AAOV from 1.4 MG to 1.6 MG, but is easily offset with the significant increase in volume created by the extension of the Waterway Protection Tunnel.

4.3.4. GREEN INFRASTRUCTURE PROGRAMMATIC ACTIVITIES

The IOAP describes that “MSD’s long-range commitment to this [Green Infrastructure] program will be based on how green performs in comparison to more traditional gray solutions” (Volume 2, Chapter 4, page 12). Through coordination with EPA and with strong support of MSD’s Wet Weather Team stakeholder group, MSD’s program evolved from solely project-level benefits to maximizing programmatic and community benefits. MSD’s green infrastructure program has been successful in downsizing or eliminating gray infrastructure projects, providing a programmatic factor of safety, and providing community enhancements. These three objectives have been accomplished through a mixture of capital projects, incentive projects, downspout disconnections, and urban reforestation as listed in Table 4.2 and described below.

Table 4.2. Green Program Objectives and Program Elements

GREEN INFRASTRUCTURE PROGRAM OBJECTIVE	CAPITAL PROJECTS	INCENTIVE PROJECTS	DOWNSPOUT DISCONNECTION	URBAN REFORESTATION
Right-Sizing	✓	✓	✓	✓
Factor of Safety		✓	✓	✓
Enganced Community Benefits			✓	✓

4.3.4.1. OBJECTIVE 1 – DOWNSIZE OR ELIMINATE GRAY INFRASTRUCTURE PROJECTS

This objective was largely met using capital projects developed using the “right-sizing” methodology. Two LTCP gray storage basin projects were replaced by green infrastructure project suites: the Story and Spring Street Green Infrastructure Project that mitigated CSO130 overflows and the Portland Green Infrastructure Project that mitigated CSO190 overflows.

Concurrent with the right-sizing analysis of LTCP projects, MSD was developing and implementing the incentive program. The monetary values used in the incentive program reflected a cost similar to that used for the right-sizing approach, as reduced impervious areas from redevelopment projects could reduce basin sizes. The reduced impervious areas were taken into account through model calibration and taken into consideration in the final selection of the gray project sizes.

4.3.4.2. OBJECTIVE 2 – PROVIDE PROGRAMMATIC FACTOR OF SAFETY

Due to design and construction timeframe needs ahead of LTCP schedule deadlines, the right-sizing approach to green infrastructure was no longer feasible to use beginning in 2017. At that time, the primary objective shifted to maximizing system-wide capture. Recognizing that modeling and monitoring have inherent variabilities, and that new and existing infrastructure does not always perform as planned, MSD developed a methodology that allowed additional green infrastructure area removal to be used to create a factor of safety for the overall performance of the combined sewer system as well as incentivize implementation of green projects within priority sewersheds. MSD targeted a 5% factor of safety for overall system AAOV. Based on current modeling with the Waterway Protection Tunnel in place, a 5% reduction in system-wide AAOV is projected to be achieved with approximately a 1% (63 acres) reduction in effective impervious area.

To meet the goal, MSD modified the incentive program to provide values based on costs to provide similar factors of safety using gray infrastructure. The impervious area removal performed for this objective was achieved entirely through the incentive program. As of 4/30/2019, MSD has removed 75 acres of impervious area. An additional 34 acres is tentatively planned for removal, contingent upon property owner development schedules and MSD budget availability. Although future incentive projects are subject to factors like development schedules that are beyond MSD's control, because the impervious area reduction targets of this objective have already been met, completion of additional projects will only further enhance the programmatic factor of safety.

4.3.4.3. OBJECTIVE 3 – COMMUNITY ENHANCEMENTS

The Green Infrastructure Program's objective to provide additional community benefits beyond direct impacts to system performance has continually been met throughout the duration of the program through a variety of program elements. The main program element contributing to this objective is the Urban Reforestation program. This program allows MSD to partner with various entities (non-profit organizations, neighborhood associations, etc.) to provide funding for tree planting projects in previously developed areas. Tree planting has an indirect impact on overflow volumes as increased tree canopy reduces runoff volume and attenuates peak runoff discharges. Tree planting also improves air quality, reduces the heat island effect, indirectly improves flooding, beautifies neighborhoods, and improves overall health and quality of life in neighborhoods. MSD set a goal of planting approximately 1,000 trees annually, which equates to approximately 14,000 trees over the life of the program. To date, approximately 11,200 trees already planted, with an additional 2800 trees planned or committed through December 31, 2024.

The downspout disconnection program also contributes to this objective. Downspout disconnection allows MSD to redirect downspouts to grassed or other overland flow areas and also to protect basements from sewer backups. This element also has an indirect impact on overflow volumes as re-directing downspouts helps attenuate peak flows. Furthermore, this also incrementally reduces flooding and protects individual homeowners from basement back-ups. This provides a health, safety, and economic benefit to the individual property owner and the community.

Lastly, capital projects and incentive projects contribute other community benefits beyond overflow reduction. In CSO130 and CSO190, existing areas of asphalt and concrete were replaced with green infrastructure, improving the aesthetics of the overall neighborhood. Many of the demonstration projects also performed similar functions. Incentive projects provide additional green infrastructure within new (and existing for re-developments) parking areas and other hardscapes, improving aesthetics and providing some incremental benefit to the heat island effect.

FY19 Program

- Maintained www.msddgreen.org, an MSD Green Infrastructure website intended to offer general information on green infrastructure.
- Utilized a green tracking protocol for green infrastructure projects. Participated in Urban Heat Island workgroups under the guidance of Louisville Metro.
- Tracked and calculated the impacts of green infrastructure projects on stormwater capture and estimated overflow reductions.

- Continued the arrangement with EPA Office of Research and Development (ORD) to determine the performance of green infrastructure practices to determine most effective applications, maintenance cycles and areas with high potential for reduction of overflows.
- Supported a joint funding partnership with the Louisville Metro Office of Sustainability to further incentivize the construction of green infrastructure on private property.

FY20 Program

- Continue to participate in the Louisville Metro Sustainability Plan.
- Continue to track green infrastructure projects in Hansen and MSD's Geographic Information System (GIS).

4.4. DISCHARGE ABATEMENT PLAN PROJECT STATUS

4.4.1. PROJECT CERTIFICATION PROGRESS

This section addresses project certification progress for the current reporting period and required activities for the upcoming reporting period.

4.4.1.1. SANITARY SEWER DISCHARGE PLAN

Per the approved IOAP schedule, no new SSDP projects were completed in FY19, and no new projects are schedule to be completed in FY20.

4.4.1.2. JEFFERSONTOWN WATER QUALITY TREATMENT CENTER ELIMINATION

Jeffersontown WQTC elimination project was completed and certified December 23, 2015. Subsequent post-construction monitoring activities are reported in Section 4.5.2.

4.4.1.3. COMBINED SEWER OVERFLOW LONG TERM CONTROL PLAN

Table 4.3 details CSO LTCP projects completed and certified during the current reporting period, and Table 4.4 details CSO LTCP projects required to be completed and certified during the next reporting period.

Table 4.3. FY19 IOAP Project Completion Dates – CSO LTCP

BUDGET ID	ACD PROJECT NUMBER	PROJECT NAME	ACD DATE	CERTIFIED COMPLETION DATE
H12155	L_OR_MF_155_M_09B_B_B_4	Central Relief Drain CSO In-line Storage, Green Infrastructure, & Distributed Storage	December 31, 2018	December 20, 2018
H09123	L_MU_MF_154_M_09B_B_A_8	Clifton Heights Storage Basin	December 31, 2018	December 21, 2018
H12159	L_OR_MF_211_M_13_B_A_8	Morris Forman WQTC Headworks	December 31, 2018	December 17, 2018
H12158	L_OR_MF_211_M_13_B_A_8	Southern Outfall In-Line Storage at 43 rd Street (SOR1)	December 31, 2018	November 30, 2018

Table 4.3. FY19 IOAP Project Completion Dates – CSO LTCP

BUDGET ID	ACD PROJECT NUMBER	PROJECT NAME	ACD DATE	CERTIFIED COMPLETION DATE
H09132	L_OR_MF_105_M_13_B_A_0	Southwestern Parkway Storage Basin	June 30, 2019	March 29, 2019

Table 4.4. FY20 IOAP Project Required Completion Dates – CSO LTCP

BUDGET ID	ACD PROJECT NUMBER	PROJECT NAME	ACD DATE	CERTIFIED COMPLETION DATE
H09125	L_OR_MF_019_S_13_B_A_8	Portland CSO Basin	Decmeber 31, 2019	August 30, 2019

4.4.2. DISCHARGE ABATEMENT ACTIVITY PROGRESS

A Gantt chart showing the 2012 IOAP Modification project schedules along with subsequently approved minor modifications is provided in Figure 4.1.

Figure 4.1. MSD Integrated Overflow Abatement Plan Implementation Schedule

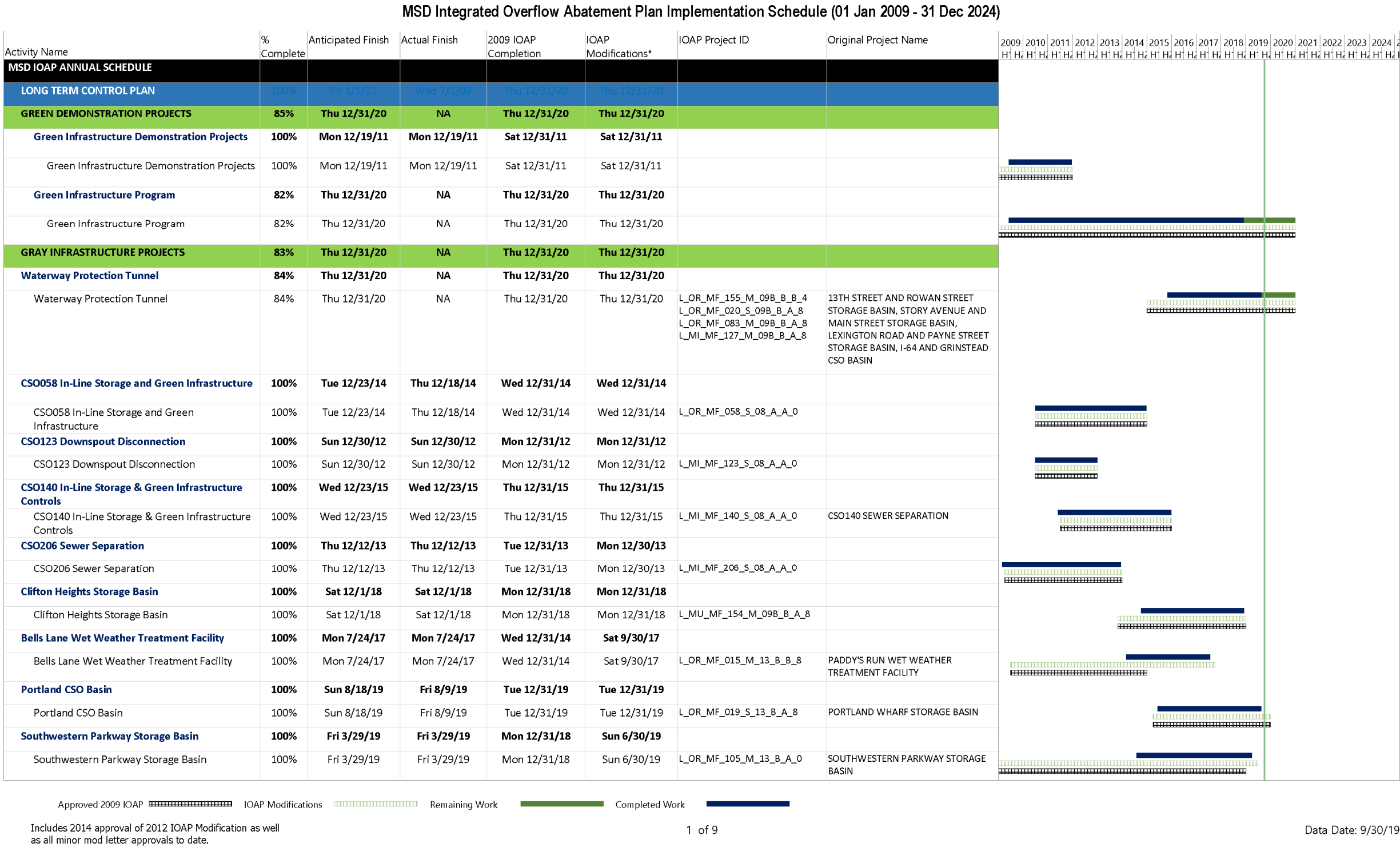


Figure 4.1. MSD Integrated Overflow Abatement Plan Implementation Schedule

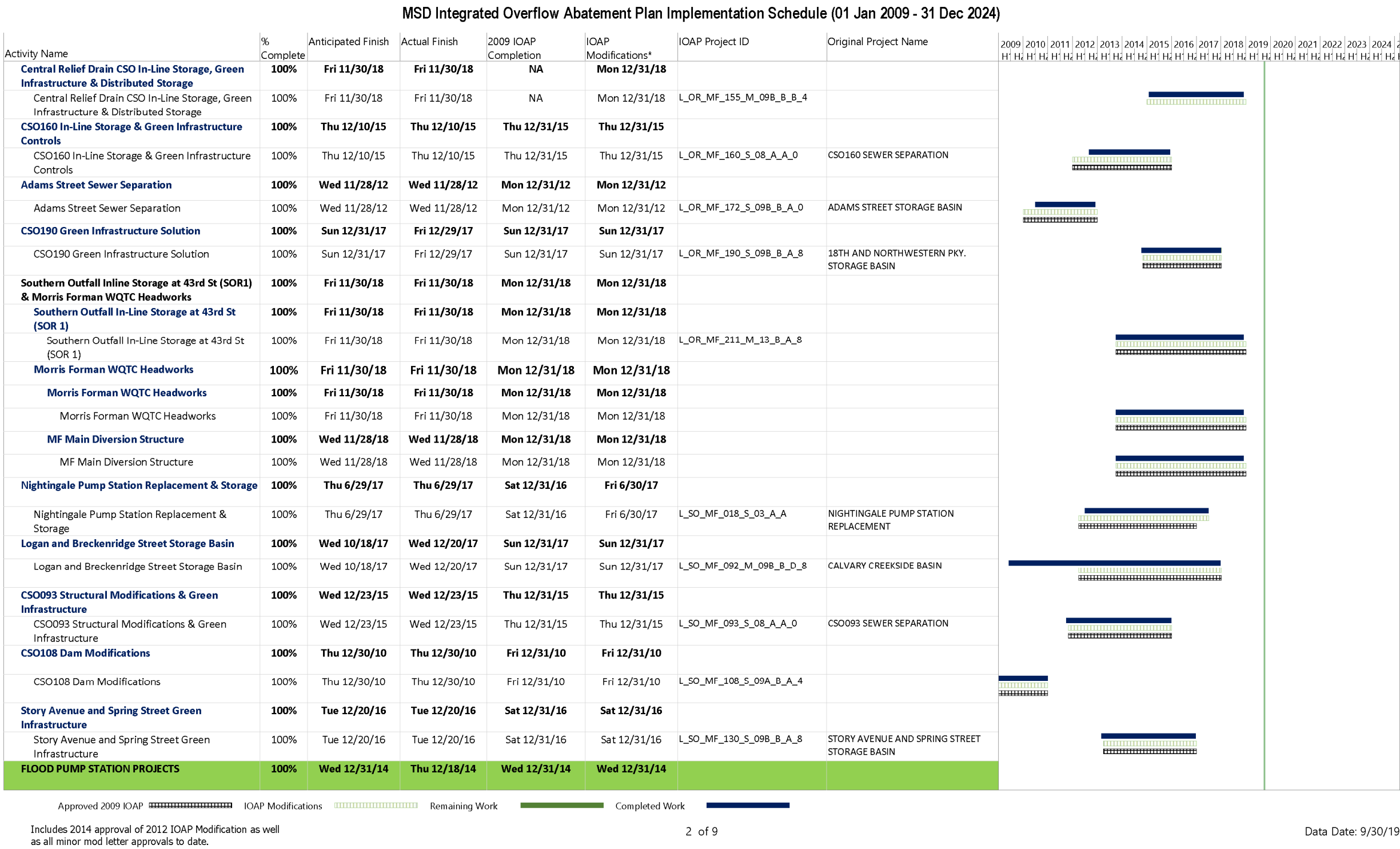
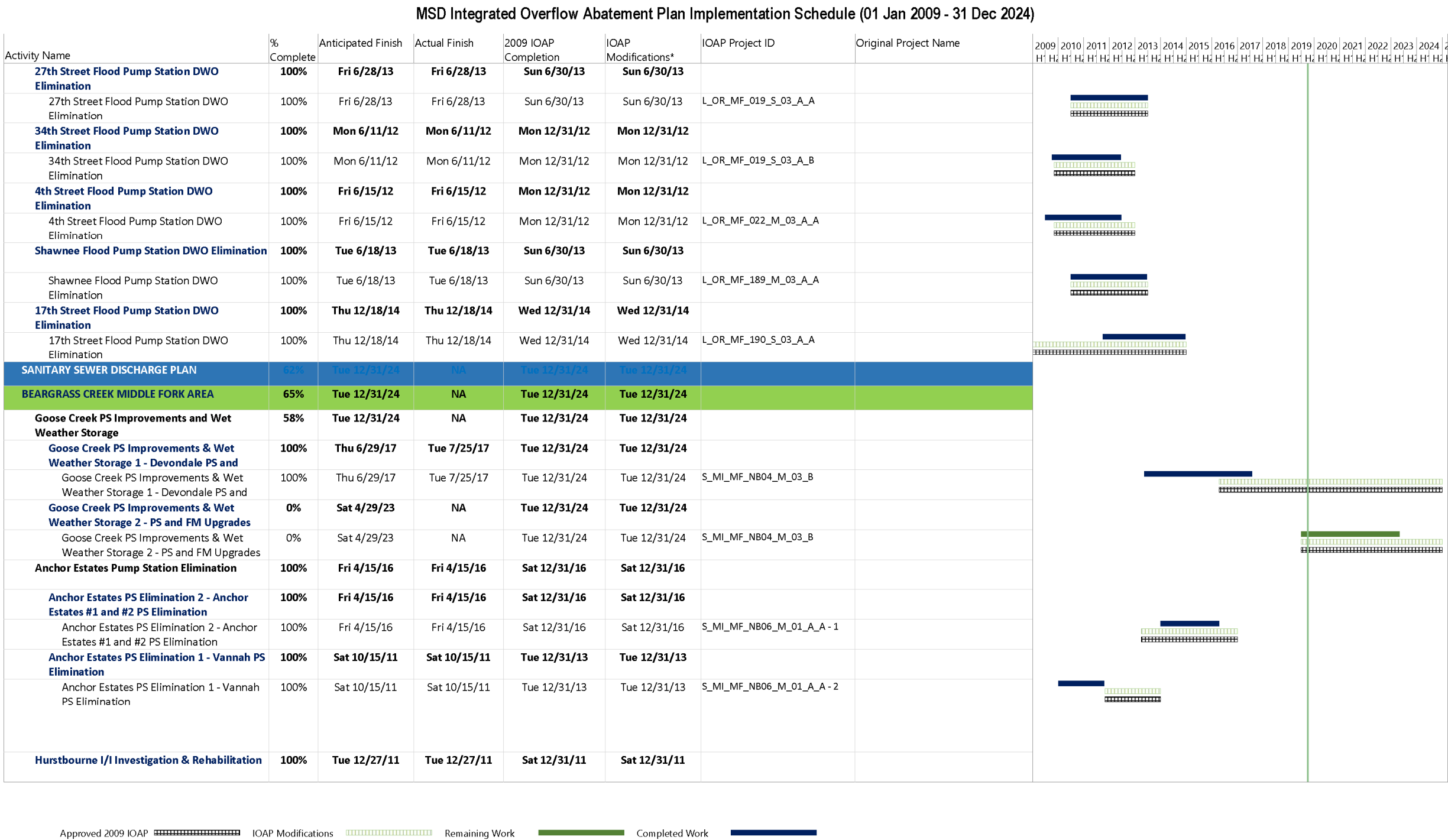


Figure 4.1. MSD Integrated Overflow Abatement Plan Implementation Schedule





MSD Integrated Overflow Abatement Plan Implementation Schedule (01 Jan 2009 - 31 Dec 2024)



Data Date: 9/30/19

Figure 4.1. MSD Integrated Overflow Abatement Plan Implementation Schedule

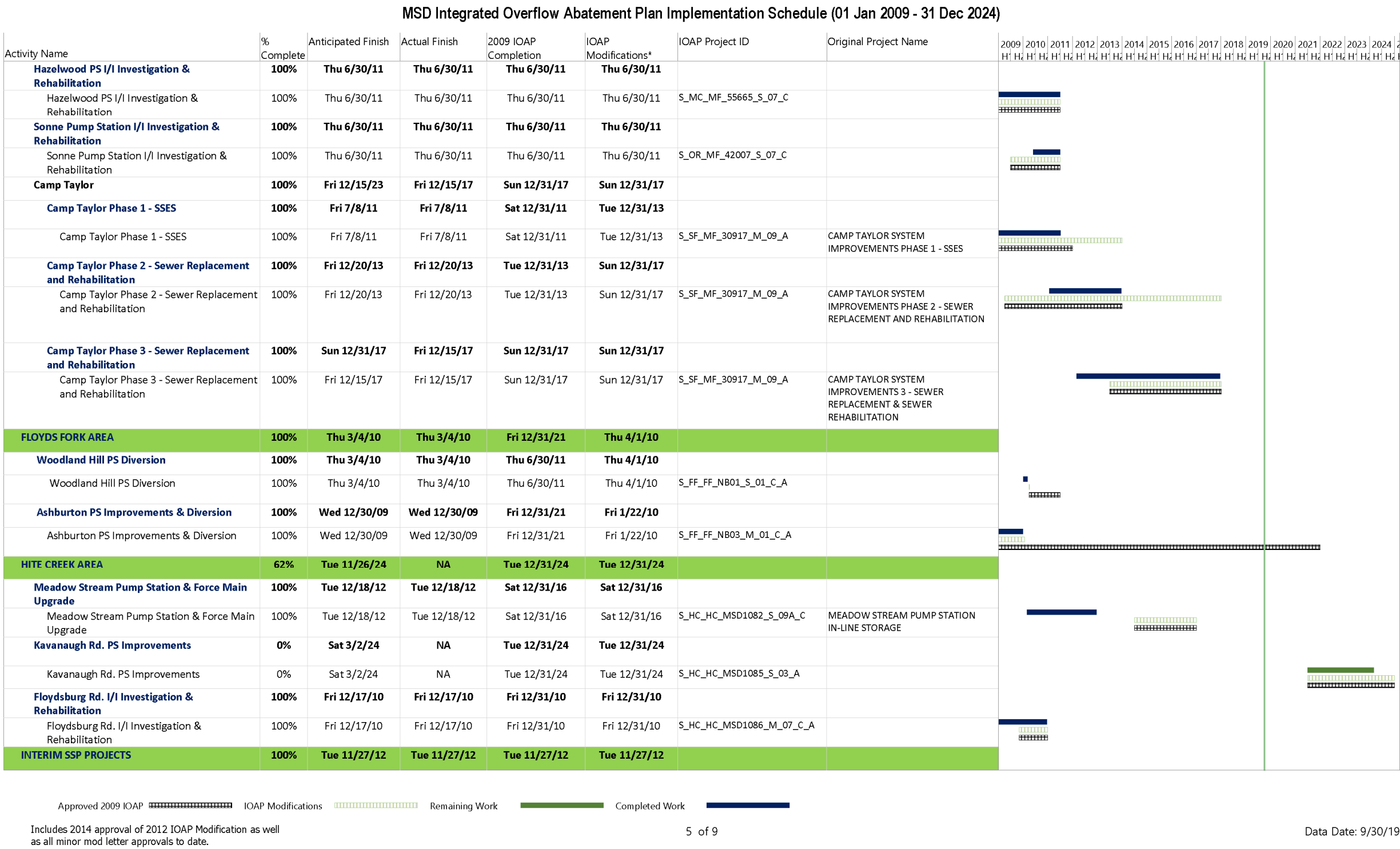


Figure 4.1. MSD Integrated Overflow Abatement Plan Implementation Schedule

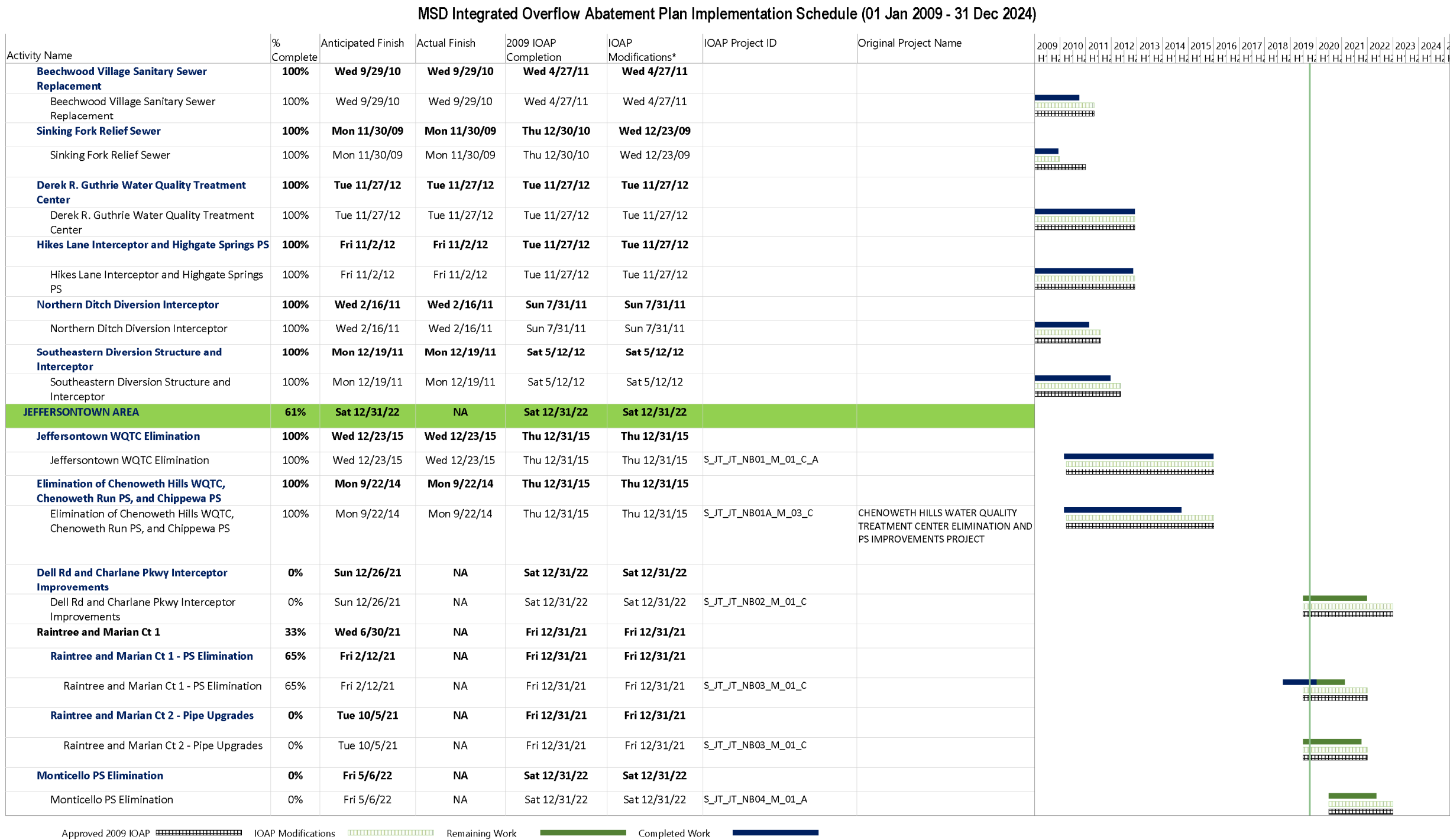


Figure 4.1. MSD Integrated Overflow Abatement Plan Implementation Schedule

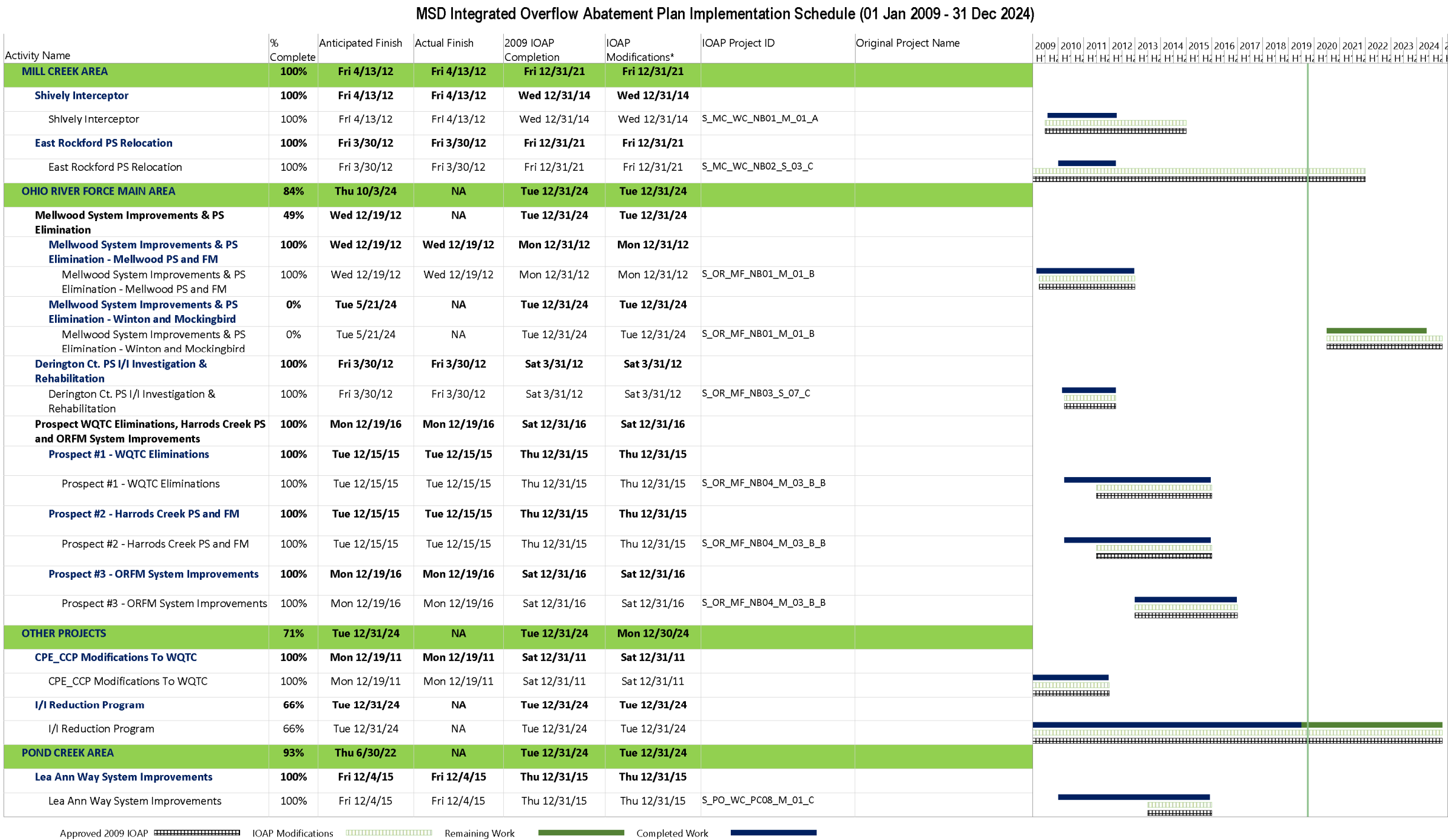


Figure 4.1. MSD Integrated Overflow Abatement Plan Implementation Schedule

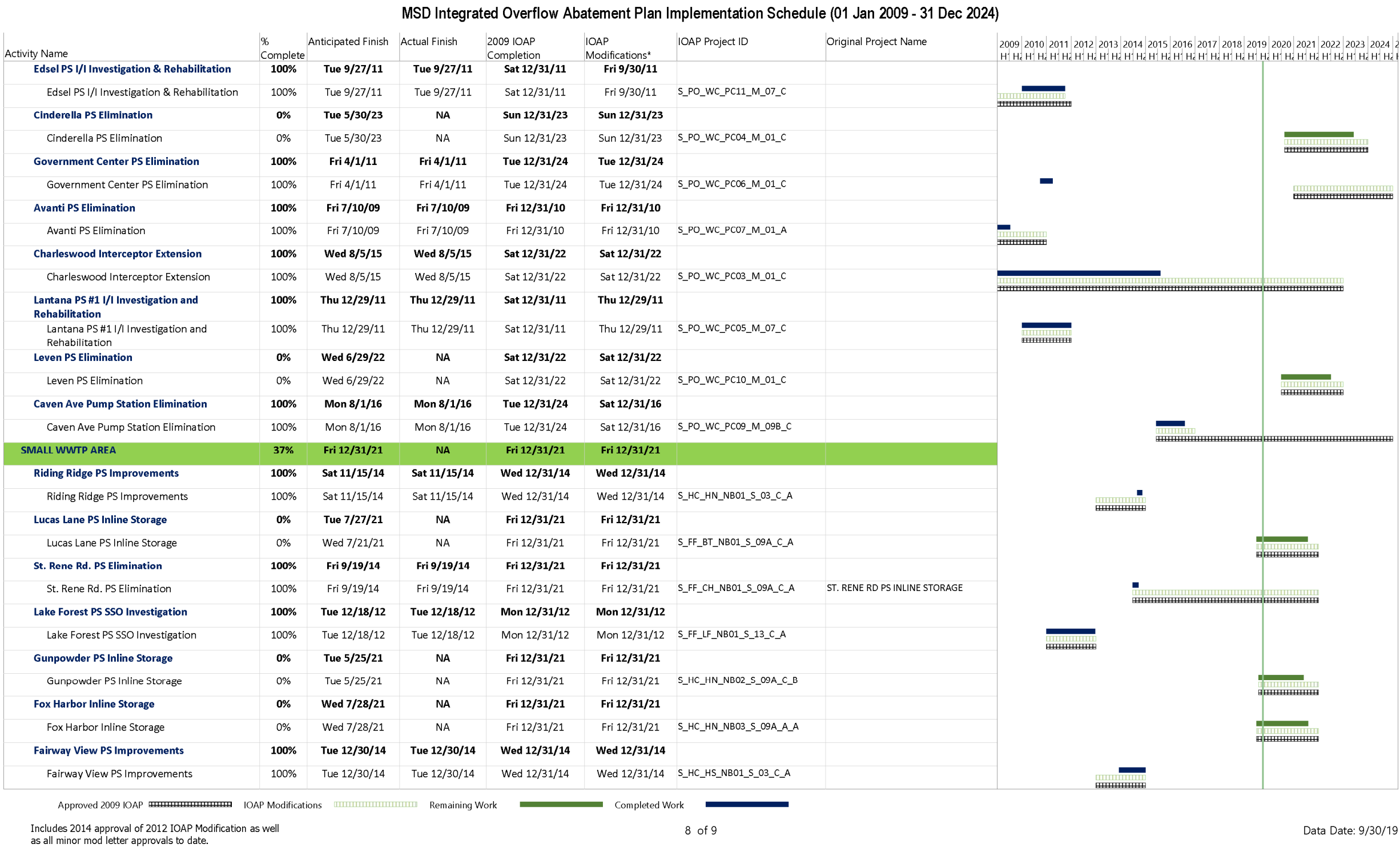
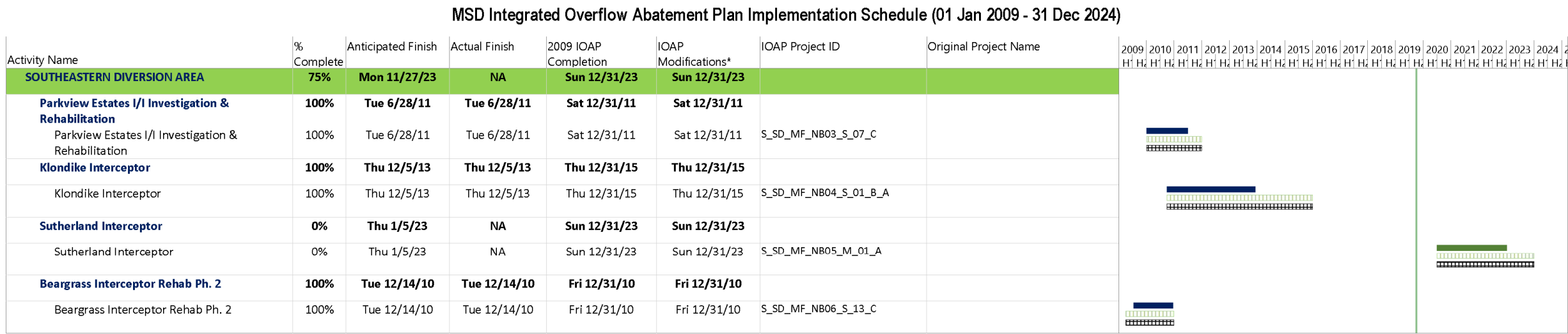


Figure 4.1. MSD Integrated Overflow Abatement Plan Implementation Schedule



Approved 2009 IOAP  IOAP Modifications  Remaining Work  Completed Work 

Includes 2014 approval of 2012 IOAP Modification as well as all minor mod letter approvals to date.

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4.5. POST CONSTRUCTION COMPLIANCE MONITORING PROGRAM

Within the IOAP, monitoring efforts that support the impact evaluation of both project and plan implementation are discussed in Volume 1, Section 6.5 - Post Construction Compliance Monitoring (PCCM). These efforts are incorporated into MSD's overall environmental data monitoring and management planning and activities, which support various MSD initiatives including operational support, the Municipal Separate Storm Sewer System (MS4) program, hydraulic and water quality modeling, and a range of regulatory reporting and trending requirements. Under the IOAP, the primary compliance assessment objectives will be to certify project completion to the selected overflow control level, both for CSOs and SSOs, as well as to confirm that the predicted levels of overflow control and anticipated water quality benefits have been realized. As such, post-construction compliance monitoring supports impact analysis and the validation of various objectives of IOAP project initiatives, and the overall abatement plan.

4.5.1. MODELING PROGRAM

As implementation of the IOAP continues, the sewer models increasingly support critical planning and design decisions on sizing, location and operation of new facilities (e.g., storage basins, pump stations, gates) as well as providing validation of predicted project level of control.

MSD has contracted with a hydraulic / hydrologic modeling (H/H) consultant to update and maintain a calibrated Infoworks ICM model of the combined and sanitary sewer collection systems. The model is used for the following activities:

- Planning and design of IOAP and other capital projects, including recommendations for changes to the operation of MSD's RTC system based on project impacts.
- Validation of performance of IOAP projects after construction.
- Evaluation of sewer capacity requests and proposed green infrastructure impacts on the combined and separate sanitary sewer systems.

The model is calibrated to both in-system flow monitors as well as flow monitors on CSO outfalls. MSD continues to look for ways to improve the accuracy and precision of the model by performing field surveys and reconnaissance where additional details or other critical details need clarification to refine calibration of the models.

FY19 Program

- Worked with H/H consultant to update ICM model to incorporate IOAP minor modifications.
- Worked with H/H consultant to review IOAP projects under design for validation of proposed performance.
- Worked with H/H consultant to validate performance of IOAP projects under assessment, as discussed in Section 4.5.2.

FY20 Program

- Work with H/H consultant to review CSO flow monitoring data as discussed in Section 1.2.3.3.
- Work with H/H consultant to review IOAP projects under design for validation of proposed performance.
- Work with H/H consultant to validate performance of IOAP projects after construction is completed.

4.5.2. PROJECT PERFORMANCE REPORTING

As described in Volume 1, Section 6.5.2 of the 2012 IOAP Modification, dated May 2014, beginning with the FY14 Annual Report, MSD has agreed to provide annual reports on performance findings for completed projects and to self-identify cases where the performance falls below the committed level of control. In such cases, MSD will define the necessary remedial measures and schedule to improve performance to the appropriate level. It is the intent that performance analyses will be conducted for all constructed IOAP projects as monitoring data becomes available. To complete this effort and independently assess IOAP projects that have been certified to date, MSD has partnered with the University of Louisville Center for Infrastructure Research (UofL) for the majority of the IOAP projects.

Current performance reporting is updated to include 88 projects certified through June 30, 2018, with data through June 30, 2019.

MSD committed to an analysis of twelve months of final effluent sampling to determine performance of the Derek R. Guthrie WQTC Flow Equalization and Treatment Project, which was completed July 10, 2015. For all other LTCP and SSDP projects, the period for monitoring performance and compliance encompasses a three-year window following construction. Green demonstration projects were determined to meet performance commitments based on reported benefit and improvement to MSD's Green Infrastructure Program, as reported in Annual Report 7. Two supplemental environmental projects (SEPs) were assessed for successful restoration.

Detailed performance status of each project is included in Table 4.5. Of the 79 projects analyzed to date, 63 have met the criteria for final committed level of control and 16 remain under assessment. Projects detailed in Table 4.6 have been identified as phased projects that did not pass the current performance assessment but are linked to other projects that will address performance issues. Projects detailed in Table 4.7 need remediation to address performance issues. Projects that have been completed through the assessment date but have not been assessed as of the current reporting period are detailed in Table 4.8.

Table 4.5. IOAP Project Performance – Performance Status

PROJECT NAME	ACD PROJECT NUMBER	PROJECT CERTIFICATION DATE	PROJECT TYPE	ASSESSMENT RESULT	ASSESSMENT COMPLETION DATE
Avanti PS Elimination	S_PO_WC_PC07_M_01_A	July 28, 2009	SSDP	Pass	December 30, 2013
Sinking Fork Relief Sewer	SINKING FORK RELIEF SEWER	December 23, 2009	SSDP	Pass	December 30, 2014
Ashburton PS Improvements and Diversion	S_FF_FF_NB03_M_01_C_A	January 22, 2010	SSDP	Pass	December 30, 2013
Woodland Hills PS Diversion	S_FF_FF_NB03_M_01_C_A	April 1, 2010	SSDP	Pass	December 30, 2013
Running Fox PS Elimination	S_CC_CC_MSD1080_S_01_C	April 5, 2010	SSDP	Pass	December 30, 2013
Beechwood Village Sanitary Sewer Replacement	BEECHWOOD VILLAGE SANITARY SEWER REPLACEMENT	September 29, 2010	SSDP	Pass	December 30, 2014
Billy Goat Strut (Formerly Campbell and Main) Permeable Alley	L_SO_MF_121_S_12_A	October 8, 2010	Green	Pass	December 30, 2013
W. Gaulbert & W. Hill (Formerly Seventeenth and W. Hill) Permeable Alley	L_OR_MF_015_S_12_A	October 15, 2010	Green	Pass	December 30, 2013
2300 Block of Congress Street (Formerly Seventh and Market) Permeable Alley	L_OR_MF_053_S_12_A_C	November 11, 2010	Green	Pass	December 30, 2013
Clifton Triangle Area Rain Garden	ADDITIONAL RAIN GARDEN PROJECT	November 11, 2010	Green	Pass	December 30, 2013
Brandeis Apartments Rain Garden	ADDITIONAL RAIN GARDEN PROJECT	November 15, 2010	Green	Pass	December 30, 2013
Cherokee Park Stream Restoration1	SEP PROJECT	December 3, 2010	Other	Pass	May 7, 2014
MSD Main Office Parking Lot Bioswale	L_OR_MF_053_S_12_A_A	December 3, 2010	Green	Pass	December 30, 2013
3rd & Ormsby Biofiltration	L_OR_MF_198_S_12_A	December 12, 2010	Green	Pass	December 30, 2013
Beargrass Interceptor Rehabilitation Phase 2	S_SD_MF_NB06_S_13_C	December 14, 2010	SSDP	Phased Project	Ongoing
Floydsburg Rd I/I Investigation & Rehabilitation	S_HC_HC_MSD1086_M_07_C_A	December 17, 2010	SSDP	Pass	June 30, 2019
6th & Martin Luther King (Formerly Sixth and Muhammad Ali) Green Parking Lot	L_OR_MF_022_S_12_A	December 28, 2010	Green	Pass	December 30, 2013
7th & Cedar Green Parking Lot	L_OR_MF_053_S_12_A_B	December 30, 2010	Green	Pass	December 30, 2013

Table 4.5. IOAP Project Performance – Performance Status

PROJECT NAME	ACD PROJECT NUMBER	PROJECT CERTIFICATION DATE	PROJECT TYPE	ASSESSMENT RESULT	ASSESSMENT COMPLETION DATE
CSO108 Dam Modifications	L_SO_MF_108_S_09A_B_A_4	December 30, 2010	LTCP	Minor Modification	Ongoing
Housing Authority Green Roof (Formerly Sixth and Broadway Rain Garden)	L_OR_MF_028_S_12_A	December 30, 2010	Green	Pass	December 30, 2013
Scholar House Green Parking Lot (Formerly Twelfth and Jefferson)	L_OR_MF_208_S_12_A	December 30, 2010	Green	Pass	December 30, 2013
Swift Company Green Project (Formerly Second and Broadway Green Parking Lot)	L_OR_MF_181_S_12_A	December 30, 2010	Green	Pass	December 30, 2013
Northern Ditch Diversion Interceptor	NORTHERN DITCH DIVERSION INTERCEPTOR	February 16, 2011	SSDP	Pass	December 30, 2014
Pond Creek Trail SEP ³	SEP PROJECT	February 19, 2011	Other	Pass	December 30, 2014
Government Center PS Elimination	S_PO_WC_PC06_M_01_C	April 1, 2011	SSDP	Pass	December 30, 2014
Parkview Estates I/I Investigation & Rehabilitation	S_SD_MF_NB03_S_07_C	June 28, 2011	SSDP	Pass	December 30, 2014
Hazelwood PS I&I Investigation & Rehabilitation	S_MC_MF_55665_S_07_C	June 30, 2011	SSDP	Pass	December 30, 2013
Sonne PS I&I Investigation & Rehabilitation	S_OR_MF_42007_S_07_C	June 30, 2011	SSDP	Pass	June 30, 2019
Camp Taylor Phase 1- Replace Sewers	S_SF_MF_30917_M_09_A	July 8, 2011	SSDP	Pass	June 30, 2019
Edsel Pump Station I/I Investigation & Rehabilitation	S_PO_WC_PC11_M_07_C	September 27, 2011	SSDP	Pass	December 30, 2014
Anchor Estates PS Eliminations 1- Vannah PS Elimination	S_MI_MF_NB06_M_01_A_A - 2	October 15, 2011	SSDP	Pass	December 30, 2014
CPE/CCP Modifications to WQTC	CPE/CCP MODIFICATIONS TO WQTC	December 19, 2011	Other	Internal	Ongoing
East Washington @ Adams Street Green Demonstration Project (Formerly I-264 On-Ramp Dry Well)	L_OR_MF_019_S_12_A	December 19, 2011	Green	Pass	December 30, 2014
3rd Street and Campbell Ventures Green Project (Formerly JFK Montessori Area Dry Well)	L_OR_MF_191_S_12_A_B	December 20, 2011	Green	Pass	December 30, 2014

Table 4.5. IOAP Project Performance – Performance Status

PROJECT NAME	ACD PROJECT NUMBER	PROJECT CERTIFICATION DATE	PROJECT TYPE	ASSESSMENT RESULT	ASSESSMENT COMPLETION DATE
German/Paristown Green Street Rain Garden	ADDITIONAL RAIN GARDEN PROJECT	December 20, 2011	Green	Pass	December 30, 2014
Grawemeyer Hall Parking Lot (Formerly I-264 and Gibson Dry Well)	L_OR_MF_191_S_12_A_A	December 20, 2011	Green	Pass	December 30, 2014
Speed Art Museum Infiltration Trench (Formerly I-264 Off-Ramp Dry Well)	L_OR_MF_189_S_12_A	December 20, 2011	Green	Pass	December 30, 2014
Hurstbourne I&I Investigation & Rehabilitation	S_MI_MF_NB07_S_07_C	December 27, 2011	SSDP	Pass	December 30, 2014
Lantana #1 PS I/I Investigation & Rehabilitation	S_PO_WC_PC05_M_07_C	December 29, 2011	SSDP	Remediation Required	Ongoing
Brown-Forman Green Roof Project (Formerly Bardstown Rd Presbyterian Church Green Parking Lot)	ADDITIONAL RAIN GARDEN PROJECT	December 30, 2011	Green	Pass	December 30, 2013
Wilson Crossings Green Parking Lot (Formerly Russell Lee Drive Dry Well)	L_OR_MF_191_S_12_A_C	December 30, 2011	Green	Pass	December 30, 2013
Derington Ct PS I/I Investigation & Rehabilitation	S_OR_MF_NB03_S_07_C	March 30, 2012	SSDP	Pass	June 30, 2016
East Rockford Lane PS Relocation	S_MC_WC_NB02_S_03_C	March 30, 2012	SSDP	Pass	June 30, 2016
Shively Interceptor	S_MC_WC_NB01_M_01_A	April 13, 2012	SSDP	Pass	June 30, 2016
Southeast Diversion Structure & Interceptor	SOUTHEASTERN DIVERSION STRUCTURE & INTERCEPTOR	April 19, 2012	SSDP	Phased Project	Ongoing
Fairmount Rd PS Improvements	S_FF_CC_81316_M_03_C_A	April 24, 2012	SSDP	Pass	June 30, 2017
34th Street FPS DWO Elimination	L_OR_MF_019_S_03_A_B	June 11, 2012	LTCP	Pass	June 30, 2016
4th Street FPS DWO Elimination	L_OR_MF_022_M_03_A_A	June 15, 2012	LTCP	Pass	June 30, 2016
Hikes Lane Interceptor & Highgate Springs PS	HIKES LANE INTERCEPTOR /HIGHGATE SPRINGS PS	November 2, 2012	SSDP	Pass	June 30, 2016
Derek R Guthrie WQTC ²	DEREK R GUTHRIE WATER QUALITY TREATMENT CENTER	November 15, 2012	SSDP	Pass	July 10, 2015
Adams Street Sewer Separation	L_OR_MF_172_S_09B_B_A_0	November 28, 2012	LTCP	Pass	June 30, 2016

Table 4.5. IOAP Project Performance – Performance Status

PROJECT NAME	ACD PROJECT NUMBER	PROJECT CERTIFICATION DATE	PROJECT TYPE	ASSESSMENT RESULT	ASSESSMENT COMPLETION DATE
Lake Forest PS SSO Investigation	S_FF_LF_NB01_S_13_C_A	December 18, 2012	SSDP	Pass	June 30, 2016
Meadow Stream PS & FM Upgrade	S_HC_HC_MSD1082_S_09A_C	December 18, 2012	SSDP	Pass	June 30, 2016
Mellwood System Improvements and PS Eliminations	S_OR_MF_NB01_M_01_B	December 27, 2012	SSDP	Phased Project	Ongoing
CSO123 Downspout Disconnection	L_MI_MF_123_S_08_A_A_0	December 30, 2012	LTCP	Pass	June 30, 2016
Eden Care PS SSO Investigation	S_FF_FF_NB02_S_13_C	December 31, 2012	SSDP	Internal	December 31, 2015
Leland Road SSO Investigation	S_OR_MF_NB02_S_13_C	December 31, 2012	SSDP	Internal	December 31, 2015
Shawnee FPS DWO Elimination	L_OR_MF_189_M_03_A_A	June 18, 2013	LTCP	Pass	June 30, 2016
27th Street FPS DWO Elimination	L_OR_MF_019_S_03_A_A	June 28, 2013	LTCP	Pass	June 30, 2016
CSO206 Sewer Separation	L_MI_MF_206_S_08_A_A_0	December 12, 2013	LTCP	Pass	June 30, 2017
Camp Taylor #2- Replace Sewers	S_SF_MF_30917_M_09_A	December 20, 2013	SSDP	Pass	June 30, 2019
Middle Fork Relief Interceptor, Wet Weather Storage & UMFPS #1 - Buechel Basin	S_MISF_MF_NB01_M_01_C_A1	December 27, 2013	SSDP	Phased Project	Ongoing
Klondike Interceptor	S_SD_MF_NB04_S_01_B_A	July 17, 2014	SSDP	Pass	June 30, 2018
St. Rene Road PS Elimination	S_FF_CH_NB01_S_09A_C_A	September 19, 2014	SSDP	Pass	June 30, 2018
Elimination of Chenoweth Hills WQTC, Chenoweth Run PS, and Chippewa PS	S_JT_JT_NB01A_M_03_C	September 22, 2014	SSDP	Pass	June 30, 2018
Riding Ridge PS Improvements	S_HC_HN_NB01_S_03_C_A	November 15, 2014	SSDP	Pass	June 30, 2018
17th FPS DWO Elimination	L_OR_MF_190_S_03_A_A	December 18, 2014	LTCP	Pass	June 30, 2018
Fairway View PS Improvements	S_HC_HS_NB01_S_03_C_A	December 30, 2014	SSDP	Pass	June 30, 2018
Charleswood Interceptor Extension	S_PO_WC_PC03_M_01_C	August 5, 2015	SSDP	Pass	June 30, 2019
Prospect #2 – Harrods Creek PS & FM	S_OR_MF_NB04_M_03_B_B	November 13, 2015	SSDP	Phased Project	Ongoing
Lea Ann Way System Improvements	S_PO_WC_PC08_M_01_C	December 4, 2015	SSDP	Pass	June 30, 2019
CSO160 In-Line Storage And Green Infrastructure	L_OR_MF_160_S_08_A_A_0	December 10, 2015	LTCP	Phased Project	Ongoing

Table 4.5. IOAP Project Performance – Performance Status

PROJECT NAME	ACD PROJECT NUMBER	PROJECT CERTIFICATION DATE	PROJECT TYPE	ASSESSMENT RESULT	ASSESSMENT COMPLETION DATE
Prospect #1 – WQTC Eliminations	S_OR_MF_NB04_M_03_B_B	December 15, 2015	SSDP	Phased Project	Ongoing
CSO093 Structural Modifications & Green Infrastructure	L_SO_MF_093_S_08_A_A_0	December 23, 2015	LTCP	Phased Project	Ongoing
CSO140 In-Line Storage And Green Infrastructure Controls	L_MI_MF_140_S_08_A_A_0	December 23, 2015	LTCP	Phased Project	Ongoing
Jeffersontown WQTC Elimination	S_JT_JT_NB01_M_01_C_A	December 23, 2015	SSDP	Pass	June 30, 2019
Fairmount Road Offline Storage Basin	S_FF_CC_81316_M_03_C_A	March 30, 2016	SSDP	Remediation Required	Ongoing
Goose Creek PS #1 - Devondale Wet Weather Storage	S_MI_MF_NB04_M_03_B	April 15, 2016	SSDP	Phased Project	Ongoing
Caven Avenue PS Elimination	S_PO_WC_PC09_M_09B_C	September 26, 2016	SSDP	Pass	Ongoing
Anchor Estates PS Eliminations 2 – Anchor Estates #1 & #2 PS Eliminations	S_MI_MF_NB06_M_01_A_A - 1	September 30, 2016	SSDP	Pass	Ongoing
Prospect #3 – ORFM System Improvements	S_OR_MF_NB04_M_03_B_B	December 19, 2016	SSDP	Remediation Required	Ongoing
Story Avenue and Spring Street Green Infrastructure	L_SO_MF_130_S_09B_B_A_8	December 20, 2016	LTCP	Phased Project	Ongoing
Nightingale PS Replacement and Storage	L_SO_MF_018_S_03_A_A	June 30, 2017	LTCP	Phased Project	Ongoing
Bells Lane Wet Weather Treatment Facility (Formerly Known as Paddy's Run)	L_OR_MF_015_M_13_B_B_8	September 25, 2017	LTCP	Phased Project	Ongoing
Camp Taylor #3 – Replace Sewer & Rehabilitation	S_SF_MF_30917_M_09_A	December 15, 2017	SSDP	Pass	Ongoing
Logan Street & Breckinridge Street Storage Basin	L_SO_MF_092_M_09B_B_D_8	December 20, 2017	LTCP	Phased Project	Ongoing
CSO190 Green Infrastructure	L_OR_MF_190_S_09B_B_A_8	December 29, 2017	LTCP	Insufficient Data	Ongoing

¹Assessment performed by Stantec Consulting Services, Inc.

²Assessment performed by HDR Engineers, Inc.

³Assessment performed by Redwing Ecological Services, Inc

Table 4.6. IOAP Project Performance – Phased Project Performance Summary through June 30, 2018

PROJECT NAME	OVERFLOW EVENTS BELOW LEVEL OF CONTROL		PHASED PROJECT	PHASED PROJECT COMPLETION DATE
	COUNT	VOLUME (GALLONS)		
Beargrass Interceptor Rehabilitation Ph 2	4	123,625	Nightingale PS Replacement & Storage (S_SD_MF_NB06_S_13_C)	June 30, 2017 ¹
CSO093 Structural Modifications & Green Infrastructure	12	225,729	Due to the interdependent nature of the CSS, the intended performance of any LTCP project is dependent on the full implementation of all LTCP projects as outlined in the IOAP.	December 31, 2020 ²
CSO140 In-Line Storage and Green Infrastructure Controls	65	27,782,344	Due to the interdependent nature of the CSS, the intended performance of any LTCP project is dependent on the full implementation of all LTCP projects as outlined in the IOAP.	December 31, 2020 ²
CSO160 In-Line Storage and Green Infrastructure	13	205,698	Due to the interdependent nature of the CSS, the intended performance of any LTCP project is dependent on the full implementation of all LTCP projects as outlined in the IOAP.	December 31, 2020 ²
Goose Creek PS Phase 1 - Devondale Wet Weather Storage	2	355,500	Goose Creek Pump Station Improvements and Wet Weather Storage 2 - Pump Station and Force Main Upgrades (S_MI_MF_NB04_M_03_B)	December 31, 2024 ²
Mellwood Sys 1 - Mellwood PS & Force Main	14	373,900	Winton & Mockingbird PS (S_OR_MF_NB01_M_01_B)	December 31, 2024 ²
Nightingale PS Replacement and Storage	17	72,669,260	Due to the interdependent nature of the CSS, the intended performance of any LTCP project is dependent on the full implementation of all LTCP projects as outlined in the IOAP.	December 31, 2020 ²
Southeast Diversion Structure & Interceptor	4	27,058	Additional rehabilitation may be required dependent on monitoring outcomes after construction of Nightingale PS / Basin (S_SD_MF_NB06_S_13_C)	June 30, 2017 ¹
Story Avenue & Spring Street Green Infrastructure	20	153,438	Due to the interdependent nature of the CSS, the intended performance of any LTCP project is dependent on the full implementation of all LTCP projects as outlined in the IOAP.	December 31, 2020 ²
UMF #1 - Buechel Basin	128	31,153,720	UMF #2 – PS Diversion & Storage (S_MISF_MF_NB01_M_01_C_A1)	December 31, 2024 ²

¹ Actual completion date.

² ACD date.

Table 4.7. IOAP Project Performance – Remediation Project Performance Summary through June 30, 2019 and Action Plan

PROJECT NAME	OVERFLOW EVENTS BELOW LEVEL OF CONTROL		REMEDIAL MEASURES	REMEDATION COMPLETION DATE
	COUNT	VOLUME (GALLONS)		
Fairmount Road Pump Station Offline Storage Basin	1	660,000	Remediation was completed for this project February 24, 2018. A revised solution will be developed and implemented.	December 31, 2024 ²
Lantana PS I/I Investigation & Rehabilitation	7	42,385	Remediation was completed for this project August 10, 2018. A revised solution will be developed and implemented.	December 31, 2024 ²
Prospect #1 – WQTC Eliminations	10	1,375,325	A revised solution will be developed and implemented.	December 31, 2024 ²
Prospect #2 – Harrods Creek PS				
Prospect #3 – ORFM System Improvements				

¹ Actual completion date

² Anticipated completion date

Table 4.8. IOAP Project Performance – Projects Completed Prior to June 30, 2019 Requiring Assessment

PROJECT NAME	PROJECT TYPE	PERFORMANCE REPORTING DISCUSSION
Bells Lane Wet Weather Treatment Facility (Formerly know as Paddy's Run)	LTCP	Under contract to be evaluated during FY20.
CSO190 Green Infrastructure	LTCP	Under contract to be evaluated during FY20.
Logan Street and Breckinridge Street Storage Basin	LTCP	Under contract to be evaluated during FY20.

4.5.3. GREEN INFRASTRUCTURE MONITORING

MSD has partnered with the EPA ORD to continue long-term green infrastructure performance monitoring for two CSO areas (CSO130 and CSO190) where green infrastructure solution alternatives have demonstrated more favorable benefit/cost ratios than overflow storage basins. The CSO190 Green Infrastructure Project is completed. A significant amount of monitoring data has been compiled to document the green infrastructure infiltration rates, effectiveness of maintenance practices, and impact on overflow reduction. The monitoring data collected for CSO130 has proven to be valuable in developing an effective regular maintenance program. EPA ORD has continued to be involved in green infrastructure monitoring data in the CSO190 basin, beginning with the installations in November 2015. Both UofL and EPA ORD will be reviewing field monitoring data for these IOAP projects to ascertain overflow reduction performance. PCCM findings for these projects will be included in the annual report subsequent to project certification as updated flow monitoring data is available. Should their findings show that MSD has not achieved the proposed level of control, an action plan will be developed.

4.5.4. WATER QUALITY SYNTHESIS REPORT

MSD publishes a synthesis report, called "State of the Streams", that summarizes water quality trends based on data MSD collects through its Long-Term Monitoring Network. The latest report is available at <http://www.louisvillemsd.org/WaterQuality>. MSD continues to synthesize and trend water quality data in a report as required by the MS4 permit.

SECTION 5: PUBLIC OUTREACH, EDUCATION, NOTIFICATION AND PARTICIPATION

5.1. PUBLIC NOTIFICATION PROGRAM

MSD produced and distributed a number of products aimed at notifying the community on the objectives of Project WIN and how to lessen the risks associated with coming into contact with sewage overflows. The following activities occurred during the reporting period or are scheduled to occur in the next reporting period.

5.1.1. OVERFLOW ADVISORY SIGNS

FY19 Program

- Updated sign inventory to ensure all needed signs are in place.
- Performed the annual sign inspection process in the spring. There were 1,161 signs inspected, 551 signs cleaned, and 609 replaced.

FY20 Program

- Perform an evaluation comparing the documented overflows with existing sign locations to ensure all needed signs are in place.
- Schedule the Annual Sign Inspection process.

5.1.2. ELECTRONIC NOTIFICATIONS

FY19 Program

- Continued to utilize the Louisville Metro e-mail alert system to notify customers who voluntarily signed up to receive email alerts regarding sewer overflows and to broadcast messages to the public.
- Provided notification on the MSD webpage for wet weather overflows during rain events and unauthorized discharges of more than 1,000 gallons.

FY20 Program

- Continue email alerts to customers who signed up to receive the information.
- Continue to provide web notification for wet weather overflows and significant unauthorized discharges.

5.1.3. PRINT NOTIFICATIONS

FY19 Program

- Mailed 1,043 Project WIN information packets to customers who called with questions about the Amended Consent Decree – specifically regarding overflows, discharges, plumbing modification and the surcharge fee.

- In April 2019, distributed the annual mailing to over 20,000 residents within 500 feet of Beargrass Creek and the Ohio River, advising the use of caution around streams during and immediately following rain events as they may contain untreated sewage. A copy of the letter to residents is provided in Appendix F.
- Provided annual notification to community at large in the Courier Journal in a newspaper advertisement to use caution around streams during and immediately following rain events as they may contain untreated sewage. A copy of the notification is provided in Appendix F.
- Sent more than 300 public outreach letters to residents in areas that have FOG issues. The FOG message, included on the reverse of these letters, is provided in Appendix F.

FY20 Program

- Continue to mail Project WIN information packets to customers who call with questions about the Amended Consent Decree – specifically regarding overflows, discharges, plumbing modification and the surcharge fee.
- Continue to send out FOG residential public outreach letters to areas that have FOG issues.
- Provide annual notification and informational material to the community, providing a general overview and awareness relating to public health impacts associated with sewer overflows and an update of Project WIN initiatives by May 1, 2020.
- Distribute, prior to May 1, 2020, the annual mailing to residents within 500 feet of Beargrass Creek and the Ohio River, advising the use of caution around streams during and immediately following rain events as they may contain untreated sewage.

5.2. PUBLIC EDUCATION PROGRAMS

MSD has developed a public education program aimed at expanding the public's knowledge on MSD's primary business functions of wastewater, stormwater and flood protection, with an emphasis on Project WIN Program elements. The following activities occurred during the reporting period or are scheduled to occur in the coming fiscal year.

FY19 Program

- Continued to identify areas of public knowledge requiring additional effort and attention and target public education efforts to fill the gaps.
- Continued to provide information on MSD's Green Infrastructure incentive programs, Louisville's tree canopy, sewer overflow prevention, pollution prevention and other topics, including the events listed in Table 5.1.
- Included Consent Decree compliance, wastewater facility upgrades, and aging infrastructure as key topics in the Critical Repair & Reinvestment Plan public meetings and posts on MSD's website and social media accounts.
- Released monthly social media ads containing messages related to upcoming IOAP project public meetings. Released posts on topics including environmental awareness, outreach programs, events, health and safety, and public meetings. Public outreach campaigns supported included World

Environment Day, World Oceans Day, Pollinator Week, Skills USA, and Ohio River Sweep. Weekly social media campaigns consisted of the following:

- Shared the benefits of green infrastructure and sewer overflow prevention.
- Encouraged activities and behaviors that have a positive impact on water quality; discouraged activities and behaviors that have a negative impact on local water quality. This campaign included tweets about the proper way to dispose of pharmaceutical products, pet waste, wipes, dental floss and other household products.
- Shared the benefits of fostering good water quality.

FY20 Program

- Continue to re-tool public education efforts to address areas of public knowledge requiring additional effort and attention.
- Continue to provide information through social media platforms.

Table 5.1. Public Education Workshops and Activities

DATE(S)	EVENT	BENEFIT / RELEVANCE / IMPACT
July 2, 2018	Stream Assessment and Water Quality Education	MSD staff discussed stream health and water quality topics with students from the Montessori School of Louisville.
July 19, 2018	LFPL Summer Reading Program - "Understanding Our Watersheds"	Discussed how human actions can impact the quality of our local waterways as well as ways that students can take steps to reduce pollution loading to receiving water bodies.
August 3, 2018	Rain Garden Program at Louisville Nature Center	MSD staff gave a presentation that included hands-on activities intended to promote awareness of native plants and the ways that they can positively impact the environment and water quality.
August 14, 2018	MS4 Environmental Science/Rain Garden Class	MSD staff gave a presentation that included hands-on activities intended to promote awareness of native plants and the ways that they can positively impact the environment and water quality.
October 1, 2018	Olmstead Academy North Field Trip	MSD staff provided a tour to children. During the tour, the water treatment process was explained. The importance of MSD's treatment systems to stream health was highlighted, and stormwater message was delivered following the tour.
October 5, 2018	Canoemobile at Riverview Park	Discussed water quality topics with students, what impacts the CSS can have on receiving waterways, and how they can improve water quality through behavior change.
October 16, 2018 – October 18, 2018	Adventures in Water	Presented on the science of stormwater and sewage treatment.
October 29, 2018	Stream health workshop on Little Goose Creek	MSD presented a stream health workshop to the middle school students of Montessori School of Louisville on the Little Goose Creek near Springhurst. Students took water quality samples from two locations on Little Goose Creek to compare results, as well as evaluating MSD's more extensive data as part of their lesson.
November 12, 2018 & November 19, 2018	River to River Program	Partnering with the Louisville Water Company, MSD conducted a workshop for the Freshman of Holy Cross High School about the different aspects of water from wastewater to stormwater and flooding. This workshop consisted of a classroom demonstration day and a field day at the Floyds Fork Water Quality Treatment Center.

Table 5.1. Public Education Workshops and Activities

DATE(S)	EVENT	BENEFIT / RELEVANCE / IMPACT
February 23, 2019	MSD tunnel core samples featured at Engineer Days	MSD's Waterway Protection Tunnel Project Manager, Jacob Mathis, spoke with students from across the region about MSD's largest project in its history. He had a portable display with actual core samples from the project, and a view of the project out of the Science Center window.
March 1, 2019 – March 3, 2019	Home, Garden and Remodeling Show	MSD staffed a booth at the Home & Garden Show and communicated directly with the public on current issues facing MSD, discussed how the work MSD is doing impacts their lives, and how their dollars are being put to use to construct projects that improve the local environment.

5.2.1. RADIO AND TV ACTIVITIES

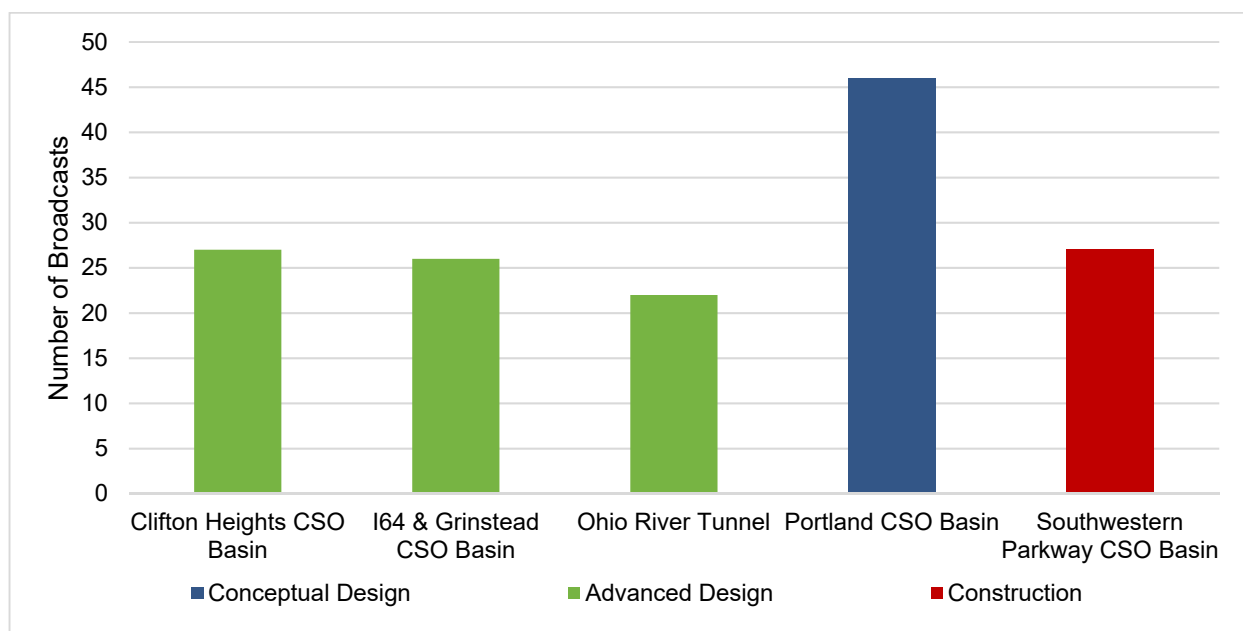
FY19 Program

- Coordinated with Metro TV (Channel 25) to air broadcasts of public input meetings as shown in Figure 5.1.

FY20 Program

- Continue to utilize various media outlets, including TV, radio and the newspaper, to serve as a conduit for disseminating information to the public.
- Continue coordination with Metro TV to show IOAP project public input meetings and special interest material.

Figure 5.1. Metro TV Broadcasts



5.2.2. PRINTED MEDIA ACTIVITIES

FY19 Program

- Purchased public service advertising messages in Business First and Louisville Magazine, provided in Appendix F.
- Provided printed copies of the StreamLine to 700 customers and staff each month. Posted the Streamline to Twitter and Facebook accounts. Project WIN related articles are contained in each issue of this newsletter. These publications are available on the MSD Website. Online versions of the StreamLine newsletter can be viewed at <http://www.msdlouky.org/aboutmsd/updatenews.htm>.

FY20 Program

- Continue to utilize various media outlets, including TV, radio and the newspaper, to serve as a conduit for disseminating information to the public.
- Continue to send the MSD Streamline to customers and staff each month.

5.2.3. PROJECT WIN AND GREEN WEBSITES

FY19 Program

- Continued to post Project WIN information on the website. On MSD's homepage, the Overflow Advisory Level indicator provides important information on the condition of area streams and shows a warning if overflows are likely to be happening or have happened in the past 48 hours. The Overflow Advisory Indicator includes a link to the Project WIN website, which includes a repository of public documents related to Project WIN, tips for customers to help control overflows through their personal actions, information about the history and background of Project WIN and a place to sign up for overflow advisory emails warning when significant precipitation has caused overflows in MSD's system. The Project WIN website can also be accessed by navigating through the Consent Decree link on MSD's homepage. This website can be found at www.msdpwin.org.
- Continued communication with customers via posts on MSD's social media platforms.

FY20 Program

- Continue to post Project WIN information on the website.
- Continue to post communication with customers via MSD's social media platforms.

5.3. PUBLIC OUTREACH PROGRAMS

MSD has developed a public outreach program aimed at involving the public on MSD's primary business functions with emphasis on wastewater, stormwater and flood protection. The following activities occurred within the current reporting period or are scheduled to occur in the coming fiscal year.

5.3.1. GREEN INFRASTRUCTURE WORKSHOPS AND ACTIVITIES

FY19 Program

Presented, attended, and/or facilitated meetings in Table 5.2 related to green infrastructure.

FY20 Program

- Schedule rain garden workshops at various times throughout the year.
- Continue planning for additional signage for green demonstration sites and green partnership locations.
- Continue planning of internal and external workshops explaining the Green Infrastructure Program, including the next Construction Field Day and classes on green infrastructure design, construction and inspection.

Table 5.2. Green Infrastructure Workshops and Activities

DATE(S)	EVENT	BENEFIT / RELEVANCE / IMPACT
August 3, 2018	Rain Garden Program at Louisville Nature Center	MSD staff gave a presentation that included hands-on activities intended to promote awareness of native plants and the ways that they can positively impact the environment and water quality.
March 1, 2019 – March 3, 2019	Home, Garden and Remodeling Show	MSD staffed a booth at the Home & Garden Show and communicated directly with the public on current issues facing MSD, discussed how the work MSD is doing impacts their lives, and how their dollars are being put to use to construct projects that improve the local environment.
May 15, 2019	Construction Field Day 2019	MSD planned and staffed the annual Field Day event where industry stakeholders are given an opportunity to interact directly with staff and ask questions about key projects and initiatives, such as major consent decree work and current MS4 issues.

5.3.2. CLEAN STREAMS WORKSHOPS AND ACTIVITIES

FY19 Program

Activities related to the current reporting period are detailed in Table 5.3.

FY20 Program

- Continue to facilitate stream cleanup events and workshops.
- Continue work with Beargrass Creek Alliance to mark catch basins in critical areas.

Table 5.3. Clean Streams Workshops & Activities

DATE(S)	EVENT	BENEFIT / RELEVANCE / IMPACT
April 13, 2019	Mayor's Give A Day Week of Service	MSD staff participated in a Mayor's Give a Day event to clean the West Broadway and Dixie Highway business corridors in association with the OneWest Special Improvement Initiative.
April 16, 2019	Mayor's Give A Day Week of Service	MSD staff performed trash pickup on city streets in downtown Louisville.

Table 5.3. Clean Streams Workshops & Activities

DATE(S)	EVENT	BENEFIT / RELEVANCE / IMPACT
April 19, 2019	Mayor's Give A Day Week of Service	MSD staff took part in the WaterStep Challenge collecting shoes to benefit the WaterStep organization.
June 15, 2019	Ohio River Sweep 2019	MSD Staff and community volunteers removed trash and debris near the Ohio River in several waterfront parks throughout Louisville Metro.
Throughout the Year	Beargrass Creek (BGC) Alliance	Assisted in marking catch basins in critical areas.

5.3.3. OUTREACH ACTIVITIES FOR STUDENTS

FY19 Program

Attended or presented at the student-centered events detailed in Table 5.4.

FY20 Program

- Continue to coordinate with Parklands of Floyds Fork on educational partnerships at the Floyds Fork WQTC, including field trips with The Parklands and Louisville Water Company at Floyds Fork WQTC.
- Continue to work with UofL to identify educational opportunities for college students.

Table 5.4. Outreach Activities for Students

DATE(S)	EVENT	BENEFIT / RELEVANCE / IMPACT
July 2, 2018	Stream assessment and water quality education at Montessori School of Louisville	MSD staff discussed stream health and water quality topics
August 14, 2018	MS4 Environmental Science/Rain Garden Class	MSD staff gave a presentation that included hands-on activities intended to promote awareness of native plants and the ways that they can positively impact the environment and water quality.
October 1, 2018 – October 2, 2018	Olmstead Academy North Field Trip	MSD staff provided a tour to school children. During the tour, wastewater treatment process were explained. The importance of MSD's treatment systems to stream health was highlighted, and a stormwater message was delivered following the plant tour.
October 5, 2018	Canoemobile	MSD staff discussed water quality topics with students, what impacts the CSS can have on receiving waterways, and how they can improve water quality through behavior change.
October 29, 2018	Stream health workshop on Little Goose Creek	MSD presented a stream health workshop to the middle school students of Montessori School of Louisville on the Little Goose Creek near Springhurst. Students took water quality samples from two locations on Little Goose Creek to compare results, as well as evaluating MSD's more extensive data as part of their lesson.
November 12, 2018	River to River Program (classroom)	Partnering with the Louisville Water Company, MSD conducted a workshop for freshman at Holy Cross High School about the different aspects of water from wastewater, drinking water, to stormwater and flooding.
November 19, 2018	Enviroscape demonstration at Whitefield Academy	MSD staff discussed stream health and water quality topics with a high school biology class.

Table 5.4. Outreach Activities for Students

DATE(S)	EVENT	BENEFIT / RELEVANCE / IMPACT
November 19, 2018	River to River Program (FFWQTC)	The day was broken down into several stops that included a partnership with Louisville Water. The MSD half of the field day comprised of lab work, a tour of the treatment plant, and a workshop on water quality sampling and watersheds.
January, 22, 2019	Rain Garden Course at Fern Creek High School	MSD staff gave a presentation intended to promote awareness of native plants and the ways that they can positively impact the environment and water quality.
January 24, 2019	Water quality course at PRP High School	MSD staff discussed the urban water cycle with students as part of the River to River curriculum.
February 1, 2019	Bellarmino University Tour of FFWQTC	MSD staff provided a tour to college students. During the tour, wastewater treatment process were explained. The importance of MSD's treatment systems to stream health was highlighted, and a stormwater message was delivered following the plant tour.
February 8, 2019	Bellarmino University Tour of FFWQTC	MSD staff provided a tour to college students. During the tour, wastewater treatment process were explained. The importance of MSD's treatment systems to stream health was highlighted, and a stormwater message was delivered following the plant tour.
February 11, 2019	Bellarmino University Introduction to Environmental Science Class	MSD staff discussed water quality related topics.
March 12, 2019	Bellarmino University Tour of FFWQTC	MSD staff provided a tour to college students. During the tour, wastewater treatment process were explained. The importance of MSD's treatment systems to stream health was highlighted, and a stormwater message was delivered following the plant tour.
March 18, 2019	Floyds Fork Field Trip	MSD staff provided a tour to school children. During the tour, wastewater treatment process were explained. The importance of MSD's treatment systems to stream health was highlighted, and a stormwater message was delivered following the plant tour.
March 21, 2019	Rain Garden Course @ Fern Creek High School	MSD staff talked to a class about rain gardens in preparation for class wide collaboration on designing and installing a rain garden at their school.
March 28, 2019	Floyds Fork Field Trip	MSD staff provided a tour to school children. During the tour, wastewater treatment process were explained. The importance of MSD's treatment systems to stream health was highlighted, and a stormwater message was delivered following the plant tour.
April 12, 2019	Fern Creek High School rain garden review of student proposals	MSD staff reviewed and commented on Fern Creek High School students rain garden proposals.
April 22, 2019	Atherton High School stream cleanup	MSD staff and Atherton High School volunteers performed trash removal along the banks of Beargrass Creek.
April 22, 2019	Fern Creek High School rainbow trout release	MSD staff assisted a science class at Fern Creek High School with a rainbow trout release into Floyds Fork.
April 23, 2019	Fern Creek High School rain garden planting event	MSD staff facilitated the installation of a rain garden at Fern Creek High School using students and staff as volunteers. During this event, the importance of rain gardens in preserving water quality was discussed, as well as MSD's role in protecting waterways.
May 7, 2019	Iroquois High School plumbing class	MSD staff provided a tour to school children. During the tour, wastewater treatment process were explained. The importance of MSD's treatment systems to stream health was highlighted.

5.3.4. IOAP PROJECT AND PROGRAM MEETINGS

MSD has developed a partnership with Louisville Metro for providing project information and soliciting feedback from stakeholders using a Structured Public Involvement approach. Structured Public Involvement is meant to facilitate relevant input on the design process as MSD prepares to design and construct CSO basins. Our current IOAP outreach activities and public meetings are using this process to elicit qualitative and quantitative information and enhance our engagement with customers. The Structured Public Involvement approach assures anonymity for each participant using transceivers to compile data which can then be correlated on a customer-specific basis. The plan for Structured Public Involvement includes implementing a four-meeting process that leads stakeholders through the project design stages as illustrated in Figure 5.2. Online surveys are also being made available to allow those not in attendance at public meetings to provide similar project-specific input. Creating this secondary online opportunity has been successful and generated responses that otherwise would not have been accounted for at the public meetings. Additional information regarding the Structured Public Involvement Process and meetings held during this reporting period may be found at the Project WIN Public Input Website (www.msdpowerwin.org/Public-Input.aspx).

FY19 Program

Facilitated the events detailed in Table 5.5.

FY20 Program

- Continue to facilitate and document IOAP Project Public Input Meetings.
- Continue to inform the Wet Weather Team on the progress of the IOAP implementation by hosting two Wet Weather Team meetings per year.
- Continue to provide information from the Wet Weather Team Stakeholders Group and IOAP Public Input meetings on the Project WIN website, at www.msdlouky.org/projectwin.

Figure 5.2. MSD’s Structured Public involvement Meeting Process

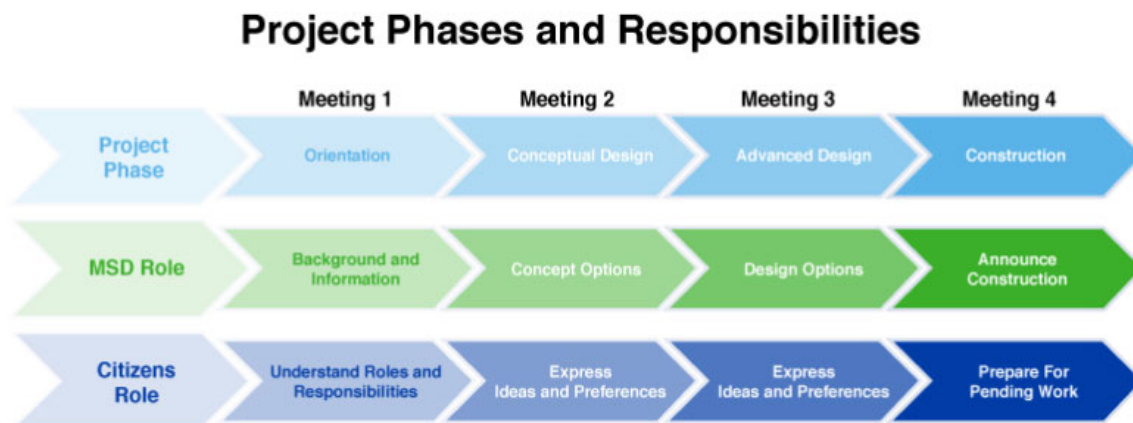


Table 5.5. IOAP Project & Program Meetings

DATE(S)	EVENT
July 10, 2018	Southwestern Parkway CSO Basin: Construction Meeting
August 28, 2018	Ohio River Tunnel: Construction Meeting
October 16, 2018	Southwestern Parkway CSO Basin: Construction Meeting
January 15, 2019	Southwestern Parkway CSO Basin: Construction Meeting
February 13, 2019	Lexington & Main: Construction Meeting
March 15, 2019	Central Relief Drain Overflow Mitigation: Construction Meeting

SECTION 6: CAPACITY MANAGEMENT OPERATIONS AND MAINTENANCE REPORT

6.1. CAPACITY MANAGEMENT OPERATIONS AND MAINTENANCE PROGRAM ACTIVITIES

Per Paragraph 24.c of the Amended Consent Decree, the CMOM Self-Assessment Report was submitted to the Environmental Protection Agency (EPA) and Kentucky Department of Environmental Protection (KDEP) on February 10, 2006. MSD received a letter of approval on August 22, 2006. The approved CMOM document can be viewed on the Project WIN website www.msdlouky.org/projectwin. Highlights of the CMOM program implementation during the reporting period are outlined below.

6.1.1. MANAGEMENT PROGRAMS

6.1.1.1. TABLE OF ORGANIZATION

This section describes MSD's Table of Organization. The goal of this section is to ensure each department works efficiently and cooperatively by clearly defining each department's role in the organization in terms of authority, function, position, duties, and relation to other departments. This section also identifies positions currently budgeted and filled.

M-A-1 Organizational Chart

The Louisville MSD Organizational Chart is updated every quarter. See Appendix G for the latest version.

M-A-2 Relationship to Other Departments

FY18 Program

- Carried 696 approved positions at the beginning of the reporting period and 713 approved positions at the end of the reporting period. This is an increase of 17 positions.
- Carried 64.5 vacant positions at the beginning of the reporting period and 73.5 vacant positions at the end of the reporting period.
- Utilized services of executive recruiter to find qualified candidates to fill specialty and senior/mid/upper management positions critical to the success of the ACD.

FY19 Program

- Continue to hire qualified staff to fill vacant positions, including specialty and senior/mid/upper management positions critical to the success of the ACD.

6.1.1.2. TRAINING PROGRAMS

This section describes MSD's Training Programs. The goal of this section is to ensure employee growth and workplace safety through mandatory training (both initial and ongoing), conference and seminar attendance,

certification, accurate record keeping of employee training, and incentives such as pay, promotions and ability to work. All training programs promote MSD's fundamental mission, goals, and policies.

M-B-1 Technical Training

M-B-2 Skills Training

M-B-3 Safety Training

FY19 Program

- Training for the reporting period is detailed in Figure 6.1 and Figure 6.2.
 - Conducted Administrative Training sessions including such topics as New Employee Orientation, Project Management, Leadership, Records Retention, Crew Management, Supplier Diversity Procurement Procedures, and Ethics.
 - Conducted Collections System training sessions including such topics as Sewer Overflow Response Protocol, Erosion Prevention & Sedimentation Control, Stormwater Pollution Prevention Plans (SWPPP) Training, Combined Sewer Overflow (CSO) & Siphon Preventative Maintenance, Sewer Cleaning, and Construction Blueprints.
 - Conducted Reporting training sessions including such topics as Crystal Reports, Telog, Budget Software and eB basics.
 - Conducted Equipment training primarily including heavy equipment that enables employees to maintain and operate the collections system, pump stations and treatment plants. Examples include training on mini-excavators, sewer cleaners, cranes, forklifts and backhoes.
 - Conducted Wastewater Operations training focusing on knowledge and skills related to wastewater treatment process and control, including sampling, Louisville Green Management System training, and Wastewater Lab Certification Preparation.
 - Conducted Safety training in such areas as Traffic Control, Hearing Protection, Confined Space Entry, Blood Borne Pathogens, Hazmat, Lock Out/Tag Out, and Competent Person training for trenching and excavation.

FY20 Program

- Increase access to digital training and resource materials for collection system and wastewater treatment employees.
- Continue development of enhanced Fleet mechanic training program.
- Continue to develop competent and capable employees through technical and skills training related to job duties.
- Continue to implement employee performance-based goals as part of annual appraisal process and utilize performance results to identify additional training needs.
- Hire Safety Trainer position under the Safety Department to track and deliver related safety topics that are required by MSD policy and other regulatory agencies.

- Develop processes to better link organizational goals to individual employee goals.
- Continue to train employees of MSD Standard Safety Procedures.

Figure 6.1. Training Programs - Sessions

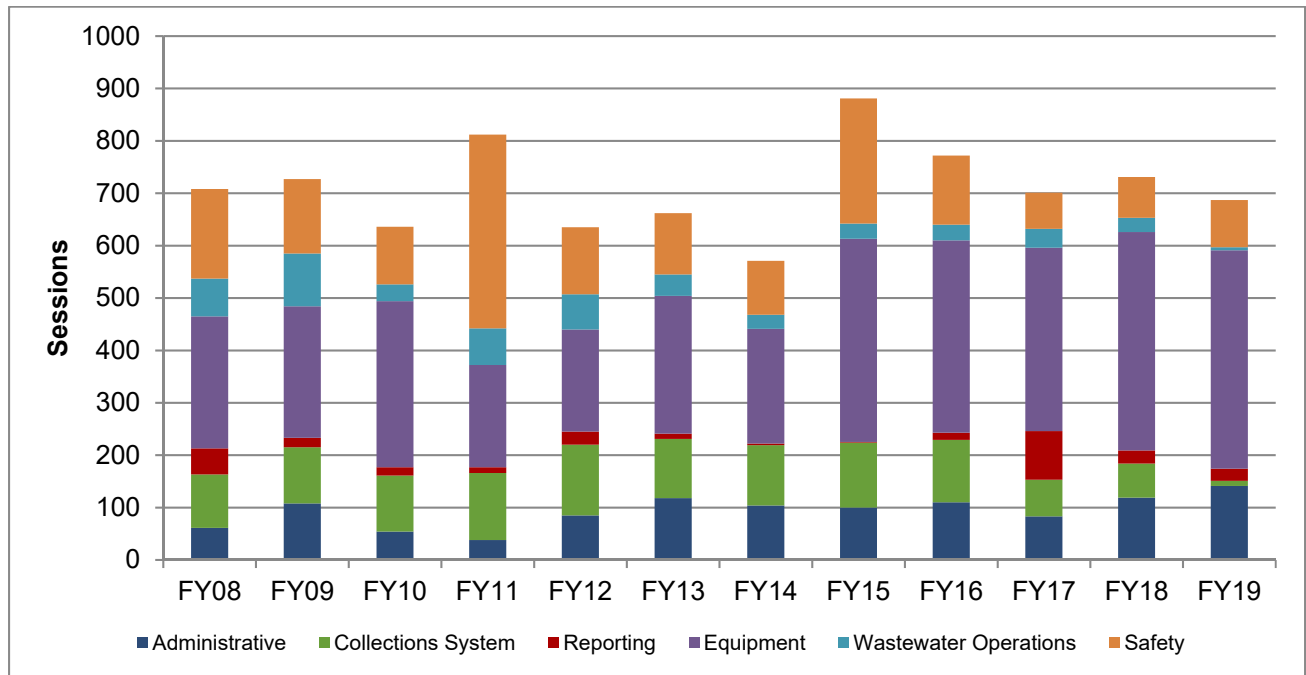
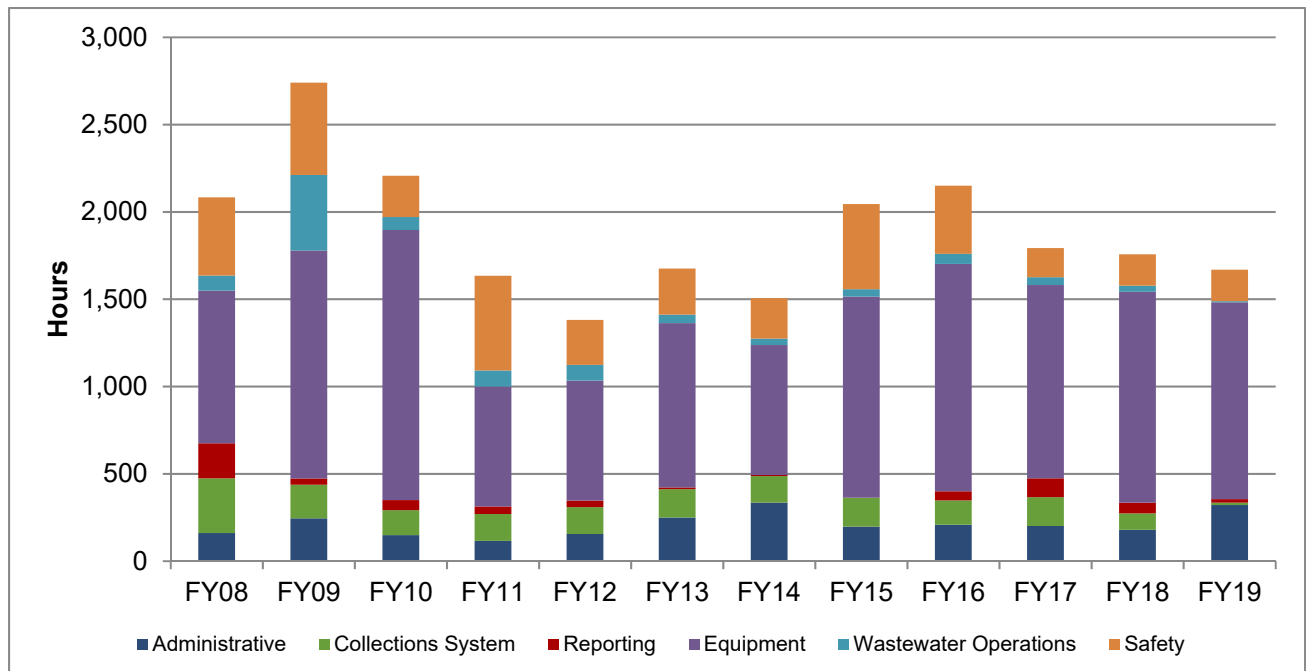


Figure 6.2. Training Programs - Hours



6.1.1.3. SAFETY PROGRAMS

This section describes MSD's Safety Programs. The goal of this section is to eliminate on-the-job injuries. MSD's Safety Programs include safety committees, confined space entry procedures, district wide safety policies, traffic management, lock out/tag out procedures, and proper use of safety equipment.

M-C-1 Safety Committee

FY19 Program

- Conducted quarterly meetings with the Safety Committee. This Committee includes representatives from across the Operations Division, including Treatment, Collections System, and Drainage and Flood Protection representatives.
- Performed random job site inspections on Drainage/Sanitary crews, and inspections at all MSD facilities.

FY20 Program

- Continue Safety Committee meetings to perform inspections and review policy and incidents. Address safety concerns presented by safety committee members.
- Continue to improve safety culture with quarterly meetings of the CMF Safety Committee, Treatment Safety Committee, Flood Protection Committee and Collections Safety Committee. Maintain a focus on safety culture that includes all personnel.
- Continue to perform random job site inspections on Drainage/Sanitary crews, inspections at Morris Forman WQTC, and quarterly inspections with Operations of WQTCs and flood & viaduct pump stations.

M-C-2 Confined Space Entry

FY19 Program

- Conducted training and monitoring procedures on confined space entries in order to maintain compliance with 29 CFR 1910.146. Health and Safety personnel has spot-checked confined space entries to determine compliance with company procedure.
- Maintained entry equipment and personal protective equipment to provide for safe entry conditions and to maintain compliance with 29 CFR 1910.146.
- Contracted with vendor to conduct annual inspections on confined space entry equipment such as tripods, wenchers, and harnesses.
- Continued to advise personnel on the purchase of multi-gas monitors to replace older models that will no longer be maintained or manufactured.
- Continued to assess confined space monitor calibration status and purchase calibration gas for the six calibration stations.
- Revised the calibration station software to remove chlorine and sulfur dioxide from the monthly calibration program, due to their removal from the operational processes at the treatment plants.
- Purchased new monitors in Collections to meet the existing needs of personnel.

FY20 Program

- Continue to administer training and monitor procedures on confined space entry in order to maintain compliance with 29 CFR 1910.146. Health and Safety personnel will spot-check confined space entries to determine compliance with company procedure.
- Continue to ensure that all “Permit Required Confined Spaces” are properly labeled in Operations.
- Continue to advise personnel on the purchase of multi-gas monitors to replace older models that will no longer be maintained or manufactured.
- Continue to assess confined space monitor calibration status and purchase calibration gas for the six calibration stations.

M-C-3 General Safety Procedures

FY19 Program

- Established various general safety procedures based on both 1910 & 1926 OSHA regulations, input from internal personnel, and on the specific needs of the district in order to maintain regulatory compliance and provide safe working procedures for employees.
- Conducted Emergency Response Team (ERT) fire drills and tornado drills at the Main Office, CMF and Morris Forman WQTC.
- Conducted 8-hour refresher training on hazardous materials for the ERTs.
- Conducted fire extinguisher training district-wide.
- Conducted annual audiograms district-wide.
- Hired a senior electrical engineer to manage arc flash studies at facilities to enhance compliance objectives based on NFPA 70E (Arc Flash).

FY20 Program

- Continue to conduct training with employees on the new OSHA Hazardous Communications Standard to include Globally Harmonized Systems for material safety data sheets and container labeling.
- Continue to assess the need to update existing procedures and/or create new procedures as conditions and regulatory requirements dictate.
- Continue to conduct 8-hour refresher training on hazardous materials for the ERTs and other required safety sensitive positions.
- Continue to conduct fire extinguisher training district-wide.
- Continue to conduct fire and tornado drills.
- Continue to conduct annual audiograms district-wide.
- Continue Monthly Safety Day Training as a refresher for safety topics.
- Schedule 40-hour HAZ-MAT Technician Level training for newly hired employees as needed based on hiring demands.

- Replace current Safety Data Sheets in the MSDS Pro database with updated safety data sheets compliant with the Globally Harmonized System (GHS) standard.
- Continue required safety orientations with contractors to ensure compliance with MSD & KYOSHA regulations and promote a strong safety culture.
- Continue to review and update the MSD Confined Space, Trenching, LOTO and Fall Protection Safety Programs.

M-C-4 Traffic Management

FY19 Program

- Purchased and maintained traffic control equipment to reduce hazardous operational exposure.
- Provided training on traffic control on all job sites and as employees are hired or as employee job duties require.

FY20 Program

- Continue traffic control training for employees to ensure continued compliance with MSD standards.
- Inspect and replace traffic control equipment regularly to ensure compliance with safety standards.
- Conduct traffic control audits of job sites in streets and roadways.

M-C-5 Lock Out/Tag Out

FY19 Program

- Enhanced lock out/tag out procedures as required by the OSHA Control of Hazardous Energy standard. Procedures are maintained and communicated to employees.
- Developed lock out/tag out procedures as equipment was added or replaced, or as processes were changed.
- Conducted an inspection of all treatment facilities to determine the number of machine specific procedures.

FY20 Program

- Continue to implement lock out/tag out, machine specific procedures as equipment is added or replaced, or as processes are changed.
- Work with staff at Morris Forman WQTC to train on new machine specific procedures. These SOPs will be available through Hansen (IPS) for improved accessibility.

M-C-6 Safety Equipment

FY19 Program

- Continued to review and provide required personal protective equipment to employees.

- Conducted NFPA 1852 required annual testing and maintenance for self-contained breathing apparatus respirators.

FY20 Program

- Maintain safety related equipment or replace the equipment per governing policies or as the need arises.
- Continue purchasing additional equipment for confined space, fall protection, trenching and Hazardous Materials.
- Explore options for more comfortable safety equipment to maintain employee adherence to safety policies and procedures.

M-C-7 Performance Measures

FY19 Program

- Maintained compliance with OSHA standards.
- Ensured that appropriate staff attended mandatory training on trench excavation safety, confined space, first aid, hazmat response and fire extinguisher usage.
- Safety / worker compensation metrics for MSD employees are detailed in Figure 6.3 and Table 6.1.

FY20 Program

- Maintain field inspections as discussed under M-C-1 Safety Committee to reduce the number of incidents.
- Continue to improve compliance with NFPA 70E and the GHS standard as discussed under M-C-3 General Safety Procedures.
- Continue to foster a strong culture of workplace safety.

Figure 6.3. Safety Performance Rate Trends

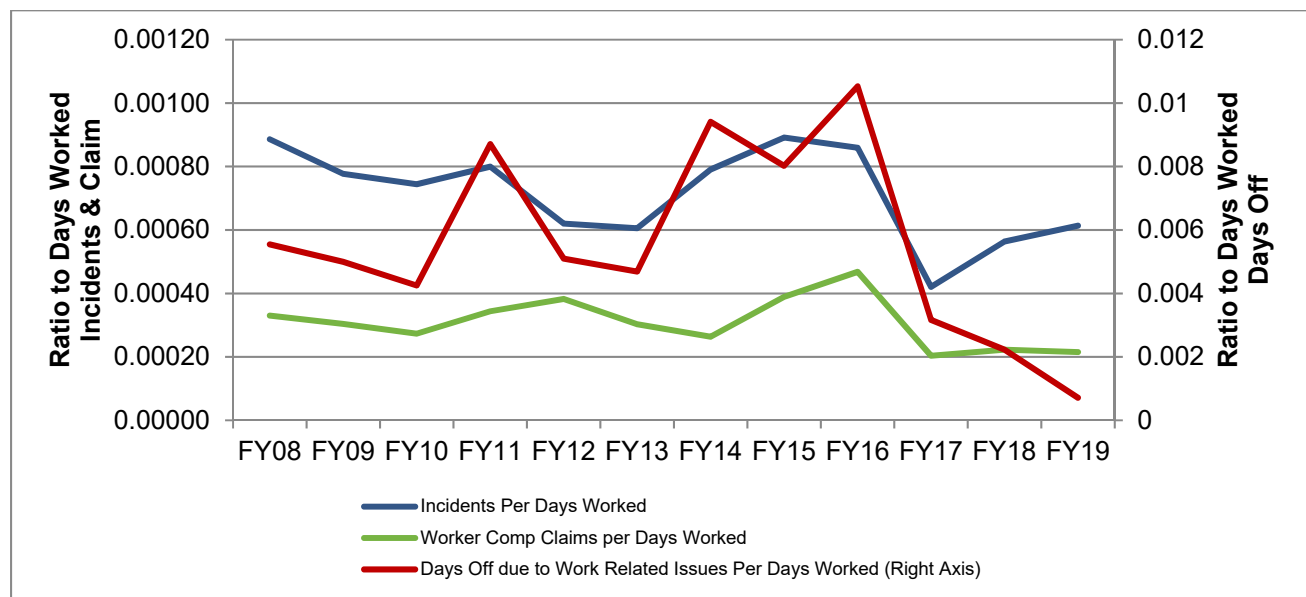


Table 6.1. Safety Incidents and Worker Compensation Claims

FY	DAYS WORKED (8 HOURS)	SAFETY INCIDENTS	OSHA RECORDABLE CLAIMS	DAYS OFF DUE TO WORK RELATED ISSUES
FY08	142,242	126	47	789
FY09	141,564	110	43	707
FY10	146,499	109	40	623
FY11	151,272	121	52	1317
FY12	151,605	94	58	773
FY13	145,302	88	44	681
FY14	144,178	114	38	1,357
FY15	141,353	126	55	1,134
FY16	143,113	123	67	1,507
FY17	152,175	64	31	482
FY18	152,616	86	34	340
FY19	153,226	94	33	109

6.1.1.4. UTILITY INFORMATION MANAGEMENT SYSTEMS

This section describes MSD's Utility Information Management System. The goal of this section is to produce quality information regarding sewer system performance. MSD's Utility Information Management System supports the following programs: management, operations, maintenance, complaint management, and performance indicators.

M-D 1 Management Information Management Systems

M-D-2 Operations Information Management Systems

M-D-3 Maintenance Information Management Systems

M-D-4 Complaint Management and Tracking Information Management Systems

M-D-5 Performance Indicators

FY19 Program

- Utilized a wide variety of software to operate the day to day business activities associated with wastewater collections, conveyance and treatments. The major Utility Information Management (UIM) applications are shown in Table 6.2.
- Continued enhancement of the Project WIN website with updated information related to the ACD. General site statistics are included in Table 6.3.
- Completed migration of all Oracle database systems to Linux virtual server environment.
- Completed Phase II of Datacenter move to P10 colocation site.

- Implemented enhanced network security features leveraging Identity Services Engine (ISE) framework.
- Upgraded the paging/safety communications systems at central maintenance facility.
- Continued design, deployment, testing LOJIC new ArcGIS Enterprise 10.6.1 architecture.
- Continued acquisition, compilation and processing of Spring 2019 aerial imagery, elevation data and base map updates.
- Expanded LOJIC Open Data Portal spatial data content.

FY20 Program

- Complete disaster recovery site technology refresh and relocation to colocation site in Tennessee.
- Upgrade paging/safety communications systems at Morris Forman wastewater treatment facility.
- Implement two-factor authentication for remote user access.
- Implement additional, redundant network access connections to Main Office and MSD's two data center colocation sites.
- Upgrade to IPS 11.1 (formerly Hansen) and migration to Infor cloud.
- Release upgrade of FASTER software.
- Perform Project WIN web site facelift.
- Convert enterprise class reporting to SSRS from Crystal Reporting.
- Complete eB upgrade and migration to Bentley cloud.
- Complete LOJIC deployment and testing of new ArcGIS Enterprise 10.6.1 architecture.
- Complete acquisition, compilation and publishing of Spring 2019 aerial imagery, elevation data and base map updates.
- Complete update and maintenance of countywide survey control network.
- Complete feasibility study and ROI for acquisition of UAV/drone technology.
- Complete acquisition, processing and analysis of thermal imagery to support MS4 Program needs.

Table 6.2. Utility Information Management (UIM) Applications

UTILITY INFORMATION MANAGEMENT (UIM) APPLICATIONS						
eB	OneRain	GIS	EGIS	FASTER	Crystal Reports	LIMS
SAP	IPS/Hansen	Telog	SCADA	SharePoint	Performance Measures	GPS

Table 6.3. Project WIN Site Statistics

METRIC	NUMBER OF VISITS:	AVERAGE NUMBER OF VISITS PER DAY:	AVERAGE VISIT DURATION (MINUTES):	UNIQUE VISITORS:	ONE-TIME VISITORS:	REPEAT VISITORS:	AVERAGE VISITS PER VISITOR:
FY11	139,919	383	31	38,371	28,822	9,549	3.65
FY12	89,753	380	20	31,387	23,115	8,272	2.85
FY13	93,326	256	6	12,714	7,224	7,749	2.52
FY14	109,689	301	10	31,155	16,855	14,270	3.52
FY15	149,677	408	15	38,649	25,416	13,233	3.93
FY16	155,790	428	8	40,029	25,960	14,069	3.71
FY17	156,546	427	8	47,172	33,741	13,431	3.38
FY18	114,808	312	22	26,200	17,308	8,932	4.38
FY19	133,166	168	16	30,458	19,942	10,515	4.37

6.1.1.5. ENGINEERING PROGRAMS

This section describes MSD's Engineering CMOM activities. The goal of this section is to maintain accurate plans of current sewer system infrastructure, oversee construction quality of new infrastructure, and conduct assessments to maximize the efficiency of current WQTCs. MSD's engineering programs include the following: collections and transmission system plans, system inventory, mapping, sewer system design, sewer construction, construction inspection, acquisition considerations, continuing sewer system assessment (CSSA), infrastructure rehabilitation, and a system capacity assurance plan (SCAP).

M-E-1 Collection and Transmission System Plans

M-E-2 System Inventory

M-E-3 Mapping

MSD has an extensive collection of record drawings of the sewer facilities dating back to 1874. In addition to the original record drawing, a scanned image is stored in eB, MSD's records management system. Plans are scanned twice during a project life cycle – once when the project is approved for construction and a second time when the plans are made "as-built" after construction completion. After a set of plans has been constructed, the facilities are created in GIS and the attributes of the facilities are stored in a corresponding asset record in the Hansen database. Map corrections are also obtained during asset inspection activities described in Appendix E.

FY19 Program

- Captured assets in the GIS and asset management software. Added 1,698 property service connection records and 25.3 miles of sewer assets.
- Corrected 42 sewer errata.
- Scanned 79 construction plan sets into the eB Imaging System.

FY20 Program

- Continue to scan plans and to add and update data in the GIS and asset management software based on new construction drawings and feedback from MSD field personnel.
- Update the GIS sewershed layer as projects are completed to support SCAP implementation.
- Continue routine audits and QA/QC methods to ensure data accuracy.

M-E-4 Sewer System DesignFY19 Program

- Continued to hold the Qualified Post-Construction Inspector (QPCI) training course, which includes a 4-hour training course and qualifying exam. All green infrastructure projects are required to submit an annual inspection by a QPCI to verify continued on-site stormwater management.
- Continued use of AutoCAD templates available on the MSD public webpage, including AutoCAD 3D templates, for use by private firms as well as in-house design.

FY20 Program

- Continue to review and update the MSD Design Manual.
- Gather additional data on GMP implementation and update design manual as needed.
- Continue to administer training on the green infrastructure review and inspection process.

M-E-5 Sewer Construction**M-E-6 Construction Inspection**FY19 Program

- Maintained the practice on significant capital projects to utilize the design engineer as the engineer of record or resident project representative (RPR).
- Continued reviews and revisions of the Construction Inspector Field Handbook.
- Continued utilization of contract inspectors due to workloads.

FY20 Program

- Continue construction inspection activities in-house and continue to supplement with contract inspection as needed.
- Continue acquisition of RPR services for significant capital projects.
- Continue review and updates of the Construction Inspector Field Handbook.

M-E-7 Acquisition ConsiderationsFY19 Program

- Financed capital expenditures of \$183,270,121.

- Committed professional services funds of \$11,790,546.
- Committed construction funds of \$54,361,665.
- Awarded construction contracts valued at \$98,450,177.

FY20 Program

- Budget for capital expenditures up to \$205,000,000.
- Monitor expenditures related to professional services and construction.

M-E-8 Continuing Sewer System Assessment

Refer to Appendix E for details on the CSSA activities for the reporting period.

M-E-9 Infrastructure Rehabilitation

Refer to Section 4: Program Activities for Discharge Abatement Plans for more details on infrastructure rehabilitation projects identified in the IOAP. Refer to Appendix E for an update on all rehabilitation projects completed during the reporting period and planned for the next reporting period in accordance with CSSA.

M-E-10 System Capacity Assurance Program

FY19 Program

- Continued to collect formula-based defect inspection of significant footage of sewer lines in various sewer-sheds across the county. This information is being used to prioritize cleaning and rehabilitation efforts that will remove inflow and infiltration from the system and create capacity credits. Refer to Appendix E for a progress update.
- Tracked pump station capacities, reviewed drawdown testing results and identified action items pertaining to deficiencies. Critical results of this effort are being documented on each asset within the Hansen system.
- Reviewed wastewater capacity requests from private development as shown in Table 6.4.
- Continued to work on the procedures for documentation of rehabilitation and the calculation of SCAP results.
- Submitted credit catchment ledgers to the Kentucky Division of Water (KDOW) and EPA as part of quarterly reports.

Table 6.4. SCAP Wastewater Capacity Request Review

FY	APPROVED		CONDITIONALLY APPROVED		DENIED	
	REVIEWS	FLOW	REVIEWS	FLOW	REVIEWS	FLOW
FY08	166	2,797,875	125	2,487,086	23	548,824
FY09	42	454,096	127	1,952,407	3	94,000
FY10	75	486,126	136	1,245,485	5	23,214
FY11	115	181,453	114	1,625,814	5	67,600
FY12	98	961,603	142	2,083,331	12	72,822
FY13	110	604,913	192	2,079,150	8	185,100
FY14	126	1,363,346	241	2,384,317	11	80,700
FY15	105	503,940	192	2,020,940	7	47,020
FY16	124	720,764	215	3,327,684	3	13,450
FY17	92	381,426	228	3,522,927	0	0
FY18	86	267,265	178	3,228,275	1	400
FY19	104	482,573	210	4,800,913	4	13,100

FY20 Program

- Continue to perform formula-based inspection of sewer lines in various sewer-sheds across the county. Refer to Appendix E for an update on the areas selected for inspection.
- Continue tracking pump station capacities through testing, investigation and capacity evaluations.
- Update WQTC capacities and track new development flows.
- Generate inflow and infiltration reduction projects and calculate related capacity credits.
- Continue to enhance credit calculation protocols and tracking in Hansen.
- Continue to enhance the procedures for documentation of rehabilitation and the calculation of SCAP credits.
- Update SCAP areas based on pump station elimination projects that have been completed.

6.1.1.6. SANITARY SEWER OVERFLOW REPORTING AND NOTIFICATION PROGRAM

This section describes MSD's SSO Reporting and Notification Program. The goal of this section is to maintain accurate, up to date records of SSOs and to ensure proper, timely notification of the agencies and organizations through un-permitted discharge reporting, SSO notification and tracking.

M-F-1 Unauthorized Discharge Reporting

Refer to Section 1: Project WIN Performance Overview for detailed information.

M-F-2 Sanitary Sewer Overflow Notification

M-F-3 Tracking Sanitary Sewer Overflows

Refer to Section 3: Program Activities for Sewer Overflow Response Protocol for detailed information.

6.1.1.7. FINANCING AND COST ANALYSIS PROGRAM

This section describes MSD's Financing and Cost Analysis Program. The goal of this section is to provide a detailed cost analysis for both the capital and operational costs of MSD for use in future budgeting and decision making.

M-G-1 Operations Cost

M-G-2 Maintenance Cost

M-G-3 Capital Improvement Funding

M-G-4 Management Programs Cost

M-G-5 Life Cycle Cost

M-G-6 Budget and Customer Rate Setting

FY19 Program

Details of the previous reporting period's program are included in Table 6.5. Capitalized budget performance is shown in Figure 6.4. Reported amounts for the program are unaudited financial results.

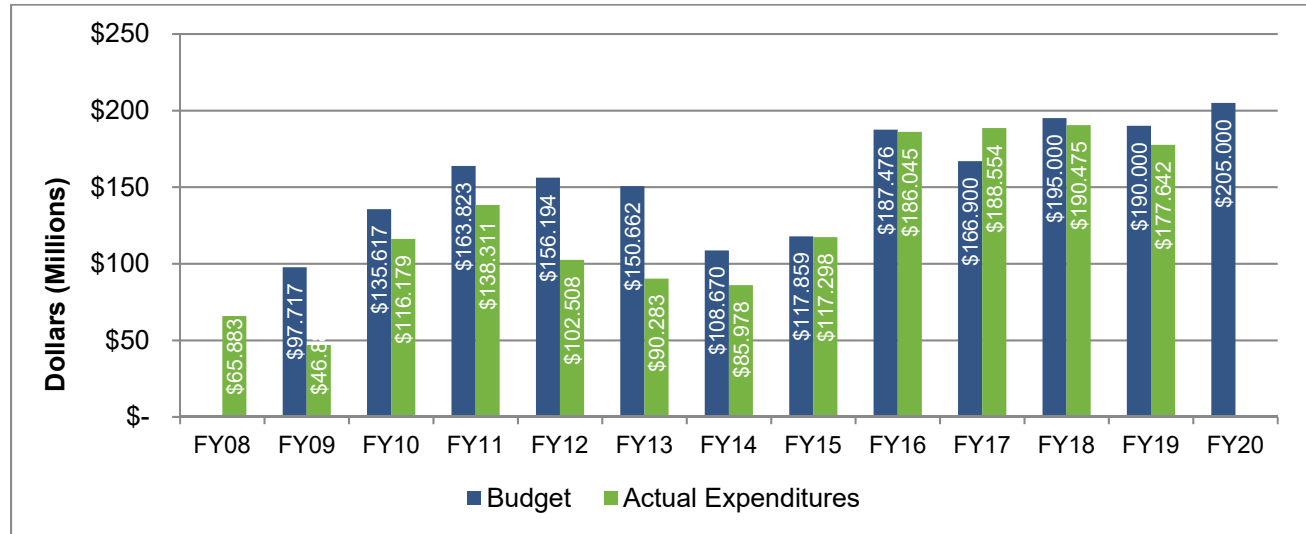
FY20 Program

- Set the operating budget at \$144,894,334 and the capital budget at \$205,000,000.
- Issue Commercial Paper to provide interim financing for the capital program.

Table 6.5. Fiscal Year Financing and Cost Analysis Program Details

METRIC	BUDGET	ACTUAL
Operating Revenue Growth	5.6%	5.5%
Operating Revenue	\$295,765,000	\$249,368,000
Wastewater / Stormwater Revenue	\$291,765,000	\$289,173,000
Investment Income	\$14,286,000	\$18,692,000
Debt Service Coverage Ratio	186.0%	181.0%
Total Operating Expenses	\$178,842,000	\$191,581,000
Total Capital Expenses	\$190,000,000	\$177,642,000

Figure 6.4. MSD Capitalized Budget Performance



6.1.1.8. EQUIPMENT AND TOOLS MANAGEMENT AND MAINTENANCE PROGRAM

This section describes MSD's Equipment and Tools Management Programs. The goal of this section is to facilitate efficient repair and support of MSD's sewer systems through an accurate spare parts inventory, a timely equipment maintenance schedule, vehicle repair, and needed tools and supplies.

M-H-1 Spare Parts Inventory Management

M-H-4 Supplies Management

FY19 Program

- Improved storeroom receiving process by recording tracking control numbers (TCNs) instead of PO numbers, and notifying receivers by email instead of phone. Improved documentation has streamlined the receiving, tracking, and delivery processes.
- Continued weekly meetings with departments for improved customer service, inventory management of critical spare parts, reorganization of new storeroom locations, and PPE/safety upgrades.
- Provided Excel refresher course training to storeroom team members for improvements with cycle counting and report design.
- Acquired spare parts for Morris Forman WQTC storeroom from ongoing equipment replacement projects.
- Continued asset management process to replace identified spare parts from Morris Forman WQTC flood event.
- Reviewed current SOPs to verify compatibility with current organizational direction. Updated SOPs for quality improvements and determined best practices to improve operations through continuous training of Storeroom applications.
- Continued improvements with recycling program.

- Improved cross training of all storeroom team and established goals to learn new inventory management processes.
- Began process to revamp the Material Master Form to ensure customer comprehension and accuracy.
- Began to implement plan to reorganize CMF North Warehouse.
- Continued Bar-Code Scanning initiatives for inventory control.

FY20 Program

- Resubmit selected Material Master Forms for reprocessing to reconcile vendor's Unit of Measure with storeroom's Unit of Issue, in order to improve inventory and ordering processes.
- Upgrade security of Cedar Creek Storeroom with camera surveillance.
- Continue improvements to Material Master Form.
- Continue to implement plan to reorganize CMF North Warehouse.
- Continue to update SOPs for quality improvements and determine best practices to improve operations, utilizing "Back to Basics" guidelines.
- Complete Bar-Code Scanning initiatives for inventory control.
- Update inventory descriptions and relocate like parts.
- Continue cycle counts after each morning rush and before system processing.
- Implement storeroom follow-up program to ensure accountability of vendors and visibility of incoming assets.
- Continue "Back to Basics" training for goal setting and incorporate focus commodities for team members.

M-H-2 Equipment and Tools Repair Management

FY19 Program

- Reconciled Morris Forman WQTC's Gas Cylinder Cage; assessed inventory of expired and currently used gas cylinders.
- Removed all expired and unused assets from account; contributing to cost savings.
- Revamped cage to be in compliance with safety regulations; separating flammable and combustible gases 25ft from one another.
- Ordered new reflective hazard/warning notification signage that will withstand inclement weather.
- Increased security measures by relocking and securing broken cage; stopping non MSD personnel from accessing cage and swapping (our serialized tanks) with their tanks; helping Maintenance keep their account current.
- Upgrading UPS account for shipping parts from a booklet to electronic.
- Attended regular safety inspections and meetings, and supported safety standards as part of participation in CMF and Morris Forman Safety Committees.

- Trained all employees in advanced safety of material handling and storeroom functionality.
- Continued annual audit of SOPs for tooling inspections and implement improved security measures for cost savings initiatives and asset management.
- Collaborated with Safety to review and update safety equipment and inspection controls (Arc Flash Personal Protective Equipment [PPE], safety harness inspections, eyewash stations, ladders, safety PPE, and fire extinguishers).

FY20 Program

- Continue participation on CMF and Morris Forman WQTC Safety Committees by attending regular safety inspections, safety meetings, and supporting safety standards.
- Continue training on safety related storeroom processes and inventory for all employees.
- Continue annual audit of SOP for tooling inspections and implement improved security measures for cost savings initiatives and asset management that aligned with departmental goals when necessary.
- Implement policies to include Safety/ Security in the reporting of lost/stolen tools, and in screening products prior to purchase (ladders, hoists).
- Implement improved documentation policies on replacement of lost/stolen or broken tools, or return of tools due to termination/transfers of personnel.

M-H-3 Vehicle Repair

MSD's vehicle repair maintenance program addresses over 600 pieces of rolling stock, including automobiles, trucks, trailers, construction equipment (backhoes, mobile cranes, etc.) and specialty sewer maintenance equipment. Quarterly and annual summary reports specifically address maintenance issues related to the grouping of Mission Critical Equipment (MCEs) that were identified as being essential to meeting Amended Consent Decree commitments related to NMC and CMOM activities. The four equipment types and respective turnaround times as related to goal are in Table 6.6, and shown with overall fleet turnaround in Figure 6.6 and Figure 6.7. In FY19, MCE metrics include measures for shop turnaround time to include the percentage of units returned to service within 24 hours (goal of 80%) and within 48 hours (goal of 90%).

FY19 Program

- Metrics – Monitored and reported availability and turnaround time of MCE targeting each equipment type's overall average goals.
- Fleet Management Information System - Monitored equipment and work order data using FASTER System reports to analyze and target areas where improvement is needed and to plan future replacements.
- Preventive Maintenance – Monitored preventive maintenance (PM) schedules to ensure they remain within industry standards, specifically addressing the operating environment of all MCE increasing the frequency of PM performed to improve availability to the operating division.
- Procurement
 - Analyzed FY19 capital purchasing needs, including the evaluation of MCE for replacement.

- Completed the following activities related to the Heavy Duty Vacuum Sewer / Catch Basin Cleaner Trucks:
 - Prepared specifications for, bid and awarded contract to purchase two new Heavy Duty Vacuum Sewer / Catch Basin Cleaner Trucks. Units were received and placed in service on August 19, 2019.
- Completed the following activities related to Flusher/Jetter Truck:
 - Prepared specifications for, bid and awarded contract to purchase one new Jetter/Flusher Truck. Unit is scheduled for delivery in September 2019.
- Completed the following activities related to Catch Basin Cleaners (mechanical clamshell type):
 - Received the new unit and placed in service on February 6, 2019.
- Completed the following activities related to Tele-Inspection Vehicles:
 - Received three new units and placed in service in October and November 2018. Two additional units are on order to replace existing units with estimated delivery in December 2019.
- One Water Fleet Services Initiative - Continued efforts associated with One Water Initiative with LWC to capitalize on fleet services opportunities to realize cost savings while better serving our customers and increasing levels of service to the community.
 - Remain in conversations with both MSD and LWC union leadership regarding opportunities to capitalize on shared resources.

FY20 Program

- Metrics - Continue monitoring and reporting availability and turnaround time of MCE targeting each equipment type's overall average goals.
- Fleet Management Information System - Continue monitoring equipment and work order data using FASTER System reports to analyze and target areas where improvement is needed and to plan future replacements.
- Preventive Maintenance – Continue monitoring preventive maintenance (PM) schedules to ensure they remain within industry standards, specifically addressing the operating environment of all MCE increasing the frequency of PM performed to improve availability to the Operations Division.
- Procurement
 - Analyze FY20 capital purchasing needs, including the evaluation of all MCE for replacement.
 - Complete the following activities related to multiple configurations of Combination Vacuum Sewer/Catch Basin Cleaner Trucks:
 - Using existing contract, procure and place in service one new unit to replace aging equipment and improve availability.
 - Coordinate operator and fleet technician training on new units after receipt.
 - Complete the following activities related to Catch Basin Cleaners (mechanical clamshell type):

- Using existing contract, procure and place in service two new units to replace aging equipment and improve availability.
- Coordinate operator and fleet technician training on new units after receipt.
- One Water Fleet Services Initiative - Continue to explore One Water Initiatives with LWC to capitalize on fleet services opportunities to realize cost savings while better serving our customers and increasing levels of service to the community.

Table 6.6. Mission Critical Equipment Availability and Turnaround Time

EQUIPMENT TYPE	QUANTITY	AVAILABILITY		24 HOUR TURNAROUND TIME		48 HOUR TURNAROUND TIME	
		GOAL	ATTAINMENT	GOAL	ATTAINMENT	GOAL	ATTAINMENT
Catch Basin Cleaners (mechanical clamshell type)	5	80%	85.6%	80%	81.9%	90%	86.1%
High-Pressure Sewer Flusher/Jetter Trucks	5	80%	77.8%	80%	87.1%	90%	90.1%
Tele-Inspection Vehicles	7	80%	94.6%	80%	91.1%	90%	97.9%
Vacuum Sewer / Catch Basin Cleaner Trucks	10	80%	83.2%	80%	92.8%	90%	97.3%

Figure 6.5. Availability for MCE and Fleet Equipment

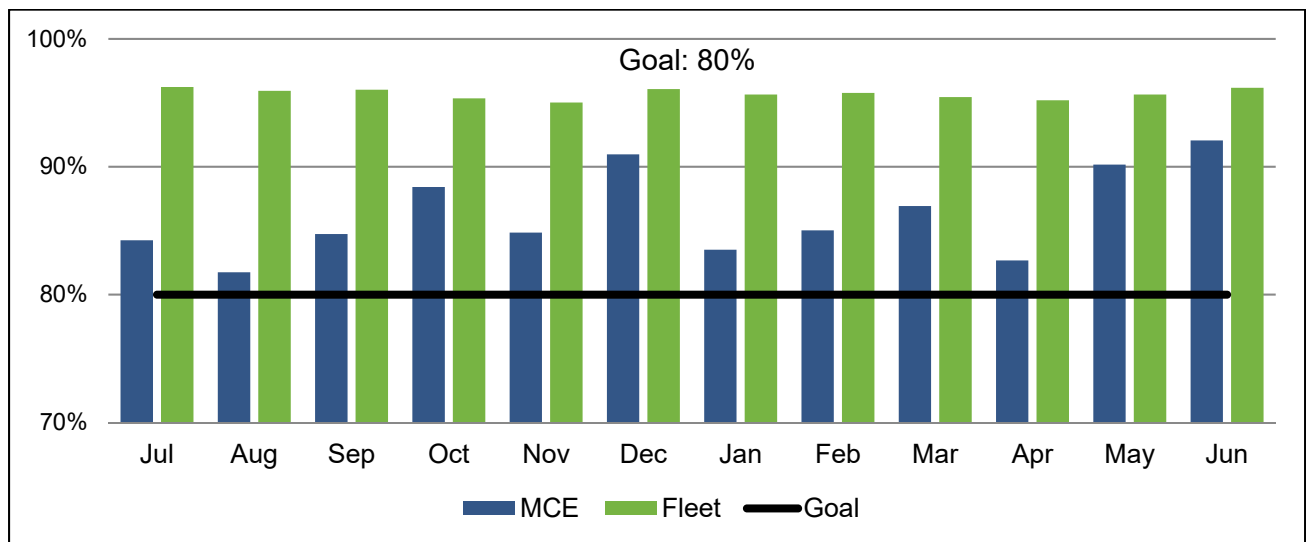


Figure 6.6. 24-Hour Turnaround for MCE and Fleet Equipment

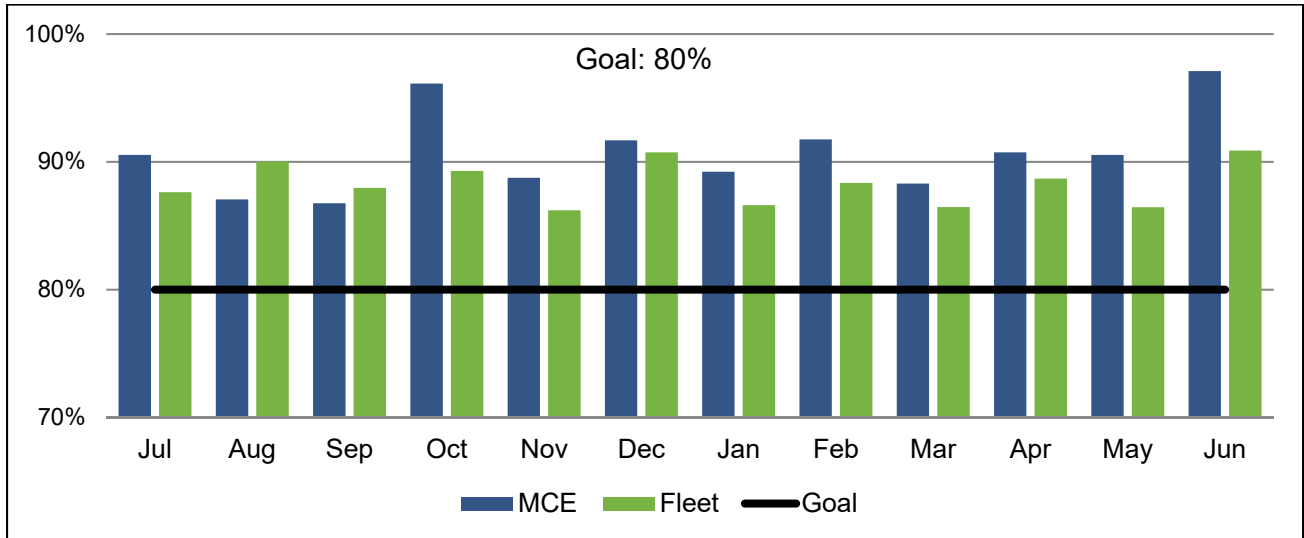
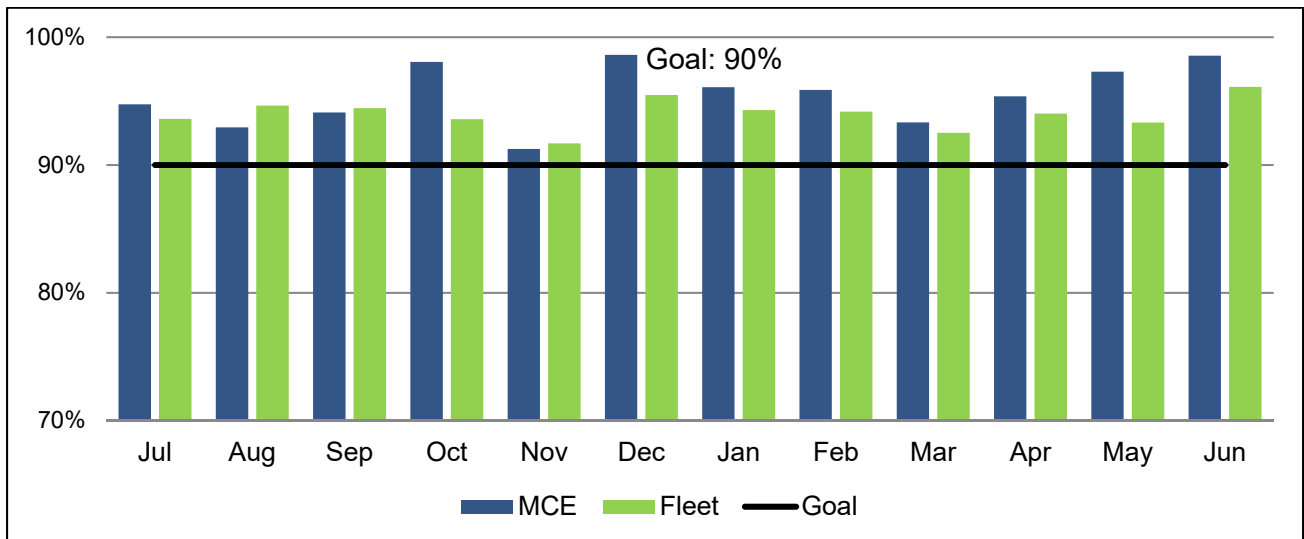


Figure 6.7. 48-Hour Turnaround for MCE and Fleet Equipment



6.1.1.9. CUSTOMER SERVICE PROGRAMS

This section describes MSD's Customer Service Programs. The goal of this section is to strengthen and maintain a healthy relationship between MSD and the public through service programs which include complaint management, public information and public education.

M-I-1 Customer Service

M-I-2 Public Information

M-I-3 Public Education

FY19 Program

- Mailed out 1,559 Project WIN and Plumbing Modification Program packets of information or applications.
- Received 49,025 calls during FY19 as shown in Figure 6.8 includes calls answered by MSD on behalf of Louisville Metro through FY14.
- Continued effort to reduce the percentage of abandoned calls below target level as shown in Figure 6.9. Annual rate dropped steeply from FY17 and remained on target for FY19 despite challenges in staffing and programmatic changes.

FY20 Program

- Continue efforts to keep the number of abandoned calls below target level.
- Fill vacant Customer Relations positions and better serve customer needs.

Figure 6.8. Total Calls Received

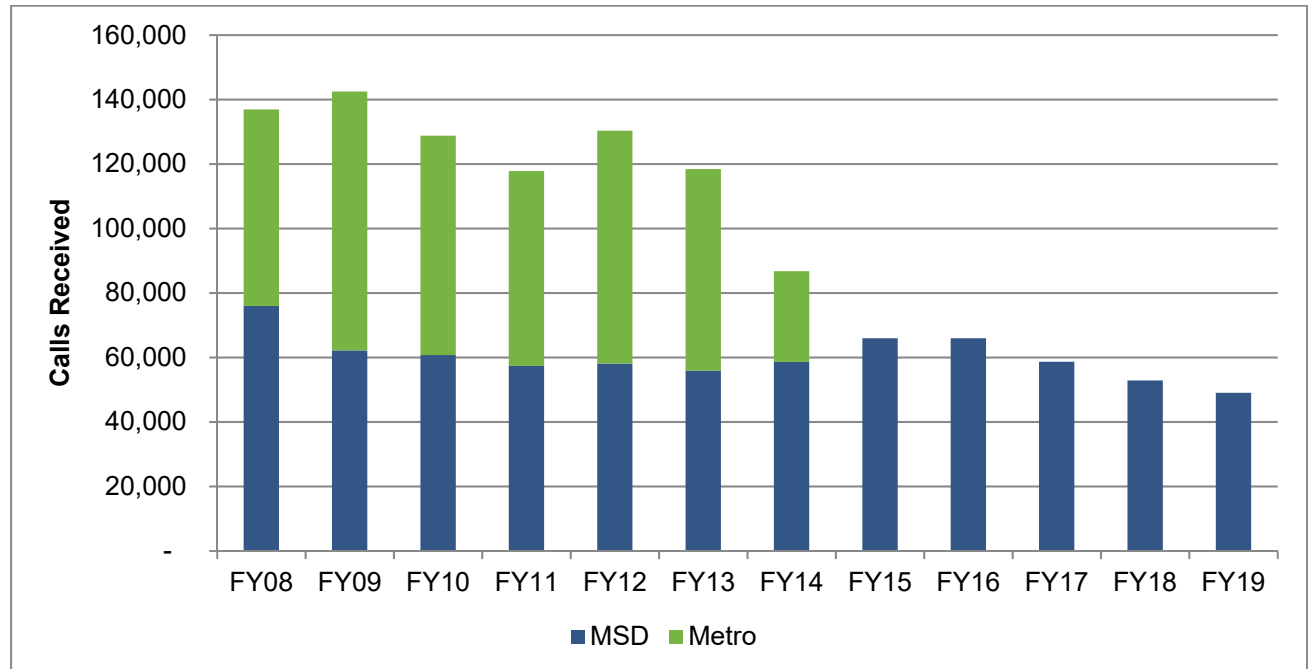
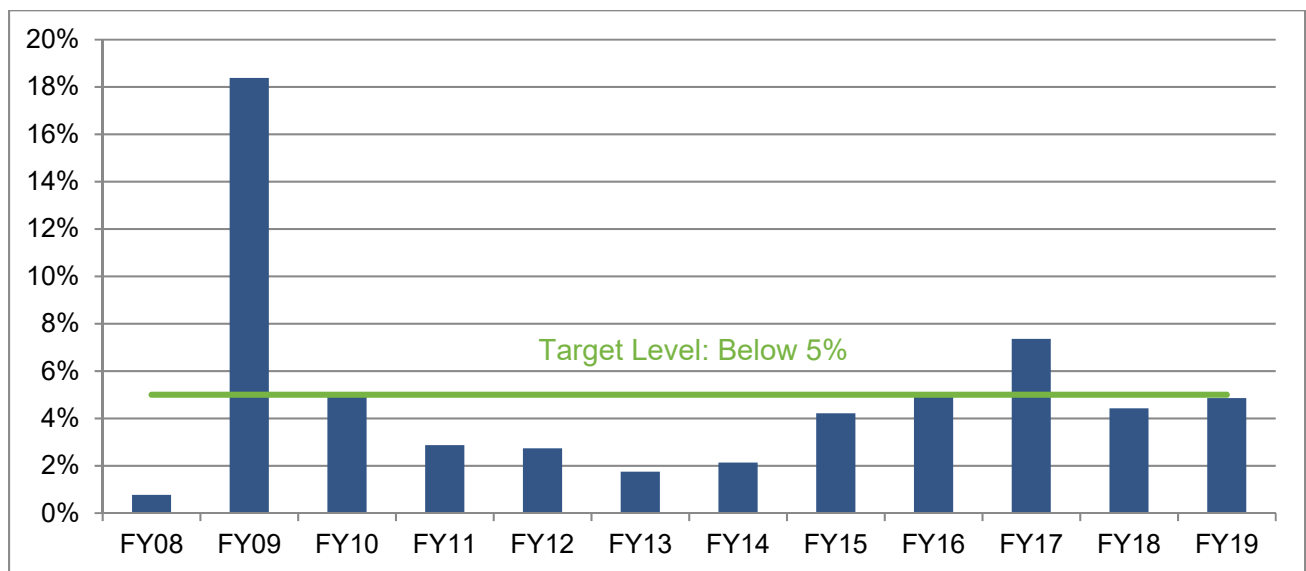


Table 6.7. Customer Service Call Data

MONTH	MSD CALLS RECEIVED	MSD CALLS ABANDONED	ABANDONED CALL RATE
July	4,200	278	7%
August	4,492	253	6%
September	5,368	259	5%
October	3,987	133	3%
November	3,233	101	3%
December	3,075	151	5%
January	3,603	137	4%
February	4,240	152	4%
March	3,901	176	5%
April	4,578	241	5%
May	4,392	300	7%
June	3,956	199	5%
TOTAL	49,025	2,380	5%

Figure 6.9. Abandoned Call Rate



6.1.1.10. LEGAL SUPPORT PROGRAMS

The following support programs are included in this section: inter-jurisdictional agreement, ordinances, pretreatment legal support, grease control legal support, service laterals legal support, septic tank haulers legal support, and “Call Before You Dig” legal support.

M-J-1 Inter-Jurisdictional Agreement**M-J-2 Ordinances****M-J-3 Pretreatment****M-J-4 Grease Control****M-J-5 Service Laterals****M-J-6 Septic Tank Haulers Legal Support****M-J-7 “Call Before You Dig”****FY19 Program**

- Over the past fiscal year, the MSD legal department has provided a variety of legal services designed to support MSD in its efforts to implement programs to abate sanitary sewer overflows as required by the Amended Consent Decree. The services most directly related to this effort include:
- Participated in and/or provided legal advice and other functions pertaining to the procurement of construction and professional service contractors to provide services and/or perform work in furtherance of IOAP related projects.
- Participated in the acquisition of properties and/or property interests (easements and/or fee simple ownership) critical to the completion of IOAP related sewer construction projects. The department's participation has included assisting in the negotiation and structuring of purchase and sale agreements, drafting acquisition related documents, drafting easements, title research, and performing or providing oversight of the closing of acquisition transactions, as well as initiating legal proceedings to acquire property through eminent domain.
- Provided support and assistance to the Development & Stormwater Services Administration department in the negotiation and preparation of green infrastructure and long term maintenance agreements.
- Provided support, assistance and counsel to regulatory programs and enforcement actions brought under the Wastewater Stormwater Discharge Regulations, Hazardous Materials Ordinance, and Erosion Prevention and Sediment Control Ordinance.

FY20 Program

Continue to provide legal services to support MSD.

6.1.1.11. WATER QUALITY MONITORING PROGRAMS

This section describes MSD's Water Quality Monitoring Program. The goal of this section is to maintain an accurate, consistent record of water quality in receiving bodies of water. Monitoring results are used to determine the effect of effluent discharge and/or spills through the following monitoring programs: routine water quality, investigative water quality, and water quality monitoring for spill impact. Water Quality monitoring data is also assessed and provided in the Water Quality Synthesis Report.

M-K-1 Routine Water Quality Monitoring Programs

M-K-2 Investigative Water Quality Monitoring

M-K-3 Water Quality Monitoring for Spill Impact

MSD has aggressively pursued a watershed management approach that relies heavily on an established water quality monitoring program. The program has an extensive in-stream monitoring effort for tributary streams and for emergency spill responses, including:

- Ambient monitoring at 28 Long Term Monitoring Network (LTMN) locations across Jefferson County to monitor multiple physical and biological indicator parameters in accordance with the MS4 permit.
 - Continuous monitoring for pH, conductivity, temperature, dissolved oxygen, and stream flow are currently collected at 25 of the 28 ambient locations.
 - Biological sampling and/or evaluation for algae, fish, habitat, and benthic macroinvertebrates are currently conducted every two years at 27 of the 28 ambient locations.
 - Quarterly sampling for Total Suspended Solids (TSS), E. coli, total nitrogen, oil and grease, copper, and pH is currently conducted on a quarterly basis at 27 of the 28 ambient locations.
 - Recreational contact monitoring is conducted seasonally from May through October is currently conducted at 27 of the 28 ambient monitoring sites for E. coli.
 - Wet weather monitoring is conducted over the course of the MS4 permit term for three storm events at 27 of the 28 ambient locations and an additional 15 locations.
- Combined Sewer Overflows (CSOs)/Significant Industrial Users (SIUs) point sampling monitors the risk of water quality impairment to discharges associated with SIUs and General Discharge Permits through the NMC No. 3 Pretreatment Program.
- CSO flow monitoring measures flow within the combined sewer system to provide improved data input into water quality models.

Additional information on these programs is provided in Section 4.5.

6.1.1.12. CONTINGENCY PLAN FOR SEWER AND TREATMENT PLANT

This section describes MSD's Contingency Plan for the wastewater collection and treatment system. The goal of this section is to provide a protocol for emergency response and notification. The following elements are included in this section: contingency planning process, response flow diagram, public notification plan, agency notification plan, emergency flow control plan, emergency operations and maintenance plan, preparedness training program, water quality monitoring plan, and Sewer Overflow Response Protocol (SORP). The SORP requires training for all MSD employees.

M-L-1 Contingency Planning Process

M-L-2 Response Flow Diagram

FY19 Program

- Continued collaboration with the National Weather Service, USGS, and Louisville Metro Emergency Management Agency (EMA) to develop a pilot project to install flow and level monitors at a site for early warning of significant weather events. Significant changes in both meters would trigger a notification at MSD and EMA.
- Continued efforts to improve disaster response protocols. Improved draft matrix for internal training modules to be implemented, including training on first aid, CPR, bloodborne pathogens, and the National Incident Management System's Incident Management System and National Response Framework.
- Practiced annual Floodwall Closure Installations.
- Revised the Comprehensive Nature Disaster and Business Continuity Plan, including development of several key documents and organizational structure of the comprehensive plan.

FY20 Program

- Developing Critical Asset Risk Management tool to perform risk and resiliency assessment for all hazards including natural, technology/accidental, human-caused/adversarial, and decaying of infrastructure.
- Continue work with the National Weather Service regarding monitors for early warning of significant weather events.
- Continue revision of Comprehensive Nature Disaster and Business Continuity Plan using the critical path.
- Continue to work with other agencies to develop Catastrophic Urban Flood Plan.
- Continue to practice annual Floodwall Closure Installations.
- Add redundant communication paths to provide improved network resiliency for key sites.

M-L-3 Public Notification Plan

M-L-4 Agency Notification Plan

Refer to Section 3: Program Activities for Sewer Overflow Response Protocol.

M-L-5 Emergency Flow Control Plan

M-L-6 Emergency Operations and Maintenance Plan

Strategy 5 of MSD's Strategic Business Plan requires that MSD "develop a comprehensive disaster response and business continuity plan for disasters that impact our ability to serve our customers and the community". As part of this effort, a diverse team from across MSD has been working to complete the initiatives of this plan.

FY19 Program

- Finalized comprehensive risk and vulnerability assessment of MSD operations and infrastructure assets, using industry best practices.
- Finalized elements and metrics of EUM related to Operational Resiliency.

FY20 Program

- Continue development of catastrophic urban flood plan in conjunction with the Department of Homeland Security, US Army Corps of Engineers, Kentucky Emergency Management, Louisville Emergency Management Agency and other partners. MSD will transition from the data gathering stage of the Regional Resiliency Assessment Program to the implementation phase.
- Develop operational emergency response SOPs from the comprehensive risk and vulnerability assessment of MSD operations and infrastructure assets, using industry best practices, and begin training.
- Continue to develop and expand each element of EUM related to Operational Resiliency.

M-L-7 Preparedness Training

Refer to Section 6.1.1.2 for details on training for emergency response procedures.

M-L-8 Water Quality Monitoring Plan

Refer to Sections 4.5 and 6.1.1.11 for more details on the MSD Water Quality Monitoring Plan.

M-L-9 Sewer Overflow Response Protocol

Refer to Section 3: Program Activities for Sewer Overflow Response Protocol for more details on the SORP.

6.1.2. OPERATIONS PROGRAMS

6.1.2.1. PUMP STATION OPERATIONS PROGRAMS

This section describes MSD's Pump Station Operation Programs. The goal of this section is to maintain pump stations for optimal use during routine and emergency operations through well documented operating procedures.

O-A-1 Routine Operating Programs

FY19 Program

- Continued review and updates, as needed, of the U.S. Army Corps of Engineers (USACE) Flood Operations and Maintenance Manual based on USACE and staff review comments. The manual is continuously under review as MSD completes both LTCP and NMC programmatic activities.
- Determined capital project priorities and the budgetary needs related to flood protection system pump stations during regular meetings with MSD Operations and Engineering staff.
- Completed Operations staff training for pump stations and diversion structures at newly-constructed CSO storage basins.

- Installed level instrumentation at 3 sanitary pump stations.
- Developed schedule for physical drawdown to coincide with completed preventive maintenance.
- Provided permanent backup power at 94 critical pump stations and RTC facilities based upon the previously performed prioritization and ongoing review.

FY20 Program

- Continue regular meetings with MSD Operations and Engineering staff to determine capital project priorities and advise on the budgetary needs on a quarterly basis.
- Complete Operations staff training for pump stations and diversion structures at newly-constructed CSO storage basins.
- Continue reviewing pump stations for the installation of level sensors in support of improved monitoring capability.
- Continue to provide backup power at critical pump stations.
- Begin telemetry panel replacement projects for pump stations with outdated processors, at risk of submergence, or with multiple PLC or communications failures.

O-A-2 Emergency Operating Programs

FY19 Program

- Reviewed and updated procedures for installation and handoff of backup power supply and mobile generator staging and operation.

FY20 Program

- Green Line Analysis - Continue to evaluate pump stations for inclusion in the Green Line program.

6.1.2.2. PRETREATMENT PROGRAM

This section describes MSD's Pretreatment Programs. The goal of this section is to protect MSD's sewer system and treatment plants by requiring industrial users to pretreat their effluent to required levels through industrial user permitting, inspection, sampling and enforcement.

O-B-1 Industrial User Permit

O-B-2 Inspection

O-B-3 Sampling Enforcement

Administered pretreatment limitations at Hite Creek, Floyds Fork, Derek R. Guthrie and Morris Forman WQTCs. Additional information related to the MSD Pretreatment Program for the combined sewer system can be found in Section 2.4. Jeffersontown WQTC was eliminated and flow was redirected to the Morris Forman and Cedar Creek WQTCs in December 2015.

FY19 Program

- Reviewed Dental Amalgam Program (DAP) guidance provided by EPA Region IV in FY19. Developed necessary documents forms, procedures, and reports to support compliance with DAP. MSD will fully implement DAP in FY20.
- Implemented measures to improve inspection and review of industrial facility compliance with pretreatment requirements. Improvements include revision of Fact Sheet template, inclusion of images in inspection reports, continued review and evaluation of sampling locations and industrial effluent flow meters. Program improvements are ongoing.
- Identified and confirmed specific sources of molybdenum in Morris Forman's influent. Brochures title Keeping Biosolids Safe: Preventing Molybdenum Pollution were distributed to industries that discharge to the publicly owned treatment works (POTW). MSD will continue to monitor molybdenum in Morris Forman's influent. MSD will respond with appropriate measures to reduce molybdenum to acceptable measures, if required.
- Developed and implemented procedures for comprehensive data collection and reporting methods. Further improvements to semi-annual and annual pretreatment reports include purchase of third party software to increase the productivity of personnel and improve data collection and reporting capabilities. Began software training and implementation in FY19, and will continue through FY20.
- Kentucky Division of Water (KDOW) approved Local Limits for Cedar Creek Water Quality Treatment Center (WQTC).

FY20 Program

- Fully implement all elements of the Dental Amalgam Program including online application process, and fee collection.
- Continue to identify and monitor sources of molybdenum in Morris Forman's influent and pursue opportunities to reduce molybdenum through product substitution or other controls. Review alternate plans to effectively reduce molybdenum in Morris Forman's influent.
- Continue to work with KDOW on review and approval of all WQTC local limits. Update MSD's Wastewater/Stormwater Discharge Regulations (WDR) after KYDOW approves local limits.
- Implement use of third party software (LINKO) to manage Pretreatment Program specific data, including online submission of self-monitoring report data from permitted industries. Develop electronic reporting procedures to meet requirements of EPA's Cross-Media Electronic Reporting Rule.

6.1.2.3. CORROSION CONTROLS PROGRAM

This section describes MSD's Corrosion Controls Program. The goal of this section is to extend the life of MSD's sewer system by controlling the corrosive effects of hydrogen sulfide (H₂S) and other corrosive chemicals in the system through inspection, control measures, monitoring, and performance measures.

O-C-1 Inspection

O-C-2 Control Measures

O-C-3 Monitoring

O-C-4 Performance Measures

Hydrogen sulfide is a serious problem for the structural integrity of the collection system, as well as a nuisance to the public due to odor. In some instances, it is possible to respond to odor complaints and treat H₂S without addressing corrosion concerns.

FY19 Program

- Continued to clean MSD facilities to minimize impact of corrosion and odors. Completed 120 cleaning work orders on collection system.
- Continued to enhance asset review and documentation by further defining service request responsibilities related to odor complaints.
- Continued contracts in order to provide professional engineering services to assist MSD with odor control for the collection system, regional WQTCs, and Ohio River Force Main (ORFM).
- Construction of a biofilter to treat H₂S at an air release valve (ARV) along the ORFM at the site of the proposed Waterfront Botanical Gardens.
- Continued to monitor and evaluate gravity lines within the collections system through the CSSA/Blockage Abatement Program using the corrosion indexes.

FY20 Program

- Continue to clean MSD facilities to minimize impact of odors and corrosion caused by H₂S on the collection system.
- Create further training and documentation on maintenance activities and work flow for better tracking of work performed and time and materials used.
- Monitor and evaluate gravity lines within the collections system through the CSSA/Blockage Abatement Program.
- Continue to monitor Evoqua's Full Service Odor Control Contract.
- Continue review of underground tank pump station sites, which may be susceptible to corrosion. Projects include application of epoxy coatings as for corrosion control and calcium nitrate as for H₂S elimination.
- Design and construction of air release valves replacement using resistant materials on the ORFM.
- Construction of two pump station oxygen injection systems to treat H₂S on the ORFM.

6.1.2.4. GREASE TRAP INSPECTION AND ENFORCEMENT PROGRAM

This section describes MSD's Grease Trap Inspection and Enforcement Programs. The goal of this section is to reduce the amount of fats, oils and grease (FOG) that enter MSD's sewer system and treatment plants through permitting, inspection, enforcement, performance measures, and the FOG program.

O-D-1 Permitting

O-D-2 Inspection

O-D-3 Enforcement

O-D-4 Performance Measures

O-D-5 Fats, Oils and Grease Program

FY19 Program

- Conducted 119 inspections at Food Service Establishments (FSEs) within Jefferson County. Inspections resulted in immediate issuance of appropriate enforcement actions to include FCNs. FCNs were issued for violation of MSDs Wastewater/Stormwater Discharge Regulations and FOG policies.
- Issued 61 enforcement actions to include FCNs, NOV's and NOV's with Fines to FSEs requiring action(s) to prevent and/or eliminate grease blockages in MSD's collections system. The enforcement actions required FSEs to install and/or modify grease control equipment, with additional requirements to submit documentation of installations and/or modifications.
- Conducted 208 plan review inspections to insure proper grease control equipment was installed at new and/or modified FSEs.
- Mailed 528 FOG residential public service notifications. The public service outreach informed residents of a recent sanitary sewer blockage occurrence near their home. Information sent to residents informs the customer of measures that could be taken within a residential dwelling to prevent any further occurrences.
- Conducted five Certified Grease Waste Hauler (CGWH) training classes for haulers servicing grease control equipment within Jefferson County. At least 18 haulers from various MSD Certified Grease Waste Hauler facilities participated and received certification cards collectively. Class number 20 was held on July 10, 2018, December 12, 2018 and July 16, 2019. CGWHs as well as master and journeyman plumbers that service or repair grease traps or grease interceptors within Jefferson County service area are required to participate and receive approval to service grease control equipment. FSEs in Jefferson County must only utilize MSD's CGWHs or plumbers that have obtained the appropriate certification.
- Ceased audits of CGWH during the 2018-2019 fiscal year due to minimal personnel to conduct the audits. Observations of CGWH services were made during joint inspections to confirm condition(s) of failing Grease Control Equipment.
- Continued to track FOG removal by CGWHs. Collectively, 4,032,053 gallons of FOG was removed from grease control equipment maintained by area FSEs during the reporting period. Collectively, CGWHs in Jefferson County serviced approximately 6,612 items of grease control equipment.

- Conducted one FOG reconnaissance tele-inspection project in conjunction with MSD's internal tele-inspection crews. The location inspected was an area where FSEs have not properly maintained grease control equipment or where multiple FOG related incidents had occurred.
- Continued to track FOG program performance measures.

FY19 Program

- Continue to conduct inspections at FESs and issue enforcement actions as appropriate for violations of the MSD Wastewater/Stormwater Discharge Regulations.
- Continue to send FOG residential public outreach letters to residents in neighborhoods in the MSD service area that had FOG issues.
- Participate in public education and outreach programs to inform the public regarding MSD's FOG program.
- Continue to host at least two CGWH training classes per year.
- Continue to conduct CGWH audits.
- Continue to track FOG program performance measures and develop reporting tools.

6.1.2.5. NEW CONNECTION TAP-IN PROGRAM

This section describes MSD's New Connection Tap-In Program. The goal of this section is to ensure that future connections do not compromise the capacity of the receiving treatment plant. The program is implemented using a new service tap approval process, inspection, enforcement, and performance measures for new connections to existing sewers and increased flow on existing service connection locations. All new service connections are installed by contractors that have a master plumber on staff. New connections made to public sanitary sewers are inspected by MSD personnel.

All new and changes to wastewater discharge volumes are reviewed through MSD's SCAP process. Developers are required to submit proposed flows to MSD's system and those flows are traced through MSD's infrastructure to identify lack of system capacity. Where capacity in the system exists, capacity requests are approved for 90 days. Where capacity does not exist, upgrades to infrastructure are undertaken or the capacity request is not approved.

O-E-1 Installation of New Service Taps

O-E-2 Inspection

O-E-3 Enforcement

O-E-4 Performance Measures

O-E-5 Other

FY19 Program

- Refer to Section 6.1.1.5, Table 6.4 for details regarding new connections approved through the SCAP process.

- Inspected installation of 120 new property service connections (PSCs) on existing MSD's sewers.

FY20 Program

- Continue to review projects for capacity available through SCAP program.
- Consolidate and improve internal tracker for new property services connections within the existing infrastructure.
- Work with Customer Relations, Development, and Engineering to develop SOP for new property service connections on existing infrastructure.

6.1.2.6. FLOW MONITORING FIELD OPERATION PROGRAMS

This section describes MSD's Flow Monitoring Field Operation Programs. The goal of this section is to provide accurate flow data for use in evaluating various aspects of MSD's sewer system. Flow is monitored at both permanent and temporary stations.

O-F-1 Permanent Stations

O-F-2 Temporary Stations

Refer to Section 4.5 for details on water quality monitoring efforts.

6.1.2.7. SEPTIC TANK HAULERS PROGRAM

MSD does not accept septic tank waste. This is handled through private contractors in Jefferson County.

6.1.2.8. "CALL BEFORE YOU DIG" PROGRAM

This section describes MSD's "Call Before You Dig" Program. The goal of this section is to prevent the damaging or cutting of sewer lines and other MSD assets and subsequent spills through permitting, inspection, enforcement, and performance measures.

O-H-1 Permitting

O-H-2 Inspection

O-H-4 Performance Measures

FY19 Program

- Contracted with locating company to locate all requests with the MSD service area. Contract is set up to handle Louisville Water Company (LWC) requests as well (invoiced separately). Invoices totaled \$839,792.80 to process 111,222 locate requests to identify MSD facilities during the reporting period.
- Contracted with the KY 811 (BUD Center) for underground utility information call center services. Invoices totaled \$ 166,833.00 to participate in this program for the reporting period.
- Requested 2,858 (1,811 via phone and 1,047 via web) to the BUD Center for the marking of other utilities during this time period.

FY20 Program

- Continue to contract for utility locating service.

O-H-3 Enforcement

Enforcement is handled by the Commonwealth of Kentucky.

6.1.3. MAINTENANCE PROGRAMS

6.1.3.1. PUMP STATION PREVENTIVE MAINTENANCE

This section describes MSD's Pump Station Preventive Maintenance program. The goal of this section is to prevent unanticipated repairs and subsequent down-time by providing scheduling, staff, and records to perform routine, preventive pump station maintenance. Electrical, mechanical, and physical maintenance are included in this section.

S-A-1 Electrical Maintenance

S-A-2 Mechanical Maintenance

S-A-3 Physical Maintenance

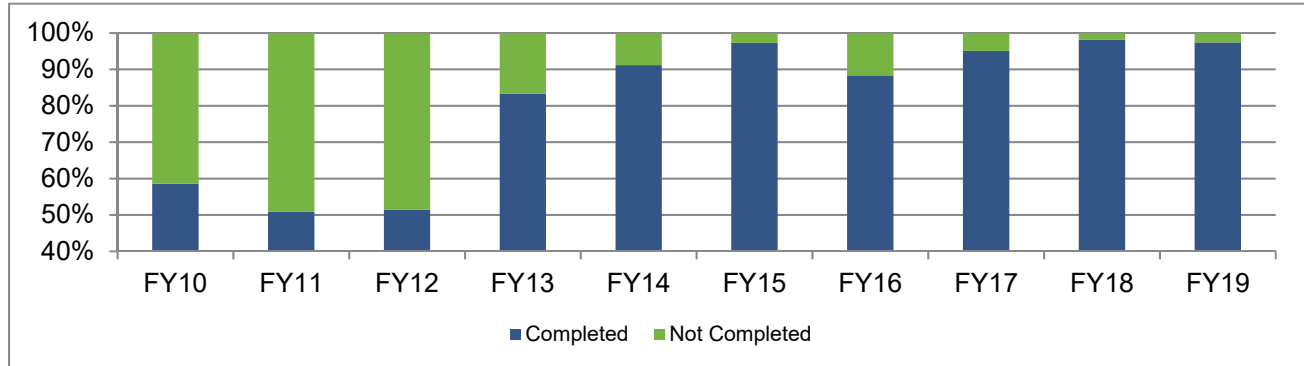
FY18 Program

- Continued preventive maintenance inspections for sanitary and flood pump stations as shown in Figure 6.10.
- Continued to annually train staff to use the Hansen asset management system to track pump station work orders as well as associated pump station assets.
- Ensured collaboration between Engineering and Operations on the design and construction of pump stations at CSO storage basins and diversion structures.

FY19 Program

- Continue preventive maintenance inspections for sanitary and flood pump stations. Continue to annually train staff to use the Hansen asset management system to track pump station work orders as well as associated pump station assets.
- Continue collaboration between Operations and Engineering staff, designers and contractors to incorporate changes to the system with the elimination of the non-regional WQTCs and the addition of storage basins and associated pump stations as required by the IOAP.
- Continue to develop and improve SOPs training, and reporting related to subsequent repairs.

Figure 6.10. Sanitary Pump Station Preventive Maintenance



6.1.3.2. FORCE MAIN PREVENTIVE MAINTENANCE

This section describes MSD's Force Main Preventive Maintenance program. The goal of this section is to prevent unanticipated repairs and subsequent down-time by providing scheduling, staff, and records to perform routine, preventive force main maintenance. The maintenance programs include walking the force main alignment to find cave-ins and air relief valve inspections.

S-B-1 Air Release Valves

S-B-2 Valve Exercise Program

FY19 Program

- Conducted the Annual Force Main Program evaluation and completed inspections on force mains listed in Table 6.10, covering 287,361 LF. Each inspection consisted of inspecting wet wells, valve vaults, air release valves, and discharge manholes; pumping out access vaults to lube, grease and exercise cross-connections; and observing the ground above the lines for evidence of pipe failure below ground.
- Continued to initiate corrective work orders for defects found on other assets during inspections.

Table 6.8. Completed Force Main Inspections

FORCE MAIN	FORCE MAIN	FORCE MAIN	FORCE MAIN
AUTUMN LAKE – 1,564'	GRAND AVE. – 26,848'	LONG CREEK WAY – 8,892'	STARKEY – 1,959'
BECKLEY STATION – 7,268'	HARRODS CREEK – 33,087'	OHIO RIVER – 90,385'	TRANSYLVANIA – 4,760'
BINGHAM WAY – 1,118'	LAKE FOREST – 1,428'	ROSA TERRACE – 1,498'	VALLEY VILLAGE -785'
DIODE CT – 838'	LANDHERR – 4,827'	RUBBERTOWN – 9,609'	WEST COUNTY SLUDGE MAIN – 73,093'
EASTWOOD-FISHERVILLE – 6,028'	LEA ANN WAY – 11,392'	STANNYE – 1,349'	WEST GOOSE CREEK – 6,292'

FY20 Program

- Complete the annual force main evaluation by June 30, 2020. Adjustments to the inspection schedule will be made based on conditions observed during the inspection cycle.
- Review 5-year trends in activities and performance metrics, comparing to targets established in 2006.
- Schedule FY20 force mains for inspection.

6.1.3.3. GRAVITY LINE PREVENTIVE MAINTENANCE

This section describes MSD's Gravity Line Preventive Maintenance program. The goal of this section is to reduce infiltration and increase efficiency of the gravity line system through routine cleaning, root control, and manhole preventive maintenance.

S-C-1 Routine Hydraulic Cleaning

S-C-2 Routine Mechanical Cleaning

S-C-3 Root Control Program

S-C-4 Manhole Preventive Maintenance

Refer to Appendix E for more details on the Gravity Line Preventative Maintenance Program.

6.1.3.4. EQUIPMENT AND COLLECTIONS SYSTEM MAINTENANCE

S-D-1 Equipment Maintenance

Equipment and vehicle maintenance is discussed in detail in Section 6.1.1.8.

6.2. COMPREHENSIVE PERFORMANCE EVALUATIONS AND COMPOSITE CORRECTION PLANS

Per requirements of MSD's 2009 Amended Consent Decree, MSD implemented a Comprehensive Performance Evaluation (CPE) and Composite Correction Plan (CCP) program for MSD's Water Quality Treatment Centers (WQTCs). This program defined specific WQTC improvements to be completed by December 31, 2011. These improvements under this program are discussed under Section 6.2.1. Although the IOAP CPE/CCP improvements were completed by December 31, 2011, MSD will continue to implement CPE/CCP activities as part of the MSD's CMOM Program. Section 6.2.2 will list such activities per WQTC as they occur each reporting period and a comprehensive project schedule for CPE/CCP related capital projects is provided in Section 6.3.

6.2.1. AMENDED CONSENT DECREE CPE/CCP PROGRAM

All activities under this program were completed by December 31, 2011, as required per the IOAP.

6.2.2. CMOM CPE/CCP PROGRAM

This section describes CMOM CPE/CCP activities active during the reporting period and being planned for the next fiscal year. Schedules for CPE/CCP related capital projects are provided in Section 6.3.

6.2.3. CEDAR CREEK WATER QUALITY TREATMENT CENTER

FY19 Program

- Influent Pump Station Motor Controls Upgrade project was planned to be constructed in FY19. Project was redesigned in FY19 to add VFDs in the current MCCs located in the filter building.

FY20 Program

- Construction of the Influent Pump Station Motor Controls Upgrade project is anticipated to start in FY20.
- Design of a new effluent parshall flume is anticipated to begin in FY20.
- Design of a new building to hold the Sodium Aluminate chemical storage tank is anticipated to begin in FY20.
- Design of a new tertiary filter system is anticipated to begin in FY20.

6.2.4. HITE CREEK WATER QUALITY TREATMENT CENTER

FY19 Program

- Completed design and advertisement of the expansion project to increase the average daily treatment capacity from 6 MGD to 9 MGD.

FY20 Program

- Construction of the expansion project is anticipated to begin in FY20 and end in FY22.

6.2.5. FLOYDS FORK WATER QUALITY TREATMENT CENTER

No major capital projects were completed the Floyds Fork WQTC in FY19. No major capital projects are planned for the Floyds Fork WQTC in FY20.

6.2.6. DEREK R. GUTHRIE WATER QUALITY TREATMENT CENTER

FY19 Program

- Completed construction of the Return Activated Sludge (RAS) 1 and 4 Pump Replacement project.
- Completed design of the Clarifier #7-12 Floor Repair and Gate Replacement project. New gates and automated actuators will be provided for the Influent and the Return Activated Sludge (RAS) lines for Clarifiers 1 - 6. Defective grout will be removed/replaced for Clarifiers 7 – 12. A new isolation gate will also be installed for the aeration basin.

- Completed design of the Sodium Hypochlorite Containment project. This project will repair leaks in containment system and separate the storage into two separate systems to provide more adequate containment volume.

FY20 Program

- Construction of the Clarifier #7-12 Floor Repair and Gate Replacement project is anticipated to begin in FY20 and end in FY21.
- Construction of the Sodium Hypochlorite Containment project is anticipated to be complete in FY20.

6.2.7. JEFFERSONTOWN WATER QUALITY TREATMENT CENTER

MSD has completed the elimination Jeffersontown WQTC. Refer to Section 1.2.2.5 for details.

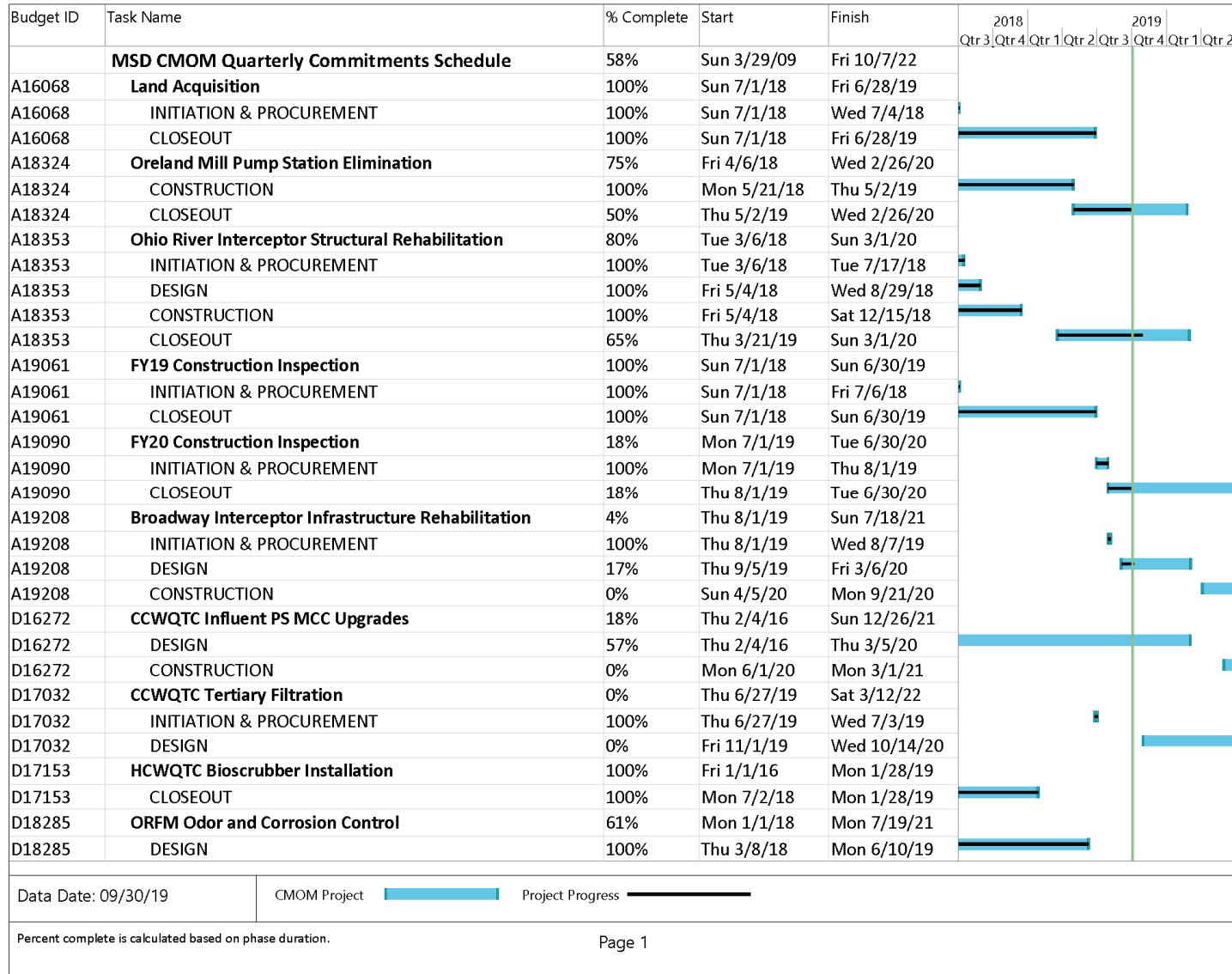
6.2.8. NON-REGIONAL WATER QUALITY TREATMENT CENTER UPDATES

MSD has completed the elimination of all existing non-regional WQTCs at this time. Refer to Section 1.2.2.5 for details.

6.3. CMOM ACTIVITY SCHEDULE



CMOM capital project milestones for the current reporting period as well as a look-ahead for the upcoming reporting period are provided in Figure 6.11.

Figure 6.11. CMOM Annual Commitments Schedule



Budget ID	Task Name	% Complete	Start	Finish	2018 Qtr 3 Qtr 4 Qtr 1 Qtr 2 Qtr 3 Qtr 4 Qtr 1 Qtr 2
D18285	CONSTRUCTION	0%	Sun 9/15/19	Tue 9/22/20	
D18290	DRGWQTC Carbon Odor Control	100%	Wed 1/31/18	Mon 4/15/19	
D18290	CONSTRUCTION	100%	Tue 9/11/18	Mon 2/18/19	
D18290	CLOSEOUT	100%	Tue 4/9/19	Mon 4/15/19	
D18292	DRGWQTC Clarifier Grout Repair and RAS Gate Replacement	45%	Wed 1/31/18	Fri 3/25/22	
D18292	DESIGN	100%	Wed 5/23/18	Wed 8/14/19	
D18292	CONSTRUCTION	0%	Fri 11/15/19	Fri 5/28/21	
D18452	FY20 MFWQTC Equipment Renewal & Replacement	10%	Mon 7/1/19	Tue 6/30/20	
D18452	INITIATION & PROCUREMENT	100%	Mon 7/1/19	Sun 9/1/19	
D18452	CLOSEOUT	10%	Sun 9/1/19	Tue 6/30/20	
D19038	CCWQTC Hydraulics Study	100%	Sun 7/1/18	Fri 3/29/19	
D19038	INITIATION & PROCUREMENT	100%	Sun 7/1/18	Tue 9/11/18	
D19038	STUDY	100%	Mon 11/19/18	Fri 2/22/19	
D19038	CLOSEOUT	100%	Mon 3/25/19	Fri 3/29/19	
D19039	CCWQTC Effluent Parshall Flume Upgrade	3%	Tue 6/4/19	Wed 7/27/22	
D19039	INITIATION & PROCUREMENT	100%	Tue 6/4/19	Mon 6/10/19	
D19039	DESIGN	8%	Sun 9/1/19	Mon 8/31/20	
D19042	FY19 WQTC Odor Improvements	100%	Sun 7/1/18	Sun 6/30/19	
D19042	INITIATION & PROCUREMENT	100%	Sun 7/1/18	Sat 11/10/18	
D19042	CLOSEOUT	100%	Sat 11/10/18	Sun 6/30/19	
D19227	MFWQTC Primary Sludge Line Replacement	85%	Sun 7/1/18	Wed 9/30/20	
D19227	INITIATION & PROCUREMENT	100%	Sun 7/1/18	Fri 7/6/18	
D19227	DESIGN	100%	Sun 7/1/18	Fri 3/15/19	
D19227	CONSTRUCTION	65%	Mon 3/25/19	Thu 12/5/19	
D19227	CLOSEOUT	0%	Mon 2/3/20	Wed 9/30/20	
D19237	MFWQTC Arc Flash Update	100%	Mon 7/2/18	Fri 6/21/19	
D19237	INITIATION & PROCUREMENT	100%	Mon 7/2/18	Wed 9/26/18	
D19237	STUDY UPDATE AND FIELD WORK	100%	Wed 9/26/18	Fri 6/21/19	
D19237	CLOSEOUT	100%	Fri 6/14/19	Fri 6/21/19	
D19243	FY19 Jacobs MFWQTC Engineering Support	100%	Sun 7/1/18	Sun 6/30/19	
D19243	INITIATION & PROCUREMENT	100%	Sun 7/1/18	Fri 8/17/18	

Data Date: 09/30/19

CMOM Project  Project Progress 

Percent complete is calculated based on phase duration.

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Figure 6.11. CMOM Annual Commitments Schedule

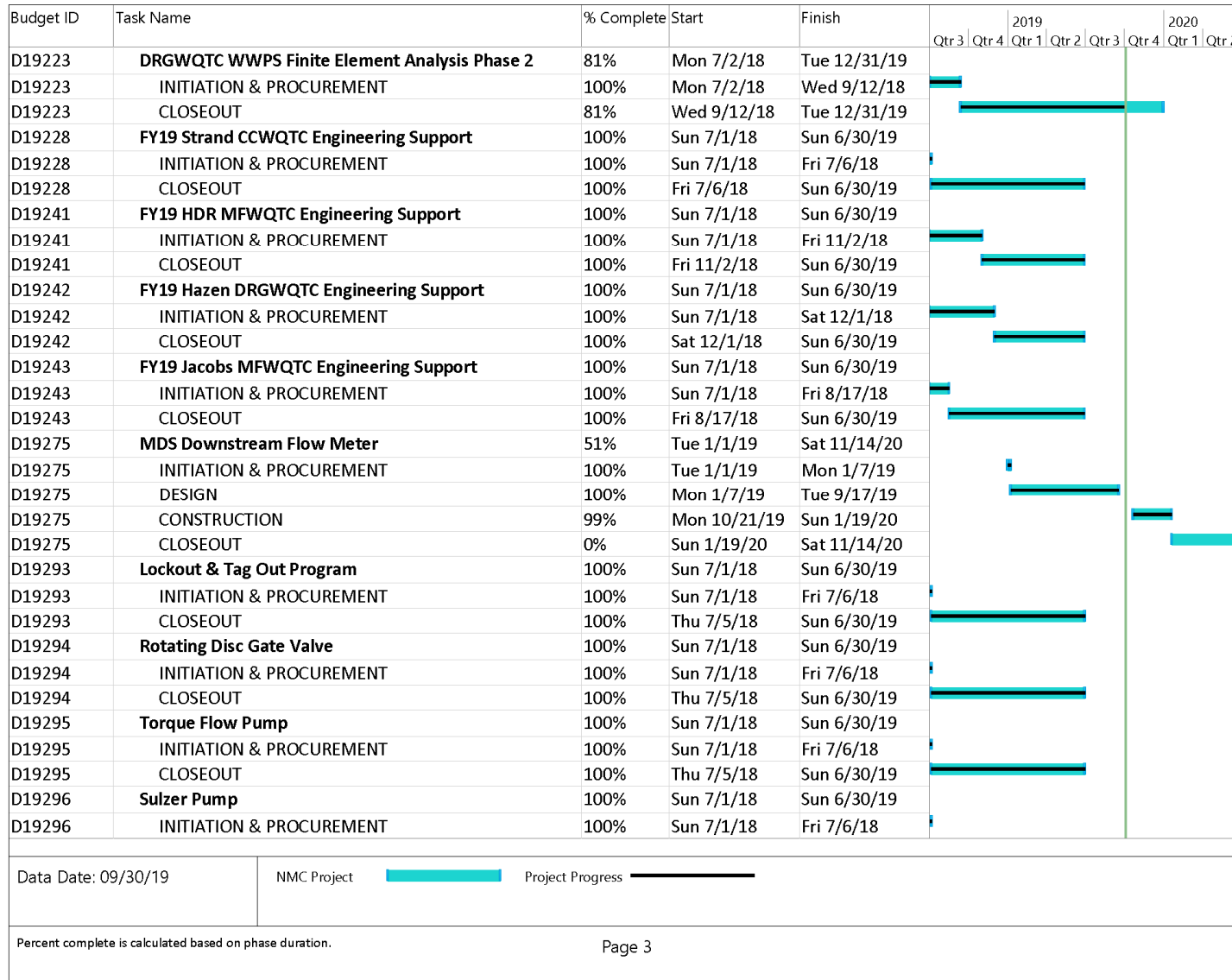


Figure 6.11. CMOM Annual Commitments Schedule

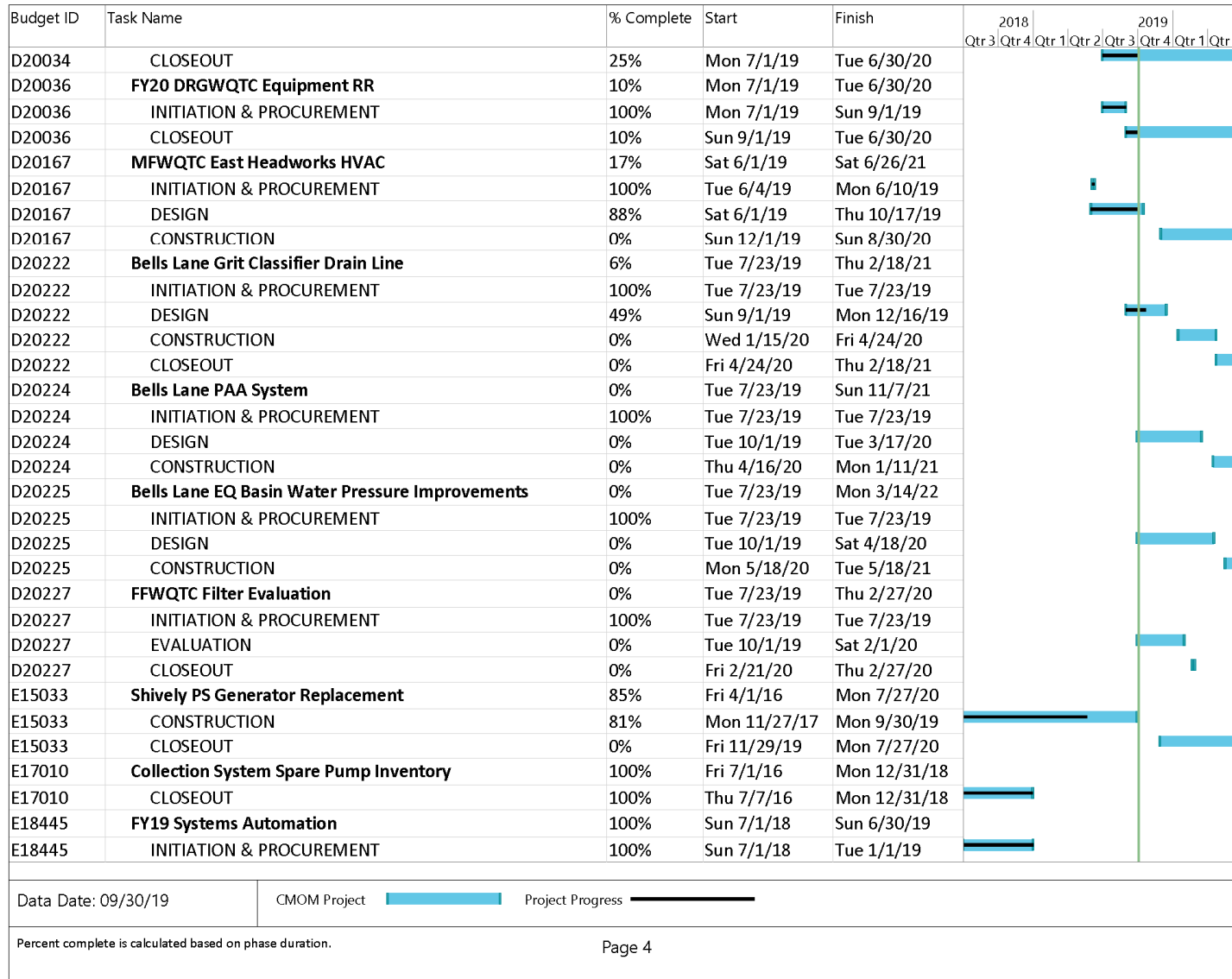


Figure 6.11. CMOM Annual Commitments Schedule

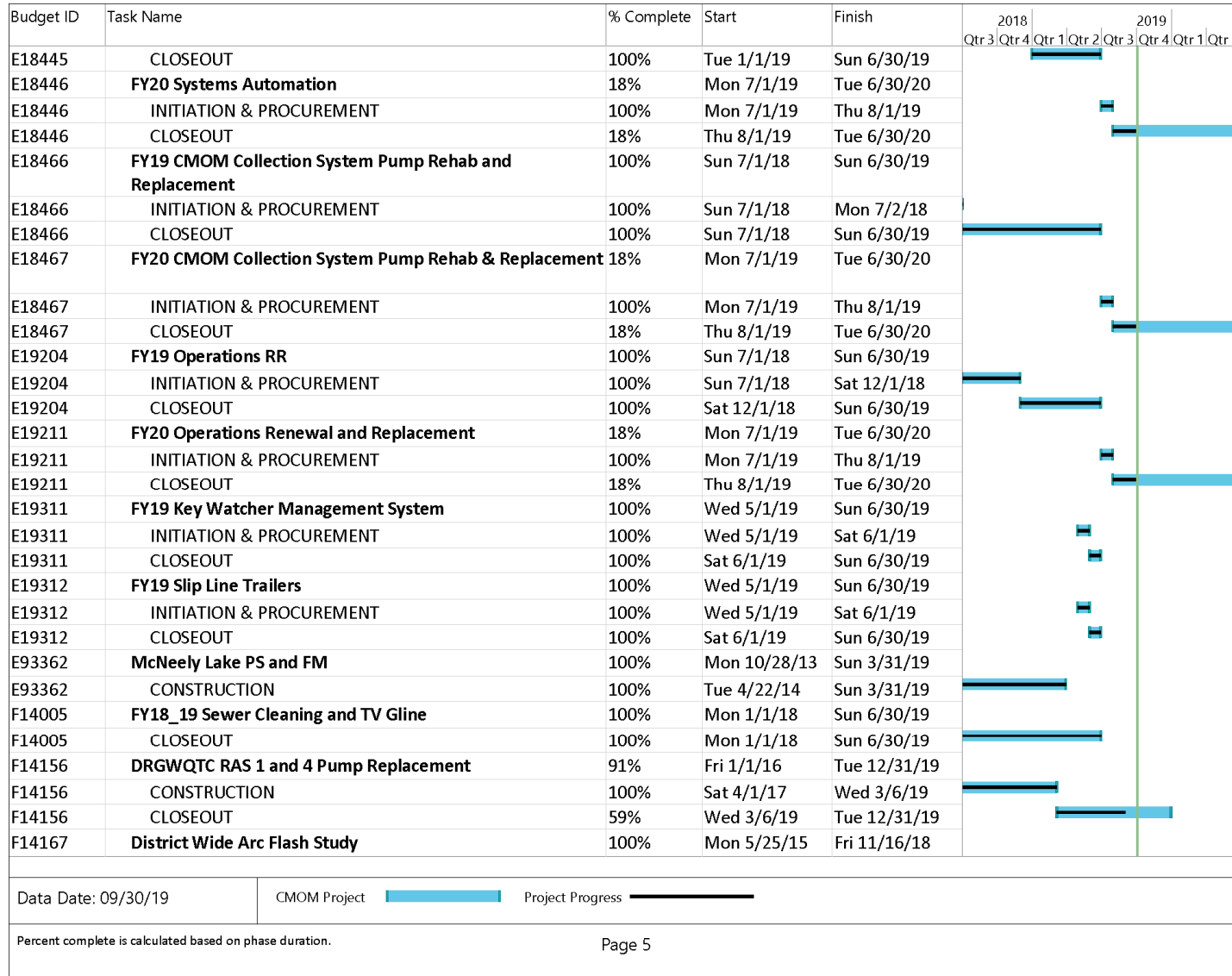


Figure 6.11. CMOM Annual Commitments Schedule

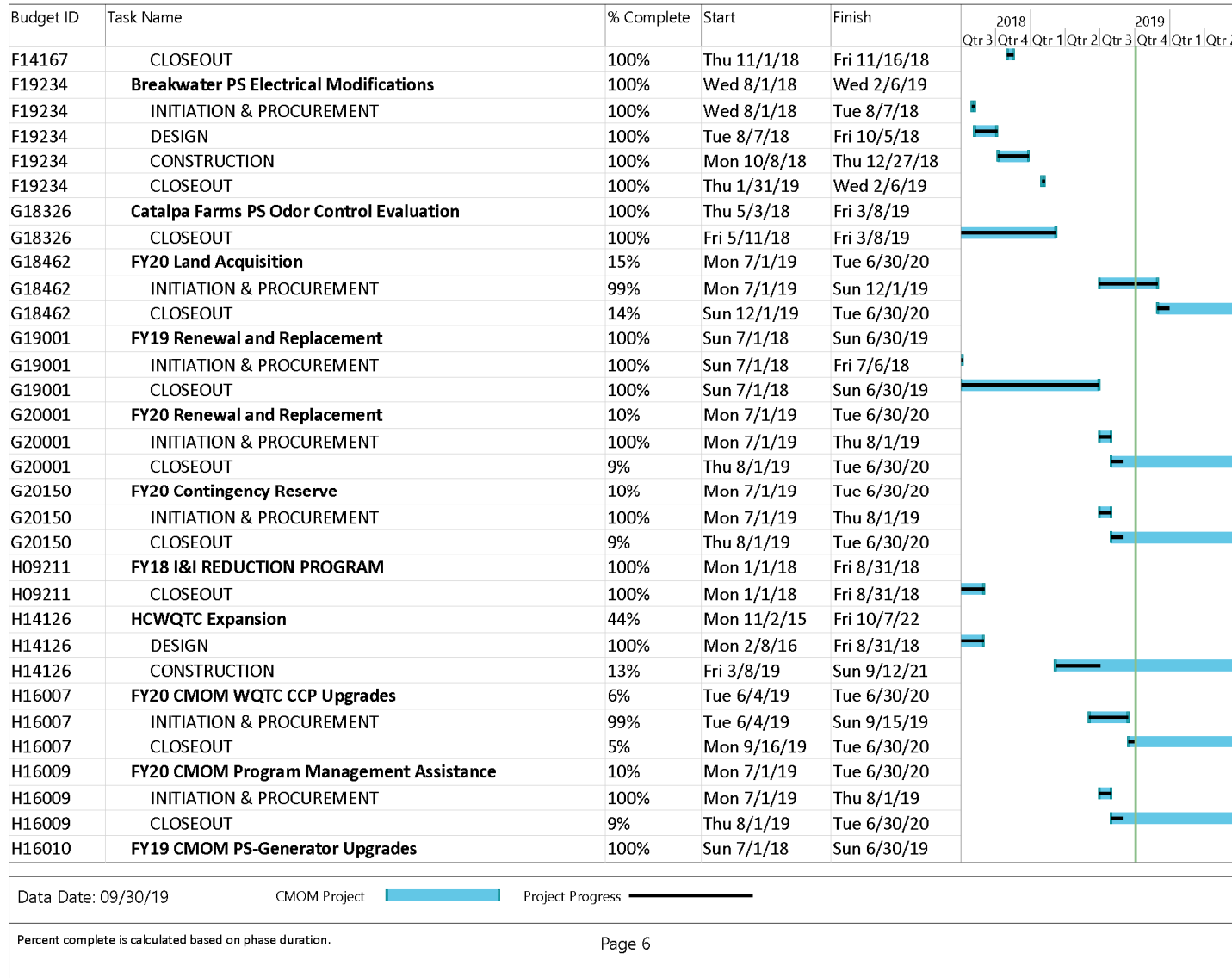


Figure 6.11. CMOM Annual Commitments Schedule

Budget ID	Task Name	% Complete	Start	Finish	2018								2019							
					Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2
H16010	INITIATION & PROCUREMENT	100%	Sun 7/1/18	Tue 1/1/19																
H16010	CLOSEOUT	100%	Tue 1/1/19	Sun 6/30/19																
H16012	FY19 CMOM SCAP, AAM and FOG	100%	Sun 7/1/18	Sun 6/30/19																
H16012	INITIATION & PROCUREMENT	100%	Sun 7/1/18	Thu 11/1/18																
H16012	CLOSEOUT	100%	Thu 11/1/18	Sun 6/30/19																
H16013	FY20 CMOM SCAP, AAM and FOG	10%	Mon 7/1/19	Tue 6/30/20																
H16013	INITIATION & PROCUREMENT	99%	Mon 7/1/19	Thu 8/1/19																
H16013	CLOSEOUT	10%	Thu 8/1/19	Tue 6/30/20																
H16036	FY19 I and I Reduction Program	99%	Sun 7/1/18	Mon 9/30/19																
H16036	INITIATION & PROCUREMENT	100%	Sun 7/1/18	Tue 1/1/19																
H16036	CLOSEOUT	99%	Thu 11/1/18	Mon 9/30/19																
H16040	FY19 PMP	100%	Sun 7/1/18	Sun 6/30/19																
H16040	INITIATION & PROCUREMENT	100%	Sun 7/1/18	Fri 7/6/18																
H16040	CLOSEOUT	100%	Sun 7/1/18	Sun 6/30/19																
H16045	FY20 Plumbing Modification Program	19%	Mon 7/1/19	Sat 6/20/20																
H16045	INITIATION & PROCUREMENT	100%	Mon 7/1/19	Thu 8/1/19																
H16045	CLOSEOUT	19%	Thu 8/1/19	Sat 6/20/20																
H16074	Nightingale Rehab	16%	Mon 7/2/18	Mon 3/28/22																
H16074	INITIATION & PROCUREMENT	100%	Mon 7/2/18	Wed 7/18/18																
H16074	DESIGN	93%	Fri 6/28/19	Tue 10/8/19																
H16074	CONSTRUCTION	0%	Sat 12/7/19	Sun 5/30/21																
H16356	South Pope Lick Pump Station Repair	100%	Mon 7/27/15	Fri 1/4/19																
H16356	CLOSEOUT	100%	Tue 12/5/17	Fri 1/4/19																
H17154	ORFM Biofilter for AVR67839	100%	Tue 3/28/17	Fri 8/31/18																
H17154	CLOSEOUT	100%	Thu 8/31/17	Fri 8/31/18																
H18171	FY19 Information Governance Architecture	100%	Sun 7/1/18	Sun 6/30/19																
H18171	INITIATION & PROCUREMENT	100%	Sun 7/1/18	Mon 4/1/19																
H18171	CLOSEOUT	100%	Mon 4/1/19	Sun 6/30/19																
H18172	FY20 Information Governance	18%	Mon 7/1/19	Tue 6/30/20																
H18172	INITIATION & PROCUREMENT	99%	Mon 7/1/19	Thu 8/1/19																
H18172	CLOSEOUT	18%	Thu 8/1/19	Tue 6/30/20																
H18217	FY18 Consent Decree Operating Program Support	100%	Wed 11/1/17	Thu 1/31/19																

Data Date: 09/30/19
CMOM Project
Project Progress

Percent complete is calculated based on phase duration.

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Figure 6.11. CMOM Annual Commitments Schedule

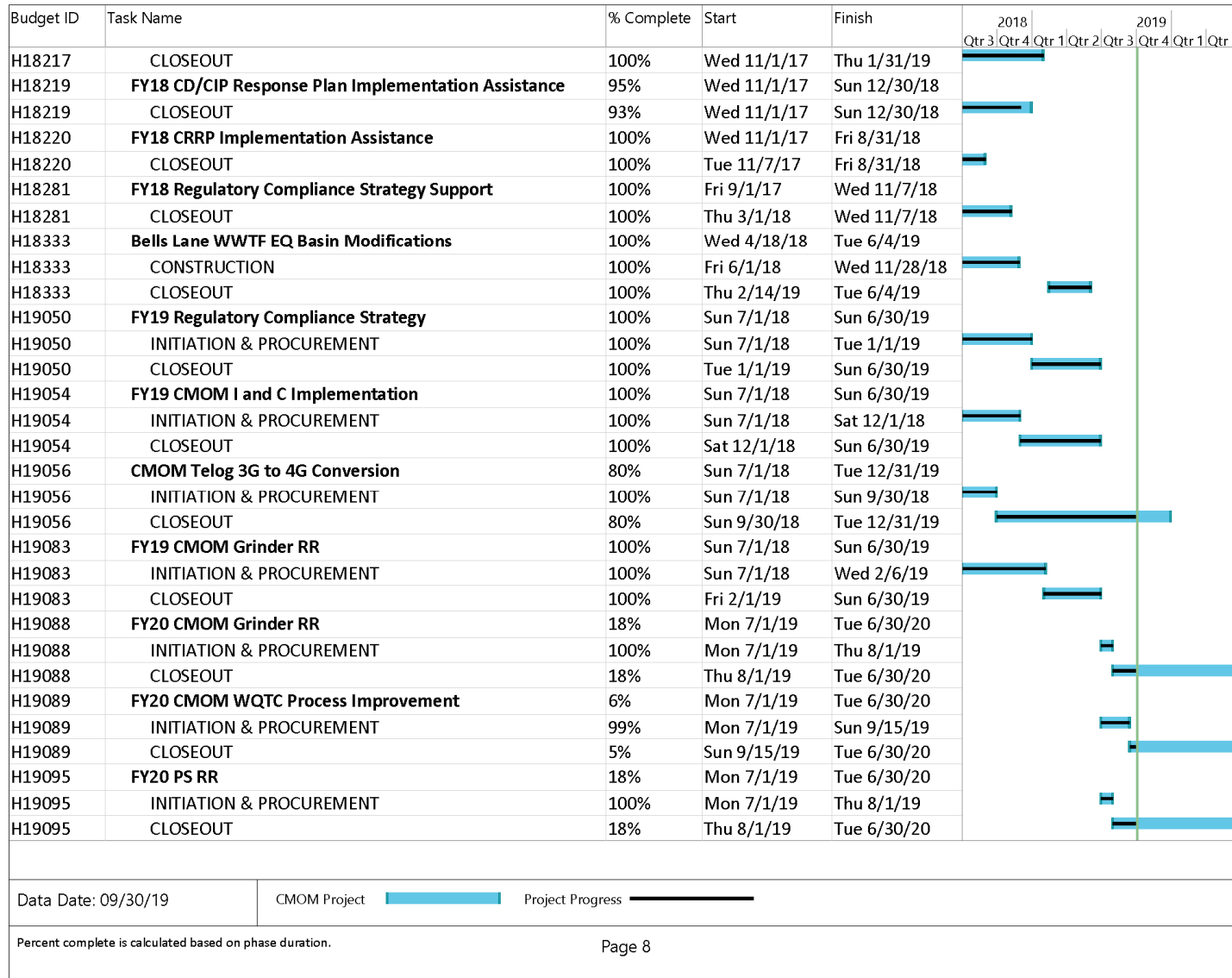


Figure 6.11. CMOM Annual Commitments Schedule

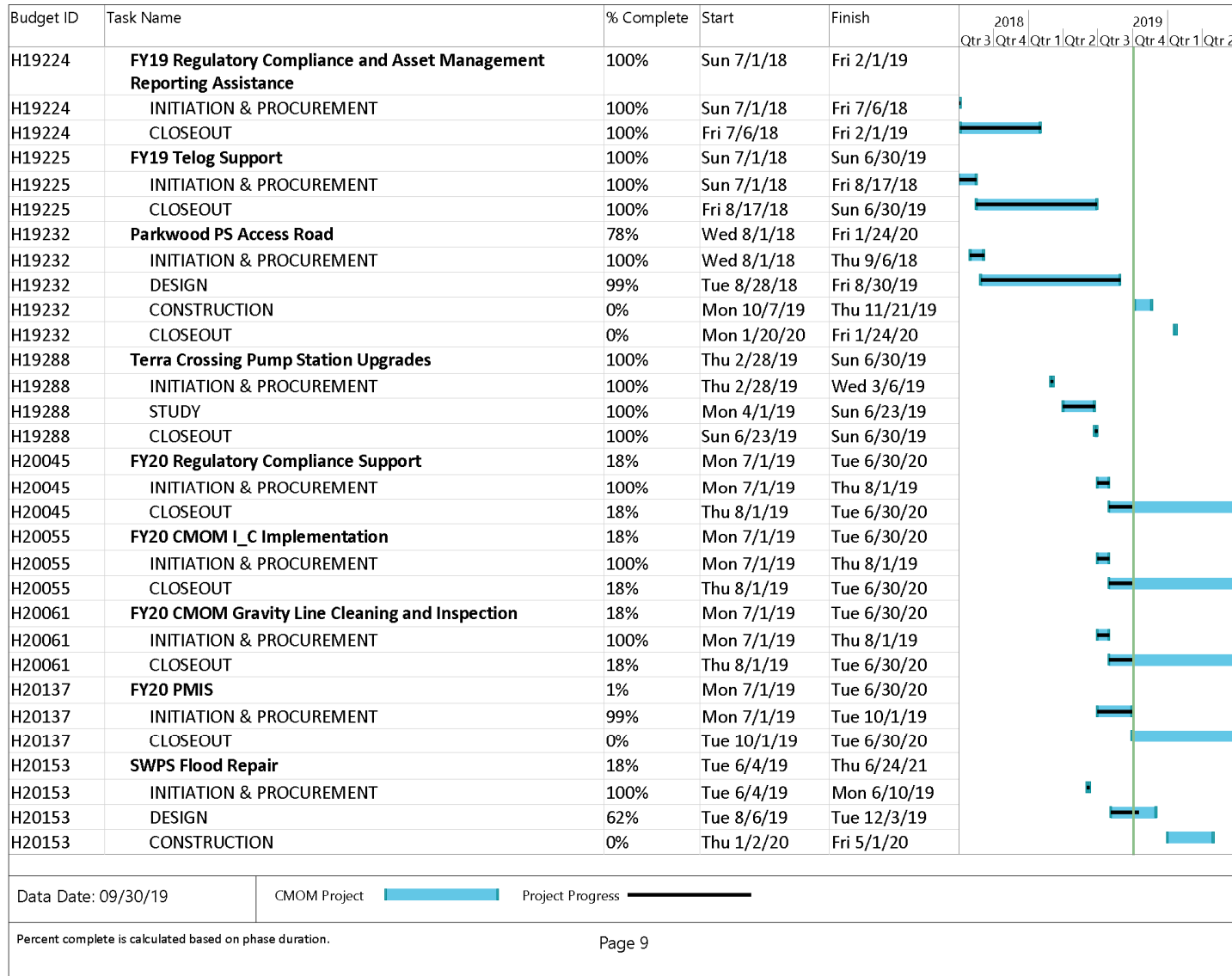
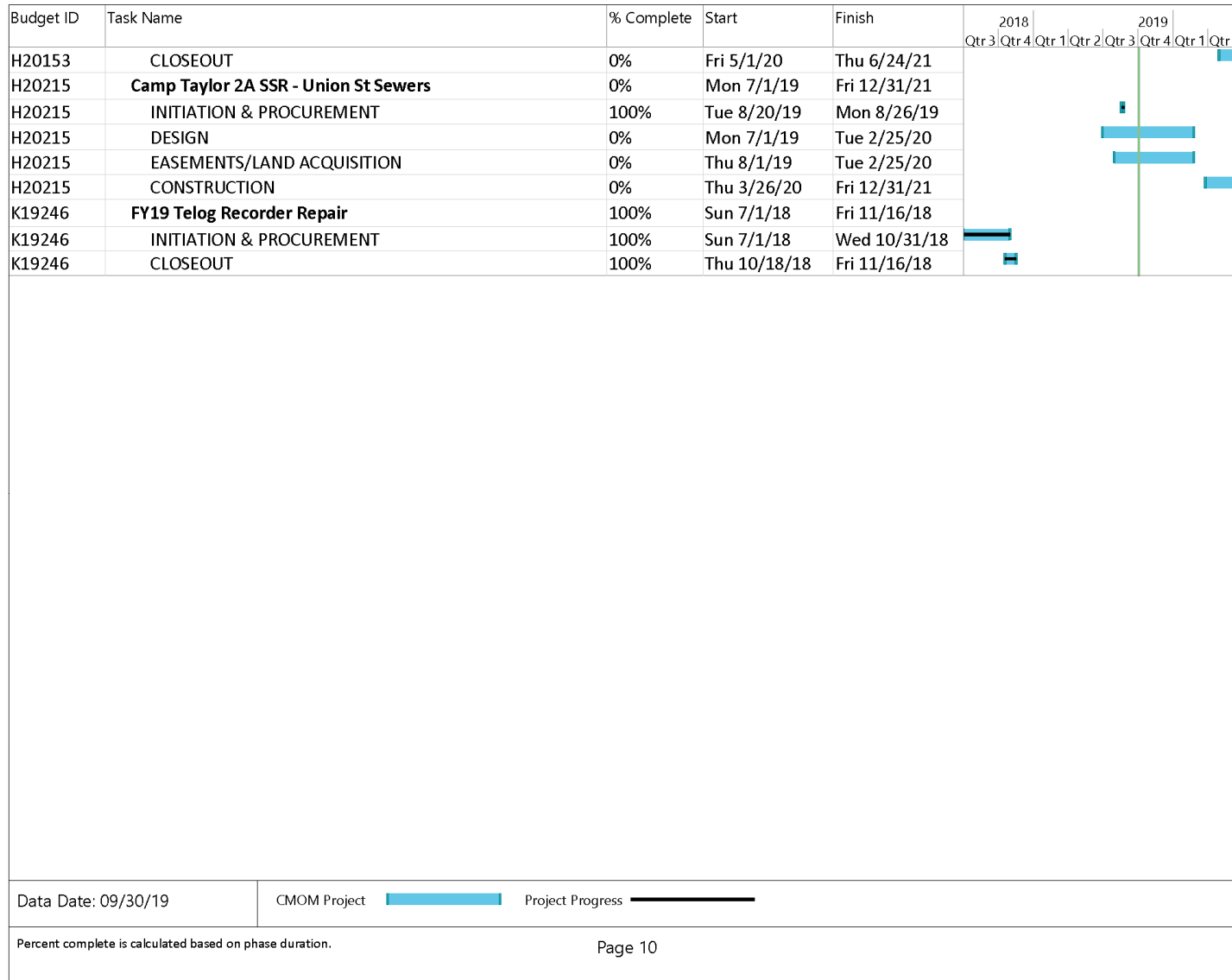


Figure 6.11. CMOM Annual Commitments Schedule



APPENDICES

Appendix A	Acronyms
Appendix B	Annual Average Overflow Volume
Appendix C	CSO Flow Monitoring Data
Appendix D	Discharge Work Orders
Appendix D-1	Discharge Work Orders – Waters of the United States
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Appendix D-3	Discharge Work Orders – Interior
Appendix E	CSSA Annual Report
Appendix F	Public Notification
Appendix G	Organizational Chart

Appendix A

Acronyms

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Appendix A Acronyms

AAOV	Annual Average Overflow Volume
ACD	Amended Consent Decree
ARV	Air Release Valve
BAP	Blockage Abatement Program
BGC	Beargrass Creek
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
BUD	Before "U" Dig
CC&B	Customer Care and Billing
CCP	Composite Correction Plan
CDS	Continuous Deflection Separator
CFR	Code of Federal Regulations
CGWH	Certified Grease Waste Hauler
CMOM	Capacity Management Operations and Maintenance
CPE	Comprehensive Performance Evaluations
CRD	Central Relief Drain
CRS	Community Rating System
CSO	Combined Sewer Overflow
CSOFT	Software Name
CSS	Combined Sewer System
CSSA	Continuous Sewer System Assessment
CY	Calendar Year
DAP	Dental Amalgam Program
DMR	Discharge Monitoring Report
DSDC	Design Services During Construction
DWO	Dry Weather Overflow
eB	Enterprise Bridge (Enterprise Informatics scanning software for document management)
EGIS	Emergency Geographic Information System
EMA	Louisville Metro Emergency Management Agency
EPA	Environmental Protection Agency
EPSC	Erosion Prevention and Sediment Control
ERT	Emergency Response Team
EUM	Effective Utility Management
FCN	Field Correction Notice
FEMA	Federal Emergency Management Agency
FEPS	Final Effluent Pump Station
FM	Force Main
FOG	Fats, Oil & Grease
FPS	Flood Pump Station
FSE	Food Service Establishment
FY	Fiscal Year

Appendix A Acronyms

GASB	Governmental Accounting Standards Board
GHS	Globally Harmonized System
GIS	Geographic Information System
GLPM	Gravity Line Preventive Maintenance
GPD	Gallons per Day
GPS	Global Positioning System
H/H	Hydraulic/Hydrologic
H ₂ S	Hydrogen Sulfide
I&C	Instrumentation and Controls
I&I	Inflow and Infiltration
ICM	Integrated Catchment Model
ID	Identification
IOAP	Integrated Overflow Abatement Plan
ISSDP	Interim Sanitary Sewer Discharge Plan
IT	Information Technology
KDEP	Kentucky Department of Environmental Protection
KDOW	Kentucky Division of Water
KPDES	Kentucky Pollutant Discharge Elimination System
KY	Kentucky
LG&E	Louisville Gas and Electric
LIMS	Laboratory Information Management System
LOJIC	Louisville and Jefferson County Information Consortium
LTCP	Long Term Control Plan
LWC	Louisville Water Company
MCC	Motor Control Center
MCE	Mission Critical Equipment
MCU	Monitoring Controls Upgrade
MG	Million Gallons
MGD	Million Gallons per Day
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
MSD	Metropolitan Sewer District (Louisville and Jefferson County)
MSDS	Material Safety Data Sheet
NACWA	National Association of Clean Water Agencies
NASSCO	National Association of Sewer Services Companies
NDD	Non-Domestic Dischargers
NFPA	National Fire Protection Association
NMC	Nine Minimum Controls
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPS	Nightingale Pump Station

Appendix A Acronyms

O&M	Operations and Maintenance
OPC	Open Platform Communications
ORD	Office of Research and Development
ORFM	Ohio River Force Main
PACP	Pipeline Assessment and Certification Program
PCCM	Post Construction Compliance Monitoring
PLC	Programmable Logic Control
PM	Preventive Maintenance
POC	Pollutant of Concern
POTW	Publicly-Owned Treatment Works
PPE	Personal Protective Equipment
PS	Pump Station
PSC	Property Service Connection
PTF	Preliminary Treatment Facilities
QPCI	Qualified Post-Construction Inspector
RAS	Return Activated Sludge
RFP	Request for Proposal
RFQ	Request for Qualifications
RPR	Resident Project Representative
RTC	Real Time Control
S&F	Solids and Floatables
SAP	Software Name
SCADA	Supervisory Control And Data Acquisition
SCAP	System Capacity Assurance Plan
SEP	Supplemental Environmental Projects
SIU	Significant Industrial User
SOP	Standard Operating Procedure
SORP	Sewer Overflow Response Protocol
SSDP	Sanitary Sewer Discharge Plan
SSES	Sanitary Sewer Evaluation Study
SSO	Sanitary Sewer Overflow
SSOP	Sanitary Sewer Overflow Plan
SWOR1	Southwestern Outfall Relief – Phase 1
SWOR2	Southwestern Outfall Relief – Phase 2
SWPPP	Stormwater Pollution Prevention Plan
SWPS	Southwestern Pump Station
WSG	Southwest Sluice Gate
TCN	Tracking Control Numbers
TSS	Total Suspended Solids
TV	Television
UDR	Unusual Discharge Request
UIM	Utility Information Management

Appendix A Acronyms

UMF	Upper Middle Fork
UofL	University of Louisville
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WIN	Waterway Improvements Now
WQTC	Water Quality Treatment Center
WUS	Waters of the United States

Appendix B Annual Average Overflow Volume

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Appendix B Annual Average Overflow Volume

Modeled Typical Year CSO Activations: Post-IOAP, Current, and Pre-IOAP Conditions

CSO	IOAP Approved Level of Control	Modeled Typical Year Activations for Post-IOAP Conditions ¹				Modeled Typical Year Activations for Current Conditions ²				Modeled Typical Year Activations for Pre-IOAP Conditions ³			
		Volume (MG)	Typical Year Modeled Activations	Typical Year Modeled Total Minutes Activated	Typical Year Modeled Total Hours Activated	Volume (MG)	Typical Year Modeled Activations	Typical Year Modeled Total Minutes Activated	Typical Year Modeled Total Hours Activated	Volume (MG)	Typical Year Modeled Activations	Typical Year Modeled Total Minutes Activated	Typical Year Modeled Total Hours Activated
015 & 191	8	124.6	8	1095	18.25	391.6	12	5745	95.75	2784.2	76	77235	1287.25
016	8	0.4	6	285	4.75	5.5	9	1665	27.75	39.0	32	5625	93.75
018	0	0.0	0	0	0	14.5	3	1440	24	158.1	28	30045	500.75
019	8	13.6	8	435	7.25	143.0	51	10785	179.75	192.7	67	15990	266.5
020	8	1.0	5	435	7.25	110.3	52	14445	240.75	355.3	74	26115	435.25
022	8	1.8	5	315	5.25	1.7	7	435	7.25	4.5	16	945	15.75
023	8	0.0	0	0	0	0.4	4	225	3.75	1.8	8	525	8.75
027	N/A ⁵	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
028	8	0.0	0	0	0	0.0	0	0	0	1.1	20	2520	42
029	8	0.0	3	105	1.75	0.1	4	270	4.5	4.6	40	6315	105.25
031	N/A ⁵	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
034	8	0.1	3	180	3	0.1	3	180	3	3.0	39	7680	128
035	N/A ⁵	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
036	8	0.1	3	165	2.75	0.1	5	255	4.25	0.2	7	480	8
038	N/A ⁵	0.1	3	195	3.25	0.1	4	390	6.5	0.1	5	390	6.5
050	8	0.0	0	0	0	34.0	55	11685	194.75	19.6	55	7230	120.5
051	N/A - CSO to be eliminated ⁴	N/A - CSO to be eliminated ⁴							3.4	12	3810	63.5	0.3
052	8	0.0	0	0	0	6.9	27	7155	119.25	2.5	21	2700	45
053	8	0.0	0	0	0	8.4	50	10695	178.25	7.7	50	11100	185
054	8	0.2	5	465	7.75	4.1	17	5685	94.75	1.8	35	8865	147.75
055	8	1.3	7	510	8.5	19.9	30	8835	147.25	4.9	17	2535	42.25
056	8	0.0	0	0	0	11.1	29	5400	90	4.3	24	2550	42.5
057	N/A ⁵	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
058	8	0.0	0	0	0	7.8	8	855	14.25	51.4	68	21510	358.5
062	N/A ⁵	0.8	4	255	4.25	135.6	52	14715	245.25	100.4	69	18525	308.75
082	0	0.0	0	0	0	35.8	49	12315	205.25	19.2	50	11925	198.75
083	N/A - CSO to be eliminated ⁴	N/A - CSO to be eliminated ⁴							0.4	7	360	6	0.5
084	0	0.0	0	0	0	19.1	46	5205	86.75	19.2	46	5205	86.75
086	N/A ⁵	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
088	4	0.0	1	45	0.75	0.0	1	45	0.75	10.7	45	8685	144.75
091	8	0.0	0	0	0	0.0	0	0	0	2.7	44	9675	161.25
092	N/A ⁵	0.0	0	0	0	0.0	0	0	0	1.3	33	30	0.5
093	0	0.0	0	0	0	0.0	0	0	0	0.0	1	60	1
097	8	0.3	7	285	4.75	0.3	7	285	4.75	17.7	50	12390	206.5
104	8	29.0	6	585	9.75	56.5	7	1860.0	31	9.5	20	2955	49.25
105										260.1	46	9450	157.5
106	N/A - CSO to be eliminated ⁴	N/A - CSO to be eliminated ⁴										CSO Eliminated	
108	8	1.6	6	210	3.5	2.2	5	270	4.5	51.9	41	7410	123.5
109	N/A ⁵	2.3	8	705	11.75	2.3	12	1260	21	1.2	11	1695	28.25

Appendix B Annual Average Overflow Volume

Modeled Typical Year CSO Activations: Post-IOAP, Current, and Pre-IOAP Conditions

CSO	IOAP Approved Level of Control	Modeled Typical Year Activations for Post-IOAP Conditions ¹				Modeled Typical Year Activations for Current Conditions ²				Modeled Typical Year Activations for Pre-IOAP Conditions ³			
		Volume (MG)	Typical Year Modeled Activations	Typical Year Modeled Total Minutes Activated	Typical Year Modeled Total Hours Activated	Volume (MG)	Typical Year Modeled Activations	Typical Year Modeled Total Minutes Activated	Typical Year Modeled Total Hours Activated	Volume (MG)	Typical Year Modeled Activations	Typical Year Modeled Total Minutes Activated	Typical Year Modeled Total Hours Activated
110	8	0.3	4	240	4	0.3	4	240	4	20.0	47	9735	162.25
111	8	0.7	4	315	5.25	0.7	4	315	5.25	5.0	35	3675	61.25
113	8	0.0	0	0	0	0.0	0	0	0	6.2	28	2475	41.25
117	8	35.4	8	2415	40.25	35.4	8	2415	40.25	86.4	60	13320	222
118	0	0.0	0	0	0	124.1	60	10350	172.5	117.5	60	10350	172.5
119	0	0.9	8	1185	19.75	11.2	51	7755	129.25	10.3	53	7830	130.5
120	0	0.0	0	0	0	8.1	53	6840	114	7.5	52	6825	113.75
121	0	0.0	0	0	0	6.8	23	1950	32.5	5.5	23	1890	31.5
125	4	0.0	0	0	0	25.0	43	5415	90.25	24.4	43	5295	88.25
126	4	0.0	0	0	0	6.2	26	4350	72.5	3.4	20	3225	53.75
127	N/A - CSO to be eliminated ⁴	N/A - CSO to be eliminated ⁴							12.4	40	4335	72.25	12.0
130	8	0.0	0	0	0	0.0	0	0	0	2.2	26	0	0
131	4	0.1	2	75	1.25	0.1	4	165	2.75	1.7	16	135	2.25
132	4	0.0	0	0	0	0.0	0	0	0	83.3	61	0	0
137	N/A - CSO to be eliminated ⁴	N/A - CSO to be eliminated ⁴										CSO Eliminated	
140	0	0.0	0	0	0	0.0	0	0	0	2.6	29	3030	50.5
141	0	0.0	0	0	0	0.0	0	0	0	0.7	20	10215	170.25
144	N/A ⁵	0.6	5	345	5.75	0.6	5	345	5.75	0.8	11	225	3.75
146	8	0.7	4	315	5.25	0.7	4	315	5.25	37.6	40	5910	98.5
148	8	0.0	0	0	0	0.0	0	0	0	0.7	17	1650	27.5
149	8	22.4	8	1920	32	22.4	8	1920	32	138.5	47	7590	126.5
150	8	0.0	0	0	0	3.8	20	6975	116.25	0.8	10	1575	26.25
151	8	0.0	2	90	1.5	0.0	2	90	1.5	97.7	72	35145	585.75
152	8	6.0	7	720	12	6.0	7	720	12	58.9	62	11715	195.25
153	0	0.0	0	0	0	19.4	71	15495	258.25	18.7	71	15345	255.75
154	4	0.0	0	0	0	0.0	0	0	0	23.0	56	15480	258
155	8	0.0	0	0	0	0.6	8	1995	33.25	0.6	18	2130	35.5
160	0	0.0	0	0	0	0.0	0	0	0	0.0	1	465	7.75
161	N/A ⁵	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
166	4	0.0	0	0	0	54.6	46	5820	97	52.5	46	5595	93.25
167	4	0.0	0	0	0	0.0	0	0	0	0.5	11	1890	31.5
172	N/A - CSO eliminated ⁴	N/A - CSO eliminated ⁴										N/A - CSO eliminated ⁴	
178	8	0.1	3	75	1.25	0.4	7	240	4	20.0	58	11250	187.5
179	N/A ⁵	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
181	8	0.0	0	0	0	0.0	0	0	0	3.8	42	8835	147.25
189	8	24.5	6	555	9.25	46.8	7	1560	26	240.0	52	11505	191.75
190	8	1.0	5	210	3.5	1.0	5	210	3.5	29.9	56	7380	123
193	8	0.1	3	180	3	0.1	3	240	4	0.1	4	315	5.25
195	8	0.0	0	0	0	0.0	0	0	0	2.8	44	10545	175.75
196	8	0.0	0	0	0	0.0	0	0	0	0.0	1	495	8.25
197	8	0.0	3	165	2.75	0.1	4	270	4.5	2.8	43	8385	139.75

Appendix B Annual Average Overflow Volume

Modeled Typical Year CSO Activations: Post-IOAP, Current, and Pre-IOAP Conditions

CSO	IOAP Approved Level of Control	Modeled Typical Year Activations for Post-IOAP Conditions ¹				Modeled Typical Year Activations for Current Conditions ²				Modeled Typical Year Activations for Pre-IOAP Conditions ³			
		Volume (MG)	Typical Year Modeled Activations	Typical Year Modeled Total Minutes Activated	Typical Year Modeled Total Hours Activated	Volume (MG)	Typical Year Modeled Activations	Typical Year Modeled Total Minutes Activated	Typical Year Modeled Total Hours Activated	Volume (MG)	Typical Year Modeled Activations	Typical Year Modeled Total Minutes Activated	Typical Year Modeled Total Hours Activated
198	N/A ⁵	0.0	2	150	2.5	0.1	2	255	4.25	0.1	4	510	8.5
199	8	0.0	1	150	2.5	0.1	1	285	4.75	0.7	24	7605	126.75
200	8	0.0	0	0	0	0.0	0	0	0	2.2	45	12120	202
201	N/A ⁵	0.4	5	240	4	0.4	7	495	8.25	0.7	11	1245	20.75
202	8	0.0	1	150	2.5	0.0	1	285	4.75	0.1	6	1695	28.25
203	N/A ⁵	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
206	N/A - CSO eliminated ⁴	N/A - CSO eliminated ⁴								N/A - CSO eliminated ⁴			
207	N/A ⁵	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
208	N/A ⁵	0.2	4	375	6.25	0.2	6	375	6.25	0.7	21	4890	81.5
210	8	1.7	7	375	6.25	4.0	8	1800	30	19.4	31	5835	97.25
211	8	34.4	8	690	11.5	137.4	9	1980	33	1090.4	62	18585	309.75
SBR	N/A ⁵	5.3	5	645	10.75	7.7	9	765	12.75	46.1	38	27015	450.25

¹Post-IOAP Condition results are based on model simulations of the 2001 Typical Year with the "baseline" projects implemented (Sanitary Sewer Discharge Plan and other existing Combined Sewer System facility improvements) and the most recently compiled Long Term Control Plan project model. This model reflects the most recently approved minor modifications to projects. Modeling results assume MFWQTC operating at full capacity. The data reflects the construction of the current approved suite of IOAP projects, with some minor modifications to the results based on projected optimization and projected revision of the RTC. Additional revisions to RTC and programming is anticipated as projects are completed and RTC is optimized. Modeling results demonstrate that the system, as currently designed, will perform slightly better than the approved plan. However, this data is provided for information only. The modeling results do not reflect a specific commitment to a set number of activations, cumulative volume or total minutes of overflow at each CSO, nor do they represent a cumulative commitment to residual AAOV. Target commitments for each CSO are based on the approved Level of Control for activations. Target commitment residual AAOV for the system remains 340 MG (98% capture) for the system.

²Current Condition results are based on model simulations of the 2001 Typical Year with current upstream SSDP conditions and the current average available treatment plant capacity. The model reflects projects certified through June 30, 2019. Partial construction of projects was not included.

³Pre-IOAP results are based on model simulations of the 2001 Typical Year with no baseline projects or IOAP projects constructed. Model results reflect calibration modifications to the model that occurred after the onset of the IOAP.

⁴These CSOs have been or will be eliminated (i.e., closed & removed from permit) by 2020 via implementation of Long Term Control Plan projects.

⁵These CSOs were originally modeled or had baseline modeling conditions causing them to activate less than or equal to 8 times per Typical Year and thus do not have an associated project in the approved IOAP. Some were revised later with updated model geometry and were corrected with CMOM activities.

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Appendix C CSO Flow Monitoring Data

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO015	7/16/2018 7:45	8/22/2018 7:00	53235	0.28	724,293,932	8.76	0.18	3	Atlas		202,802,301	1
	8/22/2018 17:15	8/23/2018 10:45	1050	0.06	102,367	4.55	0.05	1	Atlas		6,142	1
	9/17/2018 9:15	9/19/2018 23:00	3705	0.08	1,417,613	0.08	0.03	12	Atlas		113,409	1
	9/23/2018 4:45	9/26/2018 21:15	5310	1.87	133,616,873	6.28	0.69	24	Atlas		249,863,552	1
	10/4/2018 16:15	10/5/2018 9:00	1005	0.04	290,375	0.06	0.03	1	Atlas		11,615	1
	10/6/2018 20:45	10/9/2018 11:30	3765	0.03	196,167	0.1	0.03	1	Atlas		5,885	1
	10/10/2018 18:45	10/10/2018 20:00	75	0.33	9,606	0.43	0.27	1	Atlas		3,170	1
	4/14/2019 2:30	4/14/2019 11:00	510	1.03	25,735,943	1.82	0.47	12	Atlas		26,508,021	1
	4/16/2019 7:00	4/16/2019 20:15	795	Discharge	0	1.18					343,608	
	4/19/2019 20:00	4/22/2019 20:15	4335	2.44	94,341,075	4.27	0.92	24	Atlas		230,192,222	1
	4/26/2019 2:45	4/26/2019 5:45	180	0.96	5,697,632	3.76	0.31	48	Atlas		5,469,727	1
	5/2/2019 11:45	5/2/2019 15:15	210	0.1	129,270	0.65	0.09	1	Atlas		12,927	1
	5/3/2019 5:15	5/3/2019 18:30	795	1.22	38,828,000	1.37	0.67	6	Atlas		47,370,160	1
	5/15/2019 13:15	5/15/2019 19:15	360	0.01	215,100	0.43	0.01	1	Atlas		2,151	1
	5/22/2019 17:15	5/22/2019 22:15	300	0.01	1,175,300	0.32	0.01	1	Atlas		11,753	1
	5/26/2019 18:00	5/26/2019 21:00	180	0.41	16,317	0.65	0.25	3	Atlas		6,690	1
	5/29/2019 15:00	5/29/2019 20:45	345	0.63	34,241	1.13	0.34	6	Atlas		21,572	1
	5/30/2019 15:30	5/30/2019 16:15	45	0.35	2,449	1.39	0.16	3	Atlas		857	1
	6/5/2019 9:30	6/5/2019 20:15	645	0.05	476,520	1.11	0.03	6	Atlas		23,826	1
	6/6/2019 8:00	6/6/2019 22:30	870	1.21	29,830	1.53	0.95	1	Atlas		36,094	1
	6/9/2019 10:45	6/9/2019 19:30	525	0.92	6,791	2.59	0.30	24	Atlas		6,248	1
	6/16/2019 20:30	6/16/2019 21:30	60	1.95	4,492,813	1.75	0.91	6	Atlas		8,760,986	1
	6/17/2019 9:30	6/17/2019 20:30	660	1.95	22,365	2.28	0.91	6	Atlas		43,612	1
	6/22/2019 11:00	6/23/2019 0:00	780	0.96	21,906	3.55	0.37	24	Atlas		21,030	1
	6/23/2019 16:30	6/23/2019 20:15	225	0.58	1,530,333	3.84	0.45	1	Atlas		887,593	1
	6/24/2019 14:15	6/24/2019 22:00	465	0.66	1,223,295	2.67	0.39	3	Atlas		807,375	1
CSO015 Total											773,332,526	25
CSO016	7/2/2018 19:00	7/2/2018 21:00	120	0.1	26,720,050	0.88	0.09	1	Atlas		2,672,005	1
	7/3/2018 16:45	7/3/2018 19:15	150	0.11	26,944,955	0.58	0.06	6	Atlas		2,963,945	1
	7/16/2018 10:30	7/16/2018 12:15	105	0.36	1,074,556	0.46	0.24	1	Atlas		386,840	1
	7/20/2018 20:00	7/21/2018 1:30	330	0.71	14,417,713	1.18	0.27	24	Atlas		10,236,576	1
	7/31/2018 1:30	7/31/2018 16:15	885	2.18	10,493,513	2.43	1.28	6	Cloudburst		22,875,859	1
	8/15/2018 20:30	8/16/2018 14:45	1095	3.98	8,516,644	3.98	6.05	24	Cloudburst		33,896,244	1
	8/20/2018 11:30	8/20/2018 13:45	135	0.69	5,064,535	4.47	0.34	1	Atlas		3,494,529	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO016	8/31/2018 17:00	8/31/2018 18:00	60	1.18	187,323	1.18	0.88	1	Atlas		221,041	1
	9/8/2018 17:00	9/9/2018 1:45	525	3.53	4,835,341	3.86	10.51	6	Cloudburst		17,068,752	1
	9/22/2018 16:45	9/22/2018 19:15	150	1.85	723,274	0.85	0.68	24	Atlas		1,338,057	1
	9/23/2018 5:00	9/23/2018 9:15	255	1.85	3,593,695	2.05	0.68	24	Atlas		6,648,336	1
	9/24/2018 7:30	9/24/2018 17:15	585	2.72	6,818,311	4.76	2.69	6	Cloudburst		18,545,807	1
	9/25/2018 16:45	9/26/2018 5:00	735	1.08	7,673,583	5.87	0.50	1	Atlas		8,287,470	1
	10/10/2018 16:45	10/10/2018 18:45	120	0.45	1,326,918	0.58	0.38	1	Atlas		597,113	1
	10/31/2018 17:15	11/1/2018 4:30	675	2.58	2,262,869	2.37	0.90	24	Atlas		5,838,201	1
	11/1/2018 16:45	11/1/2018 18:45	120	2.58	46,793	3.08	0.90	24	Atlas		120,726	1
	11/5/2018 21:15	11/6/2018 3:00	345	1.44	5,940,701	4.11	0.78	6	Atlas		8,554,610	1
	11/14/2018 23:15	11/15/2018 6:30	435	0.46	20,679,787	0.69	0.21	12	Atlas		9,512,702	1
	12/1/2018 4:30	12/1/2018 17:45	795	1.69	13,009,713	1.89	0.75	12	Atlas		21,986,415	1
	12/15/2018 3:00	12/15/2018 13:30	630	1.61	7,756,942	1.62	0.64	12	Atlas		12,488,676	1
	12/27/2018 18:30	12/27/2018 21:15	165	0.4	5,750,873	0.72	0.23	1	Atlas		2,300,349	1
	12/31/2018 6:00	12/31/2018 23:45	1065	1.58	16,546,460	2	0.61	24	Atlas		26,143,407	1
	1/4/2019 14:45	1/4/2019 20:45	360	0.59	14,263,337	2.15	0.28	3	Atlas		8,415,369	1
	1/19/2019 7:15	1/19/2019 22:30	915	1.06	1,551,845	1.31	0.41	24	Atlas		1,644,956	1
	1/23/2019 9:45	1/23/2019 20:15	630	1.07	17,287,259	2.25	0.44	12	Atlas		18,497,367	1
	2/6/2019 7:00	2/6/2019 12:45	345	1.82	1,467,620	0.94	0.58	48	Atlas		2,671,069	1
	2/7/2019 9:45	2/8/2019 1:00	915	1.82	6,521,008	1.98	0.58	48	Atlas		11,868,234	1
	2/11/2019 2:30	2/12/2019 18:15	2385	3.15	19,064,456	5.09	0.99	48	Atlas		60,053,037	1
	2/20/2019 3:00	2/20/2019 20:15	1035	2.26	8,901,538	2.32	1.08	6	Cloudburst		20,117,477	1
	2/23/2019 17:45	2/24/2019 4:15	630	1.24	17,145,469	3.56	0.67	6	Atlas		21,260,381	1
	3/9/2019 14:15	3/10/2019 1:15	660	1.29	16,663,953	1.47	0.59	12	Atlas		21,496,499	1
	3/14/2019 7:15	3/14/2019 21:45	870	0.38	22,286,242	2.37	0.21	6	Atlas		8,468,772	1
	3/30/2019 16:00	3/31/2019 0:15	495	1.07	13,001,338	1.44	0.49	6	Atlas		13,911,432	1
	4/7/2019 12:00	4/7/2019 17:00	300	0.75	10,554,600	0.96	0.35	1	Atlas		7,915,950	1
	4/14/2019 1:45	4/14/2019 8:30	405	1.1	12,731,981	2.02	0.51	6	Atlas		14,005,179	1
	4/18/2019 21:45	4/19/2019 5:45	480	0.68	15,832,547	2.17	0.31	12	Atlas		10,766,132	1
	4/19/2019 18:45	4/20/2019 19:30	1485	2.53	20,600,166	4.54	0.96	24	Atlas		52,118,421	1
	4/24/2019 21:00	4/25/2019 1:15	255	1.05	4,920,076	3.87	0.34	48	Atlas		5,166,080	1
	4/25/2019 18:15	4/26/2019 5:00	645	1.05	3,543,785	4.43	0.34	48	Atlas		3,720,974	1
	5/3/2019 5:15	5/3/2019 12:15	420	1.19	8,945,736	1.41	0.64	6	Atlas		10,645,426	1
	5/26/2019 14:00	5/26/2019 21:15	435	0.45	19,224,782	0.76	0.27	3	Atlas		8,651,152	1
	5/29/2019 10:30	5/29/2019 17:30	420	0.72	10,619,168	1.23	0.39	6	Atlas		7,645,801	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO016	5/30/2019 12:15	5/30/2019 12:30	15	0.32	140,438	1.52	0.14	3	Atlas		44,940	1
	6/5/2019 21:00	6/6/2019 1:30	270	0.99	4,883,747	1.35	0.70	1	Atlas		4,834,910	1
	6/7/2019 22:15	6/8/2019 5:15	420	0.52	9,763,423	1.55	0.22	6	Atlas		5,076,980	1
	6/9/2019 1:00	6/9/2019 4:15	195	0.77	3,201,382	1.91	0.25	48	Atlas		2,465,064	1
	6/9/2019 15:45	6/9/2019 23:45	480	0.77	12,445,156	2.35	0.25	48	Atlas		9,582,770	1
	6/16/2019 7:30	6/16/2019 7:45	15	0.19	14,584	0.73	0.14	1	Atlas		2,771	1
	6/16/2019 18:45	6/17/2019 7:15	750	2.09	9,087,007	2.53	0.96	6	Atlas		18,991,845	1
	6/18/2019 16:45	6/18/2019 20:30	225	0.3	9,011,163	2.7	0.12	24	Atlas		2,703,349	1
	6/21/2019 19:45	6/22/2019 12:45	1020	0.54	18,515,006	3.81	0.36	3	Atlas		9,998,103	1
	6/23/2019 16:15	6/23/2019 20:45	270	0.61	8,046,098	3.96	0.48	1	Atlas		4,908,120	1
	6/24/2019 13:30	6/24/2019 19:00	330	0.65	10,384,154	2.67	0.38	3	Atlas		6,749,700	1
CSO016 Total											590,575,920	53
CSO018	8/16/2018 9:30	8/17/2018 16:45	1875	3.85	74,788	3.88	5.00	24	Cloudburst		287,932	1
	8/19/2018 20:30	8/20/2018 13:30	1020	1.7	121,691	5.92	1.67	3	Atlas		206,874	1
	9/9/2018 1:00	9/9/2018 13:15	735	2.51	210,282	3.21	1.97	6	Cloudburst		527,808	1
	9/23/2018 13:45	9/27/2018 5:45	5280	2.07	297,478	5.98	0.81	3	Atlas		615,779	1
	11/13/2018 11:30	11/13/2018 11:30	0	0.1	13,370	0.24	0.04	24	Atlas		1,337	1
	12/1/2018 16:15	12/2/2018 18:30	1575	1.53	386,022	1.73	0.67	12	Atlas		590,614	1
	2/8/2019 1:30	2/8/2019 21:15	1185	1.95	116,462	2.04	0.63	48	Atlas		227,101	1
	2/12/2019 1:15	2/13/2019 22:15	2700	3.02	158,331	4.99	0.95	48	Atlas		478,160	1
	2/20/2019 18:30	2/21/2019 5:45	675	1.9	160,073	1.97	0.86	6	Atlas		304,138	1
	4/20/2019 4:00	4/22/2019 1:45	2745	3.89	111,194	5.26	2.69	48	Cloudburst		432,545	1
CSO018 Total											3,672,288	10
CSO019	7/2/2018 18:15	7/2/2018 19:00	45	0.25	359,936	0.93	0.22	1	Atlas		89,984	1
	7/3/2018 13:00	7/3/2018 23:15	615	0.88	3,830,382	1.52	0.52	3	Atlas		3,370,736	1
	7/16/2018 9:15	7/16/2018 12:00	165	0.1	19,197,100	0.33	0.07	3	Atlas		1,919,710	1
	7/20/2018 19:00	7/21/2018 4:30	570	1.62	6,036,904	1.95	0.95	3	Atlas		9,779,785	1
	8/4/2018 18:00	8/8/2018 4:45	4965	Discharge	0	2.56				Data Under Review	3,328,294	
	8/15/2018 15:45	8/16/2018 21:00	1755	3.39	8,546,927	3.41	3.16	24	Cloudburst		28,974,084	1
	8/17/2018 8:00	8/17/2018 17:00	540	0.23	982,078	3.64	0.19	1	Atlas		225,878	1
	8/20/2018 11:15	8/20/2018 16:45	330	0.44	3,057,100	4.08	0.32	1	Atlas		1,345,124	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO019	8/21/2018 11:00	8/21/2018 13:15	135	0.11	323,400	4.24	0.06	3	Atlas		35,574	1
	8/22/2018 1:30	8/22/2018 1:45	15	0.11	931,291	4.26	0.06	3	Atlas		102,442	1
	8/31/2018 0:00	9/1/2018 0:00	1440	Discharge	0	1.93				Data Under Review	5,058,976	
	9/6/2018 11:30	9/6/2018 20:00	510	0.82	1,078,845	2.74	0.67	1	Atlas		884,653	1
	9/8/2018 0:30	9/9/2018 17:15	2445	0.24	135,477,483	4.64	0.13	3	Atlas		32,514,596	1
	9/21/2018 14:00	9/21/2018 22:45	525	0.57	6,048,049	0.63	0.32	1	Atlas		3,447,388	1
	9/22/2018 15:00	9/26/2018 18:45	5985	1.39	32,690,598	5.95	0.51	24	Atlas		45,439,931	1
	10/12/2018 22:15	10/13/2018 0:00	105	0.08	359,125	0.44	0.04	6	Atlas		28,730	1
	10/14/2018 4:00	10/15/2018 13:30	2010	0.24	1,848,796	0.79	0.13	3	Atlas		443,711	1
	10/19/2018 20:45	10/20/2018 0:30	225	0.17	340,053	0.58	0.10	1	Atlas		57,809	1
	10/26/2018 2:45	10/27/2018 1:45	1380	0.5	799,596	0.67	0.19	24	Atlas		399,798	1
	10/31/2018 11:45	11/2/2018 13:15	2970	2.63	6,374,737	3.16	0.90	24	Atlas		16,765,559	1
	11/4/2018 19:00	11/4/2018 19:30	30	0.09	869,300	2.71	0.05	3	Atlas		78,237	1
	11/5/2018 19:30	11/6/2018 14:15	1125	1.15	7,294,617	3.87	0.62	6	Atlas		8,388,809	1
	11/9/2018 3:30	11/9/2018 9:45	375	0.12	657,992	1.36	0.06	6	Atlas		78,959	1
	11/12/2018 21:30	11/12/2018 21:30	0	0.09	52,600	0.83	0.03	24	Atlas		4,734	1
	11/13/2018 6:00	11/13/2018 9:00	180	0.09	217,144	0.22	0.03	24	Atlas		19,543	1
	11/14/2018 20:15	11/16/2018 0:00	1665	0.44	17,112,420	0.68	0.20	12	Atlas		7,529,465	1
	11/24/2018 0:00	11/24/2018 12:00	720	0.34	546,479	0.35	0.18	6	Atlas		185,803	1
	11/25/2018 23:45	11/26/2018 3:00	195	0.06	733,467	0.41	0.03	12	Atlas		44,008	1
	11/30/2018 1:30	11/30/2018 2:00	30	0.06	167,450	0.5	0.04	1	Atlas		10,047	1
	12/1/2018 3:00	12/2/2018 4:00	1500	1.62	9,326,738	1.8	0.71	12	Atlas		15,109,315	1
	12/14/2018 14:45	12/15/2018 22:15	1890	1.91	6,945,205	1.93	0.78	12	Atlas		13,265,341	1
	12/20/2018 14:15	12/21/2018 9:15	1140	0.59	618,471	2.51	0.23	24	Atlas		364,898	1
	12/27/2018 17:45	12/27/2018 20:30	165	0.42	4,332,521	0.79	0.19	12	Atlas		1,819,659	1
	12/31/2018 4:45	12/31/2018 23:00	1095	1.36	8,604,620	1.8	0.52	24	Atlas		11,702,283	1
	1/4/2019 14:15	1/5/2019 7:00	1005	0.69	6,449,867	2.05	0.34	3	Atlas		4,450,408	1
	1/12/2019 6:45	1/13/2019 8:45	1560	0.19	898,126	0.42	0.09	6	Atlas		170,644	1
	1/17/2019 12:45	1/17/2019 12:45	0	0.11	25,673	0.5	0.05	1	Atlas		2,824	1
	1/19/2019 6:30	1/20/2019 19:15	2205	0.95	8,024,666	1.28	0.37	24	Atlas		7,623,433	1
	1/23/2019 3:45	1/24/2019 1:45	1320	1.09	7,767,753	2.15	0.44	12	Atlas		8,466,851	1
	2/6/2019 5:15	2/8/2019 4:15	2820	1.59	9,227,577	1.73	0.51	48	Atlas		14,671,848	1
	2/9/2019 6:45	2/9/2019 9:30	165	Discharge	0	1.7				Affected by River Flooding	270,781	
	2/10/2019 18:00	2/12/2019 17:45	2865	2.9	5,028,170	4.6	0.91	48	Atlas		14,581,694	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO019	2/14/2019 10:00	2/14/2019 13:45	225	Discharge	0	3.45				Affected by River Flooding	4,311,118	
	2/20/2019 1:45	2/21/2019 6:45	1740	1.99	9,307,231	2.05	0.89	6	Atlas		18,521,390	1
	2/23/2019 17:15	2/24/2019 2:45	570	0.91	20,005,327	2.97	0.49	6	Atlas		18,204,848	1
	3/9/2019 13:30	3/10/2019 4:30	900	0.99	11,853,979	1.13	0.48	6	Atlas		11,735,439	1
	3/14/2019 5:15	3/15/2019 5:00	1425	0.98	6,580,622	2.09	0.45	1	Atlas		6,449,010	1
	3/30/2019 15:15	3/31/2019 1:15	600	1.19	9,678,065	1.5	0.53	6	Atlas		11,516,897	1
	4/7/2019 6:45	4/7/2019 17:45	660	0.76	6,805,300	0.97	0.44	1	Atlas		5,172,028	1
	4/14/2019 1:15	4/14/2019 9:45	510	1.07	5,931,748	1.95	0.50	6	Atlas		6,346,970	1
	6/30/2019 17:30	6/30/2019 18:45	75	0.15	7,915,580	0.78	0.08	6	Atlas		1,187,337	1
CSO019 Total											346,497,383	47
CSO020	7/2/2018 17:30	7/2/2018 20:15	165	0.4	5,213,068	1.12	0.33	1	Atlas		2,085,227	1
	7/3/2018 15:30	7/3/2018 18:00	150	0.47	3,245,536	1.26	0.35	1	Atlas		1,525,402	1
	7/20/2018 19:15	7/21/2018 0:30	315	1.82	2,605,574	2.1	1.40	3	Atlas		4,742,144	1
	7/22/2018 17:15	7/22/2018 19:00	105	0.19	4,947,947	2.22	0.13	1	Atlas		940,110	1
	7/31/2018 0:30	7/31/2018 14:30	840	1.82	3,798,227	1.86	0.83	1	Atlas		6,912,773	1
	8/10/2018 3:15	8/10/2018 7:00	225	Discharge	0	0.18					883,123	
	8/16/2018 3:15	8/16/2018 16:45	810	2.55	4,384,296	2.56	0.98	24	Atlas		11,179,954	1
	8/17/2018 13:30	8/23/2018 21:15	9105	Discharge	0	3.27				Data Under Review	116,377,257	
	8/31/2018 17:45	9/1/2018 20:30	1605	0.3	4,026,727	0.33	0.19	3	Atlas		1,208,018	1
	9/6/2018 11:30	9/7/2018 2:00	870	0.29	2,685,993	0.6	0.24	1	Atlas		778,938	1
	9/7/2018 12:30	9/9/2018 6:00	2490	0.01	293,940,000	3.49	0.01	1	Atlas		2,939,400	1
	9/21/2018 14:15	9/22/2018 1:30	675	0.37	12,671,608	0.42	0.20	6	Atlas		4,688,495	1
	9/22/2018 14:15	9/22/2018 19:30	315	1.22	4,440,989	0.77	0.46	24	Atlas		5,418,006	1
	9/23/2018 4:00	9/23/2018 11:15	435	1.22	1,355,287	1.64	0.46	24	Atlas		1,653,450	1
	10/2/2018 23:15	10/5/2018 0:45	2970	Discharge	0	0.32					361,276	
	10/5/2018 11:15	10/5/2018 23:15	720	Discharge	0	0.02					55,833	
	10/6/2018 14:00	10/6/2018 19:15	315	Discharge	0	0.02					31,207	
	10/8/2018 20:30	10/8/2018 21:30	60	Discharge	0	0.02					1,703	
	10/10/2018 16:00	10/11/2018 1:15	555	0.13	1,819,238	0.15	0.09	1	Atlas		236,501	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO020	10/11/2018 21:00	10/11/2018 23:30	150	Discharge	0	0.15					542	
	10/12/2018 19:15	10/13/2018 1:15	360	0.09	1,218,989	0.22	0.05	6	Atlas		109,709	1
	10/14/2018 5:45	10/14/2018 22:30	1005	0.25	519,180	0.47	0.13	3	Atlas		129,795	1
	10/15/2018 9:15	10/16/2018 0:30	915	0.11	4,132,718	0.58	0.08	1	Atlas		454,599	1
	10/16/2018 10:00	10/16/2018 13:15	195	Discharge	0	0.58					10,917	
	10/19/2018 21:30	10/20/2018 0:00	150	0.11	292,691	0.49	0.06	6	Atlas		32,196	1
	10/26/2018 9:00	10/27/2018 1:00	960	0.22	2,134,264	0.33	0.08	24	Atlas		469,538	1
CSO020 Total											163,226,113	18
CSO022	7/3/2018 16:00	7/3/2018 16:15	15	0.46	368,109	1.07	0.36	1	Atlas		169,330	1
	7/20/2018 5:00	7/20/2018 5:00	0	1.81	18,201	0.54	1.23	3	Atlas		32,943	1
	7/20/2018 19:30	7/20/2018 21:15	105	1.81	1,045,814	2.19	1.23	3	Atlas		1,892,924	1
	7/31/2018 1:30	7/31/2018 1:45	15	1.74	296,933	0.62	0.77	6	Atlas		516,663	1
	8/10/2018 7:30	8/10/2018 15:15	465	Discharge	0	0.13					3,000,000	
	9/21/2018 13:45	9/21/2018 17:15	210	0.47	169,587	0.52	0.26	1	Atlas		79,706	1
	9/24/2018 7:15	9/24/2018 10:45	210	1.43	258,660	3.04	0.66	6	Atlas		369,884	1
	9/25/2018 16:15	9/25/2018 17:30	75	0.7	372,399	3.89	0.30	12	Atlas		260,679	1
	9/26/2018 1:45	9/26/2018 1:45	0	0.7	124	4.11	0.30	12	Atlas		87	1
	10/10/2018 16:15	10/10/2018 16:15	0	0.17	142,700	0.12	0.11	3	Atlas		24,259	1
	10/31/2018 17:00	11/1/2018 19:30	1590	1.83	641,005	2.11	0.64	24	Atlas		1,173,040	1
	11/5/2018 21:45	11/5/2018 23:15	90	0.86	133,859	2.62	0.46	6	Atlas		115,119	1
	11/24/2018 9:15	11/24/2018 9:30	15	0.26	1,555,227	0.27	0.14	6	Atlas		404,359	1
	2/12/2019 4:45	2/12/2019 5:45	60	2.86	619,460	4.17	0.90	48	Atlas		1,771,657	1
	2/20/2019 5:15	2/20/2019 7:00	105	1.36	2,256,828	1.31	0.61	6	Atlas		3,069,286	1
	3/14/2019 17:00	3/14/2019 17:15	15	0.38	900,255	1.6	0.25	3	Atlas		342,097	1
	5/3/2019 4:45	5/3/2019 5:15	30	0.88	133,953	0.61	0.48	6	Atlas		117,879	1
	6/5/2019 20:45	6/5/2019 21:00	15	0.91	505,329	0.99	0.66	1	Atlas		459,849	1
	6/9/2019 16:45	6/9/2019 17:00	15	0.39	655,977	1.87	0.19	6	Atlas		255,831	1
	6/16/2019 19:30	6/16/2019 21:00	90	2.41	337,924	2.53	1.58	12	Cloudburst		814,397	1
	6/18/2019 16:15	6/18/2019 16:30	15	0.48	890,308	3.55	0.38	1	Atlas		427,348	1
	6/21/2019 19:15	6/21/2019 19:15	0	0.53	83,526	3.89	0.35	3	Atlas		44,269	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.25	456,492	4.09	0.18	1	Atlas		114,123	1
	6/24/2019 13:30	6/24/2019 13:45	15	0.42	156,712	2.49	0.27	3	Atlas		65,819	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO022 Total											15,521,548	23
CSO023	7/20/2018 20:45	7/20/2018 20:45	0	1.81	108,953	2.1	1.23	3	Atlas		197,205	1
	7/31/2018 2:15	7/31/2018 2:15	0	1.74	98,090	1.18	0.77	6	Atlas		170,676	1
CSO023 Total											367,881	2
CSO027	7/31/2018 2:00	7/31/2018 2:00	0	1.94	31	1.22	0.78	6	Atlas		61	1
	8/20/2018 11:00	8/20/2018 11:15	15	0.72	3,915	3.57	0.57	1	Atlas		2,819	1
	9/8/2018 17:30	9/8/2018 21:00	210	2.68	178,234	2.58	1.75	6	Cloudburst		477,666	1
	12/31/2018 13:15	12/31/2018 16:15	180	1.3	1,626	1.69	0.50	12	Atlas		2,114	1
	6/16/2019 19:45	6/16/2019 19:45	0	2.14	956	1.74	0.97	3	Atlas		2,045	1
CSO027 Total											484,705	5
CSO028	7/20/2018 19:15	7/20/2018 20:45	90	0.94	29	1.2	0.42	3	Atlas		27	1
	7/31/2018 1:30	7/31/2018 7:00	330	1.94	14,880	1.84	0.78	6	Atlas		28,868	1
	8/16/2018 3:45	8/16/2018 8:45	300	2.81	256	2.61	1.45	24	Cloudburst		719	1
	9/8/2018 19:45	9/8/2018 20:15	30	2.68	122,962	2.3	1.75	6	Cloudburst		329,538	1
	3/14/2019 17:15	3/14/2019 17:15	0	0.51	34,939	1.86	0.34	3	Atlas		17,819	1
	5/3/2019 4:45	5/3/2019 4:45	0	0.84	495	0.51	0.45	6	Atlas		416	1
	6/9/2019 16:45	6/9/2019 16:45	0	0.53	28,709	2.05	0.27	3	Atlas		15,216	1
	6/16/2019 19:30	6/16/2019 20:45	75	2.14	10,870	1.96	0.97	3	Atlas		23,262	1
	6/18/2019 16:15	6/18/2019 16:15	0	0.24	2,467	2.71	0.09	24	Atlas		592	1
	6/21/2019 19:15	6/21/2019 19:15	0	0.8	6,813	3.25	0.53	3	Atlas		5,450	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.36	23,933	4.04	0.28	1	Atlas		8,616	1
CSO028 Total											430,523	11
CSO029	7/3/2018 14:15	7/3/2018 14:15	0	0.27	730	0.63	0.20	1	Atlas		197	1
	7/20/2018 18:15	7/20/2018 19:00	45	0.94	48,532	0.61	0.42	3	Atlas		45,620	1
	7/30/2018 23:45	7/31/2018 5:30	345	1.94	510,745	1.62	0.78	6	Atlas		990,846	1
	8/15/2018 18:00	8/16/2018 7:00	780	2.81	102,025	2.27	1.45	24	Cloudburst		286,691	1
	8/20/2018 11:15	8/20/2018 11:15	0	0.72	330,874	3.57	0.57	1	Atlas		238,229	1
	9/8/2018 17:15	9/8/2018 22:15	300	2.68	2,990,656	2.8	1.75	6	Cloudburst		8,014,957	1
	9/21/2018 17:30	9/21/2018 17:30	0	0.39	1,172,885	0.44	0.21	6	Atlas		457,425	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO029	9/22/2018 16:30	9/22/2018 16:45	15	1.42	342,692	0.81	0.53	24	Atlas		486,623	1
	9/23/2018 4:15	9/23/2018 6:45	150	1.42	2,192,175	1.79	0.53	24	Atlas		3,112,889	1
	9/24/2018 7:15	9/24/2018 13:45	390	1.45	2,738,383	3.24	0.68	6	Atlas		3,970,655	1
	9/25/2018 5:45	9/25/2018 5:45	0	0.06	6,288,667	3.32	0.05	1	Atlas		377,320	1
	9/25/2018 16:30	9/26/2018 2:00	570	0.77	3,704,361	4.02	0.33	12	Atlas		2,852,358	1
	10/10/2018 16:15	10/10/2018 16:30	15	0.19	53,453	0.12	0.13	1	Atlas		10,156	1
	6/16/2019 19:30	6/16/2019 20:30	60	2.14	27,914	1.87	0.97	3	Atlas		59,736	1
CSO029 Total											20,903,702	14
CSO031	8/20/2018 11:30	8/20/2018 11:30	0	0.72	19,914	3.57	0.57	1	Atlas		14,338	1
	9/8/2018 17:30	9/8/2018 21:15	225	2.68	48,749	2.64	1.75	6	Cloudburst		130,646	1
	2/20/2019 5:30	2/20/2019 5:30	0	1.4	179	1.08	0.63	6	Atlas		250	1
	3/14/2019 17:30	3/14/2019 17:30	0	0.51	2,535	1.86	0.34	3	Atlas		1,293	1
	5/3/2019 5:00	5/3/2019 5:00	0	0.84	876	0.57	0.45	6	Atlas		736	1
	6/9/2019 17:00	6/9/2019 17:00	0	0.53	1,851	2.07	0.27	3	Atlas		981	1
	6/16/2019 19:45	6/16/2019 21:00	75	2.14	914	1.99	0.97	3	Atlas		1,957	1
	6/21/2019 19:30	6/21/2019 19:30	0	0.8	284	3.27	0.53	3	Atlas		227	1
	6/23/2019 16:15	6/23/2019 16:15	0	0.36	4,194	3.82	0.28	1	Atlas		1,510	1
	6/24/2019 13:45	6/24/2019 13:45	0	0.4	1,248	2.38	0.25	3	Atlas		499	1
CSO031 Total											152,437	10
CSO034	7/20/2018 5:00	7/20/2018 5:00	0	0.94	155	0.48	0.42	3	Atlas		146	1
	7/20/2018 19:30	7/20/2018 21:00	90	0.94	43,086	1.22	0.42	3	Atlas		40,501	1
	7/31/2018 1:30	7/31/2018 7:15	345	1.94	188,848	1.84	0.78	6	Atlas		366,365	1
	8/15/2018 20:00	8/16/2018 8:45	765	2.81	8,298	2.61	1.45	24	Cloudburst		23,318	1
	8/20/2018 11:15	8/20/2018 11:30	15	0.72	34,161	3.57	0.57	1	Atlas		24,596	1
	9/8/2018 17:30	9/8/2018 21:15	225	2.68	86,782	2.64	1.75	6	Cloudburst		232,576	1
	9/21/2018 17:30	9/21/2018 17:30	0	0.39	7,600	0.44	0.21	6	Atlas		2,964	1
	9/23/2018 4:15	9/23/2018 6:45	150	1.42	69	1.79	0.53	24	Atlas		98	1
	9/24/2018 7:15	9/24/2018 13:45	390	1.45	1,298	3.24	0.68	6	Atlas		1,882	1
	9/25/2018 5:45	9/25/2018 5:45	0	0.06	1,100	3.32	0.05	1	Atlas		66	1
	9/25/2018 16:30	9/26/2018 2:15	585	0.77	7,888	4.05	0.33	12	Atlas		6,074	1
	11/1/2018 0:30	11/1/2018 2:15	105	1.93	36	1.71	0.69	24	Atlas		69	1
	12/31/2018 16:15	12/31/2018 16:15	0	1.3	257	1.69	0.50	12	Atlas		334	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO034	2/8/2019 20:15	2/9/2019 0:30	255	Discharge	0	1.76				Data Under Review	18,674	
	3/14/2019 17:15	3/14/2019 17:15	0	0.51	65,847	1.86	0.34	3	Atlas		33,582	1
	4/24/2019 20:30	4/24/2019 20:30	0	1.09	3,572	2.82	0.35	48	Atlas		3,894	1
	5/3/2019 4:45	5/3/2019 4:45	0	0.84	40,921	0.51	0.45	6	Atlas		34,374	1
	6/5/2019 20:30	6/5/2019 21:00	30	0.8	29,313	0.91	0.58	1	Atlas		23,450	1
	6/9/2019 16:45	6/9/2019 16:45	0	0.53	92,745	2.05	0.27	3	Atlas		49,155	1
	6/16/2019 19:30	6/16/2019 20:45	75	2.14	50,668	1.96	0.97	3	Atlas		108,429	1
	6/18/2019 16:15	6/18/2019 16:15	0	0.24	152,025	2.71	0.09	24	Atlas		36,486	1
	6/21/2019 19:15	6/21/2019 19:15	0	0.8	45,008	3.25	0.53	3	Atlas		36,006	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.36	78,931	4.04	0.28	1	Atlas		28,415	1
	6/24/2019 13:30	6/24/2019 13:30	0	0.4	40,900	2.34	0.25	3	Atlas		16,360	1
CSO034 Total											1,087,814	23
CSO035	12/1/2018 9:15	12/1/2018 13:00	225	1.21	185,055	1.17	0.51	12	Atlas		223,917	1
	12/15/2018 4:00	12/15/2018 4:30	30	1.66	77,093	0.97	0.70	12	Atlas		127,975	1
	12/27/2018 17:45	12/27/2018 17:45	0	0.41	324,249	0.55	0.27	1	Atlas		132,942	1
	12/31/2018 12:15	12/31/2018 16:30	255	1.17	114,215	1.57	0.45	24	Atlas		133,631	1
	3/30/2019 15:45	3/30/2019 20:00	255	0.92	431,857	1.23	0.44	6	Atlas		397,308	1
	4/7/2019 12:00	4/7/2019 12:30	30	0.48	524,392	0.57	0.22	12	Atlas		251,708	1
	4/24/2019 20:30	4/24/2019 20:30	0	0.58	1,853	2.76	0.29	1	Atlas		1,075	1
	5/3/2019 4:45	5/3/2019 4:45	0	0.86	21,407	0.5	0.46	6	Atlas		18,410	1
	6/5/2019 20:45	6/5/2019 20:45	0	0.83	19,477	0.88	0.62	1	Atlas		16,166	1
	6/9/2019 16:30	6/9/2019 16:45	15	0.59	39,044	2.22	0.32	3	Atlas		23,036	1
	6/16/2019 19:30	6/16/2019 20:45	75	1.87	17,256	1.71	0.85	12	Atlas		32,268	1
	6/18/2019 16:15	6/18/2019 16:15	0	0.21	387,281	2.36	0.08	24	Atlas		81,329	1
	6/21/2019 19:15	6/21/2019 19:15	0	0.76	1,580	2.88	0.51	3	Atlas		1,201	1
	6/23/2019 15:45	6/23/2019 16:00	15	0.28	11,529	3.68	0.21	1	Atlas		3,228	1
	6/24/2019 13:30	6/24/2019 13:30	0	0.41	4,107	2.2	0.26	3	Atlas		1,684	1
CSO035 Total											1,445,878	15
CSO036	7/2/2018 18:00	7/2/2018 18:15	15	0.27	467,552	0.86	0.22	1	Atlas		126,239	1
	7/3/2018 16:00	7/3/2018 16:15	15	0.36	203,306	0.92	0.27	1	Atlas		73,190	1
	9/24/2018 11:15	9/24/2018 14:00	165	1.35	29,212	2.83	0.64	6	Atlas		39,436	1
	9/25/2018 5:45	9/25/2018 6:00	15	0.06	936,600	2.92	0.05	1	Atlas		56,196	1
	9/25/2018 16:30	9/26/2018 2:30	600	0.67	451,234	3.55	0.29	12	Atlas		302,327	1
	10/10/2018 16:30	10/10/2018 16:30	0	0.11	345,327	0.07	0.07	3	Atlas		37,986	1
	10/15/2018 9:00	10/15/2018 9:15	15	0.17	65,106	0.62	0.10	1	Atlas		11,068	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO036	10/31/2018 15:00	11/1/2018 16:15	1515	1.71	41,119	1.91	0.60	24	Atlas		70,313	1
	11/5/2018 21:15	11/6/2018 0:15	180	0.82	104,828	2.57	0.44	6	Atlas		85,959	1
	2/6/2019 7:00	2/6/2019 7:00	0	1.48	1,504	0.57	0.48	48	Atlas		2,226	1
	2/20/2019 5:30	2/20/2019 6:15	45	1.44	5,253	1.31	0.66	6	Atlas		7,565	1
	3/9/2019 13:30	3/9/2019 15:15	105	0.99	8,795	0.7	0.45	12	Atlas		8,707	1
	3/14/2019 17:15	3/14/2019 17:30	15	0.43	37,002	1.76	0.30	1	Atlas		15,911	1
	3/30/2019 17:30	3/30/2019 17:30	0	0.92	450	0.89	0.44	6	Atlas		414	1
	4/7/2019 12:00	4/7/2019 12:00	0	0.48	1,219	0.55	0.22	12	Atlas		585	1
	4/24/2019 20:45	4/24/2019 20:45	0	0.58	52,383	2.8	0.29	1	Atlas		30,382	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.33	4,761	3.17	0.15	12	Atlas		1,571	1
	5/3/2019 5:00	5/3/2019 5:15	15	0.86	12,623	0.61	0.46	6	Atlas		10,856	1
	6/5/2019 20:45	6/5/2019 21:15	30	0.83	137,728	0.94	0.62	1	Atlas		114,314	1
	6/9/2019 0:30	6/9/2019 0:30	0	0.28	15,382	1.77	0.14	6	Atlas		4,307	1
	6/16/2019 19:45	6/16/2019 21:15	90	1.87	65,780	1.75	0.85	12	Atlas		123,008	1
	6/18/2019 16:30	6/18/2019 16:30	0	0.21	200,071	2.36	0.08	24	Atlas		42,015	1
	6/23/2019 16:15	6/23/2019 16:15	0	0.28	195,014	3.42	0.21	1	Atlas		54,604	1
	6/24/2019 13:45	6/24/2019 14:00	15	0.41	130,024	2.26	0.26	3	Atlas		53,310	1
CSO036 Total											1,272,489	24
CSO038	7/20/2018 19:30	7/20/2018 21:00	90	0.94	25,954	1.22	0.42	3	Atlas		24,397	1
	9/8/2018 17:30	9/8/2018 20:30	180	2.68	69,881	2.35	1.75	6	Cloudburst		187,282	1
	3/14/2019 17:30	3/14/2019 17:30	0	0.51	31,245	1.86	0.34	3	Atlas		15,935	1
	5/3/2019 5:00	5/3/2019 5:00	0	0.84	2,194	0.57	0.45	6	Atlas		1,843	1
	6/5/2019 20:45	6/5/2019 21:00	15	0.8	18,316	0.91	0.58	1	Atlas		14,653	1
	6/9/2019 17:00	6/9/2019 17:00	0	0.53	19,575	2.07	0.27	3	Atlas		10,375	1
CSO038 Total											254,485	6
CSO050	7/2/2018 13:15	7/2/2018 15:00	105	Discharge	0	0.79				Data Under Review	762,299	
	7/3/2018 10:00	7/3/2018 12:30	150	Discharge	0	1.01				Data Under Review	624,648	
	7/15/2018 14:45	7/15/2018 15:00	15	0.15	883,767	0.14	0.07	3	Atlas		132,565	1
	7/20/2018 15:30	7/20/2018 18:00	150	1.73	599,814	0.61	1.30	3	Atlas		1,037,678	1
	7/30/2018 20:00	7/31/2018 9:30	810	2.08	1,512,172	1.96	0.86	6	Atlas		3,145,318	1
	8/8/2018 0:45	8/8/2018 1:00	15	0.24	82,088	0.19	0.15	1	Atlas		19,701	1
	8/15/2018 12:45	8/16/2018 13:45	1500	3	1,064,340	2.98	1.78	24	Cloudburst		3,193,019	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO050	8/20/2018 11:15	8/20/2018 20:00	525	0.61	1,490,626	3.64	0.37	1	Atlas		909,282	1
	8/31/2018 16:45	8/31/2018 17:45	60	0.47	292,272	0.45	0.31	3	Atlas		137,368	1
	9/6/2018 11:45	9/6/2018 12:00	15	0.17	423,612	0.58	0.11	3	Atlas		72,014	1
	9/8/2018 0:45	9/8/2018 1:30	45	0.25	65,668	0.43	0.14	3	Atlas		16,417	1
	9/8/2018 15:15	9/9/2018 0:15	540	3.55	950,282	3.97	12.29	6	Cloudburst		3,373,501	1
	9/21/2018 14:00	9/21/2018 17:45	225	0.46	820,715	0.52	0.26	1	Atlas		377,529	1
	9/22/2018 15:00	9/22/2018 17:45	165	1.59	99,182	1	0.60	24	Atlas		157,699	1
	9/23/2018 4:00	9/23/2018 7:45	225	1.59	523,645	2.06	0.60	24	Atlas		832,596	1
	9/24/2018 0:45	9/24/2018 19:45	1140	1.99	914,789	3.94	0.85	6	Atlas		1,820,431	1
	9/25/2018 5:45	9/25/2018 6:15	30	1.99	64,940	4.04	0.85	6	Atlas		129,231	1
	9/25/2018 16:30	9/26/2018 2:45	615	1.02	793,294	5.03	0.45	12	Atlas		809,160	1
	10/10/2018 16:00	10/10/2018 17:30	90	0.34	612,947	0.38	0.27	1	Atlas		208,402	1
	10/12/2018 21:45	10/12/2018 21:45	0	0.1	1,470	0.44	0.05	6	Atlas		147	1
	10/14/2018 4:30	10/14/2018 4:45	15	0.27	19,615	0.67	0.14	3	Atlas		5,296	1
	10/15/2018 9:00	10/15/2018 9:15	15	0.16	97,575	0.84	0.10	1	Atlas		15,612	1
	10/19/2018 20:45	10/19/2018 21:15	30	0.14	5,007	0.63	0.08	1	Atlas		701	1
	10/26/2018 14:15	10/26/2018 16:00	105	0.34	101,097	0.46	0.13	24	Atlas		34,373	1
	10/31/2018 11:30	11/1/2018 17:45	1815	2.27	312,987	2.64	0.80	24	Atlas		710,481	1
	11/4/2018 18:45	11/4/2018 18:45	0	0.07	6,157	2.34	0.05	3	Atlas		431	1
	11/5/2018 19:30	11/6/2018 1:45	375	0.99	564,104	3.33	0.54	6	Atlas		558,463	1
	11/14/2018 22:00	11/15/2018 4:15	375	0.42	571,740	0.62	0.19	12	Atlas		240,131	1
	11/23/2018 21:45	11/24/2018 0:00	135	0.27	34,374	0.15	0.14	6	Atlas		9,281	1
	11/25/2018 23:45	11/26/2018 0:00	15	0.07	92,414	0.35	0.04	1	Atlas		6,469	1
	12/1/2018 3:00	12/1/2018 21:00	1080	1.45	563,770	1.64	0.60	12	Atlas		817,466	1
	12/14/2018 14:15	12/14/2018 14:30	15	1.55	3,767	0.12	0.64	12	Atlas		5,839	1
	12/15/2018 2:00	12/15/2018 11:00	540	1.55	714,566	1.53	0.64	12	Atlas		1,107,577	1
	12/20/2018 14:45	12/20/2018 21:30	405	0.47	32,106	1.91	0.18	24	Atlas		15,090	1
	12/27/2018 17:30	12/27/2018 18:45	75	0.36	358,594	0.64	0.21	1	Atlas		129,094	1
	12/31/2018 4:30	12/31/2018 17:30	780	1.59	612,652	1.97	0.62	12	Atlas		974,116	1
	1/4/2019 13:45	1/4/2019 20:00	375	0.53	284,426	2.1	0.25	3	Atlas		150,746	1
	1/12/2019 23:15	1/13/2019 0:30	75	0.18	34,106	0.37	0.08	12	Atlas		6,139	1
	1/17/2019 11:45	1/17/2019 11:45	0	0.12	24,100	0.5	0.06	12	Atlas		2,892	1
	1/19/2019 5:45	1/19/2019 20:15	870	1	275,831	1.11	0.38	24	Atlas		275,831	1
	1/23/2019 7:00	1/23/2019 17:15	615	0.97	281,002	2.06	0.39	12	Atlas		272,572	1
	2/4/2019 13:00	2/4/2019 14:15	75	0.11	75,891	0.15	0.06	3	Atlas		8,348	1
	2/6/2019 6:30	2/6/2019 10:00	210	1.61	145,807	0.8	0.52	48	Atlas		234,750	1
	2/7/2019 5:00	2/7/2019 19:45	885	1.61	191,307	1.75	0.52	48	Atlas		308,005	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO050	2/10/2019 19:00	2/12/2019 16:45	2745	3.03	734,773	4.75	0.95	48	Atlas		2,226,361	1
	2/20/2019 1:15	2/20/2019 17:30	975	1.6	1,194,203	1.65	0.71	6	Atlas		1,910,724	1
	2/23/2019 16:45	2/23/2019 22:45	360	0.89	973,945	2.55	0.49	6	Atlas		866,811	1
	3/9/2019 12:15	3/9/2019 19:15	420	1.14	710,045	1.29	0.55	6	Atlas		809,451	1
	3/14/2019 4:15	3/14/2019 8:00	225	0.36	71,514	1.64	0.20	6	Atlas		25,745	1
	3/14/2019 17:00	3/14/2019 19:00	120	0.48	1,764,456	2.08	0.32	3	Atlas		846,939	1
	3/25/2019 0:30	3/25/2019 5:00	270	0.3	20,383	0.36	0.16	6	Atlas		6,115	1
	3/30/2019 15:00	3/30/2019 20:30	330	1.07	964,188	1.45	0.48	6	Atlas		1,031,681	1
	4/7/2019 6:00	4/7/2019 13:45	465	0.62	524,726	0.84	0.28	12	Atlas		325,330	1
	4/12/2019 6:00	4/12/2019 6:00	0	0.1	21,550	0.71	0.06	1	Atlas		2,155	1
	4/14/2019 0:45	4/14/2019 5:15	270	0.86	706,849	1.57	0.40	6	Atlas		607,890	1
	4/14/2019 14:30	4/14/2019 14:30	0	0.03	61,100	0.99	0.03	1	Atlas		1,833	1
	4/18/2019 21:15	4/18/2019 22:45	90	2.59	12,125	1.35	0.84	48	Atlas		31,404	1
	4/19/2019 12:30	4/20/2019 9:00	1230	2.59	909,641	3.17	0.84	48	Atlas		2,355,969	1
	4/24/2019 20:30	4/24/2019 21:00	30	1.16	186,303	3.05	0.38	24	Atlas		216,112	1
	4/25/2019 17:45	4/25/2019 18:00	15	1.16	112,305	3.56	0.38	24	Atlas		130,274	1
	4/26/2019 2:15	4/26/2019 2:15	0	1.16	1,313	3.18	0.38	24	Atlas		1,523	1
	5/2/2019 11:15	5/2/2019 11:15	0	0.22	205,950	0.8	0.19	1	Atlas		45,309	1
	5/3/2019 4:30	5/3/2019 8:00	210	1.14	665,449	1.4	0.62	6	Atlas		758,612	1
	5/4/2019 17:15	5/4/2019 17:15	0	0.23	11,417	1.6	0.12	3	Atlas		2,626	1
	6/16/2019 5:45	6/16/2019 5:45	0	0.59	117,939	0.97	0.39	3	Atlas		69,584	1
CSO050 Total											35,921,156	63
CSO051	7/16/2018 9:15	7/16/2018 9:15	0	0.32	119	0.21	0.26	1	Atlas		38	1
	7/20/2018 4:45	7/20/2018 4:45	0	1.73	23	0.5	1.30	3	Atlas		39	1
	7/20/2018 19:15	7/20/2018 22:15	180	1.73	1,057	2.2	1.30	3	Atlas		1,828	1
	7/22/2018 12:00	7/22/2018 12:00	0	0.08	463	2.19	0.04	12	Atlas		37	1
	7/31/2018 1:15	7/31/2018 8:30	435	2.08	2,270	1.96	0.86	6	Atlas		4,721	1
	8/15/2018 19:45	8/16/2018 9:45	840	3	48,944	2.91	1.78	24	Cloudburst		146,833	1
	8/20/2018 11:15	8/20/2018 11:15	0	0.61	77,469	3.47	0.37	1	Atlas		47,256	1
	8/31/2018 17:00	8/31/2018 17:00	0	0.47	5,853	0.39	0.31	3	Atlas		2,751	1
	9/6/2018 11:45	9/6/2018 11:45	0	0.17	14,965	0.56	0.11	3	Atlas		2,544	1
	9/8/2018 17:15	9/8/2018 22:00	285	3.55	19,042	3.94	12.29	6	Cloudburst		67,600	1
	9/21/2018 14:00	9/21/2018 17:15	195	0.46	24,287	0.52	0.26	1	Atlas		11,172	1
	9/23/2018 4:00	9/23/2018 6:15	135	1.59	4,149	1.9	0.60	24	Atlas		6,597	1
	9/24/2018 7:30	9/24/2018 13:45	375	1.99	7,640	3.87	0.85	6	Atlas		15,203	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO051	9/25/2018 16:30	9/25/2018 17:00	30	1.02	6,148	4.59	0.45	12	Atlas		6,271	1
	9/26/2018 1:30	9/26/2018 1:45	15	1.02	3,946	4.96	0.45	12	Atlas		4,025	1
	10/10/2018 16:15	10/10/2018 16:15	0	0.34	27,844	0.27	0.27	1	Atlas		9,467	1
	11/1/2018 2:15	11/1/2018 2:15	0	2.27	349	1.89	0.80	24	Atlas		793	1
	11/5/2018 21:45	11/5/2018 22:00	15	0.99	4,212	2.85	0.54	6	Atlas		4,170	1
	12/1/2018 9:00	12/1/2018 10:00	60	1.45	1,160	1.26	0.60	12	Atlas		1,682	1
	12/15/2018 4:15	12/15/2018 9:15	300	1.55	9,758	1.43	0.64	12	Atlas		15,125	1
	12/27/2018 17:30	12/27/2018 17:30	0	0.36	2,633	0.49	0.21	1	Atlas		948	1
	12/31/2018 12:30	12/31/2018 17:00	270	1.59	8,348	1.97	0.62	12	Atlas		13,273	1
	2/6/2019 6:45	2/6/2019 9:30	165	1.61	5,000	0.79	0.52	48	Atlas		8,050	1
	2/7/2019 9:00	2/7/2019 9:15	15	1.61	491	1.27	0.52	48	Atlas		791	1
	2/11/2019 23:15	2/12/2019 8:30	555	3.03	24,481	4.57	0.95	48	Atlas		74,178	1
	2/20/2019 3:15	2/20/2019 7:45	270	1.6	64,663	1.5	0.71	6	Atlas		103,460	1
	2/23/2019 18:30	2/23/2019 21:45	195	0.89	8,182	2.54	0.49	6	Atlas		7,282	1
	3/9/2019 16:30	3/9/2019 18:30	120	1.14	2,200	1.24	0.55	6	Atlas		2,508	1
	3/14/2019 17:00	3/14/2019 18:00	60	0.48	76,481	1.94	0.32	3	Atlas		36,711	1
	3/30/2019 15:15	3/30/2019 20:15	300	1.07	36,516	1.45	0.48	6	Atlas		39,072	1
	4/7/2019 11:45	4/7/2019 13:45	120	0.62	13,003	0.84	0.28	12	Atlas		8,062	1
	4/14/2019 2:30	4/14/2019 5:30	180	0.86	31,195	1.58	0.40	6	Atlas		26,828	1
	4/18/2019 5:00	5/10/2019 6:45	31785	Discharge	0	6.49				Data Under Review	7,795,956	
	5/26/2019 14:00	5/26/2019 15:00	60	0.87	2,000	0.94	0.53	3	Atlas		1,740	1
	5/29/2019 9:00	5/29/2019 9:00	0	0.9	6,166	1.2	0.49	6	Atlas		5,549	1
	6/5/2019 20:30	6/5/2019 21:00	30	0.95	7,049	1.08	0.70	1	Atlas		6,697	1
	6/7/2019 21:00	6/7/2019 21:00	0	0.66	2,089	1.11	0.21	48	Atlas		1,379	1
	6/9/2019 0:15	6/9/2019 0:15	0	0.66	648	1.61	0.21	48	Atlas		428	1
	6/9/2019 15:30	6/9/2019 18:00	150	0.37	58,141	1.96	0.17	6	Atlas		21,512	1
	6/16/2019 5:45	6/16/2019 5:45	0	0.59	6,620	0.97	0.39	3	Atlas		3,906	1
	6/16/2019 16:00	6/16/2019 22:45	405	2.61	39,372	3.27	2.00	12	Cloudburst		102,762	1
	6/18/2019 16:15	6/18/2019 16:30	15	0.65	37,551	3.97	0.37	1	Atlas		24,408	1
	6/21/2019 19:15	6/21/2019 19:15	0	0.41	9,673	4.25	0.27	3	Atlas		3,966	1
	6/22/2019 6:45	6/22/2019 6:45	0	0.5	4,000	4.5	0.33	3	Atlas		2,000	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.31	27,365	4.41	0.23	1	Atlas		8,483	1
	6/24/2019 13:30	6/24/2019 14:45	75	0.53	17,736	2.51	0.33	3	Atlas		9,400	1
CSO051 Total											8,657,501	45

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO052	8/15/2018 19:45	8/16/2018 12:00	975	3.06	102,939	3.06	1.94	24	Cloudburst		314,993	1
	8/20/2018 11:00	8/20/2018 11:30	30	0.81	49,177	3.77	0.53	1	Atlas		39,833	1
	9/6/2018 11:30	9/6/2018 11:30	0	0.19	49,821	0.58	0.13	1	Atlas		9,466	1
	9/8/2018 17:15	9/8/2018 22:15	300	3.08	51,458	3.5	5.81	6	Cloudburst		158,490	1
	9/21/2018 13:45	9/21/2018 17:15	210	0.52	12,840	0.57	0.28	6	Atlas		6,677	1
	9/22/2018 16:30	9/22/2018 16:30	0	1.43	309	0.91	0.53	24	Atlas		442	1
	9/23/2018 4:00	9/23/2018 6:30	150	1.43	6,276	1.88	0.53	24	Atlas		8,974	1
	9/24/2018 7:15	9/24/2018 13:30	375	1.65	22,698	3.54	0.78	6	Atlas		37,451	1
	9/25/2018 5:30	9/25/2018 5:30	0	0.2	6,595	3.75	0.17	1	Atlas		1,319	1
	9/25/2018 16:15	9/25/2018 17:15	60	0.81	13,516	4.26	0.35	12	Atlas		10,948	1
	9/26/2018 1:45	9/26/2018 1:45	0	0.81	2,564	4.52	0.35	12	Atlas		2,077	1
	10/10/2018 16:15	10/10/2018 16:15	0	0.16	36,038	0.09	0.10	1	Atlas		5,766	1
	11/1/2018 2:00	11/1/2018 2:00	0	1.98	1,845	1.62	0.69	24	Atlas		3,654	1
	11/5/2018 22:00	11/5/2018 23:15	75	0.88	328	2.79	0.48	6	Atlas		289	1
	12/1/2018 8:00	12/1/2018 12:30	270	1.32	253	1.24	0.55	12	Atlas		334	1
	12/15/2018 4:15	12/15/2018 8:15	240	1.56	10,726	1.31	0.65	12	Atlas		16,733	1
	12/31/2018 12:15	12/31/2018 17:00	285	1.43	4,892	1.79	0.55	24	Atlas		6,996	1
	2/6/2019 6:45	2/6/2019 6:45	0	1.54	416	0.5	0.49	48	Atlas		641	1
	2/11/2019 13:00	2/12/2019 14:15	1515	2.98	66,012	4.57	0.94	48	Atlas		196,717	1
	2/20/2019 3:45	2/20/2019 8:00	255	1.41	125,785	1.35	0.63	6	Atlas		177,357	1
	2/23/2019 18:15	2/23/2019 22:00	225	0.82	96,644	2.29	0.45	6	Atlas		79,248	1
	3/9/2019 13:15	3/9/2019 19:00	345	1.06	43,842	1.23	0.52	6	Atlas		46,472	1
	3/14/2019 17:00	3/14/2019 18:45	105	0.42	44,400	1.95	0.28	3	Atlas		18,648	1
	6/5/2019 20:45	6/5/2019 20:45	0	0.95	11,061	0.97	0.70	1	Atlas		10,508	1
	6/16/2019 19:30	6/16/2019 19:30	0	2.25	1,024	2.12	1.19	12	Cloudburst		2,305	1
CSO052 Total											1,156,338	25
CSO053	7/16/2018 9:45	7/16/2018 9:45	0	0.26	7,223	0.33	0.21	1	Atlas		1,878	1
	7/20/2018 5:00	7/20/2018 5:00	0	1.69	14,139	0.46	1.07	3	Atlas		23,895	1
	7/20/2018 20:00	7/20/2018 21:15	75	1.69	65,918	2.05	1.07	3	Atlas		111,402	1
	7/31/2018 1:30	7/31/2018 13:00	690	1.73	187,286	1.76	0.73	6	Atlas		324,004	1
	8/15/2018 20:00	8/16/2018 8:45	765	3.06	132,017	2.89	1.94	24	Cloudburst		403,972	1
	8/20/2018 11:15	8/20/2018 11:45	30	0.81	15,158	3.77	0.53	1	Atlas		12,278	1
	9/8/2018 1:00	9/8/2018 1:15	15	0.27	78,159	0.45	0.15	3	Atlas		21,103	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO053	9/8/2018 10:30	9/8/2018 17:15	405	0.27	444,693	1.21	0.15	3	Atlas		120,067	1
	9/21/2018 14:00	9/21/2018 17:30	210	0.52	135,519	0.57	0.28	6	Atlas		70,470	1
	9/22/2018 15:15	9/22/2018 17:00	105	1.43	42,078	0.95	0.53	24	Atlas		60,171	1
	9/23/2018 4:15	9/23/2018 7:15	180	1.43	113,090	1.95	0.53	24	Atlas		161,719	1
	9/24/2018 0:45	9/24/2018 14:00	795	1.65	151,607	3.58	0.78	6	Atlas		250,152	1
	9/25/2018 5:45	9/25/2018 6:00	15	0.2	97,380	3.8	0.17	1	Atlas		19,476	1
	9/25/2018 16:30	9/26/2018 2:30	600	0.81	222,441	4.57	0.35	12	Atlas		180,177	1
	10/10/2018 16:30	10/10/2018 17:00	30	0.16	271,244	0.18	0.10	1	Atlas		43,399	1
	12/27/2018 16:30	12/27/2018 17:15	45	0.35	75,394	0.48	0.21	1	Atlas		26,388	1
	12/31/2018 3:45	12/31/2018 15:45	720	1.43	97,270	1.4	0.55	24	Atlas		139,096	1
	1/4/2019 12:45	1/4/2019 14:45	120	0.5	103,526	1.64	0.25	3	Atlas		51,763	1
	1/19/2019 5:15	1/19/2019 21:00	945	0.93	74,834	1.04	0.36	24	Atlas		69,596	1
	1/20/2019 9:00	1/21/2019 21:00	2160	0.93	66,403	1.05	0.36	24	Atlas		61,755	1
	1/23/2019 9:45	1/23/2019 13:15	210	0.91	36,605	1.76	0.36	12	Atlas		33,311	1
	2/6/2019 7:00	2/6/2019 9:45	165	1.54	19,577	0.7	0.49	48	Atlas		30,148	1
	2/7/2019 8:30	2/7/2019 19:45	675	1.54	50,816	1.65	0.49	48	Atlas		78,257	1
	2/11/2019 0:30	2/11/2019 3:15	165	2.98	803	2.39	0.94	48	Atlas		2,392	1
	2/11/2019 20:00	2/12/2019 7:30	690	2.98	41,294	4.41	0.94	48	Atlas		123,056	1
	2/20/2019 2:45	2/20/2019 15:00	735	1.41	163,145	1.41	0.63	6	Atlas		230,034	1
	2/23/2019 17:00	2/23/2019 21:45	285	0.82	126,757	2.29	0.45	6	Atlas		103,941	1
	3/9/2019 12:30	3/9/2019 19:15	405	1.06	152,051	1.23	0.52	6	Atlas		161,174	1
	3/14/2019 4:30	3/14/2019 8:00	210	0.35	11,366	1.56	0.19	6	Atlas		3,978	1
	3/14/2019 17:15	3/14/2019 18:45	90	0.42	254,221	1.95	0.28	3	Atlas		106,773	1
	3/25/2019 5:00	3/25/2019 5:00	0	0.29	714	0.35	0.15	6	Atlas		207	1
	3/30/2019 15:15	3/30/2019 20:00	285	1.02	184,233	1.39	0.46	6	Atlas		187,918	1
	4/7/2019 6:00	4/7/2019 13:45	465	0.57	145,605	0.78	0.27	3	Atlas		82,995	1
	4/12/2019 6:00	4/12/2019 6:00	0	0.09	99,300	0.66	0.06	1	Atlas		8,937	1
	4/14/2019 1:00	4/14/2019 5:30	270	0.79	153,673	1.45	0.38	6	Atlas		121,402	1
	4/18/2019 21:15	4/18/2019 23:00	105	2.39	5,982	1.23	0.77	48	Atlas		14,297	1
	4/19/2019 18:30	4/20/2019 7:00	750	2.39	127,537	2.83	0.77	48	Atlas		304,813	1
	4/24/2019 20:30	4/25/2019 1:45	315	1.04	68,649	2.97	0.34	48	Atlas		71,395	1
	4/25/2019 18:00	4/26/2019 3:00	540	1.04	88,660	3.42	0.34	48	Atlas		92,206	1
	5/2/2019 11:30	5/2/2019 11:45	15	0.23	18,713	0.73	0.20	1	Atlas		4,304	1
	5/3/2019 3:15	5/3/2019 8:30	315	0.95	226,028	1.29	0.51	6	Atlas		214,727	1
	5/19/2019 13:15	5/19/2019 13:15	0	0.28	21,121	0.15	0.11	12	Atlas		5,914	1
	5/19/2019 23:30	5/19/2019 23:30	0	0.28	17,914	0.31	0.11	12	Atlas		5,016	1
	5/23/2019 16:00	5/23/2019 16:00	0	0.03	242,633	0.35	0.03	1	Atlas		7,279	1
	5/26/2019 13:45	5/26/2019 17:00	195	0.79	65,780	1	0.45	3	Atlas		51,966	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO053	5/29/2019 9:15	5/29/2019 13:45	270	0.8	72,346	1.62	0.44	6	Atlas		57,877	1
	5/30/2019 11:00	5/30/2019 12:00	60	0.21	72,205	1.81	0.08	12	Atlas		15,163	1
	6/5/2019 20:45	6/5/2019 21:15	30	0.95	110,153	1.04	0.70	1	Atlas		104,645	1
	6/7/2019 21:15	6/8/2019 2:30	315	0.43	49,609	1.37	0.19	6	Atlas		21,332	1
	6/9/2019 0:30	6/9/2019 1:00	30	0.23	133,074	1.64	0.11	6	Atlas		30,607	1
	6/9/2019 15:45	6/9/2019 17:45	120	0.37	110,165	1.92	0.17	6	Atlas		40,761	1
	6/16/2019 6:00	6/16/2019 6:00	0	0.58	8,717	1.03	0.42	1	Atlas		5,056	1
	6/16/2019 16:15	6/17/2019 1:15	540	2.25	46,807	3.26	1.19	12	Cloudburst		105,315	1
	6/18/2019 16:30	6/18/2019 17:00	30	0.42	119,426	3.53	0.33	1	Atlas		50,159	1
	6/21/2019 19:30	6/21/2019 21:15	105	0.46	112,254	4.09	0.31	3	Atlas		51,637	1
	6/22/2019 7:00	6/22/2019 9:00	120	0.52	65,623	4.45	0.34	3	Atlas		34,124	1
	6/23/2019 16:15	6/23/2019 16:30	15	0.27	105,581	3.68	0.20	1	Atlas		28,507	1
	6/24/2019 13:00	6/24/2019 14:15	75	0.48	102,319	2.38	0.31	3	Atlas		49,113	1
	6/30/2019 17:30	6/30/2019 17:45	15	0.14	74,443	0.62	0.08	1	Atlas		10,422	1
CSO053 Total											4,803,919	59
CSO054	8/15/2018 19:45	8/16/2018 9:30	825	3.06	150,774	2.96	1.94	24	Cloudburst		461,369	1
	8/20/2018 11:00	8/20/2018 11:15	15	0.81	87,963	3.77	0.53	1	Atlas		71,250	1
	9/6/2018 11:30	9/6/2018 11:30	0	0.19	150,558	0.58	0.13	1	Atlas		28,606	1
	9/8/2018 17:15	9/8/2018 21:15	240	3.08	62,622	3.28	5.81	6	Cloudburst		192,876	1
	9/21/2018 13:45	9/21/2018 13:45	0	0.52	35,363	0.34	0.28	6	Atlas		18,389	1
	9/23/2018 4:00	9/23/2018 4:00	0	1.43	2,842	1.34	0.53	24	Atlas		4,064	1
	9/24/2018 7:15	9/24/2018 7:30	15	1.65	11,214	2.52	0.78	6	Atlas		18,503	1
	9/25/2018 16:45	9/25/2018 16:45	0	0.81	21,911	4.18	0.35	12	Atlas		17,748	1
	10/10/2018 16:15	10/10/2018 16:15	0	0.16	117,356	0.09	0.10	1	Atlas		18,777	1
	12/31/2018 12:15	12/31/2018 17:00	285	1.43	48,055	1.79	0.55	24	Atlas		68,719	1
	2/12/2019 3:30	2/12/2019 8:45	315	2.98	174,004	4.44	0.94	48	Atlas		518,532	1
	2/20/2019 4:00	2/20/2019 7:45	225	1.41	343,850	1.35	0.63	6	Atlas		484,829	1
	2/23/2019 18:30	2/23/2019 19:00	30	0.82	11,520	2.08	0.45	6	Atlas		9,446	1
	3/14/2019 17:45	3/14/2019 17:45	0	0.42	33,583	1.81	0.28	3	Atlas		14,105	1
	3/30/2019 17:15	3/30/2019 20:15	180	1.02	234,586	1.39	0.46	6	Atlas		239,278	1
	4/7/2019 13:30	4/7/2019 13:45	15	0.57	23,223	0.78	0.27	3	Atlas		13,237	1
	4/14/2019 2:30	4/14/2019 5:15	165	0.79	158,080	1.44	0.38	6	Atlas		124,883	1
	4/19/2019 19:15	4/20/2019 9:00	825	2.39	414,974	2.94	0.77	48	Atlas		991,788	1
	5/3/2019 5:15	5/3/2019 8:45	210	0.95	427,255	1.28	0.51	6	Atlas		405,892	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO054	5/29/2019 13:15	5/29/2019 13:15	0	0.8	676	1.59	0.44	6	Atlas		541	1
	6/9/2019 16:45	6/9/2019 18:00	75	0.37	385,492	1.95	0.17	6	Atlas		142,632	1
	6/16/2019 20:00	6/16/2019 22:45	165	2.25	158,372	2.72	1.19	12	Cloudburst		356,338	1
	6/18/2019 16:30	6/18/2019 16:45	15	0.42	65,269	3.53	0.33	1	Atlas		27,413	1
	6/24/2019 13:45	6/24/2019 14:45	60	0.48	209,144	2.38	0.31	3	Atlas		100,389	1
CSO054 Total											4,329,604	24
CSO055	10/10/2018 16:30	10/10/2018 16:30	0	0.16	124,238	0.12	0.10	1	Atlas		19,878	1
	10/26/2018 15:00	10/26/2018 16:00	60	0.3	6,317	0.43	0.12	24	Atlas		1,895	1
	10/31/2018 11:30	11/1/2018 17:15	1785	1.98	24,448	2.29	0.69	24	Atlas		48,408	1
	11/5/2018 19:45	11/6/2018 0:45	300	0.88	63,067	2.93	0.48	6	Atlas		55,499	1
	11/7/2018 16:15	11/7/2018 17:45	90	Discharge	0	2.58					7,369	
	11/14/2018 22:00	11/15/2018 4:15	375	0.38	39,345	0.57	0.17	12	Atlas		14,951	1
	11/23/2018 22:00	11/24/2018 0:15	135	0.26	4,773	0.16	0.13	6	Atlas		1,241	1
	11/26/2018 0:00	11/26/2018 0:15	15	0.07	14,143	0.34	0.04	1	Atlas		990	1
	11/28/2018 12:45	11/28/2018 19:45	420	Discharge	0	0.35					1,419	
	11/29/2018 6:30	12/2/2018 0:15	3945	Discharge	0	1.73					191,976	
	12/2/2018 12:30	12/2/2018 21:15	525	Discharge	0	1.47					9,711	
	12/3/2018 9:00	12/4/2018 21:30	2190	Discharge	0	1.41					47,572	
	12/5/2018 6:00	12/9/2018 7:45	5865	0.02	3,177,550	1.44	0.01	6	Atlas		63,551	1
	12/15/2018 3:00	12/15/2018 9:30	390	1.56	54,489	1.46	0.65	12	Atlas		85,003	1
	12/27/2018 17:45	12/27/2018 17:45	0	0.35	420	0.5	0.21	1	Atlas		147	1
	12/31/2018 10:15	12/31/2018 17:30	435	1.43	564	1.79	0.55	24	Atlas		806	1
	1/19/2019 19:30	1/19/2019 19:30	0	0.93	901	1.01	0.36	24	Atlas		838	1
	2/6/2019 9:45	2/6/2019 9:45	0	1.54	136	0.7	0.49	48	Atlas		209	1
	2/7/2019 8:30	2/7/2019 8:30	0	1.54	38	1.13	0.49	48	Atlas		58	1
	2/11/2019 15:45	2/12/2019 15:30	1425	2.98	476,590	4.53	0.94	48	Atlas		1,420,238	1
	2/20/2019 3:30	2/20/2019 8:15	285	1.41	210,565	1.35	0.63	6	Atlas		296,896	1
	2/23/2019 18:30	2/23/2019 22:15	225	0.82	256,807	2.29	0.45	6	Atlas		210,582	1
	3/9/2019 13:30	3/9/2019 19:00	330	1.06	115,745	1.23	0.52	6	Atlas		122,690	1
	3/14/2019 17:15	3/14/2019 19:00	105	0.42	414,352	1.95	0.28	3	Atlas		174,028	1
	3/30/2019 15:30	3/30/2019 21:15	345	1.02	616,504	1.39	0.46	6	Atlas		628,834	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO055	4/7/2019 6:00	4/7/2019 14:45	525	0.57	246,205	0.78	0.27	3	Atlas		140,337	1
	4/12/2019 6:00	4/12/2019 6:00	0	0.09	1,744	0.66	0.06	1	Atlas		157	1
	4/14/2019 1:15	4/14/2019 6:15	300	0.79	471,766	1.47	0.38	6	Atlas		372,695	1
	4/18/2019 21:15	4/18/2019 21:15	0	2.39	566	1.12	0.77	48	Atlas		1,353	1
	4/19/2019 19:00	4/20/2019 17:15	1335	2.39	975,191	3.19	0.77	48	Atlas		2,330,707	1
	4/24/2019 20:30	4/24/2019 22:15	105	1.04	65,477	2.87	0.34	48	Atlas		68,096	1
	4/25/2019 18:15	4/25/2019 18:15	0	1.04	7,144	3.25	0.34	48	Atlas		7,430	1
	4/26/2019 2:30	4/26/2019 2:30	0	1.04	5,309	2.94	0.34	48	Atlas		5,521	1
	5/2/2019 11:30	5/2/2019 11:30	0	0.23	7,887	0.72	0.20	1	Atlas		1,814	1
	5/3/2019 3:15	5/3/2019 9:45	390	0.95	994,243	1.29	0.51	6	Atlas		944,531	1
	5/26/2019 13:45	5/26/2019 17:15	210	0.79	51,089	1	0.45	3	Atlas		40,360	1
	5/29/2019 9:15	5/29/2019 14:00	285	0.8	159,039	1.62	0.44	6	Atlas		127,231	1
	6/5/2019 20:45	6/5/2019 21:45	60	0.95	132,302	1.1	0.70	1	Atlas		125,687	1
	6/9/2019 0:30	6/9/2019 0:30	0	0.23	2,383	1.63	0.11	6	Atlas		548	1
	6/9/2019 17:00	6/9/2019 22:15	315	0.37	1,208,022	2.03	0.17	6	Atlas		446,968	1
	6/16/2019 6:00	6/16/2019 6:00	0	0.58	10,586	1.03	0.42	1	Atlas		6,140	1
	6/16/2019 19:45	6/17/2019 2:00	375	2.25	485,846	3.02	1.19	12	Cloudburst		1,093,153	1
	6/18/2019 16:30	6/18/2019 19:30	180	0.42	421,324	3.54	0.33	1	Atlas		176,956	1
	6/21/2019 19:30	6/21/2019 21:30	120	0.46	255,276	4.09	0.31	3	Atlas		117,427	1
	6/22/2019 6:45	6/22/2019 9:45	180	0.52	113,823	4.46	0.34	3	Atlas		59,188	1
	6/23/2019 16:15	6/23/2019 17:30	75	0.27	272,233	3.68	0.20	1	Atlas		73,503	1
	6/24/2019 13:30	6/24/2019 15:45	135	0.48	615,471	2.38	0.31	3	Atlas		295,426	1
	6/30/2019 17:30	6/30/2019 17:30	0	0.14	75,229	0.62	0.08	1	Atlas		10,532	1
CSO055 Total											9,850,549	43
CSO056	7/3/2018 16:00	7/3/2018 16:15	15	0.32	14,334	0.95	0.23	1	Atlas		4,587	1
	7/20/2018 19:30	7/20/2018 22:00	150	1.69	218,666	2.06	1.07	3	Atlas		369,545	1
	7/31/2018 1:30	7/31/2018 8:00	390	1.73	439,971	1.64	0.73	6	Atlas		761,150	1
	8/15/2018 20:00	8/16/2018 9:30	810	3.06	187,255	2.96	1.94	24	Cloudburst		573,000	1
	8/20/2018 11:15	8/20/2018 11:30	15	0.81	284,869	3.77	0.53	1	Atlas		230,744	1
	9/6/2018 11:45	9/6/2018 11:45	0	0.19	134,737	0.6	0.13	1	Atlas		25,600	1
	9/8/2018 17:30	9/8/2018 21:30	240	3.08	155,843	3.33	5.81	6	Cloudburst		479,996	1
	9/24/2018 7:30	9/24/2018 11:00	210	1.65	39,187	3.37	0.78	6	Atlas		64,659	1
	9/25/2018 17:00	9/25/2018 17:30	30	0.81	77,683	4.29	0.35	12	Atlas		62,923	1
	10/10/2018 16:30	10/10/2018 17:30	60	0.16	605,313	0.18	0.10	1	Atlas		96,850	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO056	10/15/2018 9:15	10/15/2018 10:30	75	0.13	67,515	0.65	0.07	1	Atlas		8,777	1
	10/26/2018 15:15	10/26/2018 16:30	75	0.3	40,153	0.43	0.12	24	Atlas		12,046	1
	10/31/2018 11:45	11/1/2018 18:15	1830	1.98	80,532	2.31	0.69	24	Atlas		159,454	1
	11/5/2018 20:00	11/6/2018 2:15	375	0.88	15,841	2.93	0.48	6	Atlas		13,940	1
	11/14/2018 22:15	11/15/2018 0:45	150	0.38	12,474	0.45	0.17	12	Atlas		4,740	1
	11/23/2018 22:00	11/24/2018 3:45	345	0.26	24,354	0.25	0.13	6	Atlas		6,332	1
	11/26/2018 0:00	11/26/2018 0:30	30	0.07	136,314	0.34	0.04	1	Atlas		9,542	1
	12/1/2018 5:30	12/1/2018 21:45	975	1.32	6,986	1.49	0.55	12	Atlas		9,221	1
	12/31/2018 13:15	12/31/2018 16:15	180	1.43	131	1.72	0.55	24	Atlas		188	1
	2/12/2019 4:00	2/12/2019 6:00	120	2.98	1,557	4.28	0.94	48	Atlas		4,640	1
	2/20/2019 4:15	2/20/2019 6:45	150	1.41	2,830	1.35	0.63	6	Atlas		3,990	1
	3/9/2019 13:30	3/9/2019 13:30	0	1.06	148	0.44	0.52	6	Atlas		157	1
	3/14/2019 17:15	3/14/2019 17:15	0	0.42	7,133	1.81	0.28	3	Atlas		2,996	1
	3/30/2019 17:15	3/30/2019 20:00	165	1.02	18,576	1.39	0.46	6	Atlas		18,948	1
	4/14/2019 3:15	4/14/2019 3:15	0	0.79	1,805	1.28	0.38	6	Atlas		1,426	1
	4/19/2019 19:15	4/20/2019 0:45	330	2.39	74,439	2.14	0.77	48	Atlas		177,909	1
	5/3/2019 4:45	5/3/2019 8:15	210	0.95	95,342	1.27	0.51	6	Atlas		90,575	1
	6/5/2019 20:45	6/5/2019 21:15	30	0.95	83,519	1.04	0.70	1	Atlas		79,343	1
	6/9/2019 17:00	6/9/2019 17:45	45	0.37	446,427	1.92	0.17	6	Atlas		165,178	1
	6/16/2019 19:45	6/16/2019 22:15	150	2.25	116,463	2.72	1.19	12	Cloudburst		262,041	1
	6/18/2019 16:30	6/18/2019 16:45	15	0.42	121,164	3.53	0.33	1	Atlas		50,889	1
	6/21/2019 19:30	6/21/2019 19:30	0	0.46	37,865	3.8	0.31	3	Atlas		17,418	1
	6/23/2019 16:15	6/23/2019 16:15	0	0.27	64,619	3.68	0.20	1	Atlas		17,447	1
	6/24/2019 13:45	6/24/2019 14:15	30	0.48	75,421	2.38	0.31	3	Atlas		36,202	1
CSO056 Total											3,822,453	34
CSO057	8/20/2018 11:15	8/20/2018 11:30	15	0.63	1,732	3.38	0.47	1	Atlas		1,091	1
	9/6/2018 11:45	9/6/2018 11:45	0	0.21	5,162	0.37	0.15	1	Atlas		1,084	1
	9/8/2018 10:30	9/8/2018 21:30	660	2.96	5,916	3	3.04	6	Cloudburst		17,510	1
	9/23/2018 4:15	9/23/2018 6:15	120	1.37	1,354	1.61	0.52	24	Atlas		1,855	1
	9/24/2018 10:45	9/24/2018 13:45	180	1.35	1,428	3.01	0.64	6	Atlas		1,928	1
	9/25/2018 16:30	9/25/2018 16:30	0	0.81	993	3.27	0.35	12	Atlas		804	1
	10/10/2018 16:30	10/10/2018 16:30	0	0.13	4,192	0.09	0.09	3	Atlas		545	1
	11/1/2018 0:30	11/1/2018 2:15	105	1.75	512	1.56	0.62	24	Atlas		896	1
	11/14/2018 21:45	11/15/2018 0:00	135	0.38	105	0.45	0.17	12	Atlas		40	1
	12/1/2018 10:00	12/1/2018 10:00	0	1.34	149	1.2	0.56	12	Atlas		199	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO057	12/15/2018 1:00	12/15/2018 14:30	810	1.63	37	1.63	0.68	12	Atlas		61	1
	12/27/2018 17:30	12/27/2018 17:30	0	0.45	5,384	0.53	0.30	1	Atlas		2,423	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.61	1,420	1.19	0.52	48	Atlas		2,286	1
	2/20/2019 3:15	2/20/2019 6:00	165	1.29	795	1.1	0.58	6	Atlas		1,025	1
	3/9/2019 13:15	3/9/2019 15:00	105	0.93	180	0.61	0.43	6	Atlas		167	1
	3/14/2019 17:00	3/14/2019 17:00	0	0.58	4,307	1.69	0.39	3	Atlas		2,498	1
	3/30/2019 15:30	3/30/2019 17:15	105	1.1	108	1.07	0.52	6	Atlas		119	1
	4/7/2019 11:45	4/7/2019 12:15	30	0.6	2,497	0.67	0.28	3	Atlas		1,498	1
	4/14/2019 2:00	4/14/2019 2:00	0	0.68	943	1.08	0.33	6	Atlas		641	1
	5/23/2019 16:00	5/23/2019 17:15	75	0.07	9,000	0.32	0.04	1	Atlas		630	1
	5/26/2019 14:00	5/26/2019 14:00	0	0.55	182	0.44	0.32	3	Atlas		100	1
	6/7/2019 21:00	6/7/2019 21:00	0	0.47	164	1.1	0.20	6	Atlas		77	1
	6/9/2019 15:30	6/9/2019 16:45	75	0.48	2,756	2.01	0.23	6	Atlas		1,323	1
	6/16/2019 19:45	6/16/2019 19:45	0	1.81	93	1.52	0.83	12	Atlas		168	1
	6/18/2019 16:15	6/18/2019 16:15	0	0.15	9,760	2.49	0.12	1	Atlas		1,464	1
	6/22/2019 6:45	6/22/2019 6:45	0	0.49	994	3.49	0.33	3	Atlas		487	1
	6/24/2019 13:45	6/24/2019 13:45	0	0.37	759	2.32	0.23	3	Atlas		281	1
CSO057 Total											41,200	27
CSO058	7/20/2018 20:00	7/20/2018 20:00	0	1.48	290,679	1.32	0.83	3	Atlas		430,205	1
	7/31/2018 1:00	7/31/2018 1:30	30	2.22	469,713	0.69	1.06	6	Cloudburst		1,042,763	1
	8/15/2018 19:15	8/17/2018 8:30	2235	2.7	7,334,693	2.72	1.22	24	Cloudburst		19,803,672	1
	9/8/2018 20:00	9/8/2018 20:15	15	2.83	65,649	2.41	2.17	6	Cloudburst		185,788	1
	11/1/2018 13:15	11/1/2018 20:00	405	1.73	2,211,462	1.99	0.62	24	Atlas		3,825,830	1
	6/9/2019 17:00	6/9/2019 17:00	0	0.56	310,245	2.15	0.30	3	Atlas		173,737	1
	6/16/2019 21:00	6/16/2019 21:00	0	1.79	294,038	1.76	0.82	12	Atlas		526,328	1
	6/18/2019 16:45	6/18/2019 16:45	0	0.32	1,501,797	2.54	0.16	1	Atlas		480,575	1
CSO058 Total											26,468,898	8
CSO062	8/16/2018 3:45	8/16/2018 17:15	810	2.55	4,102,360	2.56	0.98	24	Atlas		10,461,018	1
	8/17/2018 14:00	8/23/2018 21:45	9105	Discharge	0	3.27				Data Under Review	101,399,231	
	8/24/2018 10:30	8/25/2018 16:30	1800	Discharge	0	0.71				Data Under Review	6,096,512	

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO062	8/27/2018 12:30	8/27/2018 13:45	75	Discharge	0	0.14				Data Under Review	9,516	
	8/31/2018 18:00	9/1/2018 21:00	1620	0.3	55,322,263	0.33	0.19	3	Atlas		16,596,679	1
	9/6/2018 11:45	9/9/2018 7:30	4065	0.29	169,235,145	3.5	0.24	1	Atlas		49,078,192	1
	9/16/2018 20:30	9/16/2018 22:15	105	Discharge	0	0.01				Data Under Review	108,775	
	9/17/2018 15:30	9/17/2018 16:00	30	0.05	23,100	0.05	0.02	24	Atlas		1,155	1
	9/21/2018 14:45	9/22/2018 2:00	675	0.37	10,167,459	0.42	0.20	6	Atlas		3,761,960	1
	9/22/2018 14:45	9/22/2018 19:45	300	1.22	4,225,037	0.78	0.46	24	Atlas		5,154,545	1
	9/23/2018 4:30	9/23/2018 11:30	420	1.22	4,448,383	1.64	0.46	24	Atlas		5,427,027	1
	9/24/2018 7:15	9/24/2018 20:15	780	1.26	12,098,101	2.86	0.58	6	Atlas		15,243,607	1
	9/25/2018 6:00	9/25/2018 7:15	75	0.06	9,453,850	2.91	0.05	1	Atlas		567,231	1
	10/3/2018 14:45	10/5/2018 1:15	2070	Discharge	0	0.05				Data Under Review	2,796,368	
	10/5/2018 11:30	10/6/2018 0:00	750	Discharge	0	0.02				Data Under Review	778,435	
	10/6/2018 14:15	10/7/2018 1:00	645	Discharge	0	0.02				Data Under Review	412,729	
	10/8/2018 20:45	10/8/2018 22:00	75	Discharge	0	0.02				Data Under Review	35,835	
	10/9/2018 15:30	10/9/2018 23:00	450	Discharge	0	0.02				Data Under Review	7,098	
	10/10/2018 16:30	10/11/2018 1:45	555	0.13	21,679,038	0.15	0.09	1	Atlas		2,818,275	1
	10/11/2018 21:00	10/12/2018 0:00	180	Discharge	0	0.15				Data Under Review	30,541	
	10/12/2018 19:00	10/13/2018 1:45	405	0.09	14,052,000	0.22	0.05	6	Atlas		1,264,680	1
	10/14/2018 6:00	10/14/2018 23:30	1050	0.25	6,749,144	0.47	0.13	3	Atlas		1,687,286	1
	10/15/2018 9:30	10/16/2018 1:00	930	0.11	54,056,018	0.58	0.08	1	Atlas		5,946,162	1
	10/16/2018 10:15	10/16/2018 13:45	210	Discharge	0	0.58				Data Under Review	170,291	
	10/19/2018 22:00	10/20/2018 0:30	150	0.11	3,438,564	0.47	0.06	6	Atlas		378,242	1
	10/26/2018 9:30	10/27/2018 1:30	960	0.22	29,289,436	0.33	0.08	24	Atlas		6,443,676	1
	10/27/2018 16:30	10/27/2018 17:15	45	Discharge	0	0.23				Data Under Review	1,318	
	10/31/2018 12:45	11/1/2018 20:30	1905	1.66	16,058,698	1.9	0.60	24	Atlas		26,657,438	1
	11/5/2018 20:45	11/6/2018 5:00	495	0.76	10,621,361	2.47	0.41	6	Atlas		8,072,234	1
	11/12/2018 15:00	11/13/2018 2:00	660	0.09	8,342,333	0.93	0.03	24	Atlas		750,810	1
	11/13/2018 12:15	11/13/2018 14:30	135	0.09	562,022	0.2	0.03	24	Atlas		50,582	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Discharge Volume (Gal)	Count
CSO062	11/14/2018 22:30	11/15/2018 6:30	480	0.38	16,220,505	0.57	0.17	12	Atlas		6,163,792	1
	11/16/2018 15:00	11/17/2018 1:30	630	Discharge	0	0.5				Data Under Review	2,943,620	
	11/17/2018 12:45	11/17/2018 16:15	210	Discharge	0	0.49				Data Under Review	1,443,461	
	11/18/2018 14:30	11/18/2018 17:00	150	Discharge	0	0.49				Data Under Review	894,803	
	11/19/2018 1:15	11/19/2018 2:30	75	Discharge	0	0.49				Data Under Review	35,529	
	11/19/2018 11:45	11/19/2018 23:45	720	0.03	77,344,900	0.52	0.02	3	Atlas		2,320,347	1
	11/23/2018 22:45	11/24/2018 4:30	345	0.22	4,234,177	0.25	0.12	6	Atlas		931,519	1
	11/25/2018 23:45	11/26/2018 2:15	150	0.06	29,781,383	0.31	0.03	1	Atlas		1,786,883	1
	11/26/2018 14:00	11/27/2018 1:00	660	0.01	33,910,500	0.29	0.01	1	Atlas		339,105	1
	12/1/2018 3:45	12/2/2018 0:00	1215	1.29	15,155,026	1.43	0.55	12	Atlas		19,549,983	1
	1/19/2019 7:15	1/20/2019 4:00	1245	0.78	32,031,763	1.02	0.30	24	Atlas		24,984,775	1
	1/20/2019 14:15	1/20/2019 16:00	105	Discharge	0	0.9				Data Under Review	110,501	
	2/6/2019 0:15	2/6/2019 10:15	600	1.39	2,822,902	0.64	0.45	48	Atlas		3,923,834	1
	3/9/2019 14:00	3/9/2019 23:45	585	0.95	9,656,283	1.1	0.45	6	Atlas		9,173,469	1
	4/7/2019 12:30	4/7/2019 15:15	165	0.47	1,339,634	0.66	0.22	3	Atlas		629,628	1
	4/14/2019 1:30	4/14/2019 9:00	450	0.79	6,494,124	1.38	0.39	6	Atlas		5,130,358	1
	4/19/2019 19:00	4/20/2019 8:00	780	2.59	4,291,591	3.11	0.84	48	Atlas		11,115,220	1
	5/26/2019 13:30	5/26/2019 18:15	285	0.89	8,035,270	1.06	0.56	3	Atlas		7,151,390	1
	5/29/2019 10:15	5/29/2019 15:30	315	0.99	1,228,829	1.7	0.41	6	Atlas		1,216,541	1
	5/30/2019 11:30	5/30/2019 13:00	90	0.99	358,265	1.91	0.41	6	Atlas		354,682	1
	6/5/2019 21:15	6/5/2019 23:15	120	0.84	965,473	1.07	0.62	1	Atlas		810,997	1
	6/7/2019 22:30	6/7/2019 23:30	60	0.51	276,996	1.16	0.22	6	Atlas		141,268	1
	6/9/2019 1:00	6/9/2019 2:00	60	0.27	440,819	1.67	0.14	6	Atlas		119,021	1
	6/9/2019 16:45	6/9/2019 22:00	315	0.63	8,279,116	2.31	0.33	3	Atlas		5,215,843	1
	6/16/2019 20:15	6/17/2019 9:30	795	1.81	2,491,510	2.22	0.83	12	Atlas		4,509,633	1
	6/18/2019 5:45	6/18/2019 6:45	60	0.13	761,062	2.32	0.06	12	Atlas		98,938	1
	6/18/2019 16:15	6/18/2019 21:00	285	0.64	26,769,191	2.96	0.52	1	Atlas		17,132,282	1
	6/21/2019 20:00	6/21/2019 23:45	225	0.51	12,860,586	3.55	0.34	3	Atlas		6,558,899	1
	6/22/2019 8:00	6/22/2019 12:15	255	0.36	16,671,156	3.77	0.23	3	Atlas		6,001,616	1
	6/23/2019 16:15	6/23/2019 19:15	180	0.36	14,047,769	3.46	0.27	1	Atlas		5,057,197	1
	6/24/2019 13:15	6/24/2019 19:45	390	0.4	28,822,678	2.5	0.25	3	Atlas		11,529,071	1
CSO062 Total											429,581,653	45

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO082	7/2/2018 17:30	7/2/2018 18:45	75	0.43	247,165	1.11	0.35	1	Atlas		106,281	1
	7/3/2018 15:45	7/3/2018 16:30	45	0.56	111,352	1.33	0.42	1	Atlas		62,357	1
	7/20/2018 19:30	7/20/2018 22:30	180	1.61	174,968	1.85	0.92	3	Atlas		281,698	1
	7/22/2018 17:45	7/22/2018 18:00	15	0.17	51,894	1.96	0.12	1	Atlas		8,822	1
	7/31/2018 1:30	7/31/2018 7:45	375	2.1	168,874	2	0.93	6	Atlas		354,636	1
	8/16/2018 3:30	8/16/2018 8:15	285	2.51	135,919	2.28	0.96	24	Atlas		341,156	1
	8/19/2018 20:30	8/20/2018 2:00	330	0.11	4,489,882	2.64	0.08	1	Atlas		493,887	1
	8/20/2018 10:45	8/20/2018 23:15	750	0.63	1,826,941	3.25	0.49	1	Atlas		1,150,973	1
	8/21/2018 10:45	8/21/2018 21:00	615	0.02	2,042,750	3.3	0.02	1	Atlas		40,855	1
	8/31/2018 17:45	8/31/2018 23:15	330	0.24	988,329	0.26	0.14	3	Atlas		237,199	1
	9/6/2018 11:30	9/6/2018 13:30	120	0.27	681,381	0.52	0.21	1	Atlas		183,973	1
	9/8/2018 1:15	9/8/2018 19:45	1110	2.44	454,711	2.02	1.14	6	Cloudburst		1,109,494	1
	9/21/2018 17:30	9/21/2018 19:00	90	0.37	360,019	0.43	0.20	6	Atlas		133,207	1
	9/22/2018 15:15	9/22/2018 18:15	180	1.24	292,911	0.78	0.47	24	Atlas		363,210	1
	9/23/2018 4:30	9/23/2018 7:45	195	1.24	334,082	1.64	0.47	24	Atlas		414,262	1
	9/24/2018 7:00	9/24/2018 10:45	225	1.32	424,164	2.71	0.61	6	Atlas		559,897	1
	9/25/2018 16:45	9/26/2018 3:00	615	0.72	384,185	3.68	0.32	12	Atlas		276,613	1
	10/10/2018 17:15	10/10/2018 18:15	60	0.11	417,073	0.12	0.07	3	Atlas		45,878	1
	10/15/2018 9:30	10/15/2018 11:30	120	0.13	1,165,162	0.56	0.08	1	Atlas		151,471	1
	10/26/2018 15:15	10/26/2018 18:45	210	0.23	839,543	0.32	0.09	24	Atlas		193,095	1
	10/31/2018 15:00	11/1/2018 19:45	1725	1.64	782,513	1.89	0.59	24	Atlas		1,283,322	1
	11/5/2018 21:30	11/6/2018 2:45	315	0.83	684,042	2.52	0.45	6	Atlas		567,755	1
	11/8/2018 10:45	11/8/2018 11:30	45	Discharge	0	0.98					31,557	
	11/14/2018 22:30	11/15/2018 4:45	375	0.39	1,098,567	0.59	0.17	12	Atlas		428,441	1
	11/16/2018 23:15	11/17/2018 0:45	90	Discharge	0	0.51					243,664	
	11/23/2018 23:00	11/23/2018 23:00	0	0.27	43,630	0.11	0.14	6	Atlas		11,780	1
	11/26/2018 0:30	11/26/2018 1:30	60	0.06	2,083,200	0.36	0.03	1	Atlas		124,992	1
	12/1/2018 3:45	12/1/2018 19:00	915	1.46	928,642	1.49	0.60	12	Atlas		1,355,818	1
	12/15/2018 3:15	12/15/2018 21:00	1065	1.6	1,420,878	1.63	0.68	12	Atlas		2,273,405	1
	12/20/2018 16:30	12/21/2018 0:30	480	0.47	1,751,840	2.04	0.18	12	Atlas		823,365	1
	12/31/2018 5:45	1/1/2019 5:45	1440	1.21	3,202,907	1.54	0.47	24	Atlas		3,875,518	1
	1/19/2019 7:30	1/20/2019 1:15	1065	0.77	2,963,144	0.99	0.30	24	Atlas		2,281,621	1
	2/6/2019 7:00	2/6/2019 15:45	525	1.4	673,701	0.71	0.45	48	Atlas		943,182	1
	2/7/2019 5:30	2/7/2019 19:15	825	1.4	1,556,871	1.45	0.45	48	Atlas		2,179,619	1
	2/12/2019 19:30	2/13/2019 15:30	1200	2.61	246,423	4	0.81	48	Atlas		643,165	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO082	2/14/2019 0:00	2/14/2019 0:00	0	Discharge	0	3.26				Affected by River Flooding	41,429	
	2/14/2019 10:15	2/14/2019 10:15	0	Discharge	0	3.07				Affected by River Flooding	40,996	
	2/14/2019 18:30	2/14/2019 18:45	15	Discharge	0	2.74				Affected by River Flooding	78,505	
	2/15/2019 15:15	2/16/2019 2:30	675	Discharge	0	2.64				Affected by River Flooding	1,178,838	
	2/20/2019 2:30	2/20/2019 4:45	135	1.49	307,325	0.82	0.68	6	Atlas		457,914	1
	2/28/2019 18:00	2/28/2019 19:15	75	0.08	1,523,375	0.84	0.04	3	Atlas		121,870	1
	3/9/2019 14:15	3/9/2019 22:15	480	0.97	790,441	1.12	0.44	12	Atlas		766,728	1
	3/14/2019 6:15	3/15/2019 0:15	1080	0.33	4,572,161	1.95	0.18	6	Atlas		1,508,813	1
	3/30/2019 17:00	3/30/2019 21:45	285	0.85	203,073	1.18	0.40	6	Atlas		172,612	1
	4/7/2019 13:30	4/7/2019 13:45	15	0.47	451	0.66	0.22	3	Atlas		212	1
	4/14/2019 2:00	4/14/2019 7:00	300	0.8	379,220	1.33	0.37	6	Atlas		303,376	1
	4/19/2019 19:00	4/21/2019 1:45	1845	2.57	1,479,317	3.37	0.83	48	Atlas		3,801,844	1
	4/24/2019 20:45	4/24/2019 23:30	165	0.54	594,669	2.99	0.26	1	Atlas		321,121	1
	4/25/2019 18:15	4/26/2019 6:00	705	0.31	1,850,232	3.45	0.14	12	Atlas		573,572	1
	5/3/2019 5:00	5/3/2019 9:45	285	0.88	376,252	1.08	0.48	6	Atlas		331,102	1
	5/29/2019 13:30	5/29/2019 13:30	0	0.59	775	1.21	0.32	6	Atlas		457	1
	6/5/2019 21:00	6/5/2019 21:15	15	0.81	3,302	0.94	0.61	1	Atlas		2,675	1
	6/9/2019 16:30	6/9/2019 19:00	150	0.72	372,603	2.36	0.39	3	Atlas		268,274	1
	6/16/2019 20:45	6/17/2019 1:30	285	1.68	90,171	2.06	0.77	12	Atlas		151,487	1
	6/18/2019 16:15	6/18/2019 19:45	210	0.38	1,504,045	2.58	0.31	1	Atlas		571,537	1
	6/21/2019 20:00	6/21/2019 22:45	165	0.58	531,374	3.23	0.38	3	Atlas		308,197	1
	6/22/2019 8:00	6/22/2019 10:45	165	0.35	916,843	3.46	0.23	3	Atlas		320,895	1
	6/23/2019 16:15	6/23/2019 18:15	120	0.38	583,255	3.3	0.30	1	Atlas		221,637	1
	6/24/2019 13:30	6/24/2019 17:15	225	0.4	1,185,860	2.31	0.25	3	Atlas		474,344	1
CSO082 Total											35,594,603	53
CSO083	7/2/2018 17:45	7/2/2018 17:45	0	0.52	3,587	1.08	0.43	1	Atlas		1,865	1
	7/3/2018 15:15	7/3/2018 15:15	0	0.53	7,896	1.01	0.37	1	Atlas		4,185	1
	7/20/2018 16:30	7/20/2018 19:15	165	1.21	1,612	0.82	0.61	3	Atlas		1,950	1
	7/31/2018 1:30	7/31/2018 6:45	315	1.94	12,219	1.6	0.80	6	Atlas		23,705	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO083	8/16/2018 4:45	8/16/2018 8:45	240	2.46	29,184	2.34	0.95	24	Atlas		71,792	1
	8/19/2018 20:45	8/19/2018 20:45	0	0.28	30,357	2.72	0.19	3	Atlas		8,500	1
	8/20/2018 11:15	8/20/2018 11:15	0	0.46	107,726	3.15	0.33	1	Atlas		49,554	1
	9/8/2018 18:30	9/8/2018 21:00	150	2.23	10,918	2.31	0.90	6	Atlas		24,348	1
	9/24/2018 10:45	9/24/2018 10:45	0	1.41	1,744	2.56	0.65	6	Atlas		2,459	1
	11/1/2018 0:45	11/1/2018 0:45	0	1.65	4,478	1.25	0.59	24	Atlas		7,388	1
	11/5/2018 22:00	11/5/2018 22:00	0	0.94	3,266	2.24	0.51	6	Atlas		3,070	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.5	815	1.1	0.48	48	Atlas		1,223	1
	2/20/2019 5:15	2/20/2019 6:00	45	1.43	280	1.22	0.65	6	Atlas		400	1
	3/14/2019 17:15	3/14/2019 17:15	0	0.4	60,823	1.67	0.27	3	Atlas		24,329	1
	4/24/2019 20:45	4/24/2019 20:45	0	0.47	613	3.05	0.22	12	Atlas		288	1
	5/29/2019 9:00	5/29/2019 9:00	0	0.75	15,588	0.8	0.41	6	Atlas		11,691	1
	6/5/2019 21:00	6/5/2019 21:00	0	0.82	1,183	0.91	0.61	1	Atlas		970	1
	6/9/2019 16:45	6/9/2019 16:45	0	0.69	34,825	2.24	0.37	3	Atlas		24,029	1
	6/16/2019 19:45	6/16/2019 20:45	60	1.52	28,257	1.37	0.68	12	Atlas		42,950	1
	6/18/2019 16:30	6/18/2019 16:30	0	0.29	65,679	2.09	0.11	24	Atlas		19,047	1
	6/24/2019 13:30	6/24/2019 13:45	15	0.43	101,147	2.1	0.27	3	Atlas		43,493	1
CSO083 Total											367,236	21
CSO084	7/2/2018 13:15	7/2/2018 15:00	105	Discharge	0	0.63				Data Under Review	570,677	
	7/3/2018 10:00	7/3/2018 12:30	150	Discharge	0	1.14				Data Under Review	397,025	
	7/15/2018 14:45	7/15/2018 15:00	15	0.11	651,255	0.08	0.05	12	Atlas		71,638	1
	7/16/2018 6:00	7/16/2018 6:00	0	Discharge	0	0.11				Data Under Review	13,684	
	7/20/2018 1:15	7/20/2018 1:30	15	Discharge	0	0.23				Data Under Review	54,109	
	7/20/2018 15:30	7/20/2018 18:00	150	1.21	613,923	0.51	0.61	3	Atlas		742,847	1
	7/22/2018 13:45	7/22/2018 14:00	15	0.21	105,957	1.41	0.15	1	Atlas		22,251	1
	7/30/2018 20:00	7/31/2018 9:30	810	1.94	1,230,515	1.8	0.80	6	Atlas		2,387,200	1
	8/7/2018 21:00	8/7/2018 23:15	135	0.01	3,410,100	0.05	0.01	1	Atlas		34,101	1
	8/15/2018 16:00	8/16/2018 8:30	990	2.46	1,043,705	2.32	0.95	24	Atlas		2,567,515	1
	8/31/2018 17:45	8/31/2018 17:45	0	0.26	36,646	0.17	0.13	3	Atlas		9,528	1
	9/6/2018 11:30	9/6/2018 12:00	30	0.25	462,016	0.5	0.18	1	Atlas		115,504	1
	9/8/2018 5:45	9/8/2018 5:45	0	2.23	3,888	0.64	0.90	6	Atlas		8,671	1
	9/8/2018 17:45	9/9/2018 4:30	645	2.23	1,181,720	2.49	0.90	6	Atlas		2,635,236	1
	9/22/2018 16:30	9/22/2018 17:15	45	1.22	131,238	0.58	0.45	24	Atlas		160,110	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO084	9/23/2018 4:30	9/23/2018 7:45	195	1.22	1,129,776	1.44	0.45	24	Atlas		1,378,327	1
	9/24/2018 7:00	9/24/2018 18:00	660	1.41	785,133	2.79	0.65	6	Atlas		1,107,038	1
	9/25/2018 6:00	9/25/2018 6:00	0	0.11	203,927	2.91	0.10	1	Atlas		22,432	1
	10/15/2018 20:00	10/15/2018 20:00	0	0.15	55,207	0.57	0.10	1	Atlas		8,281	1
	10/31/2018 17:30	11/1/2018 1:30	480	1.65	119,183	1.28	0.59	24	Atlas		196,652	1
	11/5/2018 21:45	11/6/2018 0:30	165	0.94	242,186	2.64	0.51	6	Atlas		227,655	1
	4/12/2019 6:00	4/12/2019 6:15	15	0.07	159,243	0.59	0.05	3	Atlas		11,147	1
	4/14/2019 1:15	4/14/2019 5:30	255	0.84	600,944	1.44	0.40	6	Atlas		504,793	1
	4/18/2019 21:30	4/18/2019 21:30	0	0.46	9,046	1.04	0.21	12	Atlas		4,161	1
	4/19/2019 18:30	4/20/2019 7:00	750	2.29	347,140	3.26	0.86	24	Atlas		794,951	1
	4/23/2019 18:00	4/23/2019 18:30	30	0.05	1,088,180	2.8	0.04	1	Atlas		54,409	1
	4/24/2019 20:45	4/24/2019 21:30	45	0.47	802,398	3.11	0.22	12	Atlas		377,127	1
	4/25/2019 18:15	4/25/2019 18:30	15	0.32	772,284	3.39	0.16	1	Atlas		247,131	1
	4/26/2019 2:45	4/26/2019 3:00	15	0.32	61,675	3.19	0.16	1	Atlas		19,736	1
	5/3/2019 5:00	5/3/2019 8:15	195	0.9	491,682	1.07	0.49	6	Atlas		442,514	1
	5/4/2019 17:00	5/4/2019 17:30	30	0.22	113,391	1.25	0.13	3	Atlas		24,946	1
	5/19/2019 23:30	5/19/2019 23:30	0	0.27	72,404	0.28	0.11	12	Atlas		19,549	1
	5/23/2019 16:00	5/23/2019 16:00	0	0.1	455,890	0.39	0.06	1	Atlas		45,589	1
	5/26/2019 14:00	5/26/2019 15:30	90	0.42	183,271	0.61	0.26	3	Atlas		76,974	1
	5/29/2019 9:15	5/29/2019 13:45	270	0.75	337,077	1.27	0.41	6	Atlas		252,808	1
	6/5/2019 20:45	6/5/2019 21:30	45	0.82	198,534	0.92	0.61	1	Atlas		162,798	1
	6/9/2019 0:30	6/9/2019 0:45	15	0.31	37,139	1.74	0.16	6	Atlas		11,513	1
	6/9/2019 17:00	6/9/2019 18:15	75	0.69	485,943	2.38	0.37	3	Atlas		335,301	1
	6/16/2019 19:45	6/17/2019 1:15	330	1.52	477,060	1.81	0.68	12	Atlas		725,131	1
	6/18/2019 16:30	6/18/2019 17:15	45	0.29	1,132,755	2.1	0.11	24	Atlas		328,499	1
	6/21/2019 19:30	6/21/2019 20:45	75	0.58	165,207	2.72	0.39	3	Atlas		95,820	1
	6/23/2019 16:15	6/23/2019 16:45	30	0.33	694,521	2.96	0.25	1	Atlas		229,192	1
6/24/2019 13:30	6/24/2019 14:30	60	0.43	911,202	2.11	0.27	3	Atlas		391,817	1	
CSO084 Total											17,886,387	39
CSO088	2/12/2019 4:00	2/12/2019 17:45	825	2.5	50,876	3.85	0.77	48	Atlas		127,189	1
	2/20/2019 3:45	2/20/2019 7:15	210	1.46	72,140	1.42	0.67	6	Atlas		105,325	1
	2/23/2019 18:45	2/23/2019 19:15	30	0.75	14,517	2.07	0.40	6	Atlas		10,888	1
CSO088 Total											243,402	3
CSO092	7/2/2018 17:45	7/2/2018 17:45	0	0.58	26,950	1.14	0.46	1	Atlas		15,631	1
	7/3/2018 15:30	7/3/2018 15:30	0	0.46	1,335	1.17	0.29	1	Atlas		614	1
	7/20/2018 20:45	7/20/2018 21:00	15	1.06	9,172	1.28	0.51	3	Atlas		9,722	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO092	7/30/2018 23:45	7/31/2018 7:00	435	2.03	159	1.87	0.82	6	Atlas		323	1
	8/16/2018 3:15	8/16/2018 8:30	315	2.56	389	2.41	0.98	24	Atlas		996	1
	8/19/2018 20:00	8/19/2018 20:45	45	0.78	1,181	3.31	0.52	3	Atlas		921	1
	9/6/2018 11:30	9/6/2018 11:30	0	0.26	4,808	0.58	0.17	1	Atlas		1,250	1
	9/8/2018 19:30	9/8/2018 20:15	45	2.34	64,445	2.24	0.95	6	Atlas		150,802	1
	9/21/2018 17:30	9/21/2018 23:15	345	0.25	49,308	0.34	0.18	1	Atlas		12,327	1
	9/24/2018 10:45	9/24/2018 10:45	0	1.44	38	2.79	0.66	6	Atlas		54	1
	9/25/2018 16:30	9/25/2018 16:30	0	0.71	45	3.27	0.32	12	Atlas		32	1
	11/1/2018 0:45	11/1/2018 0:45	0	1.6	18	1.33	0.57	24	Atlas		29	1
	12/27/2018 17:30	12/27/2018 17:30	0	0.34	344	0.53	0.19	1	Atlas		117	1
	4/7/2019 11:45	4/7/2019 11:45	0	0.49	218	0.52	0.25	3	Atlas		107	1
	4/18/2019 21:15	4/18/2019 21:15	0	3.06	119	1.3	0.99	48	Atlas		364	1
	4/23/2019 17:45	4/23/2019 18:00	15	0.34	41,265	3.4	0.30	1	Atlas		14,030	1
	5/26/2019 13:45	5/26/2019 13:45	0	0.5	1,740	0.54	0.31	3	Atlas		870	1
	6/5/2019 21:00	6/5/2019 21:00	0	0.8	288	0.91	0.58	1	Atlas		230	1
	6/16/2019 17:30	6/16/2019 20:45	195	1.43	2,953	1.38	0.65	12	Atlas		4,223	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.46	2,048	3.12	0.37	1	Atlas		942	1
CSO092 Total											213,584	20
CSO093	7/2/2018 17:30	7/2/2018 17:45	15	0.65	42,548	1.18	0.52	1	Atlas		27,656	1
	7/3/2018 15:30	7/3/2018 15:45	15	0.68	619	1.54	0.42	3	Atlas		421	1
	7/20/2018 19:15	7/20/2018 20:45	90	1.63	54,681	1.78	0.93	3	Atlas		89,130	1
	7/22/2018 12:15	7/22/2018 17:15	300	0.36	14,761	2.03	0.27	1	Atlas		5,314	1
	7/31/2018 1:45	7/31/2018 2:15	30	2.06	81	1.37	0.91	6	Atlas		167	1
	9/8/2018 19:45	9/8/2018 20:00	15	2.37	1,717	2.29	1.06	6	Cloudburst		4,069	1
	11/5/2018 22:00	11/5/2018 22:00	0	0.84	44	2.12	0.45	6	Atlas		37	1
	2/12/2019 4:30	2/12/2019 4:30	0	2.63	399	3.65	0.82	48	Atlas		1,049	1
	5/26/2019 13:45	5/26/2019 13:45	0	0.58	533	0.53	0.36	3	Atlas		309	1
	6/9/2019 16:30	6/9/2019 16:30	0	0.68	1,896	1.92	0.37	3	Atlas		1,289	1
	6/18/2019 16:30	6/18/2019 16:30	0	0.84	3,518	2.82	0.55	1	Atlas		2,955	1
CSO093 Total											132,396	11
CSO097	7/2/2018 17:30	7/2/2018 18:30	60	0.65	617,766	1.52	0.52	1	Atlas		401,548	1
	7/3/2018 15:30	7/3/2018 16:15	45	0.56	133,461	1.43	0.39	1	Atlas		74,738	1
	7/15/2018 18:15	7/15/2018 19:00	45	0.22	461,632	0.22	0.11	1	Atlas		101,559	1
	7/20/2018 14:00	7/20/2018 22:15	495	0.93	624,776	1.31	0.39	12	Atlas		581,042	1
	7/22/2018 17:45	7/22/2018 18:00	15	0.3	6,657	1.55	0.17	1	Atlas		1,997	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO097	7/30/2018 23:45	7/31/2018 13:15	810	2.22	106,092	2.33	0.90	12	Atlas		235,524	1
	8/15/2018 20:00	8/16/2018 11:15	915	2.8	763,440	2.79	1.41	24	Cloudburst		2,137,631	1
	8/19/2018 20:00	8/19/2018 23:00	180	2.93	454,096	5.78	36.61	1	Atlas		1,330,500	1
	8/20/2018 11:15	8/20/2018 11:45	30	0.61	93,993	6.17	0.34	1	Atlas		57,336	1
	8/31/2018 17:30	8/31/2018 17:45	15	0.58	58,162	0.5	0.41	1	Atlas		33,734	1
	9/6/2018 11:30	9/6/2018 11:30	0	0.3	15,373	0.82	0.19	3	Atlas		4,612	1
	9/8/2018 18:15	9/9/2018 0:30	375	2.08	1,142,588	2.78	0.98	6	Atlas		2,376,584	1
	9/21/2018 17:30	9/21/2018 17:45	15	0.36	27,906	0.49	0.30	1	Atlas		10,046	1
	9/22/2018 17:00	9/22/2018 17:00	0	1.41	1,042	0.84	0.54	3	Atlas		1,469	1
	9/23/2018 4:15	9/23/2018 8:30	255	1.41	812,268	1.88	0.54	3	Atlas		1,145,298	1
	9/24/2018 6:30	9/24/2018 16:30	600	2	1,155,364	3.8	0.88	6	Atlas		2,310,728	1
	9/25/2018 5:30	9/25/2018 6:00	30	0.1	258,920	3.87	0.09	1	Atlas		25,892	1
	9/25/2018 16:30	9/26/2018 3:00	630	0.77	623,553	4.62	0.34	12	Atlas		480,136	1
	10/31/2018 17:00	11/1/2018 2:30	570	2.04	153,515	1.89	0.73	24	Atlas		313,170	1
	11/5/2018 21:30	11/6/2018 0:45	195	1.24	463,515	3.38	0.67	6	Atlas		574,758	1
	11/14/2018 23:00	11/15/2018 0:45	105	0.48	137,894	0.49	0.22	12	Atlas		66,189	1
	12/1/2018 6:00	12/1/2018 14:30	510	1.5	172,637	1.61	0.66	12	Atlas		258,955	1
	12/15/2018 2:15	12/15/2018 13:15	660	1.7	776,101	1.7	0.70	12	Atlas		1,319,371	1
	12/20/2018 20:15	12/20/2018 22:15	120	0.56	29,439	2.17	0.22	12	Atlas		16,486	1
	12/27/2018 17:30	12/27/2018 19:15	105	0.32	427,509	0.65	0.18	1	Atlas		136,803	1
	12/31/2018 5:00	12/31/2018 17:45	765	1.36	404,979	1.69	0.52	24	Atlas		550,771	1
	1/4/2019 14:00	1/4/2019 16:15	135	0.64	251,588	1.83	0.29	12	Atlas		161,016	1
	1/23/2019 10:00	1/23/2019 13:00	180	0.75	38,853	1.48	0.29	12	Atlas		29,140	1
	2/6/2019 7:00	2/6/2019 10:30	210	1.48	63,409	0.54	0.48	48	Atlas		93,845	1
	2/7/2019 8:45	2/7/2019 19:45	660	1.48	179,804	1.56	0.48	48	Atlas		266,110	1
	2/10/2019 19:15	2/12/2019 17:45	2790	2.59	885,775	4.14	0.81	48	Atlas		2,294,158	1
	2/20/2019 2:45	2/20/2019 17:30	885	1.76	739,480	1.82	0.80	6	Atlas		1,301,485	1
	2/23/2019 17:00	2/23/2019 22:30	330	0.9	348,661	2.72	0.49	6	Atlas		313,795	1
	3/9/2019 13:30	3/9/2019 19:15	345	1.11	118,708	1.27	0.56	6	Atlas		131,766	1
	3/14/2019 17:15	3/14/2019 19:15	120	0.17	730,194	1.77	0.11	3	Atlas		124,133	1
	3/30/2019 17:00	3/30/2019 20:15	195	0.79	213,056	1.1	0.37	6	Atlas		168,314	1
	4/7/2019 12:00	4/7/2019 13:30	90	0.61	133,559	0.81	0.31	3	Atlas		81,471	1
	4/14/2019 1:15	4/14/2019 5:15	240	1.18	220,400	1.89	0.57	6	Atlas		260,072	1
	4/19/2019 18:45	4/20/2019 10:30	945	3.64	375,080	4.6	1.92	48	Cloudburst		1,365,293	1
	4/23/2019 17:45	4/23/2019 18:30	45	0.24	940,171	3.88	0.21	1	Atlas		225,641	1
	5/3/2019 4:45	5/3/2019 8:30	225	0.95	201,757	1.33	0.51	6	Atlas		191,669	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO097	5/19/2019 23:00	5/19/2019 23:45	45	0.38	124,045	0.4	0.19	1	Atlas		47,137	1
	5/26/2019 13:45	5/26/2019 16:00	135	0.43	195,400	0.67	0.25	3	Atlas		84,022	1
	5/29/2019 9:15	5/29/2019 13:45	270	0.78	52,497	1.25	0.43	6	Atlas		40,948	1
	5/30/2019 11:00	5/30/2019 11:30	30	0.21	85,738	1.42	0.11	1	Atlas		18,005	1
	6/5/2019 21:00	6/5/2019 21:30	30	0.65	61,717	0.78	0.47	1	Atlas		40,116	1
	6/7/2019 22:15	6/7/2019 22:15	0	0.63	395	1.02	0.25	6	Atlas		249	1
	6/9/2019 16:15	6/9/2019 19:00	165	0.83	787,286	2.4	0.48	3	Atlas		653,447	1
	6/16/2019 19:45	6/16/2019 22:15	150	1.28	258,709	1.33	0.58	12	Atlas		331,147	1
	6/18/2019 17:00	6/18/2019 17:30	30	0.52	11,985	2.12	0.20	24	Atlas		6,232	1
	6/21/2019 19:30	6/21/2019 21:15	105	0.77	71,327	2.68	0.30	24	Atlas		54,922	1
	6/22/2019 6:45	6/22/2019 9:00	135	0.77	36,432	2.9	0.30	24	Atlas		28,053	1
	6/23/2019 15:45	6/23/2019 16:45	60	0.47	381,883	3.1	0.36	1	Atlas		179,485	1
	6/24/2019 13:15	6/24/2019 14:45	90	0.48	635,019	2.36	0.30	3	Atlas		304,809	1
CSO097 Total											23,343,357	54
CSO104	7/20/2018 20:45	7/20/2018 21:30	45	0.79	847	1.17	0.40	3	Atlas		669	1
	7/31/2018 1:45	7/31/2018 12:45	660	2.27	9,687	2.47	1.11	6	Cloudburst		21,989	1
	8/16/2018 3:45	8/16/2018 10:30	405	4.16	228,187	4.09	6.94	24	Cloudburst		949,259	1
	8/20/2018 12:00	8/20/2018 12:30	30	0.48	38,767	4.59	0.28	1	Atlas		18,608	1
	8/31/2018 16:30	8/31/2018 18:00	90	1.94	97,406	2.02	6.15	1	Atlas		188,968	1
	9/8/2018 17:30	9/9/2018 0:00	390	3.74	1,216,130	4.17	16.61	6	Cloudburst		4,548,328	1
	9/23/2018 6:15	9/23/2018 7:30	75	1.55	13,674	1.81	0.56	24	Atlas		21,195	1
	9/24/2018 8:00	9/24/2018 14:30	390	2.69	390,472	4.52	2.15	12	Cloudburst		1,050,371	1
	9/25/2018 17:15	9/25/2018 18:15	60	1.29	41,345	5.63	0.75	1	Atlas		53,335	1
	10/10/2018 17:15	10/10/2018 17:15	0	0.47	11,172	0.52	0.40	1	Atlas		5,251	1
	11/1/2018 2:45	11/1/2018 2:45	0	2.49	63	2.3	0.86	24	Atlas		156	1
	11/5/2018 22:45	11/6/2018 0:45	120	1.29	29,621	3.87	0.69	6	Atlas		38,211	1
	12/1/2018 8:45	12/1/2018 10:45	120	1.63	21,276	1.55	0.72	12	Atlas		34,680	1
	12/15/2018 6:00	12/15/2018 17:30	690	1.78	15,776	1.78	0.71	12	Atlas		28,082	1
	12/20/2018 21:00	12/22/2018 5:15	1935	0.61	777	2.4	0.23	12	Atlas		474	1
	12/27/2018 18:30	12/31/2018 17:45	5715	0.42	95,417	2.32	0.25	1	Atlas		40,075	1
	2/12/2019 4:15	2/12/2019 6:45	150	2.84	56,861	4.37	0.90	48	Atlas		161,485	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO104	2/12/2019 23:00	2/14/2019 5:15	1815	Discharge	0	4.44				Affected by River Flooding	267,835	
	2/14/2019 17:00	2/15/2019 12:45	1185	Discharge	0	3.07				Affected by River Flooding	11,172	
	2/15/2019 22:45	2/15/2019 22:45	0	0.03	20,033	2.88	0.02	3	Atlas		601	1
	2/16/2019 13:00	2/16/2019 14:00	60	Discharge	0	2.89				Affected by River Flooding	758	
	2/20/2019 4:30	2/20/2019 8:00	210	2.3	552,513	2.03	0.95	6	Atlas		1,270,780	1
	2/23/2019 21:15	2/23/2019 22:30	75	1.08	28,053	3.42	0.58	6	Atlas		30,297	1
	3/9/2019 14:00	3/9/2019 20:00	360	1.07	142,960	1.22	0.49	12	Atlas		152,967	1
	3/14/2019 17:30	3/14/2019 18:45	75	0.24	205,571	1.76	0.21	1	Atlas		49,337	1
	3/30/2019 17:15	3/30/2019 20:15	180	1.17	2,740	1.5	0.56	6	Atlas		3,206	1
	4/7/2019 8:15	4/7/2019 16:30	495	0.79	158,080	1.01	0.43	3	Atlas		124,883	1
	4/14/2019 2:15	4/14/2019 8:30	375	1.02	224,754	1.95	0.49	6	Atlas		229,249	1
	4/18/2019 22:30	4/19/2019 1:30	180	1.03	57,891	2.06	0.48	6	Atlas		59,628	1
	4/19/2019 19:00	4/20/2019 13:30	1110	2.69	528,442	4.68	1.12	24	Cloudburst		1,421,510	1
	4/24/2019 21:00	4/25/2019 0:30	210	0.91	13,791	4.11	0.30	48	Atlas		12,550	1
	4/25/2019 20:15	4/26/2019 3:15	420	0.91	6,023	4.56	0.30	48	Atlas		5,481	1
	5/3/2019 5:15	5/3/2019 11:15	360	1.15	227,603	1.42	0.63	3	Atlas		261,744	1
	5/26/2019 13:45	5/26/2019 15:15	90	1.09	73,315	1.15	0.65	3	Atlas		79,913	1
	5/29/2019 12:00	5/29/2019 13:15	75	1.15	108,766	1.93	0.45	6	Atlas		125,081	1
	5/30/2019 12:15	5/30/2019 15:30	195	1.15	1,357	2.25	0.45	6	Atlas		1,560	1
	6/7/2019 22:30	6/8/2019 3:45	315	0.57	7,004	1.75	0.23	6	Atlas		3,992	1
	6/9/2019 1:30	6/9/2019 1:30	0	0.87	168	2.09	0.29	24	Atlas		146	1
	6/9/2019 15:45	6/9/2019 17:45	120	0.87	58,277	2.57	0.29	24	Atlas		50,701	1
	6/16/2019 6:30	6/16/2019 8:15	105	0.21	352	0.87	0.17	1	Atlas		74	1
	6/16/2019 19:30	6/17/2019 4:45	555	3	477,954	3.36	3.67	6	Cloudburst		1,433,863	1
	6/18/2019 17:30	6/18/2019 17:30	0	0.5	43,818	3.84	0.19	24	Atlas		21,909	1
	6/21/2019 19:30	6/22/2019 10:00	870	0.52	660,860	5.03	0.34	3	Atlas		343,647	1
	6/23/2019 16:15	6/23/2019 19:30	195	0.64	44,184	4.73	0.50	1	Atlas		28,278	1
	6/24/2019 13:30	6/24/2019 15:45	135	0.65	270,280	2.98	0.39	3	Atlas		175,682	1
	6/30/2019 19:30	6/30/2019 19:45	15	0.39	1,949	0.84	0.21	6	Atlas		760	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO104 Total											13,328,740	43
CSO105	9/8/2018 20:00	9/9/2018 4:00	480	3.74	9,514	4.17	16.61	6	Cloudburst		35,583	1
	2/12/2019 2:45	2/12/2019 23:45	1260	2.84	4,949	4.56	0.90	48	Atlas		14,056	1
	4/7/2019 12:15	4/7/2019 14:00	105	0.79	4,062,138	1.01	0.43	3	Atlas		3,209,089	1
	4/19/2019 19:15	4/20/2019 10:30	915	2.69	9,440,374	4.59	1.12	24	Cloudburst		25,394,607	1
	4/24/2019 21:15	4/24/2019 21:15	0	0.91	624,145	4.06	0.30	48	Atlas		567,972	1
	4/25/2019 19:30	4/25/2019 19:30	0	0.91	136,279	4.42	0.30	48	Atlas		124,014	1
	5/26/2019 14:15	5/26/2019 14:15	0	1.09	364,861	0.82	0.65	3	Atlas		397,698	1
	6/16/2019 21:15	6/16/2019 21:15	0	3	561,898	2.78	3.67	6	Cloudburst		1,685,695	1
CSO105 Total											31,428,714	8
CSO108	7/2/2018 17:30	7/2/2018 18:00	30	0.81	2,328,391	2.58	0.63	1	Atlas		1,885,997	1
	7/15/2018 18:00	7/15/2018 18:45	45	0.53	600,287	0.54	0.37	1	Atlas		318,152	1
	7/20/2018 20:45	7/21/2018 0:00	195	1.45	725,848	2.16	0.58	12	Atlas		1,052,480	1
	7/31/2018 4:45	7/31/2018 4:45	0	1.56	49,313	1.44	0.58	12	Atlas		76,929	1
	8/1/2018 17:00	8/1/2018 17:30	30	0.25	1,409,052	1.9	0.20	1	Atlas		352,263	1
	8/16/2018 3:15	8/16/2018 15:00	705	4.17	7,679,389	4.18	7.66	24	Cloudburst		32,023,054	1
	8/19/2018 20:30	8/20/2018 6:00	570	2.94	2,180,930	7.33	22.27	1	Atlas		6,411,933	1
	8/31/2018 17:15	8/31/2018 18:00	45	0.71	2,437,004	0.69	0.53	1	Atlas		1,730,273	1
	9/8/2018 19:45	9/9/2018 5:45	600	2.66	8,684,476	3.4	3.10	6	Cloudburst		23,100,706	1
	9/21/2018 17:45	9/21/2018 17:45	0	0.5	327,084	0.62	0.42	1	Atlas		163,542	1
	9/23/2018 5:15	9/23/2018 13:00	465	2.38	3,728,495	3	0.93	3	Atlas		8,873,818	1
	9/24/2018 7:00	9/24/2018 21:30	870	2.39	16,645,346	5.3	1.28	12	Cloudburst		39,782,377	1
	9/25/2018 5:45	9/25/2018 6:00	15	0.15	2,775,673	5.42	0.13	1	Atlas		416,351	1
	9/25/2018 16:45	9/25/2018 17:15	30	1.01	1,088,739	5.95	0.45	12	Atlas		1,099,626	1
	9/26/2018 2:00	9/26/2018 5:00	180	1.01	1,397,714	6.4	0.45	12	Atlas		1,411,691	1
	11/1/2018 0:45	11/1/2018 6:15	330	2.38	307,058	2.36	0.85	24	Atlas		730,799	1
	11/5/2018 22:00	11/6/2018 3:45	345	1.39	785,575	3.9	0.75	6	Atlas		1,091,949	1
	12/4/2018 14:15	12/4/2018 14:15	0	Discharge	0	1.66					42,663	
	2/7/2019 9:15	2/7/2019 9:15	0	2.25	1,173	1.63	0.73	48	Atlas		2,640	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO108	2/12/2019 5:00	2/12/2019 11:30	390	3.1	586,531	5.26	0.98	48	Atlas		1,818,245	1
	2/20/2019 6:00	2/20/2019 11:00	300	1.89	7,300	1.77	0.85	6	Atlas		13,797	1
	3/14/2019 17:30	3/14/2019 19:15	105	0.59	136,015	2.38	0.39	3	Atlas		80,249	1
	4/19/2019 22:00	4/20/2019 14:45	1005	3.97	772,444	5.21	2.97	48	Atlas		3,066,601	1
	4/23/2019 18:30	4/23/2019 18:30	0	0.06	360,333	4.02	0.04	1	Atlas		21,620	1
	4/25/2019 18:45	4/25/2019 18:45	0	1.61	15,207	5.4	0.67	1	Atlas		24,484	1
	6/9/2019 15:30	6/9/2019 21:00	330	1.7	182,972	3.45	1.57	1	Atlas		311,053	1
	6/16/2019 20:15	6/16/2019 21:30	75	2.47	27,281	1.71	0.78	48	Atlas		67,385	1
	6/24/2019 14:15	6/24/2019 14:30	15	0.64	74,055	3.11	0.40	3	Atlas		47,395	1
CSO108 Total											126,018,072	27
CSO109	7/2/2018 18:15	7/2/2018 18:15	0	0.78	82,927	2.5	0.62	1	Atlas		64,683	1
	7/3/2018 15:45	7/3/2018 15:45	0	0.47	1,123	1.6	0.30	1	Atlas		528	1
	7/15/2018 18:15	7/15/2018 18:15	0	0.34	293,012	0.33	0.20	1	Atlas		99,624	1
	7/20/2018 20:00	7/20/2018 21:15	75	1.23	164,941	1.72	0.53	12	Atlas		202,877	1
	7/31/2018 1:45	7/31/2018 1:45	0	2.05	25,122	1.19	0.80	12	Atlas		51,500	1
	8/16/2018 3:30	8/16/2018 13:30	600	3.85	768,924	3.85	5.00	24	Cloudburst		2,960,358	1
	8/19/2018 20:15	8/19/2018 22:15	120	1.7	767,974	5.68	1.67	3	Atlas		1,305,555	1
	8/29/2018 15:45	8/29/2018 22:15	390	0.01	351,500	0.06	0.01	1	Atlas		3,515	1
	9/8/2018 18:45	9/8/2018 22:15	210	2.51	456,421	3.1	1.97	6	Cloudburst		1,145,616	1
	9/21/2018 17:45	9/21/2018 18:00	15	0.4	575,658	0.53	0.34	1	Atlas		230,263	1
	9/23/2018 5:30	9/23/2018 9:45	255	2.07	233,270	2.57	0.81	3	Atlas		482,869	1
	9/24/2018 7:30	9/24/2018 17:45	615	2.27	172,417	4.77	0.99	12	Atlas		391,386	1
	11/1/2018 0:45	11/1/2018 1:15	30	2.41	46,434	2.3	0.87	24	Atlas		111,906	1
	11/5/2018 22:00	11/5/2018 22:15	15	1.42	69,234	3.42	0.77	6	Atlas		98,312	1
	12/15/2018 4:15	12/15/2018 4:15	0	1.69	8,080	0.97	0.69	12	Atlas		13,655	1
	2/6/2019 7:15	2/6/2019 9:45	150	1.95	82,490	0.65	0.63	48	Atlas		160,856	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.95	93,866	1.38	0.63	48	Atlas		183,039	1
	2/12/2019 4:45	2/12/2019 5:45	60	3.02	54,379	4.64	0.95	48	Atlas		164,225	1
	2/20/2019 5:30	2/20/2019 6:30	60	1.9	115,634	1.74	0.86	6	Atlas		219,705	1
	3/9/2019 13:30	3/9/2019 15:15	105	1.23	244,235	0.85	0.62	6	Atlas		300,409	1
	3/14/2019 17:15	3/14/2019 19:00	105	0.56	526,314	2.36	0.37	3	Atlas		294,736	1
	3/30/2019 19:00	3/30/2019 19:00	0	1.06	4,878	1.27	0.52	6	Atlas		5,171	1
	4/7/2019 12:15	4/7/2019 12:15	0	0.7	64,906	0.83	0.32	12	Atlas		45,434	1
	4/14/2019 3:00	4/14/2019 3:00	0	1.33	7,118	1.89	0.63	6	Atlas		9,467	1
	4/23/2019 18:00	4/23/2019 18:15	15	0.07	2,579,214	3.96	0.06	1	Atlas		180,545	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO109	4/24/2019 21:00	4/24/2019 21:00	0	0.47	20,011	4.24	0.22	1	Atlas		9,405	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.77	118,623	4.99	0.46	1	Atlas		91,340	1
	5/2/2019 11:45	5/2/2019 11:45	0	0.39	100,333	1.21	0.34	1	Atlas		39,130	1
	5/3/2019 5:00	5/3/2019 5:00	0	1.01	1,346	0.78	0.55	6	Atlas		1,359	1
	5/19/2019 23:15	5/19/2019 23:15	0	0.24	64,371	0.42	0.20	1	Atlas		15,449	1
	5/26/2019 14:00	5/26/2019 14:00	0	0.44	147,584	0.43	0.25	3	Atlas		64,937	1
	5/29/2019 9:15	5/29/2019 9:15	0	0.87	77,357	0.81	0.48	6	Atlas		67,301	1
	6/5/2019 21:15	6/5/2019 21:15	0	0.73	63,856	0.87	0.52	1	Atlas		46,615	1
	6/9/2019 16:30	6/9/2019 19:30	180	1.2	378,122	2.87	0.71	1	Atlas		453,746	1
	6/16/2019 20:00	6/16/2019 21:00	60	1.38	97,454	1.42	0.68	6	Atlas		134,486	1
	6/23/2019 16:15	6/23/2019 16:15	0	0.51	372,598	3.72	0.37	1	Atlas		190,025	1
	6/24/2019 14:00	6/24/2019 14:00	0	0.55	193,073	2.99	0.35	3	Atlas		106,190	1
CSO109 Total											9,946,217	37
CSO110	8/16/2018 3:45	8/16/2018 11:30	465	2.49	1,242,087	2.49	0.96	24	Atlas		3,092,796	1
	8/19/2018 20:15	8/19/2018 23:15	180	1.34	1,686,104	3.9	1.13	1	Atlas		2,259,380	1
	8/20/2018 11:45	8/20/2018 12:15	30	0.42	708,076	4.22	0.28	1	Atlas		297,392	1
	8/31/2018 18:00	8/31/2018 18:15	15	0.44	155,980	0.39	0.29	1	Atlas		68,631	1
	9/8/2018 18:45	9/8/2018 23:45	300	2.15	746,346	2.83	1.25	6	Cloudburst		1,604,644	1
	9/21/2018 18:00	9/21/2018 18:15	15	0.33	42,976	0.45	0.26	1	Atlas		14,182	1
	9/23/2018 4:45	9/23/2018 8:45	240	1.3	1,305,726	1.73	0.49	3	Atlas		1,697,444	1
	9/24/2018 7:15	9/24/2018 16:00	525	1.65	1,682,886	3.29	0.73	6	Atlas		2,776,762	1
	9/25/2018 6:15	9/25/2018 6:30	15	0.09	689,644	3.37	0.08	1	Atlas		62,068	1
	9/25/2018 17:00	9/26/2018 3:30	630	0.76	1,252,347	4.11	0.34	12	Atlas		951,784	1
	11/1/2018 0:45	11/1/2018 1:30	45	1.72	127,967	1.47	0.62	24	Atlas		220,103	1
	11/5/2018 22:15	11/6/2018 1:15	180	1.13	351,980	2.93	0.61	6	Atlas		397,737	1
	11/15/2018 0:15	11/15/2018 0:30	15	0.46	17,183	0.45	0.21	12	Atlas		7,904	1
	12/1/2018 8:30	12/1/2018 15:00	390	1.42	227,804	1.52	0.63	12	Atlas		323,482	1
	12/15/2018 3:15	12/15/2018 11:45	510	1.7	351,386	1.69	0.70	12	Atlas		597,356	1
	12/27/2018 18:00	12/27/2018 18:45	45	0.32	28,094	0.62	0.19	1	Atlas		8,990	1
	12/31/2018 9:45	12/31/2018 17:45	480	1.2	266,035	1.54	0.46	24	Atlas		319,242	1
	1/4/2019 15:45	1/4/2019 15:45	0	0.68	3,941	1.67	0.31	12	Atlas		2,680	1
	2/6/2019 7:15	2/6/2019 10:15	180	1.37	55,442	0.57	0.44	48	Atlas		75,955	1
	2/7/2019 9:00	2/7/2019 20:00	660	1.37	273,646	1.49	0.44	48	Atlas		374,895	1
	2/11/2019 1:45	2/12/2019 14:45	2220	2.43	782,920	3.9	0.76	48	Atlas		1,902,495	1
	4/23/2019 18:00	4/23/2019 18:30	30	0.25	250,044	3.7	0.22	1	Atlas		62,511	1
	4/24/2019 21:00	4/24/2019 21:15	15	0.42	99,310	3.97	0.20	1	Atlas		41,710	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO110	4/25/2019 16:15	4/25/2019 16:15	0	Discharge	0	4.12					14,314	
	4/26/2019 0:45	4/26/2019 0:45	0	0.43	9,944	3.79	0.23	1	Atlas		4,276	1
	5/3/2019 3:00	5/3/2019 5:45	165	1.04	84,464	0.74	0.46	6	Atlas		87,843	1
	5/19/2019 21:15	5/19/2019 21:15	0	0.1	102,250	0.13	0.07	1	Atlas		10,225	1
	5/29/2019 9:30	5/29/2019 13:45	255	0.59	13,183	1.09	0.32	6	Atlas		7,778	1
	5/30/2019 11:30	5/30/2019 11:30	0	0.2	17,160	1.26	0.10	1	Atlas		3,432	1
	6/5/2019 21:30	6/5/2019 21:30	0	0.71	49,220	0.84	0.52	1	Atlas		34,946	1
	6/9/2019 16:45	6/9/2019 18:15	90	0.68	300,434	2.26	0.36	3	Atlas		204,295	1
	6/16/2019 20:15	6/16/2019 22:15	120	1.21	86,309	1.25	0.55	12	Atlas		104,434	1
	6/18/2019 17:30	6/18/2019 17:30	0	0.43	32,200	1.93	0.17	24	Atlas		13,846	1
	6/21/2019 20:00	6/21/2019 20:00	0	0.83	1,386	2.33	0.32	24	Atlas		1,150	1
	6/22/2019 7:15	6/22/2019 7:15	0	0.83	9,910	2.53	0.32	24	Atlas		8,225	1
	6/23/2019 16:30	6/23/2019 16:45	15	0.47	327,674	2.94	0.37	1	Atlas		154,007	1
	6/24/2019 14:00	6/24/2019 14:45	45	0.45	385,327	2.27	0.28	3	Atlas		173,397	1
CSO110 Total											17,982,311	36
CSO111	7/2/2018 16:30	7/2/2018 17:15	45	Discharge	0	0.76					121,632	
	7/3/2018 14:15	7/3/2018 15:00	45	0.47	49,670	0.93	0.32	1	Atlas		23,345	1
	7/15/2018 17:15	7/15/2018 17:15	0	0.13	281,746	0.08	0.06	12	Atlas		36,627	1
	7/20/2018 12:45	7/20/2018 20:15	450	0.88	106,710	0.73	0.37	1	Atlas		93,905	1
	7/30/2018 22:15	7/31/2018 12:00	825	2.08	110,215	1.98	0.84	12	Atlas		229,247	1
	8/16/2018 2:15	8/16/2018 9:30	435	2.49	351,825	2.41	0.96	24	Atlas		876,045	1
	8/19/2018 18:45	8/19/2018 21:30	165	Discharge	0	3.88				Data Under Review	564,635	
	8/20/2018 10:15	8/20/2018 10:30	15	Discharge	0	3.9				Data Under Review	61,117	
	8/31/2018 17:30	8/31/2018 17:45	15	0.44	47,318	0.35	0.29	1	Atlas		20,820	1
	9/8/2018 17:45	9/8/2018 22:30	285	2.15	179,848	2.81	1.25	6	Cloudburst		386,673	1
	9/21/2018 17:45	9/21/2018 17:45	0	0.33	22,961	0.45	0.26	1	Atlas		7,577	1
	9/23/2018 4:30	9/23/2018 8:00	210	1.3	375,278	1.73	0.49	3	Atlas		487,862	1
	9/24/2018 6:45	9/24/2018 14:30	465	1.65	646,430	3.28	0.73	6	Atlas		1,066,610	1
	9/25/2018 5:45	9/25/2018 6:00	15	0.09	584,100	3.37	0.08	1	Atlas		52,569	1
	9/25/2018 16:45	9/25/2018 17:00	15	0.76	39,309	3.73	0.34	12	Atlas		29,875	1
	9/26/2018 2:00	9/26/2018 2:45	45	0.76	134,764	4.1	0.34	12	Atlas		102,421	1
	11/1/2018 0:30	11/1/2018 1:15	45	1.72	8,180	1.47	0.62	24	Atlas		14,070	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO111	11/5/2018 23:00	11/6/2018 0:00	60	1.13	55,296	2.89	0.61	6	Atlas		62,485	1
	12/1/2018 10:00	12/1/2018 13:00	180	1.42	25,839	1.45	0.63	12	Atlas		36,691	1
	12/15/2018 8:45	12/15/2018 9:15	30	1.7	5,366	1.56	0.70	12	Atlas		9,123	1
	12/31/2018 12:00	12/31/2018 17:15	315	1.2	95,850	1.54	0.46	24	Atlas		115,020	1
	2/6/2019 7:15	2/6/2019 7:15	0	1.37	8,088	0.38	0.44	48	Atlas		11,081	1
	2/7/2019 19:45	2/7/2019 19:45	0	1.37	131	1.48	0.44	48	Atlas		179	1
	2/11/2019 20:15	2/12/2019 13:30	1035	2.43	132,574	3.81	0.76	48	Atlas		322,155	1
	2/20/2019 6:15	2/20/2019 15:00	525	1.52	164,818	1.55	0.69	6	Atlas		250,524	1
	2/23/2019 18:00	2/23/2019 22:15	255	0.82	357,415	2.39	0.44	6	Atlas		293,080	1
	4/7/2019 12:30	4/7/2019 12:30	0	0.7	10,620	0.69	0.38	3	Atlas		7,434	1
	4/14/2019 1:45	4/14/2019 5:00	195	1.04	57,683	1.92	0.50	6	Atlas		59,990	1
	4/19/2019 19:00	4/20/2019 9:15	855	3.45	227,128	4.26	1.62	48	Cloudburst		783,593	1
	4/24/2019 20:30	4/24/2019 21:15	45	0.42	41,429	3.97	0.20	1	Atlas		17,400	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.43	14,526	4.4	0.23	1	Atlas		6,246	1
	4/26/2019 2:30	4/26/2019 2:45	15	0.43	26,693	3.78	0.23	1	Atlas		11,478	1
	5/26/2019 14:00	5/26/2019 14:00	0	0.46	5,667	0.5	0.28	3	Atlas		2,607	1
	5/29/2019 9:15	5/29/2019 9:15	0	0.59	6,824	0.68	0.32	6	Atlas		4,026	1
	5/30/2019 11:15	5/30/2019 11:15	0	0.2	22,510	1.26	0.10	1	Atlas		4,502	1
	6/9/2019 16:30	6/9/2019 17:30	60	0.68	350,860	2.16	0.36	3	Atlas		238,585	1
	6/16/2019 20:00	6/16/2019 22:00	120	1.21	133,953	1.24	0.55	12	Atlas		162,083	1
	6/18/2019 17:15	6/18/2019 17:15	0	0.43	3,430	1.93	0.17	24	Atlas		1,475	1
	6/22/2019 7:00	6/22/2019 7:00	0	0.83	8,653	2.51	0.32	24	Atlas		7,182	1
	6/23/2019 16:00	6/23/2019 16:30	30	0.47	113,587	2.97	0.37	1	Atlas		53,386	1
	6/24/2019 13:45	6/24/2019 14:15	30	0.45	273,304	2.27	0.28	3	Atlas		122,987	1
CSO111 Total											6,758,342	38
CSO113	12/15/2018 4:00	12/15/2018 4:00	0	1.76	383	0.91	0.73	12	Atlas		674	1
	2/7/2019 8:45	2/7/2019 8:45	0	1.39	6,099	0.96	0.45	48	Atlas		8,477	1
	2/12/2019 4:15	2/12/2019 5:15	60	2.42	22,815	3.54	0.76	48	Atlas		55,213	1
	2/20/2019 4:00	2/20/2019 6:30	150	1.43	113,582	1.37	0.66	6	Atlas		162,422	1
	3/14/2019 17:15	3/14/2019 17:15	0	0.21	51,629	1.4	0.14	3	Atlas		10,842	1
	4/7/2019 11:45	4/7/2019 11:45	0	0.49	3,598	0.52	0.25	3	Atlas		1,763	1
	4/14/2019 2:45	4/14/2019 2:45	0	0.92	2,176	1.35	0.43	6	Atlas		2,002	1
	4/19/2019 22:15	4/19/2019 22:15	0	3.06	219	2.29	0.99	48	Atlas		671	1
	4/23/2019 17:30	4/23/2019 18:00	30	0.34	840,056	3.4	0.30	1	Atlas		285,619	1
	4/24/2019 20:30	4/24/2019 20:30	0	0.47	35,374	3.61	0.22	12	Atlas		16,626	1
	6/5/2019 20:45	6/5/2019 20:45	0	0.8	6,443	0.86	0.58	1	Atlas		5,154	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO113	6/9/2019 16:15	6/9/2019 16:45	30	0.72	248,592	2.36	0.40	3	Atlas		178,986	1
	6/16/2019 20:30	6/16/2019 20:45	15	1.43	49,302	1.24	0.65	12	Atlas		70,502	1
	6/23/2019 15:45	6/23/2019 16:00	15	0.46	172,685	3.13	0.37	1	Atlas		79,435	1
	6/24/2019 13:30	6/24/2019 13:45	15	0.44	374,507	2.18	0.28	3	Atlas		164,783	1
CSO113 Total											1,043,169	15
CSO117	12/1/2018 10:15	12/1/2018 14:45	270	1.27	1,060,160	1.3	0.53	12	Atlas		1,346,403	1
	12/15/2018 7:30	12/15/2018 11:00	210	1.65	1,384,378	1.62	0.69	12	Atlas		2,284,224	1
	12/31/2018 16:15	12/31/2018 17:30	75	1.17	1,202,815	1.58	0.45	24	Atlas		1,407,293	1
	2/7/2019 16:45	2/7/2019 20:15	210	1.52	1,097,805	1.65	0.49	48	Atlas		1,668,664	1
	2/11/2019 3:00	2/12/2019 17:45	2325	2.55	4,387,012	4.17	0.80	48	Atlas		11,186,880	1
	2/20/2019 5:15	2/20/2019 15:00	585	1.44	3,516,596	1.46	0.66	6	Atlas		5,063,898	1
	2/23/2019 18:00	2/23/2019 22:30	270	0.72	5,737,615	2.21	0.39	6	Atlas		4,131,083	1
	3/30/2019 20:30	3/30/2019 20:30	0	0.88	7,947	1.19	0.42	6	Atlas		6,993	1
	4/14/2019 5:15	4/14/2019 5:45	30	0.73	93,181	1.46	0.35	6	Atlas		68,022	1
	4/19/2019 22:00	4/20/2019 14:15	975	2.08	4,320,839	3.16	0.78	24	Atlas		8,987,345	1
	4/26/2019 2:45	4/26/2019 3:45	60	0.34	1,915,024	3.1	0.15	12	Atlas		651,108	1
	5/3/2019 7:45	5/3/2019 8:45	60	0.88	689,182	1.06	0.48	6	Atlas		606,480	1
	6/9/2019 16:45	6/9/2019 19:00	135	0.6	2,309,317	2.35	0.33	3	Atlas		1,385,590	1
	6/16/2019 20:45	6/17/2019 1:30	285	1.79	609,322	2.07	0.81	12	Atlas		1,090,687	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.29	474,014	3.55	0.22	1	Atlas		137,464	1
	6/24/2019 13:45	6/24/2019 15:00	75	0.41	1,023,202	2.23	0.26	3	Atlas		419,513	1
CSO117 Total											40,441,647	16
CSO118	7/2/2018 17:30	7/2/2018 18:30	60	0.52	3,772,894	1.13	0.43	1	Atlas		1,961,905	1
	7/3/2018 15:45	7/3/2018 16:30	45	0.53	2,276,196	1.38	0.37	1	Atlas		1,206,384	1
	7/16/2018 9:45	7/16/2018 10:15	30	0.12	1,096,683	0.23	0.09	1	Atlas		131,602	1
	7/20/2018 5:15	7/20/2018 5:15	0	1.21	5,472	0.4	0.61	3	Atlas		6,621	1
	7/20/2018 19:45	7/20/2018 22:00	135	1.21	4,377,832	1.43	0.61	3	Atlas		5,297,177	1
	7/22/2018 17:45	7/22/2018 18:15	30	0.21	1,411,967	1.59	0.15	1	Atlas		296,513	1
	7/30/2018 23:45	7/31/2018 13:15	810	1.94	3,842,111	1.96	0.80	6	Atlas		7,453,696	1
	8/15/2018 19:45	8/16/2018 11:00	915	2.46	4,747,586	2.47	0.95	24	Atlas		11,679,062	1
	8/19/2018 20:30	8/19/2018 22:15	105	0.28	1,406,918	2.77	0.19	3	Atlas		393,937	1
	8/20/2018 11:15	8/20/2018 20:00	525	0.46	3,978,178	3.21	0.33	1	Atlas		1,829,962	1
	8/31/2018 17:45	8/31/2018 17:45	0	0.26	308	0.17	0.13	3	Atlas		80	1
	9/6/2018 11:30	9/6/2018 12:15	45	0.25	2,673,448	0.51	0.18	1	Atlas		668,362	1
	9/8/2018 1:30	9/8/2018 5:45	255	2.23	1,052	0.7	0.90	6	Atlas		2,345	1
	9/8/2018 15:30	9/8/2018 23:45	495	2.23	6,362,749	2.49	0.90	6	Atlas		14,188,931	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO118	9/21/2018 17:30	9/21/2018 18:00	30	0.17	2,273,765	0.25	0.10	1	Atlas		386,540	1
	9/22/2018 15:15	9/22/2018 17:45	150	1.22	940,156	0.59	0.45	24	Atlas		1,146,990	1
	9/23/2018 4:00	9/23/2018 8:00	240	1.22	3,291,831	1.44	0.45	24	Atlas		4,016,034	1
	9/24/2018 0:30	9/24/2018 14:15	825	1.41	5,949,878	2.81	0.65	6	Atlas		8,389,328	1
	9/25/2018 5:45	9/25/2018 6:15	30	0.11	3,756,891	2.91	0.10	1	Atlas		413,258	1
	9/25/2018 16:30	9/26/2018 2:45	615	0.71	4,671,261	3.59	0.32	12	Atlas		3,316,595	1
	10/10/2018 17:15	10/10/2018 17:30	15	0.09	2,667	0.1	0.06	1	Atlas		240	1
	10/15/2018 9:00	10/15/2018 9:45	45	0.15	1,075,153	0.56	0.10	1	Atlas		161,273	1
	10/26/2018 15:15	10/26/2018 16:00	45	0.27	99,148	0.35	0.10	1	Atlas		26,770	1
	10/31/2018 15:00	11/1/2018 18:15	1635	1.65	2,387,195	1.94	0.59	24	Atlas		3,938,871	1
	3/30/2019 15:45	3/30/2019 20:45	300	0.79	5,512,772	1.08	0.38	6	Atlas		4,355,090	1
	4/7/2019 6:30	4/7/2019 18:30	720	0.53	2,880,060	0.71	0.26	3	Atlas		1,526,432	1
	4/12/2019 6:15	4/12/2019 6:30	15	0.07	776,543	0.59	0.05	3	Atlas		54,358	1
	4/14/2019 1:30	4/14/2019 13:45	735	0.84	4,156,585	1.46	0.40	6	Atlas		3,491,531	1
	4/18/2019 23:00	4/19/2019 5:30	390	0.46	242,178	1.41	0.21	12	Atlas		111,402	1
	4/19/2019 18:15	4/21/2019 12:45	2550	2.29	5,381,883	3.63	0.86	24	Atlas		12,324,511	1
	4/23/2019 18:15	4/23/2019 18:45	30	0.05	3,214,420	2.8	0.04	1	Atlas		160,721	1
	4/24/2019 20:45	4/25/2019 2:30	345	0.47	4,490,566	3.21	0.22	12	Atlas		2,110,566	1
	4/25/2019 18:15	4/26/2019 4:00	585	0.32	3,119,169	3.59	0.16	1	Atlas		998,134	1
	5/3/2019 5:00	5/3/2019 9:15	255	0.9	5,602,262	1.08	0.49	6	Atlas		5,042,036	1
	5/4/2019 17:15	5/4/2019 18:00	45	0.22	1,267,968	1.26	0.13	3	Atlas		278,953	1
	5/19/2019 23:30	5/19/2019 23:45	15	0.27	431,830	0.28	0.11	12	Atlas		116,594	1
	5/23/2019 16:00	5/23/2019 16:30	30	0.1	4,394,330	0.39	0.06	1	Atlas		439,433	1
	5/26/2019 14:00	5/26/2019 16:00	120	0.42	2,754,119	0.62	0.26	3	Atlas		1,156,730	1
	5/29/2019 9:15	5/29/2019 14:15	300	0.75	1,302,209	1.27	0.41	6	Atlas		976,657	1
	5/30/2019 11:30	5/30/2019 12:00	30	0.18	1,030,206	1.41	0.07	12	Atlas		185,437	1
	6/5/2019 21:00	6/5/2019 22:00	60	0.82	2,439,977	0.99	0.61	1	Atlas		2,000,781	1
	6/7/2019 21:30	6/8/2019 3:00	330	0.57	491,868	1.39	0.24	6	Atlas		280,365	1
	6/9/2019 0:30	6/9/2019 1:15	45	0.31	1,333,826	1.74	0.16	6	Atlas		413,486	1
	6/9/2019 16:45	6/9/2019 19:15	150	0.69	5,176,643	2.41	0.37	3	Atlas		3,571,884	1
	6/16/2019 6:15	6/16/2019 6:15	0	0.15	404,133	0.96	0.10	1	Atlas		60,620	1
	6/16/2019 20:00	6/17/2019 1:45	345	1.52	3,726,622	1.81	0.68	12	Atlas		5,664,465	1
	6/18/2019 5:15	6/18/2019 5:15	0	0.29	190	1.96	0.11	24	Atlas		55	1
	6/18/2019 16:30	6/18/2019 18:15	105	0.29	11,702,883	2.1	0.11	24	Atlas		3,393,836	1
	6/21/2019 19:30	6/21/2019 22:00	150	0.58	3,189,526	2.74	0.39	3	Atlas		1,849,925	1
	6/22/2019 7:15	6/22/2019 10:00	165	0.41	2,461,222	3.03	0.27	3	Atlas		1,009,101	1
	6/23/2019 16:15	6/23/2019 17:15	60	0.33	6,544,533	2.96	0.25	1	Atlas		2,159,696	1
	6/24/2019 13:30	6/24/2019 15:45	135	0.43	5,745,991	2.11	0.27	3	Atlas		2,470,776	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO118	6/30/2019 18:00	6/30/2019 18:00	0	0.1	426,060	0.55	0.07	1	Atlas		42,606	1
CSO118 Total											123,158,657	53
CSO119	8/15/2018 19:45	8/16/2018 10:45	900	2.46	655,152	2.47	0.95	24	Atlas		1,611,674	1
	8/19/2018 20:30	8/19/2018 21:45	75	0.28	937,736	2.76	0.19	3	Atlas		262,566	1
	8/20/2018 11:15	8/20/2018 12:00	45	0.46	463,733	3.15	0.33	1	Atlas		213,317	1
	8/31/2018 17:45	8/31/2018 17:45	0	0.26	43,235	0.17	0.13	3	Atlas		11,241	1
	9/6/2018 11:15	9/6/2018 12:00	45	0.25	760,344	0.5	0.18	1	Atlas		190,086	1
	9/8/2018 5:30	9/8/2018 5:45	15	2.23	20,785	0.64	0.90	6	Atlas		46,350	1
	9/8/2018 15:45	9/9/2018 3:00	675	2.23	935,738	2.49	0.90	6	Atlas		2,086,695	1
	9/21/2018 17:30	9/21/2018 17:45	15	0.17	351,812	0.25	0.10	1	Atlas		59,808	1
	9/22/2018 16:15	9/22/2018 17:15	60	1.22	186,549	0.58	0.45	24	Atlas		227,590	1
	9/23/2018 4:15	9/23/2018 7:30	195	1.22	557,517	1.44	0.45	24	Atlas		680,171	1
	9/24/2018 6:45	9/24/2018 14:30	465	1.41	907,881	2.78	0.65	6	Atlas		1,280,112	1
	9/25/2018 5:45	9/25/2018 6:00	15	0.11	665,473	2.91	0.10	1	Atlas		73,202	1
	9/25/2018 16:30	9/26/2018 2:30	600	0.71	718,311	3.59	0.32	12	Atlas		510,001	1
	10/15/2018 9:00	10/15/2018 9:15	15	0.15	293,860	0.56	0.10	1	Atlas		44,079	1
	10/31/2018 15:00	11/1/2018 18:00	1620	1.65	491,151	1.94	0.59	24	Atlas		810,399	1
	11/5/2018 21:00	11/6/2018 0:45	225	0.94	694,982	2.64	0.51	6	Atlas		653,283	1
	11/14/2018 22:30	11/15/2018 1:00	150	0.43	853,737	0.45	0.20	12	Atlas		367,107	1
	12/1/2018 5:30	12/1/2018 14:30	540	1.34	708,003	1.39	0.57	12	Atlas		948,724	1
	12/15/2018 2:30	12/15/2018 10:45	495	1.66	648,140	1.65	0.70	12	Atlas		1,075,912	1
	12/27/2018 17:30	12/27/2018 18:45	75	0.33	644,215	0.59	0.19	1	Atlas		212,591	1
	12/31/2018 5:00	12/31/2018 17:45	765	1.2	887,591	1.54	0.46	12	Atlas		1,065,109	1
	1/4/2019 14:00	1/4/2019 16:30	150	0.61	552,648	1.68	0.29	3	Atlas		337,115	1
	1/19/2019 6:45	1/19/2019 19:30	765	0.75	353,723	0.81	0.29	24	Atlas		265,292	1
	1/23/2019 9:30	1/23/2019 17:45	495	0.78	1,001,656	1.6	0.31	12	Atlas		781,292	1
	2/5/2019 23:00	2/6/2019 10:30	690	1.5	223,087	0.74	0.48	48	Atlas		334,630	1
	2/7/2019 8:45	2/7/2019 21:45	780	1.5	642,867	1.6	0.48	48	Atlas		964,301	1
	2/10/2019 18:45	2/12/2019 19:30	2925	2.5	2,944,720	4.07	0.78	48	Atlas		7,361,799	1
	2/20/2019 2:45	2/20/2019 18:15	930	1.43	1,018,872	1.49	0.65	6	Atlas		1,456,987	1
	2/23/2019 17:00	2/24/2019 1:30	510	0.72	1,711,767	2.21	0.39	6	Atlas		1,232,472	1
	3/9/2019 13:30	3/9/2019 19:30	360	0.93	669,447	1.07	0.43	6	Atlas		622,586	1
	3/14/2019 6:30	3/14/2019 7:45	75	0.34	244,135	1.4	0.19	6	Atlas		83,006	1
	3/14/2019 17:00	3/14/2019 19:15	135	0.4	921,823	1.77	0.27	3	Atlas		368,729	1
	3/30/2019 15:30	3/30/2019 20:15	285	0.79	810,508	1.08	0.38	6	Atlas		640,301	1
	4/7/2019 6:15	4/7/2019 13:45	450	0.53	556,498	0.71	0.26	3	Atlas		294,944	1
	4/12/2019 5:45	4/12/2019 6:00	15	0.07	558,486	0.59	0.05	3	Atlas		39,094	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO119	4/14/2019 1:00	4/14/2019 5:30	270	0.84	736,943	1.44	0.40	6	Atlas		619,032	1
	4/18/2019 21:15	4/18/2019 23:00	105	0.46	93,337	1.18	0.21	12	Atlas		42,935	1
	4/19/2019 18:15	4/20/2019 14:15	1200	2.29	821,954	3.54	0.86	24	Atlas		1,882,275	1
	4/23/2019 17:45	4/23/2019 18:15	30	0.05	1,735,940	2.8	0.04	1	Atlas		86,797	1
	4/24/2019 20:30	4/24/2019 21:30	60	0.47	502,053	3.11	0.22	12	Atlas		235,965	1
	4/25/2019 18:00	4/26/2019 3:00	540	0.32	670,678	3.58	0.16	1	Atlas		214,617	1
	5/3/2019 4:45	5/3/2019 8:30	225	0.9	753,584	1.08	0.49	6	Atlas		678,226	1
	5/4/2019 16:45	5/4/2019 17:45	60	0.22	565,200	1.27	0.13	3	Atlas		124,344	1
	5/19/2019 13:15	5/19/2019 13:15	0	0.27	26,274	0.12	0.11	12	Atlas		7,094	1
	5/19/2019 23:15	5/19/2019 23:30	15	0.27	183,063	0.28	0.11	12	Atlas		49,427	1
	5/23/2019 15:45	5/23/2019 16:00	15	0.1	616,190	0.39	0.06	1	Atlas		61,619	1
	5/26/2019 13:45	5/26/2019 15:30	105	0.42	454,762	0.61	0.26	3	Atlas		191,000	1
	5/29/2019 9:00	5/29/2019 13:45	285	0.75	450,888	1.27	0.41	6	Atlas		338,166	1
	5/30/2019 11:15	5/30/2019 11:30	15	0.18	239,967	1.41	0.07	12	Atlas		43,194	1
	6/5/2019 20:45	6/5/2019 21:30	45	0.82	201,713	0.92	0.61	1	Atlas		165,405	1
	6/7/2019 21:15	6/7/2019 22:30	75	0.57	102,181	1.21	0.24	6	Atlas		58,243	1
	6/9/2019 0:15	6/9/2019 0:45	30	0.31	273,455	1.74	0.16	6	Atlas		84,771	1
	6/9/2019 16:30	6/9/2019 18:30	120	0.69	662,654	2.4	0.37	3	Atlas		457,231	1
	6/16/2019 19:45	6/17/2019 1:15	330	1.52	423,034	1.81	0.68	12	Atlas		643,012	1
	6/18/2019 4:45	6/18/2019 4:45	0	0.29	35,372	1.94	0.11	24	Atlas		10,258	1
	6/18/2019 16:15	6/18/2019 17:15	60	0.29	850,941	2.1	0.11	24	Atlas		246,773	1
	6/21/2019 19:15	6/21/2019 21:15	120	0.58	487,538	2.74	0.39	3	Atlas		282,772	1
	6/22/2019 7:00	6/22/2019 9:15	135	0.41	518,712	3.03	0.27	3	Atlas		212,672	1
	6/23/2019 16:00	6/23/2019 16:45	45	0.33	598,836	3.15	0.25	1	Atlas		197,616	1
	6/24/2019 13:15	6/24/2019 14:30	75	0.43	707,472	2.11	0.27	3	Atlas		304,213	1
CSO119 Total											34,450,222	60
CSO120	9/8/2018 5:30	9/8/2018 5:45	15	2.44	41,018	0.62	1.14	6	Cloudburst		100,085	1
	9/8/2018 15:45	9/8/2018 22:15	390	2.44	379,558	2.71	1.14	6	Cloudburst		926,122	1
	9/21/2018 17:30	9/21/2018 17:30	0	0.37	219,224	0.43	0.20	6	Atlas		81,113	1
	9/22/2018 16:30	9/22/2018 17:15	45	1.24	117,016	0.77	0.47	24	Atlas		145,100	1
	9/23/2018 4:15	9/23/2018 7:15	180	1.24	612,722	1.63	0.47	24	Atlas		759,775	1
	9/24/2018 0:45	9/24/2018 14:00	795	1.32	771,121	2.94	0.61	6	Atlas		1,017,880	1
	9/25/2018 5:45	9/25/2018 6:00	15	0.05	2,198,820	2.98	0.04	1	Atlas		109,941	1
	9/25/2018 16:30	9/26/2018 2:30	600	0.72	959,358	3.68	0.32	12	Atlas		690,738	1
	10/15/2018 9:00	10/15/2018 9:00	0	0.13	290,738	0.54	0.08	1	Atlas		37,796	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO120	10/31/2018 17:30	11/1/2018 17:00	1410	1.64	558,177	1.86	0.59	24	Atlas		915,411	1
	11/5/2018 21:30	11/6/2018 0:30	180	0.83	491,852	2.52	0.45	6	Atlas		408,237	1
	11/14/2018 22:45	11/15/2018 1:00	135	0.39	579,692	0.45	0.17	12	Atlas		226,080	1
	12/1/2018 3:00	12/1/2018 14:15	675	1.46	190,041	1.47	0.60	12	Atlas		277,460	1
	12/15/2018 2:45	12/15/2018 10:15	450	1.6	146,547	1.55	0.68	12	Atlas		234,475	1
	12/27/2018 17:45	12/27/2018 18:30	45	0.32	166,778	0.57	0.18	1	Atlas		53,369	1
	12/31/2018 5:15	12/31/2018 17:00	705	1.21	305,653	1.54	0.47	24	Atlas		369,840	1
	1/4/2019 14:00	1/4/2019 16:00	120	0.58	254,434	1.65	0.27	3	Atlas		147,572	1
	1/19/2019 6:45	1/19/2019 11:15	270	0.77	52,191	0.55	0.30	24	Atlas		40,187	1
	1/23/2019 10:15	1/23/2019 15:15	300	0.8	126,731	1.57	0.31	12	Atlas		101,385	1
	2/6/2019 7:00	2/6/2019 10:00	180	1.4	180,979	0.64	0.45	48	Atlas		253,371	1
	2/7/2019 9:00	2/7/2019 19:45	645	1.4	244,109	1.49	0.45	48	Atlas		341,752	1
	2/11/2019 0:30	2/12/2019 19:00	2550	2.61	298,774	4.08	0.81	48	Atlas		779,799	1
	2/17/2019 13:15	2/18/2019 1:30	735	0.01	81,251,000	2.48	0.01	1	Atlas		812,510	1
	2/20/2019 2:45	2/20/2019 17:30	885	1.49	931,147	1.54	0.68	6	Atlas		1,387,409	1
	2/22/2019 5:45	2/22/2019 10:15	270	0.02	3,967,650	1.56	0.01	3	Atlas		79,353	1
	2/23/2019 17:15	2/24/2019 10:30	1035	0.72	1,992,901	2.27	0.39	6	Atlas		1,434,889	1
	2/25/2019 5:45	2/25/2019 10:15	270	Discharge	0	2.26				Affected by River Flooding	467,694	
	3/9/2019 13:30	3/9/2019 18:45	315	0.97	243,745	1.1	0.44	12	Atlas		236,433	1
	3/14/2019 7:45	3/14/2019 7:45	0	0.33	2,415	1.43	0.18	6	Atlas		797	1
	3/14/2019 17:15	3/14/2019 18:45	90	0.52	213,521	1.92	0.38	1	Atlas		111,031	1
	3/30/2019 15:45	3/30/2019 20:00	255	0.85	336,126	1.17	0.40	6	Atlas		285,707	1
	4/7/2019 6:00	4/7/2019 13:30	450	0.47	137,677	0.66	0.22	3	Atlas		64,708	1
	4/12/2019 6:00	4/12/2019 6:00	0	0.08	56,638	0.53	0.05	3	Atlas		4,531	1
	4/14/2019 1:00	4/14/2019 5:00	240	0.8	318,513	1.29	0.37	6	Atlas		254,810	1
	4/19/2019 18:15	4/20/2019 9:00	885	2.57	264,291	3.11	0.83	48	Atlas		679,227	1
	4/23/2019 18:15	4/23/2019 18:15	0	0.02	26,400	2.59	0.02	1	Atlas		528	1
	4/24/2019 20:30	4/24/2019 21:00	30	0.54	313,491	2.95	0.26	1	Atlas		169,285	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.31	186,858	3.27	0.14	12	Atlas		57,926	1
	4/26/2019 2:30	4/26/2019 2:45	15	0.31	144,465	3.09	0.14	12	Atlas		44,784	1
	5/3/2019 3:15	5/3/2019 8:00	285	0.88	391,492	1.06	0.48	6	Atlas		344,513	1
	5/4/2019 16:45	5/4/2019 17:00	15	0.19	87,311	1.22	0.12	3	Atlas		16,589	1
	5/19/2019 23:00	5/19/2019 23:15	15	0.14	471,250	0.24	0.10	1	Atlas		65,975	1
	5/23/2019 15:45	5/23/2019 15:45	0	0.11	628,900	0.35	0.07	1	Atlas		69,179	1
	5/26/2019 13:45	5/26/2019 15:30	105	0.51	239,696	0.7	0.33	3	Atlas		122,245	1
	5/29/2019 9:15	5/29/2019 13:15	240	0.59	58,593	1.18	0.32	6	Atlas		34,570	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO120	5/30/2019 11:15	5/30/2019 11:15	0	0.21	4,738	1.35	0.09	3	Atlas		995	1
	6/7/2019 21:00	6/7/2019 22:15	75	0.52	68,612	1.14	0.22	6	Atlas		35,678	1
	6/9/2019 0:15	6/9/2019 0:30	15	0.3	74,157	1.66	0.15	6	Atlas		22,247	1
	6/9/2019 15:15	6/9/2019 17:45	150	0.72	265,560	2.28	0.39	3	Atlas		191,203	1
	6/16/2019 21:15	6/17/2019 8:15	660	1.68	74,129	2.06	0.77	12	Atlas		124,537	1
	6/18/2019 4:45	6/18/2019 4:45	0	0.14	125,443	2.18	0.06	12	Atlas		17,562	1
CSO120 Total											15,154,403	50
CSO121	7/2/2018 16:00	7/2/2018 16:45	45	Discharge	0	0.71				Data Under Review	413,781	
	7/3/2018 13:45	7/3/2018 14:15	30	0.56	154,498	0.92	0.42	1	Atlas		86,519	1
	7/15/2018 16:45	7/15/2018 16:45	0	0.1	742,200	0.08	0.05	12	Atlas		74,220	1
	7/16/2018 8:00	7/16/2018 8:15	15	Discharge	0	0.1				Data Under Review	15,121	
	7/20/2018 3:30	7/20/2018 3:30	0	1.61	76,427	0.25	0.92	3	Atlas		123,048	1
	7/20/2018 17:30	7/20/2018 19:45	135	1.61	311,309	1.43	0.92	3	Atlas		501,207	1
	7/22/2018 16:00	7/22/2018 16:15	15	0.17	101,841	1.82	0.12	1	Atlas		17,313	1
	7/30/2018 22:15	7/31/2018 11:15	780	2.1	181,620	2	0.93	6	Atlas		381,402	1
	8/15/2018 20:15	8/16/2018 15:30	1155	2.51	901,924	2.52	0.96	24	Atlas		2,263,830	1
	8/19/2018 20:45	8/19/2018 21:15	30	0.11	807,655	2.63	0.08	1	Atlas		88,842	1
	8/20/2018 11:45	8/20/2018 11:45	0	0.63	63,640	3.2	0.49	1	Atlas		40,093	1
	9/6/2018 11:30	9/6/2018 12:00	30	0.27	650,315	0.5	0.21	1	Atlas		175,585	1
	9/8/2018 15:45	9/9/2018 3:00	675	2.44	767,348	2.72	1.14	6	Cloudburst		1,872,329	1
	9/22/2018 16:30	9/22/2018 17:15	45	1.24	120,046	0.77	0.47	24	Atlas		148,857	1
	9/23/2018 4:30	9/23/2018 7:30	180	1.24	274,750	1.63	0.47	24	Atlas		340,690	1
	9/24/2018 0:45	9/24/2018 14:15	810	1.32	528,269	2.95	0.61	6	Atlas		697,315	1
	9/25/2018 6:00	9/25/2018 6:00	0	0.05	130,680	2.98	0.04	1	Atlas		6,534	1
	9/25/2018 16:45	9/26/2018 2:30	585	0.72	69,347	3.68	0.32	12	Atlas		49,930	1
	10/31/2018 15:15	11/1/2018 18:15	1620	1.64	228,871	1.89	0.59	24	Atlas		375,349	1
	11/5/2018 21:15	11/6/2018 0:45	210	0.83	344,501	2.52	0.45	6	Atlas		285,936	1
	11/14/2018 22:45	11/15/2018 1:00	135	0.39	508,256	0.45	0.17	12	Atlas		198,220	1
	12/1/2018 3:15	12/1/2018 14:45	690	1.46	308,896	1.46	0.60	12	Atlas		450,988	1
	12/15/2018 2:45	12/15/2018 10:45	480	1.6	341,118	1.6	0.68	12	Atlas		545,789	1
	12/27/2018 18:00	12/27/2018 19:00	60	0.32	141,181	0.56	0.18	1	Atlas		45,178	1
	12/31/2018 5:15	12/31/2018 19:15	840	1.21	372,348	1.54	0.47	24	Atlas		450,541	1
	1/4/2019 14:15	1/4/2019 17:00	165	0.58	310,445	1.68	0.27	3	Atlas		180,058	1
	1/19/2019 6:45	1/19/2019 20:00	795	0.77	129,803	0.82	0.30	24	Atlas		99,948	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO121	1/23/2019 9:15	1/23/2019 19:15	600	0.8	516,578	1.64	0.31	12	Atlas		413,262	1
	2/5/2019 23:15	2/6/2019 10:00	645	1.4	110,952	0.64	0.45	48	Atlas		155,333	1
	2/7/2019 9:00	2/7/2019 23:30	870	1.4	213,240	1.5	0.45	48	Atlas		298,536	1
	2/10/2019 17:15	2/12/2019 21:45	3150	2.61	1,406,921	4.08	0.81	48	Atlas		3,672,064	1
	2/20/2019 3:00	2/20/2019 18:00	900	1.49	422,634	1.54	0.68	6	Atlas		629,724	1
	2/23/2019 17:00	2/24/2019 2:15	555	0.72	1,571,254	2.27	0.39	6	Atlas		1,131,303	1
	3/9/2019 15:30	3/9/2019 19:15	225	0.97	94,005	1.12	0.44	12	Atlas		91,185	1
	3/14/2019 7:00	3/14/2019 8:00	60	0.33	20,964	1.43	0.18	6	Atlas		6,918	1
	3/14/2019 17:30	3/14/2019 19:15	105	0.52	126,138	1.92	0.38	1	Atlas		65,592	1
	3/30/2019 15:15	3/30/2019 20:15	300	0.85	256,365	1.18	0.40	6	Atlas		217,910	1
	4/7/2019 6:15	4/7/2019 13:45	450	0.47	248,630	0.66	0.22	3	Atlas		116,856	1
	4/14/2019 1:15	4/14/2019 5:30	255	0.8	351,706	1.31	0.37	6	Atlas		281,365	1
	4/18/2019 23:00	4/18/2019 23:00	0	2.57	3,489	1.08	0.83	48	Atlas		8,967	1
	4/19/2019 15:45	4/20/2019 14:45	1380	2.57	461,016	3.3	0.83	48	Atlas		1,184,811	1
	4/24/2019 21:15	4/24/2019 21:30	15	0.54	104,850	2.97	0.26	1	Atlas		56,619	1
	4/25/2019 18:30	4/25/2019 18:30	0	0.31	106,255	3.28	0.14	12	Atlas		32,939	1
	4/26/2019 2:45	4/26/2019 3:00	15	0.31	150,706	3.08	0.14	12	Atlas		46,719	1
	5/2/2019 11:45	5/2/2019 11:45	0	0.11	3,955	0.51	0.10	1	Atlas		435	1
	5/3/2019 6:15	5/3/2019 8:00	105	0.88	215,236	1.05	0.48	6	Atlas		189,408	1
	5/4/2019 17:30	5/4/2019 17:30	0	0.19	83,574	1.24	0.12	3	Atlas		15,879	1
	5/19/2019 13:30	5/19/2019 13:30	0	0.09	55,322	0.11	0.06	1	Atlas		4,979	1
	5/19/2019 23:15	5/19/2019 23:15	0	0.14	92,636	0.24	0.10	1	Atlas		12,969	1
	5/23/2019 16:00	5/23/2019 16:00	0	0.11	157,318	0.35	0.07	1	Atlas		17,305	1
	5/26/2019 14:15	5/26/2019 15:30	75	0.51	159,459	0.7	0.33	3	Atlas		81,324	1
	5/29/2019 9:15	5/29/2019 13:45	270	0.59	157,286	1.21	0.32	6	Atlas		92,799	1
	5/30/2019 11:30	5/30/2019 11:30	0	0.21	46,076	1.37	0.09	3	Atlas		9,676	1
	6/5/2019 20:45	6/5/2019 21:30	45	0.81	259,637	0.95	0.61	1	Atlas		210,306	1
	6/7/2019 21:15	6/8/2019 2:30	315	0.52	46,190	1.31	0.22	6	Atlas		24,019	1
	6/9/2019 0:30	6/9/2019 0:45	15	0.3	98,440	1.66	0.15	6	Atlas		29,532	1
	6/9/2019 17:45	6/9/2019 18:30	45	0.72	56,331	2.34	0.39	3	Atlas		40,558	1
	6/16/2019 6:00	6/16/2019 6:15	15	0.24	76,463	1.07	0.17	1	Atlas		18,351	1
	6/16/2019 20:15	6/17/2019 1:15	300	1.68	114,978	2.08	0.77	12	Atlas		193,163	1
	6/18/2019 16:30	6/18/2019 18:00	90	0.38	5,253,124	2.58	0.31	1	Atlas		1,996,187	1
	6/21/2019 19:30	6/21/2019 21:15	105	0.58	2,590,079	3.22	0.38	3	Atlas		1,502,246	1
	6/22/2019 7:00	6/22/2019 9:30	150	0.35	4,692,234	3.46	0.23	3	Atlas		1,642,282	1
	6/23/2019 16:30	6/23/2019 16:45	15	0.38	780,734	3.3	0.30	1	Atlas		296,679	1
	6/24/2019 13:30	6/24/2019 14:45	75	0.4	2,948,463	2.31	0.25	3	Atlas		1,179,385	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO121 Total											25,896,208	62
CSO125	7/2/2018 18:30	7/2/2018 18:30	0	1.4	24	2.2	1.70	1	Atlas		33	1
	7/3/2018 16:15	7/3/2018 16:15	0	0.61	462	2.27	0.43	1	Atlas		282	1
	7/15/2018 18:30	7/15/2018 19:00	30	0.26	39,092	0.26	0.14	1	Atlas		10,164	1
	7/16/2018 10:00	7/16/2018 10:15	15	0.16	16,156	0.42	0.11	1	Atlas		2,585	1
	7/20/2018 20:00	7/21/2018 5:45	585	1.31	198,228	1.73	0.71	3	Atlas		259,679	1
	7/30/2018 23:45	7/31/2018 7:30	465	2.34	1,376	2.14	0.92	6	Atlas		3,220	1
	8/16/2018 8:45	8/16/2018 18:15	570	2.77	597,433	2.77	1.35	24	Cloudburst		1,654,889	1
	9/6/2018 11:45	9/6/2018 11:45	0	0.44	916	1.02	0.34	1	Atlas		403	1
	9/8/2018 2:15	9/8/2018 2:15	0	2.57	1,450	0.77	1.44	6	Cloudburst		3,726	1
	9/8/2018 17:45	9/9/2018 10:45	1020	2.57	1,344,408	3.04	1.44	6	Cloudburst		3,455,128	1
	9/21/2018 17:45	9/21/2018 18:00	15	0.15	8,260	0.24	0.08	6	Atlas		1,239	1
	9/22/2018 16:00	9/22/2018 17:30	90	1.29	4,305	0.63	0.48	24	Atlas		5,553	1
	9/23/2018 4:15	9/23/2018 15:45	690	1.29	134,549	1.53	0.48	24	Atlas		173,568	1
	9/24/2018 7:15	9/25/2018 6:15	1380	1.72	1,779,190	3.3	0.78	6	Atlas		3,060,206	1
	9/25/2018 16:45	9/25/2018 17:00	15	0.68	10,975	3.57	0.31	12	Atlas		7,463	1
	9/26/2018 2:45	9/26/2018 3:30	45	0.68	357	3.95	0.31	12	Atlas		243	1
	10/15/2018 9:15	10/15/2018 9:30	15	0.13	2,500	0.57	0.09	1	Atlas		325	1
	10/31/2018 15:15	11/1/2018 0:30	555	1.77	2,579	1.26	0.60	24	Atlas		4,565	1
	11/5/2018 20:45	11/6/2018 1:15	270	1.02	355,792	2.87	0.55	6	Atlas		362,908	1
	11/14/2018 22:45	11/15/2018 1:30	165	0.5	355,448	0.52	0.23	12	Atlas		177,724	1
	11/23/2018 22:15	11/24/2018 15:45	1050	0.33	13,888	0.35	0.17	6	Atlas		4,583	1
	12/1/2018 3:15	12/1/2018 15:30	735	1.63	195,245	1.76	0.71	12	Atlas		318,249	1
	12/15/2018 3:00	12/15/2018 21:15	1095	1.51	323,918	1.52	0.61	12	Atlas		489,116	1
	12/27/2018 17:45	12/27/2018 18:45	60	0.31	151,674	0.64	0.17	1	Atlas		47,019	1
	12/31/2018 5:30	12/31/2018 18:30	780	1.36	276,979	1.69	0.52	24	Atlas		376,692	1
	1/4/2019 14:15	1/4/2019 16:30	135	0.62	194,108	1.82	0.28	12	Atlas		120,347	1
	1/19/2019 7:00	1/19/2019 23:00	960	0.87	159,122	1.02	0.33	24	Atlas		138,436	1
	1/23/2019 10:00	1/23/2019 18:00	480	0.87	355,434	1.8	0.34	12	Atlas		309,228	1
	2/5/2019 23:30	2/6/2019 17:15	1065	1.56	208,148	0.74	0.50	48	Atlas		324,711	1
	2/7/2019 9:00	2/7/2019 23:15	855	1.56	715,587	1.66	0.50	48	Atlas		1,116,315	1
	2/11/2019 1:00	2/13/2019 0:15	2835	2.75	2,547,617	4.38	0.85	48	Atlas		7,005,948	1
	2/20/2019 3:00	2/20/2019 18:30	930	1.85	1,002,254	1.9	0.86	6	Atlas		1,854,170	1
	2/23/2019 17:15	2/24/2019 0:00	405	0.89	838,166	2.8	0.48	6	Atlas		745,968	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO125	3/9/2019 13:45	3/9/2019 19:45	360	1.24	556,371	1.37	0.62	6	Atlas		689,900	1
	3/14/2019 7:00	3/14/2019 7:15	15	0.41	13,761	1.74	0.22	6	Atlas		5,642	1
	3/14/2019 17:15	3/14/2019 19:30	135	0.74	196,664	2.47	0.50	1	Atlas		145,531	1
	3/30/2019 15:45	3/30/2019 20:45	300	0.69	403,975	1.1	0.37	6	Atlas		278,743	1
	4/7/2019 6:15	4/7/2019 14:00	465	0.51	72,982	0.72	0.26	3	Atlas		37,221	1
	4/12/2019 6:15	4/12/2019 6:15	0	0.06	89,517	0.57	0.04	3	Atlas		5,371	1
	4/14/2019 1:15	4/14/2019 5:45	270	1.19	140,425	1.78	0.57	6	Atlas		167,106	1
	4/18/2019 23:00	4/18/2019 23:15	15	3.71	3,657	1.8	2.10	48	Cloudburst		13,566	1
	4/19/2019 18:30	4/20/2019 19:15	1485	3.71	1,650,353	4.94	2.10	48	Cloudburst		6,122,810	1
	4/24/2019 20:45	4/24/2019 21:45	60	0.48	154,840	4.03	0.23	1	Atlas		74,323	1
	4/25/2019 18:30	4/26/2019 3:30	540	0.42	393,455	4.61	0.19	12	Atlas		165,251	1
	5/2/2019 12:00	5/2/2019 12:00	0	0.14	55,807	0.62	0.12	1	Atlas		7,813	1
	5/3/2019 5:00	5/3/2019 9:00	240	0.96	416,723	1.16	0.52	6	Atlas		400,054	1
	5/4/2019 17:15	5/4/2019 18:00	45	0.28	89,836	1.41	0.16	3	Atlas		25,154	1
	5/16/2019 21:15	5/16/2019 22:45	90	0.03	313,667	0.27	0.03	1	Atlas		9,410	1
	5/19/2019 23:15	5/19/2019 23:45	30	0.28	340,611	0.3	0.11	12	Atlas		95,371	1
	5/26/2019 14:15	5/26/2019 15:45	90	0.55	115,835	0.64	0.31	3	Atlas		63,709	1
	5/29/2019 9:15	5/29/2019 14:00	285	0.81	257,163	1.42	0.44	6	Atlas		208,302	1
	5/30/2019 11:30	5/30/2019 11:45	15	0.19	111,626	1.59	0.10	1	Atlas		21,209	1
	6/5/2019 21:00	6/5/2019 21:30	30	0.57	108,349	0.68	0.39	1	Atlas		61,759	1
	6/7/2019 21:15	6/8/2019 8:30	675	0.59	137,863	1.24	0.24	12	Atlas		81,339	1
	6/9/2019 0:30	6/9/2019 0:30	0	0.27	23,256	1.49	0.14	6	Atlas		6,279	1
	6/9/2019 15:45	6/9/2019 23:15	450	1.24	117,967	2.75	0.71	3	Atlas		146,279	1
	6/10/2019 12:30	6/10/2019 16:30	240	Discharge	0	2.76				Data Under Review	360	
	6/16/2019 6:00	6/16/2019 6:15	15	0.2	12,655	1.56	0.13	3	Atlas		2,531	1
	6/16/2019 20:15	6/17/2019 1:15	300	1.55	1,960	1.86	0.69	12	Atlas		3,038	1
	6/18/2019 5:00	6/18/2019 5:00	0	1.2	190	2.11	0.73	1	Atlas		228	1
	6/18/2019 16:45	6/18/2019 17:45	60	1.2	324	3.09	0.73	1	Atlas		389	1
	6/21/2019 19:45	6/21/2019 21:15	90	0.43	1,202	3.59	0.29	3	Atlas		517	1
	6/24/2019 13:45	6/24/2019 14:30	45	0.56	861	3.13	0.35	3	Atlas		482	1
	6/30/2019 17:45	6/30/2019 17:45	0	0.04	2,825	0.65	0.03	3	Atlas		113	1
CSO125 Total											30,874,485	63
CSO126	7/2/2018 17:15	7/3/2018 1:00	465	1.4	119,646	2.24	1.70	1	Atlas		167,505	1
	7/3/2018 15:30	7/3/2018 18:30	180	0.61	56,546	2.35	0.43	1	Atlas		34,493	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO126	7/15/2018 18:30	7/15/2018 18:30	0	0.26	700	0.26	0.14	1	Atlas		182	1
	7/20/2018 19:15	7/21/2018 6:45	690	1.31	65,889	1.73	0.71	3	Atlas		86,314	1
	7/31/2018 2:00	7/31/2018 13:00	660	2.34	11,212	2.37	0.92	6	Atlas		26,235	1
	8/31/2018 17:30	9/1/2018 2:30	540	0.63	128,952	0.66	0.43	1	Atlas		81,240	1
	9/6/2018 11:30	9/6/2018 11:30	0	0.44	16,634	0.99	0.34	1	Atlas		7,319	1
	9/8/2018 18:15	9/9/2018 11:45	1050	2.57	358,656	3.04	1.44	6	Cloudburst		921,747	1
	9/22/2018 17:00	9/22/2018 17:00	0	1.29	1,384	0.61	0.48	24	Atlas		1,786	1
	9/23/2018 5:30	9/23/2018 17:15	705	1.29	121,524	1.53	0.48	24	Atlas		156,766	1
	9/24/2018 7:15	9/25/2018 1:45	1110	1.72	444,808	3.18	0.78	6	Atlas		765,070	1
	9/25/2018 16:45	9/26/2018 4:15	690	0.68	239,007	3.95	0.31	12	Atlas		162,525	1
	11/1/2018 0:45	11/1/2018 18:30	1065	1.77	41,803	2.14	0.60	24	Atlas		73,992	1
	11/5/2018 22:00	11/6/2018 8:00	600	1.02	174,625	2.88	0.55	6	Atlas		178,117	1
	11/15/2018 4:30	11/15/2018 9:00	270	0.5	29,544	0.69	0.23	12	Atlas		14,772	1
	12/1/2018 10:15	12/1/2018 14:45	270	1.63	503,561	1.74	0.71	12	Atlas		820,804	1
	12/15/2018 4:30	12/15/2018 17:30	780	1.51	524,748	1.52	0.61	12	Atlas		792,370	1
	12/31/2018 9:00	12/31/2018 23:30	870	1.36	367,314	1.69	0.52	24	Atlas		499,547	1
	1/4/2019 14:45	1/4/2019 21:00	375	0.62	132,106	1.97	0.28	12	Atlas		81,906	1
	1/19/2019 17:30	1/19/2019 21:00	210	0.87	22,567	0.92	0.33	24	Atlas		19,633	1
	1/23/2019 10:15	1/23/2019 22:45	750	0.87	322,154	1.84	0.34	12	Atlas		280,274	1
	2/6/2019 10:00	2/6/2019 12:00	120	1.56	7,843	0.74	0.50	48	Atlas		12,235	1
	2/7/2019 9:15	2/8/2019 0:45	930	1.56	1,375,918	1.66	0.50	48	Atlas		2,146,432	1
	2/10/2019 17:15	2/12/2019 6:15	2220	2.75	2,161,793	4.14	0.85	48	Atlas		5,944,930	1
	2/12/2019 19:00	2/13/2019 14:15	1155	2.75	533,305	4.29	0.85	48	Atlas		1,466,590	1
	2/20/2019 3:30	2/20/2019 22:45	1155	1.85	817,359	1.9	0.86	6	Atlas		1,512,114	1
	2/23/2019 17:30	2/24/2019 10:00	990	0.89	1,690,906	2.8	0.48	6	Atlas		1,504,906	1
	3/9/2019 15:30	3/12/2019 19:15	4545	1.24	128,497	1.37	0.62	6	Atlas		159,336	1
	3/13/2019 7:00	3/13/2019 8:15	75	0.01	47,200	1.35	0.01	1	Atlas		472	1
	3/14/2019 17:15	3/15/2019 2:00	525	0.74	282,661	2.47	0.50	1	Atlas		209,169	1
	3/30/2019 17:15	3/30/2019 21:00	225	0.69	51,622	1.1	0.37	6	Atlas		35,619	1
	4/7/2019 12:00	4/7/2019 12:30	30	0.51	8,449	0.63	0.26	3	Atlas		4,309	1
	4/14/2019 2:00	4/14/2019 5:00	180	1.19	53,420	1.74	0.57	6	Atlas		63,570	1
	4/19/2019 19:00	4/21/2019 0:45	1785	3.71	572,911	4.94	2.10	48	Cloudburst		2,125,501	1
	4/24/2019 21:00	4/24/2019 22:15	75	0.48	47,098	4.04	0.23	1	Atlas		22,607	1
	4/25/2019 18:15	4/26/2019 4:15	600	0.42	183,348	4.62	0.19	12	Atlas		77,006	1
	5/3/2019 7:00	5/3/2019 17:30	630	0.96	103,260	1.16	0.52	6	Atlas		99,130	1
	5/26/2019 14:00	5/26/2019 14:00	0	0.55	5,956	0.49	0.31	3	Atlas		3,276	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO126	5/29/2019 9:15	5/29/2019 9:15	0	0.81	16,580	1.02	0.44	6	Atlas		13,430	1
	6/5/2019 21:15	6/5/2019 21:15	0	0.57	2,863	0.67	0.39	1	Atlas		1,632	1
	6/9/2019 4:30	6/9/2019 4:30	0	0.27	3,400	1.51	0.14	6	Atlas		918	1
	6/9/2019 15:45	6/9/2019 21:00	315	1.24	790,382	2.75	0.71	3	Atlas		980,074	1
	6/16/2019 21:00	6/17/2019 2:00	300	1.55	49,574	1.85	0.69	12	Atlas		76,839	1
	6/18/2019 17:15	6/18/2019 18:15	60	1.2	37,783	3.09	0.73	1	Atlas		45,339	1
	6/21/2019 20:45	6/21/2019 21:45	60	0.43	12,788	3.59	0.29	3	Atlas		5,499	1
	6/22/2019 8:45	6/22/2019 10:00	75	0.33	33,312	3.8	0.22	3	Atlas		10,993	1
	6/23/2019 16:30	6/23/2019 17:00	30	0.52	7,623	3.93	0.41	1	Atlas		3,964	1
	6/24/2019 14:15	6/24/2019 15:30	75	0.56	99,848	3.13	0.35	3	Atlas		55,915	1
CSO126 Total											21,754,402	48
CSO127	7/2/2018 17:00	7/2/2018 19:15	135	1.14	2,147,844	1.95	0.86	1	Atlas		2,448,542	1
	7/3/2018 15:30	7/3/2018 16:45	75	0.64	1,721,548	2.08	0.47	1	Atlas		1,101,791	1
	7/15/2018 18:15	7/15/2018 19:00	45	0.38	1,202,832	0.38	0.23	1	Atlas		457,076	1
	7/16/2018 9:45	7/16/2018 10:15	30	0.15	741,893	0.53	0.10	1	Atlas		111,284	1
	7/20/2018 3:30	7/20/2018 3:45	15	1.32	22,344	0.55	0.71	3	Atlas		29,494	1
	7/20/2018 14:00	7/21/2018 5:15	915	1.32	1,240,402	1.85	0.71	3	Atlas		1,637,330	1
	7/22/2018 17:30	7/22/2018 18:00	30	0.56	241,207	2.32	0.43	1	Atlas		135,076	1
	7/30/2018 23:30	7/31/2018 13:45	855	2.2	170,747	2.27	0.89	12	Atlas		375,643	1
	8/8/2018 1:00	8/8/2018 2:45	105	0.31	195,574	0.29	0.17	3	Atlas		60,628	1
	8/15/2018 12:45	8/16/2018 13:45	1500	2.9	577,615	2.9	1.63	24	Cloudburst		1,675,083	1
	8/18/2018 19:00	8/18/2018 19:15	15	0.07	238,614	2.98	0.03	1	Atlas		16,703	1
	8/19/2018 20:30	8/19/2018 23:00	150	1.18	2,774,732	4.17	0.80	1	Atlas		3,274,184	1
	8/20/2018 11:30	8/20/2018 12:15	45	0.6	116,053	4.53	0.31	1	Atlas		69,632	1
	8/31/2018 17:30	8/31/2018 18:30	60	0.76	1,282,703	0.69	0.54	1	Atlas		974,854	1
	9/6/2018 12:00	9/6/2018 12:00	0	0.31	6,700	1.05	0.23	1	Atlas		2,077	1
	9/8/2018 2:00	9/8/2018 2:30	30	0.39	105,736	0.64	0.19	6	Atlas		41,237	1
	9/8/2018 16:00	9/9/2018 9:00	1020	2.46	2,069,450	3.17	2.29	6	Cloudburst		5,090,848	1
	9/21/2018 17:45	9/21/2018 18:15	30	0.21	14,629	0.32	0.15	1	Atlas		3,072	1
	9/22/2018 15:15	9/22/2018 18:00	165	1.53	33,111	0.79	0.56	24	Atlas		50,660	1
	9/23/2018 4:15	9/23/2018 9:15	300	1.53	59,741	1.81	0.56	24	Atlas		91,404	1
	9/24/2018 1:00	9/24/2018 19:30	1110	2.06	968,583	3.86	0.90	12	Atlas		1,995,281	1
	9/25/2018 6:00	9/25/2018 6:45	45	0.12	311,933	3.92	0.10	1	Atlas		37,432	1
	9/25/2018 16:45	9/26/2018 3:30	645	0.8	181,551	4.7	0.37	1	Atlas		145,241	1
	10/10/2018 17:15	10/10/2018 17:45	30	0.12	70,400	0.13	0.10	1	Atlas		8,448	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO127	10/14/2018 5:00	10/14/2018 5:00	0	0.23	7,430	0.43	0.12	3	Atlas		1,709	1
	10/15/2018 9:15	10/15/2018 9:45	30	0.14	44,086	0.59	0.10	1	Atlas		6,172	1
	10/26/2018 15:15	10/26/2018 16:00	45	0.38	38,168	0.48	0.16	1	Atlas		14,504	1
	10/31/2018 15:00	11/1/2018 19:00	1680	1.99	122,537	2.39	0.68	24	Atlas		243,848	1
	11/5/2018 20:15	11/6/2018 1:45	330	1.13	304,630	3.21	0.61	6	Atlas		344,232	1
	11/14/2018 22:15	11/15/2018 4:30	375	0.47	201,047	0.66	0.22	12	Atlas		94,492	1
	11/23/2018 22:45	11/23/2018 22:45	0	0.29	9,148	0.12	0.15	6	Atlas		2,653	1
	11/26/2018 0:15	11/26/2018 0:45	30	0.1	52,950	0.43	0.07	1	Atlas		5,295	1
	12/1/2018 3:15	12/1/2018 15:30	735	1.59	137,727	1.72	0.70	12	Atlas		218,986	1
	12/14/2018 14:30	12/14/2018 14:45	15	1.52	822	0.12	0.62	12	Atlas		1,249	1
	12/15/2018 2:30	12/15/2018 12:00	570	1.52	197,566	1.51	0.62	12	Atlas		300,300	1
	12/20/2018 15:45	12/20/2018 21:15	330	0.58	6,621	1.96	0.22	12	Atlas		3,840	1
	12/27/2018 17:45	12/27/2018 19:00	75	0.35	132,866	0.68	0.19	1	Atlas		46,503	1
	12/31/2018 5:15	12/31/2018 18:30	795	1.47	292,795	1.84	0.57	24	Atlas		430,408	1
	1/4/2019 13:45	1/4/2019 21:00	435	0.65	219,838	2.1	0.29	12	Atlas		142,895	1
	1/13/2019 0:30	1/13/2019 0:45	15	0.2	21,990	0.24	0.09	1	Atlas		4,398	1
	1/19/2019 6:30	1/19/2019 21:00	870	0.92	202,786	1.04	0.35	24	Atlas		186,563	1
	1/23/2019 8:45	1/23/2019 18:15	570	0.88	268,184	1.86	0.35	12	Atlas		236,002	1
	2/4/2019 14:30	2/4/2019 14:45	15	0.06	107,500	0.11	0.04	3	Atlas		6,450	1
	2/5/2019 3:45	2/5/2019 4:00	15	0.03	366,267	0.12	0.02	1	Atlas		10,988	1
	2/5/2019 23:15	2/6/2019 11:45	750	1.62	146,566	0.75	0.52	48	Atlas		237,437	1
	2/7/2019 5:15	2/7/2019 21:15	960	1.62	211,883	1.74	0.52	48	Atlas		343,250	1
	2/10/2019 19:15	2/12/2019 23:00	3105	2.84	1,510,652	4.55	0.88	48	Atlas		4,290,252	1
	2/20/2019 2:30	2/20/2019 18:45	975	1.98	373,561	2.04	0.93	6	Atlas		739,650	1
	2/23/2019 17:00	2/23/2019 23:45	405	1.01	173,899	3.06	0.55	6	Atlas		175,638	1
	3/9/2019 13:45	3/9/2019 20:00	375	1.19	300,839	1.33	0.60	6	Atlas		357,998	1
	3/14/2019 4:45	3/14/2019 8:15	210	0.41	211,434	1.72	0.22	6	Atlas		86,688	1
	3/14/2019 17:15	3/14/2019 20:00	165	0.65	264,469	2.34	0.44	1	Atlas		171,905	1
	3/25/2019 0:45	3/25/2019 5:30	285	0.24	102,163	0.3	0.13	6	Atlas		24,519	1
	3/30/2019 15:45	3/30/2019 21:00	315	0.82	235,061	1.13	0.38	6	Atlas		192,750	1
	4/7/2019 6:00	4/7/2019 14:15	495	0.62	299,287	0.85	0.31	1	Atlas		185,558	1
	4/12/2019 6:00	4/12/2019 6:15	15	0.06	370,983	0.66	0.04	1	Atlas		22,259	1
	4/14/2019 1:00	4/14/2019 6:15	315	1.22	169,058	1.93	0.58	6	Atlas		206,251	1
	4/18/2019 23:00	4/19/2019 5:15	375	3.83	3,254	1.94	2.49	48	Cloudburst		12,462	1
	4/19/2019 18:15	4/20/2019 18:45	1470	3.83	701,662	5.09	2.49	48	Cloudburst		2,687,367	1
	4/23/2019 18:00	4/23/2019 18:45	45	0.15	1,176,947	3.98	0.13	1	Atlas		176,542	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO127	4/24/2019 20:45	4/24/2019 22:15	90	0.52	182,315	4.33	0.27	1	Atlas		94,804	1
	4/25/2019 18:30	4/26/2019 4:00	570	0.44	156,432	4.93	0.19	12	Atlas		68,830	1
	5/3/2019 3:30	5/3/2019 9:15	345	1.07	262,294	1.32	0.58	6	Atlas		280,655	1
	5/4/2019 17:15	5/4/2019 18:30	75	0.26	533,477	1.54	0.15	3	Atlas		138,704	1
	5/11/2019 21:15	5/11/2019 21:30	15	0.24	27,688	0.26	0.13	3	Atlas		6,645	1
	5/19/2019 13:30	5/19/2019 13:45	15	0.15	166,153	0.2	0.10	1	Atlas		24,923	1
	5/19/2019 23:30	5/19/2019 23:30	0	0.13	94,215	0.3	0.09	1	Atlas		12,248	1
	5/23/2019 16:00	5/23/2019 16:15	15	0.11	237,055	0.43	0.07	1	Atlas		26,076	1
	5/26/2019 14:00	5/26/2019 17:30	210	0.5	608,532	0.75	0.31	3	Atlas		304,266	1
	5/29/2019 9:15	5/29/2019 14:15	300	0.77	814,838	1.39	0.42	6	Atlas		627,425	1
	5/30/2019 11:15	5/30/2019 12:00	45	0.23	336,548	1.57	0.10	1	Atlas		77,406	1
	6/5/2019 21:00	6/5/2019 21:45	45	0.62	211,068	0.79	0.42	1	Atlas		130,862	1
	6/7/2019 21:15	6/8/2019 9:00	705	0.65	258,446	1.3	0.24	12	Atlas		167,990	1
	6/9/2019 0:30	6/9/2019 0:45	15	0.3	56,313	1.57	0.15	6	Atlas		16,894	1
	6/9/2019 15:15	6/9/2019 20:00	285	1.45	1,952,596	3.01	0.89	3	Atlas		2,831,264	1
	6/16/2019 6:15	6/16/2019 6:45	30	0.17	223,565	1.75	0.11	3	Atlas		38,006	1
	6/16/2019 20:00	6/17/2019 1:45	345	1.66	105,511	1.94	0.73	12	Atlas		175,148	1
	6/17/2019 21:30	6/18/2019 18:15	1245	0.8	90,604	2.77	0.33	1	Atlas		72,483	1
	6/19/2019 21:15	6/19/2019 21:30	15	0.09	127,567	2.86	0.06	1	Atlas		11,481	1
	6/21/2019 19:45	6/21/2019 21:45	120	0.57	116,951	3.43	0.38	3	Atlas		66,662	1
	6/22/2019 7:00	6/22/2019 10:00	180	0.32	364,091	3.62	0.21	3	Atlas		116,509	1
CSO127 Total	6/23/2019 16:15	6/23/2019 17:15	60	0.7	832,149	3.89	0.57	1	Atlas		582,504	1
	6/24/2019 13:30	6/24/2019 15:15	105	0.61	299,616	3.1	0.38	3	Atlas		182,766	1
											38,099,584	83
CSO130	7/3/2018 16:00	7/3/2018 16:00	0	0.53	20,243	1.42	0.36	1	Atlas		10,729	1
	7/20/2018 21:00	7/20/2018 21:00	0	1.61	44,566	1.88	0.91	3	Atlas		71,752	1
	9/8/2018 18:30	9/8/2018 19:45	75	2.34	21,904	2.18	1.83	6	Cloudburst		51,256	1
CSO130 Total											133,737	3
CSO131	11/1/2018 0:45	11/1/2018 1:15	30	1.6	41,399	1.3	0.58	24	Atlas		66,238	1
	11/5/2018 22:00	11/5/2018 22:15	15	0.79	56,781	2.14	0.43	6	Atlas		44,857	1
	12/1/2018 10:15	12/1/2018 10:15	0	1.32	3,976	1.2	0.56	12	Atlas		5,248	1
	12/27/2018 17:45	12/27/2018 17:45	0	0.3	93,663	0.46	0.19	1	Atlas		28,099	1
	12/31/2018 16:30	12/31/2018 16:45	15	1.22	34,838	1.53	0.47	24	Atlas		42,502	1
	1/4/2019 15:15	1/4/2019 15:45	30	0.55	11,418	1.64	0.27	3	Atlas		6,280	1
	1/19/2019 6:45	1/19/2019 19:45	780	0.77	55,390	0.82	0.30	24	Atlas		42,650	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO131	1/23/2019 10:00	1/23/2019 13:15	195	0.82	81,570	1.52	0.32	12	Atlas		66,887	1
	2/6/2019 7:15	2/6/2019 7:15	0	1.35	22,681	0.41	0.44	48	Atlas		30,619	1
	2/7/2019 9:15	2/7/2019 9:15	0	1.35	26,455	1.01	0.44	48	Atlas		35,714	1
	2/12/2019 4:45	2/12/2019 4:45	0	2.5	11,130	3.47	0.77	48	Atlas		27,824	1
	2/20/2019 4:15	2/20/2019 6:15	120	1.46	80,440	1.33	0.67	6	Atlas		117,442	1
	3/14/2019 18:45	3/14/2019 18:45	0	0.66	20,098	2.11	0.49	1	Atlas		13,265	1
	3/30/2019 17:30	3/30/2019 17:30	0	0.81	880	0.9	0.43	6	Atlas		713	1
	4/14/2019 2:15	4/14/2019 2:15	0	0.8	30,703	1.1	0.39	6	Atlas		24,562	1
	4/24/2019 21:00	4/24/2019 21:00	0	0.55	37,607	3.09	0.26	6	Atlas		20,684	1
	4/25/2019 18:15	4/25/2019 18:30	15	0.36	54,931	3.51	0.17	1	Atlas		19,775	1
	5/26/2019 14:00	5/26/2019 14:00	0	0.78	53,727	0.64	0.49	3	Atlas		41,907	1
	6/5/2019 21:00	6/5/2019 21:00	0	0.66	4,794	0.78	0.48	1	Atlas		3,164	1
	6/9/2019 15:30	6/9/2019 17:15	105	0.73	79,804	2.13	0.40	3	Atlas		58,257	1
	6/16/2019 20:00	6/16/2019 21:00	60	1.4	65,686	1.26	0.64	12	Atlas		91,961	1
	6/18/2019 17:15	6/18/2019 17:15	0	1.05	16,864	2.87	0.87	1	Atlas		17,707	1
	6/23/2019 16:15	6/23/2019 16:30	15	0.45	148,816	3.6	0.36	1	Atlas		66,967	1
	6/24/2019 14:15	6/24/2019 14:15	0	0.42	54,355	2.9	0.26	3	Atlas		22,829	1
CSO131 Total											896,151	24
CSO132	7/15/2018 18:30	7/15/2018 18:45	15	0.13	64,415	0.13	0.06	12	Atlas		8,374	1
	7/16/2018 9:30	7/16/2018 10:00	30	0.17	350,341	0.28	0.13	1	Atlas		59,558	1
	7/20/2018 4:30	7/20/2018 5:15	45	1.45	43,291	0.5	0.78	3	Atlas		62,772	1
	7/20/2018 19:00	7/20/2018 22:15	195	1.45	2,165,543	1.74	0.78	3	Atlas		3,140,037	1
	7/22/2018 16:45	7/22/2018 18:00	75	0.51	1,086,302	2.19	0.37	1	Atlas		554,014	1
	7/30/2018 23:30	7/31/2018 13:30	840	1.99	557,295	2.06	0.87	6	Atlas		1,109,018	1
	8/8/2018 1:00	8/8/2018 3:30	150	0.11	704,973	0.46	0.06	3	Atlas		77,547	1
	8/15/2018 19:45	8/16/2018 15:30	1185	2.38	732,429	2.39	0.92	24	Atlas		1,743,181	1
	8/19/2018 21:15	8/19/2018 22:00	45	0.2	186,075	2.61	0.16	1	Atlas		37,215	1
	8/20/2018 11:30	8/20/2018 14:15	165	0.34	993,612	2.88	0.23	1	Atlas		337,828	1
	8/31/2018 17:15	8/31/2018 18:45	90	0.42	909,136	0.41	0.28	1	Atlas		381,837	1
	9/6/2018 11:30	9/6/2018 12:15	45	0.46	537,502	0.87	0.37	1	Atlas		247,251	1
	9/8/2018 1:15	9/8/2018 6:00	285	2.43	31,898	0.83	1.11	6	Cloudburst		77,511	1
	9/8/2018 15:45	9/9/2018 10:45	1140	2.43	1,197,126	2.91	1.11	6	Cloudburst		2,909,017	1
	9/21/2018 17:15	9/21/2018 18:00	45	0.41	60,439	0.47	0.24	1	Atlas		24,780	1
	9/22/2018 15:30	9/22/2018 18:00	150	1.21	80,550	0.83	0.46	24	Atlas		97,466	1
	9/23/2018 4:15	9/23/2018 9:00	285	1.21	467,709	1.66	0.46	24	Atlas		565,928	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO132	9/24/2018 0:45	9/25/2018 7:30	1845	1.3	775,201	3.05	0.57	6	Atlas		1,007,761	1
	9/25/2018 16:30	9/26/2018 10:30	1080	0.68	3,102,510	3.69	0.30	12	Atlas		2,109,707	1
	10/10/2018 17:45	10/10/2018 17:45	0	0.1	65,240	0.12	0.08	1	Atlas		6,524	1
	10/15/2018 9:00	10/15/2018 9:45	45	0.12	879,658	0.55	0.09	1	Atlas		105,559	1
	10/26/2018 15:15	10/26/2018 16:00	45	0.25	242,452	0.34	0.10	24	Atlas		60,613	1
	10/31/2018 15:00	11/1/2018 20:00	1740	1.54	786,322	1.81	0.55	24	Atlas		1,210,936	1
	11/5/2018 20:15	11/6/2018 3:15	420	0.82	940,701	2.42	0.44	6	Atlas		771,375	1
	11/14/2018 22:15	11/15/2018 5:30	435	0.43	2,149,098	0.62	0.20	12	Atlas		924,112	1
	11/23/2018 22:15	11/23/2018 22:30	15	0.25	83,856	0.09	0.13	6	Atlas		20,964	1
	11/26/2018 0:15	11/26/2018 0:30	15	0.07	349,200	0.34	0.04	1	Atlas		24,444	1
	12/1/2018 3:15	12/1/2018 20:15	1020	1.38	824,580	1.51	0.60	12	Atlas		1,137,920	1
	12/20/2018 17:00	12/20/2018 23:45	405	0.51	536,535	2	0.20	12	Atlas		273,633	1
	12/27/2018 13:15	12/27/2018 19:30	375	0.29	597,062	0.76	0.18	1	Atlas		173,148	1
	12/31/2018 5:30	1/1/2019 2:00	1230	1.2	817,352	1.5	0.46	24	Atlas		980,822	1
	1/4/2019 14:15	1/4/2019 23:30	555	0.59	2,632,080	1.79	0.29	3	Atlas		1,552,927	1
	1/19/2019 6:30	1/19/2019 22:00	930	0.77	1,752,581	0.85	0.30	24	Atlas		1,349,487	1
	1/23/2019 8:30	1/24/2019 11:15	1605	0.82	6,560,117	1.69	0.32	12	Atlas		5,379,296	1
	2/5/2019 23:15	2/6/2019 12:30	795	1.35	1,674,181	0.7	0.43	48	Atlas		2,260,145	1
	2/7/2019 5:30	2/17/2019 14:00	14910	1.35	52,515,512	4.03	0.43	48	Atlas		70,895,941	1
	2/20/2019 2:45	2/21/2019 23:15	2670	1.55	7,262,487	1.6	0.72	6	Atlas		11,256,855	1
	2/23/2019 17:00	2/25/2019 3:00	2040	0.76	9,875,761	2.38	0.42	6	Atlas		7,505,578	1
	2/25/2019 12:30	3/1/2019 17:15	6045	Discharge	0	2.46				Affected by River Flooding	19,869,171	
	3/2/2019 4:45	3/2/2019 10:15	330	Discharge	0	0.87				Affected by River Flooding	1,357	
	3/2/2019 21:15	3/3/2019 15:45	1110	Discharge	0	0.17				Affected by River Flooding	520,292	
	3/4/2019 9:00	3/4/2019 9:30	30	Discharge	0	0.12				Affected by River Flooding	199,927	
	3/5/2019 17:15	3/5/2019 19:00	105	Discharge	0	0.12				Affected by River Flooding	140,805	

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO132	3/7/2019 2:00	3/7/2019 5:15	195	Discharge	0	0.12				Affected by River Flooding	212,848	
	3/7/2019 14:30	3/7/2019 20:30	360	0.1	2,396,190	0.14	0.04	24	Atlas		239,619	1
	3/9/2019 0:15	3/9/2019 20:30	1215	Discharge	0	1.15				Affected by River Flooding	2,913,554	
	3/14/2019 5:30	3/14/2019 8:30	180	0.36	302,350	1.49	0.20	6	Atlas		108,846	1
	3/14/2019 17:00	3/14/2019 21:15	255	0.67	465,336	2.13	0.48	1	Atlas		311,775	1
	3/30/2019 15:45	3/30/2019 21:00	315	0.74	564,454	1.14	0.39	6	Atlas		417,696	1
	4/7/2019 6:45	4/7/2019 14:15	450	0.57	340,896	0.77	0.29	3	Atlas		194,311	1
	4/12/2019 6:00	4/12/2019 6:15	15	0.08	2,503,238	0.67	0.05	3	Atlas		200,259	1
	4/14/2019 1:15	4/14/2019 7:15	360	0.91	343,873	1.61	0.44	6	Atlas		312,924	1
	4/18/2019 22:45	4/18/2019 23:30	45	3.01	4,325	1.44	0.98	48	Atlas		13,018	1
	4/19/2019 18:30	4/21/2019 7:00	2190	3.01	3,607,134	3.99	0.98	48	Atlas		10,857,473	1
	4/24/2019 20:30	4/24/2019 22:15	105	0.59	1,045,741	3.45	0.32	1	Atlas		616,987	1
	4/25/2019 18:00	4/26/2019 4:30	630	0.43	874,437	4.04	0.23	1	Atlas		376,008	1
	5/3/2019 5:00	5/3/2019 9:30	270	0.95	1,099,032	1.11	0.51	6	Atlas		1,044,080	1
	5/4/2019 17:00	5/4/2019 18:15	75	0.19	561,847	1.27	0.11	3	Atlas		106,751	1
	5/19/2019 13:30	5/19/2019 13:45	15	0.13	312,615	0.18	0.08	1	Atlas		40,640	1
	5/19/2019 23:00	5/19/2019 23:45	45	0.09	3,611,978	0.27	0.08	1	Atlas		325,078	1
	5/26/2019 13:45	5/26/2019 16:00	135	0.69	633,013	0.82	0.43	3	Atlas		436,779	1
	5/29/2019 9:00	5/29/2019 14:15	315	0.64	1,107,314	1.41	0.35	6	Atlas		708,681	1
	5/30/2019 11:15	5/30/2019 12:00	45	0.19	648,379	1.56	0.09	1	Atlas		123,192	1
	6/5/2019 20:45	6/5/2019 22:15	90	0.53	2,007,040	0.7	0.37	1	Atlas		1,063,731	1
	6/7/2019 21:15	6/8/2019 8:45	690	0.6	617,120	1.2	0.26	12	Atlas		370,272	1
	6/9/2019 0:30	6/9/2019 0:30	0	0.3	36,750	1.48	0.15	6	Atlas		11,025	1
	6/9/2019 15:15	6/9/2019 22:30	435	1.03	3,746,359	2.53	0.59	3	Atlas		3,858,750	1
	6/16/2019 5:45	6/16/2019 6:30	45	0.16	1,508,213	1.28	0.11	3	Atlas		241,314	1
	6/16/2019 19:45	6/17/2019 8:45	780	1.23	2,156,437	1.56	0.55	12	Atlas		2,652,417	1
	6/18/2019 4:45	6/18/2019 5:15	30	1.5	55,441	1.66	1.52	1	Atlas		83,161	1
	6/18/2019 16:00	6/18/2019 22:45	405	1.5	4,948,429	3.03	1.52	1	Atlas		7,422,644	1
	6/21/2019 19:30	6/21/2019 22:00	150	0.34	940,765	3.44	0.23	3	Atlas		319,860	1
	6/22/2019 7:15	6/22/2019 10:15	180	0.29	2,058,759	3.6	0.19	3	Atlas		597,040	1
	6/23/2019 16:00	6/23/2019 17:15	75	0.42	425,155	3.79	0.33	1	Atlas		178,565	1
	6/24/2019 13:30	6/24/2019 17:00	210	0.48	3,513,723	3.11	0.30	3	Atlas		1,686,587	1
CSO132 Total											179,218,518	68

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO140	7/2/2018 17:45	7/3/2018 2:00	495	0.65	145,365	1.26	0.52	1	Atlas		94,487	1
	7/20/2018 19:45	7/20/2018 21:15	90	1.63	246,383	1.88	0.93	3	Atlas		401,604	1
	7/31/2018 2:00	7/31/2018 14:15	735	2.06	44,115	2.12	0.91	6	Atlas		90,877	1
	9/1/2018 2:00	9/1/2018 3:45	105	0.31	4,590	0.35	0.18	3	Atlas		1,423	1
	9/8/2018 18:30	9/8/2018 21:15	165	2.37	680,646	2.62	1.06	6	Cloudburst		1,613,131	1
	9/9/2018 12:30	9/9/2018 18:30	360	0.03	69,533	2.78	0.02	6	Atlas		2,086	1
	9/23/2018 6:30	9/23/2018 7:00	30	1.23	47,611	1.51	0.46	24	Atlas		58,562	1
	9/23/2018 18:45	9/23/2018 21:00	135	1.23	1,219	1.53	0.46	24	Atlas		1,499	1
	9/24/2018 7:30	9/24/2018 14:00	390	1.35	181,983	2.81	0.61	6	Atlas		245,677	1
	9/25/2018 0:00	9/26/2018 19:45	2625	1.35	48,736	3.6	0.61	6	Atlas		65,794	1
	11/1/2018 1:00	11/1/2018 16:15	915	1.59	12,270	1.81	0.57	24	Atlas		19,509	1
	11/5/2018 22:45	11/6/2018 12:00	795	0.84	4,064	2.49	0.45	6	Atlas		3,414	1
	11/15/2018 4:00	11/15/2018 12:30	510	0.43	2,228	0.62	0.20	12	Atlas		958	1
	12/1/2018 23:00	12/2/2018 5:45	405	1.52	2,704	1.66	0.61	12	Atlas		4,110	1
	12/15/2018 8:00	12/15/2018 20:15	735	1.66	13,082	1.66	0.69	12	Atlas		21,716	1
	12/31/2018 9:30	1/1/2019 5:15	1185	1.23	353,019	1.53	0.47	24	Atlas		434,213	1
	1/4/2019 15:00	1/4/2019 22:45	465	0.59	146,680	1.81	0.27	3	Atlas		86,541	1
	1/19/2019 22:15	1/20/2019 3:45	330	0.74	3,455	0.94	0.28	24	Atlas		2,557	1
	1/23/2019 10:15	1/24/2019 2:30	975	0.8	1,175,680	1.64	0.31	24	Atlas		940,544	1
	2/6/2019 15:30	2/6/2019 19:00	210	1.45	914	0.73	0.47	48	Atlas		1,325	1
	2/7/2019 9:15	2/7/2019 20:15	660	1.45	1,151,570	1.55	0.47	48	Atlas		1,669,776	1
	2/8/2019 5:00	2/8/2019 20:30	930	Discharge	0	1.54				Affected by River Flooding	6,778	
	2/10/2019 16:45	2/13/2019 15:00	4215	2.63	2,293,458	4.15	0.82	48	Atlas		6,031,795	1
	2/14/2019 1:30	2/14/2019 2:00	30	Discharge	0	3.32				Affected by River Flooding	18,705	
	2/15/2019 1:15	2/15/2019 1:15	0	Discharge	0	2.63				Affected by River Flooding	30	
	2/20/2019 3:30	2/21/2019 4:15	1485	1.46	629,051	1.51	0.67	6	Atlas		918,415	1
	2/23/2019 17:30	2/24/2019 15:00	1290	0.75	2,557,389	2.26	0.40	6	Atlas		1,918,042	1
	3/9/2019 16:30	3/10/2019 5:45	795	0.95	18,318	1.09	0.45	6	Atlas		17,402	1
	3/14/2019 17:45	3/15/2019 3:45	600	0.54	193,787	1.9	0.39	1	Atlas		104,645	1
	4/19/2019 21:15	4/19/2019 23:15	120	2.88	33,941	2.4	0.94	48	Atlas		97,749	1
	4/20/2019 9:30	4/20/2019 9:45	15	2.88	35,894	3.54	0.94	48	Atlas		103,375	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO140	4/24/2019 20:45	4/24/2019 21:15	30	0.54	30,739	3.24	0.25	1	Atlas		16,599	1
CSO140 Total											14,993,338	29
CSO141	7/2/2018 17:30	7/2/2018 17:45	15	0.43	104,991	1.04	0.35	1	Atlas		45,146	1
	7/3/2018 15:15	7/3/2018 15:45	30	0.56	77,995	1.26	0.42	1	Atlas		43,677	1
	7/20/2018 20:45	7/20/2018 20:45	0	1.61	16,026	1.78	0.92	3	Atlas		25,802	1
	7/31/2018 2:00	7/31/2018 2:00	0	2.1	5,615	1.23	0.93	6	Atlas		11,792	1
	9/8/2018 19:45	9/8/2018 20:15	30	2.44	48,146	2.28	1.14	6	Cloudburst		117,477	1
	11/15/2018 1:45	11/15/2018 3:45	120	0.39	8,982	0.56	0.17	12	Atlas		3,503	1
	3/9/2019 13:45	3/9/2019 18:45	300	0.97	226	1.1	0.44	12	Atlas		219	1
	3/14/2019 18:30	3/14/2019 18:30	0	0.52	687	1.92	0.38	1	Atlas		357	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.31	14,745	3.27	0.14	12	Atlas		4,571	1
	6/9/2019 16:30	6/9/2019 16:30	0	0.72	84,921	1.9	0.39	3	Atlas		61,143	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.38	22,313	3.48	0.30	1	Atlas		8,479	1
CSO141 Total											322,166	11
CSO142	8/15/2018 20:00	8/16/2018 8:45	765	2.55	25,845	2.42	0.98	24	Atlas	Retained by Sneads Branch	65,904	1
	8/19/2018 20:45	8/19/2018 20:45	0	0.21	73,719	2.76	0.14	3	Atlas	Retained by Sneads Branch	15,481	1
	8/20/2018 11:30	8/20/2018 11:30	0	0.5	15,628	3.23	0.38	1	Atlas	Retained by Sneads Branch	7,814	1
	9/6/2018 11:30	9/6/2018 11:45	15	0.19	98,937	0.38	0.12	3	Atlas	Retained by Sneads Branch	18,798	1
	9/8/2018 5:30	9/8/2018 5:30	0	2.36	1,159	0.56	0.97	6	Atlas	Retained by Sneads Branch	2,736	1
	9/8/2018 17:30	9/8/2018 21:15	225	2.36	63,239	2.42	0.97	6	Atlas	Retained by Sneads Branch	149,244	1
	9/23/2018 4:30	9/23/2018 6:30	120	1.28	9,708	1.46	0.48	24	Atlas	Retained by Sneads Branch	12,426	1

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CSO Data Monitoring Procedures are being Revised

Project WIN - FY19 Annual Report

CSO Data Summary

July 01, 2018 - June 30, 2019

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO142	9/24/2018 7:30	9/24/2018 13:30	360	1.29	22,175	2.74	0.60	6	Atlas	Retained by Sneads Branch	28,606	1
	9/25/2018 5:45	9/25/2018 5:45	0	0.08	139,575	2.83	0.07	1	Atlas	Retained by Sneads Branch	11,166	1
	9/25/2018 17:00	9/25/2018 17:00	0	0.67	35,240	3.08	0.30	12	Atlas	Retained by Sneads Branch	23,611	1
	11/1/2018 0:30	11/1/2018 1:00	30	1.73	4,150	1.38	0.62	24	Atlas	Retained by Sneads Branch	7,180	1
	11/5/2018 22:00	11/5/2018 22:00	0	0.95	11,948	2.34	0.51	6	Atlas	Retained by Sneads Branch	11,351	1
	12/31/2018 16:15	12/31/2018 16:15	0	1.18	1,386	1.47	0.45	24	Atlas	Retained by Sneads Branch	1,636	1
	2/6/2019 7:00	2/6/2019 7:00	0	1.4	621	0.5	0.45	48	Atlas	Retained by Sneads Branch	869	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.4	9,821	1.01	0.45	48	Atlas	Retained by Sneads Branch	13,749	1
	2/12/2019 4:45	2/12/2019 4:45	0	2.48	415	3.52	0.77	48	Atlas		1,030	1
	2/20/2019 3:30	2/20/2019 6:15	165	1.42	12,682	1.31	0.67	6	Atlas		18,009	1
	3/9/2019 13:30	3/9/2019 15:15	105	0.82	34,361	0.58	0.38	6	Atlas	Retained by Sneads Branch	28,176	1
	3/14/2019 17:30	3/14/2019 17:30	0	0.21	52,229	1.42	0.14	3	Atlas	Retained by Sneads Branch	10,968	1
	3/30/2019 17:15	3/30/2019 17:15	0	0.77	2,822	0.83	0.37	6	Atlas	Retained by Sneads Branch	2,173	1
	4/7/2019 12:00	4/7/2019 12:00	0	0.58	2,838	0.57	0.30	3	Atlas	Retained by Sneads Branch	1,646	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO142	4/14/2019 2:00	4/14/2019 3:00	60	0.77	14,483	1.42	0.36	6	Atlas	Retained by Sneads Branch	11,152	1
	4/19/2019 21:30	4/19/2019 21:30	0	2.79	322	1.85	0.91	48	Atlas		898	1
	4/23/2019 18:00	4/23/2019 18:00	0	0.24	99,538	3.03	0.21	1	Atlas	Retained by Sneads Branch	23,889	1
	4/24/2019 20:30	4/24/2019 20:45	15	0.58	9,778	3.35	0.28	1	Atlas	Retained by Sneads Branch	5,671	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.33	21,394	3.75	0.15	12	Atlas	Retained by Sneads Branch	7,060	1
	5/29/2019 9:15	5/29/2019 9:15	0	0.64	11,394	0.83	0.35	6	Atlas	Retained by Sneads Branch	7,292	1
	6/5/2019 21:00	6/5/2019 21:00	0	0.8	9,579	0.91	0.58	1	Atlas	Retained by Sneads Branch	7,663	1
	6/9/2019 16:45	6/9/2019 17:00	15	0.59	35,859	2.16	0.31	3	Atlas		21,157	1
	6/16/2019 6:00	6/16/2019 6:00	0	0.12	1,667	0.81	0.08	3	Atlas	Retained by Sneads Branch	200	1
	6/16/2019 20:45	6/16/2019 21:45	60	1.4	24,284	1.36	0.63	6	Atlas	Retained by Sneads Branch	33,997	1
CSO142	6/23/2019 16:15	6/23/2019 16:15	0	0.41	35,861	3	0.32	1	Atlas		14,703	1
	6/24/2019 13:45	6/24/2019 14:00	15	0.42	88,064	2.15	0.26	3	Atlas		36,987	1
CSO142 Total											603,242	33
CSO144	7/2/2018 17:30	7/2/2018 17:45	15	0.9	36,456	1.48	0.72	1	Atlas		32,810	1
	7/20/2018 19:30	7/20/2018 21:00	90	1.34	21,769	1.7	0.73	3	Atlas		29,170	1
	7/31/2018 2:00	7/31/2018 2:15	15	2.23	4,157	1.44	0.92	6	Atlas		9,271	1
	8/16/2018 8:30	8/16/2018 8:45	15	2.55	4,909	2.42	0.98	24	Atlas		12,518	1
	8/31/2018 17:30	8/31/2018 17:30	0	0.46	31,348	0.36	0.33	1	Atlas		14,420	1
	9/8/2018 17:30	9/8/2018 20:30	180	2.48	28,388	2.67	1.31	6	Cloudburst		70,401	1
	9/24/2018 19:15	9/24/2018 19:15	0	1.47	132	2.92	0.66	6	Atlas		194	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO144	6/9/2019 15:15	6/9/2019 17:00	105	1	45,126	2.35	0.57	3	Atlas		45,126	1
	6/18/2019 16:45	6/18/2019 16:45	0	0.99	16,224	2.97	0.64	1	Atlas		16,062	1
	6/23/2019 16:15	6/23/2019 16:15	0	0.52	1,460	3.71	0.42	1	Atlas		759	1
	6/24/2019 13:45	6/24/2019 14:00	15	0.5	92,416	2.85	0.31	3	Atlas		46,208	1
CSO144 Total											276,939	11
CSO146	12/31/2018 16:30	12/31/2018 16:45	15	1.18	26,851	1.52	0.45	24	Atlas		31,684	1
	2/6/2019 10:00	2/6/2019 10:00	0	1.4	2,838	0.63	0.45	48	Atlas		3,973	1
	2/7/2019 9:15	2/7/2019 17:30	495	1.4	16,847	1.35	0.45	48	Atlas		23,586	1
	2/12/2019 4:15	2/12/2019 6:15	120	2.48	175,370	3.67	0.77	48	Atlas		434,917	1
	2/20/2019 4:30	2/20/2019 7:15	165	1.42	450,949	1.4	0.67	6	Atlas		640,347	1
	2/23/2019 19:00	2/23/2019 19:15	15	0.8	686	2.09	0.44	6	Atlas		549	1
	3/14/2019 17:30	3/14/2019 17:30	0	0.21	8,290	1.42	0.14	3	Atlas		1,741	1
	4/19/2019 22:00	4/19/2019 23:30	90	2.79	30,237	2.27	0.91	48	Atlas		84,360	1
	4/23/2019 18:00	4/23/2019 18:00	0	0.24	130,683	3.03	0.21	1	Atlas		31,364	1
	5/3/2019 5:30	5/3/2019 5:30	0	0.85	69	0.65	0.46	6	Atlas		59	1
	6/5/2019 21:15	6/5/2019 21:15	0	0.8	12,305	0.91	0.58	1	Atlas		9,844	1
CSO146 Total											1,262,424	11
CSO148	7/2/2018 17:30	7/2/2018 18:00	30	0.65	267,645	1.52	0.52	1	Atlas		173,969	1
	7/3/2018 15:15	7/3/2018 15:45	30	0.56	215,527	1.39	0.39	1	Atlas		120,695	1
	7/15/2018 18:15	7/15/2018 18:15	0	0.22	441,023	0.21	0.11	1	Atlas		97,025	1
	7/20/2018 13:45	7/20/2018 21:00	435	0.93	188,670	1.26	0.39	12	Atlas		175,463	1
	7/22/2018 12:15	7/22/2018 17:15	300	0.3	91,363	1.45	0.17	1	Atlas		27,409	1
	7/30/2018 23:15	7/31/2018 12:45	810	2.22	77,494	2.33	0.90	12	Atlas		172,036	1
	8/20/2018 11:15	8/20/2018 11:30	15	0.61	44,995	6.17	0.34	1	Atlas		27,447	1
	8/31/2018 17:30	8/31/2018 17:45	15	0.58	44,760	0.5	0.41	1	Atlas		25,961	1
	9/6/2018 11:30	9/6/2018 11:30	0	0.3	123,407	0.82	0.19	3	Atlas		37,022	1
	9/8/2018 17:30	9/8/2018 22:15	285	2.08	210,907	2.73	0.98	6	Atlas		438,687	1
	9/21/2018 17:45	9/21/2018 17:45	0	0.36	12,292	0.49	0.30	1	Atlas		4,425	1
	9/22/2018 15:45	9/22/2018 17:00	75	1.41	4,085	0.84	0.54	3	Atlas		5,760	1
	9/23/2018 4:00	9/23/2018 7:00	180	1.41	130,445	1.86	0.54	3	Atlas		183,928	1
	9/24/2018 6:30	9/24/2018 13:45	435	2	72,304	3.76	0.88	6	Atlas		144,608	1
	9/25/2018 5:45	9/25/2018 5:45	0	0.1	42,350	3.87	0.09	1	Atlas		4,235	1
	9/25/2018 16:45	9/25/2018 17:30	45	0.77	92,896	4.28	0.34	12	Atlas		71,530	1
	9/26/2018 1:45	9/26/2018 2:15	30	0.77	25,738	4.61	0.34	12	Atlas		19,818	1
	10/10/2018 17:00	10/10/2018 17:00	0	0.12	5,667	0.14	0.10	1	Atlas		680	1
	10/15/2018 9:00	10/15/2018 9:15	15	0.17	20,471	0.66	0.10	1	Atlas		3,480	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO148	10/31/2018 15:00	11/1/2018 1:15	615	2.04	42,676	1.78	0.73	24	Atlas		87,059	1
	11/1/2018 17:45	11/1/2018 17:45	0	2.04	102	2.44	0.73	24	Atlas		208	1
	11/5/2018 21:45	11/5/2018 23:45	120	1.24	27,743	3.31	0.67	6	Atlas		34,401	1
	11/14/2018 23:15	11/15/2018 0:15	60	0.48	2,452	0.47	0.22	12	Atlas		1,177	1
	12/1/2018 3:00	12/1/2018 14:15	675	1.5	5,487	1.62	0.66	12	Atlas		8,230	1
	12/15/2018 3:00	12/15/2018 8:00	300	1.7	15,975	1.4	0.70	12	Atlas		27,158	1
	12/27/2018 17:45	12/27/2018 17:45	0	0.32	21,281	0.53	0.18	1	Atlas		6,810	1
	12/31/2018 8:00	12/31/2018 16:45	525	1.36	21,459	1.69	0.52	24	Atlas		29,184	1
	1/4/2019 14:15	1/4/2019 15:30	75	0.64	1,469	1.78	0.29	12	Atlas		940	1
	1/19/2019 6:45	1/19/2019 11:15	270	0.84	4,381	0.72	0.32	24	Atlas		3,680	1
	1/23/2019 10:15	1/23/2019 10:30	15	0.75	11,239	1.34	0.29	12	Atlas		8,429	1
	2/4/2019 14:15	2/4/2019 14:15	0	0.05	76,960	0.11	0.03	1	Atlas		3,848	1
	2/6/2019 7:00	2/6/2019 10:00	180	1.48	13,668	0.52	0.48	48	Atlas		20,228	1
	2/7/2019 9:00	2/7/2019 17:15	495	1.48	46,224	1.38	0.48	48	Atlas		68,411	1
	2/11/2019 1:45	2/11/2019 2:00	15	2.59	3,366	2.01	0.81	48	Atlas		8,717	1
	2/11/2019 22:30	2/12/2019 5:45	435	2.59	36,161	3.82	0.81	48	Atlas		93,656	1
	2/20/2019 2:45	2/20/2019 14:45	720	1.76	160,591	1.79	0.80	6	Atlas		282,641	1
	2/23/2019 17:00	2/23/2019 19:15	135	0.9	21,110	2.51	0.49	6	Atlas		18,999	1
	3/9/2019 13:30	3/9/2019 19:15	345	1.11	51,715	1.27	0.56	6	Atlas		57,404	1
	3/14/2019 17:15	3/14/2019 19:00	105	0.17	158,447	1.77	0.11	3	Atlas		26,936	1
	3/25/2019 4:45	3/25/2019 4:45	0	0.25	1,160	0.32	0.14	6	Atlas		290	1
	3/30/2019 15:30	3/30/2019 20:00	270	0.79	54,306	1.09	0.37	6	Atlas		42,902	1
	4/7/2019 6:00	4/7/2019 13:30	450	0.61	67,080	0.81	0.31	3	Atlas		40,919	1
	4/14/2019 1:00	4/14/2019 3:15	135	1.18	29,688	1.68	0.57	6	Atlas		35,032	1
	4/18/2019 22:45	4/18/2019 22:45	0	3.64	1,530	1.7	1.92	48	Cloudburst		5,568	1
	4/19/2019 19:00	4/20/2019 6:30	690	3.64	43,035	4.25	1.92	48	Cloudburst		156,648	1
	4/23/2019 17:45	4/23/2019 18:15	30	0.24	464,821	3.88	0.21	1	Atlas		111,557	1
	4/24/2019 20:30	4/24/2019 21:15	45	0.46	46,439	4.17	0.22	1	Atlas		21,362	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.51	23,782	4.69	0.28	1	Atlas		12,129	1
	4/26/2019 2:30	4/26/2019 2:45	15	0.51	27,684	4.22	0.28	1	Atlas		14,119	1
	5/3/2019 4:45	5/3/2019 7:30	165	0.95	41,900	1.27	0.51	6	Atlas		39,805	1
	5/19/2019 23:00	5/19/2019 23:15	15	0.38	49,129	0.4	0.19	1	Atlas		18,669	1
	5/23/2019 15:45	5/23/2019 15:45	0	0.04	85,225	0.44	0.03	1	Atlas		3,409	1
	5/26/2019 14:00	5/26/2019 15:00	60	0.43	14,188	0.62	0.25	3	Atlas		6,101	1
	5/29/2019 9:15	5/29/2019 13:15	240	0.78	15,995	1.21	0.43	6	Atlas		12,476	1
	5/30/2019 11:00	5/30/2019 11:15	15	0.21	29,519	1.41	0.11	1	Atlas		6,199	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO148	6/5/2019 21:00	6/5/2019 21:15	15	0.65	37,097	0.78	0.47	1	Atlas		24,113	1
	6/7/2019 21:00	6/7/2019 21:00	0	0.63	4,627	0.92	0.25	6	Atlas		2,915	1
	6/9/2019 0:15	6/9/2019 0:30	15	0.32	5,056	1.6	0.16	6	Atlas		1,618	1
	6/9/2019 16:30	6/9/2019 17:30	60	0.83	211,983	2.22	0.48	3	Atlas		175,946	1
	6/16/2019 6:00	6/16/2019 6:00	0	0.22	47,414	1.12	0.17	1	Atlas		10,431	1
	6/16/2019 19:45	6/17/2019 1:00	315	1.28	109,317	1.63	0.58	12	Atlas		139,926	1
	6/18/2019 4:45	6/18/2019 4:45	0	0.52	9,906	1.84	0.20	24	Atlas		5,151	1
	6/18/2019 17:15	6/18/2019 17:15	0	0.52	18,810	2.12	0.20	24	Atlas		9,781	1
	6/22/2019 7:00	6/22/2019 7:00	0	0.77	7,531	2.68	0.30	24	Atlas		5,799	1
	6/23/2019 16:15	6/23/2019 16:15	0	0.47	71,991	3.05	0.36	1	Atlas		33,836	1
	6/24/2019 13:45	6/24/2019 14:00	15	0.48	129,304	2.36	0.30	3	Atlas		62,066	1
CSO148 Total											3,521,061	66
CSO149	7/31/2018 2:15	7/31/2018 8:15	360	2.14	2,105,963	2	0.89	6	Atlas		4,506,761	1
	8/16/2018 4:45	8/16/2018 11:30	405	2.55	4,524,606	2.54	0.98	24	Atlas		11,537,746	1
	8/19/2018 21:00	8/19/2018 22:15	75	0.21	5,146,438	2.79	0.14	3	Atlas		1,080,752	1
	8/20/2018 11:30	8/20/2018 12:30	60	0.5	3,468,712	3.23	0.38	1	Atlas		1,734,356	1
	9/8/2018 19:30	9/8/2018 20:30	60	2.36	152,183	2.25	0.97	6	Atlas		359,153	1
	9/23/2018 6:00	9/23/2018 8:15	135	1.28	1,997,889	1.52	0.48	24	Atlas		2,557,298	1
	9/24/2018 1:00	9/24/2018 14:45	825	1.29	8,156,579	2.78	0.60	6	Atlas		10,521,987	1
	9/25/2018 6:00	9/25/2018 6:30	30	0.08	8,546,113	2.83	0.07	1	Atlas		683,689	1
	9/25/2018 17:15	9/26/2018 3:00	585	0.67	5,488,037	3.47	0.30	12	Atlas		3,676,985	1
	11/6/2018 0:00	11/6/2018 1:15	75	0.95	1,043,595	2.74	0.51	6	Atlas		991,415	1
	12/1/2018 10:30	12/1/2018 15:00	270	1.29	2,220,322	1.38	0.57	12	Atlas		2,864,216	1
	2/7/2019 17:00	2/7/2019 20:30	210	1.4	1,968,221	1.53	0.45	48	Atlas		2,755,509	1
	2/11/2019 3:00	2/12/2019 16:15	2235	2.48	4,649,681	3.98	0.77	48	Atlas		11,531,208	1
	2/20/2019 5:30	2/20/2019 15:30	600	1.42	2,419,185	1.47	0.67	6	Atlas		3,435,243	1
	2/23/2019 18:15	2/23/2019 22:45	270	0.8	9,194,828	2.28	0.44	6	Atlas		7,355,862	1
	4/14/2019 5:30	4/14/2019 6:00	30	0.77	365,636	1.59	0.36	6	Atlas		281,540	1
	4/19/2019 22:15	4/20/2019 10:15	720	2.79	3,834,350	3.38	0.91	48	Atlas		10,697,836	1
CSO149 Total											76,571,556	17
CSO150	7/20/2018 4:45	7/20/2018 4:45	0	1.69	2,313	0.45	1.07	3	Atlas		3,909	1
	7/20/2018 19:15	7/20/2018 23:15	240	1.69	85,473	2.06	1.07	3	Atlas		144,450	1
	7/31/2018 1:30	7/31/2018 10:00	510	1.73	158,692	1.65	0.73	6	Atlas		274,537	1
	8/15/2018 19:45	8/16/2018 12:45	1020	3.06	138,486	3.06	1.94	24	Cloudburst		423,766	1
	8/20/2018 11:15	8/20/2018 11:30	15	0.81	42,025	3.77	0.53	1	Atlas		34,040	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO150	9/6/2018 11:45	9/6/2018 11:45	0	0.19	2,626	0.6	0.13	1	Atlas		499	1
	9/8/2018 17:30	9/8/2018 21:30	240	3.08	12,120	3.33	5.81	6	Cloudburst		37,331	1
	9/21/2018 14:00	9/21/2018 14:00	0	0.52	21,169	0.35	0.28	6	Atlas		11,008	1
	9/25/2018 17:00	9/25/2018 17:00	0	0.81	105	4.22	0.35	12	Atlas		85	1
	12/15/2018 4:30	12/15/2018 9:30	300	1.56	26,240	1.46	0.65	12	Atlas		40,935	1
	12/27/2018 17:30	12/27/2018 17:30	0	0.35	1,551	0.47	0.21	1	Atlas		543	1
	12/31/2018 10:00	12/31/2018 17:30	450	1.43	57,155	1.79	0.55	24	Atlas		81,731	1
	2/11/2019 13:00	2/12/2019 15:15	1575	2.98	150,619	4.57	0.94	48	Atlas		448,846	1
	2/20/2019 4:00	2/20/2019 8:15	255	1.41	87,941	1.35	0.63	6	Atlas		123,997	1
	2/23/2019 18:30	2/23/2019 22:15	225	0.82	107,923	2.29	0.45	6	Atlas		88,497	1
	3/9/2019 16:30	3/9/2019 19:15	165	1.06	40,942	1.23	0.52	6	Atlas		43,398	1
	3/14/2019 17:00	3/14/2019 19:00	120	0.42	134,000	1.95	0.28	3	Atlas		56,280	1
	3/30/2019 17:00	3/30/2019 20:45	225	1.02	122,113	1.39	0.46	6	Atlas		124,555	1
	4/7/2019 12:30	4/7/2019 14:30	120	0.57	77,147	0.78	0.27	3	Atlas		43,974	1
	4/14/2019 2:15	4/14/2019 6:15	240	0.79	131,852	1.47	0.38	6	Atlas		104,163	1
	4/19/2019 19:00	4/20/2019 16:15	1275	2.39	234,351	3.18	0.77	48	Atlas		560,100	1
	4/24/2019 21:00	4/24/2019 21:45	45	1.04	19,700	2.86	0.34	48	Atlas		20,488	1
	4/25/2019 18:00	4/25/2019 18:00	0	1.04	768	3.24	0.34	48	Atlas		799	1
	5/3/2019 5:00	5/3/2019 9:45	285	0.95	173,887	1.28	0.51	6	Atlas		165,193	1
	5/26/2019 13:45	5/26/2019 17:15	210	0.79	23,262	1	0.45	3	Atlas		18,377	1
	5/29/2019 9:00	5/29/2019 14:00	300	0.8	64,609	1.62	0.44	6	Atlas		51,687	1
	6/5/2019 20:30	6/5/2019 21:30	60	0.95	31,782	1.05	0.70	1	Atlas		30,193	1
	6/9/2019 16:45	6/9/2019 21:45	300	0.37	151,400	2.03	0.17	6	Atlas		56,018	1
	6/16/2019 5:45	6/16/2019 5:45	0	0.58	2,450	1.01	0.42	1	Atlas		1,421	1
	6/16/2019 19:30	6/17/2019 1:30	360	2.25	71,665	3.02	1.19	12	Cloudburst		161,246	1
	6/18/2019 16:15	6/18/2019 18:45	150	0.42	88,326	3.54	0.33	1	Atlas		37,097	1
	6/21/2019 19:30	6/21/2019 21:30	120	0.46	75,539	4.09	0.31	3	Atlas		34,748	1
	6/22/2019 8:30	6/22/2019 9:30	60	0.52	41,663	4.46	0.34	3	Atlas		21,665	1
	6/23/2019 16:00	6/23/2019 17:15	75	0.27	49,748	3.92	0.20	1	Atlas		13,432	1
	6/24/2019 13:45	6/24/2019 15:30	105	0.48	78,210	2.38	0.31	3	Atlas		37,541	1
CSO150 Total											3,296,549	35
CSO151	7/2/2018 17:30	7/2/2018 18:15	45	0.72	1,409,464	1.34	0.55	1	Atlas		1,014,814	1
	7/3/2018 15:15	7/3/2018 16:00	45	0.63	421,570	1.62	0.39	1	Atlas		265,589	1
	7/15/2018 18:00	7/15/2018 18:30	30	0.16	705,950	0.16	0.07	12	Atlas		112,952	1
	7/20/2018 14:00	7/20/2018 21:15	435	1.11	465,586	1.42	0.53	3	Atlas		516,800	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO151	7/22/2018 12:30	7/22/2018 12:30	0	0.4	23,945	1.47	0.28	1	Atlas		9,578	1
	7/30/2018 23:15	7/31/2018 13:00	825	2.04	777,939	2.06	0.82	12	Atlas		1,586,995	1
	8/15/2018 18:45	8/16/2018 12:00	1035	2.58	2,978,551	2.58	1.00	24	Cloudburst		7,684,661	1
	8/19/2018 19:00	8/19/2018 23:15	255	Discharge	0	4.37				Data Under Review	2,658,705	
	8/20/2018 10:15	8/20/2018 12:00	105	Discharge	0	4.83				Data Under Review	146,639	
	8/31/2018 17:45	8/31/2018 18:15	30	0.53	561,436	0.43	0.33	1	Atlas		297,561	1
	9/6/2018 11:45	9/6/2018 12:00	15	0.36	52,069	0.86	0.25	1	Atlas		18,745	1
	9/8/2018 2:15	9/8/2018 2:15	0	2.37	10,333	0.65	0.96	6	Atlas		24,489	1
	9/8/2018 17:45	9/8/2018 23:45	360	2.37	919,312	2.74	0.96	6	Atlas		2,178,769	1
	9/9/2018 17:30	9/9/2018 18:00	30	0.03	5,773,933	2.77	0.01	12	Atlas		173,218	1
	9/21/2018 18:00	9/21/2018 18:15	15	0.22	155,127	0.33	0.15	1	Atlas		34,128	1
	9/22/2018 16:45	9/22/2018 17:30	45	1.35	27,856	0.7	0.51	3	Atlas		37,605	1
	9/23/2018 4:30	9/23/2018 10:00	330	1.35	3,094,619	1.67	0.51	3	Atlas		4,177,736	1
	9/24/2018 1:00	9/25/2018 7:30	1830	1.65	6,280,842	3.41	0.74	6	Atlas		10,363,390	1
	9/25/2018 17:00	9/26/2018 6:00	780	0.67	4,665,787	4	0.30	12	Atlas		3,126,077	1
	10/15/2018 9:30	10/15/2018 9:45	15	0.19	167,147	0.63	0.12	1	Atlas		31,758	1
	10/31/2018 17:15	11/1/2018 2:45	570	1.78	288,590	1.63	0.63	24	Atlas		513,691	1
	11/1/2018 18:30	11/1/2018 18:30	0	1.78	1,192	2.16	0.63	24	Atlas		2,122	1
	11/5/2018 22:00	11/6/2018 2:30	270	1.05	1,566,617	2.9	0.57	6	Atlas		1,644,948	1
	11/14/2018 23:30	11/15/2018 1:00	90	0.48	374,925	0.49	0.22	12	Atlas		179,964	1
	12/1/2018 6:30	12/1/2018 16:15	585	1.42	1,816,442	1.52	0.62	12	Atlas		2,579,347	1
	12/15/2018 3:15	12/15/2018 15:15	720	1.76	1,718,572	1.76	0.73	12	Atlas		3,024,687	1
	12/27/2018 18:00	12/27/2018 18:45	45	0.35	108,423	0.65	0.20	1	Atlas		37,948	1
	12/31/2018 9:45	12/31/2018 19:30	585	1.29	858,952	1.65	0.50	24	Atlas		1,108,048	1
	1/4/2019 15:45	1/4/2019 15:45	0	0.62	7,658	1.72	0.28	12	Atlas		4,748	1
	1/23/2019 10:45	1/23/2019 10:45	0	0.76	24,521	1.32	0.30	12	Atlas		18,636	1
	2/6/2019 7:30	2/6/2019 10:30	180	1.39	126,260	0.56	0.45	48	Atlas		175,502	1
	2/7/2019 9:15	2/7/2019 22:45	810	1.39	2,432,450	1.49	0.45	48	Atlas		3,381,105	1
	2/11/2019 1:15	2/13/2019 0:45	2850	2.56	9,230,798	4.03	0.80	48	Atlas		23,630,844	1
	2/20/2019 3:00	2/20/2019 20:30	1050	1.54	4,522,711	1.61	0.69	6	Atlas		6,964,975	1
	2/23/2019 17:15	2/24/2019 1:15	480	0.87	4,353,264	2.46	0.46	6	Atlas		3,787,340	1
	3/9/2019 13:45	3/9/2019 19:30	345	0.99	341,183	1.13	0.48	6	Atlas		337,771	1
	3/14/2019 7:15	3/14/2019 7:15	0	0.36	2,747	1.45	0.20	6	Atlas		989	1
	3/14/2019 17:30	3/14/2019 19:30	120	0.25	1,539,336	1.69	0.17	3	Atlas		384,834	1
	3/30/2019 16:15	3/30/2019 20:30	255	0.8	369,549	1.19	0.43	6	Atlas		295,639	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO151	4/7/2019 6:15	4/7/2019 14:00	465	0.52	537,719	0.7	0.25	3	Atlas		279,614	1
	4/14/2019 1:30	4/14/2019 7:15	345	1.09	926,746	1.68	0.52	6	Atlas		1,010,153	1
	4/18/2019 23:15	4/18/2019 23:15	0	3.32	1,017	1.54	1.40	48	Cloudburst		3,378	1
	4/19/2019 19:00	4/20/2019 21:30	1590	3.32	3,589,339	4.47	1.40	48	Cloudburst		11,916,607	1
	4/23/2019 18:15	4/23/2019 18:15	0	0.3	860,843	3.62	0.26	1	Atlas		258,253	1
CSO151 Total											96,001,352	42
CSO152	7/2/2018 17:30	7/2/2018 17:45	15	0.58	671,150	1.14	0.46	1	Atlas		389,267	1
	7/20/2018 20:45	7/20/2018 20:45	0	1.06	33,824	1.19	0.51	3	Atlas		35,853	1
	7/31/2018 5:00	7/31/2018 7:30	150	2.03	429,066	1.87	0.82	6	Atlas		871,004	1
	8/16/2018 5:15	8/16/2018 11:30	375	2.56	860,503	2.56	0.98	24	Atlas		2,202,888	1
	8/19/2018 21:15	8/19/2018 23:00	105	0.78	799,886	3.38	0.52	3	Atlas		623,911	1
	8/20/2018 11:30	8/20/2018 12:15	45	0.42	930,686	3.72	0.30	1	Atlas		390,888	1
	8/31/2018 17:45	8/31/2018 17:45	0	0.37	46,786	0.29	0.23	1	Atlas		17,311	1
	9/8/2018 20:00	9/8/2018 22:45	165	2.34	943,688	2.59	0.95	6	Atlas		2,208,229	1
	9/23/2018 6:00	9/23/2018 8:45	165	1.35	879,577	1.66	0.51	3	Atlas		1,187,429	1
	9/24/2018 0:45	9/24/2018 16:45	960	1.44	3,464,157	3.1	0.66	6	Atlas		4,988,386	1
	9/25/2018 6:00	9/25/2018 6:30	30	0.1	2,190,810	3.14	0.09	1	Atlas		219,081	1
	9/25/2018 17:15	9/26/2018 3:30	615	0.71	2,398,900	3.83	0.32	12	Atlas		1,703,219	1
	11/6/2018 0:00	11/6/2018 1:30	90	1	1,020,130	2.67	0.54	6	Atlas		1,020,130	1
	12/1/2018 10:30	12/1/2018 15:15	285	1.36	1,393,372	1.44	0.60	12	Atlas		1,894,986	1
	12/15/2018 7:45	12/15/2018 12:00	255	1.76	1,456,567	1.75	0.73	12	Atlas		2,563,558	1
	12/27/2018 17:45	12/27/2018 17:45	0	0.34	39,976	0.53	0.19	1	Atlas		13,592	1
	12/31/2018 10:00	12/31/2018 18:00	480	1.15	1,176,332	1.51	0.44	24	Atlas		1,352,782	1
	1/4/2019 14:30	1/4/2019 16:00	90	0.62	45,534	1.62	0.28	12	Atlas		28,231	1
	2/6/2019 7:15	2/6/2019 7:30	15	1.39	5,373	0.43	0.45	48	Atlas		7,469	1
	2/7/2019 9:15	2/7/2019 20:45	690	1.39	1,033,721	1.51	0.45	48	Atlas		1,436,872	1
	2/11/2019 3:00	2/12/2019 19:15	2415	2.42	6,306,049	3.91	0.76	48	Atlas		15,260,638	1
	2/20/2019 3:30	2/20/2019 18:30	900	1.43	4,597,559	1.5	0.66	6	Atlas		6,574,510	1
	2/23/2019 17:30	2/23/2019 23:15	345	0.78	6,610,836	2.27	0.43	6	Atlas		5,156,452	1
	3/9/2019 15:30	3/9/2019 15:30	0	0.82	21,715	0.58	0.39	6	Atlas		17,806	1
	3/14/2019 19:00	3/14/2019 19:00	0	0.21	6,243	1.46	0.14	3	Atlas		1,311	1
	3/30/2019 17:45	3/30/2019 17:45	0	0.8	18,781	0.88	0.39	6	Atlas		15,025	1
	4/7/2019 12:15	4/7/2019 12:30	15	0.49	44,453	0.59	0.25	3	Atlas		21,782	1
	4/14/2019 5:30	4/14/2019 6:30	60	0.92	393,097	1.6	0.43	6	Atlas		361,649	1
	4/19/2019 22:15	4/20/2019 16:15	1080	3.06	2,998,142	4.02	0.99	48	Atlas		9,174,313	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO152	4/23/2019 18:15	4/23/2019 18:15	0	0.34	504,768	3.4	0.30	1	Atlas		171,621	1
	4/24/2019 21:00	4/24/2019 21:00	0	0.47	157,430	3.68	0.22	12	Atlas		73,992	1
	4/25/2019 18:30	4/25/2019 18:30	0	0.35	35,337	4.04	0.16	12	Atlas		12,368	1
	5/3/2019 5:30	5/3/2019 5:30	0	0.87	12,451	0.65	0.47	6	Atlas		10,832	1
	6/9/2019 16:45	6/9/2019 17:00	15	0.72	231,879	2.38	0.40	3	Atlas		166,953	1
CSO152 Total											60,174,338	34
CSO153	7/2/2018 17:30	7/2/2018 18:15	45	0.43	807,819	1.11	0.35	1	Atlas		347,362	1
	7/3/2018 13:30	7/3/2018 16:30	180	0.56	423,291	1.41	0.42	1	Atlas		237,043	1
	7/15/2018 18:30	7/15/2018 18:30	0	0.1	142,650	0.1	0.05	12	Atlas		14,265	1
	7/16/2018 9:30	7/16/2018 9:45	15	0.14	292,600	0.19	0.11	1	Atlas		40,964	1
	7/20/2018 5:00	7/20/2018 5:00	0	1.61	16,445	0.38	0.92	3	Atlas		26,476	1
	7/20/2018 19:15	7/20/2018 21:15	120	1.61	542,969	1.84	0.92	3	Atlas		874,180	1
	7/22/2018 12:15	7/22/2018 18:00	345	0.17	2,506,388	2.01	0.12	1	Atlas		426,086	1
	7/30/2018 23:45	7/31/2018 13:00	795	2.1	801,934	2.16	0.93	6	Atlas		1,684,061	1
	8/15/2018 19:45	8/15/2018 19:45	0	2.51	7,443	0.38	0.96	24	Atlas		18,683	1
	8/16/2018 4:15	8/16/2018 8:45	270	2.51	196,046	2.34	0.96	24	Atlas		492,076	1
	8/19/2018 20:30	8/19/2018 21:15	45	0.11	1,007,036	2.63	0.08	1	Atlas		110,774	1
	8/20/2018 11:15	8/20/2018 11:45	30	0.63	40,317	3.2	0.49	1	Atlas		25,400	1
	9/6/2018 11:30	9/6/2018 11:30	0	0.27	63,974	0.47	0.21	1	Atlas		17,273	1
	9/8/2018 18:15	9/8/2018 22:00	225	2.44	483,258	2.69	1.14	6	Cloudburst		1,179,149	1
	9/22/2018 16:45	9/22/2018 16:45	0	1.24	2,052	0.74	0.47	24	Atlas		2,544	1
	9/23/2018 5:15	9/23/2018 6:45	90	1.24	63,590	1.61	0.47	24	Atlas		78,851	1
	9/24/2018 7:15	9/24/2018 13:30	375	1.32	338,994	2.9	0.61	6	Atlas		447,472	1
	9/25/2018 5:45	9/25/2018 5:45	0	0.05	974,460	2.98	0.04	1	Atlas		48,723	1
	9/25/2018 16:30	9/26/2018 2:15	585	0.72	491,282	3.68	0.32	12	Atlas		353,723	1
	11/1/2018 0:30	11/1/2018 11:00	630	1.64	285,048	1.79	0.59	24	Atlas		467,478	1
	11/5/2018 21:45	11/6/2018 0:15	150	0.83	255,728	2.51	0.45	6	Atlas		212,254	1
	3/30/2019 15:30	3/31/2019 3:00	690	0.85	658,314	1.18	0.40	6	Atlas		559,567	1
	4/7/2019 6:00	4/7/2019 13:45	465	0.47	366,457	0.66	0.22	3	Atlas		172,235	1
	4/12/2019 6:00	4/12/2019 6:00	0	0.08	96,300	0.53	0.05	3	Atlas		7,704	1
	4/14/2019 1:00	4/14/2019 5:45	285	0.8	509,234	1.32	0.37	6	Atlas		407,387	1
	4/18/2019 22:45	4/18/2019 23:15	30	2.57	10,942	1.09	0.83	48	Atlas		28,122	1
	4/19/2019 18:15	4/20/2019 5:00	645	2.57	202,723	2.73	0.83	48	Atlas		520,999	1
	4/23/2019 18:15	4/23/2019 18:15	0	0.02	380,000	2.59	0.02	1	Atlas		7,600	1
	4/24/2019 20:30	4/25/2019 1:45	315	0.54	512,559	3.08	0.26	1	Atlas		276,782	1
	4/25/2019 18:00	4/26/2019 5:00	660	0.31	901,284	3.45	0.14	12	Atlas		279,398	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO153	5/3/2019 3:15	5/3/2019 8:45	330	0.88	551,800	1.09	0.48	6	Atlas		485,584	1
	5/4/2019 16:45	5/4/2019 17:45	60	0.19	352,295	1.24	0.12	3	Atlas		66,936	1
	5/11/2019 21:00	5/11/2019 21:00	0	0.23	53,043	0.22	0.13	3	Atlas		12,200	1
	5/19/2019 13:15	5/19/2019 13:15	0	0.09	195,633	0.11	0.06	1	Atlas		17,607	1
	5/19/2019 23:00	5/19/2019 23:30	30	0.14	219,286	0.24	0.10	1	Atlas		30,700	1
	5/23/2019 15:45	5/23/2019 16:00	15	0.11	142,527	0.35	0.07	1	Atlas		15,678	1
	5/26/2019 13:45	5/26/2019 17:00	195	0.51	178,751	0.76	0.33	3	Atlas		91,163	1
	5/29/2019 9:15	5/29/2019 14:00	285	0.59	233,683	1.21	0.32	6	Atlas		137,873	1
	5/30/2019 11:00	5/30/2019 11:45	45	0.21	139,781	1.37	0.09	3	Atlas		29,354	1
	6/5/2019 20:45	6/5/2019 21:30	45	0.81	347,737	0.95	0.61	1	Atlas		281,667	1
	6/7/2019 21:00	6/8/2019 8:30	690	0.52	143,006	1.38	0.22	6	Atlas		74,363	1
	6/9/2019 0:15	6/9/2019 0:45	30	0.3	188,153	1.66	0.15	6	Atlas		56,446	1
	6/9/2019 16:30	6/9/2019 17:30	60	0.72	356,222	2.26	0.39	3	Atlas		256,480	1
	6/16/2019 6:00	6/16/2019 6:00	0	0.24	106,400	1.07	0.17	1	Atlas		25,536	1
	6/16/2019 16:30	6/17/2019 8:15	945	1.68	323,041	2.6	0.77	12	Atlas		542,709	1
	6/18/2019 4:45	6/18/2019 4:45	0	0.14	135,029	2.18	0.06	12	Atlas		18,904	1
	6/18/2019 16:00	6/18/2019 19:00	180	0.38	1,176,318	2.58	0.31	1	Atlas		447,001	1
	6/21/2019 19:30	6/21/2019 22:15	165	0.58	380,441	3.23	0.38	3	Atlas		220,656	1
	6/22/2019 7:00	6/22/2019 10:45	225	0.35	579,057	3.46	0.23	3	Atlas		202,670	1
	6/23/2019 16:00	6/23/2019 17:45	105	0.38	524,621	3.5	0.30	1	Atlas		199,356	1
	6/24/2019 13:00	6/24/2019 14:30	90	0.4	792,748	2.31	0.25	3	Atlas		317,099	1
CSO153 Total											12,894,613	51
CSO154	7/2/2018 18:00	7/2/2018 20:15	135	0.87	38,164	1.49	0.71	1	Atlas		33,203	1
	7/3/2018 15:45	7/3/2018 16:15	30	0.59	14,156	1.71	0.35	3	Atlas		8,352	1
	7/20/2018 19:30	7/20/2018 21:00	90	1.45	197,344	1.73	0.78	3	Atlas		286,149	1
	7/22/2018 17:45	7/22/2018 17:45	0	0.51	902	2.18	0.37	1	Atlas		460	1
	7/31/2018 1:30	7/31/2018 13:00	690	1.99	2,152	2.06	0.87	6	Atlas		4,282	1
	8/16/2018 4:00	8/16/2018 11:15	435	2.38	143,316	2.39	0.92	24	Atlas		341,093	1
	8/16/2018 20:45	8/16/2018 20:45	0	0.01	41,500	2.4	0.01	1	Atlas		415	1
	8/20/2018 11:30	8/20/2018 11:30	0	0.34	2,659	2.88	0.23	1	Atlas		904	1
	8/31/2018 17:45	8/31/2018 23:45	360	0.42	7,443	0.42	0.28	1	Atlas		3,126	1
	9/6/2018 11:45	9/6/2018 11:45	0	0.46	7,900	0.83	0.37	1	Atlas		3,634	1
	9/8/2018 17:45	9/9/2018 3:30	585	2.43	179,639	2.9	1.11	6	Cloudburst		436,523	1
	9/22/2018 17:15	9/22/2018 17:15	0	1.21	864	0.82	0.46	24	Atlas		1,045	1
	9/23/2018 5:00	9/23/2018 10:15	315	1.21	23,726	1.67	0.46	24	Atlas		28,708	1
	9/24/2018 7:30	9/24/2018 18:30	660	1.3	474,815	2.93	0.57	6	Atlas		617,259	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO154	9/25/2018 3:45	9/25/2018 7:15	210	Discharge	0	3.01				Data Under Review	338	
	9/25/2018 16:45	9/25/2018 16:45	0	0.68	2,493	3.27	0.30	12	Atlas		1,695	1
	9/26/2018 2:30	9/26/2018 2:45	15	0.68	84,466	3.66	0.30	12	Atlas		57,437	1
	11/6/2018 1:00	11/6/2018 1:15	15	0.82	52,880	2.41	0.44	6	Atlas		43,362	1
	12/27/2018 18:00	12/27/2018 18:00	0	0.29	32,669	0.52	0.18	1	Atlas		9,474	1
	12/31/2018 16:45	12/31/2018 16:45	0	1.2	14,653	1.5	0.46	24	Atlas		17,584	1
	2/7/2019 17:15	2/7/2019 17:15	0	1.35	9,405	1.3	0.43	48	Atlas		12,697	1
	2/8/2019 20:00	2/9/2019 2:45	405	Discharge	0	1.44				Affected by River Flooding	2,465,301	
	2/9/2019 15:00	2/9/2019 15:45	45	Discharge	0	1.44				Affected by River Flooding	91,082	
	2/10/2019 3:45	2/12/2019 19:30	3825	Discharge	0	3.96				Affected by River Flooding	10,336,316	
	2/20/2019 1:00	2/20/2019 15:45	885	1.55	716,573	1.58	0.72	6	Atlas		1,110,688	1
	2/21/2019 4:00	2/21/2019 12:00	480	Discharge	0	1.6				Affected by River Flooding	160,702	
	2/24/2019 0:15	2/24/2019 0:15	0	0.76	32,057	2.38	0.42	6	Atlas		24,363	1
	4/19/2019 3:45	4/19/2019 5:45	120	3.01	153	1.65	0.98	48	Atlas		460	1
CSO154 Total	4/19/2019 18:15	4/20/2019 19:45	1530	3.01	1,179,630	3.99	0.98	48	Atlas		3,550,687	1
	5/2/2019 11:45	5/2/2019 11:45	0	0.05	20,440	0.59	0.04	1	Atlas		1,022	1
	5/3/2019 3:15	5/3/2019 7:45	270	0.95	4,583	1.08	0.51	6	Atlas		4,354	1
	5/4/2019 15:45	5/4/2019 17:45	120	0.19	39,453	1.29	0.11	3	Atlas		7,496	1
	6/18/2019 16:15	6/18/2019 18:15	120	1.5	1,310,544	3.03	1.52	1	Atlas		1,965,816	1
	6/24/2019 11:30	6/24/2019 15:15	225	0.48	341,560	3.11	0.30	3	Atlas		163,949	1
											21,789,976	29
	7/16/2018 9:30	7/16/2018 9:30	0	0.32	18,438	0.33	0.26	1	Atlas		5,900	1
	7/20/2018 4:45	7/20/2018 4:45	0	1.73	772	0.5	1.30	3	Atlas		1,335	1
	7/20/2018 19:15	7/20/2018 21:00	105	1.73	39,287	2.19	1.30	3	Atlas		67,966	1
	7/31/2018 1:15	7/31/2018 12:45	690	2.08	56,641	2.12	0.86	6	Atlas		117,814	1
	8/15/2018 20:00	8/16/2018 9:30	810	3	37,692	2.89	1.78	24	Cloudburst		113,075	1
	8/20/2018 11:15	8/20/2018 11:15	0	0.61	79,039	3.47	0.37	1	Atlas		48,214	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO155	8/20/2018 19:45	8/20/2018 19:45	0	0.61	3,828	3.64	0.37	1	Atlas		2,335	1
	8/31/2018 17:00	8/31/2018 17:00	0	0.47	43,545	0.39	0.31	3	Atlas		20,466	1
	9/6/2018 11:45	9/6/2018 11:45	0	0.17	12,876	0.56	0.11	3	Atlas		2,189	1
	9/8/2018 17:15	9/8/2018 22:30	315	3.55	72,720	3.95	12.29	6	Cloudburst		258,157	1
	9/21/2018 14:00	9/21/2018 17:15	195	0.46	45,630	0.52	0.26	1	Atlas		20,990	1
	9/23/2018 4:15	9/23/2018 7:00	165	1.59	16,711	2.03	0.60	24	Atlas		26,571	1
	9/24/2018 7:30	9/24/2018 13:45	375	1.99	66,872	3.87	0.85	6	Atlas		133,075	1
	9/25/2018 5:45	9/25/2018 5:45	0	1.99	9,904	4.04	0.85	6	Atlas		19,708	1
	9/25/2018 16:30	9/25/2018 17:15	45	1.02	30,358	4.64	0.45	12	Atlas		30,965	1
	9/26/2018 1:30	9/26/2018 2:15	45	1.02	3,220	5.02	0.45	12	Atlas		3,284	1
	10/10/2018 16:30	10/10/2018 16:30	0	0.34	37,838	0.3	0.27	1	Atlas		12,865	1
	11/1/2018 0:30	11/1/2018 2:15	105	2.27	7,004	1.89	0.80	24	Atlas		15,900	1
	11/5/2018 21:45	11/5/2018 23:45	120	0.99	5,696	3.25	0.54	6	Atlas		5,639	1
	11/15/2018 0:00	11/15/2018 0:00	0	0.42	381	0.44	0.19	12	Atlas		160	1
	12/1/2018 6:00	12/1/2018 10:00	240	1.45	3,476	1.27	0.60	12	Atlas		5,040	1
	12/15/2018 3:15	12/15/2018 8:00	285	1.55	5,188	1.28	0.64	12	Atlas		8,042	1
	12/27/2018 17:30	12/27/2018 17:30	0	0.36	10,039	0.49	0.21	1	Atlas		3,614	1
	12/31/2018 12:15	12/31/2018 16:30	255	1.59	4,036	1.94	0.62	12	Atlas		6,418	1
	2/6/2019 6:45	2/6/2019 9:15	150	1.61	822	0.76	0.52	48	Atlas		1,324	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.61	340	1.25	0.52	48	Atlas		548	1
	2/12/2019 3:45	2/12/2019 5:30	105	3.03	5,905	4.32	0.95	48	Atlas		17,891	1
	2/20/2019 3:15	2/20/2019 6:45	210	1.6	70,552	1.5	0.71	6	Atlas		112,883	1
	2/23/2019 18:00	2/23/2019 21:00	180	0.89	4,202	2.52	0.49	6	Atlas		3,740	1
	3/9/2019 13:30	3/9/2019 18:30	300	1.14	11,074	1.24	0.55	6	Atlas		12,624	1
	3/14/2019 17:00	3/14/2019 17:15	15	0.48	183,888	1.94	0.32	3	Atlas		88,266	1
	3/30/2019 15:15	3/30/2019 19:45	270	1.07	35,580	1.43	0.48	6	Atlas		38,071	1
	4/7/2019 11:45	4/7/2019 12:15	30	0.62	28,260	0.75	0.28	12	Atlas		17,521	1
	4/14/2019 1:45	4/14/2019 3:00	75	0.86	5,074	1.39	0.40	6	Atlas		4,364	1
	4/19/2019 19:00	4/20/2019 0:15	315	2.59	8,881	2.24	0.84	48	Atlas		23,002	1
	4/24/2019 20:30	4/24/2019 20:45	15	1.16	9,479	2.98	0.38	24	Atlas		10,996	1
	4/25/2019 18:00	4/25/2019 18:00	0	1.16	15,238	3.56	0.38	24	Atlas		17,676	1
	5/2/2019 11:15	5/2/2019 11:15	0	0.22	32,591	0.8	0.19	1	Atlas		7,170	1
	5/3/2019 4:45	5/3/2019 7:30	165	1.14	13,189	1.33	0.62	6	Atlas		15,035	1
	5/26/2019 15:00	5/26/2019 15:00	0	0.87	305	0.92	0.53	3	Atlas		265	1
	5/29/2019 9:00	5/29/2019 9:00	0	0.9	3,161	1.2	0.49	6	Atlas		2,845	1
	6/5/2019 20:30	6/5/2019 21:00	30	0.95	3,432	1.08	0.70	1	Atlas		3,260	1
	6/16/2019 5:45	6/16/2019 5:45	0	0.59	8,729	0.97	0.39	3	Atlas		5,150	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO155	6/16/2019 16:00	6/16/2019 20:45	285	2.61	15,946	2.99	2.00	12	Cloudburst		41,618	1
	6/18/2019 16:15	6/18/2019 16:30	15	0.65	31,089	3.97	0.37	1	Atlas		20,208	1
	6/22/2019 6:45	6/22/2019 6:45	0	0.5	2,436	4.5	0.33	3	Atlas		1,218	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.31	23,558	4.41	0.23	1	Atlas		7,303	1
	6/24/2019 13:30	6/24/2019 13:45	15	0.53	4,223	2.51	0.33	3	Atlas		2,238	1
CSO155 Total											1,384,938	48
CSO160	8/16/2018 8:15	8/16/2018 8:15	0	2.75	301	2.52	1.33	24	Cloudburst		829	1
	9/8/2018 20:00	9/8/2018 20:00	0	2.96	461	2.37	3.04	6	Cloudburst		1,364	1
	6/16/2019 20:30	6/16/2019 20:30	0	1.81	1,510	1.67	0.83	12	Atlas		2,733	1
	6/18/2019 16:15	6/18/2019 16:15	0	0.15	680	2.49	0.12	1	Atlas		102	1
CSO160 Total											5,028	4
CSO161	7/20/2018 4:45	7/20/2018 4:45	0	1.46	1,881	0.35	0.81	3	Atlas		2,746	1
	7/20/2018 19:15	7/20/2018 20:45	90	1.46	4,590	1.67	0.81	3	Atlas		6,702	1
	7/31/2018 1:15	7/31/2018 2:00	45	2.33	27,318	1.39	1.33	6	Cloudburst		63,651	1
	8/15/2018 20:00	8/16/2018 8:30	750	2.75	5,234	2.56	1.33	24	Cloudburst		14,393	1
	8/20/2018 11:15	8/20/2018 11:30	15	0.63	30,902	3.38	0.47	1	Atlas		19,468	1
	9/6/2018 11:45	9/6/2018 11:45	0	0.21	6,810	0.37	0.15	1	Atlas		1,430	1
	9/8/2018 17:30	9/8/2018 21:30	240	2.96	5,810	3	3.04	6	Cloudburst		17,197	1
	9/21/2018 14:00	9/21/2018 14:00	0	0.32	2,109	0.26	0.17	6	Atlas		675	1
	9/23/2018 4:15	9/23/2018 4:15	0	1.37	180	1.14	0.52	24	Atlas		247	1
	9/24/2018 7:30	9/24/2018 10:45	195	1.35	103	2.86	0.64	6	Atlas		139	1
	9/25/2018 5:45	9/25/2018 5:45	0	0.07	3,143	3.11	0.06	1	Atlas		220	1
	9/25/2018 16:30	9/25/2018 17:00	30	0.81	4,601	3.45	0.35	12	Atlas		3,727	1
	10/10/2018 16:30	10/10/2018 16:30	0	0.13	1,100	0.09	0.09	3	Atlas		143	1
	12/27/2018 17:30	12/27/2018 17:30	0	0.45	387	0.53	0.30	1	Atlas		174	1
	12/31/2018 12:15	12/31/2018 16:15	240	1.2	1,303	1.61	0.46	24	Atlas		1,563	1
	2/6/2019 7:00	2/6/2019 7:00	0	1.61	22	0.51	0.52	48	Atlas		35	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.61	46	1.19	0.52	48	Atlas		74	1
	3/9/2019 18:30	3/9/2019 18:30	0	0.93	355	1.06	0.43	6	Atlas		330	1
	3/14/2019 17:00	3/14/2019 18:30	90	0.58	13,793	1.95	0.39	3	Atlas		8,000	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO161	3/30/2019 17:15	3/30/2019 18:45	90	1.1	485	1.2	0.52	6	Atlas		533	1
	4/7/2019 11:45	4/7/2019 12:15	30	0.6	233	0.67	0.28	3	Atlas		140	1
	4/14/2019 2:00	4/14/2019 2:00	0	0.68	197	1.08	0.33	6	Atlas		134	1
	4/24/2019 20:30	4/24/2019 20:45	15	0.86	113	2.64	0.28	48	Atlas		97	1
	5/3/2019 5:00	5/3/2019 5:00	0	0.91	1,449	0.56	0.49	6	Atlas		1,319	1
	5/23/2019 15:45	5/23/2019 21:00	315	0.07	24,286	0.32	0.04	1	Atlas		1,700	1
	5/26/2019 13:45	5/26/2019 13:45	0	0.55	1,695	0.43	0.32	3	Atlas		932	1
	6/5/2019 21:00	6/5/2019 21:00	0	0.92	5,451	1.04	0.70	1	Atlas		5,015	1
	6/9/2019 16:45	6/9/2019 16:45	0	0.48	21,179	2.01	0.23	6	Atlas		10,166	1
	6/16/2019 19:30	6/16/2019 20:45	75	1.81	15,878	1.79	0.83	12	Atlas		28,740	1
	6/18/2019 16:15	6/18/2019 16:30	15	0.15	194,240	2.5	0.12	1	Atlas		29,136	1
	6/21/2019 19:30	6/21/2019 19:30	0	0.84	190	3.1	0.56	3	Atlas		160	1
	6/22/2019 6:45	6/22/2019 6:45	0	0.49	112	3.49	0.33	3	Atlas		55	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.26	18,746	3.67	0.19	1	Atlas		4,874	1
	6/24/2019 13:30	6/24/2019 13:45	15	0.37	1,076	2.32	0.23	3	Atlas		398	1
CSO161 Total											224,313	34
CSO166	7/2/2018 17:00	7/2/2018 19:45	165	1.14	3,734,935	1.98	0.86	1	Atlas		4,257,826	1
	7/3/2018 14:30	7/3/2018 15:45	75	0.64	752,788	1.99	0.47	1	Atlas		481,784	1
	7/15/2018 18:15	7/15/2018 19:15	60	0.38	1,622,034	0.38	0.23	1	Atlas		616,373	1
	7/16/2018 10:00	7/16/2018 10:30	30	0.15	422,093	0.53	0.10	1	Atlas		63,314	1
	7/20/2018 19:30	7/21/2018 5:15	585	1.32	4,859,192	1.85	0.71	3	Atlas		6,414,133	1
	7/30/2018 23:45	7/31/2018 14:00	855	2.2	834,200	2.27	0.89	12	Atlas		1,835,240	1
	8/15/2018 20:15	8/16/2018 19:00	1365	2.9	5,481,751	2.9	1.63	24	Cloudburst		15,897,078	1
	8/19/2018 20:30	8/19/2018 20:30	0	1.18	1,685	3.59	0.80	1	Atlas		1,988	1
	8/20/2018 11:15	8/20/2018 12:30	75	0.6	691,010	4.53	0.31	1	Atlas		414,606	1
	8/31/2018 17:30	8/31/2018 19:00	90	0.76	1,830,109	0.72	0.54	1	Atlas		1,390,883	1
	9/8/2018 2:00	9/8/2018 2:45	45	0.39	452,372	0.65	0.19	6	Atlas		176,425	1
	9/8/2018 18:00	9/9/2018 11:00	1020	2.46	5,589,565	3.17	2.29	6	Cloudburst		13,750,330	1
	9/21/2018 18:00	9/21/2018 18:15	15	0.21	506,029	0.32	0.15	1	Atlas		106,266	1
	9/22/2018 16:45	9/22/2018 17:45	60	1.53	182,946	0.79	0.56	24	Atlas		279,907	1
	9/23/2018 4:30	9/23/2018 15:45	675	1.53	2,426,181	1.85	0.56	24	Atlas		3,712,057	1
	9/24/2018 6:45	9/26/2018 16:45	3480	2.06	8,852,362	4.74	0.90	12	Atlas		18,235,866	1
	10/8/2018 20:00	10/8/2018 20:00	0	Discharge	0	0.01					9,719	
	10/15/2018 9:30	10/15/2018 9:45	15	0.14	208,821	0.59	0.10	1	Atlas		29,235	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO166	10/31/2018 15:30	11/1/2018 19:00	1650	1.99	615,664	2.39	0.68	24	Atlas		1,225,172	1
	11/5/2018 21:45	11/6/2018 2:45	300	1.13	708,090	3.22	0.61	6	Atlas		800,142	1
	11/14/2018 23:15	11/15/2018 4:15	300	0.47	1,064,323	0.64	0.22	12	Atlas		500,232	1
	12/15/2018 3:15	12/15/2018 12:15	540	1.52	716,907	1.52	0.62	12	Atlas		1,089,699	1
	12/27/2018 18:00	12/27/2018 19:00	60	0.35	441,834	0.67	0.19	1	Atlas		154,642	1
	12/31/2018 8:15	12/31/2018 20:30	735	1.47	837,941	1.84	0.57	24	Atlas		1,231,774	1
	1/4/2019 14:30	1/4/2019 20:45	375	0.65	604,443	2.1	0.29	12	Atlas		392,888	1
	1/19/2019 7:15	1/19/2019 20:45	810	0.92	175,799	1.04	0.35	24	Atlas		161,735	1
	1/23/2019 10:15	1/23/2019 21:15	660	0.88	531,155	1.89	0.35	12	Atlas		467,416	1
	2/6/2019 7:15	2/6/2019 12:00	285	1.62	200,066	0.76	0.52	48	Atlas		324,107	1
	2/7/2019 9:00	2/8/2019 2:15	1035	1.62	970,750	1.74	0.52	48	Atlas		1,572,615	1
	2/10/2019 19:30	2/14/2019 2:30	4740	2.84	4,916,006	4.55	0.88	48	Atlas		13,961,456	1
	2/20/2019 3:15	2/21/2019 0:45	1290	1.98	1,477,862	2.04	0.93	6	Atlas		2,926,166	1
	2/23/2019 17:15	2/24/2019 6:15	780	1.01	1,726,353	3.06	0.55	6	Atlas		1,743,617	1
	3/9/2019 13:45	3/9/2019 20:30	405	1.19	1,152,154	1.33	0.60	6	Atlas		1,371,063	1
	3/14/2019 7:30	3/14/2019 7:30	0	0.41	30,080	1.72	0.22	6	Atlas		12,333	1
	3/14/2019 17:30	3/14/2019 20:45	195	0.65	841,386	2.34	0.44	1	Atlas		546,901	1
	3/30/2019 16:15	3/30/2019 21:30	315	0.82	663,387	1.13	0.38	6	Atlas		543,977	1
	4/7/2019 6:45	4/7/2019 14:45	480	0.62	541,929	0.85	0.31	1	Atlas		335,996	1
	4/14/2019 1:30	4/14/2019 7:30	360	1.22	749,932	1.93	0.58	6	Atlas		914,917	1
	4/18/2019 23:30	4/18/2019 23:30	0	3.83	1,762	1.67	2.49	48	Cloudburst		6,749	1
	4/19/2019 18:45	4/21/2019 12:45	2520	3.83	3,215,399	5.09	2.49	48	Cloudburst		12,314,978	1
	4/24/2019 21:00	4/24/2019 22:30	90	0.52	473,383	4.33	0.27	1	Atlas		246,159	1
	4/25/2019 18:15	4/26/2019 5:00	645	0.44	1,449,845	4.93	0.19	12	Atlas		637,932	1
	5/2/2019 12:00	5/2/2019 12:45	45	0.16	924,931	0.67	0.14	1	Atlas		147,989	1
	5/3/2019 5:15	5/3/2019 10:15	300	1.07	1,060,009	1.31	0.58	6	Atlas		1,134,210	1
	5/4/2019 17:45	5/4/2019 18:45	60	0.26	191,458	1.54	0.15	3	Atlas		49,779	1
	5/19/2019 23:30	5/20/2019 0:15	45	0.13	1,681,123	0.3	0.09	1	Atlas		218,546	1
	5/26/2019 14:15	5/26/2019 16:15	120	0.5	499,874	0.7	0.31	3	Atlas		249,937	1
	5/29/2019 9:30	5/29/2019 14:15	285	0.77	350,212	1.39	0.42	6	Atlas		269,663	1
	5/30/2019 11:30	5/30/2019 11:45	15	0.23	270,935	1.57	0.10	1	Atlas		62,315	1
	6/5/2019 21:15	6/5/2019 22:15	60	0.62	279,081	0.83	0.42	1	Atlas		173,030	1
	6/7/2019 21:30	6/8/2019 3:15	345	0.65	66,765	1.18	0.24	12	Atlas		43,397	1
	6/8/2019 23:45	6/9/2019 1:00	75	0.3	381,477	1.57	0.15	6	Atlas		114,443	1
	6/9/2019 15:45	6/10/2019 3:30	705	1.45	983,491	3.04	0.89	3	Atlas		1,426,062	1
	6/16/2019 6:30	6/16/2019 6:45	15	0.17	219,700	1.75	0.11	3	Atlas		37,349	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO166	6/16/2019 20:00	6/17/2019 2:45	405	1.66	827,513	1.94	0.73	12	Atlas		1,373,671	1
	6/18/2019 5:15	6/18/2019 18:15	780	0.8	114,845	2.77	0.33	1	Atlas		91,876	1
	6/21/2019 20:15	6/21/2019 22:00	105	0.57	105,902	3.43	0.38	3	Atlas		60,364	1
	6/22/2019 8:30	6/22/2019 10:15	105	0.32	285,116	3.62	0.21	3	Atlas		91,237	1
	6/23/2019 16:30	6/23/2019 17:30	60	0.7	272,249	3.89	0.57	1	Atlas		190,574	1
	6/24/2019 14:00	6/24/2019 16:00	120	0.61	658,000	3.1	0.38	3	Atlas		401,380	1
	6/30/2019 18:00	6/30/2019 18:00	0	0.1	32,980	0.75	0.08	1	Atlas		3,298	1
CSO166 Total											117,294,816	60
CSO167	7/2/2018 15:30	7/2/2018 17:00	90	Discharge	0	0.64				Data Under Review	281,105	
	7/3/2018 13:45	7/3/2018 14:30	45	0.59	160,702	1.4	0.35	3	Atlas		94,814	1
	7/15/2018 17:00	7/15/2018 17:00	0	0.13	9,385	0.1	0.06	12	Atlas		1,220	1
	7/16/2018 8:15	7/16/2018 8:30	15	0.17	44,841	0.14	0.13	1	Atlas		7,623	1
	7/20/2018 3:15	7/20/2018 3:30	15	1.45	20,638	0.31	0.78	3	Atlas		29,925	1
	7/20/2018 17:30	7/20/2018 20:15	165	1.45	304,203	1.25	0.78	3	Atlas		441,095	1
	7/22/2018 15:30	7/22/2018 16:15	45	0.51	120,098	1.75	0.37	1	Atlas		61,250	1
	7/30/2018 22:00	7/31/2018 11:45	825	1.99	157,151	1.95	0.87	6	Atlas		312,731	1
	8/15/2018 19:45	8/16/2018 13:00	1035	2.38	402,143	2.39	0.92	24	Atlas		957,101	1
	8/19/2018 20:30	8/19/2018 21:45	75	0.2	479,035	2.6	0.16	1	Atlas		95,807	1
	8/20/2018 11:15	8/20/2018 12:30	75	0.34	316,356	2.88	0.23	1	Atlas		107,561	1
	8/31/2018 17:15	8/31/2018 18:15	60	0.42	317,486	0.37	0.28	1	Atlas		133,344	1
	9/6/2018 11:30	9/6/2018 12:00	30	0.46	122,778	0.86	0.37	1	Atlas		56,478	1
	9/8/2018 1:30	9/8/2018 5:45	255	2.43	3,351	0.83	1.11	6	Cloudburst		8,142	1
	9/8/2018 15:45	9/9/2018 7:15	930	2.43	392,953	2.9	1.11	6	Cloudburst		954,875	1
	9/21/2018 17:30	9/21/2018 18:00	30	0.41	85,112	0.47	0.24	1	Atlas		34,896	1
	9/22/2018 15:30	9/22/2018 17:45	135	1.21	65,698	0.83	0.46	24	Atlas		79,495	1
	9/23/2018 4:15	9/23/2018 8:30	255	1.21	290,159	1.66	0.46	24	Atlas		351,092	1
	9/24/2018 0:45	9/24/2018 21:15	1230	1.3	587,658	2.96	0.57	6	Atlas		763,955	1
	9/25/2018 5:45	9/25/2018 6:45	60	0.09	444,689	3.01	0.08	1	Atlas		40,022	1
	9/25/2018 16:30	9/26/2018 5:15	765	0.68	445,612	3.66	0.30	12	Atlas		303,016	1
	10/10/2018 17:30	10/10/2018 17:30	0	0.1	39,560	0.12	0.08	1	Atlas		3,956	1
	10/15/2018 9:15	10/15/2018 9:30	15	0.12	46,558	0.55	0.09	1	Atlas		5,587	1
	10/26/2018 15:15	10/26/2018 15:45	30	0.25	20,180	0.34	0.10	24	Atlas		5,045	1
	10/31/2018 15:15	11/1/2018 18:30	1635	1.54	147,864	1.81	0.55	24	Atlas		227,711	1
	11/5/2018 20:30	11/6/2018 1:15	285	0.82	300,930	2.41	0.44	6	Atlas		246,763	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO167	11/14/2018 22:15	11/15/2018 4:00	345	0.43	233,874	0.59	0.20	12	Atlas		100,566	1
	12/1/2018 3:15	12/1/2018 15:15	720	1.38	218,411	1.47	0.60	12	Atlas		301,407	1
	12/15/2018 3:00	12/15/2018 11:30	510	1.55	179,021	1.53	0.64	12	Atlas		277,483	1
	12/27/2018 17:45	12/27/2018 19:00	75	0.29	170,259	0.57	0.18	1	Atlas		49,375	1
	12/31/2018 5:15	12/31/2018 20:15	900	1.2	220,230	1.5	0.46	24	Atlas		264,276	1
	1/4/2019 14:15	1/4/2019 20:15	360	0.59	143,873	1.78	0.29	3	Atlas		84,885	1
	1/19/2019 6:45	1/19/2019 20:45	840	0.77	77,744	0.82	0.30	24	Atlas		59,863	1
	1/23/2019 9:45	1/23/2019 22:15	750	0.82	156,333	1.67	0.32	12	Atlas		128,193	1
	2/5/2019 23:15	2/6/2019 11:30	735	1.35	72,610	0.68	0.43	48	Atlas		98,024	1
	2/7/2019 9:00	2/7/2019 23:45	885	1.35	171,270	1.46	0.43	48	Atlas		231,215	1
	2/10/2019 17:15	2/15/2019 15:45	7110	2.52	687,811	3.97	0.78	48	Atlas		1,733,283	1
	2/20/2019 3:00	2/20/2019 20:45	1065	1.55	303,235	1.6	0.72	6	Atlas		470,015	1
	2/23/2019 17:00	2/24/2019 10:00	1020	0.76	492,664	2.38	0.42	6	Atlas		374,425	1
	2/25/2019 14:15	2/25/2019 15:15	60	Discharge	0	2.37				Affected by River Flooding	16,368	
	2/28/2019 17:15	2/28/2019 17:45	30	0.09	42,756	0.88	0.04	6	Atlas		3,848	1
	3/1/2019 3:45	3/1/2019 5:45	120	Discharge	0	0.88				Affected by River Flooding	19,035	
	3/1/2019 16:15	3/1/2019 21:00	285	Discharge	0	0.88				Affected by River Flooding	14,524	
	3/9/2019 13:45	3/9/2019 19:45	360	1.02	247,246	1.15	0.49	6	Atlas		252,191	1
	3/14/2019 6:00	3/14/2019 8:15	135	0.36	68,933	1.49	0.20	6	Atlas		24,816	1
	3/14/2019 17:15	3/14/2019 19:45	150	0.67	176,228	2.13	0.48	1	Atlas		118,073	1
	3/30/2019 15:45	3/30/2019 20:45	300	0.74	387,650	1.14	0.39	6	Atlas		286,861	1
	4/7/2019 6:00	4/7/2019 13:45	465	0.57	226,495	0.77	0.29	3	Atlas		129,102	1
	4/12/2019 6:00	4/12/2019 6:00	0	0.08	113,238	0.67	0.05	3	Atlas		9,059	1
	4/14/2019 1:00	4/14/2019 5:45	285	0.91	347,903	1.6	0.44	6	Atlas		316,592	1
	4/18/2019 22:45	4/18/2019 23:15	30	3.01	6,301	1.43	0.98	48	Atlas		18,967	1
	4/19/2019 18:15	4/20/2019 22:45	1710	3.01	367,536	3.99	0.98	48	Atlas		1,106,284	1
	4/24/2019 20:30	4/24/2019 21:45	75	0.59	213,915	3.45	0.32	1	Atlas		126,210	1
	4/25/2019 18:00	4/26/2019 3:30	570	0.43	203,949	4.03	0.23	1	Atlas		87,698	1
	5/3/2019 4:45	5/3/2019 8:45	240	0.95	294,543	1.1	0.51	6	Atlas		279,816	1
	5/4/2019 17:00	5/4/2019 17:45	45	0.19	84,063	1.27	0.11	3	Atlas		15,972	1
	5/19/2019 23:00	5/19/2019 23:30	30	0.09	375,667	0.27	0.08	1	Atlas		33,810	1
	5/26/2019 13:45	5/26/2019 15:45	120	0.69	161,391	0.8	0.43	3	Atlas		111,360	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO167	5/29/2019 9:00	5/29/2019 14:00	300	0.64	191,858	1.41	0.35	6	Atlas		122,789	1
	5/30/2019 11:15	5/30/2019 11:45	30	0.19	78,037	1.56	0.09	1	Atlas		14,827	1
	6/5/2019 20:45	6/5/2019 21:30	45	0.53	229,158	0.65	0.37	1	Atlas		121,454	1
	6/7/2019 21:15	6/8/2019 8:30	675	0.6	64,662	1.2	0.26	12	Atlas		38,797	1
	6/9/2019 15:15	6/9/2019 19:45	270	1.03	380,803	2.5	0.59	3	Atlas		392,227	1
	6/16/2019 5:45	6/16/2019 6:15	30	0.16	142,650	1.28	0.11	3	Atlas		22,824	1
	6/16/2019 19:45	6/17/2019 8:30	765	1.23	284,360	1.56	0.55	12	Atlas		349,763	1
	6/18/2019 4:45	6/18/2019 5:00	15	1.5	5,622	1.66	1.52	1	Atlas		8,433	1
	6/18/2019 16:00	6/18/2019 20:15	255	1.5	281,200	3.03	1.52	1	Atlas		421,800	1
	6/21/2019 19:30	6/21/2019 21:30	120	0.34	236,832	3.44	0.23	3	Atlas		80,523	1
	6/22/2019 7:45	6/22/2019 9:30	105	0.29	224,721	3.6	0.19	3	Atlas		65,169	1
	6/23/2019 16:00	6/23/2019 16:45	45	0.42	197,452	3.79	0.33	1	Atlas		82,930	1
	6/24/2019 13:15	6/24/2019 15:15	120	0.48	331,679	3.11	0.30	3	Atlas		159,206	1
CSO167 Total											14,628,947	67
CSO174	7/2/2018 17:30	7/2/2018 17:45	15	0.4	2,805,140	1.03	0.33	1	Atlas	Retained by Sneads Branch	1,122,056	1
	7/15/2018 18:15	7/15/2018 18:15	0	0.1	757,080	0.1	0.05	3	Atlas	Retained by Sneads Branch	75,708	1
	7/31/2018 2:00	7/31/2018 5:00	180	2.14	380,788	1.61	0.89	6	Atlas	Retained by Sneads Branch	814,887	1
	7/31/2018 13:15	7/31/2018 13:15	0	2.14	57,670	2.17	0.89	6	Atlas	Retained by Sneads Branch	123,413	1
	9/8/2018 18:30	9/8/2018 22:15	225	2.36	1,533,211	2.54	0.97	6	Atlas	Retained by Sneads Branch	3,618,378	1
	9/23/2018 5:30	9/23/2018 6:45	75	1.28	481,629	1.49	0.48	24	Atlas	Retained by Sneads Branch	616,485	1
	9/24/2018 7:30	9/24/2018 11:00	210	1.29	266,049	2.56	0.60	6	Atlas	Retained by Sneads Branch	343,203	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO174	9/25/2018 17:00	9/25/2018 17:00	0	0.67	159,030	3.08	0.30	12	Atlas	Retained by Sneads Branch	106,550	1
	11/1/2018 0:45	11/1/2018 1:00	15	1.73	141,464	1.38	0.62	24	Atlas	Retained by Sneads Branch	244,733	1
	11/5/2018 22:00	11/5/2018 22:00	0	0.95	77,556	2.34	0.51	6	Atlas	Retained by Sneads Branch	73,678	1
	2/6/2019 9:45	2/6/2019 9:45	0	1.4	43,014	0.63	0.45	48	Atlas	Retained by Sneads Branch	60,219	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.4	78,091	1.01	0.45	48	Atlas	Retained by Sneads Branch	109,327	1
	2/12/2019 4:45	2/12/2019 4:45	0	2.48	44,906	3.52	0.77	48	Atlas		111,368	1
	2/20/2019 5:15	2/20/2019 6:30	75	1.42	481,074	1.37	0.67	6	Atlas		683,125	1
	3/14/2019 17:15	3/14/2019 17:30	15	0.21	196,481	1.42	0.14	3	Atlas	Retained by Sneads Branch	41,261	1
	4/14/2019 2:00	4/14/2019 2:00	0	0.77	153,690	1.24	0.36	6	Atlas	Retained by Sneads Branch	118,341	1
	4/23/2019 17:45	4/23/2019 18:00	15	0.24	4,533,275	3.03	0.21	1	Atlas	Retained by Sneads Branch	1,087,986	1
	4/24/2019 20:45	4/24/2019 21:00	15	0.58	209,209	3.39	0.28	1	Atlas	Retained by Sneads Branch	121,341	1
	6/5/2019 21:00	6/5/2019 21:00	0	0.8	132,138	0.91	0.58	1	Atlas	Retained by Sneads Branch	105,710	1
	6/9/2019 16:45	6/9/2019 17:00	15	0.59	1,135,819	2.16	0.31	3	Atlas	Retained by Sneads Branch	670,133	1
	6/16/2019 20:00	6/16/2019 22:00	120	1.4	668,889	1.41	0.63	6	Atlas	Retained by Sneads Branch	936,445	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO174	6/18/2019 17:15	6/18/2019 17:30	15	0.24	658,650	1.89	0.09	24	Atlas	Retained by Sneads Branch	158,076	1
	6/21/2019 20:00	6/21/2019 20:00	0	0.5	1,478	2.31	0.33	3	Atlas	Retained by Sneads Branch	739	1
	6/22/2019 7:00	6/22/2019 7:15	15	0.5	258,410	2.64	0.33	3	Atlas	Retained by Sneads Branch	129,205	1
	6/23/2019 16:15	6/23/2019 16:45	30	0.41	2,040,698	3	0.32	1	Atlas		836,686	1
	6/24/2019 13:45	6/24/2019 14:30	45	0.42	2,012,148	2.15	0.26	3	Atlas		845,102	1
CSO174 Total											13,154,155	26
CSO178	8/15/2018 20:00	8/16/2018 9:15	795	2.81	300,090	2.68	1.45	24	Cloudburst		843,252	1
	8/20/2018 11:15	8/20/2018 11:45	30	0.72	254,485	3.57	0.57	1	Atlas		183,229	1
	9/8/2018 17:30	9/8/2018 22:30	300	2.68	3,284,894	2.8	1.75	6	Cloudburst		8,803,517	1
	9/22/2018 16:45	9/22/2018 17:00	15	1.42	29,491	0.83	0.53	24	Atlas		41,877	1
	9/23/2018 4:30	9/23/2018 7:15	165	1.42	340,628	1.81	0.53	24	Atlas		483,692	1
	9/24/2018 7:30	9/24/2018 11:15	225	1.45	310,440	3.06	0.68	6	Atlas		450,138	1
	9/25/2018 17:00	9/25/2018 17:30	30	0.77	158,461	3.64	0.33	12	Atlas		122,015	1
	9/26/2018 2:00	9/26/2018 2:00	0	0.77	14,268	4.02	0.33	12	Atlas		10,986	1
	11/5/2018 22:00	11/5/2018 22:15	15	0.83	41,552	2.48	0.45	6	Atlas		34,488	1
	11/14/2018 23:00	11/15/2018 1:00	120	0.36	716,742	0.45	0.17	12	Atlas		258,027	1
CSO178 Total											11,231,221	10
CSO180	7/2/2018 17:30	7/2/2018 17:45	15	0.4	326,845	1.03	0.33	1	Atlas	Retained by Sneads Branch	130,738	1
	7/15/2018 18:15	7/15/2018 18:15	0	0.1	664,740	0.1	0.05	3	Atlas	Retained by Sneads Branch	66,474	1
	7/16/2018 9:15	7/16/2018 9:30	15	0.14	48,107	0.2	0.11	1	Atlas	Retained by Sneads Branch	6,735	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO180	7/20/2018 13:45	7/20/2018 21:00	435	1.07	193,335	1.26	0.53	3	Atlas	Retained by Sneads Branch	206,868	1
	7/22/2018 17:30	7/22/2018 17:30	0	0.12	7,533	1.32	0.08	1	Atlas	Retained by Sneads Branch	904	1
	7/30/2018 23:45	7/31/2018 12:45	780	2.14	170,554	2.17	0.89	6	Atlas		364,986	1
	8/15/2018 20:00	8/16/2018 9:00	780	2.55	142,887	2.43	0.98	24	Atlas	Retained by Sneads Branch	364,363	1
	8/19/2018 20:30	8/19/2018 21:15	45	0.21	312,300	2.78	0.14	3	Atlas	Retained by Sneads Branch	65,583	1
	8/20/2018 11:15	8/20/2018 11:30	15	0.5	117,402	3.23	0.38	1	Atlas	Retained by Sneads Branch	58,701	1
	9/6/2018 11:30	9/6/2018 11:45	15	0.19	162,395	0.38	0.12	3	Atlas	Retained by Sneads Branch	30,855	1
	9/8/2018 5:30	9/8/2018 5:30	0	2.36	5,283	0.56	0.97	6	Atlas	Retained by Sneads Branch	12,467	1
	9/8/2018 17:30	9/8/2018 22:15	285	2.36	458,608	2.54	0.97	6	Atlas	Retained by Sneads Branch	1,082,316	1
	9/21/2018 17:45	9/21/2018 17:45	0	0.18	31,533	0.26	0.12	1	Atlas	Retained by Sneads Branch	5,676	1
	9/22/2018 17:00	9/22/2018 17:00	0	1.28	5,089	0.6	0.48	24	Atlas	Retained by Sneads Branch	6,514	1
	9/23/2018 4:15	9/23/2018 7:00	165	1.28	125,616	1.5	0.48	24	Atlas	Retained by Sneads Branch	160,789	1
	9/24/2018 7:15	9/24/2018 13:45	390	1.29	169,237	2.74	0.60	6	Atlas	Retained by Sneads Branch	218,316	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO180	9/25/2018 5:45	9/25/2018 5:45	0	0.08	391,475	2.83	0.07	1	Atlas	Retained by Sneads Branch	31,318	1
	9/25/2018 17:00	9/25/2018 17:30	30	0.67	121,936	3.14	0.30	12	Atlas	Retained by Sneads Branch	81,697	1
	9/26/2018 1:45	9/26/2018 2:15	30	0.67	33,833	3.47	0.30	12	Atlas	Retained by Sneads Branch	22,668	1
	10/15/2018 9:00	10/15/2018 9:00	0	0.2	12,355	0.66	0.13	1	Atlas	Retained by Sneads Branch	2,471	1
	11/1/2018 0:30	11/1/2018 1:15	45	1.73	36,680	1.38	0.62	24	Atlas	Retained by Sneads Branch	63,457	1
	11/5/2018 21:45	11/5/2018 23:45	120	0.95	43,478	2.66	0.51	6	Atlas	Retained by Sneads Branch	41,304	1
	11/14/2018 23:45	11/15/2018 0:00	15	0.41	10,144	0.41	0.19	12	Atlas	Retained by Sneads Branch	4,159	1
	12/1/2018 3:00	12/1/2018 13:00	600	1.29	8,657	1.32	0.57	12	Atlas	Retained by Sneads Branch	11,167	1
	12/15/2018 3:00	12/15/2018 8:00	300	1.69	25,530	1.43	0.72	12	Atlas	Retained by Sneads Branch	43,146	1
	12/27/2018 17:45	12/27/2018 17:45	0	0.32	15,081	0.48	0.19	1	Atlas	Retained by Sneads Branch	4,826	1
	12/31/2018 12:00	12/31/2018 16:30	270	1.18	29,503	1.49	0.45	24	Atlas	Retained by Sneads Branch	34,814	1
	2/5/2019 23:00	2/6/2019 9:45	645	1.4	27,747	0.64	0.45	48	Atlas	Retained by Sneads Branch	38,846	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO180	2/7/2019 9:00	2/7/2019 17:15	495	1.4	35,236	1.33	0.45	48	Atlas	Retained by Sneads Branch	49,331	1
	2/12/2019 4:00	2/12/2019 5:45	105	2.48	30,888	3.65	0.77	48	Atlas		76,602	1
	2/20/2019 3:30	2/20/2019 7:00	210	1.42	137,059	1.4	0.67	6	Atlas		194,624	1
	2/23/2019 18:00	2/23/2019 19:00	60	0.8	19,150	2.06	0.44	6	Atlas	Retained by Sneads Branch	15,320	1
	3/9/2019 13:30	3/9/2019 16:45	195	0.82	75,782	0.81	0.38	6	Atlas	Retained by Sneads Branch	62,141	1
	3/14/2019 17:15	3/14/2019 18:45	90	0.21	107,567	1.47	0.14	3	Atlas	Retained by Sneads Branch	22,589	1
	3/30/2019 15:30	3/30/2019 19:45	255	0.77	79,600	1.09	0.37	6	Atlas	Retained by Sneads Branch	61,292	1
	4/7/2019 6:00	4/7/2019 13:30	450	0.58	69,738	0.75	0.30	3	Atlas	Retained by Sneads Branch	40,448	1
	4/12/2019 6:00	4/12/2019 6:00	0	0.24	946	0.79	0.17	1	Atlas	Retained by Sneads Branch	227	1
	4/14/2019 2:00	4/14/2019 5:00	180	0.77	102,768	1.57	0.36	6	Atlas	Retained by Sneads Branch	79,131	1
	4/19/2019 18:30	4/19/2019 23:15	285	2.79	27,401	2.24	0.91	48	Atlas		76,449	1
	4/23/2019 17:45	4/23/2019 18:15	30	0.24	958,054	3.03	0.21	1	Atlas	Retained by Sneads Branch	229,933	1
	4/24/2019 20:30	4/24/2019 21:00	30	0.58	72,198	3.39	0.28	1	Atlas	Retained by Sneads Branch	41,875	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.33	34,061	3.75	0.15	12	Atlas	Retained by Sneads Branch	11,240	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO180	4/26/2019 2:30	4/26/2019 2:45	15	0.33	66,579	3.44	0.15	12	Atlas	Retained by Sneads Branch	21,971	1
	5/3/2019 4:45	5/3/2019 7:45	180	0.85	62,629	1.03	0.46	6	Atlas	Retained by Sneads Branch	53,235	1
	5/19/2019 13:15	5/19/2019 13:15	0	0.3	15,150	0.13	0.13	1	Atlas	Retained by Sneads Branch	4,545	1
	5/19/2019 23:00	5/19/2019 23:15	15	0.3	89,457	0.3	0.13	1	Atlas	Retained by Sneads Branch	26,837	1
	5/23/2019 15:45	5/23/2019 15:45	0	0.05	587,700	0.35	0.03	1	Atlas	Retained by Sneads Branch	29,385	1
	5/26/2019 15:00	5/26/2019 15:00	0	0.57	204	0.64	0.34	3	Atlas	Retained by Sneads Branch	116	1
	5/29/2019 9:15	5/29/2019 9:15	0	0.64	18,164	0.83	0.35	6	Atlas	Retained by Sneads Branch	11,625	1
	6/5/2019 21:00	6/5/2019 21:15	15	0.8	99,936	0.91	0.58	1	Atlas	Retained by Sneads Branch	79,949	1
	6/7/2019 21:00	6/7/2019 22:15	75	0.88	6,611	1.19	0.29	48	Atlas	Retained by Sneads Branch	5,818	1
	6/9/2019 0:15	6/9/2019 0:45	30	0.88	11,058	1.73	0.29	48	Atlas		9,731	1
	6/9/2019 16:45	6/9/2019 17:00	15	0.59	144,471	2.16	0.31	3	Atlas		85,238	1
	6/16/2019 6:00	6/16/2019 6:00	0	0.12	22,833	0.81	0.08	3	Atlas		2,740	1
	6/16/2019 19:45	6/16/2019 21:45	120	1.4	122,844	1.39	0.63	6	Atlas		171,982	1
	6/18/2019 4:45	6/18/2019 4:45	0	0.24	1,242	1.78	0.09	24	Atlas	Retained by Sneads Branch	298	1
	6/21/2019 19:30	6/21/2019 19:30	0	0.5	7,552	2.18	0.33	3	Atlas	Retained by Sneads Branch	3,776	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO180	6/22/2019 7:00	6/22/2019 7:00	0	0.5	178	2.62	0.33	3	Atlas	Retained by Sneads Branch	89	1
	6/23/2019 16:00	6/23/2019 16:30	30	0.41	244,610	3.09	0.32	1	Atlas		100,290	1
	6/24/2019 13:30	6/24/2019 14:00	30	0.42	313,286	2.15	0.26	3	Atlas		131,580	1
CSO180 Total											4,862,565	60
CSO181	7/2/2018 18:00	7/2/2018 18:15	15	0.27	276,926	0.86	0.22	1	Atlas		74,770	1
	7/3/2018 16:00	7/3/2018 16:00	0	0.36	27,964	0.91	0.27	1	Atlas		10,067	1
	7/20/2018 5:15	7/20/2018 5:15	0	0.94	445	0.41	0.44	3	Atlas		418	1
	7/20/2018 19:45	7/20/2018 21:15	90	0.94	224,269	1.17	0.44	3	Atlas		210,813	1
	7/31/2018 2:00	7/31/2018 7:15	315	1.92	497,910	1.91	0.84	6	Atlas		955,987	1
	8/15/2018 20:00	8/16/2018 9:00	780	2.7	82,445	2.55	1.24	24	Cloudburst		222,602	1
	8/20/2018 11:30	8/20/2018 11:45	15	0.59	175,163	3.34	0.46	1	Atlas		103,346	1
	9/8/2018 17:45	9/8/2018 21:30	225	2.32	395,916	2.31	0.95	6	Atlas		918,526	1
	9/24/2018 7:45	9/24/2018 11:00	195	1.35	8,606	2.68	0.64	6	Atlas		11,618	1
	2/6/2019 7:15	2/6/2019 7:15	0	1.48	143	0.58	0.48	48	Atlas		212	1
	2/9/2019 17:15	2/9/2019 19:00	105	Discharge	0	1.6				Affected by River Flooding	1,654,798	
	2/13/2019 3:45	2/16/2019 0:15	4110	Discharge	0	3.98				Affected by River Flooding	1,622,699	
	2/19/2019 13:15	2/19/2019 14:15	60	Discharge	0	0.1				Affected by River Flooding	451,896	
	3/9/2019 13:45	3/9/2019 17:15	210	0.99	555,545	0.94	0.45	12	Atlas		549,990	1
	3/14/2019 17:45	3/14/2019 17:45	0	0.43	5,098	1.76	0.30	1	Atlas		2,192	1
	6/9/2019 16:45	6/9/2019 16:45	0	0.59	512,980	2.22	0.32	3	Atlas		302,658	1
	6/18/2019 16:15	6/18/2019 16:15	0	0.21	1,261,733	2.36	0.08	24	Atlas		264,964	1
CSO181 Total											7,357,556	14
CSO182	7/2/2018 17:30	7/2/2018 17:30	0	0.52	3,231	0.99	0.43	1	Atlas	Retained by Sneads Branch	1,680	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO182	7/3/2018 14:30	7/3/2018 15:15	45	0.44	23,116	1.06	0.30	1	Atlas	Retained by Sneads Branch	10,171	1
	7/15/2018 17:30	7/15/2018 17:30	0	0.12	70,608	0.08	0.06	12	Atlas	Retained by Sneads Branch	8,473	1
	7/16/2018 8:15	7/16/2018 8:45	30	0.14	55,193	0.14	0.09	1	Atlas	Retained by Sneads Branch	7,727	1
	7/20/2018 13:15	7/20/2018 20:30	435	0.86	20,929	1	0.37	1	Atlas	Retained by Sneads Branch	17,999	1
	7/22/2018 16:30	7/22/2018 17:00	30	0.1	78,840	1.11	0.07	1	Atlas	Retained by Sneads Branch	7,884	1
	7/30/2018 22:00	7/31/2018 5:00	420	1.86	13,515	1.34	0.74	6	Atlas		25,138	1
	12/1/2018 8:00	12/2/2018 1:15	1035	1.31	1,497,230	1.44	0.58	12	Atlas	Retained by Sneads Branch	1,961,371	1
	12/14/2018 14:30	12/14/2018 15:00	30	1.61	5,860	0.12	0.66	12	Atlas	Retained by Sneads Branch	9,435	1
	12/15/2018 1:15	12/15/2018 13:30	735	1.61	369,677	1.61	0.66	12	Atlas	Retained by Sneads Branch	595,180	1
	12/20/2018 15:00	12/20/2018 22:45	465	0.52	263,940	2.07	0.21	12	Atlas	Retained by Sneads Branch	137,249	1
	12/27/2018 19:00	12/27/2018 19:15	15	0.42	28,824	0.66	0.27	1	Atlas	Retained by Sneads Branch	12,106	1
	12/31/2018 4:45	12/31/2018 19:00	855	1.16	127,141	1.59	0.45	24	Atlas	Retained by Sneads Branch	147,483	1
	1/4/2019 13:45	1/4/2019 20:45	420	0.65	45,151	1.8	0.30	12	Atlas	Retained by Sneads Branch	29,348	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO182	1/13/2019 0:30	1/13/2019 8:30	480	0.18	47,061	0.34	0.08	12	Atlas	Retained by Sneads Branch	8,471	1
	1/19/2019 6:15	1/19/2019 21:00	885	0.72	77,025	0.85	0.28	24	Atlas	Retained by Sneads Branch	55,458	1
	1/23/2019 7:45	1/23/2019 22:30	885	0.77	84,981	1.59	0.31	12	Atlas	Retained by Sneads Branch	65,435	1
	2/4/2019 14:30	2/4/2019 14:30	0	0.12	4,417	0.14	0.06	3	Atlas	Retained by Sneads Branch	530	1
	2/6/2019 7:15	2/6/2019 11:45	270	1.36	138,139	0.63	0.44	48	Atlas	Retained by Sneads Branch	187,869	1
	2/7/2019 5:00	2/7/2019 23:00	1080	1.36	366,251	1.5	0.44	48	Atlas		498,101	1
	2/10/2019 17:15	2/13/2019 3:30	3495	2.38	664,454	3.86	0.75	48	Atlas	Retained by Sneads Branch	1,581,400	1
	2/20/2019 1:30	2/20/2019 20:15	1125	1.41	248,779	1.47	0.64	6	Atlas		350,779	1
	2/23/2019 8:00	2/23/2019 8:00	0	0.02	50,850	1.46	0.01	3	Atlas	Retained by Sneads Branch	1,017	1
	2/23/2019 17:30	2/24/2019 2:15	525	0.73	126,247	2.19	0.40	6	Atlas	Retained by Sneads Branch	92,160	1
	2/28/2019 17:30	2/28/2019 17:30	0	0.08	38,125	0.84	0.04	6	Atlas	Retained by Sneads Branch	3,050	1
	3/3/2019 15:15	3/3/2019 15:15	0	0.03	8,100	0.11	0.02	1	Atlas	Retained by Sneads Branch	243	1
	3/9/2019 13:30	3/9/2019 20:15	405	0.8	138,971	0.96	0.38	6	Atlas	Retained by Sneads Branch	111,177	1
	3/14/2019 4:45	3/14/2019 8:30	225	0.34	279,332	1.28	0.19	6	Atlas	Retained by Sneads Branch	94,973	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO182	3/14/2019 17:15	3/14/2019 20:00	165	0.14	501,929	1.4	0.09	3	Atlas	Retained by Sneads Branch	70,270	1
	3/25/2019 1:00	3/25/2019 5:30	270	0.26	151,554	0.32	0.14	6	Atlas	Retained by Sneads Branch	39,404	1
	3/30/2019 15:45	3/30/2019 20:45	300	0.63	90,517	1.03	0.33	6	Atlas	Retained by Sneads Branch	57,026	1
	4/7/2019 6:15	4/7/2019 14:30	495	0.85	50,193	1.03	0.47	3	Atlas	Retained by Sneads Branch	42,664	1
	4/12/2019 6:30	4/12/2019 6:30	0	0.38	224	1.2	0.30	1	Atlas	Retained by Sneads Branch	85	1
	4/14/2019 1:15	4/14/2019 6:15	300	0.86	84,660	2.1	0.40	6	Atlas	Retained by Sneads Branch	72,808	1
	4/18/2019 23:00	4/19/2019 5:00	360	3.1	2,267	2.04	1.02	48	Cloudburst	Retained by Sneads Branch	7,028	1
	4/19/2019 18:30	4/20/2019 19:45	1515	3.1	56,680	4.04	1.02	48	Cloudburst		175,707	1
	4/23/2019 18:00	4/23/2019 19:00	60	0.24	105,042	3.34	0.21	1	Atlas	Retained by Sneads Branch	25,210	1
	4/24/2019 21:15	4/25/2019 2:15	300	0.91	10,886	3.79	0.30	48	Atlas	Retained by Sneads Branch	9,906	1
	4/26/2019 2:30	4/26/2019 4:00	90	0.91	642	3.63	0.30	48	Atlas	Retained by Sneads Branch	584	1
	5/2/2019 12:00	5/2/2019 12:00	0	0.29	8,393	0.74	0.25	1	Atlas	Retained by Sneads Branch	2,434	1
	5/3/2019 4:45	5/3/2019 9:30	285	0.9	136,114	1.24	0.49	6	Atlas	Retained by Sneads Branch	122,503	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO182	5/4/2019 17:15	5/4/2019 18:15	60	0.22	23,823	1.43	0.13	3	Atlas	Retained by Sneads Branch	5,241	1
	5/11/2019 20:45	5/11/2019 21:30	45	0.22	31,155	0.23	0.12	6	Atlas	Retained by Sneads Branch	6,854	1
	5/19/2019 23:30	5/19/2019 23:30	0	0.31	33,500	0.32	0.14	1	Atlas		10,385	1
	5/23/2019 16:00	5/23/2019 16:00	0	0.09	16,500	0.41	0.05	1	Atlas	Retained by Sneads Branch	1,485	1
	5/26/2019 14:15	5/26/2019 17:30	195	0.54	20,646	0.83	0.32	3	Atlas	Retained by Sneads Branch	11,149	1
	5/29/2019 9:45	5/29/2019 14:15	270	0.59	44,186	1.22	0.32	6	Atlas	Retained by Sneads Branch	26,070	1
	5/30/2019 11:45	5/30/2019 11:45	0	0.19	12,037	1.37	0.09	1	Atlas	Retained by Sneads Branch	2,287	1
	6/5/2019 21:00	6/5/2019 21:45	45	1.02	4,911	1.16	0.79	1	Atlas	Retained by Sneads Branch	5,009	1
	6/7/2019 21:30	6/8/2019 3:00	330	0.88	24,200	1.57	0.29	48	Atlas	Retained by Sneads Branch	21,296	1
	6/8/2019 19:45	6/9/2019 1:15	330	0.88	4,716	1.95	0.29	48	Atlas	Retained by Sneads Branch	4,150	1
	6/9/2019 18:30	6/9/2019 21:30	180	0.61	22,126	2.58	0.31	6	Atlas		13,497	1
	6/16/2019 6:15	6/16/2019 6:45	30	0.16	61,000	0.9	0.11	1	Atlas		9,760	1
	6/16/2019 17:45	6/17/2019 1:30	465	1.27	34,722	1.69	0.60	6	Atlas		44,097	1
	6/17/2019 21:15	6/17/2019 21:30	15	0.33	3,873	1.62	0.13	24	Atlas	Retained by Sneads Branch	1,278	1
	6/18/2019 9:00	6/18/2019 9:30	30	0.33	10,918	1.83	0.13	24	Atlas	Retained by Sneads Branch	3,603	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO182	6/18/2019 17:45	6/18/2019 17:45	0	0.33	11,618	1.89	0.13	24	Atlas	Retained by Sneads Branch	3,834	1
	6/19/2019 21:00	6/19/2019 21:30	30	0.08	105,438	1.97	0.05	1	Atlas	Retained by Sneads Branch	8,435	1
	6/21/2019 19:30	6/21/2019 21:45	135	0.87	21,587	2.4	0.33	24	Atlas	Retained by Sneads Branch	18,781	1
	6/22/2019 6:45	6/22/2019 10:00	195	0.87	19,879	2.72	0.33	24	Atlas	Retained by Sneads Branch	17,295	1
	6/23/2019 16:00	6/23/2019 16:00	0	0.42	6,952	2.9	0.32	1	Atlas		2,920	1
CSO182 Total											6,864,962	61
CSO183	9/8/2018 17:30	9/8/2018 21:15	225	2.25	100,615	2.47	0.92	6	Atlas	Retained by Sneads Branch	226,384	1
	9/23/2018 6:15	9/23/2018 6:15	0	1.38	88	1.75	0.53	3	Atlas	Retained by Sneads Branch	122	1
	9/25/2018 17:00	9/25/2018 17:00	0	0.66	908	3.66	0.29	12	Atlas	Retained by Sneads Branch	599	1
	11/5/2018 22:00	11/5/2018 22:00	0	1.1	81	2.53	0.60	6	Atlas	Retained by Sneads Branch	89	1
	3/9/2019 13:30	3/9/2019 13:30	0	0.82	451	0.45	0.39	6	Atlas	Retained by Sneads Branch	370	1
	6/9/2019 16:45	6/9/2019 16:45	0	0.65	2,022	2.08	0.33	6	Atlas		1,314	1
	6/16/2019 20:45	6/16/2019 20:45	0	1.16	5,814	0.99	0.56	6	Atlas		6,744	1
	6/24/2019 13:45	6/24/2019 13:45	0	0.45	1,820	2.43	0.28	3	Atlas		819	1
CSO183 Total											236,441	8
CSO184	8/20/2018 11:30	8/20/2018 11:30	0	0.41	25,749	3.22	0.28	1	Atlas	Retained by Sneads Branch	10,557	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO184	9/8/2018 17:30	9/8/2018 22:15	285	2.25	960,871	2.59	0.92	6	Atlas	Retained by Sneads Branch	2,161,960	1
	9/23/2018 6:15	9/23/2018 6:30	15	1.38	19,111	1.79	0.53	3	Atlas	Retained by Sneads Branch	26,373	1
	9/24/2018 13:30	9/24/2018 13:30	0	1.54	380	3.24	0.68	6	Atlas	Retained by Sneads Branch	585	1
	9/25/2018 17:00	9/25/2018 17:00	0	0.66	13,729	3.66	0.29	12	Atlas	Retained by Sneads Branch	9,061	1
	11/1/2018 0:45	11/1/2018 1:00	15	1.75	6,794	1.48	0.62	24	Atlas	Retained by Sneads Branch	11,889	1
	11/5/2018 22:00	11/5/2018 22:00	0	1.1	5,393	2.53	0.60	6	Atlas	Retained by Sneads Branch	5,932	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.38	681	0.97	0.44	48	Atlas	Retained by Sneads Branch	940	1
	2/12/2019 4:45	2/12/2019 4:45	0	2.4	94	3.44	0.75	48	Atlas		225	1
	3/9/2019 13:30	3/9/2019 13:30	0	0.82	3,209	0.45	0.39	6	Atlas	Retained by Sneads Branch	2,631	1
	3/14/2019 17:15	3/14/2019 18:45	90	0.17	27,541	1.5	0.11	3	Atlas	Retained by Sneads Branch	4,682	1
	4/7/2019 12:15	4/7/2019 12:15	0	0.61	959	0.74	0.34	1	Atlas	Retained by Sneads Branch	585	1
	4/14/2019 2:00	4/14/2019 2:00	0	1.02	111	1.63	0.48	6	Atlas	Retained by Sneads Branch	113	1
	4/23/2019 18:00	4/23/2019 18:00	0	0.06	101,350	3.39	0.05	1	Atlas	Retained by Sneads Branch	6,081	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO184	4/24/2019 20:45	4/24/2019 20:45	0	0.46	5,596	3.62	0.21	6	Atlas	Retained by Sneads Branch	2,574	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.39	6,821	4.07	0.18	1	Atlas	Retained by Sneads Branch	2,660	1
	6/9/2019 16:45	6/9/2019 17:00	15	0.65	53,388	2.1	0.33	6	Atlas		34,702	1
	6/16/2019 21:00	6/16/2019 21:00	0	1.16	1,162	0.99	0.56	6	Atlas		1,348	1
	6/23/2019 16:15	6/23/2019 16:15	0	0.41	198,776	3.08	0.32	1	Atlas		81,498	1
	6/24/2019 13:45	6/24/2019 14:00	15	0.45	31,229	2.43	0.28	3	Atlas		14,053	1
CSO184 Total											2,378,449	20
CSO185	7/2/2018 17:30	7/2/2018 18:00	30	0.65	8,217	1.41	0.52	1	Atlas	Retained by Sneads Branch	5,341	1
	7/3/2018 16:00	7/3/2018 16:00	0	0.5	138	1.43	0.34	1	Atlas	Retained by Sneads Branch	69	1
	7/15/2018 18:15	7/15/2018 18:15	0	0.13	13,054	0.14	0.06	12	Atlas	Retained by Sneads Branch	1,697	1
	7/20/2018 13:45	7/20/2018 21:15	450	1.09	2,116	1.33	0.49	1	Atlas	Retained by Sneads Branch	2,306	1
	7/30/2018 23:15	7/31/2018 13:00	825	1.58	4,861	1.72	0.59	12	Atlas		7,680	1
	8/15/2018 19:45	8/16/2018 9:00	795	2.64	169,491	2.5	1.12	24	Cloudburst	Retained by Sneads Branch	447,456	1
	8/19/2018 20:00	8/19/2018 20:45	45	0.15	291,453	2.88	0.10	3	Atlas	Retained by Sneads Branch	43,718	1
	8/20/2018 11:15	8/20/2018 11:15	0	0.41	119,751	3.22	0.28	1	Atlas	Retained by Sneads Branch	49,098	1
	8/31/2018 17:15	8/31/2018 17:15	0	0.27	12,915	0.16	0.16	3	Atlas	Retained by Sneads Branch	3,487	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO185	9/8/2018 17:15	9/8/2018 22:15	300	2.25	944,210	2.59	0.92	6	Atlas	Retained by Sneads Branch	2,124,472	1
	10/15/2018 9:30	10/15/2018 9:30	0	0.19	626	0.72	0.13	1	Atlas	Retained by Sneads Branch	119	1
	11/1/2018 0:45	11/1/2018 1:15	30	1.75	56,855	1.48	0.62	24	Atlas	Retained by Sneads Branch	99,497	1
	11/5/2018 22:00	11/5/2018 23:45	105	1.1	28,413	2.86	0.60	6	Atlas	Retained by Sneads Branch	31,254	1
	12/1/2018 10:15	12/1/2018 10:15	0	1.38	2,819	1.28	0.61	12	Atlas	Retained by Sneads Branch	3,890	1
	12/15/2018 3:00	12/15/2018 7:30	270	1.7	5,415	1.34	0.70	12	Atlas	Retained by Sneads Branch	9,206	1
	12/27/2018 17:45	12/27/2018 17:45	0	0.36	30,958	0.57	0.19	1	Atlas	Retained by Sneads Branch	11,145	1
	12/31/2018 10:00	12/31/2018 12:00	120	1.26	1,506	1.31	0.49	12	Atlas	Retained by Sneads Branch	1,897	1
	2/6/2019 7:15	2/6/2019 10:00	165	1.38	32,395	0.57	0.44	48	Atlas		44,705	1
	2/7/2019 9:00	2/7/2019 17:15	495	1.38	33,851	1.33	0.44	48	Atlas		46,715	1
	2/12/2019 4:00	2/12/2019 6:00	120	2.4	31,441	3.57	0.75	48	Atlas		75,458	1
	2/20/2019 3:30	2/20/2019 7:00	210	1.43	108,780	1.38	0.64	6	Atlas		155,555	1
	2/23/2019 18:30	2/23/2019 19:15	45	0.72	9,749	2.07	0.39	6	Atlas		7,019	1
	3/9/2019 13:45	3/9/2019 16:45	180	0.82	29,685	0.87	0.39	6	Atlas		24,342	1
	3/14/2019 17:15	3/14/2019 19:00	105	0.17	429,812	1.5	0.11	3	Atlas		73,068	1
	3/30/2019 17:15	3/30/2019 19:45	150	0.7	30,981	1.02	0.33	6	Atlas		21,687	1
	4/7/2019 12:00	4/7/2019 13:30	90	0.61	60,341	0.82	0.34	1	Atlas	Retained by Sneads Branch	36,808	1
	4/12/2019 6:00	4/12/2019 6:00	0	0.45	2,907	1.03	0.36	1	Atlas	Retained by Sneads Branch	1,308	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO185	4/14/2019 2:00	4/14/2019 5:00	180	1.02	37,433	2.05	0.48	6	Atlas	Retained by Sneads Branch	38,182	1
	4/18/2019 21:30	4/18/2019 21:30	0	3.33	457	1.83	1.42	48	Cloudburst	Retained by Sneads Branch	1,523	1
	4/19/2019 19:15	4/19/2019 23:15	240	3.33	19,100	2.78	1.42	48	Cloudburst		63,604	1
	4/23/2019 18:00	4/23/2019 18:15	15	0.06	91,333	3.39	0.05	1	Atlas	Retained by Sneads Branch	5,480	1
	4/24/2019 20:45	4/24/2019 21:15	30	0.46	60,313	3.66	0.21	6	Atlas	Retained by Sneads Branch	27,744	1
	4/25/2019 18:15	4/25/2019 18:15	0	0.39	55,128	4.07	0.18	1	Atlas	Retained by Sneads Branch	21,500	1
	4/26/2019 2:45	4/26/2019 2:45	0	0.39	8,918	3.47	0.18	1	Atlas	Retained by Sneads Branch	3,478	1
	5/3/2019 5:00	5/3/2019 7:30	150	0.93	12,155	1.13	0.50	6	Atlas	Retained by Sneads Branch	11,304	1
	5/19/2019 23:15	5/19/2019 23:15	0	0.21	43,529	0.36	0.15	1	Atlas	Retained by Sneads Branch	9,141	1
	5/26/2019 14:00	5/26/2019 15:30	90	0.48	16,115	0.74	0.29	3	Atlas	Retained by Sneads Branch	7,735	1
	5/29/2019 9:15	5/29/2019 9:15	0	0.52	8,863	0.77	0.28	6	Atlas	Retained by Sneads Branch	4,609	1
	5/30/2019 11:15	5/30/2019 11:15	0	0.19	9,474	1.3	0.10	1	Atlas	Retained by Sneads Branch	1,800	1
	6/5/2019 21:15	6/5/2019 21:15	0	0.77	27,660	0.9	0.57	1	Atlas	Retained by Sneads Branch	21,298	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO185	6/7/2019 22:30	6/7/2019 22:30	0	0.54	291	1.11	0.21	6	Atlas	Retained by Sneads Branch	157	1
	6/9/2019 0:30	6/9/2019 0:30	0	0.3	24,603	1.66	0.15	6	Atlas		7,381	1
	6/9/2019 16:45	6/9/2019 17:00	15	0.65	116,031	2.1	0.33	6	Atlas		75,420	1
	6/16/2019 20:00	6/16/2019 21:45	105	1.16	68,909	1.23	0.56	6	Atlas		79,935	1
	6/18/2019 17:15	6/18/2019 17:15	0	0.65	34,242	2.1	0.25	24	Atlas	Retained by Sneads Branch	22,257	1
	6/21/2019 19:45	6/21/2019 19:45	0	0.82	4,304	2.42	0.32	24	Atlas	Retained by Sneads Branch	3,529	1
	6/22/2019 7:00	6/22/2019 7:00	0	0.82	6,246	2.68	0.32	24	Atlas	Retained by Sneads Branch	5,122	1
	6/23/2019 16:15	6/23/2019 16:30	15	0.41	632,749	3.09	0.32	1	Atlas		259,427	1
	6/24/2019 13:45	6/24/2019 14:15	30	0.45	198,589	2.43	0.28	3	Atlas		89,365	1
CSO185 Total											4,088,988	49
CSO186	9/8/2018 20:00	9/8/2018 20:00	0	2.36	22,875	2.08	0.97	6	Atlas	Retained by Sneads Branch	53,986	1
	1/18/2019 1:45	1/18/2019 9:15	450	Discharge	0	0.41				Retained by Sneads Branch	340,195	
	2/9/2019 2:00	2/9/2019 6:15	255	Discharge	0	1.5				Affected by River Flooding - Retained by Sneads branch	312,685	
	2/16/2019 14:00	2/16/2019 14:00	0	Discharge	0	2.53				Affected by River Flooding - Retained by Sneads branch	98,477	

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO186 Total											805,343	1
CSO187	8/16/2018 4:30	8/16/2018 4:30	0	2.55	1,689	1.79	0.98	24	Atlas	Retained by Sneads Branch	4,308	1
	8/20/2018 11:00	8/20/2018 11:00	0	0.5	20,834	3.01	0.38	1	Atlas	Retained by Sneads Branch	10,417	1
	9/8/2018 20:00	9/8/2018 20:00	0	2.36	9,208	2.08	0.97	6	Atlas	Retained by Sneads Branch	21,730	1
	4/23/2019 17:30	4/23/2019 17:45	15	0.24	47,492	3.02	0.21	1	Atlas	Retained by Sneads Branch	11,398	1
	6/16/2019 20:30	6/16/2019 20:30	0	1.4	16,901	1.14	0.63	6	Atlas		23,662	1
	6/23/2019 15:45	6/23/2019 15:45	0	0.41	28,520	2.84	0.32	1	Atlas		11,693	1
	6/24/2019 13:30	6/24/2019 13:30	0	0.42	33,907	2.11	0.26	3	Atlas		14,241	1
CSO187 Total											97,449	7
CSO188	9/8/2018 20:00	9/8/2018 20:15	15	2.36	41,771	2.2	0.97	6	Atlas	Retained by Sneads Branch	98,580	1
	6/16/2019 20:45	6/16/2019 20:45	0	1.4	251	1.22	0.63	6	Atlas		351	1
CSO188 Total											98,931	2
CSO189	7/3/2018 14:00	7/3/2018 15:15	75	0.2	3,447,240	0.48	0.12	1	Atlas		689,448	1
	7/16/2018 7:30	7/16/2018 8:30	60	0.26	2,466,885	0.17	0.18	1	Atlas		641,390	1
	7/20/2018 17:15	7/20/2018 20:30	195	0.79	7,563,011	0.94	0.40	3	Atlas		5,974,779	1
	7/30/2018 23:30	7/31/2018 12:00	750	2.27	6,551,678	2.42	1.11	6	Cloudburst		14,872,309	1
	8/15/2018 20:00	8/16/2018 12:45	1005	4.16	4,272,772	4.09	6.94	24	Cloudburst		17,774,732	1
	8/20/2018 11:30	8/20/2018 13:15	105	0.48	3,119,802	4.59	0.28	1	Atlas		1,497,505	1
	8/31/2018 16:45	8/31/2018 19:45	180	1.94	2,705,660	2.05	6.15	1	Atlas		5,248,980	1
	9/6/2018 12:15	9/6/2018 12:45	30	0.29	162,424	2.25	0.23	1	Atlas		47,103	1
	9/8/2018 16:15	9/9/2018 1:45	570	3.74	2,822,657	4.17	16.61	6	Cloudburst		10,556,737	1
	9/21/2018 14:45	9/21/2018 17:45	180	0.29	19,397	0.34	0.19	1	Atlas		5,625	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO189	9/23/2018 5:30	9/23/2018 6:30	60	1.55	6,591	1.74	0.56	24	Atlas		10,216	1
	9/24/2018 7:45	9/24/2018 8:15	30	2.69	1,869	3.09	2.15	12	Cloudburst		5,028	1
	9/26/2018 3:00	9/26/2018 3:00	0	1.29	59,409	5.86	0.75	1	Atlas		76,638	1
	5/9/2019 10:30	5/10/2019 0:30	840	0.03	6,783,767	1.68	0.03	1	Atlas		203,513	1
	5/26/2019 14:15	5/26/2019 16:00	105	1.09	2,076,558	1.13	0.65	3	Atlas		2,263,448	1
	6/16/2019 19:45	6/17/2019 1:45	360	3	2,949,154	3.35	3.67	6	Cloudburst		8,847,462	1
CSO189 Total											68,714,913	16
CSO190	7/16/2018 9:30	7/16/2018 9:30	0	0.32	1,353	0.33	0.26	1	Atlas		433	1
	7/20/2018 20:45	7/20/2018 20:45	0	1.73	56,157	2.13	1.30	3	Atlas		97,152	1
	7/31/2018 1:30	7/31/2018 12:45	675	2.08	208,788	2.12	0.86	6	Atlas		434,280	1
	8/15/2018 19:45	8/16/2018 9:30	825	3	310,978	2.89	1.78	24	Cloudburst		932,934	1
	8/20/2018 11:00	8/20/2018 11:30	30	0.61	1,470,734	3.47	0.37	1	Atlas		897,148	1
	8/31/2018 16:30	8/31/2018 17:00	30	0.47	95,451	0.39	0.31	3	Atlas		44,862	1
	9/8/2018 17:00	9/8/2018 22:30	330	3.55	731,480	3.95	12.29	6	Cloudburst		2,596,754	1
	9/21/2018 14:00	9/21/2018 14:00	0	0.46	54,330	0.22	0.26	1	Atlas		24,992	1
	9/23/2018 4:00	9/23/2018 6:45	165	1.59	66,256	2.01	0.60	24	Atlas		105,347	1
	9/24/2018 7:15	9/24/2018 13:45	390	1.99	393,502	3.87	0.85	6	Atlas		783,069	1
	9/25/2018 5:30	9/25/2018 5:30	0	1.99	1,032	3.99	0.85	6	Atlas		2,054	1
	9/25/2018 16:15	9/25/2018 17:15	60	1.02	98,498	4.64	0.45	12	Atlas		100,468	1
	9/26/2018 1:45	9/26/2018 1:45	0	1.02	1,500	4.96	0.45	12	Atlas		1,530	1
	10/10/2018 16:15	10/10/2018 16:30	15	0.34	309,568	0.3	0.27	1	Atlas		105,253	1
	11/1/2018 2:00	11/1/2018 2:15	15	2.27	10,783	1.89	0.80	24	Atlas		24,478	1
	11/5/2018 23:00	11/5/2018 23:30	30	0.99	4,342	3.22	0.54	6	Atlas		4,299	1
	12/1/2018 9:00	12/1/2018 10:00	60	1.45	1,608	1.26	0.60	12	Atlas		2,332	1
	12/15/2018 4:00	12/15/2018 8:00	240	1.55	5,697	1.28	0.64	12	Atlas		8,831	1
	12/31/2018 16:00	12/31/2018 16:30	30	1.59	25,729	1.94	0.62	12	Atlas		40,909	1
	2/6/2019 6:45	2/6/2019 6:45	0	1.61	3,394	0.53	0.52	48	Atlas		5,464	1
	2/12/2019 4:00	2/12/2019 6:00	120	3.03	49,319	4.34	0.95	48	Atlas		149,436	1
	2/20/2019 3:45	2/20/2019 6:45	180	1.6	245,629	1.5	0.71	6	Atlas		393,007	1
	2/23/2019 20:30	2/23/2019 20:45	15	0.89	44,994	2.5	0.49	6	Atlas		40,045	1
	3/9/2019 13:15	3/9/2019 18:30	315	1.14	55,575	1.24	0.55	6	Atlas		63,356	1
	3/14/2019 16:45	3/14/2019 17:30	45	0.48	516,004	1.94	0.32	3	Atlas		247,682	1
	3/30/2019 17:00	3/30/2019 17:15	15	1.07	79,736	1.13	0.48	6	Atlas		85,318	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO190	4/7/2019 11:45	4/7/2019 12:00	15	0.62	89,768	0.72	0.28	12	Atlas		55,656	1
	4/14/2019 1:45	4/14/2019 1:45	0	0.86	523	1.18	0.40	6	Atlas		450	1
	4/19/2019 19:15	4/20/2019 0:15	300	2.59	78,302	2.24	0.84	48	Atlas		202,801	1
	4/24/2019 20:30	4/24/2019 20:45	15	1.16	24,609	2.98	0.38	24	Atlas		28,547	1
	4/25/2019 18:00	4/25/2019 18:00	0	1.16	99,509	3.56	0.38	24	Atlas		115,430	1
CSO190 Total											7,594,317	31
CSO191	7/1/2018 23:00	7/3/2018 22:45	2865	Discharge	0	2				Data Under Review	4,446	
	7/4/2018 23:00	7/8/2018 14:30	5250	Discharge	0	0.37				Data Under Review	11,669	
	7/10/2018 14:15	7/15/2018 23:00	7725	Discharge	0	0.23				Data Under Review	21,939	
	7/16/2018 7:45	8/22/2018 7:00	53235	0.28	32,544,032	8.76	0.18	3	Atlas		9,112,329	1
	8/22/2018 17:15	8/23/2018 10:45	1050	0.06	4,600	4.55	0.05	1	Atlas		276	1
	8/31/2018 12:15	8/31/2018 15:45	210	Discharge	0	0.06				Data Under Review	182	
	9/17/2018 9:15	9/19/2018 23:00	3705	0.08	63,700	0.08	0.03	12	Atlas		5,096	1
	9/23/2018 4:45	9/26/2018 21:15	5310	1.87	6,003,684	6.28	0.69	24	Atlas		11,226,889	1
	10/4/2018 16:15	10/5/2018 9:00	1005	0.04	13,050	0.06	0.03	1	Atlas		522	1
	10/6/2018 20:45	10/9/2018 11:30	3765	0.03	8,800	0.1	0.03	1	Atlas		264	1
	10/10/2018 18:45	10/10/2018 20:00	75	0.33	430	0.43	0.27	1	Atlas		142	1
	4/14/2019 2:30	4/14/2019 11:00	510	1.03	1,156,370	1.82	0.47	12	Atlas		1,191,061	1
	4/16/2019 7:00	4/16/2019 20:15	795	Discharge	0	1.18					15,439	
	4/19/2019 20:00	4/22/2019 20:15	4335	2.44	4,238,941	4.27	0.92	24	Atlas		10,343,015	1
	4/26/2019 2:45	4/26/2019 5:45	180	0.96	256,006	3.76	0.31	48	Atlas		245,766	1
	5/2/2019 11:45	5/2/2019 15:15	210	0.1	5,810	0.65	0.09	1	Atlas		581	1
	5/3/2019 5:15	5/3/2019 18:30	795	1.22	1,744,623	1.37	0.67	6	Atlas		2,128,440	1
	5/15/2019 13:15	5/15/2019 19:15	360	0.01	9,700	0.43	0.01	1	Atlas		97	1
	5/26/2019 18:00	5/26/2019 21:00	180	0.41	734	0.65	0.25	3	Atlas		301	1
	5/29/2019 15:00	5/29/2019 20:45	345	0.63	1,538	1.13	0.34	6	Atlas		969	1
	5/30/2019 15:30	5/30/2019 16:15	45	0.35	111	1.39	0.16	3	Atlas		39	1
	6/9/2019 10:45	6/9/2019 19:30	525	0.92	305	2.59	0.30	24	Atlas		281	1
	6/16/2019 20:30	6/16/2019 21:30	60	1.95	201,871	1.75	0.91	6	Atlas		393,649	1
	6/17/2019 9:30	6/17/2019 20:30	660	1.95	1,005	2.28	0.91	6	Atlas		1,960	1
	6/22/2019 11:00	6/23/2019 0:00	780	0.96	984	3.55	0.37	24	Atlas		945	1
	6/23/2019 16:30	6/23/2019 20:15	225	0.58	68,760	3.84	0.45	1	Atlas		39,881	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO191	6/24/2019 14:15	6/24/2019 22:00	465	0.66	54,965	2.67	0.39	3	Atlas		36,277	1
CSO191 Total											34,782,455	22
CSO193	7/20/2018 19:30	7/20/2018 21:00	90	0.94	2,368	1.22	0.42	3	Atlas		2,226	1
	10/31/2018 17:15	11/1/2018 2:30	555	1.93	66	1.74	0.69	24	Atlas		128	1
	12/20/2018 12:45	12/24/2018 16:30	5985	0.43	160	2.09	0.17	12	Atlas		69	1
	12/31/2018 12:15	12/31/2018 16:15	240	1.3	1,326	1.69	0.50	12	Atlas		1,724	1
	2/6/2019 7:00	2/6/2019 7:00	0	1.64	1,720	0.64	0.53	48	Atlas		2,820	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.64	1,202	1.29	0.53	48	Atlas		1,971	1
	2/12/2019 4:30	2/12/2019 4:45	15	2.67	871	3.94	0.83	48	Atlas		2,326	1
	2/20/2019 3:30	2/20/2019 6:00	150	1.4	5,043	1.2	0.63	6	Atlas		7,060	1
	3/9/2019 13:30	3/9/2019 15:00	90	1.05	1,352	0.73	0.48	12	Atlas		1,420	1
	3/14/2019 17:30	3/14/2019 18:30	60	0.51	3,459	2	0.34	3	Atlas		1,764	1
	3/30/2019 17:15	3/30/2019 19:45	150	0.95	6,054	1.26	0.43	6	Atlas		5,751	1
	4/7/2019 12:00	4/7/2019 12:00	0	0.57	709	0.59	0.30	3	Atlas		404	1
	4/14/2019 2:00	4/14/2019 2:00	0	0.71	2,577	1.15	0.34	6	Atlas		1,830	1
	4/19/2019 18:30	4/19/2019 22:30	240	2.33	926	1.72	0.75	48	Atlas		2,157	1
	4/23/2019 18:00	4/23/2019 18:00	0	0.14	4,107	2.47	0.12	1	Atlas		575	1
	4/24/2019 20:45	4/24/2019 20:45	0	1.09	905	2.88	0.35	48	Atlas		986	1
	5/3/2019 4:45	5/3/2019 7:30	165	0.84	2,092	1.04	0.45	6	Atlas		1,757	1
	5/23/2019 15:45	5/23/2019 15:45	0	0.03	80,033	0.27	0.02	1	Atlas		2,401	1
	5/26/2019 13:45	5/26/2019 13:45	0	0.89	1,299	0.65	0.49	3	Atlas		1,156	1
	6/9/2019 16:45	6/9/2019 16:45	0	0.53	22,506	2.05	0.27	3	Atlas		11,928	1
	6/16/2019 19:45	6/17/2019 1:00	315	2.14	7,482	2.49	0.97	3	Atlas		16,011	1
	6/21/2019 19:15	6/21/2019 19:30	15	0.8	1,721	3.27	0.53	3	Atlas		1,377	1
	6/23/2019 16:00	6/23/2019 16:15	15	0.36	12,194	4.05	0.28	1	Atlas		4,390	1
	6/24/2019 13:30	6/24/2019 13:45	15	0.4	7,105	2.38	0.25	3	Atlas		2,842	1
	6/30/2019 17:30	6/30/2019 17:30	0	0.2	675	0.6	0.12	1	Atlas		135	1
CSO193 Total											75,208	25
CSO195	7/20/2018 14:00	7/20/2018 20:45	405	1	291	1.13	0.44	3	Atlas		291	1
	7/31/2018 1:30	7/31/2018 1:45	15	2.16	4,256	0.96	0.90	6	Atlas		9,192	1
	8/20/2018 11:30	8/20/2018 11:30	0	0.51	43	3.26	0.40	1	Atlas		22	1
	3/14/2019 17:15	3/14/2019 17:15	0	0.27	4,444	1.55	0.20	1	Atlas		1,200	1
	6/16/2019 20:45	6/16/2019 20:45	0	1.62	487	1.44	0.75	6	Atlas		789	1
CSO195 Total											11,494	5
CSO196	7/2/2018 17:30	7/2/2018 17:45	15	0.3	363	0.95	0.24	1	Atlas		109	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO196	7/3/2018 15:45	7/3/2018 16:00	15	0.35	137	1.1	0.25	1	Atlas		48	1
	7/16/2018 9:15	7/16/2018 9:30	15	0.14	364	0.16	0.10	1	Atlas		51	1
	7/20/2018 13:45	7/20/2018 21:00	435	1	3,161	1.18	0.44	3	Atlas		3,161	1
	7/31/2018 1:15	7/31/2018 12:45	690	2.16	5,804	2.21	0.90	6	Atlas		12,536	1
	8/15/2018 20:00	8/16/2018 8:45	765	2.68	13,421	2.52	1.18	24	Cloudburst		35,968	1
	8/20/2018 11:15	8/20/2018 11:30	15	0.51	17,278	3.26	0.40	1	Atlas		8,812	1
	9/8/2018 5:30	9/8/2018 5:30	0	2.47	665	0.48	1.22	6	Cloudburst		1,642	1
	9/8/2018 17:30	9/8/2018 22:00	270	2.47	121,576	2.6	1.22	6	Cloudburst		300,293	1
	9/21/2018 17:30	9/21/2018 17:45	15	0.25	8,296	0.32	0.17	1	Atlas		2,074	1
	9/22/2018 16:45	9/22/2018 17:00	15	1.34	60	0.7	0.50	24	Atlas		81	1
	9/23/2018 4:15	9/23/2018 7:00	165	1.34	14,328	1.62	0.50	24	Atlas		19,199	1
	9/24/2018 7:15	9/24/2018 13:45	390	1.3	18,103	2.88	0.61	6	Atlas		23,534	1
	9/25/2018 5:45	9/25/2018 5:45	0	0.08	29,188	2.97	0.07	1	Atlas		2,335	1
	9/25/2018 16:30	9/25/2018 17:30	60	0.76	11,322	3.3	0.33	12	Atlas		8,605	1
	10/15/2018 9:00	10/15/2018 9:00	0	0.2	2,730	0.7	0.13	1	Atlas		546	1
	10/31/2018 11:45	10/31/2018 12:45	60	1.85	14	0.33	0.67	24	Atlas		26	1
	11/5/2018 22:00	11/5/2018 22:00	0	0.88	3,030	2.42	0.48	6	Atlas		2,666	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.47	2,386	1.07	0.47	48	Atlas		3,508	1
	2/20/2019 5:30	2/20/2019 6:15	45	1.3	5,928	1.17	0.58	6	Atlas		7,707	1
	3/30/2019 17:15	3/30/2019 17:15	0	0.88	1,973	0.89	0.42	6	Atlas		1,736	1
	4/23/2019 18:00	4/23/2019 18:00	0	0.38	22,637	2.92	0.33	1	Atlas		8,602	1
	4/24/2019 20:45	4/24/2019 20:45	0	1.03	7,217	3.29	0.33	48	Atlas		7,433	1
	5/3/2019 4:45	5/3/2019 5:15	30	0.79	86,620	0.63	0.43	6	Atlas		68,430	1
CSO196 Total											519,102	24
CSO197	8/15/2018 12:15	8/16/2018 11:00	1365	2.68	79,432	2.68	1.18	24	Cloudburst		212,879	1
	8/20/2018 11:00	8/20/2018 19:45	525	0.51	93,143	3.3	0.40	1	Atlas		47,503	1
	8/21/2018 19:45	8/21/2018 19:45	0	0.05	9,320	3.36	0.02	12	Atlas		466	1
	8/25/2018 8:30	8/25/2018 11:30	180	Discharge	0	0.7				Data Under Review	1,776	
	8/31/2018 7:30	8/31/2018 8:00	30	Discharge	0	0.02				Data Under Review	932	
	8/31/2018 17:15	8/31/2018 17:30	15	0.14	12,064	0.08	0.09	3	Atlas		1,689	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO197	9/4/2018 6:45	9/5/2018 10:30	1665	Discharge	0	0.16					23,620	
	9/6/2018 11:15	9/6/2018 11:45	30	0.15	41,940	0.25	0.09	3	Atlas		6,291	1
	9/7/2018 18:45	9/10/2018 1:30	3285	2.47	879,394	2.66	1.22	6	Cloudburst		2,172,104	1
	9/19/2018 7:15	9/19/2018 12:15	300	Discharge	0	0.07					226,613	
	9/21/2018 17:45	9/21/2018 18:30	45	0.25	151,004	0.32	0.17	1	Atlas		37,751	1
	9/22/2018 14:45	9/22/2018 18:15	210	1.34	48,440	0.74	0.50	24	Atlas		64,910	1
	9/23/2018 4:00	9/27/2018 12:30	6270	1.34	874,537	3.82	0.50	24	Atlas		1,171,880	1
	10/3/2018 7:45	10/3/2018 9:45	120	Discharge	0	0.07					182	
	10/10/2018 17:15	10/10/2018 17:30	15	0.13	5,323	0.14	0.09	1	Atlas		692	1
	10/12/2018 21:45	10/12/2018 22:30	45	0.13	8,762	0.27	0.08	1	Atlas		1,139	1
	10/14/2018 4:30	10/14/2018 5:00	30	0.24	9,308	0.49	0.13	3	Atlas		2,234	1
	10/15/2018 9:00	10/15/2018 9:30	30	0.2	36,115	0.7	0.13	1	Atlas		7,223	1
	10/19/2018 21:00	10/19/2018 21:15	15	0.12	10,825	0.66	0.07	6	Atlas		1,299	1
	4/23/2019 17:45	4/23/2019 17:45	0	0.38	1,611	2.92	0.33	1	Atlas		612	1
	4/24/2019 20:30	4/24/2019 20:30	0	1.03	332	3.23	0.33	48	Atlas		342	1
	5/3/2019 4:30	5/3/2019 4:45	15	0.79	4,434	0.52	0.43	6	Atlas		3,503	1
	6/5/2019 20:45	6/5/2019 20:45	0	0.89	640	0.9	0.66	1	Atlas		570	1
	6/23/2019 15:45	6/23/2019 15:45	0	0.38	2,584	3.03	0.30	1	Atlas		982	1
	6/24/2019 13:30	6/24/2019 13:30	0	0.44	2,291	2.04	0.27	3	Atlas		1,008	1
CSO197 Total											3,988,200	20
CSO198	9/8/2018 5:00	9/8/2018 5:15	15	2.47	663	0.48	1.22	6	Cloudburst		1,637	1
	9/8/2018 17:00	9/8/2018 20:00	180	2.47	96,680	2.16	1.22	6	Cloudburst		238,800	1
	9/21/2018 17:15	9/21/2018 17:30	15	0.25	34,820	0.32	0.17	1	Atlas		8,705	1
	9/22/2018 16:30	9/22/2018 16:45	15	1.34	837	0.69	0.50	24	Atlas		1,121	1
	9/23/2018 4:00	9/23/2018 6:45	165	1.34	20,596	1.61	0.50	24	Atlas		27,599	1
	9/24/2018 6:45	9/24/2018 13:30	405	1.3	29,241	2.88	0.61	6	Atlas		38,013	1
	9/25/2018 5:30	9/25/2018 5:30	0	0.08	27,963	2.97	0.07	1	Atlas		2,237	1
	9/25/2018 16:15	9/26/2018 2:00	585	0.76	21,541	3.67	0.33	12	Atlas		16,371	1
	11/5/2018 21:45	11/5/2018 21:45	0	0.88	276	2.39	0.48	6	Atlas		243	1
	4/23/2019 17:45	4/23/2019 17:45	0	0.38	1,811	2.92	0.33	1	Atlas		688	1
	5/3/2019 4:30	5/3/2019 4:45	15	0.79	2,149	0.52	0.43	6	Atlas		1,698	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO198	6/5/2019 20:45	6/5/2019 20:45	0	0.89	787	0.9	0.66	1	Atlas		700	1
	6/9/2019 16:30	6/9/2019 16:30	0	0.52	17,179	1.97	0.27	3	Atlas		8,933	1
	6/16/2019 19:30	6/16/2019 20:45	75	1.62	12,170	1.47	0.75	6	Atlas		19,716	1
	6/23/2019 15:45	6/23/2019 15:45	0	0.38	10,355	3.03	0.30	1	Atlas		3,935	1
	6/24/2019 13:30	6/24/2019 13:30	0	0.44	10,075	2.04	0.27	3	Atlas		4,433	1
CSO198 Total											374,829	16
CSO199	7/2/2018 17:30	7/2/2018 19:00	90	0.3	1,813	1.06	0.24	1	Atlas		544	1
	7/20/2018 19:15	7/20/2018 21:00	105	1	486	1.18	0.44	3	Atlas		486	1
	7/31/2018 1:30	7/31/2018 12:45	675	2.16	2,897	2.21	0.90	6	Atlas		6,257	1
	8/15/2018 12:45	8/16/2018 14:15	1530	2.68	12,220	2.68	1.18	24	Cloudburst		32,749	1
	8/20/2018 11:15	8/20/2018 11:45	30	0.51	21,402	3.26	0.40	1	Atlas		10,915	1
	9/7/2018 19:15	9/8/2018 5:30	615	2.47	33	0.48	1.22	6	Cloudburst		82	1
	9/8/2018 17:30	9/8/2018 22:00	270	2.47	33,996	2.6	1.22	6	Cloudburst		83,971	1
	9/21/2018 17:30	9/21/2018 17:45	15	0.25	9,612	0.32	0.17	1	Atlas		2,403	1
	9/23/2018 5:15	9/23/2018 7:00	105	1.34	859	1.62	0.50	24	Atlas		1,151	1
	9/24/2018 7:15	9/24/2018 13:45	390	1.3	4,409	2.88	0.61	6	Atlas		5,732	1
	9/25/2018 17:15	9/26/2018 2:15	540	0.76	166	3.7	0.33	12	Atlas		126	1
	11/1/2018 0:45	11/1/2018 0:45	0	1.85	359	1.41	0.67	24	Atlas		665	1
	11/5/2018 22:00	11/5/2018 22:00	0	0.88	1,776	2.42	0.48	6	Atlas		1,563	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.47	993	1.07	0.47	48	Atlas		1,460	1
	2/20/2019 5:15	2/20/2019 6:15	60	1.3	2,891	1.17	0.58	6	Atlas		3,758	1
	3/14/2019 17:15	3/14/2019 17:15	0	0.27	1,281	1.55	0.20	1	Atlas		346	1
	3/30/2019 17:15	3/30/2019 17:15	0	0.88	310	0.89	0.42	6	Atlas		273	1
	4/7/2019 11:45	4/7/2019 11:45	0	0.59	2,417	0.59	0.29	3	Atlas		1,426	1
	4/23/2019 17:45	4/23/2019 18:00	15	0.38	7,861	2.92	0.33	1	Atlas		2,987	1
	4/24/2019 20:30	4/24/2019 20:45	15	1.03	1,252	3.29	0.33	48	Atlas		1,290	1
	5/3/2019 4:45	5/3/2019 5:00	15	0.79	6,639	0.58	0.43	6	Atlas		5,245	1
	6/9/2019 15:15	6/9/2019 17:00	105	0.52	72,638	2.1	0.27	3	Atlas		37,772	1
	6/16/2019 20:45	6/16/2019 21:30	45	1.62	19,087	1.58	0.75	6	Atlas		30,921	1
	6/23/2019 16:00	6/23/2019 16:15	15	0.38	77,408	3.22	0.30	1	Atlas		29,415	1
	6/24/2019 13:30	6/24/2019 13:45	15	0.44	3,477	2.07	0.27	3	Atlas		1,530	1
CSO199 Total											263,067	25
CSO200	7/20/2018 17:30	7/20/2018 17:45	15	1	42,153	0.56	0.44	3	Atlas		42,153	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO200	7/30/2018 22:15	7/31/2018 9:30	675	2.16	66,826	2.02	0.90	6	Atlas		144,344	1
	8/15/2018 16:30	8/16/2018 5:45	795	2.68	14,181	1.84	1.18	24	Cloudburst		38,005	1
	8/30/2018 10:45	8/30/2018 10:45	0	Discharge	0	0.02					365	
	9/8/2018 5:15	9/8/2018 5:15	0	2.47	1,261	0.48	1.22	6	Cloudburst		3,114	1
	9/8/2018 17:15	9/8/2018 22:00	285	2.47	92,158	2.6	1.22	6	Cloudburst		227,631	1
	9/21/2018 17:30	9/21/2018 17:30	0	0.25	2,752	0.32	0.17	1	Atlas		688	1
	9/23/2018 5:15	9/23/2018 6:30	75	1.34	1,069	1.59	0.50	24	Atlas		1,432	1
	9/24/2018 7:15	9/24/2018 11:00	225	1.3	5,403	2.7	0.61	6	Atlas		7,024	1
	11/1/2018 0:45	11/1/2018 0:45	0	1.85	350	1.41	0.67	24	Atlas		647	1
	11/5/2018 21:45	11/5/2018 22:00	15	0.88	1,798	2.42	0.48	6	Atlas		1,582	1
CSO200 Total											466,985	10
CSO201	6/5/2019 21:00	6/5/2019 21:00	0	0.8	178	0.91	0.58	1	Atlas		142	1
	6/8/2019 19:15	6/8/2019 19:15	0	0.28	117,268	1.47	0.14	6	Atlas		32,835	1
	6/9/2019 17:00	6/9/2019 17:00	0	0.53	23,223	2.07	0.27	3	Atlas		12,308	1
	6/16/2019 19:45	6/16/2019 20:45	60	2.14	15,971	1.96	0.97	3	Atlas		34,178	1
	6/21/2019 19:30	6/21/2019 19:30	0	0.8	1,489	3.27	0.53	3	Atlas		1,191	1
	6/23/2019 16:15	6/23/2019 16:15	0	0.36	12,181	3.82	0.28	1	Atlas		4,385	1
	6/24/2019 13:45	6/24/2019 13:45	0	0.4	2,930	2.38	0.25	3	Atlas		1,172	1
CSO201 Total											86,211	7
CSO202	7/2/2018 17:30	7/2/2018 17:45	15	0.3	533	0.95	0.24	1	Atlas		160	1
	7/20/2018 4:45	7/20/2018 4:45	0	1	54	0.34	0.44	3	Atlas		54	1
	7/20/2018 13:45	7/20/2018 20:45	420	1	631	1.13	0.44	3	Atlas		631	1
	7/31/2018 1:30	7/31/2018 12:45	675	2.16	1,715	2.21	0.90	6	Atlas		3,705	1
	8/15/2018 19:45	8/16/2018 8:45	780	2.68	9,470	2.52	1.18	24	Cloudburst		25,380	1
	8/20/2018 11:15	8/20/2018 11:30	15	0.51	32,737	3.26	0.40	1	Atlas		16,696	1
	9/7/2018 19:00	9/7/2018 19:00	0	2.47	19	0.19	1.22	6	Cloudburst		48	1
	9/8/2018 5:30	9/8/2018 5:30	0	2.47	38	0.48	1.22	6	Cloudburst		94	1
	9/8/2018 17:30	9/8/2018 22:00	270	2.47	36,487	2.6	1.22	6	Cloudburst		90,124	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO202	9/21/2018 17:30	9/21/2018 17:30	0	0.25	22,204	0.32	0.17	1	Atlas		5,551	1
	9/23/2018 4:15	9/23/2018 6:45	150	1.34	1,019	1.61	0.50	24	Atlas		1,366	1
	9/24/2018 0:30	9/24/2018 13:45	795	1.3	5,622	2.91	0.61	6	Atlas		7,308	1
	9/25/2018 5:45	9/25/2018 5:45	0	0.08	9,200	2.97	0.07	1	Atlas		736	1
	9/25/2018 16:30	9/25/2018 17:30	60	0.76	2,667	3.3	0.33	12	Atlas		2,027	1
	11/1/2018 0:30	11/1/2018 0:45	15	1.85	505	1.41	0.67	24	Atlas		934	1
	11/5/2018 21:45	11/5/2018 22:00	15	0.88	2,526	2.42	0.48	6	Atlas		2,223	1
	12/27/2018 17:30	12/27/2018 17:30	0	0.39	3,200	0.5	0.25	1	Atlas		1,248	1
	12/31/2018 16:15	12/31/2018 16:15	0	1.24	1,021	1.59	0.48	24	Atlas		1,266	1
	2/5/2019 23:00	2/6/2019 9:45	645	1.47	1,090	0.68	0.47	48	Atlas		1,602	1
	2/7/2019 9:00	2/7/2019 9:00	0	1.47	2,861	1.07	0.47	48	Atlas		4,205	1
	2/12/2019 4:30	2/12/2019 4:30	0	2.58	496	3.61	0.81	48	Atlas		1,279	1
	2/20/2019 3:30	2/20/2019 6:15	165	1.3	2,765	1.17	0.58	6	Atlas		3,594	1
	3/9/2019 13:30	3/9/2019 15:00	90	0.86	1,213	0.6	0.39	12	Atlas		1,043	1
	3/14/2019 17:30	3/14/2019 18:30	60	0.27	681	1.59	0.20	1	Atlas		184	1
	3/30/2019 17:00	3/30/2019 18:45	105	0.88	2,761	1.01	0.42	6	Atlas		2,430	1
	4/7/2019 11:45	4/7/2019 11:45	0	0.59	2,300	0.59	0.29	3	Atlas		1,357	1
	4/14/2019 2:00	4/14/2019 3:00	60	0.72	1,074	1.4	0.33	6	Atlas		773	1
	4/19/2019 21:30	4/19/2019 22:30	60	2.54	197	1.83	0.82	48	Atlas		501	1
	4/23/2019 17:45	4/23/2019 18:00	15	0.38	16,226	2.92	0.33	1	Atlas		6,166	1
	4/24/2019 20:30	4/24/2019 20:45	15	1.03	4,242	3.29	0.33	48	Atlas		4,369	1
	4/26/2019 2:30	4/26/2019 2:30	0	1.03	1,031	3.47	0.33	48	Atlas		1,062	1
	5/3/2019 4:45	5/3/2019 5:00	15	0.79	9,633	0.58	0.43	6	Atlas		7,610	1
	5/26/2019 13:45	5/26/2019 14:45	60	0.64	4,317	0.59	0.37	3	Atlas		2,763	1
	6/5/2019 21:00	6/5/2019 21:00	0	0.89	5,178	0.98	0.66	1	Atlas		4,608	1
	6/7/2019 21:00	6/7/2019 21:00	0	0.53	211	1.12	0.22	6	Atlas		112	1
	6/9/2019 15:15	6/9/2019 17:00	105	0.52	74,042	2.1	0.27	3	Atlas		38,502	1
	6/16/2019 19:45	6/16/2019 21:00	75	1.62	11,009	1.52	0.75	6	Atlas		17,834	1
	6/21/2019 19:15	6/21/2019 19:15	0	0.52	2,462	2.5	0.35	3	Atlas		1,280	1
	6/22/2019 6:45	6/22/2019 6:45	0	0.43	3,453	2.86	0.28	3	Atlas		1,485	1
	6/23/2019 16:00	6/23/2019 16:15	15	0.38	47,345	3.22	0.30	1	Atlas		17,991	1
	6/24/2019 13:30	6/24/2019 13:45	15	0.44	5,720	2.07	0.27	3	Atlas		2,517	1
	6/30/2019 17:30	6/30/2019 17:30	0	0.15	3,453	0.57	0.09	1	Atlas		518	1
CSO202 Total											283,336	42
CSO203	7/20/2018 19:30	7/20/2018 20:45	75	1	27,667	1.13	0.44	3	Atlas		27,667	1
	7/31/2018 1:45	7/31/2018 2:30	45	2.16	15,168	1.44	0.90	6	Atlas		32,763	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO203	8/15/2018 20:00	8/16/2018 8:45	765	2.68	595	2.52	1.18	24	Cloudburst		1,594	1
	8/20/2018 11:15	8/20/2018 11:30	15	0.51	24,114	3.26	0.40	1	Atlas		12,298	1
	9/8/2018 19:30	9/8/2018 20:00	30	2.47	19,452	2.16	1.22	6	Cloudburst		48,046	1
	9/21/2018 17:30	9/21/2018 17:30	0	0.25	1,384	0.32	0.17	1	Atlas		346	1
	9/24/2018 0:30	9/24/2018 13:30	780	1.3	74	2.91	0.61	6	Atlas		96	1
	9/25/2018 5:45	9/25/2018 5:45	0	0.08	1,875	2.97	0.07	1	Atlas		150	1
	9/25/2018 17:00	9/25/2018 17:30	30	0.76	1,120	3.3	0.33	12	Atlas		851	1
	11/5/2018 23:00	11/5/2018 23:00	0	0.88	131	2.58	0.48	6	Atlas		115	1
	12/31/2018 16:15	12/31/2018 16:15	0	1.24	32	1.59	0.48	24	Atlas		40	1
	3/14/2019 17:30	3/14/2019 17:30	0	0.27	200	1.55	0.20	1	Atlas		54	1
	3/30/2019 17:15	3/30/2019 18:45	90	0.88	45	1.01	0.42	6	Atlas		40	1
	4/14/2019 2:00	4/14/2019 2:00	0	0.72	518	1.26	0.33	6	Atlas		373	1
	4/23/2019 18:00	4/23/2019 18:00	0	0.38	442	2.92	0.33	1	Atlas		168	1
	4/24/2019 20:45	4/24/2019 20:45	0	1.03	302	3.29	0.33	48	Atlas		311	1
	5/3/2019 5:00	5/3/2019 5:00	0	0.79	24,277	0.58	0.43	6	Atlas		19,179	1
	6/5/2019 21:00	6/5/2019 21:00	0	0.89	6,780	0.98	0.66	1	Atlas		6,034	1
	6/9/2019 16:45	6/9/2019 17:00	15	0.52	9,444	2.1	0.27	3	Atlas		4,911	1
	6/16/2019 19:30	6/16/2019 20:45	75	1.62	45,438	1.47	0.75	6	Atlas		73,610	1
	6/23/2019 16:00	6/23/2019 16:15	15	0.38	1,218	3.22	0.30	1	Atlas		463	1
	6/24/2019 13:45	6/24/2019 13:45	0	0.44	2,166	2.07	0.27	3	Atlas		953	1
CSO203 Total											230,062	22
CSO205	7/20/2018 13:45	7/20/2018 21:15	450	0.86	29	1.12	0.37	1	Atlas	Retained by Sneads Branch	25	1
	7/30/2018 23:15	7/31/2018 13:00	825	1.86	27	1.94	0.74	6	Atlas		50	1
	8/16/2018 3:15	8/16/2018 11:00	465	2.69	673	2.69	1.22	24	Cloudburst	Retained by Sneads Branch	1,810	1
	8/19/2018 20:00	8/19/2018 20:45	45	0.27	3,170	3.01	0.18	3	Atlas	Retained by Sneads Branch	856	1
	8/31/2018 17:30	8/31/2018 17:45	15	0.26	300	0.17	0.15	3	Atlas	Retained by Sneads Branch	78	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO205	9/6/2018 11:30	9/6/2018 11:45	15	0.28	571	0.51	0.18	3	Atlas	Retained by Sneads Branch	160	1
	9/8/2018 15:45	9/9/2018 2:00	615	2.32	5,627	2.61	0.97	6	Atlas	Retained by Sneads Branch	13,055	1
	9/22/2018 15:45	9/22/2018 17:15	90	1.28	412	0.64	0.48	24	Atlas	Retained by Sneads Branch	527	1
	9/23/2018 4:15	9/23/2018 8:30	255	1.28	5,031	1.57	0.48	24	Atlas	Retained by Sneads Branch	6,440	1
	9/24/2018 0:45	9/24/2018 17:30	1005	1.38	5,304	2.94	0.62	6	Atlas	Retained by Sneads Branch	7,320	1
	9/25/2018 5:45	9/25/2018 6:00	15	0.07	4,814	2.94	0.06	1	Atlas	Retained by Sneads Branch	337	1
	9/25/2018 16:45	9/26/2018 4:30	705	0.69	6,414	3.61	0.31	12	Atlas	Retained by Sneads Branch	4,426	1
	10/15/2018 9:15	10/15/2018 9:45	30	0.19	2,937	0.66	0.11	1	Atlas		558	1
	10/26/2018 15:00	10/26/2018 15:30	30	0.33	76	0.4	0.13	1	Atlas		25	1
	10/31/2018 15:00	11/1/2018 18:30	1650	1.65	5,205	2	0.59	24	Atlas		8,589	1
	11/5/2018 20:15	11/6/2018 1:15	300	1.04	5,244	2.75	0.56	6	Atlas		5,454	1
	11/14/2018 22:15	11/15/2018 4:15	360	0.41	10,154	0.57	0.19	12	Atlas		4,163	1
	11/26/2018 0:15	11/26/2018 0:15	0	0.08	1,700	0.35	0.05	1	Atlas		136	1
	12/1/2018 3:00	12/1/2018 15:30	750	1.31	3,672	1.4	0.58	12	Atlas		4,810	1
	12/14/2018 14:15	12/15/2018 11:15	1260	1.61	6,496	1.6	0.66	12	Atlas		10,459	1
	12/27/2018 13:45	12/28/2018 10:45	1260	0.42	2,600	0.88	0.27	1	Atlas		1,092	1
	12/31/2018 8:00	12/31/2018 17:30	570	1.16	4,203	1.59	0.45	24	Atlas		4,875	1
	1/4/2019 14:00	1/4/2019 16:45	165	0.65	5,451	1.67	0.30	12	Atlas		3,543	1
	1/18/2019 3:30	1/19/2019 20:15	2445	0.11	21,655	1	0.05	6	Atlas		2,382	1
	1/23/2019 9:45	1/23/2019 17:30	465	0.77	2,782	1.57	0.31	12	Atlas		2,142	1
	2/4/2019 14:15	2/4/2019 14:45	30	0.12	467	0.14	0.06	3	Atlas		56	1
	2/5/2019 23:30	2/6/2019 10:00	630	1.36	1,369	0.58	0.44	48	Atlas		1,862	1
	2/7/2019 5:15	2/7/2019 19:45	870	1.36	695	1.49	0.44	48	Atlas		945	1
	2/11/2019 1:30	2/12/2019 14:00	2190	2.38	7,032	3.86	0.75	48	Atlas		16,736	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO205	2/20/2019 2:45	2/20/2019 17:45	900	1.41	12,652	1.47	0.64	6	Atlas		17,840	1
	2/23/2019 17:00	2/23/2019 23:30	390	0.73	8,189	2.19	0.40	6	Atlas		5,978	1
	3/9/2019 13:30	3/9/2019 19:30	360	0.8	6,830	0.96	0.38	6	Atlas		5,464	1
	3/14/2019 5:45	3/14/2019 8:00	135	0.34	526	1.28	0.19	6	Atlas		179	1
	3/14/2019 17:15	3/14/2019 19:00	105	0.14	2,871	1.4	0.09	3	Atlas		402	1
	3/25/2019 0:30	3/25/2019 5:15	285	0.26	612	0.32	0.14	6	Atlas		159	1
	3/30/2019 15:30	3/30/2019 20:00	270	0.63	5,284	1.02	0.33	6	Atlas		3,329	1
	4/7/2019 6:00	4/7/2019 13:30	450	0.85	2,525	1.02	0.47	3	Atlas	Retained by Sneads Branch	2,146	1
	4/12/2019 6:00	4/12/2019 6:00	0	0.38	811	1.19	0.30	1	Atlas	Retained by Sneads Branch	308	1
	4/14/2019 1:00	4/14/2019 5:30	270	0.86	7,849	2.09	0.40	6	Atlas	Retained by Sneads Branch	6,750	1
	4/22/2019 15:45	4/22/2019 16:00	15	Discharge	0	3.1				Retained by Sneads Branch	182	
	4/23/2019 17:45	4/23/2019 18:30	45	0.24	8,042	3.34	0.21	1	Atlas	Retained by Sneads Branch	1,930	1
	4/24/2019 20:30	4/25/2019 2:00	330	0.91	4,584	3.78	0.30	48	Atlas	Retained by Sneads Branch	4,171	1
	4/25/2019 18:00	4/26/2019 3:30	570	0.91	1,507	4.24	0.30	48	Atlas	Retained by Sneads Branch	1,371	1
	5/3/2019 4:45	5/3/2019 8:30	225	0.9	3,268	1.24	0.49	6	Atlas	Retained by Sneads Branch	2,941	1
	5/4/2019 17:15	5/4/2019 17:30	15	0.22	1,045	1.43	0.13	3	Atlas	Retained by Sneads Branch	230	1
	5/11/2019 20:15	5/11/2019 22:30	135	0.22	700	0.26	0.12	6	Atlas	Retained by Sneads Branch	154	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO205	5/19/2019 13:15	5/19/2019 13:30	15	0.31	787	0.14	0.14	1	Atlas	Retained by Sneads Branch	244	1
	5/19/2019 23:00	5/19/2019 23:30	30	0.31	984	0.32	0.14	1	Atlas	Retained by Sneads Branch	305	1
	5/26/2019 14:00	5/26/2019 15:30	90	0.54	920	0.73	0.32	3	Atlas	Retained by Sneads Branch	497	1
	5/29/2019 9:15	5/29/2019 13:45	270	0.59	2,325	1.22	0.32	6	Atlas	Retained by Sneads Branch	1,372	1
	5/30/2019 11:00	5/30/2019 11:30	30	0.19	2,274	1.37	0.09	1	Atlas	Retained by Sneads Branch	432	1
	6/5/2019 21:00	6/5/2019 21:15	15	1.02	2,673	1.14	0.79	1	Atlas	Retained by Sneads Branch	2,726	1
	6/7/2019 21:00	6/8/2019 2:15	315	0.88	607	1.53	0.29	48	Atlas	Retained by Sneads Branch	534	1
	6/9/2019 0:15	6/9/2019 0:45	30	0.88	318	1.94	0.29	48	Atlas		280	1
	6/9/2019 16:45	6/9/2019 18:30	105	0.61	5,948	2.49	0.31	6	Atlas		3,628	1
	6/16/2019 6:00	6/16/2019 6:45	45	0.16	6,569	0.9	0.11	1	Atlas		1,051	1
	6/16/2019 17:45	6/17/2019 1:15	450	1.27	4,143	1.68	0.60	6	Atlas		5,262	1
	6/18/2019 4:45	6/18/2019 4:45	0	0.33	1,297	1.76	0.13	24	Atlas	Retained by Sneads Branch	428	1
	6/18/2019 17:15	6/18/2019 17:15	0	0.33	1,479	1.89	0.13	24	Atlas	Retained by Sneads Branch	488	1
	6/19/2019 21:00	6/19/2019 21:00	0	0.08	975	1.97	0.05	1	Atlas	Retained by Sneads Branch	78	1
	6/21/2019 19:30	6/21/2019 21:15	105	0.87	2,007	2.4	0.33	24	Atlas	Retained by Sneads Branch	1,746	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO205	6/22/2019 6:45	6/22/2019 9:30	165	0.87	3,786	2.72	0.33	24	Atlas	Retained by Sneads Branch	3,294	1
	6/23/2019 16:00	6/23/2019 16:30	30	0.42	1,614	2.91	0.32	1	Atlas		678	1
	6/24/2019 13:00	6/24/2019 15:30	150	0.44	13,875	2.14	0.28	3	Atlas		6,105	1
	6/30/2019 17:45	6/30/2019 17:45	0	0.11	1,827	0.55	0.06	6	Atlas	Retained by Sneads Branch	201	1
CSO205 Total											185,794	64
CSO208	6/5/2019 20:45	6/5/2019 20:45	0	0.78	3,359	0.89	0.57	1	Atlas		2,620	1
	6/16/2019 19:30	6/16/2019 20:30	60	2.14	13,566	1.99	0.98	12	Atlas		29,031	1
CSO208 Total											31,651	2
CSO210	7/3/2018 15:45	7/3/2018 19:15	210	0.11	20,676,182	0.58	0.06	6	Atlas		2,274,380	1
	7/16/2018 10:45	7/16/2018 12:15	90	0.36	3,816,183	0.46	0.24	1	Atlas		1,373,826	1
	7/20/2018 19:15	7/21/2018 1:30	375	0.71	8,279,586	1.18	0.27	24	Atlas		5,878,506	1
	7/31/2018 1:15	7/31/2018 17:15	960	2.18	10,734,217	2.43	1.28	6	Cloudburst		23,400,592	1
	8/8/2018 0:30	8/8/2018 0:45	15	0.3	565,217	0.21	0.17	1	Atlas		169,565	1
	8/15/2018 19:30	8/16/2018 14:45	1155	3.98	7,288,727	3.98	6.05	24	Cloudburst		29,009,134	1
	8/20/2018 11:00	8/20/2018 14:00	180	0.69	5,291,958	4.47	0.34	1	Atlas		3,651,451	1
	8/31/2018 17:00	9/1/2018 16:45	1425	1.18	296,143,281	1.25	0.88	1	Atlas		349,449,072	1
	9/8/2018 16:45	9/9/2018 2:00	555	3.53	5,955,226	3.86	10.51	6	Cloudburst		21,021,947	1
	9/22/2018 16:45	9/22/2018 19:15	150	1.85	1,896,978	0.85	0.68	24	Atlas		3,509,410	1
	9/23/2018 5:00	9/23/2018 9:15	255	1.85	3,293,998	2.05	0.68	24	Atlas		6,093,896	1
	9/24/2018 7:00	9/24/2018 17:15	615	2.72	8,992,598	4.77	2.69	6	Cloudburst		24,459,867	1
	9/25/2018 16:15	9/26/2018 5:00	765	1.08	14,361,259	5.87	0.50	1	Atlas		15,510,160	1
	10/10/2018 16:00	10/10/2018 18:45	165	0.45	8,514,122	0.58	0.38	1	Atlas		3,831,355	1
	10/31/2018 17:00	11/1/2018 4:30	690	2.58	6,525,955	2.37	0.90	24	Atlas		16,836,964	1
	11/1/2018 16:00	11/1/2018 18:45	165	2.58	1,363,801	3.08	0.90	24	Atlas		3,518,607	1
	11/5/2018 21:00	11/6/2018 3:00	360	1.44	8,346,234	4.11	0.78	6	Atlas		12,018,577	1
	1/11/2019 9:45	1/11/2019 10:00	15	Discharge	0	0.6					2,451	
	1/19/2019 7:15	1/19/2019 22:30	915	1.06	244,919	1.31	0.41	24	Atlas		259,614	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO210	1/23/2019 9:30	1/23/2019 20:15	645	1.07	375,854	2.25	0.44	12	Atlas		402,164	1
	2/6/2019 6:30	2/6/2019 12:30	360	1.82	75,443	0.94	0.58	48	Atlas		137,307	1
	2/7/2019 9:45	2/8/2019 1:15	930	1.82	142,820	1.98	0.58	48	Atlas		259,933	1
	2/11/2019 2:15	2/12/2019 18:15	2400	3.15	549,230	5.09	0.99	48	Atlas		1,730,076	1
	2/20/2019 3:00	2/20/2019 20:15	1035	2.26	537,581	2.32	1.08	6	Cloudburst		1,214,933	1
	2/23/2019 17:30	2/24/2019 4:15	645	1.24	528,879	3.56	0.67	6	Atlas		655,810	1
	3/3/2019 16:00	3/3/2019 16:15	15	0.03	6,433	0.11	0.02	1	Atlas		193	1
	3/9/2019 13:15	3/9/2019 23:45	630	1.29	293,543	1.47	0.59	12	Atlas		378,670	1
	3/14/2019 7:15	3/14/2019 21:45	870	0.38	609,850	2.37	0.21	6	Atlas		231,743	1
	3/30/2019 15:45	3/31/2019 0:00	495	1.07	272,500	1.44	0.49	6	Atlas		291,575	1
	4/7/2019 11:30	4/7/2019 17:00	330	0.75	229,869	0.96	0.35	1	Atlas		172,402	1
	4/14/2019 1:30	4/14/2019 8:30	420	1.1	222,978	2.02	0.51	6	Atlas		245,276	1
	4/18/2019 21:30	4/19/2019 6:00	510	0.68	348,616	2.17	0.31	12	Atlas		237,059	1
	4/19/2019 18:45	4/20/2019 19:15	1470	2.53	421,581	4.54	0.96	24	Atlas		1,066,601	1
	4/24/2019 20:15	4/25/2019 1:15	300	1.05	94,306	3.87	0.34	48	Atlas		99,021	1
	4/25/2019 17:45	4/26/2019 4:45	660	1.05	147,008	4.43	0.34	48	Atlas		154,358	1
	5/3/2019 5:15	5/3/2019 12:15	420	1.19	146,178	1.41	0.64	6	Atlas		173,952	1
	5/26/2019 13:30	5/26/2019 21:00	450	0.45	449,227	0.77	0.27	3	Atlas		202,152	1
	5/29/2019 8:45	5/29/2019 17:30	525	0.72	338,221	1.23	0.39	6	Atlas		243,519	1
	6/5/2019 20:30	6/6/2019 1:15	285	0.99	1,274,298	1.3	0.70	1	Atlas		1,261,555	1
	6/7/2019 22:15	6/8/2019 5:15	420	0.52	3,114,548	1.55	0.22	6	Atlas		1,619,565	1
	6/9/2019 1:00	6/9/2019 4:15	195	0.77	1,078,457	1.91	0.25	48	Atlas		830,412	1
	6/9/2019 15:15	6/9/2019 23:45	510	0.77	6,769,082	2.35	0.25	48	Atlas		5,212,193	1
CSO210 Total											539,089,843	41
CSO211	7/2/2018 18:30	7/2/2018 20:00	90	0.1	23,141,280	0.88	0.09	1	Atlas		2,314,128	1
	7/3/2018 17:00	7/3/2018 17:45	45	0.11	1,263,891	0.58	0.06	6	Atlas		139,028	1
	7/20/2018 20:30	7/20/2018 23:30	180	0.71	17,264,525	1.18	0.27	24	Atlas		12,257,813	1
	7/31/2018 1:30	7/31/2018 9:45	495	2.18	30,557,505	2.39	1.28	6	Cloudburst		66,615,361	1
	8/15/2018 20:30	8/16/2018 12:45	975	3.98	19,333,503	3.98	6.05	24	Cloudburst		76,947,341	1
	8/20/2018 11:15	8/20/2018 13:15	120	0.69	18,997,959	4.47	0.34	1	Atlas		13,108,592	1
	9/8/2018 17:15	9/9/2018 1:00	465	3.53	14,089,991	3.86	10.51	6	Cloudburst		49,737,667	1
	9/22/2018 17:00	9/22/2018 18:15	75	1.85	404,038	0.83	0.68	24	Atlas		747,470	1
	9/23/2018 5:00	9/23/2018 9:15	255	1.85	9,495,957	2.05	0.68	24	Atlas		17,567,521	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO211	9/24/2018 7:15	9/24/2018 16:00	525	2.72	23,103,802	4.76	2.69	6	Cloudburst		62,842,341	1
	9/25/2018 17:00	9/26/2018 5:30	750	1.08	10,250,676	5.87	0.50	1	Atlas		11,070,730	1
	10/31/2018 17:45	11/1/2018 4:00	615	2.58	4,803,458	2.34	0.90	24	Atlas	Retained by Sneads Branch	12,392,922	1
	11/5/2018 21:45	11/6/2018 2:15	270	1.44	18,389,374	4.11	0.78	6	Atlas	Retained by Sneads Branch	26,480,699	1
	11/14/2018 23:30	11/15/2018 3:45	255	0.46	14,448,452	0.65	0.21	12	Atlas	Retained by Sneads Branch	6,646,288	1
	12/1/2018 5:45	12/1/2018 16:45	660	1.69	16,679,850	1.89	0.75	12	Atlas	Retained by Sneads Branch	28,188,946	1
	12/15/2018 3:15	12/15/2018 11:45	510	1.61	9,698,121	1.61	0.64	12	Atlas	Retained by Sneads Branch	15,613,975	1
	12/27/2018 18:45	12/27/2018 18:45	0	0.4	5,145	0.71	0.23	1	Atlas	Retained by Sneads Branch	2,058	1
	12/31/2018 7:45	12/31/2018 21:30	825	1.58	10,040,180	2	0.61	24	Atlas	Retained by Sneads Branch	15,863,485	1
	1/4/2019 15:30	1/4/2019 17:45	135	0.59	2,339,622	2.07	0.28	3	Atlas		1,380,377	1
	1/23/2019 10:30	1/23/2019 16:15	345	1.07	2,236,009	2.21	0.44	12	Atlas		2,392,530	1
	2/7/2019 17:30	2/7/2019 21:45	255	1.82	569,810	1.98	0.58	48	Atlas		1,037,054	1
	2/11/2019 13:00	2/12/2019 14:30	1530	3.15	10,725,972	5.05	0.99	48	Atlas		33,786,811	1
	2/20/2019 3:30	2/20/2019 9:45	375	2.26	31,644,955	2.1	1.08	6	Cloudburst		71,517,598	1
	2/23/2019 17:45	2/24/2019 0:45	420	1.24	9,310,023	3.56	0.67	6	Atlas		11,544,429	1
	3/9/2019 14:15	3/9/2019 22:45	510	1.29	18,545,696	1.47	0.59	12	Atlas		23,923,948	1
	3/14/2019 7:45	3/14/2019 7:45	0	0.38	629	1.82	0.21	6	Atlas		239	1
	3/14/2019 17:00	3/14/2019 20:00	180	0.54	22,628,578	2.35	0.46	1	Atlas		12,219,432	1
	3/30/2019 16:45	3/30/2019 21:30	285	1.07	18,513,207	1.44	0.49	6	Atlas		19,809,131	1
	4/7/2019 12:15	4/7/2019 15:00	165	0.75	6,066,219	0.96	0.35	1	Atlas		4,549,664	1
	4/14/2019 2:00	4/14/2019 6:30	270	1.1	19,677,917	2.02	0.51	6	Atlas		21,645,709	1
	4/19/2019 19:15	4/20/2019 10:00	885	2.53	16,802,314	4.34	0.96	24	Atlas		42,509,854	1

CSO	Start Date	End Date	Duration (Min)	Rain Total (Inch)	Discharge per Rain	Antecedent Rain	Frequency (yr)	Period (hr)	Standard	Comment	Values	
											Discharge Volume (Gal)	Count
CSO211	4/23/2019 18:30	4/23/2019 19:15	45	0.17	703,741	3.39	0.15	1	Atlas		119,636	1
	4/24/2019 20:45	4/24/2019 23:00	135	1.05	648,547	3.82	0.34	48	Atlas		680,974	1
	5/3/2019 5:30	5/3/2019 9:30	240	1.19	20,479,465	1.41	0.64	6	Atlas		24,370,563	1
	5/29/2019 14:15	5/29/2019 15:15	60	0.72	440,263	1.23	0.39	6	Atlas		316,989	1
	6/5/2019 21:45	6/5/2019 23:00	75	0.99	1,281,938	1.26	0.70	1	Atlas		1,269,119	1
	6/8/2019 0:45	6/8/2019 1:00	15	0.52	219,212	1.36	0.22	6	Atlas		113,990	1
	6/9/2019 17:00	6/9/2019 19:00	120	0.77	17,907,799	2.22	0.25	48	Atlas		13,789,005	1
	6/16/2019 19:30	6/17/2019 3:45	495	2.09	22,785,615	2.53	0.96	6	Atlas		47,621,936	1
	6/23/2019 16:30	6/23/2019 18:15	105	0.61	12,996,036	3.96	0.48	1	Atlas		7,927,582	1
	6/24/2019 14:00	6/24/2019 16:00	120	0.65	11,873,074	2.67	0.38	3	Atlas		7,717,498	1
CSO211 Total											768,780,433	41
Grand Total											5,140,123,063	2847

Appendix D-1 Discharge Work Orders – Waters of the United States

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Appendix D-1 Discharge Work Orders – Waters of the United States

ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	7/2/2018 19:24	7/2/2018 20:00	285355	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2943178	NO CLEANUP REQUIRED. DISCHARGE WENT DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	7/3/2018 16:36	7/3/2018 16:45	495	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY-HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2944526	NO CLEAN UP – PIPE DISCHARGING UNDERWATER, DIRECTLY INTO STREAM.	LOCATION INCLUDED IN IOAP.
FLOYDS FORK	KY0102784	14307 WAKEFIELD PL	7/6/2018 11:00	7/6/2018 12:47	1875	Sewer Main	80351C-AG	CATCH BASIN	CHENOWETH RUN	BROKEN FORCE MAIN.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2945134	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	HAULED STATION UNTIL CONTRACTOR COMPLETED REPAIRS ON FORCE MAIN.
DEREK R. GUTHRIE	KY0078956	4324 HICKORY TRACE DR	7/6/2018 11:15	7/6/2018 12:00	50	Sewer Manhole	95160	DITCH	FISHPOOL CREEK	OBSTRUCTION IN MAIN SEWER.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2945123	MSD PERSONNEL CLEANED AND SANITIZED IMPACTED AREA.	FLUSHED MAIN SEWER TO RESTORE FLOW.
MORRIS FORMAN	KY0022411	1505 SYLVAN CT	7/10/2018 15:50	7/11/2018 14:10	98250	Sewer Main	51601-T	STREAM	SOUTH FORK BEARGRASS CREEK	STRUCTURAL FAILURE OF ABANDONED 8" MAIN TEEING INTO 42" CONCRETE SEWER.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2946053	NO CLEANUP POSSIBLE. DISCHARGING DIRECTLY TO CREEK.	CONTRACTOR CREWS PLACED COFFERDAM AND PUMPS. REPAIR IN PROGRESS.
MORRIS FORMAN	KY0022411	1505 SYLVAN CT	7/17/2018 13:30	7/17/2018 16:45	975	Sewer Main	51601-T	STREAM	SOUTH FORK BEARGRASS CREEK	LONGITUDINAL CRACK IN INVERT OF 42" BEARGRASS INTERCEPTOR.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2947714	NO CLEANUP POSSIBLE - DISCHARGING DIRECTLY TO CREEK.	CONTRACTOR TO REPAIR MAIN.
MORRIS FORMAN	KY0022411	3317 BROWNSBORO RD	7/20/2018 21:48	7/20/2018 22:15	750	Sewer Manhole	26752	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2950899	NO CLEANUP REQUIRED. DISCHARGE WENT DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	7/20/2018 22:45	7/21/2018 8:55	45000	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY-HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2950893	WO#2950935	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	7/20/2018 23:15	7/21/2018 6:45	4326000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2950900	NO CLEANUP REQUIRED. DISCHARGE WENT DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	7/20/2018 23:16	7/20/2018 23:50	275113	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2950890	NO CLEANUP REQUIRED. DISCHARGE WENT DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	7/20/2018 23:29	7/21/2018 7:10	11525	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY-HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2950892	WO#2950934	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	7/21/2018 0:03	7/21/2018 10:15	300000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2950897	WO#2950941	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	7/21/2018 0:03	7/21/2018 10:15	185400	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2950895	WO#2950938	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	7/31/2018 9:30	7/31/2018 13:30	37740	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2957616	NO CLEANUP REQUIRED. DISCHARGE WENT DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	8/1/2018 18:15	8/1/2018 19:15	13584	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2958042	NO CLEAN UP REQUIRED.MH DISCHARGED DIRECTLY INTO THE CREEK	LOCATION INCLUDED IN IOAP.
DEREK R. GUTHRIE	KY0078956	6415 RIVERDALE RD	8/3/2018 11:10	8/3/2018 12:00	100	Sewer Manhole	61775	DITCH	MILL CREEK	A SECTION OF MAIN SEWER WAS BROKE.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2958552	MSD CREW WILL CLEAN IMPACTED AREA.	FLUSHED AND MADE REPAIRS TO MAIN SEWER.
MORRIS FORMAN	KY0022411	147 BUCHANAN ST	8/10/2018 4:22	8/10/2018 8:06	883123	Sewer Manhole	CSO020	STREAM	OHIO RIVER	PLANNED OUTAGE TO INSTALL TEMPORARY BULKHEAD IN ORI FOR REPAIRS.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2962582	DISCHARGE UNDERWATER, NO CLEANUP POSSIBLE.	PLANNED OUTAGE TO TERMINATE AT 0800.
MORRIS FORMAN	KY0022411	342 W MAIN ST	8/10/2018 9:30	8/10/2018 15:15	21994374	Sewer Manhole	CSO022	STREAM	OHIO RIVER	DISCHARGING AT CSO022 DURING RECOVERY FROM OVERNIGHT SHUTDOWN RELATED TO ORI EMERGENCY REPAIR. DISCHARGE UP TO 1 FT OVER WEIR. EST 2-4 MG.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2962766	NONE. DISCHARGE SUBMERGED.	CSO DISCHARGE WILL STOP WHEN STARKEY RETURNS TO NORMAL OPERATING CONDITIONS.
MORRIS FORMAN	KY0022411	342 W MAIN ST	8/14/2018 9:02	8/14/2018 9:22	5700	Sewer Manhole	CSO022	STREAM	OHIO RIVER	TEMPORARY PUMP STATION AT 4TH AND RIVER ROAD. FLOW OVERTOPPED DIVERSION STRUCTURE.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2963488	NONE. DISCHARGE SUBMERGED.	ADDING HEIGHT TO DIVESRION STRUCTURE TO INCREASE OPERATIONAL FLEXIBILITY.
MORRIS FORMAN	KY0022411	342 W MAIN ST	8/15/2018 8:36	8/15/2018 13:14	782000	Sewer Manhole	CSO022	STREAM	OHIO RIVER	TEMPORARY PUMP STATION RELATED TO ORI REPAIR. LOST A VFD.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2963807	NONE POSSIBLE. DISCHARGE SUBMERGED.	VFD CURRENTLY BEING REPLACED BY CONTRACTOR.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	8/16/2018 7:00	8/16/2018 14:15	4350	Sewer Manhole	25484	STREAM	PENNSYLVANIA RUN	HEAVY RAIN/LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964818	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	8/16/2018 7:45	8/16/2018 18:45	792000	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964985	NO CLEAN UP NEEDED. PIPE IS SUMERGED. AND DISCHARGES DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	8800 ADMIRAL DR	8/16/2018 7:50	8/17/2018 0:15	146000	Sewer Manhole	93703	GROUND	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964804	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	A SOLUTION FOR THIS LOCATION CAN BE LOCATED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9114 CINDERELLA LN	8/16/2018 8:00	8/16/2018 22:10	111000	Sewer Manhole	60679	DITCH	FISHPOOL CREEK	HEAVY RAIN/LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964831	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	A SOLUTION FOR THIS LOCATION IS LOCATED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	8/16/2018 8:15	8/16/2018 15:15	6493073	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964852	NO CLEANUP REQUIRED. DISCHARGE WENT DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3317 BROWNSBORO RD	8/16/2018 9:15	8/16/2018 10:30	2850	Sewer Manhole	26752	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964926	NO CLEANUP REQUIRED. MANHOLE DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	8/16/2018 9:30	8/17/2018 8:55	211500	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY-HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964863	DISCLN WO#2965450	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1418 TREVILIAN WAY	8/16/2018 9:30	8/16/2018 15:12	8550	Sewer Manhole	51594	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964947	DISCLN WO#2965488	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 DELL RD	8/16/2018 9:45	8/16/2018 14:19	13700	Sewer Manhole	28415	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964991	DISCLN WO#2965857	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 CHARLANE PKY	8/16/2018 9:48	8/16/2018 14:25	6925	Sewer Manhole	28451	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965001	CLEAN UP NOT NEEDED. NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	8/16/2018 9:55	8/16/2018 21:27	16500	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964995	CLEAN UP NOT NEEDED. NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	9707 WILLOWWOOD WAY	8/16/2018 10:05	8/16/2018 21:30	51150	Sewer Manhole	28336	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965013	CLEAN UP NOT NEEDED NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3501 MARLIN DR	8/16/2018 10:08	8/16/2018 14:15	1225	Sewer Manhole	28416	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965056	DISCLN WO#2969482	LOCATION INCLUDED IN THE IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	3620 CHARLANE PKY	8/16/2018 10:08	8/16/2018 21:35	51150	Sewer Manhole	28340	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965019	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	6600 SEMINARY WOODS PL	8/16/2018 10:15	8/16/2018 15:11	2500	Sewer Lift Station	MSD0123-PS	DITCH	GOOSE CREEK	ELECTRICAL PROBLEM WITH MSD EQUIPMENT/ASSET, 2 TIMERS WERE NON FUNCTIONAL.	MECHANICAL FAILURE	RAIN EVENT DISCHARGE	2965130	AREA DISINFECTED WITH LIME.	REPLACED 2 BAD TIMERS FOR THE 1ST & 2ND LAG PUMP CONTROLLER.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	8/16/2018 10:20	8/16/2018 14:05	54000	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964910	DISCLN WO#2965212	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1122 ROSTREVOR CIR	8/16/2018 10:50	8/16/2018 15:30	6800	Sewer Manhole	45900	DITCH	HAWKINS RILL	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964986	DISCLN WO#2965865	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	8/16/2018 11:14	8/16/2018 18:55	31500	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965171	DISCLN WO#2966552	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	8/16/2018 11:14	8/16/2018 12:46	20000	Sewer Manhole	47593	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965192	NO CLEANUP REQUIRED, MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	8/16/2018 11:15	8/16/2018 18:55	315000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965179	DISCLN WO#2966552	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	8/16/2018 11:30	8/17/2018 10:00	150	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965071	NO CLEANUP REQUIRED, MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3302 TROUT CREEK DR	8/16/2018 11:30	8/16/2018 16:27	22500	Sewer Manhole	23211	STREAM	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965086	DISCLN WO#2965485	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	8/16/2018 11:30	8/16/2018 18:45	10500	Sewer Manhole	2935	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965181	NO CLEANING NEEDED MANHOLE DISCHARGING DIRECTLY INTO THE CREEK	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	8/16/2018 11:30	8/16/2018 18:47	63000	Sewer Manhole	2933	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965184	DISCLN WO #2966553	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3305 INDIAN CREEK CT	8/16/2018 11:45	8/16/2018 16:30	7050	Sewer Manhole	51160	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965099	DSCLN WO#2966539	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3506 CHARLANE PKY	8/16/2018 11:45	8/16/2018 21:50	15125	Sewer Manhole	28250	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965077	NONE CLEAN UP NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	8/16/2018 11:45	8/16/2018 18:50	21000	Sewer Manhole	90700	CATCH BASIN	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965185	DISCLN WO#2965216	LOCATION INCLUDED IN THE IOAP.
FLOYDS FORK	KY0102784	12400 BRIERLY HILL PL	8/16/2018 11:50	8/16/2018 14:20	4750	Sewer Manhole	65516	GROUND	POPE LICK	RAIN EVENT / HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964977	REFER TO MAINTENANCE FOR CLEANING.	SITE FOUND DURING RECON, WILL BE MONITORED AND EVALUATED.
FLOYDS FORK	KY0102784	815 TUCKER STATION RD	8/16/2018 11:50	8/16/2018 14:20	4750	Sewer Manhole	33003	STREAM	POPE LICK	RAIN EVENT / HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965175	REFER TO MAINTENANCE FOR CLEANING.	SITE FOUND DURING RECON, WILL BE MONITORED AND EVALUATED.
MORRIS FORMAN	KY0022411	4313 PRUITT CT	8/16/2018 12:10	8/16/2018 16:05	6000	Sewer Manhole	8427	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965196	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4315 PRUITT CT	8/16/2018 12:10	8/16/2018 16:10	6000	Sewer Manhole	8426	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965195	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4332 PRUITT CT	8/16/2018 12:17	8/16/2018 16:09	5800	Sewer Service Line	085100290046 A	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965201	WO#2965213	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4341 PRUITT CT	8/16/2018 12:17	8/16/2018 16:09	6000	Sewer Manhole	8430	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965197	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7913 SHELBYVILLE RD	8/16/2018 12:55	8/16/2018 18:55	54000	Sewer Manhole	84155	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965200	DISCLN WO#2965214	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	5205 RONWOOD DR	8/16/2018 13:14	8/16/2018 14:01	100	Sewer Manhole	19360	GROUND	NORTHERN DITCH	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965064	MSD CREW WILL CLEAN IMPACTED AREA.	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT NEEDED BY MSD.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	8/16/2018 19:55	8/17/2018 9:10	19500	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965214	NO CLEAN UP REQUIRED , DISCHARGED DIRECTLY INTO THE CREEK	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	8/19/2018 22:15	8/20/2018 15:00	52481	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2967055	NO CLEAN UP NEEDED, PIPE IS SUMERGED, AND DISCHARGES DIRECTLY INTO THE CREEK	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4640 BARBOUR LN	8/24/2018 13:55	8/24/2018 15:51	4800	Sewer Manhole	65633	STREAM	LITTLE GOOSE CREEK	GATE VALVE FAILURE ON ORFM.	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	2971178	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	REPAIRS TO VALVE UNDERWAY.
MORRIS FORMAN	KY0022411	1397 S 3RD ST	8/30/2018 13:15	8/30/2018 13:16	366	Sewer Manhole	CSO200	STREAM	OHIO RIVER	CSO CREWS COMPLETING WEEKLY NMC MAINTENANCE.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2975778	NO CLEANUP REQUIRED, NO SOLIDS OR DEBRIS OBSERVED.	NO REPAIR/REMEDIAL ACTION REQUIRED.
FLOYDS FORK	KY0102784	609 WOODLAKE DR	9/4/2018 19:49	9/4/2018 19:49	130	Sewer Lift Station	MSD1171-PS	GROUND	FLOYDS FORK	FORCE MAIN BREAK.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2976291	PIPE DISCHARGE SUBMERGED.	PUMPS SHUT OFF, STATION HAULDED.
MORRIS FORMAN	KY0022411	1218 S 3RD ST	9/5/2018 7:30	9/5/2018 10:30	15603	Sewer Manhole	CSO197	STREAM	OHIO RIVER	LINE OBSTRUCTED WITH DEBRIS & SEDIMENT.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2976461	NOT REQUIRED, PIPE IS DISCHARGING TO CENTRAL RELIEF DRAIN.	FLUSHED SEWER LINE TO REMOVE DEBRIS & SEDIMENT. WO#2976472
MORRIS FORMAN	KY0022411	9818 BLUEGRASS PKY	9/5/2018 12:19	9/5/2018 13:48	25	Sewer Service Line	JT13501319	CATCH BASIN		RAGS, WIPES, DIAPERS AND SOME ROOTS IN THE MAIN SEWER.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2976522	NO SOLIDS TO CLEAN DISCHARGE WAS ONLY WATER.	ROOT CUT MAIN SEWER WORK ORDER#2976512
MORRIS FORMAN	KY0022411	3317 BROWNSBORO RD	9/8/2018 20:00	9/8/2018 23:00	60000	Sewer Manhole	26752	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977417	NO CLEANUP REQUIRED, MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	147 BUCHANAN ST	9/8/2018 20:19	9/16/2018 9:26	434055235	Sewer Manhole	CSO020	STREAM	OHIO RIVER	FLASH FLOODING FROM TROPICAL STORM OVERWHELMED CSO'S REQUIRING PUMPED OVERFLOW.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	2977372	NO CLEAN UP PERFORMED – PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.	NO CONTROL ZONE SET UP – PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.
MORRIS FORMAN	KY0022411	1726 FRASER DR	9/8/2018 21:00	9/10/2018 10:45	127731	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977385	NO CLEAN UP NEEDED, PIPE IS SUMERGED, AND DISCHARGES DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1122 ROSTREVOR CIR	9/8/2018 21:15	9/9/2018 9:54	18750	Sewer Manhole	45900	DITCH	HAWKINS RILL	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977404	WOR#2977574	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 DELL RD	9/8/2018 21:15	9/9/2018 9:45	37500	Sewer Manhole	28415	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977387	WO#2977569	LOCATION INCLUDED IN THE IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	9/8/2018 21:25	9/9/2018 19:05	95625	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977398	WO#2977593	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	9/8/2018 21:30	9/9/2018 9:55	11175	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977390	WO#2977569	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	9/8/2018 21:45	9/9/2018 9:54	112500	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977401	WO#2977573	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	9707 WILLOWWOOD WAY	9/8/2018 21:50	9/9/2018 10:10	92500	Sewer Manhole	28336	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977392	WO#2977571	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2120 INDIAN HILLS TRL	9/8/2018 22:00	9/9/2018 2:42	2820	Sewer Lift Station	MSD0186-PS	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977370	NONE POSSIBLE DUE TO MAGNITUDE OF STORM.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	9/8/2018 22:30	9/9/2018 19:30	132000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977409	WO#2977594	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	9/8/2018 22:30	9/9/2018 19:30	396000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977407	WO#2977595	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	9/8/2018 22:40	9/9/2018 11:20	150000	Sewer Manhole	2933	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977411	WO#2977576	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1418 TREVILIAN WAY	9/8/2018 22:47	9/9/2018 8:47	59600	Sewer Manhole	51594	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977381	WO#2977537	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7913 SHELBYVILLE RD	9/8/2018 23:00	9/9/2018 11:50	117000	Sewer Manhole	84155	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977414	WO#2977578	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3302 TROUT CREEK DR	9/8/2018 23:09	9/9/2018 9:05	69800	Sewer Manhole	23211	STREAM	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977382	WO#2977562	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3305 INDIAN CREEK CT	9/8/2018 23:35	9/9/2018 9:10	14375	Sewer Manhole	51160	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977396	WO#2977572	LOCATION INCLUDED IN THE IOAP.
FLOYDS FORK	KY0102784	12400 BRIERLY HILL PL	9/8/2018 23:40	9/9/2018 2:30	18000	Sewer Manhole	65516	GROUND	POPE LICK	LACK OF CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977405	DISCLN WORK ORDER #2977690 HAS BEEN CREATED.	THIS IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7713 WESTPORT RD	9/8/2018 23:45	9/9/2018 12:23	75000	Sewer Manhole	105936	GROUND	GOOSE CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977419	WO#2977582	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	9/9/2018 0:00	9/9/2018 11:25	101250	Sewer Manhole	47593	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977425	WO#2977580	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4313 PRUITT CT	9/9/2018 0:24	9/9/2018 9:23	13500	Sewer Manhole	8427	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977430	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4315 PRUITT CT	9/9/2018 0:24	9/9/2018 9:23	13500	Sewer Manhole	49647	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977431	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	9/9/2018 0:30	9/9/2018 11:22	33000	Sewer Manhole	90700	CATCH BASIN	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977422	WO#2977579	LOCATION INCLUDED IN THE IOAP.
FLOYDS FORK	KY0102784	815 TUCKER STATION RD	9/9/2018 0:42	9/9/2018 2:45	18000	Sewer Manhole	33003	STREAM	POPE LICK	LACK OF CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977412	DISCLEAN WORK ORDER #2977686 HAS BEEN CREATED.	THIS IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4339 PRUITT CT	9/9/2018 0:54	9/9/2018 9:30	38700	Sewer Manhole	8431	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977432	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	420 ECHAPPE LN	9/9/2018 1:30	9/9/2018 2:45	1500	Sewer Manhole	81443	DITCH	BEE LICK CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977438	MAGNITUDE OF STORM RESULTED IN NO DEBRIS REMAINING.	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	9/9/2018 6:30	9/10/2018 11:00	35208	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977488	NO CLEANUP REQUIRED DISCHARGE, PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	9/9/2018 10:00	9/9/2018 19:15	16200	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977493	WO#2988599	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	9/9/2018 11:30	9/10/2018 9:45	1300000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977527	NO CLEANUP REQUIRED DISCHARGE, PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1804 ROUND RIDGE RD	9/9/2018 13:17	9/9/2018 20:00	18750	Sewer Manhole	65623	STREAM	MUDDY FORK BEARGRASS CREEK	HEAVY RAIN LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977534	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4801 CASSIA CT	9/9/2018 13:17	9/9/2018 20:00	9375	Sewer Manhole	46623	STREAM	MUDDY FORK BEARGRASS CREEK	HEAVY RAIN LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977535	WO#2977597	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	974 BRECKENRIDGE LN	9/9/2018 14:17	9/9/2018 20:15	12016	Sewer Manhole	74520	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977554	WO#2977600	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4506 DEEPWOOD DR	9/18/2018 11:15	9/18/2018 13:40	300	Sewer Manhole	30082	GROUND	GOOSE CREEK	OBSTRUCTION IN THE LINE.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2983151	MSD WILL CLEAN AREA.	FLUSH AND ROOT CUT LINE.
MORRIS FORMAN	KY0022411	1218 S 3RD ST	9/19/2018 7:00	9/19/2018 12:15	225967	Sewer Manhole	CSO197	STREAM	OHIO RIVER	OBSTRUCTION.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2983430	NOT REQUIRED, UNDER GROUND PIPE IS DISCHARGING TO CENTRAL RELIEF DRAIN (CRD).	WO#2983609
FLOYDS FORK	KY0102784	1005 CLASSIC WAY	9/23/2018 0:05	9/23/2018 0:20	375	Sewer Manhole	110021	CATCH BASIN	LONG RUN	ELECTRICAL PROBLEM WITH MSD EQUIPMENT/MSD1103-PS, FLOAT SWITCHES STUCK IN F.O.G. LAYER, WENT INTO HWW WITH NO PUMPS RUNNING AND NO ALARM.	MECHANICAL FAILURE	RAIN EVENT DISCHARGE	2984534	AREA DISINFECTED WITH LIME.	REPAIRED THE PUMP STATION BY BREAKING UP F.O.G. LAYER TO ALLOW FLOAT SWITCHES TO FUNCTION WO # 2984535.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	9/23/2018 6:39	9/23/2018 7:03	800	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984599	CLEAN UP NOT REQUIRED, PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	9/23/2018 7:15	9/26/2018 23:00	566467	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984653	NO CLEANUP REQUIRED, MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	9/23/2018 7:30	9/23/2018 13:18	5880	Sewer Lift Station	MSD0101-PS	DITCH	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984572	AREA DISINFECTED WITH LIME.	SITE FOUND DURING RAIN EVENT RECON - WILL BE MONITORED AND EVALUATED FOR REPAIR.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	9/23/2018 9:00	9/27/2018 11:15	213822917	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984662	NO CLEANUP REQUIRED, MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	3506 CHARLANE PKY	9/23/2018 11:30	9/25/2018 6:40	64750	Sewer Manhole	28250	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984657	WO#2986277	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 CHARLANE PKY	9/23/2018 11:40	9/26/2018 12:50	109750	Sewer Manhole	28451	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984655	WO#2986272	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	9/23/2018 12:00	9/26/2018 17:40	116500	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984656	WO#2986273	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	9707 WILLOWWOOD WAY	9/23/2018 12:00	9/26/2018 17:30	116250	Sewer Manhole	28336	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984658	WO#2986274	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 DELL RD	9/23/2018 12:10	9/24/2018 21:45	14250	Sewer Manhole	28415	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984654	CLEAN UP NOT REQUIRED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4313 PRUITT CT	9/23/2018 12:55	9/25/2018 10:11	67900	Sewer Manhole	8427	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984650	CLEAN UP NOT REQUIRED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4339 PRUITT CT	9/23/2018 13:00	9/25/2018 10:39	68475	Sewer Manhole	8431	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984652	CLEAN UP NOT REQUIRED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	9/23/2018 14:15	9/23/2018 17:40	10500	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984660	WO#2986250	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	9/23/2018 14:45	9/23/2018 16:30	13125	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984659	WO#2986255	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3317 BROWNSBORO RD	9/24/2018 8:30	9/26/2018 17:50	68500	Sewer Manhole	26752	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985154	NO CLEANUP REQUIRED, MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	9/24/2018 9:05	9/24/2018 21:31	18400	Sewer Manhole	25484	STREAM	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984772	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	SOLUTION LOCATED IN THE IOAP.
MORRIS FORMAN	KY0022411	3620 CHARLANE PKY	9/24/2018 9:15	9/25/2018 6:40	14125	Sewer Manhole	28340	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2986278	CLEAN UP NOT REQUIRED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2011 TERRIL LN	9/24/2018 9:35	9/26/2018 9:20	143250	Sewer Manhole	51180	GROUND	BROOKLAWN TRIBUTARY	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985115	WO#2986269	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3501 MARLIN DR	9/24/2018 9:50	9/25/2018 6:25	62500	Sewer Manhole	28416	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2986279	CLEAN UP NOT REQUIRED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	9/24/2018 9:54	9/27/2018 10:35	864000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985133	WO#2986257	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	9/24/2018 10:16	9/26/2018 6:10	387000	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985134	WO#2986259	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	9/24/2018 10:35	9/27/2018 9:25	420000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985140	WO#2986250	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	9/24/2018 10:35	9/27/2018 9:00	840000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985137	WO#2986260	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1418 TREVILIAN WAY	9/24/2018 10:53	9/26/2018 16:20	320700	Sewer Manhole	51594	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985109	WO#2986271	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3305 INDIAN CREEK CT	9/24/2018 10:53	9/26/2018 12:30	297700	Sewer Manhole	51160	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985111	WO#2986270	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	9/24/2018 11:00	9/26/2018 12:10	58800	Sewer Manhole	2935	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985138	CLEAN UP NOT REQUIRED MANHOLE DISCHARES DIRECTLY INTO THE STREAM.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	9/24/2018 11:02	9/26/2018 21:05	580000	Sewer Manhole	2933	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985142	WO#2986225	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	9/24/2018 11:08	9/26/2018 12:01	294000	Sewer Manhole	90700	CATCH BASIN	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985143	WO#2985867	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	9/24/2018 11:19	9/26/2018 12:01	441000	Sewer Manhole	47593	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985144	WO#2986070	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7913 SHELBYVILLE RD	9/24/2018 11:30	9/26/2018 11:51	432000	Sewer Manhole	84155	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985147	WO#2989857	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3500 ST EDWARDS DR	9/24/2018 11:40	9/26/2018 17:10	80250	Sewer Manhole	28249	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985126	WO#2986275	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	8800 ADMIRAL DR	9/24/2018 12:00	9/24/2018 23:55	71500	Sewer Manhole	93705	STREAM	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY DUE TO HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985026	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	SOLUTION IN THE IOAP.
MORRIS FORMAN	KY0022411	2216 FAIRLAND AVE	9/24/2018 12:05	9/26/2018 11:25	123000	Sewer Manhole	49445	GROUND	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985104	WO#2986281	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9114 CINDERELLA LN	9/24/2018 12:45	9/24/2018 23:25	9600	Sewer Manhole	60679	DITCH	FISHPOOL CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984951	MSD CREW CLEANED AND SANITIZED AREA.	CONTRACTOR HAULED STATION UNTIL STATION COULD MAINTAIN ON ITS OWN.
MORRIS FORMAN	KY0022411	7713 WESTPORT RD	9/24/2018 13:18	9/26/2018 7:30	252000	Sewer Manhole	105936	GROUND	GOOSE CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985151	NO CLEANUP REQUIRED, MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1804 ROUND RIDGE RD	9/24/2018 13:54	9/26/2018 21:20	163300	Sewer Manhole	65623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985152	NO CLEAN UP PERFORMED. NO PUBLIC ACCESS TO THE DISCHARGE SITE.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4801 CASSIA CT	9/24/2018 13:54	9/26/2018 9:20	387000	Sewer Manhole	46623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985159	WO#2977597	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	9514 TAYLORSVILLE RD	9/24/2018 14:10	9/24/2018 21:45	22500	Sewer Manhole	28711	DITCH	BEATTY BROOK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985124	WO#2986280	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7713 WESTPORT RD	9/24/2018 14:20	9/25/2018 0:45	62500	Sewer Manhole	105936	GROUND	GOOSE CREEK	LACK OF SYSTEM CAPACITY - HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985015	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	SOLUTION IN THE IOAP.
MORRIS FORMAN	KY0022411	24 SOUTHWIND RD	9/24/2018 14:22	9/26/2018 8:30	126000	Sewer Manhole	89790	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985161	WO#2986264	LOCATION INCLUDED IN THE IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	300 MOCKINGBIRD VALLEY RD	9/24/2018 14:40	9/26/2018 17:50	76500	Sewer Manhole	41374	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985153	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	9/24/2018 14:45	9/27/2018 15:00	648000	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985132	WO#2986255	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4019 LELAND RD	9/24/2018 14:50	9/26/2018 8:23	120000	Sewer Manhole	96019	GROUND	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985163	WO#2986266	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4313 PRUITT CT	9/24/2018 15:15	9/26/2018 0:00	128800	Sewer Manhole	8427	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985105	CLEANING NOT REQUIRED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	974 BRECKENRIDGE LN	9/24/2018 15:20	9/26/2018 13:50	207000	Sewer Manhole	74520	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985157	WO#2986261	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3920 DUTCHMANS LN	9/24/2018 15:32	9/26/2018 17:16	367500	Sewer Manhole	96673	STREAM	WEICHER CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985160	WO#2986263	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1108 DUPONT CIR	9/24/2018 15:45	9/26/2018 17:20	150000	Sewer Manhole	43726	GROUND	WEICHER CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985156	WO#2986262	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1122 ROSTREVOR CIR	9/24/2018 17:02	9/26/2018 15:00	840000	Sewer Manhole	45900	DITCH	HAWKINS RILL	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985136	WO#2986267	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2001 TERRIL LN	9/24/2018 17:35	9/26/2018 9:27	119600	Sewer Manhole	23212	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985114	WO#2986268	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2219 RICHLAND AVE	9/24/2018 18:30	9/26/2018 11:27	246000	Sewer Manhole	49446	STREAM	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985117	WO#2986283	LOCATION INCLUDED IN THE IOAP.
CEDAR CREEK	KY0098540	9719 COLLIER LN	9/24/2018 19:20	9/28/2018 8:18	8000	Sewer Manhole	98022	STREAM	CEDAR CREEK	MECHANICAL FAILURE.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985141	MSD CLEANED AND SANITIZED AREA.	KEEP WET WELL LEVEL BELOW 28 FOOT.
CEDAR CREEK	KY0098540	10800 FAIRMOUNT RD	9/25/2018 10:45	9/26/2018 8:30	660000	Sewer Manhole	97365	GROUND	BIG RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985440	AREA DISINFECTED WITH LIME BY MSD STAFF.	SOLUTION IS IN THE IOAP.
MORRIS FORMAN	KY0022411	6600 SEMINARY WOODS PL	9/25/2018 18:30	9/25/2018 19:15	4500	Sewer Lift Station	MSD0123-PS	DITCH	GOOSE CREEK	STRUCTURAL FAILURE, FORCE MAIN BREAK.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	2985591	CLEANED AND SANITIZED THE IMPACTED AREA	
DEREK R. GUTHRIE	KY0078956	9114 CINDERELLA LN	9/26/2018 5:08	9/27/2018 0:06	22500	Sewer Manhole	60679	DITCH	FISHPOOL CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985601	CLEANUP NOT POSSIBLE DUE TO MAGNITUDE OF STORM.	SITE FOUND DURING RAIN EVENT RECON. WILL BE MONITORED AND EVALUATED FOR REPAIR.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	9/26/2018 5:21	9/26/2018 7:45	3600	Sewer Manhole	25484	STREAM	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985604	NONE POSSIBLE DUE TO MAGNITUDE OF STORM.	SOLUTION IS IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	8800 ADMIRAL DR	9/26/2018 10:50	9/26/2018 15:21	4000	Sewer Lift Station	MSD1051-PS	STREAM	PENNSYLVANIA RUN	ELECTRICAL PROBLEM WITH MSD EQUIPMENT. MOTOR STARTER FAILED.	MECHANICAL FAILURE	RAIN EVENT DISCHARGE	2985906	CLEANED AND SANITIZED THE IMPACTED AREA.	PUMP TAKEN OUT OF OPERATIONAL SEQUENCE SO LAG PUMP COULD RUN.
CEDAR CREEK	KY0098540	10801 FAIRMOUNT RD	9/27/2018 16:25	9/27/2018 23:00	29625	Sewer Main	78207	STREAM	CEDAR CREEK	BROKEN FORCE MAIN.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	2986265	NONE.	PUMP SHUT OFF. REPAIR CREW CALLED.
CEDAR CREEK	KY0098540	10800 FAIRMOUNT RD	9/28/2018 2:00	9/28/2018 21:09	166500	Sewer Manhole	97365	GROUND	BIG RUN	STRUCTURAL FAILURE (FORCE MAIN BREAK)	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	2989626	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA	CONTRACTOR REPAIRED FORCE MAIN
HITE CREEK	KY0022420	6319 RIVER RD	9/29/2018 13:00	9/29/2018 14:00	300	Sewer Main	41867P-CO			STRUCTURAL FAILURE (FORCE MAIN BREAK).	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2989983	MSD CLEANED AND SANITIZED THE IMPACTED AREA.	PUMP STATION SHUT DOWN AND HAULED STATION WHILE REPAIRS BEING MADE.
MORRIS FORMAN	KY0022411	1218 S 3RD ST	10/3/2018 11:10	10/3/2018 12:38	137	Sewer Manhole	CSO197	STREAM	OHIO RIVER	OBSTRUCTION.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2991573	NO CLEAN UP PERFORMED. PIPE DISCHARGING TO CENTRAL RELIEF DRAIN.	FLUSH & ROOT CUT HEAVY SEDIMENT AND BRICKS IN THE LINE.
MORRIS FORMAN	KY0022411	2201 CROSS HILL RD	10/8/2018 20:00	10/8/2018 20:15	10000	Sewer Manhole	CSO166	STREAM	MIDDLE FORK BEARGRASS CREEK	OBSTRUCTION.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2994503	NONE REQUIRED. DISCHARGED INTO THE CREEK.	NO REPAIR REQUIRED, SYSTEM FLUSHED OBSTRUCTION.
MORRIS FORMAN	KY0022411	147 BUCHANAN ST	10/31/2018 16:45	11/10/2018 23:59	333000000	Sewer Manhole	CSO020	STREAM	OHIO RIVER	FLASH FLOODING FROM RAIN EVENT OVERWHELMED CSO'S REQUIRING PUMPED OVERFLOW.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	3010743	NO CLEAN UP PERFORMED – PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.	NO CONTROL ZONE SET UP – PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.
MORRIS FORMAN	KY0022411	1726 FRASER DR	11/1/2018 2:15	11/1/2018 5:00	584000	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3004532	CLEAN UP NOT REQUIRED. PIPE IS SUMERGED.	LOCATION IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	11/1/2018 3:06	11/2/2018 12:30	526000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3004512	NO CLEAN UP REQUIRED DISCHARGED PIPE IS SUBMERGED UNDERGROUND.	LOCATION IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	11/1/2018 3:30	11/2/2018 0:45	1706000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3004495	NO CLEAN UP REQUIRED. DISCHARGED PIPE IS SUBMERGED UNDERGROUND.	LOCATION IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	11/1/2018 4:15	11/1/2018 11:22	10500	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3004563	WO#3005015	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	11/1/2018 4:30	11/2/2018 6:15	468000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3004569	WO#3005078	LOCATION INCLUDED IN THE IOAP.
FLOYDS FORK	KY0102784	611 WOODLAKE DR	11/4/2018 13:00	11/4/2018 14:10	3300	Sewer Main	80581B-AG	STREAM	FLOYDS FORK	STRUCTURAL FAILURE. FORCE MAIN BREAK.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3006011	CLEANED AND SANITIZED THE IMPACTED AREA.	ISOLATED MAIN AND CONTACTED CONTRACTOR FOR REPAIRS.
MORRIS FORMAN	KY0022411	1726 FRASER DR	11/5/2018 22:45	11/6/2018 10:45	3620	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3006485	NO CLEAN UP REQUIRED. DISCHARGED PIPE IS SUBMERGED UNDERGROUND.	LOCATION IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	11/5/2018 22:55	11/6/2018 15:32	878000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3006481	NO CLEAN UP REQUIRED. DISCHARGED PIPE IS SUBMERGED UNDERGROUND.	LOCATION IS INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	11/5/2018 23:00	11/6/2018 15:44	4050	Sewer Manhole	93719	DITCH	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3006332	CLEANED UP BY MSD AND LIME PUT DOWN ON AREA	A SOLUTION FOR THIS LOCATION HAS BEEN INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	11/5/2018 23:30	11/6/2018 17:45	2807000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3006477	NO CLEAN UP REQUIRED. DISCHARGED PIPE IS SUBMERGED UNDERGROUND.	LOCATION IS INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9114 CINDERELLA LN	11/6/2018 0:15	11/6/2018 15:40	6900	Sewer Manhole	60679	DITCH	FISHPOOL CREEK	LACK OF SYSTEM CAPACITY - HEAVY RAIN	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3006333	CLEANED UP BY MSD AND LINE PUT DOWN IN AREA	A SOLUTION FOR THIS LOCATION HAS BEEN INCLUDED IN THE IOAP
MORRIS FORMAN	KY0022411	201 BULLITT LN	11/6/2018 2:25	11/6/2018 9:54	112500	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3006490	WO#3006583	LOCATION INCLUDED INT THE IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	202 OXMOOR LN	11/6/2018 2:25	11/6/2018 9:54	90000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3006488	WO#3006586	LOCATION INCLUDED INT THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	11/6/2018 5:10	11/6/2018 10:00	7500	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3006503	WO#3006589	LOCATION INCLUDED INT THE IOAP.
MORRIS FORMAN	KY0022411	3406 CHARLANE PKY	11/6/2018 5:20	11/6/2018 9:50	6750	Sewer Manhole	28451	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3006505	WO#3006588	LOCATION INCLUDED INT THE IOAP.
DEREK R. GUTHRIE	KY0078956	11621 LOWER RIVER RD	11/10/2018 21:45	11/11/2018 2:00	9450000	Sewer Treatment Plant	MSD0277	STREAM	OHIO RIVER	LOSS OF POWER TO BISULFITE BUILDING. MAIN BREAKER.	BYPASS AT WQTC	DRY WEATHER DISCHARGE	3010431	NONE	REPAIRS MADE BY ELECTRICAL CREW.
MORRIS FORMAN	KY0022411	1800 NIGHTINGALE RD	11/13/2018 11:20	11/13/2018 12:00	400000	Sewer Manhole	CSO018	STREAM	SOUTH FORK BEARGRASS CREEK	ELECTRICAL PROBLEM WITH MSD EQUIPMENT. PLC FAULTED AND INFLUENT GATES CLOSED.	ELECTRICAL PROBLEMS AT MSD	RAIN EVENT DISCHARGE	3011539	CLEANUP NOT POSSIBLE DUE TO ELEVATED CREEK LEVEL.	PLC WAS RESET. CONTROLS GROUP IS ANALYZING FAULT.
MORRIS FORMAN	KY0022411	147 BUCHANAN ST	11/14/2018 22:48	11/18/2018 9:10	96378353	Sewer Manhole	CSO020	STREAM	OHIO RIVER	HEAVY RAINS OVERWHELMED CSOS. CANNOT MAXIMIZE FLOW DOWNSTREAM DUE TO ORI REPAIRS, PUMPING TO PREVENT SURFACE FLOODING.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	3012176	NO CLEAN UP PERFORMED. PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.	NO CONTROL ZONE SET UP. PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	11/15/2018 5:15	11/15/2018 5:16	100	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3012332	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	11/15/2018 7:29	11/15/2018 13:15	300000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3012326	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
HITE CREEK	KY0022420	7520 KAVANAUGH RD	11/15/2018 11:35	11/15/2018 13:15	5700	Sewer Lift Station	MSD1085-PS	GROUND	HITE CREEK	POWER OUTAGE (LG&E).	POWER OUTAGE (LG&E)	RAIN EVENT DISCHARGE	3012575	MSD DISINFECTED AREA WITH LIME.	GENERATOR UTILIZED UNTIL POWER RESTORED.
DEREK R. GUTHRIE	KY0078956	4510 COD DR	11/15/2018 19:55	11/17/2018 9:30	50000	Sewer Main	62018	STREAM	POND CREEK	STRUCTURAL FAILURE OF MAIN SEWER.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	3012604	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	REFERRED TO SUPERVISOR TO MAKE NEEDED REPAIRS.
MORRIS FORMAN	KY0022411	4640 BARBOUR LN	11/18/2018 19:12	11/18/2018 19:27	750	Sewer Manhole	42680	STREAM	LITTLE GOOSE CREEK	ELECTRICAL PROBLEM WITH MSD EQUIPMENT/STOP FLOAT HUNG IN F.O.G. LAYER.	ELECTRICAL PROBLEMS AT MSD	DRY WEATHER DISCHARGE	3013035	MSD STAFF SANITIZED THE IMPACTED AREA WITH LIME.	REINSERTED STOP FLOAT BELOW F.O.G. LAYER. WILL BE VACTORED ASAP.
MORRIS FORMAN	KY0022411	147 BUCHANAN ST	11/26/2018 1:15	11/26/2018 7:50	25945290	Sewer Manhole	CSO020	STREAM	OHIO RIVER	HEAVY RAINS OVERWHELMED CSOS. CANNOT MAXIMIZE FLOW DOWNSTREAM DUE TO ORI REPAIRS, PUMPING TO PREVENT SURFACE FLOODING.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	3014088	NO CLEAN UP PERFORMED. PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.	NO CONTROL ZONE SET UP. PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.
MORRIS FORMAN	KY0022411	3000 INDUSTRIAL BLVD	11/29/2018 14:29	11/29/2018 14:30	100	Sewer Manhole	15074	DITCH	NORTHERN DITCH	OBSTRUCTION IN MAIN SEWER.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3018025	MSD PERSONNEL CLEANED DISCHARGE AREA.	FLUSHED MAIN SEWER.
MORRIS FORMAN	KY0022411	147 BUCHANAN ST	12/1/2018 3:48	12/7/2018 6:00	267456608	Sewer Manhole	CSO020	STREAM	OHIO RIVER	HEAVY RAINS OVERWHELMED CSOS. CANNOT MAXIMIZE FLOW DOWNSTREAM DUE TO ORI REPAIRS, PUMPING TO PREVENT SURFACE FLOODING.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	3018069	NO CLEAN UP PERFORMED – PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.	NO CONTROL ZONE SET UP – PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	12/1/2018 9:25	12/2/2018 17:23	2197000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018161	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	12/1/2018 10:00	12/1/2018 21:30	456454	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018164	CLEANING NOT REQUIRED.	LOCATION IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	12/1/2018 10:15	12/2/2018 17:30	3915000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018160	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	12/1/2018 10:58	12/2/2018 8:40	378000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018168	WO#3018235	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	12/1/2018 11:20	12/2/2018 8:50	32250	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018165	WO#3019059	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	12/1/2018 11:40	12/2/2018 9:10	378000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018169	WO#3019091	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	9707 WILLOWWOOD WAY	12/1/2018 11:45	12/2/2018 9:20	32375	Sewer Manhole	28336	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018167	WO#3019050	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1418 TREVLIAN WAY	12/1/2018 13:00	12/1/2018 13:20	500	Sewer Manhole	51594	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018171	WO3024131	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2120 INDIAN HILLS TRL	12/1/2018 14:00	12/1/2018 16:30	11500	Sewer Lift Station	MSD0186-PS	DITCH	MUDDY FORK BEARGRASS CREEK	ELECTRICAL PROBLEM WITH MSD EQUIPMENT/ASSET - ONLY CALLED FOR 2 PUMPS TO RUN AND NO HIGH WET WELL ALARM.	ELECTRICAL PROBLEMS AT MSD	RAIN EVENT DISCHARGE	3018134	CLEANED AND SANITIZED THE IMPACTED AREA.	VACTOR WET WELL REMOVING FOG LAYER.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	12/1/2018 14:25	12/1/2018 18:00	9375	Sewer Manhole	25484	STREAM	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018146	CLEANUP NOT POSSIBLE DUE TO MAGNITUDE OF STORM.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	4339 PRUITT CT	12/1/2018 14:30	12/1/2018 15:41	1775	Sewer Manhole	8431	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3018174	CLEAN UP NOT REQUIRED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2324 NEWBURG RD	12/4/2018 13:58	12/4/2018 14:13	42667	Sewer Manhole	CSO108	STREAM	SOUTH FORK BEARGRASS CREEK	PLC MECHANICAL MALFUNCTION. ERRONEOUS SIGNAL SENT FROM THE PLC ACTIVATED THE PUMPS.	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3019590	NO CLEANUP REQUIRED DISCHARGE. PIPE IS SUBMERGED AND DISCHARGES DIRECTLY IN TO THE CREEK.	REPAIRS ARE BEING MADE TO THE REAL TIME CONTROL PLC SYSEM.
MORRIS FORMAN	KY0022411	100 N 6TH ST	12/5/2018 6:00	12/9/2018 7:45	64000	Sewer Manhole	CSO055	STREAM	OHIO RIVER	OBSTRUCTION IN LOW FLOW LINE, PIPED THROUGH ORI PROJECT. UNABLE TO FLUSH AS A SAFETY ISSUE FOR WORKERS IN ORI. PIPING TO BE DISMANTLED WITHIN 24 HRS.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3019831	NONE POSSIBLE, PIPE SUBMERGED.	REMOVE FLOW THROUGH PIPING IN ORI 12/6/18.
MORRIS FORMAN	KY0022411	342 W MAIN ST	12/11/2018 0:00	12/11/2018 2:50	3675000	Sewer Manhole	CSO022	STREAM	OHIO RIVER	PLANNED OUTAGE TO REMOVE TEMPORARY BULKHEAD INSTALLED IN ORI FOR REPAIRS.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3022388	DISCHARGE UNDERWATER, NO CLEANUP POSSIBLE.	PLANNED OUTAGE TO TERMINATE BY 0800.
MORRIS FORMAN	KY0022411	1726 FRASER DR	12/15/2018 7:45	12/15/2018 15:30	86813	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3023884	NO CLEAN UP REQUIRED, DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	12/15/2018 9:30	12/15/2018 21:45	1613000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3023883	NO CLEAN UP REQUIRED, DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	12/15/2018 10:23	12/15/2018 17:02	143432	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3023880	NO CLEAN UP REQUIRED, DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	1011 ALTA CIR	12/15/2018 11:30	12/16/2018 8:54	322500	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3023885	WO#3024039	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	12/15/2018 12:27	12/16/2018 9:30	252000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3023887	WO#3024040	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	12/15/2018 13:45	12/15/2018 19:55	9000	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3023888	WO#3024050	LOCATION INCLUDED IN THE IOAP.
HITE CREEK	KY0022420	7500 RIVER RD	12/21/2018 0:30	12/21/2018 1:15	40	Sewer Manhole	110837	STREAM	WALLACE CREEK	GREASE.	GREASE BLOCKAGE	RAIN EVENT DISCHARGE	3025153	MSD WILL CLEAN AREA.	FLUSHED LINE.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	12/31/2018 10:52	1/1/2019 14:33	341000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3032865	NOT REQUIRED UNDERGROUND PIPE DISCHARES TO THE CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	12/31/2018 11:45	1/1/2019 9:15	2826000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3032866	NOT REQUIRED. MANHOLE DISCHARGES DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	12/31/2018 12:15	12/31/2018 22:45	92153	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3032867	UNDERGROUND PIPE DISCHARGES DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	12/31/2018 14:09	1/1/2019 10:26	146850	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3032870	WO#302949	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	12/31/2018 14:31	1/1/2019 6:50	24475	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3032869	WO#3032947	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1418 TREVILIAN WAY	12/31/2018 16:04	1/1/2019 5:10	117900	Sewer Manhole	51594	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3032871	WO#302948	LOCATION INCLUDED IN IOAP.
DEREK R. GUTHRIE	KY0078956	9114 CINDERELLA LN	12/31/2018 19:53	12/31/2018 21:53	3000	Sewer Lift Station	MSD1013-PS	DITCH	FISHPOOL CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3032878	MAGNITUDE OF STORM RESULTED IN NO DEBRIS REMAINING.	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	1/4/2019 20:00	1/5/2019 0:45	94000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3036333	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
FLOYDS FORK	KY0102784	14310 LAKE FOREST DR	1/4/2019 21:30	1/4/2019 22:00	600	Sewer Main	80351B-AG	GROUND	CHENOWETH RUN	STRUCTURAL FAILURE OF FORCE MAIN.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	3036327	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	STATION PUMPS TURNED OFF AND STATION HAULED.
MORRIS FORMAN	KY0022411	4212 RIVIERA DR	1/15/2019 10:45	1/15/2019 11:00	3000	Sewer Valve	69041B-V	GROUND	OHIO RIVER	MECHANICAL FAILURE. SUCTION HOSE ON PUMPER TRUCK BROKE WHILE DRAINING FORCEMAIN FOR VALVE REPLACEMENT.	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3038452	MSD PERSONNEL AND CONTRACTOR (SES ENVIRONMENTAL) CLEANED AND SANITIZED IMPACTED AREA.	SHUT OFF VALVE TO STOP DISCHARGE.
MORRIS FORMAN	KY0022411	2201 INDIAN HILLS TRL	1/15/2019 13:50	1/15/2019 14:20	9000	Sewer Main	79113-V	GROUND	MUDDY FORK BEARGRASS CREEK	STRUCTURAL FAILURE. FORCE MAIN BREAK.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3038576	PIPE SUBMERGED. NO CLEANUP NEEDED.	SHUT OFF PUMPS AT MUDDY FORK PUMP STATION. VALVED IN OLD FORCEMAIN AND VALVED OUT NORTH BARREL OF OHIO RIVER FORCE MAIN.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	1/19/2019 19:15	1/19/2019 23:45	181000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY DUE TO HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3040682	CLEAN UP NOT PERFORMED. NO PUBLIC ACCESS TO THE DISCHARGE SITE.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	1/23/2019 10:18	1/24/2019 5:25	34200	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY DUE TO HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3040343	CLEAN UP NOT NEEDED. NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	1/23/2019 10:30	1/24/2019 5:20	142500	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY DUE TO HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3040342	WO#3040688	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	1/23/2019 11:57	1/24/2019 23:30	2476000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY DUE TO HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3040344	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	1/23/2019 15:30	1/23/2019 18:15	5750	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY DUE TO HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3040684	NO CLEANUP REQUIRED. DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	2/6/2019 11:15	2/9/2019 19:15	8757000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3048759	CLEAN UP NOT REQUIRED. PIPE IS SUBMERGED.	LOCATION IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	2/7/2019 9:00	2/8/2019 12:30	139433	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052114	NOT REQUIRED PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	2/7/2019 9:46	2/9/2019 8:15	837000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052109	WO#3052401	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	2/7/2019 11:25	2/8/2019 15:54	1179000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052108	NO CLEANUP REQUIRED. PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	2/7/2019 17:52	2/7/2019 21:52	30000	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052111	WO#3052109	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	2/7/2019 18:08	2/8/2019 0:45	9555	Sewer Manhole	93719	DITCH	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052150	AREA DISINFECTED WITH LIME.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	3302 TROUT CREEK DR	2/7/2019 18:18	2/7/2019 21:20	4500	Sewer Manhole	23211	STREAM	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052119	WO#3052414	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	2/7/2019 18:20	2/8/2019 5:50	138000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052123	WO#3052382	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	2/7/2019 18:20	2/8/2019 11:15	306000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052122	WO#3052387	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	2/7/2019 18:28	2/8/2019 5:52	82650	Sewer Manhole	2933	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052125	WO#3052380	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3305 INDIAN CREEK CT	2/7/2019 18:30	2/8/2019 10:30	3000	Sewer Manhole	51160	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052120	WO#3052417	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7913 SHELBYVILLE RD	2/7/2019 19:05	2/8/2019 5:55	49500	Sewer Manhole	84155	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052126	WO#3052374	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1804 ROUND RIDGE RD	2/7/2019 20:18	2/8/2019 6:23	540000	Sewer Manhole	65623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052149	CLEAN UP NOT REQUIRED.	LOCATION INCLUDED IN IOAP
MORRIS FORMAN	KY0022411	4801 CASSIA CT	2/7/2019 20:18	2/8/2019 6:23	72000	Sewer Manhole	46623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052151	WO#3052384	LOCATION INCLUDED IN IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	3406 DELL RD	2/7/2019 21:10	2/8/2019 7:08	15000	Sewer Manhole	28415	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052313	WO#3052607	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	2/7/2019 21:31	2/8/2019 7:10	28950	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052321	WO#3052612	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3406 CHARLANE PKY	2/7/2019 21:33	2/8/2019 7:20	15000	Sewer Manhole	28451	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052315	WO#3052608	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3506 CHARLANE PKY	2/7/2019 21:36	2/8/2019 7:59	14450	Sewer Manhole	28250	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052318	WO#3052609	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	9707 WILLOWWOOD WAY	2/7/2019 21:45	2/8/2019 7:26	46725	Sewer Manhole	28336	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052320	WO#3052610	LOCATION INCLUDED IN IOAP.
DEREK R. GUTHRIE	KY0078956	9114 CINDERELLA LN	2/7/2019 21:52	2/8/2019 0:45	8790	Sewer Manhole	60679	DITCH	FISHPOOL CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052153	AREA DISINFECTED WITH LIME.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	2/11/2019 3:30	2/15/2019 1:39	17570000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052879	NO CLEAN UP REQUIRED. MANHOLE DISCHARGES DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	2/11/2019 6:42	2/14/2019 0:42	4021000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052884	PIPE DISCHARGES UNDERWATER, DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	2/11/2019 7:00	2/13/2019 20:45	1800589	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052892	PIPES DISCHARGE UNDERWATER, DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	2/11/2019 8:41	2/13/2019 7:55	70850	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052908	WO#3052612	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	231 N CAMPBELL ST	2/11/2019 9:00	2/19/2019 1:09	9999	Sewer Lift Station	MSD1137-PS	GROUND	OHIO RIVER	LACK OF SYSTEM CAPACITY DUE TO RIVER FLOODING.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053216	NO CLEANUP REQUIRED.	A SOLUTION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	2408 GRAY FOX RD	2/11/2019 9:08	2/14/2019 5:25	292500	Sewer Manhole	27012	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052991	WO#3054802	LOCATION INCLUDED IN THE IOAP
MORRIS FORMAN	KY0022411	7410 STEEPCREST CIR	2/11/2019 9:25	2/15/2019 14:00	2000000	Sewer Manhole	47596	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052994	WO#3055477	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	2/11/2019 10:15	2/13/2019 5:40	480000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052998	WO#3052382	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	2/11/2019 10:15	2/14/2019 6:03	804000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3052996	WO#3052387	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	2/11/2019 12:58	2/13/2019 5:16	4800000	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053244	WO#3052409	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 CHARLANE PKY	2/11/2019 13:40	2/13/2019 8:15	63875	Sewer Manhole	28451	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053292	WO#3052608	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	420 W RIVER RD	2/11/2019 13:55	2/19/2019 11:46	9999	Sewer Lift Station	MSD1017-PS	STREAM	OHIO RIVER	LACK OF SYSTEM CAPACITY DUE TO RAIN EVENT.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053183	NO CLEANUP. STATION UNDER WATER.	A SOLUTION FOR THIS LOCATION IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1804 ROUND RIDGE RD	2/11/2019 14:50	2/14/2019 6:21	157500	Sewer Manhole	65623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053284	CLEANING NOT REQUIRED DUE TO LACK OF PUBLIC ACCESS.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4801 CASSIA CT	2/11/2019 14:50	2/14/2019 6:21	157500	Sewer Manhole	46623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053285	WO#3054669	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7913 SHELBYVILLE RD	2/11/2019 20:22	2/13/2019 6:10	99000	Sewer Manhole	84155	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053355	WO#3054411	LOCATION INCLUDED IN IOAP.
HITE CREEK	KY0022420	6100 MAYFAIR AVE	2/12/2019 0:59	2/19/2019 8:05	9999	Sewer Lift Station	MSD1206-PS	GROUND	OHIO RIVER	LACK OF SYSTEM CAPACITY DUE TO RAIN EVENT.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053370	NO CLEANUP. STATION UNDER WATER.	A SOLUTION FOR THIS LOCATION IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1552 CHEROKEE RD	2/12/2019 4:59	2/12/2019 15:28	30000	Sewer Manhole	40471	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053670	WO#354403	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	2/12/2019 5:00	2/12/2019 13:15	61125	Sewer Manhole	93719	DITCH	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053390	CLEANED AND SANITIZED THE IMPACTED AREA.	SITE FOUND DURING RAIN EVENT. WILL BE MONITORED AND EVALUATED FOR REPAIR.
DEREK R. GUTHRIE	KY0078956	9114 CINDERELLA LN	2/12/2019 5:30	2/12/2019 23:32	138000	Sewer Manhole	60679	DITCH	FISHPOOL CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053395	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	2/12/2019 5:42	2/13/2019 5:43	72000	Sewer Manhole	2935	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053672	PENDING	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3302 TROUT CREEK DR	2/12/2019 5:45	2/13/2019 5:30	348750	Sewer Manhole	23211	STREAM	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053984	WO#3052414	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	2/12/2019 5:46	2/13/2019 5:41	216000	Sewer Manhole	2933	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053683	WO#3054409	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3305 INDIAN CREEK CT	2/12/2019 5:48	2/13/2019 14:30	196200	Sewer Manhole	51160	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053983	WO#3052417	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3305 BENT CREEK CT	2/12/2019 5:49	2/13/2019 5:35	213900	Sewer Service Line	BU05074039	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053991	WO#3054373	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	2/12/2019 5:56	2/13/2019 5:48	72000	Sewer Manhole	90700	CATCH BASIN	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053684	WO#30544125	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	2/12/2019 6:02	2/13/2019 5:52	144000	Sewer Manhole	47593	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053687	WO#3054413	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8117 COPPERCREEK DR	2/12/2019 6:25	2/13/2019 5:56	103500	Sewer Manhole	65070	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053689	WO#3054405	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4313 PRUITT CT	2/12/2019 7:00	2/13/2019 6:00	138000	Sewer Manhole	8427	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053986	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4315 PRUITT CT	2/12/2019 7:00	2/13/2019 6:00	1380	Sewer Manhole	8426	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053987	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.

Appendix D-1 Discharge Work Orders – Waters of the United States

ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	4609 BLENHEIM RD	2/12/2019 7:04	2/12/2019 14:18	10500	Sewer Manhole	21171	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053695	WO#3054415	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4341 PRUITT CT	2/12/2019 7:05	2/13/2019 6:09	207000	Sewer Manhole	8430	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053990	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4317 PRUITT CT	2/12/2019 7:08	2/13/2019 6:10	1382	Sewer Service Line	85075	GROUND	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053992	WO#3054379	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4319 PRUITT CT	2/12/2019 7:09	2/13/2019 6:12	1383	Sewer Service Line	85076	GROUND	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053993	WO#3054376	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	208 BRUNSWICK RD	2/12/2019 7:15	2/12/2019 14:23	10500	Sewer Manhole	115183	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053694	WO#3054414	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4332 PRUITT CT	2/12/2019 7:16	2/13/2019 6:20	1384	Sewer Service Line	085100290046 A	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053994	WO#3054600	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3400 DELL RD	2/12/2019 7:20	2/13/2019 7:45	73250	Sewer Manhole	28414	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054004	WO#3054396	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 DELL RD	2/12/2019 7:25	2/13/2019 7:44	36475	Sewer Manhole	28415	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054005	WO#3052607	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3317 DELL RD	2/12/2019 7:30	2/13/2019 7:50	36500	Sewer Manhole	28413	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054002	WO#3054397	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	8800 ADMIRAL DR	2/12/2019 7:30	2/12/2019 13:30	90000	Sewer Manhole	93703	GROUND	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053445	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	7713 WESTPORT RD	2/12/2019 7:39	6/30/2019 0:00	0	Sewer Manhole	105936	GROUND	GOOSE CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053696	PENDING	LOCATION INCLUDED IN THE IOAP
MORRIS FORMAN	KY0022411	3500 ST EDWARDS DR	2/12/2019 7:40	2/13/2019 8:07	36675	Sewer Manhole	28249	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054008	WO#3054398	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3506 CHARLANE PKY	2/12/2019 7:40	2/13/2019 8:10	36750	Sewer Manhole	28250	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054007	WO#3052609	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	9707 WILLOWWOOD WAY	2/12/2019 7:55	2/13/2019 8:00	144500	Sewer Manhole	28336	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054009	WO#3052610	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2216 FAIRLAND AVE	2/12/2019 8:00	2/13/2019 6:52	102900	Sewer Manhole	49445	GROUND	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053996	WO#3054591	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2219 RICHLAND AVE	2/12/2019 8:02	2/13/2019 6:53	137100	Sewer Manhole	49446	STREAM	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053997	WO#3054595	LOCATION INCLUDED IN THE IOAP.
CEDAR CREEK	KY0098540	8817 OLD BARDSTOWN RD	2/12/2019 8:05	2/12/2019 11:00	120	Sewer Manhole	111292	GROUND	BIG RUN	LACK OF SYSTEM CAPACITY - HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3065006	NO DEBRIS OBSERVED.	THIS WILL BE OBSERVED FOR A FUTURE SOLUTION.
MORRIS FORMAN	KY0022411	9514 TAYLORSVILLE RD	2/12/2019 8:11	2/13/2019 8:30	36475	Sewer Manhole	28711	DITCH	BEATTY BROOK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054001	WO#3054399	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	37 ARROWHEAD RD	2/12/2019 8:23	2/13/2019 7:10	66000	Sewer Manhole	89791	GROUND	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053697	WO#3054401	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3317 BROWNSBORO RD	2/12/2019 8:35	2/14/2019 6:37	207000	Sewer Manhole	26752	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053699	WO#3054631	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	300 MOCKINGBIRD VALLEY RD	2/12/2019 8:38	2/13/2019 7:20	34500	Sewer Manhole	41374	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053698	NO CLEAN UP PERFORMED. NO PUBLIC ACCESS TO THE DISCHARGE SITE.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4019 LELAND RD	2/12/2019 8:47	2/13/2019 7:30	66000	Sewer Manhole	96019	GROUND	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053700	WO#3054420	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	974 BRECKENRIDGE LN	2/12/2019 9:09	2/13/2019 8:03	69000	Sewer Manhole	74520	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053707	WO#3054421	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1108 DUPONT CIR	2/12/2019 9:19	2/16/2019 9:07	69000	Sewer Manhole	43726	GROUND	WEICHER CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053705	WO#3054424	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3928 DUTCHMANS LN	2/12/2019 9:30	2/13/2019 8:11	66000	Sewer Service Line	Z18284029	GROUND	WEICHER CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053630	WO#3053630	NONE REQUIRED.
MORRIS FORMAN	KY0022411	7713 WESTPORT RD	2/12/2019 9:30	2/12/2019 23:27	1275000	Sewer Manhole	105936	GROUND	GOOSE CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053603	CLEANED AND SANITIZED THE IMPACTED AREA.	A SOLUTION FOR THIS LOCATION CAN BE FOUND AT THE IOAP.
MORRIS FORMAN	KY0022411	3920 DUTCHMANS LN	2/12/2019 9:37	2/13/2019 8:07	103500	Sewer Manhole	96673	STREAM	WEICHER CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053693	WO#3054422	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3620 CHARLANE PKY	2/12/2019 12:55	2/13/2019 8:03	28700	Sewer Manhole	28340	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054000	WO#3054393	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	9011 OLD WHIPPS MILL RD	2/12/2019 13:10	2/13/2019 6:02	48000	Sewer Manhole	2099	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053709	WO#3054408	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	2/12/2019 15:33	2/15/2019 5:45	281250	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054019	WO#3054978	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3109 LOWELL AVE	2/12/2019 16:01	2/15/2019 11:44	10	Sewer Manhole	17618	GROUND	BROOKLAWN TRIBUTARY	LACK OF SYSTEM CAPACITY - HEAVY RAIN	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053939	MSD CLEANED THE AREA	REFERRED FOR CLEAN AFTER DISCHARGE.
MORRIS FORMAN	KY0022411	1913 CHARBDIN PL	2/12/2019 16:37	2/13/2019 6:40	84000	Sewer Manhole	16455	GROUND	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054020	WO#3054416	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1915 CHARBDIN PL	2/12/2019 16:37	2/13/2019 6:40	21000	Sewer Manhole	16456	GROUND	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054021	WO#3054417	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1802 ROUND RIDGE RD	2/12/2019 17:57	2/13/2019 6:52	21000	Sewer Manhole	65610	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054026	WO#3054418	LOCATION INCLUDED IN THE IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	1910 CHARBDIN PL	2/12/2019 17:57	2/13/2019 6:52	21000	Sewer Manhole	46627	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054024	WO#3054419	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1910 CHARBDIN PL	2/12/2019 17:57	2/14/2019 6:20	54000	Sewer Manhole	117953	GROUND	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3054023	WO#3054619	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2835 AVENUE OF THE WOODS	2/14/2019 8:15	2/14/2019 8:20	100	Sewer Lift Station	MSD0134-PS	STREAM	LITTLE GOOSE CREEK	BOTH PUMPS IMPELLERS WERE FULLY BLOCKED WITH RAGS PREVENTING PUMPS FROM PUMPING.	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3054609	MSD PERSONNEL CLEANED AND SANITIZED IMPACTED AREA.	BACK FLUSHED PUMP TO ALLOW ONE PUMP TO PUMP TO STOP DISCHARGE. PULLED BOTH PUMPS AND REMOVED RAGS FROM IMPELLERS. REPAIR WO# 3054609 AND 3054624
DEREK R. GUTHRIE	KY0078956	4500 AMERIVAN CT	2/15/2019 15:42	2/15/2019 14:20	100	Sewer Manhole	41547	DITCH	FERN CREEK	GREASE BLOCKAGE IN THE MAIN SEWER GREASE.	GREASE BLOCKAGE	DRY WEATHER DISCHARGE	3055047	MSD CLEANED AREA	CUT LINE.
MORRIS FORMAN	KY0022411	3317 BROWNSBORO RD	2/20/2019 4:15	2/20/2019 10:15	18000	Sewer Manhole	26752	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056280	WO#3054631	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	2/20/2019 5:00	2/20/2019 15:40	237752	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056276	NOT REQUIRED, UNDER GROUND PIPE IS DISCHARGING TO THE CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	2/20/2019 5:45	2/25/2019 1:15	10265000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056923	NO CLEANUP REQUIRED, MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	2/20/2019 5:46	2/24/2019 12:53	1192000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056278	NOT REQUIRED, UNDER GROUND PIPE IS DISCHARGING TO THE CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3406 DELL RD	2/20/2019 6:10	2/20/2019 12:38	19400	Sewer Manhole	28415	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056254	WO#3056954	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	2/20/2019 6:15	2/20/2019 12:38	19400	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056256	WO#3056936	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 CHARLANE PKY	2/20/2019 6:20	2/20/2019 13:10	10250	Sewer Manhole	28451	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056259	WO#3056949	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	2/20/2019 7:30	2/20/2019 10:30	9000	Sewer Manhole	93719	DITCH	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY - HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056104	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	3305 INDIAN CREEK CT	2/20/2019 7:35	2/20/2019 15:00	111250	Sewer Manhole	51160	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056263	WO#3056956	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3302 TROUT CREEK DR	2/20/2019 7:40	2/20/2019 15:05	89000	Sewer Manhole	23211	STREAM	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056264	WO#3056957	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3305 BENT CREEK CT	2/20/2019 7:45	2/20/2019 15:10	445000	Sewer Service Line	BU05074039	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056266	WO#3056959	LOCATION INCLUDED IN IOAP.
DEREK R. GUTHRIE	KY0078956	9114 CINDERELLA LN	2/20/2019 7:50	2/20/2019 10:45	14750	Sewer Manhole	60679	DITCH	FISHPOOL CREEK	LACK OF SYSTEM CAPACITY - HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056107	CLEANED AND SANITIZED THE IMPACTED AREA.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	2/20/2019 7:55	2/22/2019 5:19	204750	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056281	WO#3054978	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4315 PRUITT CT	2/20/2019 8:00	2/20/2019 15:16	4360	Sewer Manhole	8426	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056267	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	2408 GRAY FOX RD	2/20/2019 8:04	2/21/2019 5:31	161250	Sewer Manhole	27012	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056301	WO#3054802	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	2/20/2019 8:12	2/22/2019 5:25	9000000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056283	WO#3052394	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4313 PRUITT CT	2/20/2019 8:15	2/20/2019 15:18	423	Sewer Manhole	8427	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056269	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN IOAP.
DEREK R. GUTHRIE	KY0078956	8800 ADMIRAL DR	2/20/2019 8:15	2/20/2019 10:37	4450	Sewer Manhole	93703	GROUND	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY - HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056167	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	4341 PRUITT CT	2/20/2019 8:20	2/20/2019 15:20	4200	Sewer Manhole	8430	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056271	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	2/20/2019 8:22	2/21/2019 5:42	63375	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056285	WO#3056797	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	2/20/2019 9:03	2/20/2019 14:54	45000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056290	WO#3056779	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	2/20/2019 9:03	2/20/2019 14:54	420000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056287	WO#3056778	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	2/20/2019 9:06	2/20/2019 15:15	9000	Sewer Manhole	2935	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056293	CLEAN UP NOT NEEDED, NO SOLID OR DEBRIS OBSERVED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	2/20/2019 9:12	2/20/2019 15:12	45000	Sewer Manhole	2933	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056295	WO#3056776	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	2/20/2019 9:12	2/20/2019 15:15	9000	Sewer Manhole	90700	CATCH BASIN	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056298	WO#3056794	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7913 SHELBYVILLE RD	2/20/2019 9:51	2/20/2019 15:21	16500	Sewer Manhole	84155	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056302	WO#3056785	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1804 ROUND RIDGE RD	2/20/2019 11:27	2/21/2019 6:40	28875	Sewer Manhole	65623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056336	NO CLEAN UP NOT PERFORMED, NO PUBLIC ACCESS TO THE DISCHARGE SITE.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4801 CASSIA CT	2/20/2019 11:27	2/21/2019 6:40	28775	Sewer Manhole	46623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056345	WO#3056338	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	420 W RIVER RD	2/23/2019 13:00	3/4/2019 10:00	9999	Sewer Lift Station	MSD1017-PS	STREAM	OHIO RIVER	LACK OF SYSTEM CAPACITY DUE TO HEAVY REAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057490	NONE POSSIBLE DUE TO MAGNITUDE OF STORM.	A SOLUTION FOR THIS LOCATION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	2/23/2019 18:16	2/24/2019 9:10	19500	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057563	WO#3056797	LOCATION INCLUDED IN IOAP.

Appendix D-1 Discharge Work Orders – Waters of the United States

ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	3317 BROWNSBORO RD	2/23/2019 18:45	2/23/2019 23:30	7500	Sewer Manhole	26752	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057558	WO#3057566	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	2/23/2019 19:00	2/24/2019 13:30	174583	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057557	CLEAN UP NOT REQUIRED. PIPE IS SUBMERGED IN THE CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	2/23/2019 19:59	2/24/2019 8:25	18750	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057521	WO#3056936	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	2/23/2019 20:08	2/25/2019 5:45	100500	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057560	WO#3054978	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	2408 GRAY FOX RD	2/23/2019 20:10	2/24/2019 15:46	285000	Sewer Manhole	27012	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057559	WO#3057812	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	2/23/2019 20:12	2/25/2019 5:50	402000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057562	WO#3057816	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	231 N CAMPBELL ST	2/23/2019 20:30	3/4/2019 10:00	9999	Sewer Lift Station	MSD1137-PS	GROUND	OHIO RIVER	LACK OF SYSTEM CAPACITY - HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057519	NONE POSSIBLE DUE TO MAGNITUDE OF STORM.	A SOLUTION FOR THIS LOCATION IS INCLUDED IN THE INTEGRATED OVERFLOW ABATEMENT PLAN.
MORRIS FORMAN	KY0022411	1677 STORY AVE	2/24/2019 15:00	3/1/2019 6:09	10000	Sewer Manhole	30213	CATCH BASIN	SOUTH FORK BEARGRASS CREEK	THE BEARGRASS CREEK FLOOD PUMP STATION WAS IN SERVICE AND GATE 6 WAS CLOSED.	PUMPED OVERFLOW	RAIN EVENT DISCHARGE	3058612	NONE REQUIRED. FLOW MADE IT TO THE WETWELL OF BEARGRASS FLOOD PUMP STATION AND WAS PUMPED TO THE RIVER.	WE WILL OPEN GATE 6 WHEN THE RIVER RECEDES TO 24.6 AND ALLOW FLOW TO TRAVEL ON TO THE TREATMENT PLANT.
HITE CREEK	KY0022420	6100 MAYFAIR AVE	2/25/2019 14:00	3/3/2019 10:00	9999	Sewer Lift Station	MSD1206-PS	GROUND	OHIO RIVER	LACK OF SYSTEM CAPACITY DUE TO RIVER FLOODING.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3057848	NO CLEAN UP REQUIRED.	STATION WILL BE RETURNED TO SERVICE ONCE RIVER RECEDES.
MORRIS FORMAN	KY0022411	1919 BROWNSBORO RD	2/27/2019 8:00	3/1/2019 17:30	13680000	Sewer Manhole	CSO132	STREAM	BEARGRASS CREEK	BEARGRASS FPS PLACED IN FLOOD PUMPING MODE PER USACOE PROTOCOL DURING ELEVATED RIVER LEVELS. FLOOD GATE IS CLOSED.	PUMPED DUE TO COE MANUAL	DRY WEATHER DISCHARGE	3058872	NO CLEAN UP PERFORMED – PIPES DISCHARGE UNDERWATER, DIRECTLY INTO RIVER.	IN COMPLIANCE WITH USACOE FLOOD PUMPING PROTOCOLS.
HITE CREEK	KY0022420		2/27/2019 17:30	2/27/2019 17:45	3750	Sewer Main	102451-V	GROUND	HARRODS CREEK	STRUCTURAL FAILURE OF MAIN SEWER.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3058887	CLEAN UP PERFORMED BY MSD. RAKED, CLEANED, LIMED, SEED AND STRAW PUT DOWN.	STATION PUMPS TURNED OFF.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	3/9/2019 15:24	3/9/2019 17:02	266	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3065420	NO CLEANUP REQUIRED. DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	3/9/2019 16:24	3/9/2019 22:30	43000	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3065419	NO CLEANUP REQUIRED. DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	3/9/2019 16:45	3/10/2019 6:00	1345000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3065422	NO CLEANUP REQUIRED. DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	3/9/2019 18:30	3/10/2019 9:30	22500	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3065423	WO#3065469	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2408 GRAY FOX RD	3/9/2019 18:35	3/10/2019 9:30	45000	Sewer Manhole	27012	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3065425	WO#3065468	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	3/9/2019 18:45	3/10/2019 9:40	180000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3065424	WO#3065471	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	3/9/2019 20:08	3/10/2019 7:10	16550	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3065427	WO#3065474	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2120 INDIAN HILLS TRL	3/9/2019 20:44	3/9/2019 21:09	1250	Sewer Manhole	40871	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3065415	CLEANED AND SANITIZED IMPACTED AREA.	A SOLUTION CAN BE FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	3/14/2019 19:45	3/15/2019 11:30	465000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3067287	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	3/14/2019 20:46	3/14/2019 22:34	75000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3067288	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
FLOYDS FORK	KY0102784	11926 CREEL LODGE DR	3/26/2019 9:00	3/27/2019 14:00	12375	Sewer Main	41354B-V	GROUND	GOOSE CREEK	FORCE MAIN BREAK CAUSED BY COMMUNICATIONS BORE THROUGH MAIN.	UTILITY DAMAGED MSD ASSET	DRY WEATHER DISCHARGE	3072045	MSD CONTRACTOR WILL CLEAN AND SANITIZE IMPACTED AREA.	MSD CONTRACTOR REPAIRED FORCE MAIN.
MORRIS FORMAN	KY0022411	1726 FRASER DR	3/30/2019 20:30	3/30/2019 22:15	1165	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3078412	NOT REQUIRED. DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	3/30/2019 21:00	3/31/2019 3:00	1609000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3078413	NOT REQUIRED. DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	3/30/2019 21:51	3/31/2019 0:19	18000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3078411	NOT REQUIRED. DISCHARGE PIPE IS SUBMERGED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	3/30/2019 23:30	3/30/2019 10:30	99000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3078417	UNABLE TO ACCESS DISCHARGE SITE DUE TO AREA BEING UNDER CONSTRUCTION.	LOCATION INCLUDED IN IOAP.
DEREK R. GUTHRIE	KY0078956	10517 SUNLIGHT LN	4/3/2019 10:10	4/3/2019 10:15	1000	Sewer Main	82288-V	STREAM	POND CREEK	STRUCTURAL FAILURE (FORCE MAIN BREAK).	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3081275	MSD PERSONNEL CLEANED AND SANITIZED IMPACTED AREA.	SHUT OFF PUMPS TO STOP DISCHARGE. HAULED STATION WHILE REPAIRS MADE TO FORCE MAIN (REPAIR WORK ORDER 3081279) (HAULOP WORK ORDER 3081385).
MORRIS FORMAN	KY0022411	1726 FRASER DR	4/14/2019 3:30	4/14/2019 15:00	21672	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3084205	NO CLEANUP REQUIRED. DISCHARGING PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	4/14/2019 5:55	4/14/2019 19:30	882000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3084207	NO CLEANUP REQUIRED. DISCHARGING PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	4/19/2019 20:43	4/21/2019 23:30	1661000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086557	NOT REQUIRED. PIPE DISCHARGES UNDERGROUND DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	4/19/2019 20:45	4/22/2019 22:00	1684800	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086558	NOT REQUIRED. PIPE DISCHARGES DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3317 BROWNSBORO RD	4/19/2019 20:45	4/22/2019 22:00	16848000	Sewer Manhole	26752	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086559	NOT REQUIRED. PIPE DISCHARGES DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN THE IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	1726 FRASER DR	4/19/2019 22:30	4/20/2019 23:15	76000	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086563	NOT REQUIRED. PIPE DISCHARGES DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	4/20/2019 0:35	4/20/2019 13:37	19550	Sewer Lift Station	MSD0101-PS	DITCH	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086537	NO CLEAN UP PERFORMED.	SITE FOUNDED DURING RAIN EVENT. RECON WILL BE MONITORED.
DEREK R. GUTHRIE	KY0078956	8800 ADMIRAL DR	4/20/2019 1:00	4/20/2019 16:30	139500	Sewer Lift Station	MSD1051-PS	STREAM	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086542	CLEANUP NOT POSSIBLE DUE TO MAGNITUDE OF STORM.	SITE FOUND DURING RAIN EVENT. RECON WILL BE MONITORED.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	4/20/2019 1:33	4/21/2019 9:00	22500	Sewer Manhole	47593	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086620	WO#3086809	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1804 ROUND RIDGE RD	4/20/2019 3:30	4/22/2019 12:33	342000	Sewer Manhole	65623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086633	NO PUBLIC ACCESS TO DISCHARGE SITE.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4801 CASSIA CT	4/20/2019 3:30	4/22/2019 12:22	312000	Sewer Manhole	46623	STREAM	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086630	WO#3087210	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	2107 LITTLE CREEK CT	4/20/2019 3:40	4/21/2019 17:25	113250	Sewer Service Line	46602107	GROUND	BROOKLAWN TRIBUTARY	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086659	WO#3086836	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3302 TROUT CREEK DR	4/20/2019 3:40	4/21/2019 17:20	169500	Sewer Manhole	23211	STREAM	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086662	WO#2086833	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3305 INDIAN CREEK CT	4/20/2019 3:45	4/21/2019 17:30	226500	Sewer Manhole	51160	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086661	WO#3086832	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7713 WESTPORT RD	4/20/2019 3:50	4/22/2019 11:51	392000	Sewer Manhole	105936	GROUND	GOOSE CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086627	SITE HAS BEEN CLEANED, RAKED AND SANITIZED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	4/20/2019 4:00	4/21/2019 8:57	261000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086608	WO#3086807	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	4/20/2019 4:00	4/22/2019 11:00	990000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086607	WO#3086806	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	4/20/2019 4:10	4/21/2019 9:00	348000	Sewer Manhole	2933	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086613	WO#3086804	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	4/20/2019 4:14	4/21/2019 20:30	24000	Sewer Manhole	2935	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086612	WO#3086805	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	8021 CHRISTIAN CT	4/20/2019 4:20	4/21/2019 9:00	855000	Sewer Manhole	90700	CATCH BASIN	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086616	WO#3086808	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7913 SHELBYVILLE RD	4/20/2019 4:30	4/21/2019 9:15	261000	Sewer Manhole	84155	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086622	WO#3086810	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1132 ROSTREVOR CIR	4/20/2019 4:55	4/22/2019 10:02	371000	Sewer Manhole	45835	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086564	WO#3087202	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	4/20/2019 5:00	4/22/2019 10:04	1060000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086604	WO#3087204	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	4/20/2019 5:05	4/21/2019 8:30	165000	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086606	WO#3087078	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4315 PRUITT CT	4/20/2019 5:10	4/21/2019 17:00	215000	Sewer Manhole	8426	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086648	CLEAN UP NOT REQUIRED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4332 PRUITT CT	4/20/2019 5:25	4/21/2019 17:10	53625	Sewer Service Line	085100290046 A	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086658	WO#3086839	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4339 PRUITT CT	4/20/2019 5:25	4/21/2019 17:00	107250	Sewer Manhole	8431	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086650	WO#3086831	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4341 PRUITT CT	4/20/2019 5:25	4/21/2019 17:10	214500	Sewer Manhole	8430	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086652	CLEANUP NOT REQUIRED.	LOCATION INCLUDED IN IOAP.
DEREK R. GUTHRIE	KY0078956	9114 CINDERELLA LN	4/20/2019 5:50	4/20/2019 18:00	91250	Sewer Manhole	60679	DITCH	FISHPOOL CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086556	WATER HAS NOT RECEDED.	SITE FOUND DURING RAIN EVENT RECON. WILL BE MONITORED.
MORRIS FORMAN	KY0022411	4319 PRUITT CT	4/20/2019 6:00	4/21/2019 17:00	52500	Sewer Service Line	85076	GROUND	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086655	WO#3086838	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4317 PRUITT CT	4/20/2019 6:03	4/21/2019 17:00	52425	Sewer Service Line	85075	GROUND	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086654	WO#3086837	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3406 DELL RD	4/20/2019 7:50	4/21/2019 8:05	72750	Sewer Manhole	28415	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086636	WO#3086820	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3400 DELL RD	4/20/2019 7:55	4/21/2019 8:45	35225	Sewer Manhole	28414	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086646	WO#3086828	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	2216 FAIRLAND AVE	4/20/2019 8:00	4/20/2019 23:40	70500	Sewer Manhole	49445	GROUND	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086663	WO#3086834	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	4/20/2019 8:00	4/21/2019 8:12	36300	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086637	WO#3086821	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3406 CHARLANE PKY	4/20/2019 8:05	4/21/2019 8:17	36300	Sewer Manhole	28451	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086639	WO#3086822	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3506 CHARLANE PKY	4/20/2019 8:07	4/21/2019 8:22	36375	Sewer Manhole	28250	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086641	WO#3086823	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3500 ST EDWARDS DR	4/20/2019 8:10	4/20/2019 16:10	12000	Sewer Manhole	28249	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086642	WO#3086824	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	9707 WILLOWWOOD WAY	4/20/2019 8:15	4/21/2019 8:30	36375	Sewer Manhole	28336	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086643	WO#3086825	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3620 CHARLANE PKY	4/20/2019 8:17	4/21/2019 8:32	36375	Sewer Manhole	28340	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086645	WO#3086825	LOCATION INCLUDED IN IOAP.

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	2219 RICHLAND AVE	4/20/2019 8:30	4/20/2019 23:40	113750	Sewer Manhole	49446	STREAM	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086664	WO#3086835	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	9514 TAYLORSVILLE RD	4/20/2019 8:30	4/20/2019 15:52	11050	Sewer Manhole	28711	DITCH	BEATTY BROOK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086647	WO#3086829	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	24 SOUTHWIND RD	4/20/2019 10:00	4/20/2019 21:35	17250	Sewer Manhole	89790	DITCH	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086693	WO#3086815	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	37 ARROWHEAD RD	4/20/2019 10:00	4/20/2019 21:35	17250	Sewer Manhole	89791	GROUND	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086692	WO#3086814	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4019 LELAND RD	4/20/2019 10:15	4/20/2019 21:45	34500	Sewer Manhole	96019	GROUND	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086694	WO#3086816	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	9 MUIRFIELD PL	4/20/2019 11:30	4/20/2019 20:50	27000	Sewer Manhole	1793	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086689	WO#3086812	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	8117 COPPERCREEK DR	4/20/2019 11:35	4/20/2019 21:00	42750	Sewer Manhole	65070	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086690	WO#3086813	LOCATION INCLUDED IN THE IOAP.
CEDAR CREEK	KY0098540	8809 CEDAR CREEK RD	4/20/2019 11:53	4/22/2019 12:46	36200	Sewer Manhole	98024	GROUND	CEDAR CREEK	LACK OF SYSTEM CAPACITY DUE TO RAIN EVENT.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086656	MSD CLEANED AND SANITIZED AREA.	CLEAN UP WILL BE PERFORMED AFTER DISCHARGE STOPS.
MORRIS FORMAN	KY0022411	1108 DUPONT CIR	4/20/2019 12:05	4/20/2019 22:00	15000	Sewer Manhole	43726	GROUND	WEICHER CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086666	WO#3086811	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3928 DUTCHMANS LN	4/20/2019 12:05	4/20/2019 22:00	30000	Sewer Service Line	Z18284029	GROUND	WEICHER CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086674	MSD CLEANED IMPACTED AREA.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	5901 DUTCHMANS LN	4/20/2019 13:05	4/20/2019 22:00	13500	Sewer Manhole	74512	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086696	WO#3086818	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	974 BRECKENRIDGE LN	4/20/2019 13:10	4/20/2019 21:45	12750	Sewer Manhole	74520	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086695	WO#3086817	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	2408 GRAY FOX RD	4/20/2019 13:35	4/22/2019 10:00	534000	Sewer Manhole	27012	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086697	WO#3087209	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1910 CHARBDIN PL	4/21/2019 12:15	4/21/2019 23:50	11500	Sewer Manhole	117953	GROUND	MUDDY FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086786	NO CLEAN UP PERFORMED.	SITE FOUND DURING RAIN EVENT RECON. WILL BE MONITORED.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	4/25/2019 19:40	4/26/2019 8:47	570	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3089961	CLEAN UP IS NOT REQUIRED. PIPE IS SUBMERGED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	4/25/2019 19:45	4/27/2019 1:15	1680000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3089976	NO CLEAN UP PERFORMED. NO PUBLIC ACCESS TO THE DISCHARGE SITE.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	2408 GRAY FOX RD	4/25/2019 20:50	4/27/2019 6:30	100500	Sewer Manhole	27012	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3089972	WO#3093773	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	4/25/2019 20:55	4/26/2019 12:00	135000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3089973	WO#3090199	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1726 FRASER DR	4/26/2019 17:30	4/26/2019 17:45	570	Sewer Manhole	16649	DITCH	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3098921	NO CLEANUP REQUIRE. DISCHARGING PIPE IS SUBMERGED.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	5/3/2019 7:15	5/6/2019 13:53	244587	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100611	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	5/3/2019 8:15	5/3/2019 22:45	2964000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100612	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	5/3/2019 8:40	5/3/2019 11:45	925	Sewer Manhole	25484	STREAM	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100375	AREA DISINFECTED WITH LIME.	LOCATION FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	2408 GRAY FOX RD	5/3/2019 8:56	5/3/2019 17:02	97200	Sewer Manhole	27012	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100621	WO#3090373	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	5/3/2019 8:59	5/3/2019 17:35	75750	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100623	WO#3090199	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	1700 SULGRAVE RD	5/3/2019 9:09	5/3/2019 17:40	51100	Sewer Manhole	72289	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100626	WO#3100847	LOCATION INCLUDED IN THE IOAP.
FLOYDS FORK	KY0102784	815 TUCKER STATION RD	5/3/2019 9:10	5/3/2019 10:55	2625	Sewer Manhole	33003	STREAM	POPE LICK	LACK OF CAPACITY. HEAVY RAIN	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100429	WO#3100528	A SOLUTION FOR THIS IS INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 DELL RD	5/3/2019 9:42	5/3/2019 20:45	16575	Sewer Manhole	28415	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100638	WO#3100638	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	8800 ADMIRAL DR	5/3/2019 9:47	5/3/2019 12:00	13300	Sewer Manhole	93705	STREAM	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100439	AREA DISINFECTED WITH LIME.	LOCATION FOUND IN THE IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	5/3/2019 9:58	5/4/2019 10:01	34625	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100639	WO#3100854	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	5/3/2019 10:06	5/3/2019 18:20	49000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100636	WO#3100852	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	5/3/2019 10:06	5/3/2019 18:15	97800	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100629	WO#3100850	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3406 CHARLANE PKY	5/3/2019 10:10	5/3/2019 20:50	16000	Sewer Manhole	28451	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100641	WO#3100855	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3500 ST EDWARDS DR	5/3/2019 10:15	5/3/2019 13:54	5475	Sewer Manhole	28249	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100643	WO#3100856	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4315 PRUITT CT	5/3/2019 10:21	5/3/2019 13:56	11300	Sewer Manhole	8426	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100648	CLEAN UP NOT REQUIRED. NO VISABLE SIGNS OF DEBRIS ON OR AROUND MANHOLE.	LOCATION INCLUDED IN THE IOAP.

Appendix D-1 Discharge Work Orders – Waters of the United States

ASSOCIATED WASTEWATER TREATMENT PLANT NAME	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW LOCATION	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	FACILITY DISCHARGES TO	RECEIVING STREAM	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	9707 WILLOWWOOD WAY	5/3/2019 10:26	5/3/2019 20:57	31550	Sewer Manhole	28336	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITIY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100646	WO#3100858	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	3620 CHARLANE PKY	5/3/2019 10:32	5/3/2019 21:04	15800	Sewer Manhole	28340	GROUND	CHENOWETH RUN	LACK OF SYSTEM CAPACITIY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100644	WO#3100859	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4337 PRUITT CT	5/3/2019 10:57	5/3/2019 11:57	600	Sewer Manhole	8429	GROUND	BUECHEL BRANCH	LACK OF SYSTEM CAPACITIY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100649	CLEAN UP NOT REQUIRED. NO VISABLE SIGNS OF DEBRIS ON OR AROUND MANHOLE.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	4341 PRUITT CT	5/3/2019 10:57	5/3/2019 11:58	600	Sewer Manhole	8430	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITIY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100650	CLEAN UP NOT REQUIRED. NO VISABLE SIGNS OF DEBRIS ON OR AROUND MANHOLE.	LOCATION INCLUDED IN THE IOAP.
FLOYDS FORK	KY0102784	15302 CRYSTAL SPRINGS WAY	5/9/2019 16:44	5/9/2019 18:18	940	Sewer Main	80289	STREAM	KLEMENZ CREEK	LINE BREAK OCCURRED WHILE PLUMBER TYING IN CONNECTION.	UTILITY DAMAGED MSD ASSET	DRY WEATHER DISCHARGE	3102538	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA.	PUMPS SET TO PUMP AROUND LINE BREAK. CONTRACTOR TO REPAIR DAMAGED MAIN AND STREAM BANK.
MORRIS FORMAN	KY0022411	10401 FOREST GARDEN LN	5/15/2019 20:00	5/15/2019 22:10	600	Sewer Manhole	92106	GROUND	MIDDLE FORK BEARGRASS CREEK	ROOTS IN MANHOLE.	ROOTS	DRY WEATHER DISCHARGE	3104340	CLEAN UP ACTIVITIES PERFORMED.	FLUSHED AND PULLED ROOTS FROM MANHOLE.
FLOYDS FORK	KY0102784	611 WOODLAKE DR	5/16/2019 18:30	5/16/2019 18:45	150	Sewer Main	80581B-AG	STREAM	FLOYDS FORK	STRUCTURAL FAILURE. FORCE MAIN BREAK.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3104799	CLEAN UP ACTIVITIES WILL BE PERFORMED AFTER REPAIR IS DONE.	TURNED OFF PUMP FOR THIS FORCE MAIN.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	5/29/2019 15:15	5/29/2019 18:45	300000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY. HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3113155	CLEAN UP NOT REQUIRED. MANHOLE DISCHARGES DIRECTLY INTO THE CREEK.	LOCATION INCLUDED IN THE IOAP.
MORRIS FORMAN	KY0022411	329 W MAIN ST	5/30/2019 10:40	5/30/2019 10:50	1000	Sewer Main	75126-AG	CATCH BASIN	OHIO RIVER	STRUCTURAL FAILURE AT FORCE MAIN CLEANOUT MANHOLE.	STRUCTURAL FAILURE	RAIN EVENT DISCHARGE	3113373	NOT NEEDED. DISCHARGE FLOWED DIRECTLY TO DRAIN GRATE DURING REV.	1 PUMP TAKEN OUT OF SERVICE UNTIL REPAIRS CAN BE MADE.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	6/9/2019 1:22	6/10/2019 16:21	1037000	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117247	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	6/9/2019 3:41	6/11/2019 1:45	7100000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117248	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	2408 GRAY FOX RD	6/9/2019 19:53	6/10/2019 10:14	105000	Sewer Manhole	27012	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSEM CAPACITIY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117312	WO#3117973.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	202 OXMOOR LN	6/9/2019 20:00	6/11/2019 8:45	666000	Sewer Manhole	47583	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117314	WO#3118213.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1011 ALTA CIR	6/9/2019 20:05	6/10/2019 10:26	162000	Sewer Manhole	45796	DITCH	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSEM CAPACITIY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117313	WO#3117974.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	201 BULLITT LN	6/9/2019 20:30	6/11/2019 8:45	270000	Sewer Manhole	47582	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117315	WO#3118214.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7900 SHELBYVILLE RD	6/9/2019 20:40	6/10/2019 9:30	975000	Sewer Manhole	2933	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117316	WO#3117976	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	7913 SHELBYVILLE RD	6/9/2019 20:50	6/10/2019 9:35	975000	Sewer Manhole	84155	GROUND	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117319	WO#3117978.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4315 PRUITT CT	6/9/2019 21:33	6/9/2019 23:17	2600	Sewer Manhole	8426	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117320	CLEAN UP NOT REQUIRED, NO VISABLE SIGNS OF DEBRIS ON OR AROUND MANHOLE.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4341 PRUITT CT	6/9/2019 22:03	6/9/2019 23:17	1800	Sewer Manhole	8430	GROUND	SOUTH FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117322	CLEAN UP NOT REQUIRED, NO VISABLE SIGNS OF DEBRIS ON OR AROUND MANHOLE.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	4337 PRUITT CT	6/9/2019 22:05	6/9/2019 23:17	1800	Sewer Manhole	8429	GROUND	BUECHEL BRANCH	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3117321	CLEAN UP NOT REQUIRED, NO VISABLE SIGNS OF DEBRIS ON OR AROUND MANHOLE.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	6/16/2019 22:30	6/19/2019 1:30	2400000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3119623	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN THE IOAP.
DEREK R. GUTHRIE	KY0078956	9317 LANTANA DR	6/17/2019 1:50	6/17/2019 3:30	2500	Sewer Manhole	25484	STREAM	PENNSYLVANIA RUN	LACK OF SYSTEM CAPACITY.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3119612	NO CLEAN UP PERFORMED.	SITE FOUND DURING RAIN EVENT RECON.
CEDAR CREEK	KY0098540	8405 CEDAR CREEK RD	6/17/2019 7:10	6/17/2019 7:13	300	Sewer Treatment Plant	MSD0289	GROUND	CEDAR CREEK	THERE WAS HEAVY RAIN.	BYPASS AT WQTC	RAIN EVENT DISCHARGE	3119657	THERE WAS NOT ANY DEBRIS.	WE OPENED SAND FILTER BYPASS GATE.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	6/18/2019 8:13	6/18/2019 23:05	5664	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3122417	NO CLEANUP REQUIRED. MANHOLE IS DISCHARGING DIRECTLY INTO CREEK.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3506 CHARLANE PKY	6/18/2019 21:45	6/19/2019 7:30	585	Sewer Manhole	28250	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3122418	CLEAN UP NOT REQUIRED, NO VISABLE SIGNS OF DEBRIS ON OR AROUND MANHOLE.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	3402 CHARLANE PKY	6/18/2019 22:00	6/19/2019 7:35	575	Sewer Manhole	28453	DITCH	CHENOWETH RUN	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3122419	CLEAN UP NOT REQUIRED NO SOLIDS OR DEBRIS OBSERVED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1001 BRECKENRIDGE LN	6/24/2019 15:27	6/24/2019 18:15	1400	Sewer Manhole	08935-SM	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3126494	NO CLEANUP REQUIRED DISCHARGE. PIPE IS SUBMERGED.	LOCATION INCLUDED IN IOAP.
MORRIS FORMAN	KY0022411	1201 OLD CANNONS LN	6/24/2019 15:45	6/25/2019 1:30	700000	Sewer Manhole	IS021A-SI	STREAM	MIDDLE FORK BEARGRASS CREEK	LACK OF SYSTEM CAPACITY HEAVY RAIN.	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3126496	NO CLEANUP REQUIRED DISCHARGE. PIPE IS SUBMERGED.	LOCATION INCLUDED IN IOAP.
DEREK R. GUTHRIE	KY0078956	10402 W MANSICK RD	6/25/2019 10:10	6/25/2019 12:00	200	Sewer Manhole	61539	DITCH	BEE LICK CREEK	STONE AND DEBRIS BUILD UP 10' UPSTREAM OF MANHOLE 61505.	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3126646	NO CLEANUP NEEDED AT THIS LOCATION.	WE FLUSHED MAIN SEWER FROM DOWNSTREAM MANHOLE.
MORRIS FORMAN	KY0022411	816 N 34TH ST	6/28/2019 7:00	7/2/2019 14:12	9000	Sewer Manhole	CSO019	STREAM	OHIO RIVER	INTERIOR BUILDING POWER FAIL.	ELECTRICAL PROBLEMS AT MSD	DRY WEATHER DISCHARGE	3127540	NO CLEAN UP REQUIRED.	MSD PERSONNEL RESTORED POWER AND STARTED PUMPS.

Appendix D-2 Discharge Work Orders – Ground

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Appendix D-2 Discharge Work Orders – Ground

ASSOCIATED WASTEWATER TREATMENT PLANT NAME	OVERFLOW LOCATION #	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
CEDAR CREEK	KY0098540	9707 CEDAR CREEK RD	7/4/2018 12:30	7/4/2018 12:35	2000	Sewer Valve	98165B-V	BROKEN ARV VALVE ON FORCEMAIN	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2944566	CONTRACTOR AND MSD PERSONNEL CLEANED AND SANITIZED AREA	SHUT OFF PUMP STATIONS FEEDING THE 8" FORCEMAIN AND SWITCHED OVER TO THE 18" FORCEMAIN TO ALLOW FOR ARV VALVE REPLACEMENT
DEREK R. GUTHRIE	KY0078956	4324 HICKORY TRACE DR	7/10/2018 11:15	7/10/2018 14:13	25	Sewer Manhole	95160	OBSTRUCTION IN THE LINE	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2945872	MSD PERSONNEL LIMED AND CLEANED THE AREA	FLUSH MAIN SEWER TO OPEN LINE, HEN TV LINE TO SEE WHAT IS CAUSING BACK UP**CREW DUG DOWN AND REPAIRED THE 8" MAIN SEWER
MORRIS FORMAN	KY0022411	508 HILL RIDGE RD	7/20/2018 9:10	7/20/2018 10:10	25	Sewer Manhole	55083	ROOT BLOCAKGE IN MAIN SEWER	ROOTS	DRY WEATHER DISCHARGE	2950753	MSD PERSONNEL CLEANED AND SANITIZED IMPACTED AREA	ROOT CUT MAIN SEWER TO RESTORE FLOW AND REMOVE ROOTS
MORRIS FORMAN	KY0022411	3508 GLADDEN DR	8/6/2018 11:28	8/6/2018 12:15	30	Sewer Service Line	087F00140000A	GREASE IN THE MAIN SEWER	GREASE BLOCKAGE	DRY WEATHER DISCHARGE	2958895	MSD WILL CLEAN AREA	ROOT CUT GREASE
MORRIS FORMAN	KY0022411	334 E BROADWAY	8/14/2018 14:41	8/14/2018 15:15	25	Sewer Manhole	25540	DURING REPAIR OF STRUCTURAL FAILURE AT BROADWAY AND PRESTON, PUMPAROUND DISCHARGED DUE TO VALVE NOT BEING CAPPED.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2963708	CONTRACTOR CLEANED & SANITIZED AREA.	CONTRACTOR VALVED OFF PUMP.
DEREK R. GUTHRIE	KY0078956	9612 MAPLE RD	8/16/2018 11:30	8/16/2018 12:05	100	Sewer Service Line	PD21118059	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965054	MSD PERSONNEL WILL CLEAN AND SANITIZE IMPACTED AREA	INVESTIGATION INDICATED THAT FURTHER REPAIRS WERE NOT REQUIRED BY MSD
FLOYDS FORK	KY0102784	1120 BLACKTHORN RD	8/16/2018 12:15	8/16/2018 12:31	1	Sewer Manhole	46316	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964994	NONE REQUIRED AT THIS TIME	NO FURTHER ACTION REQUIRED
MORRIS FORMAN	KY0022411	5815 BRITTANY WOODS CIR	8/24/2018 14:15	8/24/2018 14:19	200	Sewer Valve	69059A-V	MECHANICAL FAILURE OF GATE VALVE DURING AIR RELIEF VALVE REPLACEMENT	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	2971183	MSD AND CONTRACTOR CLEANED AND SANITIZED AFFECTED AREA	PUMPS AT PUMP STATION SHUT OFF WHILE REPAIRS MADE
FLOYDS FORK	KY0102784	103 BECKLEY WOODS DR	9/16/2018 19:06	9/17/2018 22:37	2	Sewer Manhole	104939	ROOTS IN THE MAIN SEWER	ROOTS	DRY WEATHER DISCHARGE	2982547	CREW PUT DOWN LIME AROUND MANHOLE	ROOT CUT MAIN SEWER
MORRIS FORMAN	KY0022411	4522 ALGONQUIN PKY	9/20/2018 10:54	9/20/2018 19:30	45000	Sewer Treatment Plant	MSD0278	DIGESTER #1 PLUGGED WITHDRAW LINE AND MECH ISSUES WITH TRANSFER PUMP.	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	2984098	STAFF CLEANING UP STREET AND DIGESTER BASEMENT AREA	MAINT WORKING ON WITHDRAWAL LINE BLOCKAGE AND TRANSFER PUMP ISSUES
DEREK R. GUTHRIE	KY0078956	1710 LAMKINS CT	9/24/2018 11:45	9/24/2018 13:30	100	Sewer Manhole	4698	UNKNOWN OBSTRUCTION IN MSD'S SEWER MAIN	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	2984990	MSD PERSONNEL WILL CLEAN IMPACTED AREA	FLUSHED MAIN SEWER TO RESTORE FLOW
CEDAR CREEK	KY0098540	10800 FAIRMOUNT RD	9/25/2018 18:15	9/25/2018 18:20	20	Sewer Manhole	97363	LACK OF SYSTEM HEAVY RAIN	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985585	CREATED DISCLN WO# 2985593	ADVISED CUSTOMER AND NOTIFIED PUBLIC
FLOYDS FORK	KY0102784	815 TUCKER STATION RD	9/25/2018 19:25	9/25/2018 19:40	100	Sewer Manhole	33003	LACK OF SYSTEM HEAVY RAIN	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985592	CREATED DISCLN WO# 2985594	ADVISED CUSTOMER AND NOTIFIED PUBLIC
MORRIS FORMAN	KY0022411	4522 ALGONQUIN PKY	9/27/2018 14:45	10/10/2018 9:14	7000	Sewer Treatment Plant	MSD0278	FEPS PUMP LACK OF FLOW	MECHANICAL FAILURE	RAIN EVENT DISCHARGE	2986228	NONE	WENT TO ONE FEPS FLOW
CEDAR CREEK	KY0098540	12702 SEATONVILLE RD	10/3/2018 13:25	10/3/2018 13:30	250	Sewer Valve	116313A-V	MECHANICAL FAILURE OF ARV	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	2991629	MSD PERSONNEL CLEANED AND SANITIZED THE IMPACTED AREA	REPAIRED THE ARV (2991631)
DEREK R. GUTHRIE	KY0078956	9733 BUCKINGHAM DR	10/23/2018 21:00	10/23/2018 21:41	1	Sewer Service Line	13778A9733	BLOCKAGE MSD MAIN SEWER LINE	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2999425	UNKNONW AT THSI TIME	CREW DUG DOWN AND MADE REPAIRS
HITE CREEK	KY0022420	5500 HITT RD	11/8/2018 9:00	11/8/2018 9:05	500	Sewer Treatment Plant	MSD0202	BROKEN PROCESS WATER PIPE	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3008313	NONE	CONTRACTOR MAKING REPAIRS; WATER TURNED OFF IMMEDIATELY
CEDAR CREEK	KY0098540	9705 FAIRMOUNT RD	12/1/2018 13:00	12/1/2018 13:12	5	Sewer Service Line	171223	SURCHARGE SEWER MAIN	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	3018125	UNKNOWN AT THIS TIME	PUT CONE ON SURCHARGE SEWER
MORRIS FORMAN	KY0022411	4522 ALGONQUIN PKY	12/3/2018 1:20	12/3/2018 11:00	10	Sewer Treatment Plant	MSD0278	DIGESTER OVERFLOWED DUE TO SOLIDS INVENTORY AND RAIN EVENT THAT OCCURRED OVER THE WEEKEND	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3019032	OPS AND SES WILL CLEAN WALL.	OPENED INTERCONNECT AND EQUALIZED DIGESTERS
CEDAR CREEK	KY0098540	6720 BARDSTOWN RD	12/11/2018 2:05	12/11/2018 10:04	100	Sewer Manhole	46777	MANHOLE 46777 FULL OF ROOTS	ROOTS	DRY WEATHER DISCHARGE	3022390	UNKNOWN AT THIS TIME	FLUSHED LINE TO RESTORE FLOW FLUSH W/O#3022528
MORRIS FORMAN	KY0022411	6220 DUTCHMANS LN	12/17/2018 10:50	12/17/2018 10:50	20	Sewer Lift Station	MSD0011-LS	CONTRACTOR DISCONNECTING HOSE ON VACTOR TRUCK AND SPILLED CONTENTS OF HOSE ONTO GROUND AT PUMP STATION	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3024092	CONTRACTOR CLEANED/SANITIZED IMPACTED AREA	CHANGED OUT LEAKING HOSE
DEREK R. GUTHRIE	KY0078956	3706 NOBEL CT	1/3/2019 9:30	1/3/2019 9:35	1000	Sewer Main	06940D-AG	STRUCTURAL FAILURE (FORCEMAIN BREAK)	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3033470	AREA DISINFECTED WITH LIME	"SHUT OFF PUMP STATION TO STOP DISCHARGE. DERBY CITY HAULED STATION WHILE CHEROKEE CONSTRUCTION REPAIRED FORCEMAIN. (REPAIR WORK ORDER # 3033417)"
MORRIS FORMAN	KY0022411	1578 LONEY LN	1/3/2019 16:34	1/3/2019 16:50	1	Sewer Main	51878D-AG	STRUCTURAL FAILURE OF FORCE MAIN	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3033883	NO CLEAN UP PERFORMED , AWAITING REPAIR	1 PUMP SHUT OFF TO MITIGATE LEAKAGE AND REPAIR TO BE DONE ON 1-4-19
MORRIS FORMAN	KY0022411	4522 ALGONQUIN PKY	1/15/2019 5:00	1/15/2019 5:45	50	Sewer Treatment Plant	MSD0278	DIGESTER OUTLET REXA WERE CLOSED CAUSING THE LEVEL TO INCREASE IN DIGESTERS 1 AND 4. THIS RESULTED IN A SMALL AMOUNT OF DIGESTED SLUDGE TO SPILL.	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3038655	DIGESTED SLUDGE SPILLED INTO CONCRETE TROUGH AND WAS WASHED BACK INTO THE PLANT DRAINS THAT GO TO PRIMARY TREATMENT	DIGESTER OUTLET REXA'S WERE OPEN.
MORRIS FORMAN	KY0022411	4522 ALGONQUIN PKY	2/18/2019 19:00	3/5/2019 10:46	6200	Sewer Treatment Plant	MSD0278	FEPS RECIRCULATION LINE WAS OPEN TOO WIDE	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3056089	NONE	CLOSED FEPS RECIRCULATION LINE
MORRIS FORMAN	KY0022411	2323 RALPH AVE	2/25/2019 20:00	2/25/2019 20:37	1	Sewer Main	6395	ROOTS IN THE MAIN	ROOTS	DRY WEATHER DISCHARGE	3057907	UNKNOWN AT THIS TIME	CREW REMOVED ROOTS
MORRIS FORMAN	KY0022411	4522 ALGONQUIN PKY	2/27/2019 7:48	2/27/2019 7:57	1000000	Sewer Treatment Plant	MSD0278	SURGE IN FLOW CAUSED SEC FEPS PUMP TO KICK ON AND SEND TO MUCH WATER THROUGH THE RECIRCULATION VALVES.	MECHANICAL FAILURE	RAIN EVENT DISCHARGE	3058526	NONE	NEED VFDS, UPDATE LEVEL CONTROL DEVICES AND AUTOMATED RECIRCULATION VALVES
MORRIS FORMAN	KY0022411	1 AUTOCENTER DR	3/7/2019 15:00	3/7/2019 17:30	15	Sewer Manhole	46237	OBSTRUCTION IN THE MAIN	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3064870	NONE AT THIS TIME UNTIL DISCHARGE IS STOPPED, MITIGATING FLOW TO ONE AREA	FLUSHING TO CLEAR OBSTRUCTION IN SANITARY MAIN
MORRIS FORMAN	KY0022411	5415 WINDING RD	3/20/2019 13:00	3/20/2019 13:30	1	Sewer Manhole	55127	OBSTRUCTION IN MSD'S MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3069502	MSD PERSONNEL WILL CLEAN IMPACTED AREA	FLUSHED MAIN SEWER TO RESTORE FLOW
CEDAR CREEK	KY0098540	2360 AMPERE DR	3/25/2019 15:00	3/25/2019 16:00	15	Sewer Manhole	29261	STRUCTURAL ISSUES IN SANITARY MAIN	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3071772	TREATED CONTAMINATED AREA WITH LIME. BAGGED SOLIDS	CREW DUG DOWN AND MADE REPAIRS
DEREK R. GUTHRIE	KY0078956	3915 OAKLAWN DR	3/27/2019 14:42	3/27/2019 15:48	10000	Sewer Manhole	120572	CONTRACTOR PERFORMING SEWER REHAB HAD PUMP-AROUND MALFUNCTION.PUG BLOCKED MANHOLE AND CAUSED OVERFLOW.	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3074328	MSD CONTRACTOR CLEANED AND SANITIZED THE IMPACTED AREA	REMOVED THE OBSTRUCTION / DEBRIS FROM THE SEWER (PUMP AROUND PLUG)
DEREK R. GUTHRIE	KY0078956	1100 LONE OAK AVE	3/28/2019 19:20	3/28/2019 20:01	10	Sewer Main	85311	ROCK AND RAGS IN THE MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3077961	WASHED DOWN IMPACTED AREA	FLUSHED MAIN AND GOT IT OPEN.
DEREK R. GUTHRIE	KY0078956	3813 OAKLAWN DR	4/1/2019 18:06	4/1/2019 18:11	100	Sewer Manhole	15110	OBSTRUCTION IN MANHOLE. CONTRACTOR PUMP-AROUND FAILED	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3080701	MSD CONTRACTOR CLEANED AND SANITIZED THE IMPACTED AREA	REPAIRED THE PUMP PLUG

Appendix D-2 Discharge Work Orders – Ground

ASSOCIATED WASTEWATER TREATMENT PLANT NAME	OVERFLOW LOCATION #	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
DEREK R. GUTHRIE	KY0078956	3813 OAKLAWN DR	4/2/2019 18:06	4/2/2019 16:36	1000	Sewer Manhole	15110	CONTRACTOR PUMP-AROUND FAILED - BLOWN HOSE	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3081073	MSD CONTRACTOR CLEANED AND SANITIZED THE IMPACTED AREA	REPAIRED THE HOSE
MORRIS FORMAN	KY0022411	3037 BEAUMONT RD	4/20/2019 18:50	4/20/2019 19:30	3	Sewer Service Line	4686	SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086737	UNKNOWN AT THIS TIME	MAIN SEWER HAD TO CATCH UP
FLOYDS FORK	KY0102784	605 WOODLAKE DR	4/23/2019 11:25	4/23/2019 16:30	10	Sewer Main	80377A-AG	STRUCTURAL FAILURE, FORCE MAIN BREAK	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	3087701	AREA DISINFECTED WITH LIME	CHEROKEE CONSTRUCTION REPAIRED BROKEN FORCE MAIN
MORRIS FORMAN	KY0022411	4522 ALGONQUIN PKY	4/26/2019 14:50	4/26/2019 17:13	1500	Sewer Lift Station	MSD0278A-PS	FEPS IS IN SERVICE OPERATION TECHS ARE MANUALLY MAINTAINING WELL LEVEL BY ADJUSTING FEPS PUMP BYPASS VALVE. FEPS PUMPS BYPASS VALVE WAS OPEN TO WIDE	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	3090319	NONE	OPERATION TECH MADE ADJUSTMENT TO FEPS PUMP BYPASS VALVE
MORRIS FORMAN	KY0022411	3402 BRECKENRIDG E LN	5/17/2019 22:40	5/17/2019 23:40	1	Sewer Service Line	BJ13091039	ROOTS IN THE MAIN SEWER	ROOTS	DRY WEATHER DISCHARGE	3107899	CUSTOMER CLEANED IMPACTED AREA	FLUSHED & ROOT CUT MAIN SEWER REMOVED OBSTRUCTION
HITE CREEK	KY0022420	6507 OVERBROOKE CT	5/24/2019 17:40	5/24/2019 19:00	5	Sewer Service Line	14741P6	STONE IN MAIN	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3109776	UNKNOWN AT THIS TIME	FLUSHED AND VACTORED MAIN;REFER TO TVI
MORRIS FORMAN	KY0022411	101 W WITHERSPOON ST	6/6/2019 10:22	6/6/2019 15:00	260	Sewer Main	75200-AG	CONTRACTOR DAMAGE FORCE MAIN SEWER LINE	UTILITY DAMAGED MSD ASSET	RAIN EVENT DISCHARGE	3115792	CONTRACTOR PUMPED DISCHARGED CONTENTS INTO MANHOLE TO BE TREATED AT MFWQTP.	CONTRACTOR REPAIR PIPE TO MSD STANDARDS.
MORRIS FORMAN	KY0022411	4522 ALGONQUIN PKY	6/26/2019 9:30	6/27/2019 10:36	150	Sewer Treatment Plant	MSD0278	BACKUP IN SHOWER DRAIN IN 3RD FLOOR LOCKER ROOM, MAIN EQUIPMENT BUILDING	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3126823	OPERATOR HOSED AREA	CALLED PLUMBER
CEDAR CREEK	KY0098540	9707 CEDAR CREEK RD	7/4/2018 12:30	7/4/2018 12:35	2000	Sewer Valve	98165B-V	BROKEN ARV VALVE ON FORCEMAIN	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2944566	CONTRACTOR AND MSD PERSONNEL CLEANED AND SANITIZED AREA	SHUT OFF PUMP STATIONS FEEDING THE 8" FORCEMAIN AND SWITCHED OVER TO THE 18" FORCEMAIN TO ALLOW FOR ARV VALVE REPLACEMENT
DEREK R. GUTHRIE	KY0078956	4324 HICKORY TRACE DR	7/10/2018 11:15	7/10/2018 14:13	25	Sewer Manhole	95160	OBSTRUCTION IN THE LINE	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2945872	MSD PERSONNEL LIME D AND CLEANED THE AREA	FLUSH MAIN SEWER TO OPEN LINE, HEN TV LINE TO SEE WHAT IS CAUSING BACK UP**CREW DUG DOWN AND REPAIRED THE 8" MAIN SEWER
MORRIS FORMAN	KY0022411	508 HILL RIDGE RD	7/20/2018 9:10	7/20/2018 10:10	25	Sewer Manhole	55083	ROOT BLOCAKGE IN MAIN SEWER	ROOTS	DRY WEATHER DISCHARGE	2950753	MSD PERSONNEL CLEANED AND SANITIZED IMPACTED AREA	ROOT CUT MAIN SEWER TO RESTORE FLOW AND REMOVE ROOTS
MORRIS FORMAN	KY0022411	3508 GLADDEN DR	8/6/2018 11:28	8/6/2018 12:15	30	Sewer Service Line	087F00140000A	GREASE IN THE MAIN SEWER	GREASE BLOCKAGE	DRY WEATHER DISCHARGE	2958895	MSD WILL CLEAN AREA	ROOT CUT GREASE
MORRIS FORMAN	KY0022411	334 E BROADWAY	8/14/2018 14:41	8/14/2018 15:15	25	Sewer Manhole	25540	DURING REPAIR OF STRUCTURAL FAILURE AT BROADWAY AND PRESTON, PUMPAROUND DISCHARGED DUE TO VALVE NOT BEING CAPPED.	STRUCTURAL FAILURE	DRY WEATHER DISCHARGE	2963708	CONTRACTOR CLEANED & SANITIZED AREA.	CONTRACTOR VALVED OFF PUMP.
DEREK R. GUTHRIE	KY0078956	9612 MAPLE RD	8/16/2018 11:30	8/16/2018 12:05	100	Sewer Service Line	PD21118059	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965054	MSD PERSONNEL WILL CLEAN AND SANITIZE IMPACTED AREA	INVESTIGATION INDICATED THAT FURTHER REPAIRS WERE NOT REQUIRED BY MSD
FLOYDS FORK	KY0102784	1120 BLACKTHORN RD	8/16/2018 12:15	8/16/2018 12:31	1	Sewer Manhole	46316	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2964994	NONE REQUIRED AT THIS TIME	NO FURTHER ACTION REQUIRED
MORRIS FORMAN	KY0022411	5815 BRITTANY WOODS CIR	8/24/2018 14:15	8/24/2018 14:19	200	Sewer Valve	69059A-V	MECHANICAL FAILURE OF GATE VALVE DURING AIR RELIEF VALVE REPLACEMENT	MECHANICAL FAILURE	DRY WEATHER DISCHARGE	2971183	MSD AND CONTRACTOR CLEANED AND SANITIZED AFFECTED AREA	PUMPS AT PUMP STATION SHUT OFF WHILE REPAIRS MADE

Appendix D-3 Discharge Work Orders – Interior

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Appendix D-3 Discharge Work Orders – Interior

ASSOCIATED WASTEWATER TREATMENT PLANT NAME	OVERFLOW LOCATION #	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	3100 DIXIE HWY	7/9/2018 13:00	7/9/2018 13:46	1	Sewer Service Line	100900300000A	GREASE BLOCKAGE IN MAIN SEWER	GREASE BLOCKAGE	DRY WEATHER DISCHARGE	2945603	UNKNOWN AT THIS TIME	FLUSHED MAIN SEWER TO RESTORE FLOW
MORRIS FORMAN	KY0022411	4531 SOUTHERN PKY	8/16/2018 10:30	8/16/2018 11:05	10	Sewer Service Line	057F00250000A	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965044	MSD PERSONNEL ADVISED CUSTOMER THAT THEY ARE RESPONSIBLE TO CLEAN IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	4101 GLOUCESTER RD	8/16/2018 11:20	8/16/2018 11:56	20	Sewer Service Line	130990	ROOTS IN THE MAIN SEWER	ROOTS	RAIN EVENT DISCHARGE	2964964	CUSTOMER CLEANED THE IMPACTED AREA	ROOT CUT TO GET OPEN.
DEREK R. GUTHRIE	KY0078956	7901 BROADFERN DR	8/16/2018 12:30	8/16/2018 12:55	1	Sewer Service Line	BW06677019	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965117	MSD PERSONNEL ADVISED CUSTOMER THAT THEY ARE RESPONSIBLE TO CLEAN IMPACTED AREA	INVESTIGATIO INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	7911 BROADFERN DR	8/16/2018 12:30	8/16/2018 12:55	1	Sewer Service Line	BW06673029	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965126	MSD PERSONNEL ADVISED CUSTOMER THAT THEY ARE RESPONSIBLE TO CLEAN IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	7913 BROADFERN DR	8/16/2018 12:30	8/16/2018 12:55	1	Sewer Service Line	BW06672019	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965136	MSD PERSONNEL ADVISED CUSTOMER THAT THEY ARE RESPONSIBLE TO CLEAN IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	4709 WALNUT GROVE AVE	8/16/2018 12:35	8/16/2018 13:45	1	Sewer Service Line	DE27282029	OBSTRUCTION IN MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	2965103	CUSTOMER ADVISED MSD PERSONNEL THAT THEY WILL CLEAN THE IMPACTED AREA	FLUSHED MAIN SEWER
FLOYDS FORK	KY0102784	12202 BROOKGREEN DR	8/16/2018 12:45	8/16/2018 13:20	20	Sewer Service Line	181801400000B	ROOTS IN THE MAIN SEWER	ROOTS	RAIN EVENT DISCHARGE	2965030	CUSTOMER ADVISED MSD THEY WILL CLEAN THE IMPACTED AREA	ROOT CUT THE MAIN SEWER TO GET OPEN. REFER TO ROOT CUT WORK ORDER
DEREK R. GUTHRIE	KY0078956	8215 SIESTA WAY	8/16/2018 14:15	8/16/2018 14:45	1	Sewer Service Line	PC12110019	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965141	MSD PERSONNEL ADVISED CUSTOMER THAT THEY ARE RESPONSIBLE TO CLEAN IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	8301 SIESTA WAY	8/16/2018 14:45	8/16/2018 15:10	1	Sewer Service Line	PC12096029	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2965147	MSD PERSONNEL ADVISED CUSTOMER THAT THEY ARE RESPONSIBLE TO CLEAN IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	335 W BROADWAY	8/20/2018 14:50	8/20/2018 15:20	1	Sewer Service Line	10564	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2968046	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	9810 BLUEGRASS PKY	9/5/2018 12:19	9/5/2018 13:30	1	Sewer Service Line	174887	ROOTS IN MSD INSTALLED MANHOLE	ROOTS	DRY WEATHER DISCHARGE	2976513	CUSTOMER REPORTED BACKUP FROM FACILITIES	REMOVED ROOTS FROM MANHOLE TO RESTORE FLOW
MORRIS FORMAN	KY0022411	2454 LINDBERGH DR	9/9/2018 0:00	9/9/2018 0:07	1	Sewer Service Line	60418	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977393	CUSTOMER RESPONSIBLE FOR CLEANING IMPACTED AREA	NONE TAKEN BY MSD
DEREK R. GUTHRIE	KY0078956	2325 QUINN DR	9/9/2018 0:33	9/9/2018 1:01	1	Sewer Service Line	124802325	SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977423	CUSTOMER RESPONSIBLE FOR CLEANING IMPACTED AREA	ADVISED CUSTOMER TO CALL BACK IN 24HRS IF PSC BACKS UP AGAIN
MORRIS FORMAN	KY0022411	4222 VIRGINIA AVE	9/9/2018 0:35	9/9/2018 0:50	1	Sewer Service Line	108217	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977467	CUSTOMER CLEANED THE IMPACTED AREA	RAIN STOPPED WHICH IT ALLOWED THE SYSTEM TO CATCH
MORRIS FORMAN	KY0022411	1190 BICKNELL AVE	9/9/2018 1:20	9/9/2018 1:33	1	Sewer Service Line	053G01210000A	SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977435	CUSTOMER CLEANED IMPACTED AREA	NOTHING AT THIS TIME
DEREK R. GUTHRIE	KY0078956	405 ECHAPPE LN	9/9/2018 1:50	9/9/2018 2:10	1	Sewer Service Line	AU11214059	CAPACITY ISSUE	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977441	CUSTOMER RESPONSIBLE FOR CLEAING IMPACTED AREA	ADVISED TO CALL BACK IN 24HRS IF BACKUP OCCURS AGAIN
MORRIS FORMAN	KY0022411	500 COMPTON ST	9/9/2018 2:20	9/9/2018 2:30	1	Sewer Service Line	24460	SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977439	CUSTOMER RESPONSIBLE FOR CLEANING IMPACTED AREA	ADVISED CUSTOMER CALL BACK IF BACKUP OCCURS 24HRS LATER
DEREK R. GUTHRIE	KY0078956	1734 SAN JOSE AVE	9/9/2018 2:50	9/9/2018 3:02	1	Sewer Service Line	92231	CAPACITY ISSUE	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977442	CUSTOMER RESPONSIBLE FOR CLEANING	ADVISED TO CALL BACK IN 24HRS IF BACKUP OCCURS AGAIN
MORRIS FORMAN	KY0022411	1310 CASTLEWOOD DELL	9/9/2018 2:55	9/9/2018 3:10	1	Sewer Service Line	18950	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977469	CUSTOMER CLEANED THE IMPACTED AREA	RAIN HAS STOPPED WHICH ALLOWED THE SYSTEM TO CATCH UP.
DEREK R. GUTHRIE	KY0078956	4709 WALNUT GROVE AVE	9/9/2018 3:20	9/9/2018 4:30	1	Sewer Service Line	DE27282029	PUMP STATION NOT WORKING	MECHANICAL FAILURE	RAIN EVENT DISCHARGE	2977447	UNKNOWN AT THIS TIME	REFFERED TO OPERATIONS
DEREK R. GUTHRIE	KY0078956	1010 CRISTLAND RD	9/9/2018 3:40	9/9/2018 3:50	1	Sewer Service Line	Y08382019	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977454	CUSTOMER CLEANED THE IMPACTED AREA	SYSTEM HAD TO CATCH UP
MORRIS FORMAN	KY0022411	9207 TANGLEY LN	9/9/2018 4:20	9/9/2018 5:20	1	Sewer Service Line	HP15361029	UNKNOWN OBSTRUCTION IN THE MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	2977449	UNKNOWN AT THIS TIME	FLUSHED THE MAIN AND GOT THE LINE OPEN
MORRIS FORMAN	KY0022411	1333 LILLIAN AVE	9/9/2018 9:00	9/9/2018 9:51	1	Sewer Service Line	60652	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977476	CUSTOMER RESPONSIBLE FOR CLEANING THE IMPACTED AREA	ADVISED CUSTOMER TO CONTACT A PLUMBER IF BACKUP OCCURS AGAIN
MORRIS FORMAN	KY0022411	1611 BONNYCASTLE AVE	9/9/2018 16:45	9/9/2018 17:35	1	Sewer Service Line	9433	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977565	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT NEEDED BY MSD
MORRIS FORMAN	KY0022411	1085 BICKNELL AVE	9/9/2018 19:00	9/9/2018 19:15	5	Sewer Service Line	8653	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977604	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	3811 GREENWICH RD	9/10/2018 10:00	9/10/2018 10:36	1	Sewer Service Line	32415	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977785	CUSTOMER CLEANED IMPACTED AREA	PLUMBER HAS BEEN CONTACTED
MORRIS FORMAN	KY0022411	3216 VIRGINIA AVE	9/10/2018 10:15	9/10/2018 10:35	1	Sewer Service Line	107882	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2977842	CUSTOMER IS RESPONSIBLE FOR CLEANING THE IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	6504 OAK VALLEY DR	9/10/2018 10:50	9/10/2018 11:10	1	Sewer Service Line	90406504	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2978339	CUSTOMER RESPONSIBLE FOR CLEANING IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	733 E JEFFERSON ST	9/10/2018 13:00	9/10/2018 13:30	1	Sewer Service Line	49274	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2978351	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	4000 OAKLAWN DR	9/12/2018 13:40	9/12/2018 14:24	10	Sewer Service Line	170652	CONTRACTOR CLEANING MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2979446	CUSTOMER CLEANED IMPACTED AREA	CONTRACTOR WILL MAKE NEEDED REPAIRS
MORRIS FORMAN	KY0022411	121 N 38TH ST	9/14/2018 8:30	9/9/2018 8:30	1	Sewer Service Line	127889	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2981811	CUSTOMER RESPONSIBLE FOR CLEANING THE IMPACTED AREA	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	613 SOUTHWESTE RN PKY	9/14/2018 11:08	9/10/2018 11:08	10	Sewer Service Line	B11562019	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2981887	CUSTOMER RESPONSIBLE FOR CLEANING THE IMPACTED AREA	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	201 MARSHALL DR	9/14/2018 13:00	9/9/2018 13:35	10	Sewer Service Line	68855	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2981871	ADVISED CUSTOMER THEYRE RESPONSIBLE FOR CLEANING THE IMPACTED AREA	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	1603 BONNYCASTLE AVE	9/14/2018 13:34	9/9/2018 13:34	10	Sewer Service Line	9913	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2981866	CUSTOMER RESPONSIBLE FOR CLEANING IMPACTED AREA	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	3520 HERMAN ST	9/14/2018 14:48	9/14/2018 14:52	10	Sewer Service Line	40127	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2981862	CUSTOMER RESPONSIBLE FOR CLEANING IMPACTED AREA	NO MSD ACTION NEEDED

Appendix D-3 Discharge Work Orders – Interior

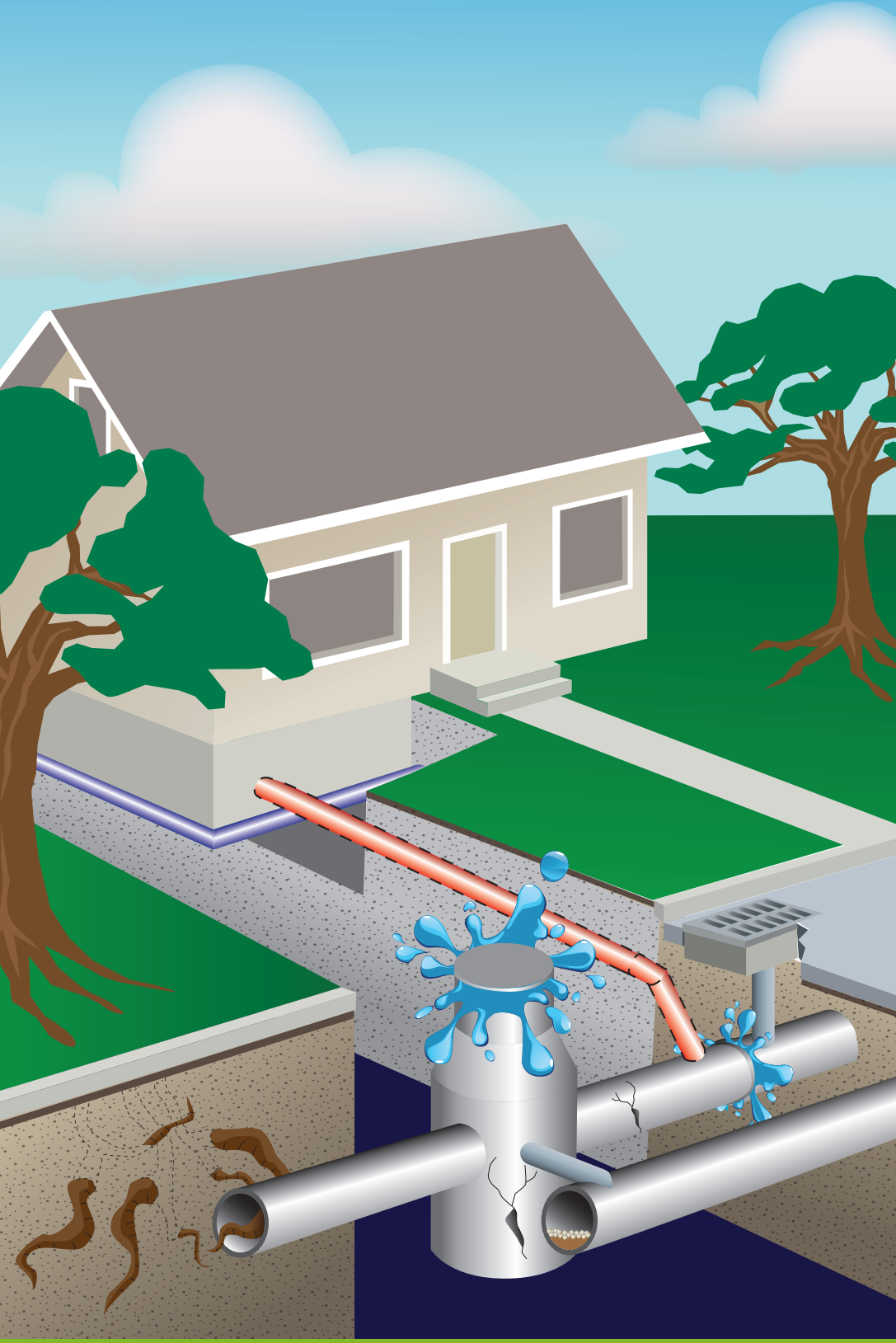
ASSOCIATED WASTEWATER TREATMENT PLANT NAME	OVERFLOW LOCATION #	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
MORRIS FORMAN	KY0022411	613 SOUTHWESTERN PKY	9/14/2018 16:21	9/10/2018 22:34	10	Sewer Service Line	B11562019	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2981890	CUSTOMER RESPONSIBLE FOR CLEANING IMPACTED AREA	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	4626 WESTCHESTER AVE	9/14/2018 16:45	9/11/2018 16:45	10	Sewer Service Line	109548	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2981892	CUSTOMER RESPONSIBLE FOR CLEANING IMPACTED AREA	NO MSD ACTION NEEDED
FLOYDS FORK	KY0102784	1101 GLENLAKE WAY	9/23/2018 14:00	9/23/2018 14:11	10	Sewer Service Line	115911101	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984617	CUSTOMER HAS TO CLEAN THE IMPACTED AREA	ADVISED CUSTOMER OF BACK WATER VALE
MORRIS FORMAN	KY0022411	4847 PEACHTREE AVE	9/24/2018 8:20	9/24/2018 9:45	1	Sewer Service Line	81102	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984710	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT NEEDED BY MSD
DEREK R. GUTHRIE	KY0078956	2336 QUINN DR	9/24/2018 10:00	9/24/2018 11:30	1	Sewer Service Line	85690	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2984961	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION DETERMINED THAT ADDITIONAL REPAIRS BY MSD WERE NOT REQUIRED
DEREK R. GUTHRIE	KY0078956	4709 WALNUT GROVE AVE	9/24/2018 11:45	9/24/2018 13:30	1	Sewer Service Line	DE27282029	UNKNOWN OBSTRUCTION IN MSD'S SEWER MAIN	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	2984980	CUSTOMER CLEANED IMPACTED AREA	FLUSHED MAIN SEWER TO RESTORE FLOW
DEREK R. GUTHRIE	KY0078956	1702 STALLINGS AVE	9/24/2018 12:00	9/24/2018 16:00	1	Sewer Service Line	109101720000A	OBSTRUCTION IN MSD'S MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	2985184	CUSTOMER CLEANED IMPACTED AREA	FLUSHED AND ROOT CUT MAIN SEWER TO RESTORE FLOW
DEREK R. GUTHRIE	KY0078956	4606 ATTERBERRY CT	9/24/2018 12:00	9/24/2018 17:15	1	Sewer Service Line	377	OBSTRUCTION IN THE LINE	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	2985182	UNKNOWN AT THIS TIME	FLUSHED MAIN SEWER TO RESTORE FLOW
DEREK R. GUTHRIE	KY0078956	1710 ATTERBERRY CT	9/24/2018 13:00	9/24/2018 17:00	1	Sewer Service Line	131162	OBSTRUCTION ON MSD'S PORTION OF SERVICE CONNECTION	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	2985185	CUSTOMER CLEANED IMPACTED AREA	FLUSHED MAIN SEWER TO RESTORE FLOW
MORRIS FORMAN	KY0022411	2300 YOUNGLAND AVE	9/24/2018 14:20	9/24/2018 19:30	1	Sewer Service Line	RR11348029	OBSTRUCTION IN MSD'S MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	2985004	CUSTOMER CLEANED IMPACTED AREA	FLUSHED MAIN SEWER TO RESTORE FLOW
CEDAR CREEK	KY0098540	9602 MARY DELL LN	9/24/2018 17:00	9/24/2018 17:53	1	Sewer Service Line	BE09185439	CAPACITY ISSUE	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985084	UNKNOWN AT THIS TIME	ADVISED CUSTOMER TO CALL BACK IF SYSTEM DOES NOT GO BACK IN SERVICE
DEREK R. GUTHRIE	KY0078956	1717 COLONY CT	9/24/2018 18:45	9/24/2018 18:50	10	Sewer Service Line	21220	MAIN SEWER BACKUP	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2985108	CUSTOMER CLEANED THE IMPACTED AREA	FLUSHED THE MAIN SEWER; TO GET OPEN
DEREK R. GUTHRIE	KY0078956	1707 COLONY CT	9/24/2018 18:55	9/24/2018 19:00	10	Sewer Service Line	21134	MAIN SEWER BACKING UP	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	2985113	CUSTOMER CLEANED THE IMPACTED AREA	FLUSHED MAIN SEWER TO GET OPEN
MORRIS FORMAN	KY0022411	3005 WINTERHAVEN RD	9/24/2018 19:00	9/24/2018 19:12	1	Sewer Service Line	190000410000A	SYSTEM IS OVER CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985120	UNKNOWN AT THIS TIME	ADVISED CUSTOMER OF FINDING
MORRIS FORMAN	KY0022411	4318 HUNSINGER LN	9/24/2018 19:00	9/24/2018 19:33	1	Sewer Service Line	BJ14863319	SYSTEM IS OVER CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985127	UNKNOWN AT THIS TIME	NOTHING MSD CAN DO AT THIS TIME
MORRIS FORMAN	KY0022411	9601 GALENE DR	9/24/2018 19:00	9/24/2018 19:57	1	Sewer Service Line	JT00505019	SYSTEM IS OVER CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985135	UNKNOWN AT THIS TIME	SYSTEM CAUGHT UP AFTER RAIN
MORRIS FORMAN	KY0022411	5309 DAHL RD	9/24/2018 19:15	9/24/2018 19:35	2	Sewer Service Line	23693	CAPACITY ISSUE	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985186	CUSTOMER CLEAN THE IMPACTED AREA	CAPACITY ISSUE
DEREK R. GUTHRIE	KY0078956	7404 MICHAEL DR	9/24/2018 20:00	9/24/2018 20:25	1	Sewer Service Line	BW01749089	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985149	UNKNOWN AT THIS TIME	SYSTEM CAUGHT UP AFTER RAIN
MORRIS FORMAN	KY0022411	3305 CHARLANE PKY	9/24/2018 21:00	9/24/2018 21:55	1	Sewer Service Line	JT00939019	SEWER AT CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985513	UNKNOWN AT THIS TIME	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	4231 ST THOMAS AVE	9/24/2018 21:00	9/24/2018 21:24	1	Sewer Service Line	BJ14682019	SYSTEM IS OVER CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985171	UNKNOWN AT THIS TIME	SYSTEM IS OVER CAPACITY
DEREK R. GUTHRIE	KY0078956	2605 LOWER HUNTERS TRCE	9/24/2018 21:15	9/24/2018 22:15	1	Sewer Service Line	DA22721519	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985191	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	6603 TOTTENHAM RD	9/24/2018 22:00	9/24/2018 22:49	1	Sewer Service Line	181260	SEWER HAS REACH CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985511	UNKNOWN AT THIS TIME	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	706 FOUNTAIN AVE	9/24/2018 22:00	9/24/2018 22:33	1	Sewer Service Line	035300390000A	SEWER HAS REACH CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985507	UNKNOWN AT THIS TIME	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	2500 AINTREE WAY	9/24/2018 23:00	9/24/2018 23:29	1	Sewer Service Line	188701260000A	SEWER HAS REACH CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985510	UNKNOWN AT THIS TIME	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	944 S 47TH ST	9/24/2018 23:30	9/24/2018 23:45	1	Sewer Service Line	130559	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985200	UNKNOWN AT THIS TIME	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	2713 WINGFIELD LN	9/25/2018 0:00	9/25/2018 0:15	1	Sewer Service Line	112760	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985204	UNKNOWN AT THIS TIME	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	1190 BICKNELL AVE	9/25/2018 11:30	9/25/2018 12:00	1	Sewer Service Line	053G01210000A	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985458	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	4012 GRAF DR	9/25/2018 14:00	9/25/2018 14:32	1	Sewer Service Line	184701680000A	SEWER HAS REACH CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985504	UNKNOWN AT THIS TIME	NO MSD ACTION NEEDED
MORRIS FORMAN	KY0022411	3100 KIPLING WAY	9/26/2018 16:40	9/26/2018 17:10	5	Sewer Service Line	56193	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985935	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	8925 OLD SOUTH PARK RD	9/26/2018 19:55	9/26/2018 20:10	1	Sewer Service Line	PC07258029	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985943	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	8211 SIESTA WAY	9/26/2018 20:15	9/26/2018 20:30	1	Sewer Service Line	PC12112019	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985944	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	8207 SIESTA WAY	9/26/2018 20:45	9/26/2018 21:00	1	Sewer Service Line	PC12114029	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	2985945	UNKNOWN AT THIS TIME	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	5202 LOWERFIELD DR	9/29/2018 21:30	9/29/2018 23:00	5	Sewer Service Line	1539129A	GREASE BLOCKAGE IN THE MAIN SEWER	GREASE BLOCKAGE	DRY WEATHER DISCHARGE	2990008	CUSTOMER CLEANED THE IMPACTED AREA	FLUSHED MAIN SEWER TO GET OPEN. REFER TO FLUSH WORK ORDER 2990009
DEREK R. GUTHRIE	KY0078956	7100 PRESTON HWY	10/1/2018 18:00	10/1/2018 18:00	1	Sewer Service Line	PB11453019	MAIN WAS STOP UP	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	2990445	UNKNOWN AT THIS TIME	FLUSH MAIN SEWER NO FURTHER ACTION NEEDED
DEREK R. GUTHRIE	KY0078956	1128 ONEIDA AVE	10/25/2018 21:00	10/25/2018 21:14	1	Sewer Service Line	062M00990000A	ROOT BLOCKAGE ON MSD PORTION OF PIPE	ROOTS	DRY WEATHER DISCHARGE	3000054	CUSTOMER CLEANED THE IMPACTED AREA	ROOT CUT AND FLUSHED LINE
DEREK R. GUTHRIE	KY0078956	9402 MOONRIDGE	11/6/2018 14:15	11/6/2018 15:45	1	Sewer Service Line	PD24760049	OBSTRUCTION IN MSD'S MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3006584	CUSTOMER CLEANED IMPACTED AREA	ROOT CUT MAIN SEWER TO RESTORE FLOW

Appendix D-3 Discharge Work Orders – Interior

ASSOCIATED WASTEWATER TREATMENT PLANT NAME	OVERFLOW LOCATION #	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
		PL											
MORRIS FORMAN	KY0022411	2903 IRIS WAY	11/19/2018 14:15	11/19/2018 15:01	1	Sewer Service Line	089C01070000A	ROOTS IN THE MAIN SEWER	ROOTS	RAIN EVENT DISCHARGE	3013284	NO CLEAN UP REQUIRED	ROOT CUT MAIN SEWER
MORRIS FORMAN	KY0022411	10907 ALLOWAY CT	11/30/2018 10:40	11/30/2018 11:57	1	Sewer Service Line	196809340000A	ROOTS IN THE MAIN SEWER	ROOTS	DRY WEATHER DISCHARGE	3017962	NO CLEAN UOP REQUIRED	ROOT CUT LINE
MORRIS FORMAN	KY0022411	4900 ROSALIND CT	12/2/2018 0:00	12/2/2018 1:00	1	Sewer Service Line	094900300000A	GREASE BLOCKAGE IN MAIN SEWER	GREASE BLOCKAGE	RAIN EVENT DISCHARGE	3018234	CUSTOMER CLEANED IMPACTED AREA	CUT MAIN SEWER TO RESTORE FLOW
HITE CREEK	KY0022420	12418 LA GRANGE RD	12/4/2018 0:00	12/4/2018 0:09	1	Sewer Service Line	147361F	BLOCKAGE ON MSD PORTION OF PIPE	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3019315	CUSTOMER HAS TO CLEAN THE IMPACTED AREA (GREASE)	FLUSH THE MAIN SEWER
DEREK R. GUTHRIE	KY0078956	2009 CRUMS LN	12/5/2018 13:45	12/5/2018 15:00	5	Sewer Service Line	25463	GREASE BLOCAGE IN MAIN SEWER	GREASE BLOCKAGE	DRY WEATHER DISCHARGE	3021384	CUSTOMER CLEANED IMPACTED AREA	ROOT CUT MAIN SEWER TO RESTORE FLOW
MORRIS FORMAN	KY0022411	6879 GREEN MEADOW CIR	12/6/2018 14:09	12/6/2018 16:08	1	Sewer Service Line	35253	ROOTS IN THE LINE	ROOTS	DRY WEATHER DISCHARGE	3021744	NO CLEAN UP REQUIRED	ROOT CUT LINE
MORRIS FORMAN	KY0022411	9002 PETERBOROUGH CT	12/17/2018 12:50	12/17/2018 15:55	1	Sewer Service Line	183302410000A	ROOTS IN CUSTOMER AND MSD PORTION	ROOTS	DRY WEATHER DISCHARGE	3024185	CUSTOMER CLEANED AREA	ROOT CUT LINE
MORRIS FORMAN	KY0022411	4303 NEWPORT RD	12/27/2018 16:00	12/27/2018 16:39	1	Sewer Service Line	201801560000A	HEAVY GREASE IN SANITARY MAIN	GREASE BLOCKAGE	DRY WEATHER DISCHARGE	3026775	UNKNOWN AT THIS TIME	CUT TO CLEAR GREASE OBSTRUCTION FROM SANITARY MAIN
DEREK R. GUTHRIE	KY0078956	3615 ROBIN DR	12/28/2018 11:50	12/28/2018 14:20	1	Sewer Service Line	116100840000A	OBSTRUCTION IN MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3031206	CUSTOMER ADVISED MSD PERSONNEL THEY WOULD CLEAN IMPACTED AREA	FLUSHED MAIN SEWER
MORRIS FORMAN	KY0022411	2206 PIKES PEAK BLVD	12/30/2018 20:10	12/30/2018 20:14	20	Sewer Service Line	136300020000A	ROOTS ON MSD PORTION OF PIPE	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3031350	REFERRED TO TV	ADVISED AREA SUPERVISOR TO MAKE NEEDED REPAIRS
MORRIS FORMAN	KY0022411	5407 MCDEANE RD	12/31/2018 14:05	12/31/2018 15:05	1	Sewer Service Line	135500010000A	FURTHER INVESTIGATION REQUIRED	ROOTS	RAIN EVENT DISCHARGE	3032833	THE RESULT OF THE TV INSPECTION WILL DETERMINE	REFERRED TO AREA SUPERVISOR FOR PCSR
DEREK R. GUTHRIE	KY0078956	1109 MARKWELL LN	1/1/2019 19:00	1/1/2019 20:00	1	Sewer Service Line	133753	BLOCKAGE ON MSD PORTION OF PIPE	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3032959	MSD CLEAN UP THE IMPACTED AREA	FLUSH MAIN SEWER
DEREK R. GUTHRIE	KY0078956	3607 ALAMETER DR	1/7/2019 13:00	1/7/2019 14:00	1	Sewer Service Line	DE24374019	OBSTRUCTION IN MSD'S MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3036710	CUSTOMER CLEANED IMPACTED AREA	FLUSHED AND ROOT CUT MAIN SEWER W/O #3036706
DEREK R. GUTHRIE	KY0078956	3611 ALAMETER DR	1/7/2019 13:00	1/7/2019 14:00	1	Sewer Service Line	DE24378019	OBSTRUCTION IN MSD'S MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3036713	CUSTOMER CLEANED IMPACTED AREA	FLUSHED AND ROOT CUT MAIN SEWER TO RESTORE FLOW. W/O #3036706
DEREK R. GUTHRIE	KY0078956	3614 ALAMETER DR	1/7/2019 13:00	1/7/2019 14:00	1	Sewer Service Line	DE24558019	OBSTRUCTION IN MSD'S MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3036708	CUSTOMER CLEANED IMPACTED AREA	ROOT CUT MAIN SEWER TO RESTORE FLOW. W/O #3036706
DEREK R. GUTHRIE	KY0078956	2218 MARY CATHERINE DR	1/7/2019 17:15	1/7/2019 18:30	1	Sewer Service Line	69568	GREASE BLOCKAGE IN MSD SEWER MAIN	GREASE BLOCKAGE	DRY WEATHER DISCHARGE	3036726	CUSTOMER CLEANED IMPACTED AREA	FLUSHED MAIN SEWER TO RESTORE FLOW
MORRIS FORMAN	KY0022411	105 ALVINA WAY	1/10/2019 14:05	1/10/2019 14:54	1	Sewer Service Line	9379	GREASE BLOCKAGE IN MAIN SEWER	GREASE BLOCKAGE	DRY WEATHER DISCHARGE	3037723	CUSTOMER CLEANED IMPACTED AREA	FLUSHED MAIN SEWER TO RESTORE FLOW
MORRIS FORMAN	KY0022411	2620 DELOR AVE	1/15/2019 16:05	1/15/2019 17:45	1	Sewer Service Line	48077	OBSTRUCTION IN THE MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3038593	CUSTOMER CLEANED IMPACTED AREA	FLUSHED MAIN SEWER TO RESTORE FLOW
MORRIS FORMAN	KY0022411	3802 LARKWOOD AVE	1/23/2019 15:15	1/23/2019 15:45	1	Sewer Service Line	57744	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3040531	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	3504 HUGHES RD	1/31/2019 18:05	1/31/2019 18:35	1	Sewer Service Line	082N00380000A	PRIVATE PROPERTY ISSUE	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3046169	CUSTOMER CLEANED IMPACTED AREA	ADVISED CUSTOMER TO CONTACT APLUMBER
MORRIS FORMAN	KY0022411	4211 SOUTHERN PKY	2/6/2019 10:15	2/6/2019 11:00	1	Sewer Service Line	U08269029	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3047418	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
CEDAR CREEK	KY0098540	9610 HOFELICH LN	2/7/2019 18:55	2/7/2019 19:45	1	Sewer Service Line	BE09196429	OBSTRUCTION IN MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	3052170	UNKOWN AT THIS TIME	FLUSHED MAIN SEWER
MORRIS FORMAN	KY0022411	8601 BLOSSOM LN	2/7/2019 21:45	2/7/2019 22:15	1	Sewer Service Line	HP12181019	OBSTRUCTION IN MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	3052159	UNKOWN AT THIS TIME	FLUSHED OBSTRUCTION FROM MAIN SEWER
DEREK R. GUTHRIE	KY0078956	3500 DORSET RD	2/12/2019 10:45	2/12/2019 11:20	5	Sewer Service Line	DE46146019	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053663	CUSTOMER CLEANED IMPACTED AREA	NVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	8925 OLD SOUTH PARK RD	2/12/2019 11:35	2/12/2019 11:55	1	Sewer Service Line	PC07258029	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3053667	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
FLOYDS FORK	KY0102784	14305 WAKEFIELD PL	2/12/2019 21:00	2/12/2019 21:45	1	Sewer Service Line	T314314305A	BLOCKAGE ON MSD PORTION	ROOTS	RAIN EVENT DISCHARGE	3054041	UNKNOWN AT THIS TIME	FLUSHED LINE TO OPEN
MORRIS FORMAN	KY0022411	1029 THRUSTON AVE	2/20/2019 10:40	2/20/2019 11:30	1	Sewer Service Line	154126	ROOTS IN MAIN SEWER	ROOTS	RAIN EVENT DISCHARGE	3056300	CUSTOMER CLEANED IMPACTED AREA	ROOT CUT MAIN SEWER TO RESTORE FLOW
DEREK R. GUTHRIE	KY0078956	2335 LINDSEY DR	2/20/2019 11:45	2/20/2019 12:00	1	Sewer Service Line	102005760000A	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056385	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT NO ADDITIONAL REPAIRS ARE REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	2325 QUINN DR	2/20/2019 12:35	2/20/2019 12:50	1	Sewer Service Line	124802325	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056415	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
DEREK R. GUTHRIE	KY0078956	10915 ALTSHELTER PL	2/20/2019 14:00	2/20/2019 14:20	1	Sewer Service Line	PD17144049	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3056469	CUSTOMER CLEANED IMPACTED AREA	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	4238 WESTPORT RD	3/5/2019 11:10	3/5/2019 12:45	1	Sewer Service Line	MA14518019	MAIN SEWER STOPPED UP	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3063458	MSD CLEANED AND SANITIZED THE IMPACTED AREA	FLUSHED PROPERTY SERVICE CONNECTION TO GET OPEN

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ASSOCIATED WASTEWATER TREATMENT PLANT NAME	OVERFLOW LOCATION #	ASSOCIATED TREATMENT PLANT KPDES #	OVERFLOW START DATE & TIME	OVERFLOW STOP DATE & TIME	VOLUME OF OVERFLOW (GAL)	SOURCE ASSET TYPE	SOURCE ASSET ID	CAUSE OF OVERFLOW	DUE TO	WEATHER	WO #	CLEANUP EFFORTS BY MSD	REPAIR EFFORTS BY MSD
DEREK R. GUTHRIE	KY0078956	3963 CANE RUN RD	3/14/2019 19:40	3/14/2019 19:43	1	Sewer Service Line	RR11789019	ROOTS IN THE MAIN SEWER	ROOTS	RAIN EVENT DISCHARGE	3067253	UNKNOWN AT THIS TIME	ROOT CUT THE MAIN SEWER
MORRIS FORMAN	KY0022411	303 N HURSTBOURNE PKY	3/28/2019 21:40	3/28/2019 22:04	1	Sewer Service Line	HU27200029	ROOTS IN THE MAIN	ROOTS	DRY WEATHER DISCHARGE	3077968	CUSTOMER CLEANED IMPACTED AREA	ROOTS WERE REMOVED BY PLUMBER
MORRIS FORMAN	KY0022411	3009 WINTERHAVEN RD	4/20/2019 17:42	4/20/2019 17:56	1	Sewer Service Line	190000420000A	MAN SEWER IS SURCHARGING /SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3086717	UNKNOWN AT THIS TIME	CUSTOMER HAS TO WAIT 24HRS FOR WATER TO RECEED AND CALL MSD BACK
DEREK R. GUTHRIE	KY0078956	8207 SIESTA WAY	5/3/2019 11:00	5/3/2019 11:15	1	Sewer Service Line	PC12114029	LACK OF SYSTEM CAPACITY	LACK OF SYSTEM CAPACITY	RAIN EVENT DISCHARGE	3100551	UNKNOWN AT THIS TIME	INVESTIGATION INDICATED THAT ADDITIONAL REPAIRS WERE NOT REQUIRED BY MSD
MORRIS FORMAN	KY0022411	1532 POPLAR LEVEL RD	6/17/2019 10:15	6/17/2019 11:00	1	Sewer Service Line	KK10241029	GREASE BLOCKAGE IN MAIN SEWER	GREASE BLOCKAGE	RAIN EVENT DISCHARGE	3119689	UNKNOWN AT THIS TIME	FLUSHED MAIN SEWER TO RESTORE FLOW
MORRIS FORMAN	KY0022411	2915 SPENCER AVE	6/18/2019 16:21	6/18/2019 16:21	50	Sewer Service Line	97816	BLOCKAGE AT MH# 17613 WHILE RESPONNDING TO BACKUP 2381CLARENDON WO# 3122318 SR# 5305450	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3122325	MSD CONTRACTOR WILL CLEAN AREA	FLUSHED LINE; REFERRED FOR FULL CLEAN
MORRIS FORMAN	KY0022411	2913 SPENCER AVE	6/18/2019 16:23	6/18/2019 16:26	3	Sewer Service Line	97813	BACK FLUSH WHEN CLEARING MAIN SEWER WO# 3122318 SR# 5305450	OBSTRUCTION-NOT GREASE / ROOTS	DRY WEATHER DISCHARGE	3122327	MSD CONTRACTOR WILL CLEAN AREA	REFERRED FOR FULL CLEAN BU CONTRACTOR
DEREK R. GUTHRIE	KY0078956	2603 THOMAS AVE	6/20/2019 10:45	6/20/2019 11:21	1	Sewer Service Line	134298	OBSTRUCTION IN MAIN SEWER	OBSTRUCTION-NOT GREASE / ROOTS	RAIN EVENT DISCHARGE	3125901	UNKNOWN AT THIS TIME	FLUSHED MAIN SEWER TO RESTORE FLOW



CONTINUOUS SEWER SYSTEM ASSESSMENT AND BLOCKAGE ABATEMENT PROGRAM

FISCAL YEAR 2019
ANNUAL REPORT

COMPILED AND SUBMITTED BY:
Louisville and Jefferson County
Metropolitan Sewer District
700 West Liberty Street
Louisville, KY 40203

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ACRONYMS AND ABBREVIATIONS

ACD	Amended Consent Decree
BAP	Blockage Abatement Program
CCTV	Closed Circuit Television
CIPP	Cured-In-Place Pipe
CMOM	Capacity, Management, Operations and Maintenance
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
CSSA	Continuous Sewer System Assessment
EEEP	Emergency Evaluation and Escalation Program
EUM	Effective Utility Management
FY	Fiscal Year
GIS	Geographic Information Systems
GLPM	Gravity Line Preventative Maintenance
I/I	Infiltration and Inflow
ICA	Interceptor Condition and Assessment
IRP	Infrastructure Rehabilitation program
IT	Information Technology
LACP	Lateral Assessment Certification Program
LF	Linear Feet
MACP	Manhole Assessment Certification Program
MSD	Louisville and Jefferson County Metropolitan Sewer District
NASSCO	National Association of Sewer Service Companies
NMC	Nine Minimum Controls
PACP	Pipeline Assessment and Certification Program
QA/QC	Quality Assurance/Quality Control
SCAP	System Capacity Assurance Plan
SSes	Sanitary Sewer Evaluation Study
SSO	Sanitary Sewer Overflow
TISCIT	Total Integrated Sonar and CCTV Inspection Technology
WQTC	Water Quality Treatment Center

1. PURPOSE

The Continuous Sewer System Assessment (CSSA) program addresses certain aspects of Paragraph 24c., “CMOM (Capacity, Management, Operations and Maintenance) Programs Self-Assessment” and Paragraph 24a. “Nine Minimum Controls (NMC)” from MSD’s federal Amended Consent Decree (ACD).

- Inspection and assessment activities for gravity sewer assets are carried out under the CSSA program.
- Immediate repairs are carried out under the Emergency Evaluation and Escalation Program (EEEP), a subsidiary of the CSSA.
- Rehabilitation activities are carried out under the Infrastructure Rehabilitation Program (IRP), also a subsidiary of the CSSA.
- Recurring gravity system maintenance activities are addressed by Gravity Line Preventative Maintenance Program (GLPM), a third subsidiary to the CSSA.

The CSSA family of programs requires a defined approach to prioritize, perform, and track the inspection, cleaning, rehabilitation, replacement, and maintenance of sewer assets on a consistent and prioritized cycle. The programs are also intended to improve compliance with NMC 1 and 2, which require the proper operation, regular maintenance, and maximum use of MSD’s combined sewer system (CSS) to prevent dry weather Combined Sewer Overflows (CSOs) and reduce wet weather CSOs to the extent possible.

This annual report summarizes the accomplishments for the 2019 Fiscal Year (FY19, July 1, 2018 – June 30, 2019) along with anticipated actions for FY20 for the CSSA family of programs.

2. GOALS

The primary objective of evaluating infrastructure assets is to develop and implement maintenance and rehabilitation recommendations that reduce sewer overflows and improve the capacity, structural integrity and functionality of existing assets.

3. PROGRAM BACKGROUND

The Louisville and Jefferson County Metropolitan Sewer District (MSD) is responsible for the operation and maintenance of Figure 1 the sewer system within the public right-of-way and dedicated easements in Jefferson County, Kentucky, in addition to small areas in several of the surrounding counties. The sanitary sewer collection system includes over 3,300 miles of sewers ranging from 6 inches to 27.5 feet in diameter, built between the mid-1800’s and present day. The construction materials consist of brick, iron, polyvinyl chloride, clay, vitrified clay, and reinforced concrete. There are over 75,000 combined and separate sanitary manholes in the system constructed of reinforced concrete and brick materials. MSD also operates and maintains over 68,000 catch basins and yard drains, 250 sanitary pump stations, 16 flood pump stations, and 5 regional water quality treatment centers (WQTCs).

In FY08, MSD committed to performing an initial gravity sewer system characterization over the next 10 years. During the first 10 years, MSD spent over \$17M and attempted at least one inspection of each sewer main in the gravity system to inform planning for preventive maintenance and rehabilitation activities in the gravity sewer system, and MSD continues to undertake second-attempt inspections. As the initial system characterization

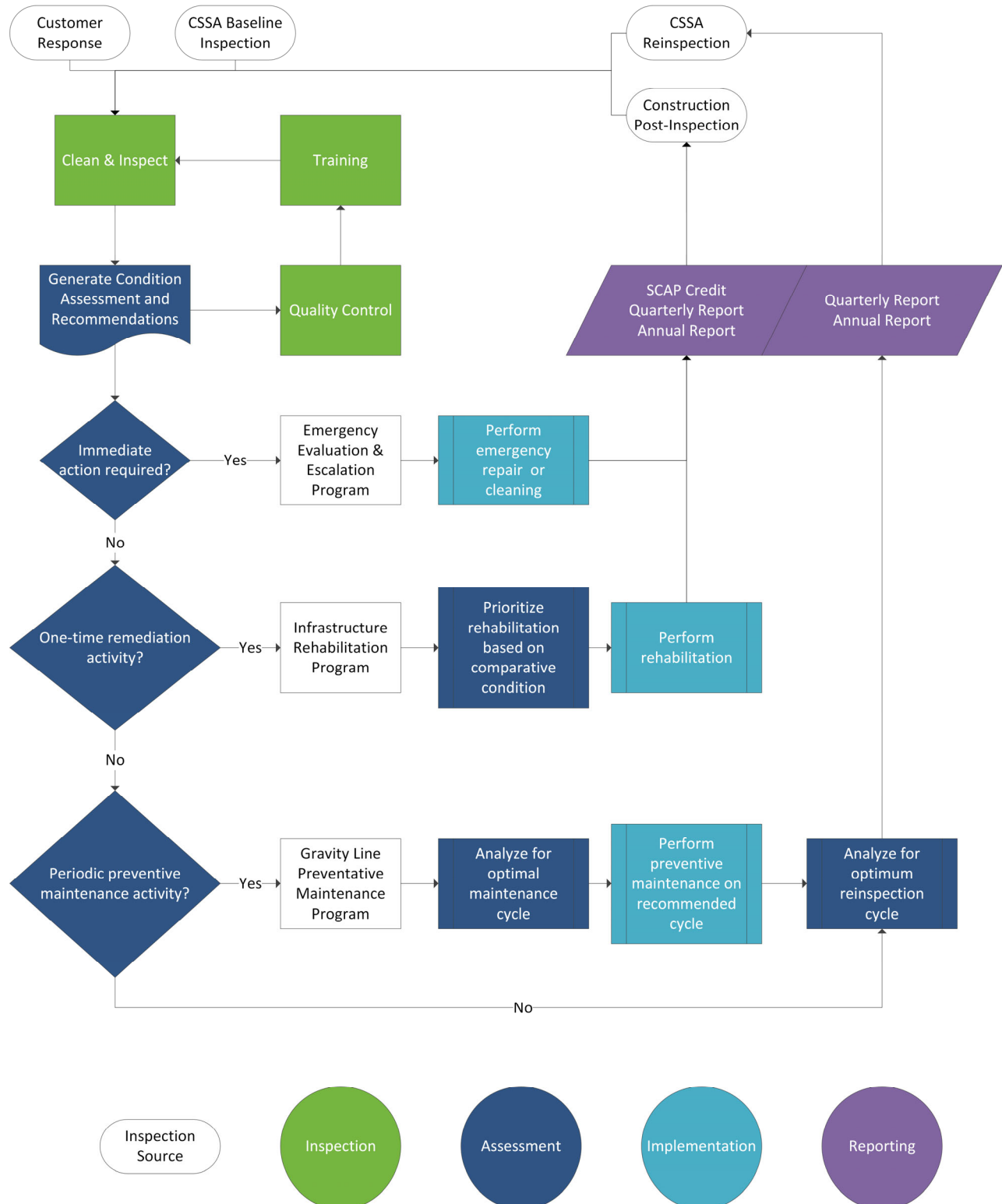
has wrapped up, MSD's focus has shifted to planning for sustainable regulatory compliance through a CSSA program with regular review and feedback.

To that end, MSD's CSSA protocol, originally published in draft as an attachment to the 2010 CSSA Annual Report, was updated during FY19. A detailed decision framework is being developed including inspection, assessment, implementation and reporting in a continuous cycle to proactively address current and upcoming infrastructure issues. The process workflow for the programs is outlined in Figure 1.

- Inspection includes gravity mainline and manhole inspections under the CSSA program umbrella, as well as service line inspections when mains have been identified for rehabilitation.
- Assessment under the CSSA program includes evaluation of inspection data for major defects or issues, recommending remediation activities as needed, and prioritizing activities based on defined criteria. Once inspection of a study area is complete, inspection data is evaluated through a pipe condition assessment process and appropriate maintenance and rehabilitation actions are taken.
- Implementation includes infrastructure rehabilitation and replacement as well as proactive maintenance activities like periodic cleaning implemented identified through inspection and assessment under CSSA subsidiary programs.
 - The EEEP encompasses critical sewer assets identified as being at or near failure condition and in need of immediate repair. Repair work is assigned immediately for immediate repair of the assets.
 - The IRP encompasses sewer lines identified as having structural issues, or operational defects, including infiltration and significant root intrusion, that cannot be addressed through preventive maintenance.
 - The GLPM encompasses sewer lines identified as having recurring maintenance needs due to root blockages, sedimentation, or oil and grease deposits. In the past, this program has been referred to as the Blockage Abatement Program (BAP).

All work is assigned to internal staff or contractors as resources are available and appropriate, and work is tracked and documented on work orders against the asset in the asset management system.
- Reporting includes calculation of credits in accordance with the approved SCAP procedure as well as discharge reporting in the quarterly and annual ACD reports. The updated protocol is attached to this CSSA Annual Report.

Figure 1. CSSA Process Workflow



4. INSPECTION

During the reporting period, the division of labor related to the assessment of MSD's collection system using internal and external resources, based on pipe diameter and internal resource availability, was managed by Engineering.

MSD employs seven TVI field crews, all of which have the ability to conduct PACP SMFTVI inspections. Three crews are primarily dedicated to CSSA CCTV work and four crews focus on customer service CMOM-related activities. An off-shift crew continues to provide service for the department after hours. Each CSSA CCTV truck is coupled with a flusher or combination vacuum cleaner truck when resources allow, so that cleaning is a more timely and responsive aspect of their condition assessment activities. Additionally, MSD holds a cleaning and inspection contract to supplement internal staff.

MSD utilizes the National Association of Sewer Service Companies (NASSCO) standard Pipeline Assessment and Certification Program (PACP) coding protocols for gravity mains and employs a standard QA/QC process to ensure deliverables meet a consistent and acceptable standard. During the current reporting period, MSD maintained PACP certification for 30 employees. All PACP-certified staff are also trained in Manhole Assessment and Certification Program (MACP) and Lateral Pipeline Assessment and Certification Program (LACP) coding protocols to expand MSD's internal understanding of condition assessment and create opportunity for using MSD's existing PACP software for other types of inspections.

In FY19, MSD began the transition from using PipeLogix software to using GraniteNet software for conducting inspections. GraniteNet will be fully integrated with the Infor Public Sector (IPS) system such that data obtained from inspections will be directly imported into IPS without the need of a third party software. As a result, the data transfer software, Nezteck, will also be phased out once the transition to GraniteNet is complete.

The Engineering staff has continued to work with the IT staff to develop a strategy for integrating CCTV videos with IPS and have continued to consolidate internal and external CCTV videos and field inspection pictures in support of that effort.

During CSSA program development, MSD utilized a three-pronged approach to gather asset inspection data. Using operational knowledge and various program drivers, MSD staff identified specific areas for the following:

- Sanitary Sewer Evaluation Studies (SSESs) on targeted areas for condition assessment. Each SSES project included CCTV, manhole inspections, smoke testing, private property inspections, and wet weather inspections
- Interceptor Condition Assessments (ICAs) for CCTV and manhole inspections on large interceptors. This effort requires higher tech equipment and brighter lighting sources.
- CCTV assessment on select System Capacity Assurance Plan (SCAP) sub-basins, generally looking at small-diameter mains under 48 inches in diameter. Inspection of sewers in these areas began in FY11.

By FY15, as the initial baseline data-gathering effort progressed for gravity mains, focus shifted to the following:

- Inspection of small-diameter gravity mains by SCAP sub-basins using CCTV and Total Integrated Sonar and CCTV Inspection Technology (TISCIT) as needed.
- Inspection of large-diameter gravity mains using CCTV, TISCIT, sonar and laser profiling as needed.
- Inspection of manholes by SCAP sub-basins regardless of main size.

As of the end of FY18, MSD attempted at least one inspection on every gravity main asset in the system, and the initial baseline data-gathering effort for gravity mains is considered complete. During FY19, second-attempt gravity main inspections continued in order to capture baseline data for gravity mains that were inaccessible during the initial effort. During FY20, gravity mains will be placed on an inspection cycle varying in frequency from 1 to 20 years, based on the current maximum structural risk score of the interceptor or SCAP sub-basin. Gravity manhole assets will continue to be prioritized based on the schedule of upcoming anticipated rehabilitation projects for just-in-time delivery of inspection and assessment results.

In FY20, MSD will begin to require PACP inspection submittals for review prior to acceptance of all sanitary sewers constructed through new development. Additionally, MSD plans to purchase two sewer line rapid assessment tools that use acoustic technology to rapidly identify blockages in 6- to 12-inch sewer lines to better allocate resources, and a multi-sensor inspection system that adds LIDAR inspection capabilities in pipes 24 inches and larger as well as a TISCIT float. This system will improve corrosion detection in the system and allow MSD to perform inspections internally for nearly all sanitary sewer segments.

Gravity main inspection projects completed during the reporting period are included in Table 1. The completion rate shown includes all inspections performed during the reporting period as well as unsuccessful inspections closed at the end of the project, which may span reporting periods. Gravity main inspection projects anticipated to be completed in the next reporting period are detailed in Table 2. A map depicting these project areas is included in Figure 2.

Gravity manhole inspection projects completed during the reporting period are included in Table 3. A map depicting these project areas is included in Figure 3.

Table 1. Completed Gravity Main Inspection Areas

PROJECT AREA	ASSIGNMENT	PIPE ASSIGNED (LF)	PIPE ASSIGNED (MI)	PIPE SURVEYED (LF)	PIPE SURVEYED (MI)	% COMPLETE
51118 Northern Ditch Interceptor	Contracted	48,134	9.1	45,586	8.6	94.7%
51138 Northern Ditch 2-5 Interceptor Inspection	Contracted	7,674	1.5	7,672	1.5	100.0%
51158 Beargrass Interceptor Relief	Contracted	12,960	2.5	12,925	2.4	99.7%
51579 Beargrass Interceptor	Contracted	69,837	13.2	53,283	10.1	76.3%
52218 Northwestern Interceptor Inspection	Contracted	13,458	2.5	7,653	1.4	56.9%
52225 Western Outfall Interceptor Inspection	Contracted	18,016	3.4	11,406	2.2	63.3%
53620 9th Street Sewer Interceptor	Contracted	750	0.1	732	0.1	97.6%
53640 Whitney Ave-Berry Blvd Interceptor	Contracted	11,466	2.2	10,757	2.0	93.8%
53641 20th Street Sewer Interceptor	Contracted	3,541	0.7	1,841	0.3	52.0%
53642 26th Street Interceptor	Contracted	8,448	1.6	6,673	1.3	79.0%
53643 26th Street Relief Sewer Interceptor	Contracted	1,067	0.2	1,065	0.2	99.8%
53644 Bannon Ave Sewer Interceptor Inspection	Contracted	2,087	0.4	2,122	0.4	101.7%
53680 Bohannon Ave Interceptor Inspection	Contracted	4,601	0.9	592	0.1	12.9%

Table 1. Completed Gravity Main Inspection Areas

PROJECT AREA	ASSIGNMENT	PIPE ASSIGNED (LF)	PIPE ASSIGNED (MI)	PIPE SURVEYED (LF)	PIPE SURVEYED (MI)	% COMPLETE
53681 Brent St-Highland Ave Sewer	Contracted	5,711	1.1	5,457	1.0	95.6%
53682 Central Business District Sewer Interceptor Inspection	Contracted	2,303	0.4	1,976	0.4	85.8%
53683 Highland Park-Beechmont Sewer Interceptor	Contracted	7,126	1.3	5,869	1.1	82.4%
53684 Jewel Ave Sewer Interceptor	Contracted	1,475	0.3	1,478	0.3	100.2%
53685 Manslick Ave Sewer	Contracted	4,774	0.9	4,397	0.8	92.1%
53740 Brownsboro Rd Trunk Interceptor	Contracted	8,706	1.6	7,271	1.4	83.5%
53760 Ormsby Ave Sewer Interceptor	Contracted	4,998	0.9	4,819	0.9	96.4%
53762 Trevellian Way Interceptor	Contracted	10,126	1.9	9,468	1.8	93.5%
53763 12th Street Sewer Interceptor	Contracted	6,059	1.1	5,838	1.1	96.4%
47211 SMN CSN FY18	Contracted	47,392	9.0	33,769	6.4	71.3%
47639 SMN CSU FY18	Contracted	63,928	12.1	25,523	4.8	39.9%
47641 SMN CST FY18	Contracted	22,205	4.2	14,513	2.7	65.4%
48102 South 3rd Street Heavy Clean Post Inspection	Contracted	2,110	0.4	2,042	0.4	96.8%
49202 SMN CSK FY18	Contracted	13,503	2.6	6,129	1.2	45.4%
50514 CSG Heavy Clean and Heavy Clean Post Inspect	Contracted	4,990	0.9	2,863	0.5	57.4%
45591 FY18 CSSA (CSL)	Internal	20,539	3.9	3,976	0.8	19.4%
TOTAL		427,984	81.1	297,695	56.4	77.5%

Table 2. Projected Gravity Main Inspection Areas

PROJECT AREA	ASSIGNMENT	PIPE (LF)	PIPE (MILES)
54741 Hikes Lane Interceptor	Contracted	9937	1.9
54775 Mill Creek Trunk Interceptor	Contracted	19739	3.7
54864 Peachtree Ave Sewer Interceptor	Contracted	10339	2.0
54866 Manning Rd-Cardinal Dr Sewer Interceptor	Contracted	12698	2.4
54867 Shipp Ave Sewer Interceptor	Contracted	6982	1.3
54868 25th Street Sewer Interceptor	Contracted	8016	1.5
54954 Grinstead Ave Area Rehab Inspection	Contracted	8959	1.7
54955 Rudd Ave Sewer Interceptor Inspection	Contracted	4022	0.8
55754 Charleswood Interceptor #23	Contracted	3608	0.7

Table 2. Projected Gravity Main Inspection Areas

PROJECT AREA	ASSIGNMENT	PIPE (LF)	PIPE (MILES)
55755 Klondike Interceptor	Contracted	3468	0.7
55756 Logan CSO Interceptor	Contracted	11414	2.2
55757 Olive Street Sewer	Contracted	4308	0.8
55774 Springhill Interceptor	Contracted	12979	2.5
55775 Lyles Sewer Interceptor	Contracted	550	0.1
55794 Orchard Way Sewer	Contracted	672	0.1
55798 Millers Lane Sewer Interceptor Inspection	Contracted	2360	0.4
55801 Riverside Gardens PS Influent Interceptor Inspection	Contracted	67	0.0
55834 Crittenden Drive Sewer interceptor Inspection	Contracted	5600	1.1
56497 Almond Ave Sewer Interceptor Inspection	Contracted	1683	0.3
56498 Bennett Ave Trunk Sewer Interceptor Inspection	Contracted	2392	0.5
56499 Big Run Interceptor	Contracted	12272	2.3
56500 Burkley Ave Sewer Interceptor Inspection	Contracted	1125	0.2
56501 Cherokee Enterprise Sewer Interceptor Inspection	Contracted	4987	0.9
56977 Forest Ave Sewer	Contracted	946	0.2
56998 Happy Hollow Sewer	Contracted	3645	0.7
56999 Hikes Point Relief	Contracted	1857	0.4
57000 Kentucky Fair & Exposition Center Gate 3 Sewer Inspection	Contracted	575	0.1
57001 Kramers Lane Interceptor	Contracted	13963	2.6
57002 Naval Ordinance Sewer Inspection	Contracted	4759	0.9
57003 Standiford Field Sewer Inspection	Contracted	2839	0.5
57004 Tavern Sewer Inspection	Contracted	1170	0.2
57005 Tenny Ave Sewer Inspection	Contracted	4630	0.9
57006 Upper Mill Creek Interceptor Inspection	Contracted	14941	2.8
57008 5th Street Sewer Interceptor Inspection	Contracted	2849	0.5
57009 Western Pkwy Sewer Interceptor Inspection	Contracted	5243	1.0
57010 Broadway Interceptor Inspection	Contracted	5407	1.0
INTERNAL INSPECTIONS BEING SCHEDULED DURING THE MONTH OF DECEMBER, WILL BE FINALIZED AND UPDATED PRIOR TO FINAL PUBLICATION, HAD TO WAIT FOR GRANITE IMPLEMENTATION AND IPS IMPLEMENTATION	Internal		
TOTAL		211,001	40

Figure 2. Completed and Projected Gravity Main Inspection Areas Will be Updated with Table 3

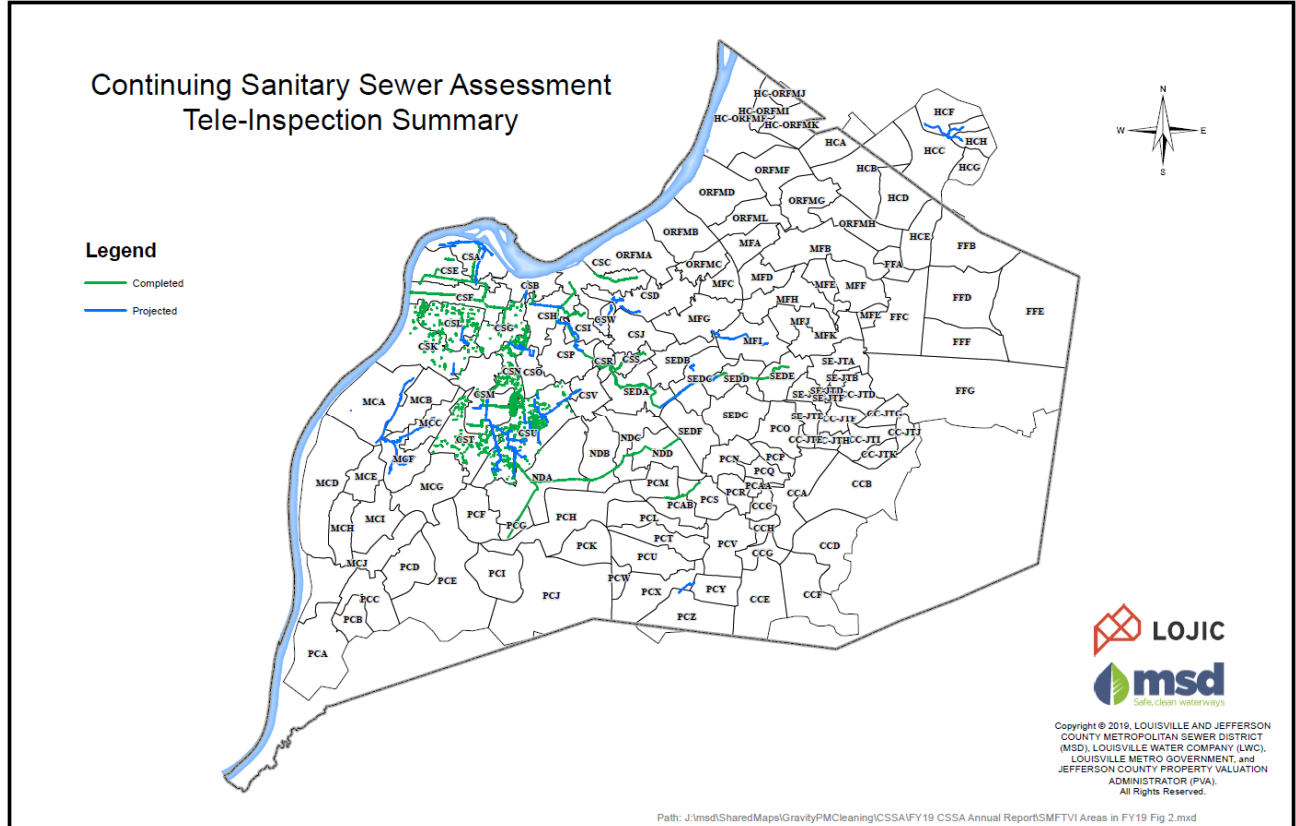
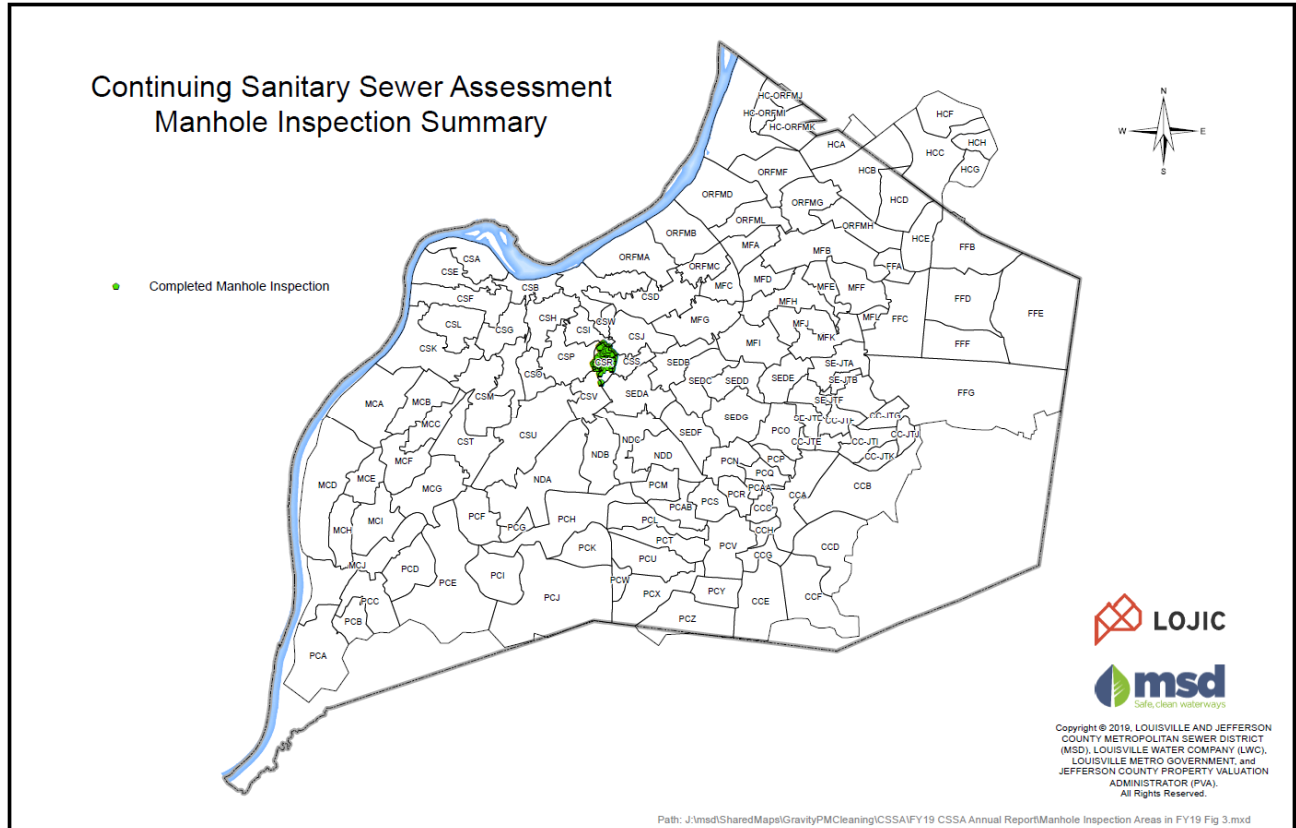


Table 3. Completed Manhole Inspection Projects

PROJECT	MANHOLES	PROJECT SELECTION CRITERIA
51562 – COMBINED SYSTEM AREA R (CSR)	121	Support for Rehabilitation Planning
TOTAL	121	

Figure 3. Completed and Projected Gravity Manhole Inspection Areas



5. ASSESSMENT

Under SSES and ICA efforts, a findings report was developed for each study area including a summary of the area and issues present, rehabilitation or remediation and maintenance recommendations, cost estimates, maps, bid documents, and a determination of the future inspection interval. In order to maximize the benefit of the CSSA program, MSD moved in FY16 to utilize existing teleinspection reports in conjunction with contracted manhole inspections that are used to generate recommendation packages. A draft pilot process was created to generate recommendations for rehabilitation and maintenance activities, including cost estimates based on current contract prices, based on inspections and other data housed in IPS and the GIS. This process includes recommendations for rehabilitation and maintenance activities, prioritized based on comparative condition to the rest of the system.

Through the updated assessment process, SCAP sub-basins and smaller targeted areas are selected for analysis to identify the cause of specific sewer overflows, capacity and performance, or Inflow and Infiltration (I/I) problems. Recommendations are generated the same day using available inspection data, including lining or point repairs for small-diameter mains and lining or frame repair / replacement for manholes, and reviewed by Engineering staff. Additional engineering support may be acquired as needed to develop rehabilitation solutions on a case-by-case basis for large-diameter gravity mains.

In FY17, MSD worked to verify the efficacy of the draft methodology. Feedback was solicited from field inspection and Operations staff as well as contractors. The feedback was generally positive for recommendations for manholes and small-diameter mains and included recommendations for minor alterations to improve the process. During FY18, feedback was incorporated in the assessment methodology, and the determination was made that specific recommendations for large-diameter gravity mains would be made on a case-by-case basis using engineering judgment.

In FY18, the current condition assessment scoring system was translated to a draft likelihood of failure (LOF) index as well as a draft predicted LOF which takes into account not only current condition but anticipated remaining life before failure based on attributes like age and material.

A parallel initiative involved the development of a draft consequence of failure (COF) index, which rates the criticality of a piece of infrastructure. Critical infrastructure is defined as combined and sanitary sewer infrastructure that would have a significant negative impact to the community in the event of failure. MSD has undertaken several initiatives to assist in determining infrastructure that qualify as critical. In FY17, MSD worked through the draft consequence of failure matrix developed by the Wet Weather Team in FY10 to identify any outstanding factors as well as data sources for the criteria within Hansen or the GIS. Efforts in FY18 focused on developing a process to calculate criticality out of existing data sources, and identifying data gaps and next steps to gather data to fulfill the COF index.

The draft LOF and COF indexes were finalized in FY19, and the updates to the CSSA protocol are being implemented under scrutiny in FY20.

In FY20, MSD plans to purchase a GIS-based application that will allow additional data sources to be used to improve the LOF and COF indexes, including hydraulic modeling data and additional spatial data. The application can also be used to generate shapefiles for tap locations that MSD can use to improve spatial data for service connections and catch basin leads.

6. IMPLEMENTATION

6.1. EMERGENCY EVALUATION AND ESCALATION PROGRAM

When an inspector in the field encounters a critical asset that is at or near failure mode, or when the assessment of a new inspection of a critical asset indicates that an asset is at or near failure mode, the asset is immediately evaluated for an emergency repair. Through FY19, this process has been informal, requiring the inspector or assessing engineer to notify their supervisor if such a defect is identified. In FY20, the procedures and work instructions associated with this process will be formalized, and training will be conducted for internal staff and contractors when the procedures are completed.

6.2. INFRASTRUCTURE REHABILITATION PROGRAM

Rehabilitation activities are selected and prioritized through the assessment process. Utilizing the recommendations, projects are advertised and awarded to contractors or assigned to annual contractors and rehabilitation work is completed. Table 4 summarizes project areas completed in the current reporting period or ongoing as of the end of the reporting period.

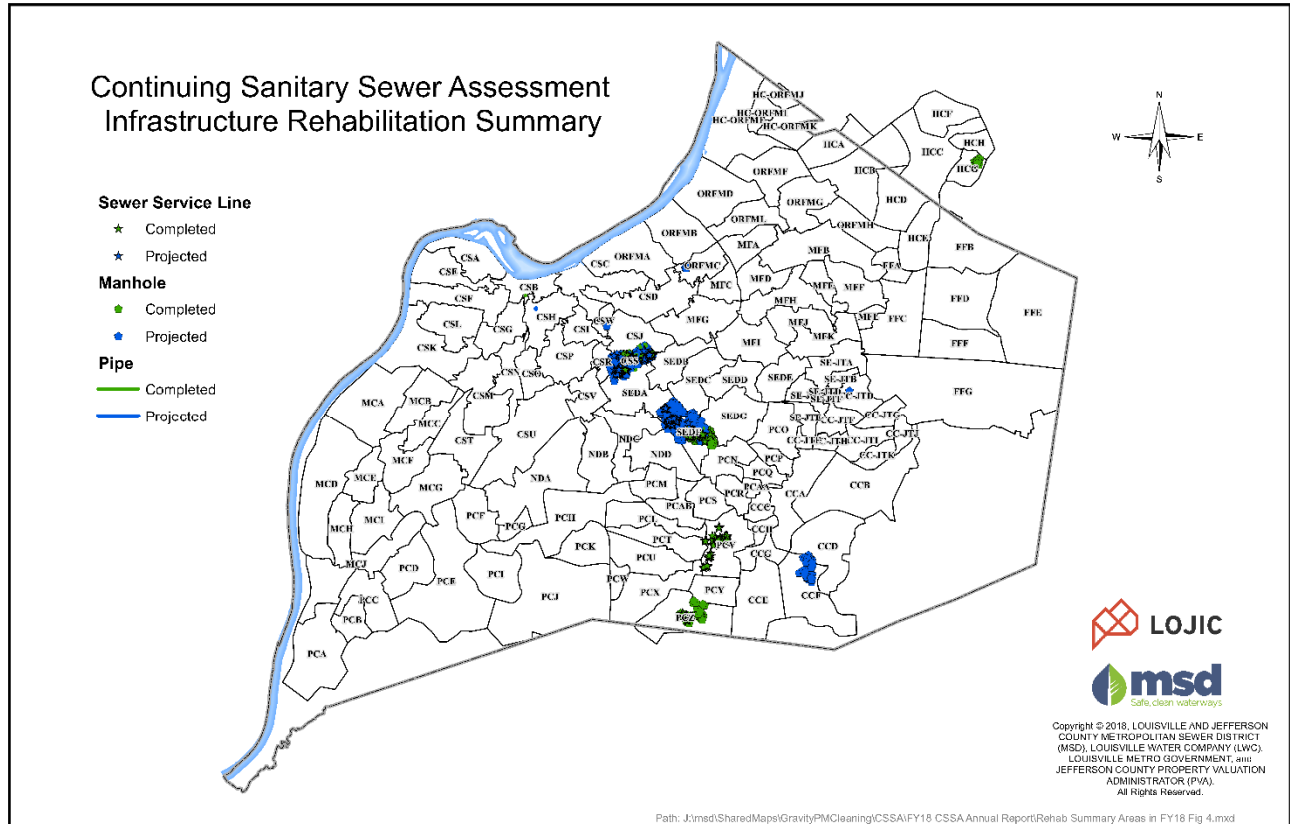
In FY19, two construction inspectors and one engineer were certified under NASSCO's Inspector Training & Certification Program, a standard national training and certification program that provides field construction professionals with comprehensive learning and tools to understand and inspect trenchless pipeline renewal technology. Each inspector was trained in inspection and application of cured-in-place pipe and manhole rehabilitation methods. In FY20, one construction inspector, one operations supervisor and three engineers will be trained in the program.

Table 4. Current Rehabilitation Projects

REHABILITATION AREA	PIPE (LF)	PIPE (MI)	MANHOLES	COST	COMPLETED DATE
BARDSTOWN RD PUMP STATION ¹	515	0.10	57	\$77,692	May 25, 2019
OHIO RIVER INTERCEPTOR STRUCTURAL REHABILITATION ¹	1,417	0.27	0	\$17,782,038	June 18, 2019
OAKLAWN DRIVE REHABILITATION ¹	2,814	0.54	1	\$518,743	June 21, 2019
SOUTHEAST DIVERSION AREA F (SEDF) ¹	13,911	2.63	209	\$897,737	August 22, 2019
INDIAN WOODS REHABILITATION ¹	100	0.2	2	\$68,062	September 29, 2019
SOUTHEASTERN DIVERSION AREA C (SEDC)(NIGHTINGALE) ²	30,374	5.80	1,557	\$3,797,334	May 31, 2021

¹Completed project. Cost and completed date are actual.

²Ongoing / planned project. Cost and completed date are estimates.

Figure 4. Current Rehabilitation Areas


6.3. GRAVITY LINE PREVENTATIVE MAINTENANCE PROGRAM

MSD currently performs condition-driven maintenance activities on portions of the sewer system under the GLPM program as a refinement of the gravity line preventive maintenance that MSD has implemented over the years. Maintenance activities related to this program include routine hydraulic cleaning, chemical root treatment, and chemical grease treatment. As the system is inspected, MSD identifies gravity mains exhibiting operational or maintenance-related defect conditions and initiates routine maintenance activities on those assets as recommended. Consistent, periodic preventive maintenance of the sewer system to maximize asset life and minimize overflows, property damage and health risks is the primary goal of the program.

Completed GLPM activities for the reporting period are summarized in Table 5. Projected GLPM activities for the upcoming reporting period are summarized in Table 6.

Table 5. Completed GLPM Activities

ACTIVITY	PIPE (LF)	PIPE (MILES)
Flushing	111,794	21.2
Chemical Root Treatment	151,194	28.6
Chemical Grease Treatment	17,980	3.4
Total	280,968	53.2

Table 6. Projected GLPM Activities

ACTIVITY	PIPE (LF)	PIPE (MILES)
Flushing	727,209	137.7
Chemical Root Treatment	105,801	75.8
Chemical Grease Treatment	5,000	0.9
Total	1,189,945	225.4

7. REPORTING

MSD's approved SCAP manual documents the process for accumulating capacity credits through I/I removal projects and estimated flow reduction from these projects, credits are calculated from I/I removal, and how credits are tracked and distributed to new flow requests within Hansen. MSD calculates these credits for each rehabilitation project completed, as well as for maintenance activities completed and illicit connections removed from the system.

During FY17, SCAP credit calculation for rehabilitation projects was automated to account for remediation activities performed by contractors in response to customer issues in addition to project areas. Additional efforts were made to review work orders completed by MSD Operations and calculate credits as appropriate. During this process, MSD staff identified process and documentation improvements that will allow credits for maintenance activities to be automated and reported in a more consistent and timely manner. These improvements will be implemented as resources allow.

Quarterly reports will continue to include progress on inspection and maintenance efforts and include regular updates to the SCAP balance. Annual reports will continue to include programmatic updates on progress, refinements, and upcoming efforts. Previous reports since FY08 are available on the Project WIN website at <http://www.msdprojectwin.org/Library.aspx> under Consent Decree Reporting.



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Appendix F

Public Notification

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What you don't see could harm you!

**Sewers can overflow
into waterways during
rainstorms.**



Those waters could contain harmful bacteria, which can make you sick.

Rainwater can overwhelm the sanitary sewer system and cause overflows into local waterways. You should **minimize contact with waterways to be safe during storms and even for 48 hours after the rain has ended. During these times, avoid swimming, fishing, wading and splashing in the water.**

Wash with warm, soapy water if you come into contact with water that may have been contaminated by a sewage overflow.



MSDProjectWIN.org

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CustomerRelations@LouisvilleMSD.org



LouisvilleMSD

LOCALiQ

Digital Display Summary Report

May - June 2019

SUMMARY OF 2018 AD CAMPAIGN

May 2018

- Ad Size - Full-Page, Full Color Print Ad (See Attachment)
- Frequency - 1x (one ad)
- Publication Date - Sunday May 5, 2018
- Section Placement - The day after Derby Special Section
- Number of Impressions - 102,000
- Investment - \$8,500

Summary - 2019 Combo Print/Digital Display Campaign

May - June 2019



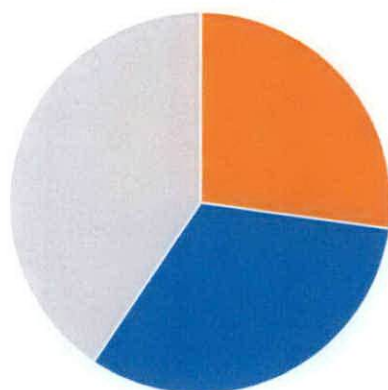
	TARGETING	IMPRESSIONS	CLICKS	CTR%
May	USA Today Network; Desktop + Mobile Geo: Louisville, KY	443,496	354	0.08%
June	USA Today Network; Desktop + Mobile Geo: Louisville, KY	387,998	346	0.09%
Total		831,494	700	0.08%

Digital Display Details

May - June 2019

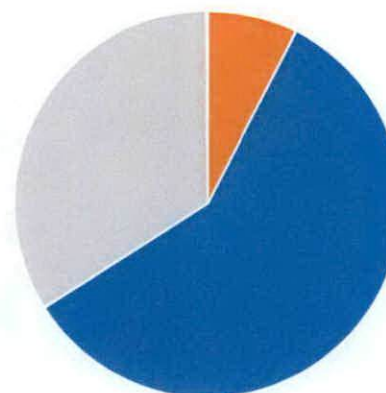


Impressions by Device Type



- Desktop
- Smartphone
- Tablet
- Other

Clicks by Device Type



- Desktop
- Smartphone
- Tablet
- Other

Creative Details

May - June 2019



What you don't see could harm you!

Sewers can overflow into waterways during rainstorms

[LEARN MORE »](#)

AVOID MAKING A SERIOUS POTTY FOUL

KNOW WHAT'S OK TO FLUSH DOWN THE TOILET

YEP!

NOPE!

(ANYTHING ELSE)

- BABY WIPES
- BANDAGES
- COTTON BALLS/SWABS
- CLEANING WIPES
- DENTAL FLOSS
- DIAPERS
- HAIR

[LEARN MORE](#)

Wipes do not break down, even if their labels read "flushable." They can lead to sewage backups in your home or work place.

Avoid the mess, toss your wipes into the trash!

What you don't see could harm you!

Sewers can overflow into waterways during rainstorms

[LEARN MORE »](#)

AVOID A MESS... PUT WHIPES IN THE TRASH... ONLY FLUSH THE 3 Ps

[LEARN MORE](#)

Clean Up After Your Pet

[LEARN MORE](#)

LOCALiQ
PART OF THE USA TODAY NETWORK

Comparison: 2018 vs 2019

Comparing results of the 2018 campaign to the 2019

2018 Campaign

Product - Print

- Ad Size - Full Page
- Frequency - 1x (one ad)
- Publication Date - Sunday May 6, 2018
- Placement - Day After Derby Special Section
- Number Impressions Delivered - 102,000
- Investment - \$8,500

2019

Product - Print

- Ad Sizes - Quarter Pages
- Frequency - Three Ads the Week of Derby
- Publication Dates - May 1st, 4th & 5th
- Print Impressions - 306,000

Product - Digital

- Medium - Digital USA Today Network
- Ad sizes - 300 x 250, 320x 50, 300 x 600
- Frequency - May through June
- # Impressions Delivered - 831,494
- Investment - \$8,995
- Total Impressions Delivered -

LOCALiQ
PART OF THE USA TODAY NETWORK

Summary - 2018 to 2019 Marketing Campaign

Comparing Apples to Apples Results

THE COMPARISON

- In 2019, for an additional \$493, MSD received three print ads compared to one ad in 2018.
- In 2019, your combo print/digital marketing campaign delivered 933,494 Impressions.
- The 2019 campaign delivered 831,494 more eyeballs that saw your ads compared to 2018.

THE DIFFERENCE

- The ads for this campaign we seen over 831,000 times.
- Your ad was clicked 700 times, meaning people were engaged by the ad and wanted to click on it to learn more information from your website.
- The average click through rate for display ads is 0.05%, the average for your

LOCALiQ
PART OF THE USA TODAY NETWORK

Summary - 2020 Combo Print/Digital Display

April through June 2020



PRODUCT	MEDIUM	TIME FRAME	PRINT & DIGITAL IMPRESSIONS	INVESTMENT
Targeted Digital Display Ads	USA Today Network; Desktop + Mobile Geo: Louisville, KY	April through June	600,000	
Print	Courier Journal Three Quarter-Page Ads	<ul style="list-style-type: none"> Wednesday April 29th Friday May 1st Sunday May 3rd (Day After Derby) 	306,000	
TOTALS			906,000	\$10,000



MSD takes innovative approach to repair Main Street sewer

Repair plan will reduce impact to downtown business and tourist area

MSD has developed an innovative approach to repair a major downtown sewer pipe at risk of a cave-in. The repair will largely occur underground and prevent closing and excavating sections of West Main Street, a busy commercial and tourism corridor.

Video and laser inspections earlier this year revealed structural damage to a section of the 60-year-old pipe underneath West Main Street between Fourth and Seventh streets. The damaged sewer pipe is one of the city's largest, carrying approximately 40 percent of Louisville's wastewater flow. The pipe carries wastewater to MSD's Morris Forman Water Quality Treatment Center so that it can be treated before release into the Ohio River.

"Last year, a different section of this pipe caved-in due to age and wear," said MSD Executive Director Tony Parrott, referring to the August 2017 collapse at Main and Hancock streets that took six weeks to repair. "We must address the safety and health hazard of this crucial sewer line and do it in a way that minimizes disruption to this vibrant downtown area."

For more information on this repair visit:

- LouisvilleMSD.org/WestMainRepair
- Social media #WestMainRepair

The Ohio River Interceptor is one of the hundreds of projects identified in MSD's Critical Repair & Reinvestment Plan, which includes funding to rehabilitate major sewer lines within the service area.

Visit: LouisvilleMSD.org/CriticalRepairPlan

STREAMLINE

News and Events at Louisville MSD • June/July 2018

OUR VISION

Achieving Safe, Clean Waterways
for a Healthy and Vibrant Community

'Pump-around' will allow workers to enter pipe and repair from within

The \$20 million repair project involves building a temporary "pump-around" system to remove wastewater flow from the damaged section of pipe, so that workers can go underground and make repairs from within the 7-foot wide pipe. Workers will enter the pipe through existing hatches in the pavement at Fourth and Main streets.

The interior of the pipe will be lined with corrosion-resistant PVC panels fit together by hand and sealed to the unique shape of the pipe itself — essentially creating a sturdy new pipe inside the damaged pipe. This will eliminate the need to close and excavate Main Street.

— Continued on page 2



Pipes for the temporary pump-around are ready for installation along River Road.



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Continued from page 1

Main Street sewer repair

Wastewater pumped out of the damaged pipe will be temporarily re-routed west along River Road to Ninth Street where it will re-enter the large sewer pipe and continue its path to MSD's Morris Forman Water Quality Treatment Center for treatment and release to the Ohio River.

Roadway closures

There will be some detours and lane reductions due to the repair and the pump-around for the wastewater. Some of the closures will be conducted during the overnight hours to minimize traffic and pedestrian disruption.

- A section of **4th Street just south of River Road** is closed for construction of a temporary pump station that will power the pump-around. It will reopen for northbound traffic by August 1.
- From July through the project's completion in November, there will be lane reductions and traffic flow changes on **Main Street near Fourth Street** to provide space for contractors to safely complete the work, while maintaining vehicle and pedestrian traffic.
- One lane of **Ninth Street — between Main and West Washington streets** — and a section of West Washington at Ninth Street will also close July 23.
- Parking lanes on the **south side of Main Street between Fourth and Seventh streets** remain closed to protect the public at this time. These lanes have been closed since March to allow inspectors to continually monitor the pavement for signs of cave-in and will allow space for MSD to safely complete the repair. As the repair progresses, these parking lanes will be reopened to traffic.

BELOW: The parking lane along the south side of Main Street between Fourth and Seventh streets has been closed since March due to the threat of a cave-in of a large sewer line under the pavement.



Inspectors regularly look for changes in the pavement that might indicate a cave-in.

Cave-ins result from corrosion of pipe interior

Following the prior cave-in of the Ohio River Interceptor at Main and Hancock streets, MSD conducted extensive video and laser inspections of the pipe, to allow engineers to analyze the pipe without having to empty it. The inspection revealed that some of the concrete and rebar in the Fourth to Seventh street section had worn away due to corrosion caused by sewer gases, reducing the structural integrity of the pipe.

MSD maintains more than 3,300 MSD miles of sewer lines — enough to stretch from California to Maine, and many dating back 75 years or more. In the past 12 months, MSD has responded to more than 1,100 cave-ins across the community, including recent collapses of a stone sewer at 2nd and Main streets and a brick sewer at Liberty Street between East Chestnut and Baxter Avenue, both more than 150 years old. To view a map of cave-ins over the past year, visit: LouisvilleMSD.org/prevent-collapsing-sewers.



MSD and USACE awarded \$3 million for in-depth study of MSD's vital Flood Protection System

Following the rainiest February in Louisville in 134 years, MSD will receive \$3 million from the U.S. Army Corps of Engineers (USACE) to identify risks to the city's flood protection system and develop a repair plan. U.S. Senate Majority Leader Mitch McConnell (R-KY) announced the funding July 12th as part of the Bipartisan Budget Act of 2018.

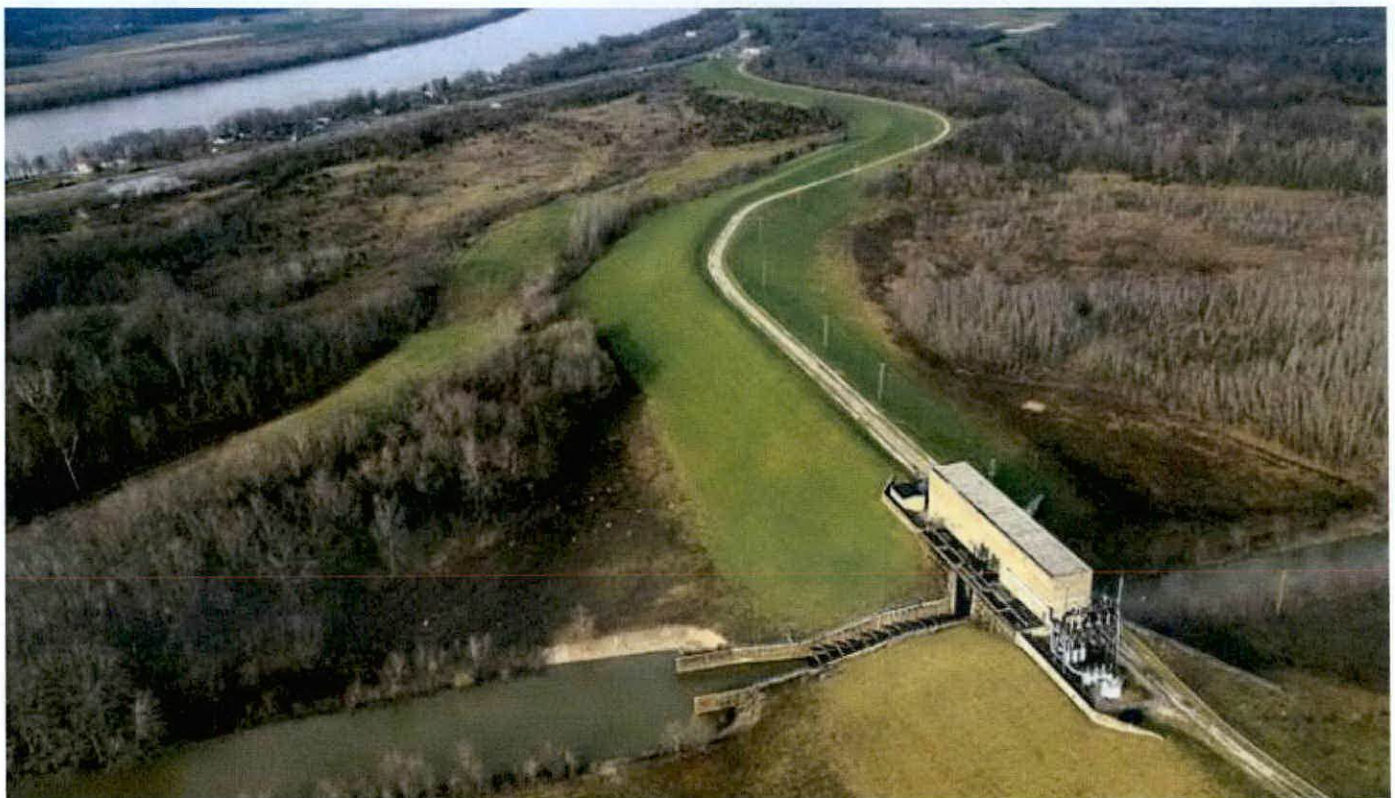
One of MSD's core functions is to maintain and operate the Ohio River Flood Protection System, which protects \$24 billion in property throughout 110 square miles of Louisville Metro. The system includes 29 miles of floodwall and earthen levee, 16 flood pumping stations, nearly 150 floodgates and 80 floodwall closures.

The recent flooding in February and March ranks among the 10 worst floods in Louisville as approximately 40 billion gallons of rain fell across the city in five days. Inspections have revealed that MSD lost 17 percent of its flood protection capacity from damages suffered during that recent flood. "Evaluations of the system are ongoing, but the figure to date is \$2.5 million and climbing," stated MSD Chief of Operations Brian Bingham.

Louisville has an aging flood protection system. The 1937 Ohio River flood led to the construction of the system MSD operates today. The floodwalls constructed in the 1940s and '50s are still in service. The pumping stations that redirect flood waters away from homes and businesses are more than 60 years old and operate with parts that are no longer available for replacement. "MSD needs to update this infrastructure to keep up with Louisville's growing population. We are grateful for Leader McConnell's support to secure funding," said MSD Executive Director Tony Parrott. "We're ready to get started, to work with the USACE, and develop a plan to protect Louisville for future generations."

The flood protection study will look at the potential failures in the flood protection system, the impact to homes and businesses and options for repair. MSD had already started to identify improvements as part of its Critical Repair & Reinvestment Plan, a 20-year outline of projects for flood protection, wastewater and drainage. However up to this point, funding the projects has been a challenge. The study will take 18 months to complete.

BELOW: MSD's Pond Creek Flood Pumping Station is the second largest flood pumping station in its system. The station provides flood protection to a large swath of southwest Jefferson County.



How did you spend your Fourth of July?

With temperatures teetering close to 100 degrees, and the smell of barbecue grills filling the air, this past Fourth of July was a day of rest and celebration for many. But it played out differently for a group of MSD employees who spent the day coping with a force main that sent a discharge onto Cedar Creek Road.

Chief Operations Manager **Brian Bingham** said MSD's customer service was contacted about the discharge that morning. "The problem was an air release valve in a force main," Bingham said. "It created a discharge that flowed from the road into a driveway and yard."

Sanitary Supervisor **Darrell Goodwin** answered the call to inspect the situation. He and his crew of **Kenny Alford**, **Roderick Harris** and **Ben Smith** worked the site. "We brought in vactor trucks and cleaned up the discharge, then we scooped up the gravel from the driveway and replenished it with pea gravel," said Goodwin.

Compounding everything was working with a skeleton crew due to the holiday in extreme temperatures. "That area is wide open, and the sun beats down on you," Goodwin said. "It was an all-day job in a tough situation, but we were able to clean it up."

Bingham praised the MSD crew, "This was an outstanding effort by everyone involved. It is a credit to the hard work and determination of MSD employees that they worked to rectify this as others celebrated Independence Day."



Shown left to right: Ben Smith, Roderick Harris, Kenny Alford and Darrell Goodwin worked through the Fourth of July to clean the site of a sewer discharge on Cedar Creek Road.

Customer Compliments

I want to thank **Horace Gaither** for a job well done. I had a downspout disconnection performed on my home. Mr. Gaither was very professional, courteous and performed high-quality workmanship. MSD should be very proud with way he represents MSD's name.

— Elenor Dougherty

Val Winburn and his crew of **Virgil Brown**, **Cecil Edwards**, **Calbert Kelsey**, **Malcolm Thomas** and **Mike Young** did an excellent job cleaning the ditch near my house. We appreciate their hard work!

— The Summers Family

My husband and I want to thank you for sending the crew of **Johnny Caudill**, **Dwayne Edwards**, **Miko Santana** and **Ricky Tobin** to our home to correct a drainage problem. The guys were wonderful. They were on time, worked hard in the heat and took time with neighbors who were curious. They dug, connected, graded, seeded and put straw down; my yard has never looked better. These gentlemen are a true asset to your organization.

— Tom and Ann Armstrong

**MSD is available 24/7
at 502.587.0603**

Report a sanitary sewer backup before contacting a plumber.

**Interested in working for one of
our construction contractors?**
For more information visit MSDJobLink.org.



MSD supports Ohio River Sweep for the 29th year

The Ohio River Sweep—one of the nation's largest and longest-running environmental cleanup events—was held Saturday, June 16. River Sweep is sponsored by the Ohio River Valley Water Sanitation Commission (ORSANCO), and locally by MSD, Louisville Water Company and LG&E. MSD's **Rhonda Boyle-Crotzer** coordinates Jefferson County's leg of the sweep. **Dane Anderson, Lynne Fleming, Kandyce Groves, Lanita Grimes, Loren Levitz, Robin Shaw** and **Dolly Smith** were hosts for the seven locations along Beargrass Creek and the Ohio River. These sites stretch from Hays Kennedy Park, in the northeast, to Riverview Park in the southwest. MSD's **Val Winburn** coordinates our crews for proper trash removal. **Sheila Beard** and **JP Carsone** organized the post-cleanup cookout for all the volunteers.



ABOVE: MSD employees provide motorized assistance to collect large items and bags of trash.

BELOW: Trash grabbers are always popular with the kids.



Join us next year!
River Sweep—June 15, 2019



ABOVE: MSD employees made sure volunteers are equipped with gloves and plenty of trash bags.

MSD thanks the volunteers who continue to help us realize
**Our Vision—Clean, Safe Waterways
for a Healthy and Vibrant Community.**





700 West Liberty Street
Louisville, KY 40203-1911



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You can find information about
MSD Board actions on our website,
msdrecords.LouisvilleMSD.org

The public is welcome to attend MSD Board meetings.
Access [http://msdrecords.louisvillemsd.org/
openmsd/board.aspx](http://msdrecords.louisvillemsd.org/openmsd/board.aspx) for the full schedule of
both regular and Board committee meetings.

Upcoming Events

- JULY 23**
MSD Board Meeting
1 PM, Open Session, 700 West Liberty Street
- AUGUST 2**
MSD Finance Committee Meeting
3 PM, 700 West Liberty Street
- AUGUST 7**
MSD Customer Service Committee Meeting
2 PM, Open Session, 700 West Liberty Street
- AUGUST 13**
MSD Personnel Committee Meeting
2 PM, 700 West Liberty Street
- AUGUST 27**
MSD Board Meeting
1 PM, Open Session, 700 West Liberty Street



Controlling mosquitoes in our catch basins

MSD has partnered with Louisville Metro Public Health and Wellness Department to routinely test and treat for mosquitoes in the coming months. The city routinely tests mosquito populations as part of the insect-control program, which includes controlling mosquitoes in MSD's 24,000 trapped catch basins within the combined sewer system.

Take a look!

Check out website LouisvilleMSD.org

Follow us on social media

@LouisvilleMSD





It is a tight traffic squeeze in a section of Main Street due to additional failures inside a large sewer pipe that runs under Main Street.

Another problem for one of MSD's largest sewer lines

Potential cave-in has become a reality

MSD has discovered another problem with the 84-inch sewer pipe running under West Main Street. A 5- by 2-feet section of the pipe has collapsed. MSD confirmed the cave-in with a remote-control camera scan on August 19. Video from the camera

shows a hole in the side of the pipe with debris, including abandoned pipes, which have fallen into the large sewer line. Further inspections have revealed a large void under the pavement, which is about 40-50 feet in both directions across and down the roadway, and 25-feet deep at the worst spot.

“Earlier this year, MSD explained that we believed there was imminent potential for this pipe to fail. Now, what we feared would happen has occurred.”

— MSD Executive Director
Tony Parrott

The road was unsupported in this area with a gas and water line suspended in the void. For public safety, MSD further reduced Main Street traffic in this area. Only one lane is open to traffic on the north side of Main Street midway between Third and Fourth streets to midway between Fourth and Fifth streets. An inspection of the pipe from June 21 shows a deteriorated pipe with exposed rebar, but no cave-in.

STREAMLINE

News and Events at Louisville MSD • August/September 2018

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A video made inside the Main Street sewer reveals a hole in the side of the pipe, allowing debris to fall inside of it.

What happens next

A team of outside experts and MSD engineers have developed a way to fill the void so that the ongoing planned repair of the sewer line can continue. On August 26, contractors began carefully filling the void from above with light-weight flowable material. This effort will continue until the void is filled up to the pavement level. Then contractors will enter the pipe to install — from inside the pipe — new metal support for the top and sides of the pipe. Once that is complete, the planned repair can proceed.

Continued on page 2



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Contractors work to fill the void underneath the West Main Street pavement. A cave-in and heavy rains removed most of the supporting soil under this portion of the roadway.

Continued from page 1

Problem for one of MSD's largest sewer lines

The sewer line was installed between 1958 and 1960 and is one of the city's largest and most vital, carrying approximately 40 percent of Louisville's wastewater flow. Known as the Ohio River Interceptor, the pipe carries wastewater to MSD's Morris Forman Water Quality Treatment Center for treatment and release of the treated water into the Ohio River. In March, MSD discovered a problem with the pipe and closed part of Main Street between Fourth and Seventh streets. In June, MSD announced a \$20 million project to repair the damaged section from Fourth to midway between Seventh and Eighth streets.

The repair project for the interceptor pipe includes lining the interior of the pipe with corrosion-resistant PVC panels fit together by hand and sealed to the unique shape of the pipe. This repair essentially creates a sturdy new pipe inside the damaged pipe.

The sewer pipe must be nearly empty for the repair to take place. To do this, MSD established a "pump-around," which is a temporary sewer line that utilizes existing pipes to convey the wastewater from Main and Fourth streets to a temporary pumping station at Fourth Street and River Road. From there, the wastewater travels west in four temporary pipes along River



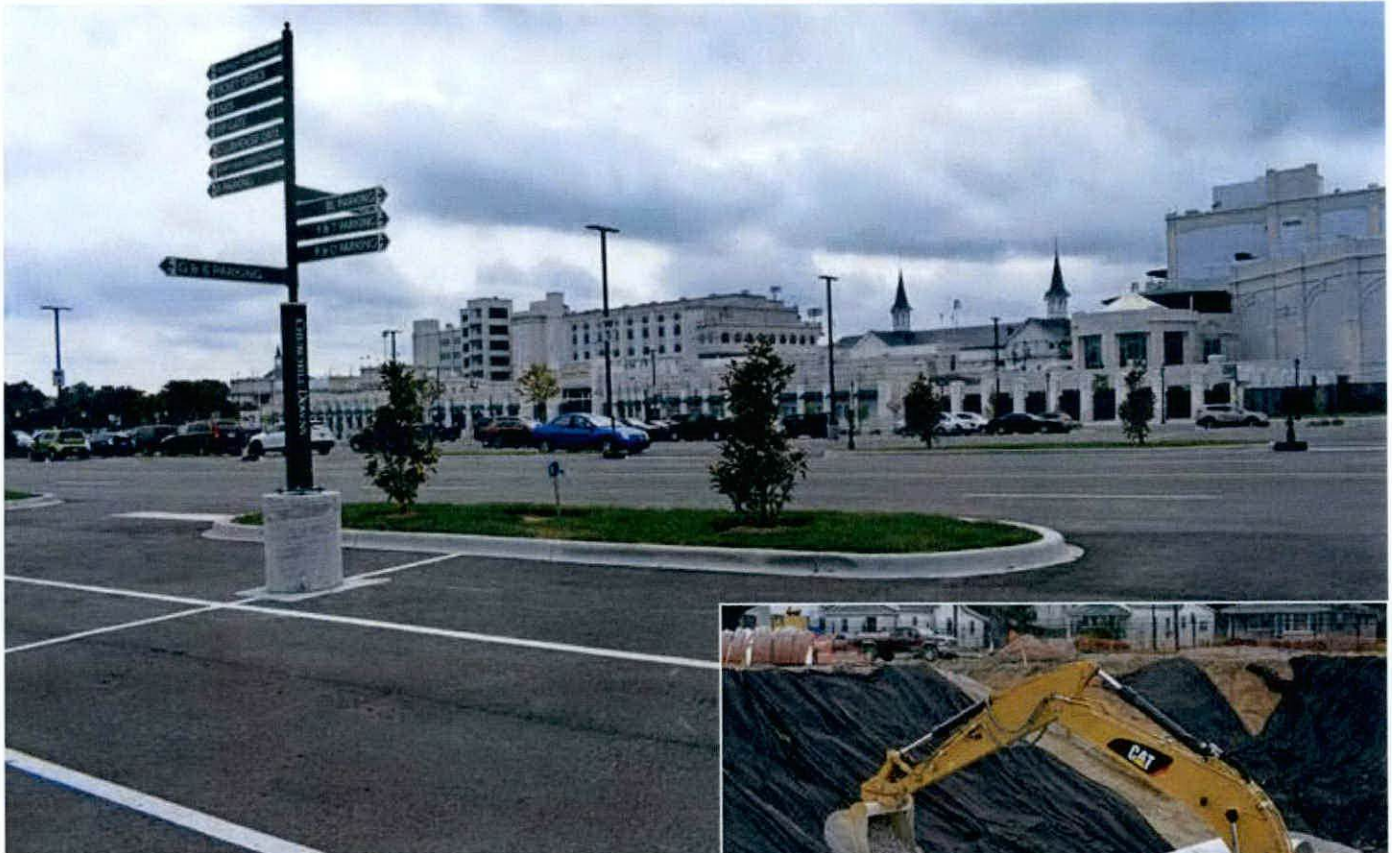
The pink "X" marks the spot of the cave-in of the West Main Street sewer 25 feet below. The pink "19" gives the depth of the void at that point under the pavement.

Road, then up an embankment and around the floodwall, down West Washington Street to Ninth Street. The pipes continue up the hill on Ninth Street where the wastewater re-enters the existing sewer pipe under Main Street.

For more information on MSD's West Main Repair visit LouisvilleMSD.org/WestMainRepair.

The Ohio River Interceptor is one of the hundreds of projects identified in MSD's Critical Repair & Reinvestment Plan, which includes funding to rehabilitate major sewer lines within the service area.

Visit: **LouisvilleMSD.org/CriticalRepairPlan**



Phase I of Churchill Downs parking renovation, which includes underground storage for stormwater runoff, is now complete.

Churchill Downs makes effort for safe, clean waterways

Churchill Downs' storied history includes the Kentucky Derby, Kentucky Oaks and hosting the Breeders' Cup. But the Kentucky institution can now be recognized for its efforts to help maintain safe, clean waterways in Louisville Metro with its participation in Louisville MSD's Green Infrastructure Program.

The track is nearing the completion of Phase 2 of its parking renovation, where 96-inch pipes have been installed underneath the parking area. The pipes — covering approximately 33 acres — will act as a storage basin during heavy rainfall events. Phase One of the project saw similar pipes installed across 22 acres. In total, the project will provide 3 million gallons of stormwater storage.

Collected stormwater will be allowed to permeate into the sand under the parking lot into the Ohio River Alluvial Aquifer. Such basins keep stormwater out of the sewer system, reducing sewer overflows and stress on wastewater treatment facilities. It is estimated the project will reduce 12 million gallons of combined sewer overflows into the Ohio River.



Work on Phase 2 of the green infrastructure installation and parking lot renovation at Churchill Downs is scheduled for completion in October.

Additional Facts about Churchill Downs Infiltration Basins:

- Each basin is the length of a football field and roughly 17 feet underground
- Basins have 3 million gallon storage capacity total — equivalent to 4.5 Olympic-size swimming pools
- They capture more than 60 million gallons of water each year and will prevent about 12 million gallons of sewer overflow each year
- Are large enough to handle a 2.13-inch rain event — this is the largest rain event in a typical year of rainfall
- In a typical rainfall year, every drop of rain that falls on the 55 acre parking lot will infiltrate back into the ground
- More than 900 trees will be planted at Churchill Downs as part of this project

For more information regarding MSD's green infrastructure incentive program, please contact Jordan Basham at jordan.basham@louisvillemsd.org or 502.540.6634.

Waterway Protection Tunnel reveals millions of years of history



Rock core samples were used to determine the depth necessary for safe construction of MSD's Waterway Protection Tunnel.

MSD's project to build a tunnel 18 stories underground for wastewater and stormwater storage has also unearthed hundreds of millions of years of history. In January 2018, MSD began construction of its Waterway Protection Tunnel, a 20-foot diameter underground tunnel deep within bedrock that will help prevent hundreds of millions of gallons of wastewater and stormwater from polluting the Ohio River and Beargrass Creek. As part of the preparation for this project, geologists drilled down 200 feet or more along the path of the tunnel to pull up samples of limestone and shale, and then analyzed the rock as part of planning for the depth of the tunnel.

MSD has thousands of linear feet of these rock core samples stored in a southern Indiana warehouse. They act as a library of sorts for contractors to access as the project proceeds. The samples highlight the history of what is now Louisville. Many of the fossils found in the core samples are similar to those seen at the fossil beds at the Falls of the Ohio State Park just across the river in Clarksville.

MSD conducted rock boring at 15 locations along the Waterway Protection Tunnel alignment. Ten distinct bedrock units were found. The bedrock strata is approximately 350 million years old. Fossilized shell fragments and the remnants of other sea creatures exist within the collected samples.

Types of rock are often named for the city in which they were discovered or predominantly found. This area includes significant amounts of Louisville, New Albany, Sellersburg and Jeffersonville limestones.

Analysis of the rock requires specialized equipment and technology. The excavated rock was sent to the Colorado School of Mining for analysis. Engineers and geologists use the findings from core sampling to determine the ideal path and depth at which the tunnel should be built as well as to make other determinations about the tunnel's engineering.

One key finding during sampling was notable amounts of Waldron Shale — a type of rock native to Indiana which easily fragments. This discovery determined the tunnel would have to be dug 20-feet deeper than originally planned.

Sampling just east of Louisville Slugger Field also found an artesian well — a pocket of deep underground water. This water was three times saltier than seawater, due to the length of time the water was pressurized underground.

Learn more about the project at
LouisvilleMSD.org/tunnel
Get Boring News at
LouisvilleMSD.org/tunnel/newletter

MSD Honors



Shawn Smith, Mike Stephenson, Duane Wright and Chris Coomer of Cedar Creek WQTC were recognized by NACWA.

Cedar Creek WQTC wins top honors

MSD Cedar Creek Water Quality Treatment Center was awarded a Platinum Peak Performance Award for permit compliance. The award — presented during the National Association of Clean Water Agencies (NACWA) Utility Leadership Conference in July — recognizes NACWA member agency facilities for 100-percent compliance with permits over a consecutive five-year period.

Rafferty appointed to Association of State Floodplain Managers



Lori Rafferty

MSD Floodplain Administrator Lori Rafferty has been appointed Co-Chair of the Professional Development and Continuing Education Policy Committee for the Association of State Floodplain Managers. Through her role she will provide vision, leadership and direction to ASFPM members regarding issues affecting the floodplain management profession.

**MSD is available 24/7
at 502.587.0603**

Report a sanitary sewer backup
before contacting a plumber.
Determining if the problem is located
on the public side of the system
will help to avoid unnecessary plumber expense.

Customer Compliments

The best job of clearing a ditch was done by the best crew behind my house. I want to thank **Bailey Baird, Stephen Prestigiacomio, Tadesse Seshagne** and **Derek Shields**. Their supervisor **Val Winburn** should buy them breakfast!

— Forrest Williams

I want to thank **Horace Gaither** for a job well done. I had a downspout disconnection performed on my home. Mr. Gaither was very professional and courteous and performed high-quality workmanship. MSD should be very proud to with way he represents MSD's name.

— Elenor Dougherty

I want to express my appreciation to MSD for addressing my drainage and erosion problem. I met with **Eric Toller** regarding the flow of water across the roadway into my yard, which was causing erosion issues. The crew of **Carey Smith** and **Mo Tolbert** spent several days working to address the lack of proper drainage and to reduce the erosion. All three of these gentlemen are a credit to MSD. I thank them for their work.

— Patrick Shanahan

Two MSD employees came to my home to check my sewer line. **Derry Baker** and **Angel Smith** were courteous, efficient and extremely helpful. In less than an hour, they cleared my sewer line and saved me money and a major headache. I was so impressed with their skills and approach to the job that I wanted to let you know.

— Mary Pidgeon

Barbara Roberson was so helpful and professional when I called the MSD Customer Call Center. She went above and beyond to make sure I had the information that I needed.

— Fred Ralston

Carolyn Fust and **Brad Selch** came out to my house on very short notice and advised me on issues related to an MSD easement. Did a great job, were very professional and polite. I appreciate the work that MSD does.

— Russell Little



700 West Liberty Street
Louisville, KY 40203-1911



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The public is welcome to attend MSD Board meetings.
For MSD Board information and meeting schedule visit:
LouisvilleMSD.org/About-Us/MSD-Board

Upcoming Events

SEPTEMBER 24
MSD Infrastructure Board Committee Meeting
10:30 AM, 700 West Liberty Street

SEPTEMBER 24
MSD Board Meeting
1 PM, Open Session, 700 West Liberty Street

OCTOBER 5
MSD Supplier Diversity Program Orientation
9 AM, 700 West Liberty Street

OCTOBER 22
MSD Board Meeting
1 PM, Open Session, 700 West Liberty Street



Beargrass Creek confluence with the Ohio River



You can help Improve our waterways by...

Composting grass clippings, and decreasing
your use of fertilizer and pesticides.

Rainwater flows over rooftops, lawns, parking lots and
roadways as it travels to storm drains and ditches. This
water accumulates pollutants along its journey—such as
lawn chemicals, oil, litter and pet waste—which flow
directly to our waterways.



MSD officially welcomes the "Bumblebee" to the tunnel construction site.

Tunnel Boring Machine 'Bumblebee' arrives at the site

412-foot-long workhorse will excavate Waterway Protection Tunnel 18 stories underground

MSD's \$200 million Waterway Protection Tunnel project is preparing to move to the tunneling phase with the arrival of a massive tunnel boring machine named "Bumblebee."

MSD celebrated the arrival of the machine's signature piece — a 22-foot diameter cutterhead — at a ceremony on November 5. Project engineers and community leaders signed a banner unveiling the machine's name "Bumblebee," inspired by the Champ's famous line, "Float like a butterfly, sting like a bee."

Parts for the 412-foot long machine have been arriving in Louisville on more than 50 tractor-trailer trucks during the past month. A crane will lower Bumblebee's components into the working shafts at the 12th and Rowan streets site. Workers will then assemble the machine underground. Tunneling of the Waterway Protection Tunnel is planned to begin later this month.

Over the next 12 months, Bumblebee will carve through more than four miles of solid bedrock, 18 stories underground. It will move forward with 3.5 million pounds of thrust, applying nearly 1.5 million pounds per foot of torque.

— Continued on page 2

STREAMLINE

News and Events at Louisville MSD • October/November 2018

OUR VISION

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MSD applauds the passage of water workforce development opportunities

On October 23, 2018, President Donald Trump signed the biennial Water Resources Development Act (WRDA), which includes significant provisions that benefit drinking water, wastewater and stormwater infrastructure and policy.

Included in WRDA is a \$1 million per year competitive Water Workforce Development Program grant. Utility agencies from both rural and urban communities will be eligible to apply for the grant funding to use for a variety of job training and workforce development programs.

"We recognize the need for a qualified and skilled workforce to meet our infrastructure challenges."

— MSD Executive Director
Tony Parrott

Louisville MSD will be hit with a wave of retirements in the next 5 to 10 years, as 19 percent of our workforce will be eligible to retire. MSD Executive Director Tony Parrott states, "The competitive grant program will help train workers to build and repair essential water systems in our community and throughout the country while providing pathways to careers with competitive wages and benefits."



OUR MISSION

Providing Exceptional Wastewater, Drainage and Flood Protection Services for Our Community

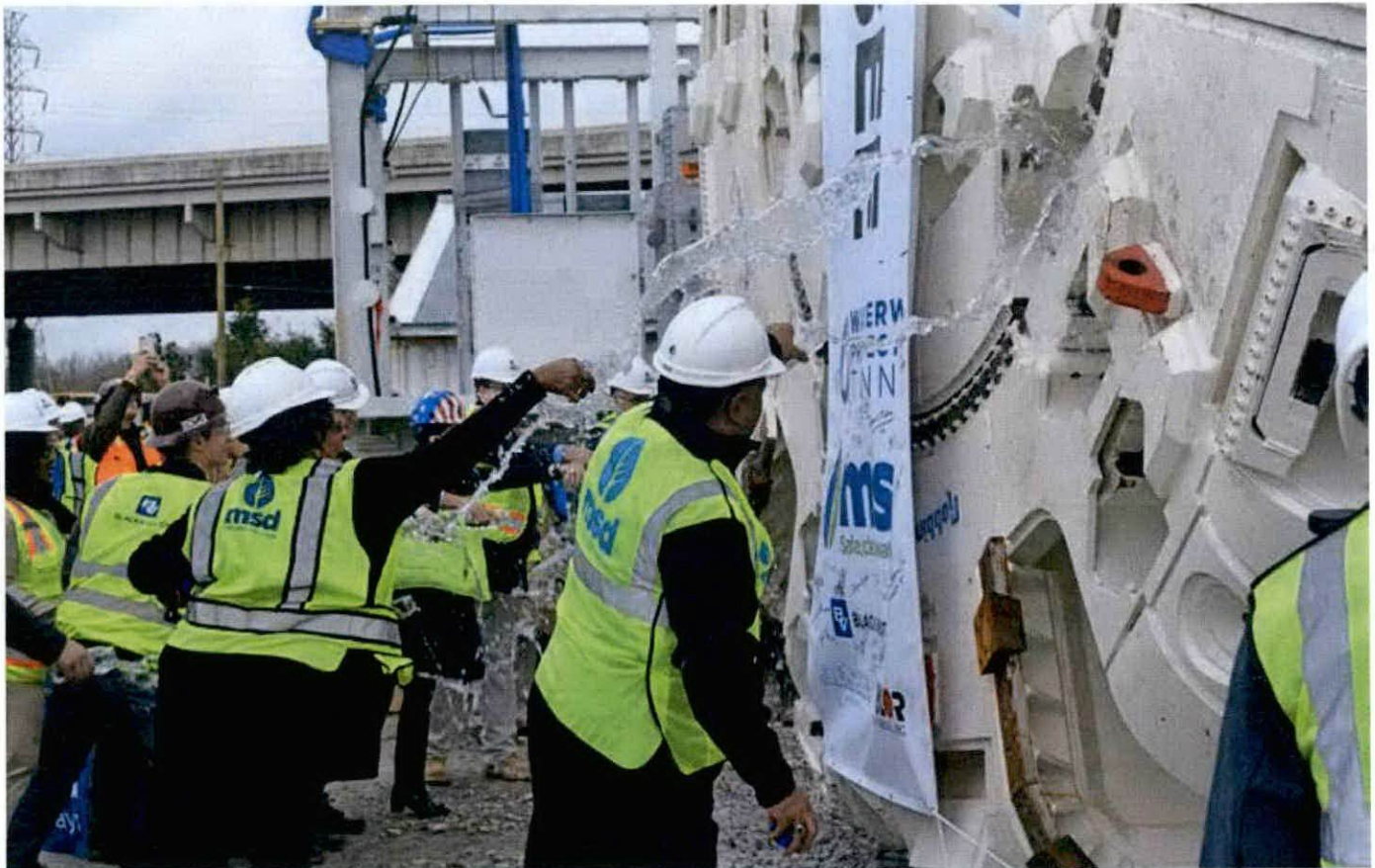
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— Continued from Page 1

'Bumblebee' arrives



Attendees "christen" the cutterhead with bottles of Louisville Water's pure tap®.

"Tunnel boring projects are wonders of engineering and technology, and we are excited to bring this type of solution to Louisville to help create safe and clean waterways," said MSD Executive Director Tony Parrott.

Once complete, MSD's Waterway Protection Tunnel will help prevent wastewater and stormwater from overflowing during periods of heavy rain — ultimately reducing pollution in the Ohio River and Beargrass Creek. The Waterway Protection Tunnel will have the capacity to store 55 million gallons of combined wastewater and stormwater until capacity is available in the MSD sewer system. The contents are then pumped back into the system, conveyed to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River. The tunnel is slated to be operational by the end of 2020.

Learn more about the project at
LouisvilleMSD.org/tunnel
 Get Boring News at
LouisvilleMSD.org/tunnel/newletter



MSD employees name tunnel boring machine

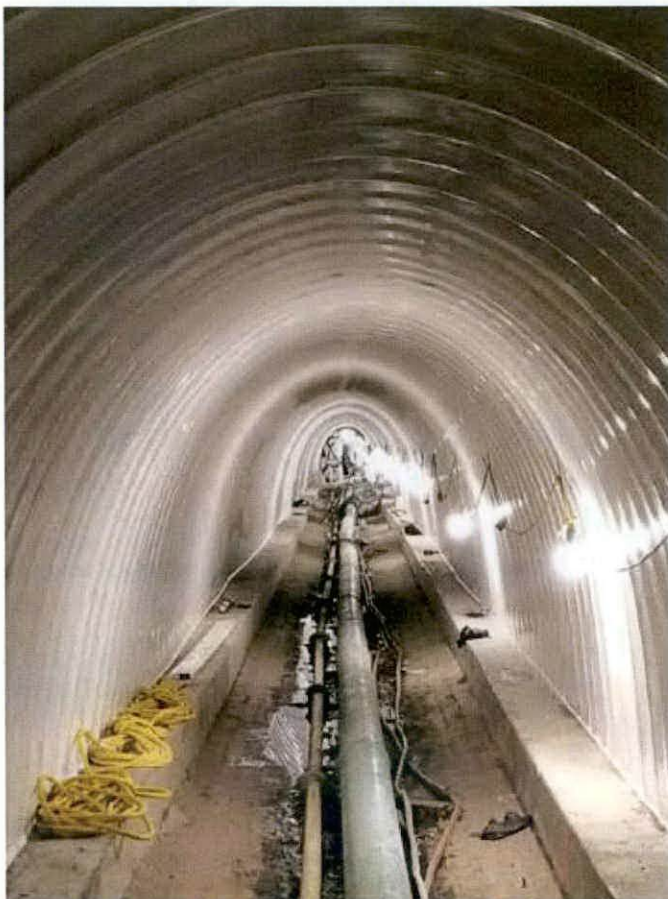
MSD Accounting Analyst Mike Fitzner submitted the name Bumblebee as part of a naming contest MSD conducted among its employees. Fittingly, Bumblebee smashed the competition. Fitzner has a special connection to Muhammad Ali, which led to his naming choice. The heavyweight champion came to the bank branch where his mother was working to sign autographs for charity. His mom had baked cookies for the event. "Ali enjoyed the cookies and asked to meet the baker. He told her that she was wasting her time working in a bank and should own a bakery," said Fitzner. "Ali gave her the confidence to do just that."

Progress continues underground for repair of one of Louisville's most critical sewer lines

MSD continues to work as diligently and safely as possible to repair the sewer line that is more than 20-feet below Main Street. This pipe known as the Ohio River Interceptor carries 40 percent of the community's wastewater to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River.

MSD contractors are currently installing corrosion-resistant PVC panels that fit together by hand and are sealed to the unique shape of the pipe — forming a new pipe inside the old one. Ventilation pipes are pumping air in and out of the system to keep workers safe. The panel installation work will continue through the first week of December. When the repair of the pipe is complete, work can begin on dismantling the pump-around. All work should be complete by the end of the year.

For more information on MSD's West Main Repair visit <http://louisvillemsd.org/westmainrepair>.



New PVC panels line the interior of a large sewer line under Main Street between Fourth and Seventh streets.



MSD employees Johnny Caudill (left) and Rick Tobin (right) responded to the scene of an accident on Westport Road.

Fast response by MSD crew helps an injured man

Quick action by a Louisville MSD work crew may have been key to preventing an accident becoming even more tragic on Westport Road Monday, October 22.

The incident took place when Louisville MSD employee Rick Tobin saw a man in a wheelchair going up a wheelchair access ramp. The man accidentally flipped off of the ramp and was launched out of his chair, landing face-first in the Westport Road driving lane.

"I ran to the scene trying to get the man before oncoming traffic reached him," Tobin said. "Thankfully, I was able to stop a car before it would have hit the man."

While a bystander called 911, Tobin's work partner, Johnny Caudill, pulled their work truck out to stop traffic and placed cones around the perimeter. They directed traffic until an ambulance arrived to transport the injured man to the hospital. Once the police arrived on the scene, they commended the men for their fast thinking and quick actions.

Tobin said he spoke to the man, who lives in a nearby assisted living facility, the next day, and said the man was in good spirits and that he thanked the men for their help. Tobin said he was acting out of instinct.

Students learn about stream health on Little Goose Creek

On October 29, MSD presented a stream health workshop to middle school students at the Montessori School of Louisville, located along Little Goose Creek near Springhurst. The students were curious about all that MSD does to protect and improve stream health. MSD's Erin Wagoner, along with Rich Fangman a biologist with Redwing, and Karen Schaffer, an environmental scientist from Stantec lead activities on watershed and pollution sources, aquatic macroinvertebrate identification, stream health field observations, water quality testing, and fish sampling with electrofishing equipment.

Students took water quality samples from two locations on Little Goose Creek to compare results, as well as evaluating MSD's more extensive data as part of their lesson.

For more information about educational opportunities for your school contact Communications Program Manager Sheryl Lauder at 502.540.6552 or by email at Sheryl.Lauder@LouisvilleMSD.org.

To all: A HUGE thanks for such an educational and engaging workshop. The kids loved it. Every person listed it as their "high" for the day. While many found handling the fish the most exciting part, others commented on how much they learned about the water itself. We plan to look more closely at the data collected tomorrow and compare results from the two sites. Thank you for all your hard work preparing this meaningful experience for our students.

Carrie Tilton
Montessori School
of Louisville

Right: Students study a vial of macroinvertebrates.

Below: Students learn how to use stream monitoring equipment on Little Goose Creek.





The tenth annual **Adventures in Water Education Festival** was held October 16 through 18, on the lawn at Water Tower Park. MSD had three display booths this year, one featuring our wastewater treatment process, another focusing on our stormwater and drainage and the third one about our tunnel project. More than 1,850 elementary students visited for a real-world extension of their classroom learning experience.

This Thanksgiving and everyday... avoid a clogged pipe

Can the grease!

Never pour fats, oils and grease down a sink, drain or toilet.

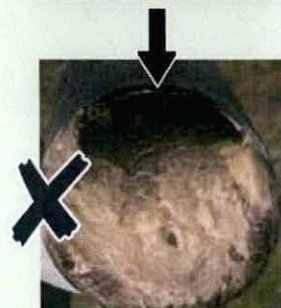
Pour used grease into an empty, heat-safe container, such as a soup can, and store it in the freezer. Once the grease has become solid, toss the can into the garbage.



Scrape food waste into the trash. Wipe all pots, pans, dishes and cooking utensils with a paper towel to soak up grease before washing them.



Catch the scraps in your sink with a basket or strainer, instead of using the garbage disposal, and throw them away in the trash can.



Recycle your deep-fryer oil by taking it to Louisville Metro's grease drop-off location at 7501 Grade Lane.

Customer Compliments

I want to make sure this entire crew gets a pat on the back. They came to my home to inspect and work on a backup. **Barry Blvin, Donald Duerson, Ricky Haycraft** and **Steve Thomas** were friendly, professional and kept me informed on each step of what they were doing.

— Tommy Duffy

Thank you to the MSD crew that came to my house to unclog the sewer line. **Reginald Gaston** and **Tony Porter** did an excellent job!

— Bernard Wathan

Marya Summers provided me with the best customer service that I have had in a long time. She took the time to explain my water and sewer bill, breaking down each charge in an easy to understand way.

— Ramona Wharton

Thank you! Thank you! Thank you! I am so grateful to you and the whole MSD team for your prompt attention to the drainage issue at my home. **June Embers, Joe Exely** and **John Tellman** were informative and kind to me. I hope MSD receives the rate increase that is needed to improve drainage in our community.

I look forward to learning more and will support your organization in any way I can. I plan to call Councilman Reed's office today and ask him to vote for the rate increase.

— Tiffany Bingham

An MSD crew repaired an erosion issue near my home and restored all the disturbed areas. Thank you to **Phillip Bradley** and **Dalton Chamberlain** for this fine work.

— Nancy Hunter

The MSD drainage crew of **Bailey Baird, Gary Evans, Donovan Henry** and **Eric Sawyers** did an excellent job cleaning the drainage ditch near my home. Thank you!

— Peggy Baldouf

**MSD is available 24/7
at 502.540.6000**

Report a sanitary sewer backup
before contacting a plumber.
Determining if the problem is located
on the public side of the system
will help to avoid unnecessary plumber expense.



700 West Liberty Street
Louisville, KY 40203-1911



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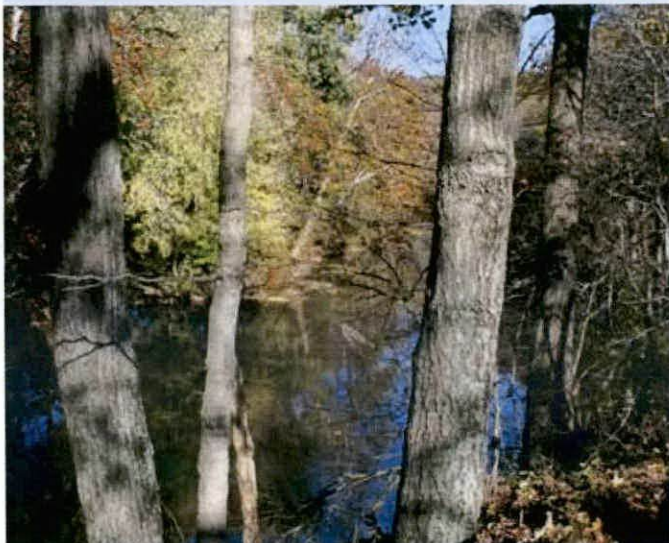
Contributor:
Chad Williamson
Communications Specialist

The public is welcome to attend MSD Board meetings.
For MSD Board information and meeting schedule visit:
LouisvilleMSD.org/About-Us/MSD-Board

Upcoming Events

NOVEMBER 12
MSD Board Meeting
1 PM, Open Session, 700 West Liberty Street

NOVEMBER 13
MSD Board Personnel Committee Meeting
1 PM, 700 West Liberty Street



Floyds Fork



68,980
catch basins...

...billions of leaves!

Help prevent surface flooding in your neighborhood
by **raking leaves and debris away from catch basins —**
or storm drains — and properly dispose of the debris.

If a catch basin or storm drain is clogged or damaged,
please do not attempt to fix it yourself.

Do not stand on or put your hand into the grate.

Contact **MSD Customer Relations at 502.540.6000**
or **CustomerRelations@LouisvilleMSD.org**.
— we will send someone to help.

Statement from MSD Executive Director Tony Parrott

Along with the Louisville community, MSD continues to mourn the loss of Louisville Metro Police Detective Deidre Mengedoht. Her death is a tragedy. Our deepest condolences go out to her family and the Louisville Metro Police Department who serve our community every day.

I also want to provide clarification as we move forward. MSD's initial decision to retain legal counsel for tractor trailer driver Roger Burdette, was based on what we knew at the time of the accident—specifically, that an employee was involved in an accident while on the job and in an MSD vehicle. After further consideration with the MSD Board and leadership, MSD decided we would not be involved in Mr. Burdette's criminal defense.

We understand that our initial decision has upset many and for that we apologize. Please know that no written contract was formalized with the defense attorney and no MSD funds have or will be used for defense in Mr. Burdette's criminal case. In addition, MSD has begun the process to terminate Mr. Burdette's employment through MSD and union contract processes. He has been on unpaid status since being arrested.

Since the accident occurred, I've heard from our employees and our customers and I know they are hurting. I share in this pain. This is an extremely difficult time for the community and especially for those of us working in public service.

As public servants, we get into this line of work to strengthen the community in which we live. And we do that by working together. This accident involved one employee, not all of our employees. I value the work of our employees—performed day in and day out—to manage and treat wastewater, provide drainage solutions and protect residents from flooding. Providing safe, clean waterways for Louisville is our mission and I appreciate their partnership in rising to meet that challenge for the community.

Detective Mengedoht will be dearly missed.

STREAMLINE

News and Events at Louisville MSD • Year End 2018

OUR VISION

Achieving Safe, Clean Waterways
for a Healthy and Vibrant Community



The repair to MSD's sewer line under Main Street is complete and the roadway is open to traffic.

Main St. sewer repair is complete

They say necessity is the mother of invention. That's certainly the case on Louisville's West Main Street where MSD recently completed an innovative repair to a vital underground sewer pipe at risk of caving in and threatening public health and safety.

One of Louisville's largest sewer pipes runs underneath Main Street. Formed in concrete out of a hand-dug tunnel in 1958, this important pipe is seven feet wide and carries 40 percent of Louisville's wastewater. After an earlier cave-in at different location, MSD conducted a remote-control video inspection to assess the pipe's structural condition.

— Continued on page 2



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Main St. sewer repair...

What was found was concerning to the agency. A section between Fourth and Seventh streets was in imminent danger of collapse. More than 12 inches of the pipe's original thickness had worn away, leaving only 2 or 3 inches of pipe.

Given Main Street is bustling with business, arts and entertainment, digging up the road to install new pipe was not feasible. So, MSD engineers and expert consultants developed a solution that was more than a repair; MSD essentially built a new pipe inside the old one.

To do this, millions of gallons of wastewater that flows daily through the pipe needed to go somewhere. First, a "pump-

"We are thankful for the collaboration of the many business, tourism and arts organizations that call Main Street home."

— MSD Executive Director
Tony Parrott

around" was constructed to divert the wastewater and empty the damaged section of pipe — essentially building a temporary sewer system on the surface. This enabled crews to safely enter the pipe and, just as important, allowed customers to continue

to flush and send used water down the drain. While there were lane closures, Main Street and its businesses and attractions were able to remain open as the repair occurred underground.

Once inside the pipe, crews fortified the existing pipe and then pieced together state-of-the-art, corrosion-resistant panels, formed them to the shape of the old pipe and sealed them together.

This complex project involved many partners. MSD is thankful for the collaboration of Louisville Metro Government; the Kentucky Transportation Cabinet and Division of Water; U.S. EPA Region 4; utility partners at Louisville Water and LG&E; and, the many businesses, tourism and arts organizations that call Main Street home.

The \$20 million emergency repair project is symptomatic of the larger issue our community faces with aging underground infrastructure. The chance of a cave-in is not limited to Main Street, as MSD maintains more than 3,300 miles of sewer



The photo on the left shows what the pipe under West Main Street looked like before the repair. The exposed rebar is actually what should be the second layer of rebar. The first layer and the concrete that surrounded it had worn away.

The photo on the right shows the newly repaired pipe, sealed in corrosive resistant PVC panels forming a new pipe inside the old pipe.

lines across Louisville, and much of the system is 50, 75 or even more than 100 years old. We respond to reports of cave-ins in all parts of the community.

Learn more about our Critical Repair & Reinvestment Plan to address not only aging pipes, but also upgrade outdated flood protection and wastewater treatment facilities — visit LouisvilleMSD.org/CriticalRepairPlan.



Have you noticed this out on Main Street? MSD Project Manager Heather Dodds shows off the gift from Boyer Inc crews out of Houston, Texas — where everything is bigger. They left us with an oversized manhole within a manhole cover.

Boring of the Waterway Protection Tunnel to begin in January

"Bumblebee's" parts have buzzed into town. The massive, 412-foot long machine that will excavate MSD's \$200 million Waterway Protection Tunnel is named "Bumblebee" in honor of Muhammad Ali. The name is the result of a competition and vote among MSD employees.

Parts for the boring machine arrived in Louisville on more than 50 tractor-trailer trucks, with the cutterhead shipping in from Italy. A crane was used to lower Bumblebee's parts into the working shafts at the 12th and Rowan streets site where workers have been busy as bees assembling the parts underground.

Beginning in January and continuing throughout the year, Bumblebee will carve through more than four miles of solid bedrock, 18 stories underground. It will move forward with 3.5 million pounds of thrust, applying nearly 1.5 million pounds per foot of torque. The machine is expected to cut through more than 140 linear feet of rock per day.

Once complete, MSD's Waterway Protection Tunnel will help prevent wastewater and stormwater from overflowing during periods of heavy rain – ultimately reducing pollution in the Ohio River and Beargrass Creek. The Waterway Protection Tunnel will have the capacity to store 55 million gallons of combined wastewater and stormwater until capacity is available in the MSD sewer system. The contents are then pumped back into the system, conveyed to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River. The tunnel is slated to be operational by the end of 2020.



Assembly for Bumblebee's giant 22-foot diameter cutterhead proceeds underground in preparation for cutting through 4 miles of rock to form MSD's Waterway Protection Tunnel.



This conveyor system allows removal of the excavated rock as Bumblebee's cutterhead buzzes through 4 miles of rock.

2018 surpasses 2011 for wettest year on record



Above: Floodwaters rush out of MSD's Pond Creek Flood Pumping Station. **Right:** The station sits idle when water levels are normal.

Seven years ago — in 2011 — Louisville Metro set a record for the amount of rainfall in a year. In 2018, the community had a glimpse of what was to become of that record when the area had a swollen Ohio River and a record-breaking amount of rain for February at 10.47 inches.

From mid-February to mid-March Louisville experienced its worst flooding in 20 years. By February 23, all 16 of MSD's flood pumping stations were in full service, with more than 150 underground floodgates closed, and 29-miles of floodwall and earthen levee keeping the river out of our city.

On Saturday evening, February 24, Louisville Metro was inundated with heavy rains. Most areas received 2-3 inches, with some getting as much as 4 inches of rain. Our 16 flood pumping stations operated at full capacity for four hours, pumping out a total of 8 million gallons per minute. River levels rose 2.3 feet in 12 hours.

Then again in September — usually a dry month for the area — Louisville received a record-breaking 10.91 inches of rain for the month. We finished 2018 with a new record 68.83* inches of rain in Louisville Metro.

During these periods of flooding, MSD personnel worked around the clock to ensure that the Flood Protection System kept the river at bay and out of the city. Once the water receded, MSD started the process of cleaning up, assessing the damage to our system and preparing for the next time.



Damage to our Flood Protection System

MSD's damage claim with the Federal Emergency Management Agency (FEMA) for the February/March 2018 flooding is more than \$10,497,000, including damage at 13 of our 16 flood pumping stations.

Currently, four of our flood pumping stations have pumps under repair. Beargrass Creek, Paddy's Run, Pond Creek and Upper Mill Creek flood pumping stations have work ongoing to restore damaged pumps and bring the facilities back to full capacity. Overall, our flood pumping capacity is down by 17 percent due to the damage sustained during the February and March flooding event.

Our Ohio River Flood Protection System consists of 29 miles of concrete wall and earthen levee, more than 150 floodgates, 79 street closures, and 16 flood pumping stations. These stations, which are along the system, move inland water to the river when the floodwalls and levees are sealed. MSD has also developed a system of stormwater storage basins to relieve surface flooding.

For access real-time rain gauge information visit:
RainGauge.LouisvilleMSD.org

*Reflects results from the rain gauge at Louisville International Airport.

MSD employees truly care... collecting nearly \$104,000 for charity

The MSD Cares Close-Out Event at the Central Maintenance Facility wrapped up successfully, with MSD Cares donations and pledges reaching \$103,870 for area charities, far surpassing the goal of \$85,000.



"This shows you the true compassion that our employees have when it comes to supporting charities that give back to those in the community who are in need," said Sandra Gibson, chair of the MSD Cares Giving Campaign.

Included in the total were funds raised by MSD employees throughout the year, including a golf scramble, bowling tournament, Halloween costume contest and a talent show.

MSD Cares-supported charities include Metro United Way; Fund for the Arts; Wednesday's Child; and Water Charities: Engineers Without Borders, Louisville Water Foundation, Water for People and WaterStep.

The MSD Cares volunteer committee members include:

Sandra Gibson - MSD Cares Chair

Vanessa Graves - MSD Cares Co-chair

Cassandra Anderson

Yozette Borges

Rhonda Boyle

Brian Bradley

Greg Brewton

Dana Burns

Tonya Callahan

Todd Cook

Robert Cosgrove

Gina Davis

June Embers

Zonetta English

William Ford

Cathy Geary

Annetta Gibson

Janice Hamilton

Lamont Hawkins

Troy Henderson

Staci Huber

Charles McCutchen

Dana Price

Tori Perkins

David Radke

Gwen Reed

Connie Rhodes

Barbara Roberson

Kevin Schmidt

Mike Scott

Robin Shaw

Darron Stone

John Sutton

Anne Trout

Donnie Thomas

Eldra McWhorter

Eric Weidner

Wagoner appointed to Jefferson County Environmental Trust Board

MSD Associate Engineer II Erin Wagoner has been named to the Jefferson County Environmental Trust, following the retirement of previous member and MSD representative Scott Porter. Founded in 1997, the Trust promotes stewardship of natural and cultural resources; advises Metro Council on matters of land conservation; and, educates the community about the need to preserve natural areas.

Customer **Compliments**

Johnny Caudill and **Ricky Tobin** came to take care of the drain opening under the roadway near my home. They did a fantastic job and went out of their way to make sure it was right.

The work is more than a job to this crew and their supervisor **Troy Smith**. They are all about making the customer happy and leaving the property as good or better than it was. Your people are the best.

— Tony Buongiorno

I am a member of the Board of the Indian Woods Condominium Association. We recently had extensive sewer repair work on our property, and I was the Association's representative in this endeavor. I dealt with MSD employee **Steven Leong** for this project. He was courteous, competent and incredibly responsive to our needs and requests. He was an absolute pleasure to work with and made my job of answering to the residents and our board very easy. MSD is to be commended for having someone like Mr. Leong on its staff. He represents the organization in a professional manner and makes ratepayers rest a bit easier about how their dollars are spent.

— Tom O'Sullivan

Dustin French-Marzian and **David Reynolds** did an excellent job on the ditch regraded near my home. I appreciate their hard work.

— Mary Devore



Plan your rain garden now

Rain gardens help infiltrate rainwater before it reaches the drainage system, and reduce the amount of stormwater and pollutants running into storm drains, combined sewers or streams. For your **FREE Rain Garden Guide**, contact MSD Customer Relations at **502.540.6000**, or online at **CustomerRelations@LouisvilleMSD.org**. Or download the brochure at **LouisvilleMSD.org/HowYouCanHelp**



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Louisville, KY 40203-1911



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LouisvilleMSD.org/About-Us/MSD-Board

Upcoming Events

JANUARY 15

Open House Floodplain Map Review

4:30-7:30 PM, Jefferson County East Government Center
200 Juneau Drive

JANUARY 16

Open House Floodplain Map Review

4:30-7:30 PM, Jefferson County Government Center
7201 Outer Loop

JANUARY 17

Open House Floodplain Map Review

4:30-7:30 PM, Southwest Government Center
7219 Dixie Highway

JANUARY 28

MSD Board Meeting

1 PM, Open Session, 700 West Liberty Street

JANUARY 31

Can You Dig It? Contractor Outreach Event

10 AM, Kentucky Center for African American Heritage
1701 W Muhammad Ali Boulevard

Help keep street drains flowing

Catch basins and street gutter drains cannot function properly when their grates are clogged with leaves, ice and snow.

Please clear away debris from catch basin grates — if you can do so safely.

If a basin still does not drain, contact **MSD Customer Relations** — at **502.540.6000** — we will send someone to help.





These homes off River Road are not protected by the Ohio River Flood Protection System.

Protecting our community Heavy rainfall and rising waters call MSD flood protection into action

In 2018, Louisville Metro set a record few people were excited to see. The area received a record high of 68.83 inches of rainfall for the year. If the first two months are any indication, 2019 may compete for that prize. February 2019 was the eighth wettest February on record with 8.25 inches of rain. So far, the rain in 2019 has been more of a constant-steady rain rather than quick downpours. The steady rainfall is more manageable for MSD's Flood Protection System to manage and the MSD Drainage System to absorb.

Stormwater drainage

MSD has built more than 1 billion gallons of stormwater storage since 1997. That year holds the number seven spot for historical crests in the area. Some of this storage also captures combined sewer overflows, providing further protection to the community.

**MSD is available 24/7
at 502.540.6000**

Report a sanitary sewer backup before contacting a plumber.

STREAMLINE

News and Events at Louisville MSD • January/February 2019

OUR VISION

Achieving Safe, Clean Waterways
for a Healthy and Vibrant Community

Basins constructed since 1997 total more than 1 billion gallons of storage

- Aluma Basin
- Buechel Basin
- Executive Inn Basin
- Melco Basin
- PTRL basins
- South Fork Beargrass Creek basins
- Vulcan Quarry
- Whipps Mill Basin



Buechel Basin is a series of storage areas that protect the community by holding a total of 104 million gallons of stormwater overflow, which is equal to a 10-year storm.

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— Continued from Page 1

Protecting our community

Ohio River Flood Protection

As Ohio River levels start to climb upward, MSD Flood Protection staff mobilize to protect our community from the rising waters. The staff manages and maintains:

- 29 miles of floodwall and levee
- 16 flood pumping stations
- 150 underground floodgates
- 80 floodwall closures

It indeed is a team effort when river levels hit action or flood mode. MSD employees from various departments join with our Flood Protection staff to keep our city safe. The job is 24/7 till river levels subside.

Thank you to our Flood Protection staff who work long shifts with no days off, and to the staff who work both their regular MSD jobs and with the MSD Flood Protection Team when the river is high to keep our community safe from the rising waters.



Carolyn Fust, who is a part of MSD's Development Review Department, works to help out at our Beargrass Flood Pumping Station.



Curt Bynum adjusts the gauges at MSD's Beargrass Flood Pumping Station. Bynum's regular job is LOJIC Manager.

Leading Innovation

Louisville MSD and Louisville Water have identified innovation as a key priority in their Strategic Business Plans and in the framework that guides their One Water partnership. The idea of innovation includes continually improving the service both utilities provide to this region; but, it's also the foundation for new lines of business and revenue.



Kimberly Reed
Chief Innovation
Officer

Kimberly Reed has been selected to lead this effort as Chief Innovation Officer for Louisville MSD and Louisville Water. Reed will also continue in her role of leading the shared service efforts with the One Water partnership between the two utilities.

Some innovation efforts may focus on one of the utilities while others will be joint and could even include partners from outside MSD and Louisville Water. Becoming a "utility of the future," with a focus on innovation is key in Louisville Water and MSD being resilient and successful.



Plan your rain garden now

Rain gardens help infiltrate rainwater before it reaches the drainage system, and reduce the amount of stormwater and pollutants running into storm drains, combined sewers or streams. For your **FREE Rain Garden Guide**, contact MSD Customer Relations at **502.540.6000**, or online at **CustomerRelations@LouisvilleMSD.org**. Or download the brochure at **LouisvilleMSD.org/HowYouCanHelp**

MSD Board approves enhanced Supplier Diversity and new Community Benefits programs

On February 25, the MSD Board of Directors approved two programs that will improve the diversity of firms that receive MSD contracts and create community benefits in neighborhoods where the agency is working. The enhanced Supplier Diversity Program and new Community Benefits Program take effect on July 1, 2019.

Why the change?

The program changes are the result of a Disparity Study completed in July 2018 by Mason Tillman Associates, Ltd. MSD commissioned the study in 2016 to analyze its contracting practices through a five-year period to determine if a statistically significant disparity existed in MSD awards of contracts to qualified Minority- and Woman-Owned Business Enterprises (M/WBE). The study looked at our procurement policies and evaluated contract data for construction, construction-related services, engineering, and professional services and materials and commodities. Additionally, vendors were interviewed as part of the assessment process.

“MSD’s enhanced Supplier Diversity and new Community Benefits programs are an important investment in the health, safety and quality of life for our contracting community and ratepayers in Louisville now and for years to come.”

— MSD Executive Director
Tony Parrott

What are the results?

The study found statistically significant evidence of disparity in the award of MSD prime and sub-contracts among African-American, Asian-Indian and Caucasian Females. Based on these findings, the MSD Board approved new supplier diversity goals. Beginning July 1, 2019, construction and construction-related

services valued at or above \$150,000 must include goals for the following qualified vendors who can perform a clear and commercially useful scope of work on the project:

- African-Americans – 18 percent
- Asian-Indian Americans – 2 percent
- Caucasian Females – 15 percent



MSD’s Supplier Diversity Program will also include a 10 percent bid discount applied to bids up to \$500,000, with a maximum discount not to exceed \$50,000 on bids submitted by M/WBE vendors. The bid discount is an evaluation tool with the goal of correcting the disparity finding.

What is a Community Benefits Program?

In addition to the enhanced Supplier Diversity Program, the MSD Board also approved a Community Benefits Program to leverage the economic and social impact MSD has in the community with large-scale engineering projects. The new Community Benefits Program will provide specific opportunities in workforce development, skills-trade training, small business outreach and mentorship, and expose youth to careers in the water sector. The vendor (contractor/firm) will provide a financial contribution, volunteer hours or in-kind services to local non-profits and schools. No dollars for this effort will come to MSD.

For more information about our new programs and to view the Disparity Study, please visit LouisvilleMSD.org/doing-business-us.

AVOID MAKING A SERIOUS POTTY FOUL

KNOW WHAT'S OK TO FLUSH DOWN THE TOILET



MSD's recently unveiled "Bowl Patrol" campaign features a friendly cast of characters that are spreading the message to only flush "the three Ps—pee, poo and toilet paper. The campaign uses humor to convey how to avoid a serious potty foul, which can result in unnecessary expense for home and business owners, as well as MSD.

MSD Collections Supervisor Claude Rottet said the problem of people sending the wrong items down the toilet causes massive issues for MSD equipment and personnel, and the biggest culprit is so-called "flushable" wipes. "Advertisers might call them 'flushable,' but only because they will typically make it past your toilet," he said. "They don't break down and, once they are in the system, it doesn't take much for them to cause damage."

That damage is costly. Because the wipes don't break down, they clog machinery and build up in wet wells. The results can range from hiring Vactor truck operators to clean out wet wells to repairing broken pumps to sewer discharges and environmental fines. Additionally, working on the problems caused by the wipes takes away from employees' other duties. "It's a full-time job," Rottet said.

It isn't just "flushable" wipes Collections confronts. Rottet rattles off a list of items that routinely come through the sewer system and to Collections. "Dental floss, underwear, feminine hygiene products," he said. "We have to get cutters and go in and cut these items into little pieces to get them free from machinery."



While the tone of the "Bowl Patrol" might be light, it is intended to combat a severe problem. Rottet said he hopes people understand the consequences of flushing things that, frankly, shouldn't be flushed. "What you flush, does not just disappear," he said. "The only things that should go down a toilet are pee, poo and paper."

Look for more information with your bill and follow us on social media to see more about the Bowl Patrol.

  @LouisvilleMSD

Customer **Compliments**

Thank you to **Matthew Clark** and **Sharl Payne** for clearing the blocked drain on the side of our Eastern Parkway building. We are pleased with your work!

— Alley Cat Advocates

I want to extend my most gracious appreciation for **Stacey Witten** and the assistance she provided to have the ditches cleaned for Village of White Oaks, Powerhouse Lane, Lyndon Kentucky. Our Board is grateful, as well. Stacey rocks!

— Deanna D. Lewis

MSD is available 24/7 at 502.540.6000

Report a sanitary sewer backup
before contacting a plumber.

Determining if the problem is located
on the public side of the system
will help to avoid unnecessary plumber expense.

Make plans now to volunteer
and make a difference!

Ohio River Sweep

Saturday, June 15 • 9 AM to Noon



MSD proudly sponsors Ohio River Sweep with ORSANCO, LG&E and Louisville Water. The event is one of the nation's largest and longest-running environmental cleanup events.

MSD employees will equip volunteers with gloves and bags.

For more information visit:

LouisvilleMSD.org/OhioRiverSweep

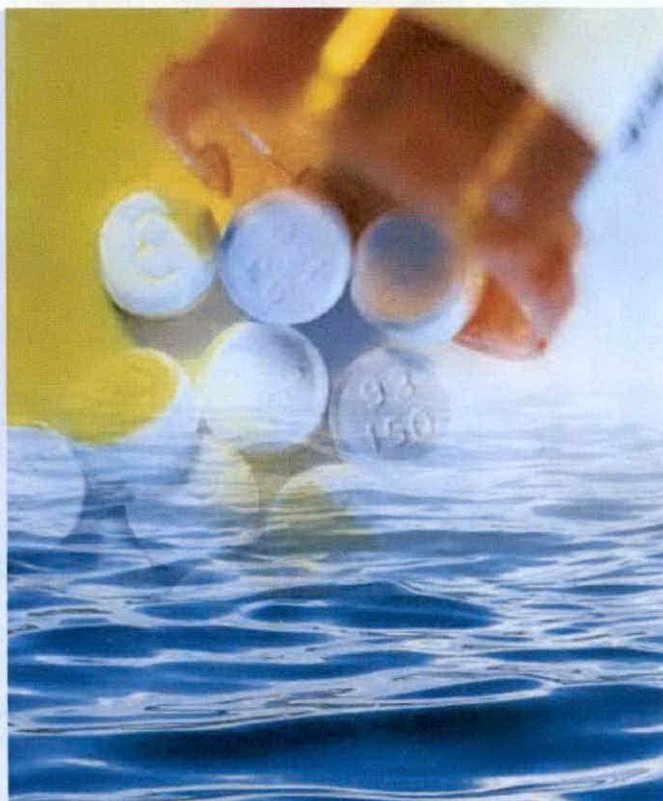
Working together, we can achieve safe, clean waterways

Make sure that you safely and properly dispose of expired prescription drugs and other medications, like unsealed cough syrups, eye drops and nose sprays; and bulk or loose capsules and pills. Remember that it is never safe to flush pharmaceutical products down the toilet or drain because:

- They can seep into the drinking and ground water source and contaminate the environment.
- They can kill bacteria or produce drug-resistant bacteria in sewage treatment plants and septic systems.

Instead of flushing, you can safely dispose any unused prescriptions at the following locations:

- Jefferson County Sheriff's Office in downtown Louisville, 531 Court Place, Suite 600, Monday through Friday, 8 AM to 4 PM.
- St. Matthews Police Department, 3940 Grandview Avenue, Monday through Friday, 8 AM to 4 PM.





700 West Liberty Street
Louisville, KY 40203-1911



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Upcoming Events

MARCH 25

MSD Personnel Board Committee Meeting
10:30 AM, 700 West Liberty Street

MSD Board Meeting

1 PM, Open Session, 700 West Liberty Street

APRIL 11

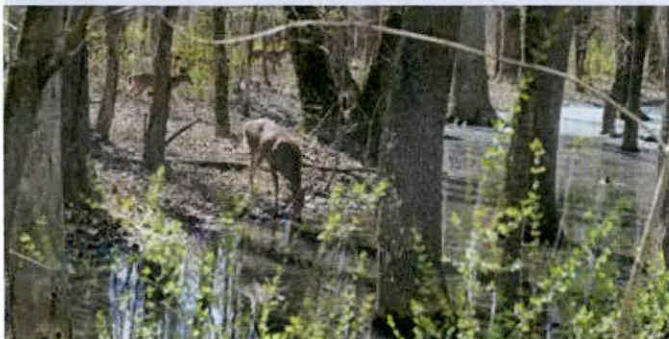
Joint Utility Reception

1-3 PM, The Olmsted, 3701 Frankfort Avenue

APRIL 22

MSD Board Meeting

1 PM, Open Session, 700 West Liberty Street



Beargrass Creek. — Photo courtesy of John Nation



Jefferson County dogs produce four dump-truck loads of waste EVERY day.

Pet waste that is left behind on sidewalks, in parks and
at home finds its way to local waterways when it rains.
Please do your part to help by scooping the poop!

Properly dispose of it in the trash.

**Working together,
we can achieve safe, clean
waterways for our community.**





Crews work to install a rail line to transport both workers and rock through the tunnel.



Excavated rock leaves the back of the boring machine by way of a conveyor belt. The rock travels to the tunnel's working shaft, where it is lifted out in muck cars by a crane.

STREAMLINE

News and Events at Louisville MSD

March 2019

OUR VISION

Achieving Safe, Clean Waterways
for a Healthy and Vibrant Community



Bumblebee—MSD's tunnel boring machine—is now at work 200-feet below Louisville

Eighteen stories underground, Louisville's largest infrastructure project is underway. MSD's massive tunnel boring machine is carving through bedrock to build the Waterway Protection Tunnel. Nicknamed "Bumblebee" in honor of Muhammad Ali, the 412-foot long machine will ultimately bore a four-mile-long tunnel to store combined stormwater and wastewater to prevent it from overflowing sewers and polluting our river and streams.

Bumblebee has taken a right turn from under the Ohio River near Ninth Street and is currently boring to a drop shaft by the Kentucky Science Center. When the side tunnel to the shaft is complete, the boring machine will back up to the main route. Over the next several months, the machine will continue east, moving deep under the river along the shore from downtown Louisville to Butchertown, then turning southeast and advancing to near Lexington Road and Grinstead Drive by the end of the year.

To remove the five-hundred-million-year-old rock from 18 stories underground, MSD dug and blasted two shafts into the bedrock and connected them by digging a tunnel between them. Cranes lowered the boring machine's parts down the shafts for the underground assembly of Bumblebee.

— Continued on page 2



OUR MISSION

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LouisvilleMSD

— Continued from Page 1

...tunnel boring machine...

How does Bumblebee work?

As the boring machine excavates the tunnel route, crews install locomotive tracks behind the machine. As the machine cuts through the rock, the rock fills a series of "muck cars." A mini-locomotive then pulls the muck cars along the underground rail tracks to the working shaft near 12th and Rowan streets. A crane on the surface then lifts the muck cars filled with rock from the tunnel through that vertical shaft, which is 48-feet in diameter. Once the muck cars are empty, the crane lowers them back into the tunnel to repeat the process. Recently, crews installed a second set of locomotive tracks and muck cars to speed up the work. The excavated rock is loaded into dump trucks and transported to a local quarry.

After excavation is complete, the entire length of the tunnel is lined in concrete, making it watertight. The Waterway Protection Tunnel will store up to 55 million gallons of combined wastewater and stormwater during periods of heavy rain until capacity is available in the MSD sewer system. The contents are then pumped back into the system, conveyed to MSD's Morris Forman Water Quality Treatment Center for proper treatment and later released into the Ohio River. The tunnel is slated to be operational by the end of 2020.



Excavated rock dumps from a muck car suspended by a crane.



To track Bumblebee's progress under Louisville, please visit LouisvilleMSD.org/Tunnel.

Get Boring News at LouisvilleMSD.org/tunnel/newletter

Below: The path for the tunnel is shown in red. The boring machine is moving from west to east.





Waterway Protection Tunnel gains national attention



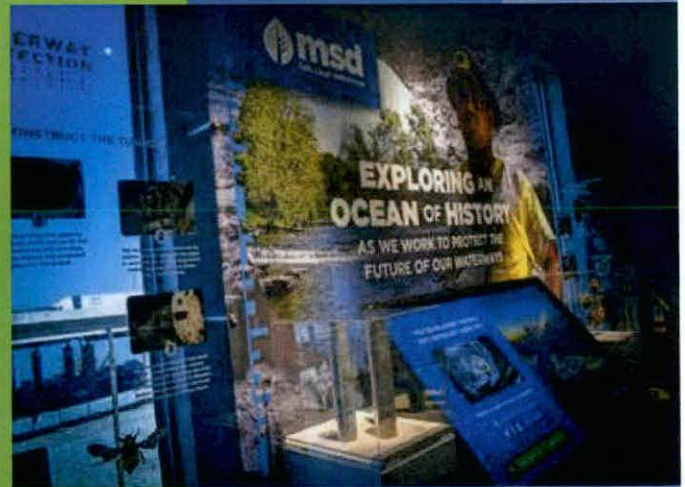
MSD Waterway Protection Tunnel Project and the project's manager, Jacob Mathis PE, are featured in the online publication "Water Innovations" March edition.



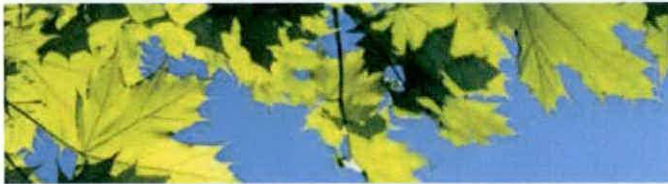
The tunnel project is also featured in the Canadian publication "Tunnels and Tunnelling" magazine's February/March edition.

To view these articles and for more information about MSD's Waterway Protection Tunnel, visit Louisvillemsd.org/tunnel

Tunnel technology on display



MSD's Waterway Protection Tunnel technology and the geological history of Louisville Metro are on display at the Kentucky Science Center. The interactive exhibit features core samples used by geologists and engineers to determine the path and depth of the tunnel, as well as why a tunnel is needed. You can find the exhibit in "The World Around Us" on the second floor of the Center.



Spreading the tree canopy

MSD recently approved a grant for planting 166 trees as part of the third annual "Planting O' the Green." Urban tree canopy restoration plays a vital role for MSD as we strive toward our vision of safe, clean waterways for our community. MSD is committed to planting 14,000 trees by 2024 as part of our Integrated Overflow Abatement Plan. The plantings are concentrated within Louisville's combined sewer system boundaries. MSD's tree planting will keep millions of gallons of stormwater from entering our sewer system, which helps decrease sewer overflows into our waterways.

Trees add value to your property

The Tree Benefits Calculator allows anyone to make a simple estimation of the benefits individual street-side trees provide. Visit <http://www.treebenefits.com/calculator/> to see the benefits trees can provide for your property.

Customer Compliments

Thank you to **Joey Ashby, David Johnson** and **Tony Kelly** for their time and assistance to help us understand the role MSD plays in the new subdivision approval process. As well as, outlining the exacting details of all that you do, and are capable of doing in terms of land drainage needs and requirements. We were impressed with your dedication, knowledge and skills. We appreciate your commitment to protecting neighboring communities, as well as new developments from water drainage issues. Your state-of-the-art "land reconnaissance" capabilities are amazing!

We appreciate your time and willingness to meet with us.

— Lynne Dowling
President Innisbrook Community HOA
Prospect, KY

**MSD is available 24/7
at 502.587.0603**

Report a sanitary sewer backup before contacting a plumber.



700 West Liberty Street
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LouisvilleMSD

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For MSD Board information and meeting schedule visit:
LouisvilleMSD.org/About-Us/MSD-Board

Upcoming Events

APRIL 8

Wet-Weather Stakeholder Meeting
5:15 PM, Shawnee Park Clubhouse
460 Northwestern Parkway

APRIL 11

Joint Utility Reception
1-3 PM, The Olmsted, 3701 Frankfort Avenue

APRIL 12

MSD Board Audit Committee Meeting
3 PM, 700 West Liberty Street

APRIL 17

**MSD Board joint Infrastructure and Finance
Committees Meeting**
3:30 PM, 700 West Liberty Street

APRIL 22

MSD Board Meeting
1 PM, Open Session, 700 West Liberty Street



Beargrass Creek. — Photo courtesy of John Nation

Make plans now!

Ohio River Sweep

Saturday, June 15 • 8 AM to Noon

MSD proudly sponsors Ohio River Sweep with ORSANCO, LG&E and Louisville Water. The event is one of the nation's largest and longest-running environmental cleanup events. MSD employees will equip volunteers with gloves and bags.

LouisvilleMSD.org/OhioRiverSweep

Beargrass Creek. — Photo courtesy of John Nation



What you don't see ...
could harm you!

Sewers can overflow into waterways during rainstorms.

Those waters could contain harmful bacteria, which can make you sick. Rainwater can overwhelm the sanitary sewer system and cause overflows into local waterways. You should minimize contact with waterways to be safe during storms and even for 48 hours after the rain has ended. During these times, avoid swimming, fishing, wading and splashing in the water.



MSD has made significant progress in decreasing sewer overflows into our waterways, but there is more work to be done. Please follow the instructions that are posted



on our overflow advisory signs. Wash with warm, soapy water if you come into contact with water that may have been contaminated by a sewage overflow.

STREAMLINE

News and Events at Louisville MSD

April 2019

OUR VISION

Achieving Safe, Clean Waterways
for a Healthy and Vibrant Community

Preparing for recreational season

MSD and its contractor Stantec provide annual training for our employees who perform water quality tests, taking samples from 42 locations on our waterways during wet weather. Sampling occurs throughout the day and night during rain and potentially severe weather conditions. We sample for water quality year round but have a particular emphasis during recreational months.



MSD's Jordan Basham demonstrates how to collect water samples along Beargrass Creek.



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Paddlefish in the Ohio River can weigh nearly 200 pounds. They look shark-like with a long bill or paddle.



Protecting our environment through underground storage

Louisville waterways are home to numerous species of fish, from bigger fish like paddlefish, blue bass, walleye, and striped bass, that inhabit the Ohio River, to smaller fish that prefer creeks and streams such as darters and longear sunfish. Some of these species of fish, like the paddlefish, were swimming around when the dinosaurs were roaming the planet over 65 million years ago!

At MSD, we want to make it easier for our local fish populations to flourish in our area by greatly reducing the volume of sewer overflows in our waterways. Sewer overflows in the water can reduce oxygen in the water that fish need to breathe. In polluted streams, biologists find fish crowded together in small nonpolluted sections of the stream to access the oxygen.

The Waterway Protection Tunnel and our underground storage basins will help reduce the number of pollutants going into Beargrass Creek and the Ohio River by diverting pollutants that can overflow during rain events into underground storage provided by the basins and tunnel where it is stored until sewer system capacity is available. Then the flow is pumped back into the sewer system and conveyed to our Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River.



Ventilation shafts pump fresh air to workers who are 200 feet below ground.



A crew member waits for the muck car train to pass before completing his survey. Muck cars move rock from the boring machine for transport out of the tunnel.

To track the tunnel, visit
LouisvilleMSD.org/Tunnel



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Upcoming Events

MAY 14

MSD Finance Committee Meeting
3 PM, 700 West Liberty Street

MAY 28

MSD Board Meeting
1 PM, Open Session, 700 West Liberty Street

JUNE 15

Ohio River Sweep
9 AM to Noon, Various locations on the Ohio River
See LouisvilleMSD.org/OhioRiverSweep

JUNE 24

MSD Board Meeting
1 PM, Open Session, 700 West Liberty Street



MSD employees provide gloves and trash bags to Ohio River Sweep volunteers.



Visit the MSD booth at Waterfront Wednesday to register to win a free rain barrel and learn about our Waterway Protection Tunnel project. We will be there May 29, July 31 and August 28 on the Big Four Lawn at Waterfront Park.

STREAMLINE

News and Events at Louisville MSD

June 2019

OUR VISION

Achieving Safe, Clean Waterways
for a Healthy and Vibrant Community

Clifton Heights CSO Basin is in service keeping millions of gallons of sewer overflow from Beargrass Creek

Built into a grassy hillside next to the Mellwood Arts and Entertainment Center, sits the MSD Clifton Heights Combined Sewer Overflow (CSO) Basin. When it rains, the basin is hard at work protecting Beargrass Creek and the neighborhood from combined sewer overflows.

Rainwater enters the combined sewer system through stormwater pipes and catch basins. This added water can overwhelm the sewer system sending a combination of wastewater and rainwater into Beargrass Creek.

The Clifton Heights CSO Basin will capture and store 7 million gallons of wastewater and stormwater during rain events and gradually release it back into the sewer system when treatment capacity is available. The mixture of rainwater and wastewater then flows through the sewer system to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release into the Ohio River. When the basin is empty, water is flushed through the structure to clean any remaining debris.

The basin, which is now complete, is mostly underground and invisible to the public. The hillside covering the part of the basin is an unmowed meadow. A mowed grassy flat area at the bottom of the hillside provides a place for the neighbors to enjoy the park-like setting. A wetlands area contains a mix of 25 diverse native meadow plant species providing pollinator habitat and erosion control.

Underground storage is part of MSD's larger endeavor to prevent wastewater from overflowing into Louisville's waterways.



MSD Executive Director Tony Parrott, center, leads the ribbon cutting ceremony for the Clifton Heights CSO Basin.



April 2019, Clifton Heights Basin construction is complete and the basin is covered with 12 feet of dirt.



In August 2017, excavation of the basin was underway.



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Louisville MSD's commitment to Supplier Diversity earns Corporation of the Year Award

This year, businesses owned and operated by minorities will oversee millions of dollars of work for Louisville MSD. The agency is focused on supplier diversity, and the Tri-State Minority Supplier Development Council (TSMSSDC) has recognized the effort by awarding MSD its 2019 Impact—Corporation of the Year Award. MSD received the award during an event on May 2, in Nashville Tennessee. The council represents corporations, government agencies and other nonprofit organizations in Kentucky, Tennessee and West Virginia.

“We believe it is important that we spend our ratepayer dollars in a way that reflects the diversity of the community. Investing in the health, safety, and quality of life for our contracting community and ratepayers is an investment worth making.”

— MSD Executive Director
Tony Parrott

MSD faced competition for the “Corporation of the Year Award” from Messer Construction Company, Nashville Electric Service, Nissan North America and Toyota North America.

The Impact Awards recognizes organizations for their outstanding efforts in advancing minority supplier development, leadership engagement, influence, active TSMSSDC participation, and purchasing opportunities for certified Minority Business Enterprises

(MBE) affiliated with the National Minority Supplier Development Council and TSMSSDC.

“Our commitment is shown in our numbers. In our fiscal year 2018, MSD spent more than \$26 million with MBE firms, many within the Greater Louisville Metro Area,” states One Water Chief Procurement Officer Rene’ Thomas.



To track the tunnel, visit
LouisvilleMSD.org/Tunnel

Below: The path for the tunnel is shown in red. The boring machine—nicknamed Bumble Bee—is moving from west to east.



You can help Improve our waterways by...

Composting grass clippings, and decreasing your use of fertilizer and pesticides.

Rainwater flows over rooftops, lawns, parking lots and roadways as it travels to storm drains and ditches. This water accumulates pollutants along its journey—such as lawn chemicals, oil, litter and pet waste—which flow directly to our waterways.

Interested in working for one of our construction contractors?

For more information visit MSDJobLink.org.



Preliminary Rate Proposal would fund \$205 million in drainage, wastewater and flood-protection projects

On May 28, 2019, the MSD Board approved a preliminary rate proposal to raise monthly wastewater bills \$3.47 and stormwater bills \$0.68 to fund Consent Decree progress and critical system repairs. Progress on more than 144 projects in all corners of the community will help maintain Louisville's wastewater treatment, stormwater management and flood protection under the fiscal year 2020 capital budget.

The MSD Board will take up the issue of the preliminary rate increase at a meeting on July 29. If approved, new rates would take effect August 1, 2019.

"We have shared with the community for some time about the great need to rebuild and restore the dated sewer pipes, water treatment facilities, flood pumping stations and other infrastructure that has outlived its useful life," said MSD Executive Director Tony Parrott. "While this budget will not permit us to advance the Critical Repair & Reinvestment Plan as we've recommended, we will move some of our highest priority projects forward to continue to maintain the system. It's a stopgap budget, not a cure-all budget."

Key initiatives include:

• Reducing Sewer Overflows

More than one half of the capital plan—about \$115 million—allows MSD to make significant progress toward meeting the estimated \$1.15 billion federal Consent Decree objective of reducing by 2024 the vast majority of combined sewer overflows and sanitary sewer overflows that pollute area waterways.

This work includes continuing progress on one of MSD's signature projects—the Waterway Protection Tunnel from downtown to Lexington Road and Grinstead Drive—as well as completing storage basin projects in the Portland neighborhood and along Southwestern Parkway.

• Water Quality Treatment

The capital plan provides more than \$8 million to expand and improve the Hite Creek Water Quality Treatment Center. This will help ensure proper wastewater treatment

capabilities are in place for Louisville's continued development in the northeastern corridor.

Additionally, more than \$5.7 million will be invested in new equipment at the Morris Forman Water Quality Treatment Center, MSD's highest volume facility, treating up to 350 million gallons per day and serving more than 62 percent of the community's wastewater treatment.

• Floodplain Management

The budget commits more than \$10 million to a number of drainage improvements and flood mitigation projects across the community as well as home buyouts in flood-prone areas. One key initiative is \$3 million for flood-mitigation and buyouts in the Cathleen Way/Belquin area.

• Ohio River Flood Protection

MSD will invest more than \$6.8 million to shore up the system of pumping stations, floodwalls and levees that protect the community when the Ohio River exceeds its banks. Included in this is a nearly \$2.2 million project to rebuild critical pumps and other equipment at the Pond Creek Flood Pumping Station that were damaged during the record rainfall of February 2018.

MSD Schedule of Rates, Rentals and Charges is available for inspection at MSD's Main Office located at 700 West Liberty Street, Louisville, KY 40203, or online at LouisvilleMSD.org/Rates. Written comments regarding this proposed rate increase must be sent to MSD Board c/o Customer Relations, 700 West Liberty Street, Louisville, KY 40203 or email to Finance@LouisvilleMSD.org by July 28, 2019.

Customer Compliments

MSD participated in our 2019 Spring Cleanup in partnership with Brightside. The team and board at One West would like to extend our gratitude to MSD for your extensive efforts in our cleanup. The supplies and equipment, including extra trash bags, a dump truck and a sewer cleaning truck, were a major help to our cleanup. Thanks goes to **Saundra Gibson**, who arranged the extra help and the crew of **Greg McCraney, Virgil Brown, Ron Scherer, Dwayne Edwards, Matt Clark and Calbert Kelsey**. Our vision was accomplished and the result exceeded our expectations thanks to MSD's outstanding effort.

— Evon J. Smith, President and CEO One West



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Louisville, KY 40203-1911



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Upcoming Events

JUNE 15

Ohio River Sweep

9 AM to Noon, Various locations on the Ohio River
See LouisvilleMSD.org/OhioRiverSweep

JUNE 18

MSD Special Personnel Committee Meeting

2 PM, Open Session, 700 West Liberty Street

JUNE 24

MSD Board Meeting

1 PM, Open Session, 700 West Liberty Street



Students canoe the Ohio River with Beargrass Waterways Alliance.

Make plans now!

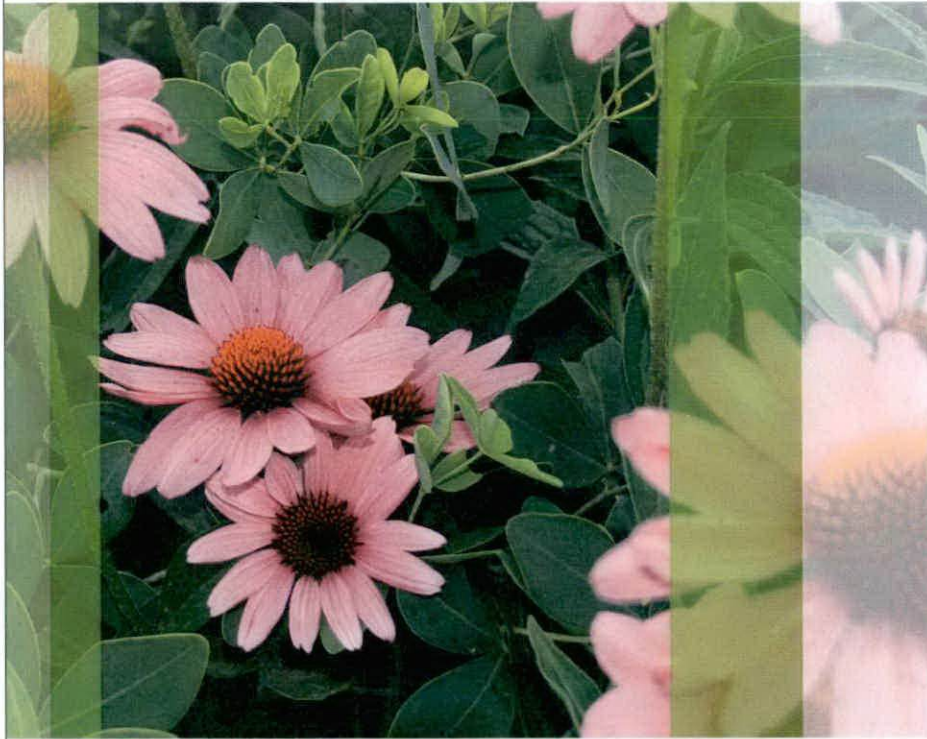
Ohio River Sweep

Saturday June 15 • 9 AM to Noon

Ohio River Sweep is one of the nation's largest and longest-running environmental cleanup events. MSD employees will equip volunteers with gloves and bags.

LouisvilleMSD.org/OhioRiverSweep

MAKE A DIFFERENCE FOR OUR WATERWAYS...



...by planting a rain garden

Going green today means healthy waterways tomorrow. Rain gardens help infiltrate rainwater before it reaches the drainage system, and reduce the amount of stormwater and pollutants running into storm drains, combined sewers or streams. **Contact us for your FREE Rain Garden Guide.**

**Together we can achieve safe, clean waterways
for our community.**

Learn more at LouisvilleMSD.org/HowYouCanHelp



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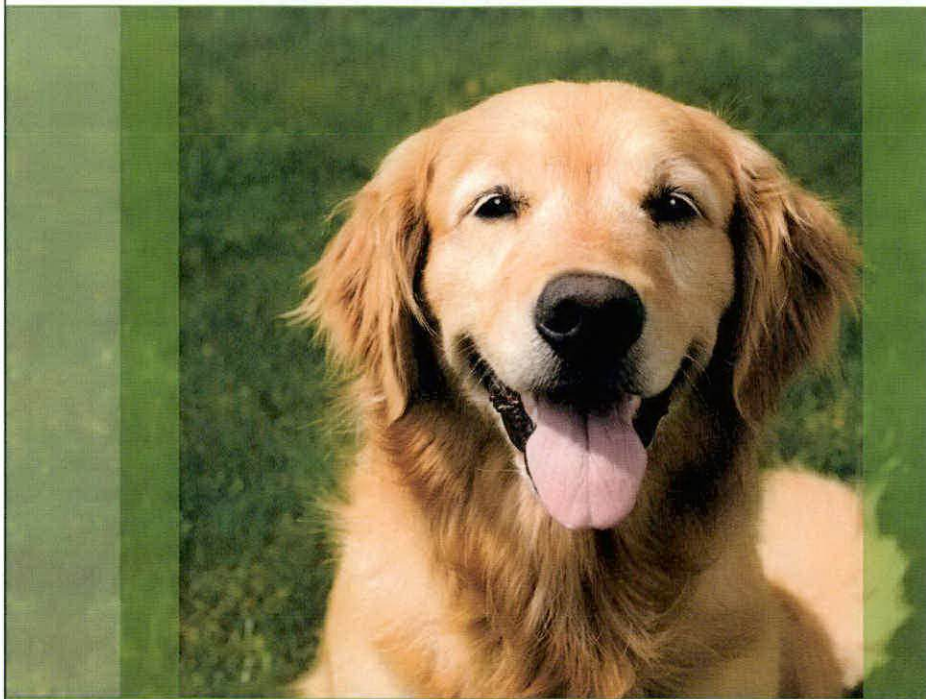
Customer Relations

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  [LouisvilleMSD](https://www.facebook.com/LouisvilleMSD)

MAKING A DIFFERENCE IN OUR WATERWAYS



**Dogs in Jefferson County produce four
dump-truck loads of waste EVERY day.**



Pet waste that is left behind on sidewalks, in parks and yards finds its way to local waterways when it rains. This waste increases bacteria and nitrogen levels in the water, depleting oxygen for fish and aquatic life. Please do your part to help by scooping the poop and properly disposing of it in the trash.

**Working together, we can achieve safe, clean waterways
for our community.**



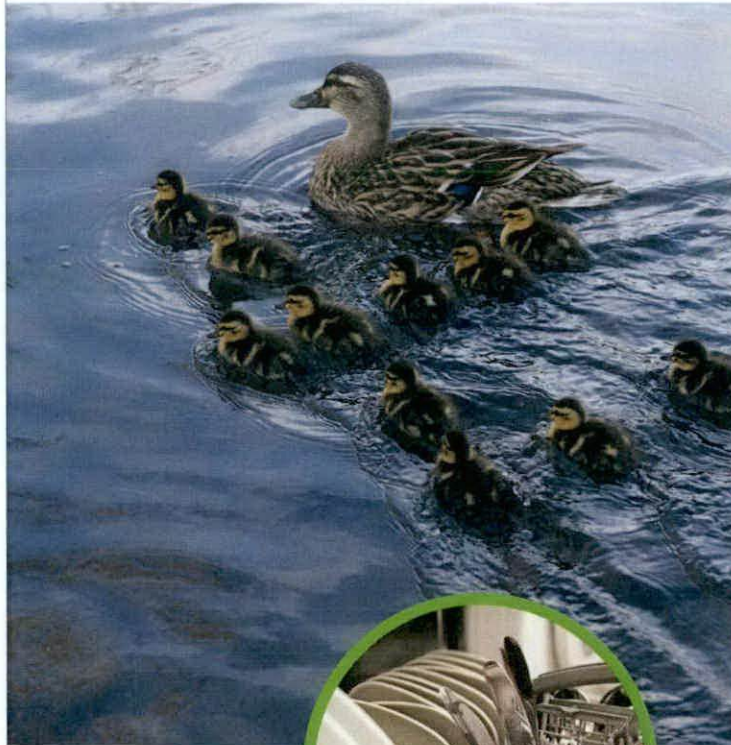
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What you do at home...
can make a difference
in our waterways



Delaying the use of your washer and dishwasher during periods of heavy rain can help. The extra water these machines use can overload the sanitary sewers and cause them to overflow. If possible delay that load of laundry or dishes to give the sewer system time to catch up.



**Working together, all of us can help
achieve safe, clean waterways.**

Learn more at LouisvilleMSD.org.



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Stream photo courtesy of John Nation

68,980 catch basins

...billions of leaves!



When it rains, all that stormwater has to go somewhere.

Help prevent surface flooding in your neighborhood
by **raking leaves and debris away from catch basins**
— or storm drains — and properly disposing of the debris.

If a basin or drain is clogged or damaged, please do not
attempt to fix it yourself, and do not stand on or put
your hand into the grate. Contact **MSD Customer
Relations — at 502.540.6000**. We will send someone
to help.

We're MSD. And we're doing more for you than you
ever imagined. Learn more at **LouisvilleMSD.org**.



24/7/365

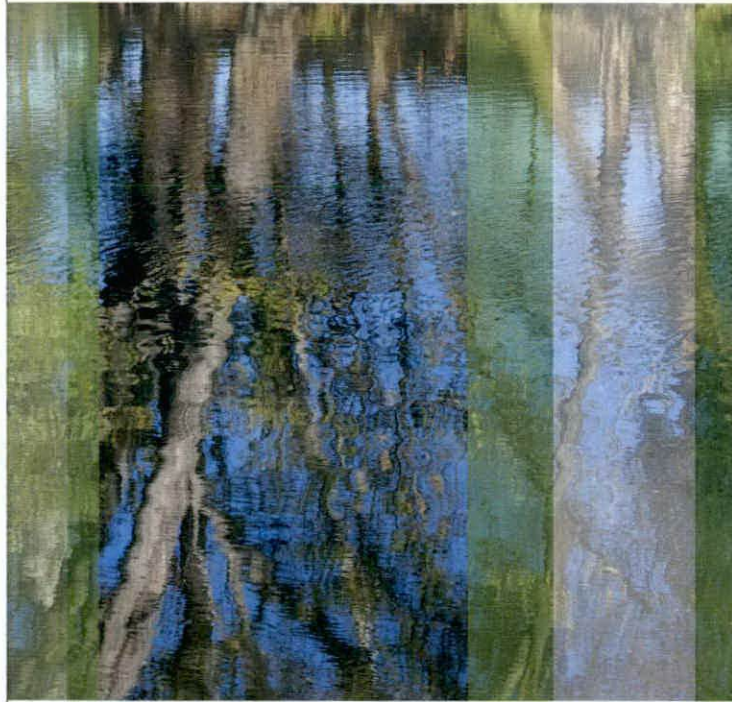
Customer Relations

502.540.6000

CustomerRelations@LouisvilleMSD.org

  LouisvilleMSD

Good Job... Great Place!



Great benefits for full-time employees

Louisville MSD is a proud, dedicated group of individuals who are here for our community 24/7/365 — managing wastewater, stormwater and flood protection services. We see our role in protecting Louisville's waterways as one of leadership, partnership and advocacy.

We know how important our waterways are to this community for business, recreation, enjoyment and overall health.

If you want to join us and serve our community, apply for a position with MSD. See what MSD has to offer.

www.LouisvilleMSD.org/Careers



24/7/365

Customer Relations

502.540.6000

CustomerRelations@LouisvilleMSD.org





Honoring our veterans

Today we pause to honor
the brave men and women
who have made a great sacrifice
to protect our families,
our country and our freedom.

MSD is proud of its 70 employees
who have served, or
are currently serving, our country.

All are true American heroes.



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CustomerRelations@LouisvilleMSD.org

  LouisvilleMSD

Volunteer and make a difference!
Ohio River Sweep



MSD proudly sponsors Ohio River Sweep, which is one of the nation's largest and longest-running environmental cleanup events. Picking up trash along the shoreline is a little thing that makes a big difference as we all work together.

Together, we can achieve safe, clean waterways for our community!

Ohio River Sweep

Saturday, June 15 • 9 AM to Noon

MSD employees will equip volunteers with gloves and bags. For location information visit:

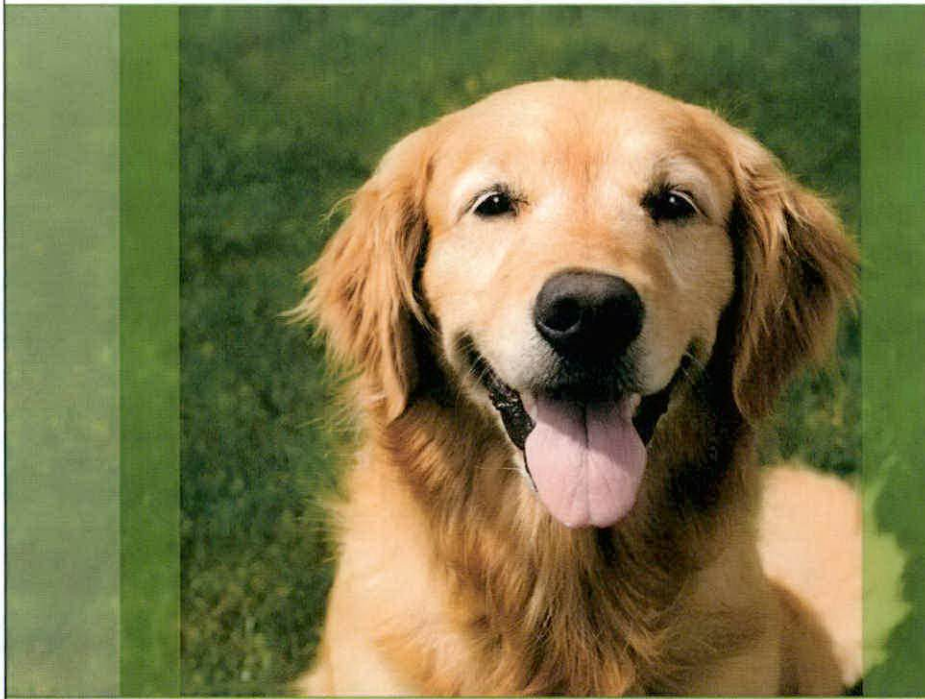
LouisvilleMSD.org/OhioRiverSweep



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MAKING A DIFFERENCE IN OUR WATERWAYS



**Dogs in Jefferson County produce four
dump-truck loads of waste EVERY day.**



Pet waste that is left behind on sidewalks, in parks and yards finds its way to local waterways when it rains. This waste increases bacteria and nitrogen levels in the water, depleting oxygen for fish and aquatic life. Please do your part to help by scooping the poop and properly disposing of it in the trash.

Working together, we can achieve safe, clean waterways for our community.



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**What you don't see
could harm you!**

**Sewers can overflow
into waterways
during rainstorms.**



**Those waters
could contain
harmful bacteria,
which can
make you sick.**

Rainwater can overwhelm the sanitary sewer system and cause overflows into local waterways. You should **minimize contact with waterways to be safe during storms and even for 48 hours after the rain has ended. During these times, avoid swimming, fishing, wading and splashing in the water.**



MSDProjectWIN.org

Wash with warm, soapy water if you come into contact with water that may have been contaminated by a sewage overflow.

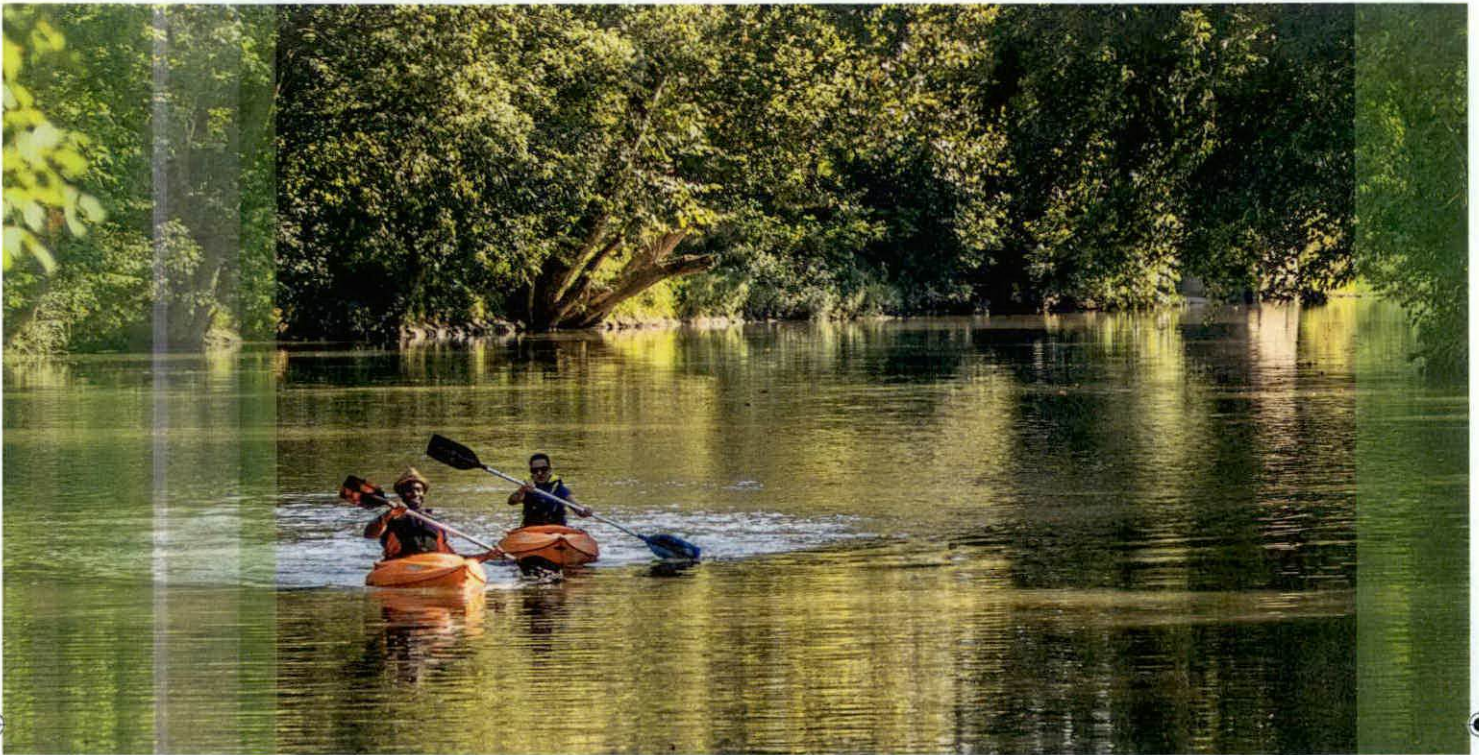


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Career opportunities rooted in **purposeful problem-solving**



Safe, clean waterways are vital to this community for ... economic development... recreation...and overall public health.

We at Louisville MSD are a proud, dedicated group of individuals who serve our community 24/7/365 — managing wastewater, stormwater and flood protection services. Our role in protecting Louisville's waterways is one of leadership, partnership and advocacy.

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Photo: Kayaks on Floyds Fork



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MEDIA ADVISORY

November 2, 2018

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Massive tunnel boring machine arrives to excavate Waterway Protection Tunnel

Excavation of MSD's four-mile-long tunnel, 18 stories underground, is closer to beginning with the arrival of a massive tunnel boring machine. The \$200 million Waterway Protection Tunnel project will reduce wastewater and stormwater overflows that pollute the Ohio River and Beargrass Creek.

Media are invited to the tunnel's construction site to view the tunnel boring machine's 22-foot diameter cutterhead and speak with MSD leaders and project engineers. Additionally, MSD will announce the name of the newly arrived machine, which will honor Louisville's greatest champion.

WHAT: News conference unveiling MSD's tunnel boring machine

WHEN: Monday, November 5, 2018
10 a.m.

WHERE: Enter through the visitor gate at 11th and Rowan streets, just west of downtown Louisville. Street parking is available on both 11th and Rowan streets.

Note: This is a working job site. For safety precautions, attendees must wear sturdy, closed-toe shoes. Hardhats, safety vests, safety goggles are required and will be available for use at the site. Expect rocky terrain. Please proceed along the construction site with caution.

OPPORTUNITIES:

- Interviews with MSD officials including Executive Director Tony Parrott and Waterway Protection Tunnel Project Manager Jacob Mathis
- Photo/video of the 22-ft. cutterhead, which will bore a 4-mile tunnel 18 stories beneath the earth
- Photo/video of project participants signing a banner and christening the cutterhead



[LouisvilleMSD](https://www.facebook.com/LouisvilleMSD)

About MSD

The Louisville/Jefferson County Metropolitan Sewer District (MSD) works to achieve and maintain clean, environmentally safe waterways for a healthy and vibrant community. The organization's more than 600 employees provide wastewater management, drainage and flood protection services across the 376 square miles of Louisville Metro. In addition to operating and maintaining Louisville Metro's sewer system, floodwall system, water quality treatment centers and flood pumping stations, MSD invests in hundreds of infrastructure improvement projects each year, plants more than 1,000 trees and other vegetation annually to enhance water filtration and reduce runoff, and provides numerous outreach programs to inform and educate the community about protecting our waterways.



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MEDIA RELEASE

November 5, 2018

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'Bumblebee' will honor The Champ while digging MSD's Waterway Protection Tunnel

LOUISVILLE, KY – Louisville's greatest champion will play a symbolic part in one of the community's largest public infrastructure projects. The massive, 412-foot long machine that will excavate MSD's \$200 million Waterway Protection Tunnel is named "Bumblebee" in honor of Muhammad Ali. The name is the result of a competition and vote among MSD employees.

"The Champ famously would float like a butterfly and sting like a bee," said Tony Parrott, MSD Executive Director. "And our tunnel boring machine similarly will move virtually unnoticed 18 stories underground while performing a big job for the community."

MSD's Bumblebee has a number of parallels to Muhammad Ali:

- **Bumblebee will get its start on the west side of the city.** The Waterway Protection Tunnel begins near 12th and Rowan streets, west of downtown. From there the tunnel will stretch east, generally along the river to Butchertown, where it will turn southeast and extend to near Lexington Road and Grinstead Drive.
- **Bumblebee is a heavyweight,** weighing in at 885,000 pounds.
- **Bumblebee has the strength to push through challenges.** It will carve through miles of solid bedrock, moving forward with 3.5 million pounds of thrust and a 22-foot wide cutter head applying nearly 1.5 million pounds per foot of torque.
- **Bumblebee has made its mark all over.** It has previously dug tunnels in Chicago, Dallas, Milwaukee and British Columbia, Canada. It recently was in Mt. Pleasant, Pennsylvania where workers retooled it for MSD's tunnel project.
- Bumblebee will spend some time digging the tunnel **underneath the Ohio River**, where Muhammad Ali reportedly tossed his Olympic medal.

- **Bumblebee will leave a lasting legacy for Louisville.** In a typical year, the Waterway Protection Tunnel will help keep Louisville waterways safe and clean by preventing 439 million gallons of pollution from entering the Ohio River and Beargrass Creek in a typical rainfall year.
- **Residents will benefit long after Bumblebee's work is complete.** After the tunnel is complete, the construction site at 12th and Rowan will become part of Waterfront Park's Phase IV, western expansion. The construction site at Lexington Road and Grinstead Drive will be converted to a public greenspace to serve as a trailhead for the Beargrass Creek Trail, with paths, trails, a rain garden and wetland preservation.

MSD Accounting Analyst Mike Fitzner submitted the name Bumblebee as part of a naming contest and vote MSD conducted among its employees. Fittingly, Bumblebee smashed the competition. Fitzner has a special connection to Muhammad Ali, which led to his naming choice. "The heavyweight champion came to the bank branch where my mother was working to sign autographs for charity. My mom had baked cookies for the event. Ali really enjoyed the cookies and asked to meet the baker. He told her that she was wasting her time working in a bank and should own a bakery. Ali gave her the confidence to just that," said Fitzner.

Bumblebee has been arriving to Louisville in components, on 50 plus tractor trailers over the course of the past month. The largest section, the cutter head, weighing more than 200,000 pounds, arrived in Louisville in late October. A crane will lower Bumblebee's parts into the working shafts at the 12th and Rowan site, where workers will assemble the machine underground.

The Waterway Protection Tunnel will be operational by the end of 2020.



LouisvilleMSD

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MEDIA RELEASE

November 5, 2018

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MSD Tunnel Boring Machine 'Bumblebee' Arrives

*412-foot-long workhorse will excavate Waterway Protection Tunnel
four miles long and 18 stories underground*

LOUISVILLE, KY – With the arrival of a massive tunnel boring machine named "Bumblebee," MSD's \$200 million Waterway Protection Tunnel project is preparing to move to the excavation phase.

MSD celebrated the arrival of the machine's signature piece – a 22-foot diameter cutterhead – at a ceremony on November 5. Project engineers and community leaders signed a banner unveiling the machine's name "Bumblebee," inspired by the Champ's famous line, "Float like a butterfly, sting like a bee."

Parts for the 412-foot long machine have been arriving in Louisville on more than 50 tractor-trailer trucks during the past month. A crane will lower Bumblebee's parts into the working shafts at the 12th and Rowan site, and workers will then assemble the machine underground. Excavation of the Waterway Protection Tunnel is planned to begin later this month.

Over the next 12 months, Bumblebee will carve through more than four miles of solid bedrock, 18 stories underground. It will move forward with 3.5 million pounds of thrust, applying nearly 1.5 million pounds per foot of torque.

"Tunnel boring projects are wonders of engineering and technology, and we are excited to bring this type of solution to Louisville to help create safe and clean waterways," said MSD Executive Director Tony Parrott.

Once complete, MSD's Waterway Protection Tunnel will help prevent wastewater and stormwater from overflowing during periods of heavy rain – ultimately reducing pollution in the Ohio River and Beargrass Creek. The Waterway Protection Tunnel will have the capacity to store 55 million gallons of combined wastewater and stormwater until capacity is available in the MSD sewer system. The contents are then pumped back into the system, conveyed to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River. The tunnel is slated to be operational by the end of 2020.

For an animation of the tunnel, click here

<https://youtu.be/u9CHHpB5xek>



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August 14, 2018

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MSD's Waterway Protection Tunnel reaches 220-foot depth milestone

Working and pump station shafts reach full depth, horizontal drilling begins

LOUISVILLE, KY – MSD contractors working to build a massive underground tunnel to prevent wastewater and stormwater from overflowing and entering the Ohio River and Beargrass Creek have reached a significant milestone. The “working” and pump station shafts — which will carry workers and equipment underground — have reached their full depth of 220 feet below the surface.

Horizontal drilling and blasting to connect the two shafts is underway — allowing space for the underground assembly of the tunnel boring machine that will arrive in Louisville this fall. From that point — 18 stories underground — the boring machine will carve MSD's Waterway Protection Tunnel out of the rock. The tunnel will begin at the working shaft site at 12th and Rowan streets just west of downtown, run east under parts of the Ohio River and downtown, then turn southeast near Butchertown and extend to near Lexington Road and Grinstead Drive.

The tunnel is designed to store stormwater and wastewater that otherwise would overflow and pollute local waterways when it rains. The tunnel stores the mixture until the rain subsides and sewer system capacity is available. Then the wastewater and stormwater is pumped back into the sewer system and conveyed to MSD's Morris Forman Water Quality Treatment Center, where it is treated before being released into the Ohio River. In total, the Waterway Protection Tunnel can store 54.5 million gallons of wastewater and stormwater.

“This is an important milestone in MSD's mission to provide safe, clean waterways for the community,” said MSD Executive Director Tony Parrott. “Now that we've reached the full depth, we're beginning to prepare the shaft for the tunnel boring machine to begin excavating the length of the tunnel.”

What happens next?

Over the next several weeks, crews will continue to blast a horizontal tunnel space between the two shafts to prepare space for assembly of the boring machine, which is 415 feet in length, and a rock-cutting head more than 20 feet in diameter. The machine was recently used for a tunnel project in Milwaukee, Wisconsin, and is currently in Pennsylvania being outfitted for MSD's Waterway Protection Tunnel job. It will arrive in Louisville in September on more workers will assemble it piece by piece underground.

It will take nearly three-years to carve the four-mile tunnel and complete the connections. The tunnel is an innovative solution to Louisville's challenge of combined sewer overflows during periods of heavy rain. The tunnel replaces the four large storage basin projects that were initially planned for areas along the tunnel route — and it provides greater storage capacity and lower long-term operations and maintenance costs compared to the basins.

Underground construction with above-ground benefits

When the Waterway Protection Tunnel project is operational at the end of 2020, the job sites at both the beginning and finishing points of the tunnel will become new public green spaces. Waterfront Development Corporation will use the location of the working and pump station shafts near 12th and Rowan streets for a western expansion of Waterfront Park.

The “retrieval shaft” — near Lexington Road and Grinstead Drive — where the tunnel boring machine will be removed when the tunnel boring is complete will also become a new public green space and trailhead for the Beargrass Creek Trail, complete with parking, paths, a rain garden, and a wetland preservation area.

For more information visit LouisvilleMSD.org/Tunnel or follow #MSDtunnel on social media.



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MEDIA ADVISORY

August 9, 2018

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Underground Photo/Video Opportunity: Inside MSD's Waterway Protection Tunnel, 220 Feet Below Louisville

Construction of MSD's Waterway Protection Tunnel, designed to prevent millions of gallons of stormwater and wastewater from entering the Ohio River and Beargrass Creek, will briefly pause for an exclusive media viewing opportunity.

What: Media photo/video opportunity inside the Waterway Protection Tunnel's working shaft, 220 feet below the surface

When: Tuesday, August 14, 2018
9:45 a.m.

Where: Rowan Street Tunnel Construction Site

- Eleventh and Rowan streets, Louisville KY 40212
- Enter through the Visitor Gate, park in front of the construction trailer
- Safety training and briefing will take place inside the construction trailer

Opportunities: Photo/video inside the Waterway Protection Tunnel shaft, and surrounding job site
Interviews with project leaders

Timeline:

- 9:45 a.m. Arrive and provide/complete consent forms
- 10 a.m. Informational briefing in trailer
- 10:20 a.m. Visit inside the tunnel shaft

Media will spend approximately 30 minutes in the tunnel.

Interviews can be conducted underground or above ground after the tunnel visit.

Media RSVP: Due to limited space in the tunnel shaft, each media outlet must RSVP with the number of attendees from each station. Working media may attend the above-ground briefing and site visit without entering the tunnel shaft.

Please RSVP with the name of your attending representatives by **noon on Monday, Aug. 13** to:

Lauren Weitlauf, lweitlauf@bch.com

502.589.7711 office / 270.792.0897 mobile

Important Information:

- Anyone entering the tunnel must sign the attached waiver. Additional copies will be available onsite.
- This is a construction site, please refrain from wearing loose fitting clothing such as dresses or skirts.
- **Long pants are required to enter the tunnel shaft.**
- **Close-toe and close-heel footwear are REQUIRED to enter the construction site.**
- **Steel-toe or composite boots are REQUIRED to enter the tunnel.** Steel-toe rubber boots are advised. There is a "mucky" surface at the bottom of the shaft. (You can find them at local big box stores.)
- Lighting will be limited inside the tunnel shaft. Please prepare accordingly when organizing photo/video equipment. You will be permitted to carry your equipment into the tunnel shaft.
- The base of the tunnel shaft is 200 feet below the surface. The temperature at the bottom is about 55 degrees, dress accordingly. Condensation may form on camera lenses.
- A steel cage will lower groups of seven-eight at a time into the shaft. Individuals entering the tunnel shaft must be comfortable with depths and confined spaces.



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MEDIA RELEASE TRAFFIC ALERT

October 2, 2018

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Traffic to divert on portion of East Broadway for sewer line work

LOUISVILLE, KY - Sewer line construction work will begin in the East Broadway area, Tuesday, October 2 at approximately 10 AM.

- **East Broadway between 933 East Broadway and Barrett Avenue**
October 2, 2018, through February 1, 2019
Two westbound traffic lanes close, traffic diverts to the center lane.
North-side sidewalk will close in this area.

All businesses in the area are open during construction with access to parking.

MORE ON THE PROJECT:

The sewer line work in the E Broadway area will allow the capture of 2 sewer overflow points that currently discharge to Beargrass Creek. The sewer line construction is part of MSD's Waterway Protection Tunnel project.

Once complete, the [Waterway Protection Tunnel](#) will serve as an innovative way to store Louisville's excess sewer and rainwater underground until it is pumped to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River. The tunnel eliminates 25 combined sewer overflow points that put more than 439 million gallons of the combined sewer and rainwater into the South Fork of Beargrass Creek and the Ohio River. By the end of 2020, MSD will capture and treat 98 percent of the combined sewer overflow volume in a typical year of rain.

LEARN MORE: The public can keep up to date on the project at LouisvilleMSD.org/tunnel or Twitter with **#MSDtunnel**. Sign up to receive regular updates on the project at LouisvilleMSD.org/tunnel/newsletter



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MEDIA ADVISORY

July 26, 2018

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Rock samples from Waterway Protection Tunnel reveal Louisville history

MSD's project to build wastewater storage tunnel unearths 500 million year-old fossils

LOUISVILLE, KY – MSD's project to build a tunnel 18 stories underground for wastewater and stormwater storage has also unearthed hundreds of millions of years of history.

In January 2018, MSD began construction of its Waterway Protection Tunnel, a 20-foot diameter underground tunnel deep within bedrock that will help prevent hundreds of millions of gallons of wastewater and stormwater from polluting the Ohio River and Beargrass Creek. As part of the preparation for this \$200 million project, geologists drilled down 200 feet or more along the path of the tunnel to pull up samples of limestone and shale, and then analyzed the rock as part of planning for the depth of the tunnel.

MSD has thousands of linear feet of these rock core samples stored in a southern Indiana warehouse. They act as a library of sorts for contractors to access as the project proceeds. The samples highlight the history of what is now Louisville; each is a unique and contain many fossils.

Upon completion of the tunnel, the core samples likely will be shown in local science museums. Some of the samples may be donated to the Kentucky Geological Survey's Well Sample and Core Library. Many of the fossils found in the core samples are similar to those seen at the fossil beds at the Falls of the Ohio State Park just across the river in Clarksville.

Facts about the core sampling:

- MSD conducted rock boring at 15 locations along the Waterway Protection Tunnel alignment.
- Ten distinct bedrock units were encountered along the tunnel alignment. The bedrock strata is approximately 350 million years old. Fossilized shell fragments and the remnants of other sea creatures exist within the collected samples.
- Types of rock are often named for the city in which they were discovered or predominantly found. This area includes significant amounts of Louisville, New Albany, Sellersburg and Jeffersonville limestones.
- Analysis of the rock requires specialized equipment and technology. The excavated rock was sent to the Colorado School of Mining for analysis.
- Engineers and geologists use the findings from core sampling to determine the ideal path and depth at which the tunnel should be built as well as to make other determinations about the tunnel's engineering.

- One key finding during sampling was notable amounts of Waldron Shale – a type of rock native to Indiana which easily fragments. This discovery determined the tunnel would have to be dug 20-feet deeper than originally planned.

Sampling just east of Louisville Slugger Field also found an artesian well – a pocket of deep underground water. This water was three times saltier than seawater, due to the length of time the water was pressurized underground.

LEARN MORE: The public can keep up to date on the project at LouisvilleMSD.org/tunnel or Twitter with [#MSDtunnel](https://twitter.com/MSDtunnel). Sign up to receive regular updates on the project at LouisvilleMSD.org/tunnel/newsletter



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MEDIA ADVISORY

July 25, 2018

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MSD Unearths Louisville History Dating Back 500 Million Years

*At 200 feet underground, geologists help plan construction
of Waterway Protection Tunnel—and provide a history lesson*

MSD's project to build a tunnel 18 stories underground for wastewater and stormwater storage has unearthed hundreds of millions of years of Louisville history. Before MSD began constructing the tunnel, geologists drilled down some 200-feet and pull up samples of limestone and shale at 15 sites along the path of the tunnel. Geologists analyzed the rock to make sure conditions were right for the Waterway Protection Tunnel. MSD has hundreds of these rock core samples stored in a southern Indiana warehouse. The samples highlight the city's history; each is a unique design filled with fossils.

WHAT: Behind the scenes of Waterway Protection Tunnel construction:
Viewing of prehistoric rock core samples

WHEN: Thursday, July 26 at 10 a.m.

WHERE: 2992 Industrial Parkway, Jeffersonville, Indiana

OPPORTUNITIES:

- Photo/video opportunities of prehistoric rock samples drilled from 200 feet under Louisville
- Interview with MSD's Jacob Mathis, Waterway Protection Tunnel project manager, and geologist Todd Tharpe with Black & Veatch.

MORE ON THE PROJECT:

The [Waterway Protection Tunnel](#) will serve as an innovative way to store Louisville's excess wastewater and rainwater underground until it can be pumped to a wastewater treatment facility. The tunnel eliminates 25 combined sewer overflow points that put more than 439 million gallons of the combined sewer and rainwater into the South Fork of Beargrass Creek and the Ohio River. By the end of 2020, MSD will capture and treat 98 percent of the combined sewer overflow volume in a typical year of rain.

LEARN MORE: The public can keep up to date on the project at LouisvilleMSD.org/tunnel or Twitter with [#MSDtunnel](#). Sign up to receive regular updates on the project at LouisvilleMSD.org/tunnel/newsletter



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MEDIA ADVISORY

July 26, 2018

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MSD's Waterway Protection Tunnel to extend and capture more wastewater overflow

Eliminates need for planned basin project at Lexington Road and Grinstead Drive

LOUISVILLE, KY – MSD's project to build a massive tunnel 18 stories underground to help keep millions of gallons of sewage out of the Ohio River and Beargrass Creek will be expanded to capture even more wastewater and stormwater overflow – and eliminate the need for a planned storage basin project.

The Waterway Protection Tunnel was initially planned to be 2.5 miles long, beginning at 12th and Rowan streets just west of downtown, and stretching east to East Main Street near the Home of the Innocents. On July 23, the MSD Board of Directors approved a change order to the project, which will extend the tunnel to about four miles total, continuing the route southeast to near Lexington Road and Grinstead Drive. The total storage capacity of the underground tunnel will increase from 37 million gallons to 55 million gallons.

The extension of the tunnel will replace the planned storage basin project at the site of the former Jim Porter's Goodtime Emporium near Lexington and Grinstead. Additionally, when the underground tunnel project is complete, the above-ground site at that location will gain a new public green space to serve as a trailhead for the Beargrass Creek Trail, complete with paths, trails, a rain garden and a wetland preservation area.

"Extending the tunnel creates the opportunity to meet our goal of safer, cleaner waterways and environment for our community with less above-ground construction impacts," said MSD Executive Director Tony Parrott.

Work began on the Waterway Protection Tunnel January 2018, with the construction of the pump station, working and retrieval shafts, and other connectors required to start the excavation of the tunnel itself – which will be more than 200-feet below the surface and 20-feet in diameter. Over the lifecycle of the Waterway Protection Tunnel, MSD also will realize cost savings through lower operations and maintenance costs of the tunnel compared to a storage basin.

In total, the Waterway Protection Tunnel will capture 25 combined sewer overflow points that discharge 439 million gallons of wastewater and rainwater in a typical rainfall year that flow into Beargrass Creek and the Ohio River. The tunnel will allow capture of 98 percent of these overflows and store the mixtures until the rain subsides and sewer system capacity is available. The mixture will then be pumped back into the sewer system and conveyed to MSD's Morris Forman Water Quality Treatment Center, where it is treated before release into the Ohio River.

"Unlike a new highway or a new bridge, Louisville residents may never see this major infrastructure project because it will be 18 stories underground. But the benefits are real in terms of keeping hundreds of millions of gallons of wastewater from overflowing every year, which has direct impacts on quality of life and economic development opportunities in our community," Parrott said.

The Waterway Protection Tunnel is part of MSD's Consent Decree work that also includes building storage basins across the community to help reduce sewer overflows. While the extension of the tunnel eliminates the need for the planned basin at Lexington and Grinstead, the original length of the tunnel also eliminates three other planned basin projects planned for Lexington Road and Payne Street; Story Avenue and Main Street; and, 13th and Rowan streets.

Even with the extension, the tunnel project is still scheduled to be in service on time – by the end of 2020, meeting all requirements for certification with the U.S. Environmental Protection Agency for MSD's Consent Decree.

MSD will hold an informational meeting for stakeholders in the area of I-64 and Grinstead Drive/Lexington Road to review the change from a basin to the tunnel for that site. The meeting is scheduled for August 28, 6:30 PM, at Girl Scouts of Kentuckiana Building, 2115 Lexington Road. Area residents will receive notification from MSD by postal mail.

For more information visit LouisvilleMSD.org/Tunnel or follow #MSDtunnel on social media.



LouisvilleMSD

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MEDIA ADVISORY

July 19, 2018

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TRAFFIC ALERT: Seventh Street between Main Street and River Road — closures and lane reductions for tunnel and flood protection work

LOUISVILLE, KY — Sewer line work to make a connection for the Waterway Protection Tunnel will begin on Friday, July 20, on Seventh Street. This work will require that Seventh become one lane between Main Street and River Road. This lane reduction will go through November 30, 2018.

Weekend closure

Additionally, MSD must close that section of roadway — Seventh Street between Main Street and River Road — over the weekend for a practice of the floodwall closure in this area. MSD is required by the U.S. Army Corps of Engineers to practice each floodwall closure on a three-year rotating basis. This practice will begin Saturday, July 21, and run through Sunday, July 22.

Three-day closures

Seventh Street will close between Main Street and River Road for additional Waterway Protection Tunnel work over these three-day periods, Friday through Sunday: July 27, 28 and 29; August 3, 4 and 5.

Patrons of the Muhammad Ali Garage should enter from Sixth Street during these closures.

MORE ON THE PROJECT:

The sewer line work in the Seventh and Main streets area will allow the capture of sewer overflow points that currently discharge to the Ohio River. The sewer line is part of MSD's Waterway Protection Tunnel project.

Once complete, the [Waterway Protection Tunnel](#) will serve as an innovative way to store Louisville's excess sewer and rainwater underground until it can be pumped to a wastewater treatment facility. The tunnel eliminates 22 combined sewer overflow points that put more than 351 million gallons of the combined sewer and rainwater into the South Fork of Beargrass Creek and the Ohio River. By the end of 2020, MSD will capture and treat 98 percent of the combined sewer overflow volume in a typical year of rain.

WHEN:

July 20 – November 30, 2018

Seventh Street will become one lane between Main Street and River Road beginning July 20 and remain one lane through November 30, 2018.

July 21 – 22

Seventh Street will be closed to traffic between Main Street and River Road July 21 and 22.

July 27, 28 and 29

August 3, 4 and 5

Seventh Street will close between Main Street and River Road.

LEARN MORE: The public can keep up to date on the project at LouisvilleMSD.org/tunnel or Twitter with [#MSDtunnel](https://twitter.com/MSDtunnel). Sign up to receive regular updates on the project at LouisvilleMSD.org/tunnel/newsletter



LouisvilleMSD

About MSD

The Louisville/Jefferson County Metropolitan Sewer District (MSD) works to achieve and maintain clean, environmentally safe waterways for a healthy and vibrant community. The organization's more than 630 employees provide wastewater management, drainage and flood protection services across the 376 square miles of Louisville Metro. In addition to operating and maintaining Louisville Metro's sewer system, floodwall system, water quality treatment centers and flood pumping stations, MSD invests in hundreds of infrastructure improvement projects each year, plants more than 1,000 trees and other vegetation annually to enhance water filtration and reduce runoff, and provides numerous outreach programs to inform and educate the community about protecting our waterways.



FOR IMMEDIATE RELEASE

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Christy Ray, Louisville Water
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Louisville Water Company and MSD host Annual Veterans Day Recognition Celebration

Who: Louisville Water Company and Louisville MSD
What: Veterans Day Recognition Celebration
When: Friday, November 9, 2018, 8 AM to 9:30 AM
Where: Louisville MSD Central Maintenance Facility
3050 Commerce Center Place, Louisville, KY 40211

MSD and Louisville Water Company will honor their combined 130 current and retired employees who have or are still serving our country in the United States Armed Forces at a ceremony at Louisville MSD's Central Maintenance Facility on Friday, November 9 at 8 AM.

The Louisville Metro Police Color Guard will provide the presentation of colors. Fern Creek High School Marine Corps Drill Team will perform. World War II U.S. Navy veteran John Richard Mooney, who retired in 1947 as a Gunners Mate III, will share about his experience from a recent Honor Flight Bluegrass visit to our nation's capital.

Mayor Greg Fischer, MSD Executive Director Tony Parrott, Louisville Water Company President Spencer Bruce and representatives of the United States Air Force, Army, Coast Guard, Navy and Marines will also provide remarks.

Veterans from both utilities are participating in the Louisville Veterans Day Parade Friday at 11 AM.



LouisvilleMSD

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ABOUT LOUISVILLE WATER COMPANY

Louisville Water began operations in October 1860 as Kentucky's first public water utility and today provides an abundant, safe supply of drinking water to nearly one million people in Louisville Metro and surrounding counties. On average, the company produces 117 million gallons of Louisville pure tap® each day. Louisville Water is recognized for its quality and innovation; both treatment plants are ranked as two of the top 16 in North America for outstanding water quality. Learn more at LouisvilleWater.com or follow on social @LouisvilleWater.



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MEDIA RELEASE

November 1, 2018

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Emergency repair and roadway closure required due to floodgate failure —

Frankfort Avenue closed between Interstate 71 and East Washington Street

LOUISVILLE, KY – One of Louisville MSD's underground floodgates has failed. In order to make the repairs, MSD will take the gate out of service and close a portion of Frankfort Avenue between Interstate 71 and East Washington Street. MSD will maintain local access for area residents and businesses.

During the repair, the roadway is subject to flooding with water depths of five feet or more. This floodgate is located at a combined sewer overflow point, which means the closed section of roadway will flood with a mixture of stormwater and wastewater.

Even though Louisville is not in flood stage, MSD must make an immediate repair of this infrastructure. The gate helps control wastewater and stormwater flow, which allows the underground repair of the sewer line on West Main Street in downtown Louisville.

Work on this gate will begin as soon as possible and will continue until complete. There is no estimate of completion at this time. There is no interruption of service to our customers.

The water flooding Frankfort Avenue and overflowing into the Ohio River is combined sewer overflow. Please take caution in the area and do not enter the water as it could contain harmful bacteria, which could make you sick. Wash with warm, soapy water if you come into contact with the water.

MSD will clean the area after repairs are made.

MSD's Customer Relations will answer your call 24/7/365.



LouisvilleMSD

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MEDIA RELEASE

November 19, 2018

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Protecting your home from sewer backups is simple

Never pour fats, oils or grease down a sink, drain or toilet

Keeping your home sewer line in working order is important. If you wash fats, oils and grease down your drain, a buildup may occur in your sewer line. This buildup may clog the sewer pipe and cause sewage overflows into your home, onto the ground and into our local waterways.

It is important to keep our sewers fat free.

When greasy wastes wash into the plumbing system through your sink or garbage disposal, they can stick to the pipes. Using your garbage disposal or a grease-cutting detergent does not keep fats, oils and grease out of the plumbing system. Garbage disposals shred solid material into smaller pieces but do not prevent fats, oils and grease from flowing down the drain. Grease dissolving detergents can pass fats, oils and grease through your household plumbing, but the grease may still cause problems in the sewer lines.

Can the grease!

- Never pour fats, oils and grease down a sink, drain or toilet. Pour used grease into an empty, heat-safe container, such as a soup can, and store it in the freezer. Toss the can into the garbage after the grease becomes solid.
- Scrape your food waste into the trash. Wipe all pots, pans, dishes and cooking utensils with a paper towel to soak up grease before washing them.
- Catch the scraps in your sink with a basket or strainer, instead of using the garbage disposal, and throw them away in the trash can.
- Recycle your deep-fryer oil by taking it to Louisville Metro's grease drop-off location at 7501 Grade Lane.

If you do have a problem with a sewer backup, call MSD's Customer Relations 24/7/365 at 502.540.6000 or send us an email at CustomerRelations@LouisvilleMSD.org. Make us your first call. Determining if the problem is located on the public side of the system will help to avoid unnecessary plumber expense.



LouisvilleMSD

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Avoid a clogged pipe.
Can the grease!





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MSD MEDIA RELEASE

December 18, 2018

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An unprecedented repair...

MSD explains how it fixed one of its largest sewer lines

*Orange traffic barricades come down by Friday as the repair nears completion**

"We appreciate the patience of the business and tourism entities located in this vibrant corridor of our community during this emergency repair of this pipe, which is vital for the health and safety of our community," states MSD Executive Director Tony Parrott.

LOUISVILLE, KY — MSD's innovative repair of a large 84-inch diameter sewer line that sits more than 20-feet below Main Street is wrapping up just in time for the holidays. This eight-month-long repair project has been unprecedented in MSD's history. The innovative solution allowed the repair to take place underground inside the damaged pipe. Usually, a sewer line repair of this magnitude would have required the complete closure of the roadway and an open cut trench from curb to curb due to the depth of the pipe.

MSD has been working for the last 10-years to perform a baseline inspection of all of its 3,300 miles of sewer pipe. Cameras are lowered inside the pipe to give an up-close view.

"The community and MSD are fortunate that the degradation of the pipe was discovered in a routine inspection. We proactively closed the southside parking lane on Main Street for public health and safety. In August, the emanate danger of collapse was fulfilled when a section of the pipe caved-in. Fortunately, no one was injured, and the point repair was made with only a few more lanes of Main Street closing for several days," states MSD Executive Director Tony Parrott.

"I am grateful for the leadership and teamwork shown by MSD during this critical, emergency repair. We appreciate the cooperation and patience shown by everyone in the downtown area during the past few months."

— Barbara Sexton Smith, Metro Councilwoman Fourth District

Background

MSD commissioned an inspection of the concrete Ohio River Interceptor — an 84-inch sewer pipe — in November 2017 and used technology that allows engineers to analyze the pipe without having to empty it. The resulting March 2018 report, revealed that some of the concrete and rebar support systems had worn away between Fourth and Seventh streets.

Experts were brought in from all parts of the country to consult and work on this unprecedented repair for the Louisville area. A solution evolved that allowed sewer service to continue, Main Street to remain mostly open and the repair to take place from inside the damaged pipe.

MSD closed the southside parking lane on Main Street between Fourth and Seventh streets in April to ensure public safety from the threat of a potential cave-in of the pipe. Work then began with a team of consultants to develop a plan to repair this vital infrastructure with the least disruption to this vibrant area of our community. The \$20 million repair project required a "pump-around" to remove wastewater flow from the damaged section of pipe so that workers could go underground and make repairs from within the 7-foot tall pipe. Workers entered the pipe through existing hatches in the pavement at Fourth and Main streets.

Constructing the pump-around required seven weeks of basically building a temporary sewer system on the surface with four parallel pipes, which total three linear miles. Wastewater pumped out of the damaged pipe was temporarily re-routed west along River Road to Ninth Street where it re-entered the large sewer pipe and continues its path to MSD's Morris Forman Water Quality Treatment Center for treatment and release to the Ohio River.

MSD contractors then installed corrosion-resistant PVC panels, which mold to the shape of pipe to form a new pipe inside of the old pipe. A concrete mix was then injected into the small space between the PVC panels and the old pipe. This process bonds the new pipe and the old pipe to form a stronger structure.

More

This pipe is called the Ohio River Interceptor and is one of Louisville's largest sewer pipes. It runs under Main Street — from the Butchertown area in the east to I-264 in the west, it then turns southwest to MSD's Morris Forman Water Quality Treatment Center. The pipe ranges in size from 60- to 186-inches in diameter. It was constructed of concrete with two layers of rebar in the 1950s and is approximately 25-feet deep.

The Ohio River Interceptor is part of the same pipe that caved in on Main and Hancock streets in late August 2017. That point repair took six weeks to complete.

The Ohio River Interceptor is one of the hundreds of projects identified in MSD's Critical Repair & Reinvestment Plan. The Plan includes funding to rehabilitate major sewer lines within the service area, including this interceptor. For more information about this plan, please visit LouisvilleMSD.org/CriticalRepairPlan.

***PLEASE NOTE: MSD HAS BEEN ASKED TO LEAVE TRAFFIC CONTROL IN PLACE ON MAIN STREET BETWEEN THIRD AND FOURTH STREETS FOR OTHER UTILITY WORK.**

Images available for download at <http://louisvillemsd.org/westmainrepair/gallery>



LouisvilleMSD

About MSD

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MSD ADVISORY

December 18, 2018

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An unprecedented repair...

MSD explains how it fixed one of its largest sewer lines

Orange traffic barricades come down by Friday as the repair nears completion

WHAT Project update and lessons learned

WHO MSD Executive Director Tony Parrott
Metro Councilwoman, District 4 Barbara Sexton Smith (ADDED)
MSD Project Manager Heather Dodds, PE

WHEN Tuesday, December 18, 2018, 11 AM

WHERE Fourth and Main Streets, southwest corner

MORE

MSD's innovative repair of a large 84-inch diameter sewer line that sits more than 20-feet below Main Street is wrapping up just in time for the holidays. MSD Executive Director Tony Parrott and Project Manager Heather Dodds, PE will speak to the complications, successes, and lessons learned from this eight-month-long project. During the repair, south side parking lanes on Main Street between Third and Seventh streets were closed for eight months and there were several additional traffic interruptions.

Experts were brought in from all parts of the country to consult and work on this unprecedented repair for the Louisville area. A solution evolved that allowed sewer service to continue, Main Street to remain mostly open and the repair to take place from inside the damaged pipe.

Background

This 84-inch sewer pipe is one of the hundreds of projects identified in MSD's Critical Repair & Reinvestment Plan. For more information about this plan, please visit LouisvilleMSD.org/CriticalRepairPlan.



[LouisvilleMSD](http://LouisvilleMSD.org)

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MEDIA RELEASE **UPDATE**

December 10, 2018

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MSD's completes emergency repair of vital sewer line under Main Street

Disassembly of the "pump-around" will continue through December 21

LOUISVILLE, KY — MSD has finished an eight month repair to one of its larger sewer lines, an 84-inch diameter that sits more than 20-feet below Main Street. Now that the repair work is complete, MSD will put wastewater back in the pipe tonight. The pipe carries 40 percent of the community's wastewater to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River.

Crews will begin to remove the three linear miles of "pump-around" on December 12, completing that task by December 21. The pump-around has handled the wastewater flow during the repair, allowing sewer service to continue to the area. The removal process will require a few temporary roadway closures.

TEMPORARY ROADWAY CLOSURES

Fourth Street and River Road

- **December 5-21: Fourth Street at River Road and one eastbound lane of River Road** (between Fourth and Sixth streets) close for the restoration of a water line and removal of the temporary pump station and diversion structure.

Sixth and Seventh streets

- **December 14-16: Sixth and Seventh streets** will close at River Road Friday evening through Sunday night, for removal of the "pump-around" pipe. Access to all garages will remain open from Main and West Washington streets.

Eighth Street

- **Week of December 17: Eighth Street** at the Science Center parking lot entrance ***closed during overnight hours*** for removal of "pump-around" pipe.

All roadways including the Main and Fourth street area will open to traffic December 21.

MEDIA OPPORTUNITY

MSD Executive Director Tony Parrott and MSD Project Manager Heather Dodds will provide a project recap on December 18, at 11 AM, at the southwest corner of Fourth and Main streets.

Background

MSD commissioned an inspection of the concrete Ohio River Interceptor — an 84-inch sewer pipe — in November 2017 and used technology that allows engineers to analyze the pipe without having to empty it. The resulting March 2018 report, reveals that some of the concrete and rebar support systems have worn away between Fourth and Seventh streets.

MSD closed the southside parking lane on Main Street between Fourth and Seventh streets in April to ensure public safety from the threat of a potential cave-in of the pipe. Work then began with a team of consultants to develop a plan to repair this vital infrastructure with the least disruption to this vibrant area of our community.

The \$20 million repair project required a “pump-around” to remove wastewater flow from the damaged section of pipe so that workers could go underground and make repairs from within the 7-foot tall pipe. Workers entered the pipe through existing hatches in the pavement at Fourth and Main streets.

Constructing the pump-around required seven weeks of basically building a temporary sewer system on the surface with four parallel pipes, which total three linear miles. Wastewater pumped out of the damaged pipe is temporarily re-routed west along River Road to Ninth Street where it re-enters the large sewer pipe and continues its path to MSD’s Morris Forman Water Quality Treatment Center for treatment and release to the Ohio River.

MSD contractors have completed installation of the corrosion-resistant PVC panels, which mold to the unique shape of pipe to form a new pipe inside of the old pipe. A unique concrete mix was injected into the small space between the PVC panels and the old pipe. This process bonds the new pipe and the old pipe to form a stronger structure.

“We appreciate the patience of the business and tourism entities located in this vibrant corridor of our community during this emergency repair of this pipe, which is vital for the health and safety of our community,” states MSD Executive Director Tony Parrott.

More Information

For more information on MSD’s West Main Repair visit <http://louisvillemad.org/westmainrepair>.

MSD’s Customer Relations will answer your call 24/7/365.



LouisvilleMSD

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MEDIA RELEASE **UPDATE**

November 29, 2018

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The end of MSD's emergency repair of vital sewer line under Main Street is in sight

*South-side parking lane of Main Street between Fourth and Seventh streets
opens for traffic December 6*

LOUISVILLE, KY — The final phase of repairing a large, 84-inch diameter sewer line, which is more than 20-feet below Main Street, is nearing a conclusion. MSD contractors are completing installation of the corrosion-resistant PVC panels, which mold to the unique shape of pipe to form a new pipe inside of the old pipe. Additionally, crews are pumping a special concrete mix into the small space between the PVC panels and the old pipe. This process bonds the new pipe and the old pipe to form a stronger structure. The pipe repair will be complete, and wastewater flow restored to the pipe by December 10.

Crews will begin removing the "pump-around" on December 12. This process will continue through December 21.

The pipe carries 40 percent of the community's wastewater to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River.

ROADWAY CLOSURES AND OPENINGS

Sixth Street (opening)

- **December 3 (NEW DATE): Sixth Street temporarily opens** between Main Street and West Washington Street

Fourth Street and River Road (closure)

- **December 5-21: Fourth Street at River Road and one eastbound lane of River Road** (between Fourth and Sixth streets) close for the restoration of a water line and removal of the temporary pump station and diversion structure

Main Street (opening)

- **December 6: Main Street** south-side parking lanes **OPEN** between Fourth and Seventh streets

Sixth and Seventh streets (closure)

- **December 14-16: Sixth Street**, between Main Street and West Washington, closed Friday evening through Sunday night, for removal of the “pump-around” pipe
- **December 14-16: Seventh Street**, between Ali Center Garage and River Road, closed Friday evening through Sunday night, for removal of the “pump-around” pipe

Eighth Street (closure)

- **Week of December 17: Eighth Street** at the Science Center parking lot entrance ***closed during overnight hours*** for removal of “pump-around” pipe

Fourth Street (opening)

- **December 21: Fourth Street at Main Street and River Road**, open for traffic

“We appreciate the patience of the business and tourism entities located in this vibrant corridor of our community during this emergency repair of this pipe, which is vital for the health and safety of our community,” states MSD Executive Director Tony Parrott.

Background

MSD commissioned an inspection of the concrete Ohio River Interceptor — an 84-inch sewer pipe — in November 2017 and used technology that allows engineers to analyze the pipe without having to empty it. The resulting March 2018 report, reveals that some of the concrete and rebar support systems have worn away between Fourth and Seventh streets.

MSD closed the southside parking lane on Main Street between Fourth and Seventh streets in April to ensure public safety from the threat of a potential cave-in of the pipe. Work then began with a team of consultants to develop a plan to repair this vital infrastructure with the least disruption to this vibrant area of our community.

The \$20 million repair project requires a “pump-around” to remove wastewater flow from the damaged section of pipe so that workers can go underground and make repairs from within the 7-foot tall pipe. Workers enter the pipe through existing hatches in the pavement at Fourth and Main streets.

Constructing the pump-around required seven weeks of basically building a temporary sewer system on the surface with four parallel pipes, which total three linear miles. Wastewater pumped out of the damaged pipe is temporarily re-routed west along River Road to Ninth Street where it re-enters the large sewer pipe and continues its path to MSD’s Morris Forman Water Quality Treatment Center for treatment and release to the Ohio River.

Completion date

The repair to the pipe will be complete by December 10. Dismantling of the pump-around system is scheduled for completion by December 21. Crews will return after the first of the year to restore sites at River Road and Fourth and Seventh streets.

More Information

For more information on MSD's West Main Repair visit <http://louisvillemsd.org/westmainrepair>.

MSD's Customer Relations will answer your call 24/7/365.



LouisvilleMSD

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MEDIA RELEASE **UPDATE**

November 14, 2018

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See inside the pipe as MSD makes progress in repairing of one of Louisville's most critical sewer lines

LOUISVILLE, KY – MSD continues to work as diligently and safely as possible to repair a large, 84-inch diameter sewer line that is more than 20-feet below Main Street. It is an emergency repair since this pipe carries 40 percent of the community's wastewater to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River.

The sewer pipe is empty for the repair. MSD contractors are currently installing corrosion-resistant PVC panels that fit together by hand and are sealed to the unique shape of the pipe — forming a new pipe inside of the old one. Ventilation pipes are pumping air in and out of the pipe to keep the workers safe. The panel installation and grouting of the space between the new panels and the old pipe are expected to continue through the first week of December.

When the repair of the pipe is complete, work can begin on dismantling the pump-around, which redirects the wastewater flow during the repair. All work is expected to be complete by the end of the year.

"MSD and its contractors continue to work as quickly and safely as possible to restore this vital sewer line and fully open Main Street and River Road. We appreciate the patience of the business and tourism entities located in this vibrant corridor of our community, states MSD Executive Director Tony Parrott. "We will continue to communicate our message about the need to repair and even replace infrastructure that is vital for not only the health and safety of our community but for economic vitality as well."

Additional work in the area

MSD is making new connections from existing sewer lines on Fifth, Sixth and Seventh streets to the large Main Street pipe. These connections will drastically reduce combined sewer overflows into the Ohio River.

- **Fifth Street** –roadway expected to open by November 21
- **Sixth Street** – roadway expected to open by November 30
- **Seventh Street** – roadway to open by Friday afternoon, November 16

Media Opportunity

- **Interview with MSD Project Manager Heather Dodds**
- **Thursday, November 15 at 11 AM**
- Southwest corner of Fourth and Main streets
- Working model of pipe repair available for photos

This link contains video of the installation of the PVC panels. (Best view is in Chrome, Internet Explorer or MS Edge. For a single image view, click on the center of the image and pull your mouse to the right or the left.)
<https://youtu.be/jd-Rjg7nx-c>

Background

MSD commissioned an inspection of the concrete Ohio River Interceptor — an 84-inch sewer pipe — in November 2017 and used technology that allows engineers to analyze the pipe without having to empty it. The resulting March 2018 report, reveals that some of the concrete and rebar support systems have worn away between Fourth and Seventh streets.

MSD closed the southside parking lane on Main Street between Fourth and Seventh streets in April to ensure public safety from the threat of a potential cave-in of the pipe. Work then began with a team of consultants to develop a plan to repair this vital infrastructure with the least disruption to this vibrant area of our community.

The \$20 million repair project requires a “pump-around” to remove wastewater flow from the damaged section of pipe so that workers can go underground and make repairs from within the 7-foot tall pipe. Workers enter the pipe through existing hatches in the pavement at Fourth and Main streets.

Constructing the pump-around required seven weeks of basically building a temporary sewer system on the surface with four parallel pipes, which total three linear miles. Wastewater pumped out of the damaged pipe is temporarily re-routed west along River Road to Ninth Street where it re-enters the large sewer pipe and continues its path to MSD’s Morris Forman Water Quality Treatment Center for treatment and release to the Ohio River.

Completion date

The repair to the pipe and dismantling of the pump-around system should be complete by the end of the year.

More Information

For more information on MSD’s West Main Repair visit <http://louisvillemsd.org/westmainrepair>.

MSD’s Customer Relations will answer your call 24/7/365.



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MEDIA ADVISORY

August 22, 2018

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Another problem for one of MSD's largest sewer lines

Problem is in a sewer pipe under Main Street that was already in danger of collapsing

LOUISVILLE, KY – The 84-inch sewer pipe that MSD is preparing to repair now appears to have another problem. On Sunday, a remote-control camera was put into the line for inspection. Video from the camera shows a 5- by 2-foot hole in the side of the pipe. Debris, including abandoned pipes, have fallen into the large sewer line from this hole. MSD last inspected this portion of the line on June 21, and this cave-in was not there.

For public safety, MSD has further reduced Main Street traffic in this area. Only one lane is open to traffic on the north side of Main Street midway between Third and Fourth streets to midway between Fourth and Fifth streets. Access to the PNC garage is open.

At this point, MSD is determining the amount of damage to the large pipe and how this will affect the ongoing planned repair of the sewer line. A team of outside experts and MSD engineers are looking at options that will allow safe entry into this pipe for a closer inspection. This will help us modify the repair plan. In the meantime, sewer service continues. There have been no injuries with this project or the cave-in.

We ask for your patience and caution as you drive in this area for the safety of not only our workers but of pedestrians, as well.

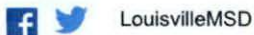
Background

The sewer line was installed between 1958 and 1960 and is one of the city's largest and most vital, carrying approximately 40 percent of Louisville's wastewater flow. Known as the Ohio River Interceptor, the pipe carries wastewater to MSD's Morris Forman Water Quality Treatment Center for treatment and release of the treated water into the Ohio River. In March, MSD discovered a problem with the pipe and closed part of Main Street between Fourth and Seventh streets. In June, MSD announced a \$20 million project to repair the damaged section from Fourth to midway between Seventh and Eighth streets.

The repair project for the interceptor pipe includes lining the interior of the pipe with corrosion-resistant PVC panels fit together by hand and sealed to the unique shape of the pipe. This repair essentially creates a sturdy new pipe inside the damaged pipe.

The sewer pipe must be nearly empty for the repair to take place. To do this, MSD established a "pump-around," which is a temporary sewer line that utilizes existing pipes to convey the wastewater from Main and Fourth streets to a temporary pumping station at Fourth Street and River Road. From there, the wastewater travels west in four temporary pipes along River Road, then up an embankment and around the floodwall, down West Washington Street to Ninth Street. The pipes continue up the hill on Ninth Street where the wastewater re-enters the existing sewer pipe under Main Street.

For more information on MSD's West Main Repair visit <http://louisvillemsd.org/westmainrepair>.



About MSD

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MAIN AND FIFTH AREA ADVISORY

March 20, 2018

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Inspection/evaluation of 84-inch sewer line

Parking and driving lanes at Main and Fifth remain closed as a safety precaution

We at MSD apologize to those individuals and businesses that are affected by the closure of the southside parking lane on Main Street, between Fourth and Fifth streets, as well as the east side parking/driving lane on Fifth Street near Main.

We do not take this disruption lightly.

An 84-inch sewer pipe — dating to 1958/1960 — that runs under the southside parking lane on Main Street between Fourth and Fifth streets is under inspection. Earlier this year MSD commissioned an outside firm to inspect the line. Those reports revealed some degradation of the structure. A more recent analysis indicates significant degradation of the pipe. As a safety precaution, MSD is keeping the parking lane on the south side of Main Street, and the parking/driving lane on the east side of Fifth Street closed to vehicular traffic while analysis continues.

Two outside engineering experts are providing more detailed analysis of the pipe. Those inspections and reports are still underway. We will inform you when additional information is available.

Background

On Friday, March 2, a section of roadway on Fifth Street at the intersection with Main Street caved-in due to a broken piece of 42-inch brick stormwater pipe. This pipe has been in service since the 1870s. The point repair was made and has no impact on the 84-inch sewer pipe that runs down Main Street.

This 84-inch sewer pipe is one of the hundreds of projects identified in MSD's Critical Repair & Reinvestment Plan. For more information about this plan, please visit LouisvilleMSD.org/CriticalRepairPlan.



LouisvilleMSD

About MSD

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MEDIA RELEASE

UPDATE

September 24, 2018

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See inside one of the city's largest sewer pipes as MSD makes progress on repairs

LOUISVILLE, KY – More than 20-feet below Main Street, repairs are well underway on one of the city's most essential sewer lines. This pipe known as the Ohio River Interceptor carries 40 percent of the community's wastewater to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release to the Ohio River.

MSD contractors are currently installing extra support for the failing concrete structure. Ring beams brace the upper and side curves of the pipe while steel lagging is installed between the ring beams to complete the support system. This extra support of the pipe is needed beginning at Fourth Street and proceeding west for 160 feet, due to a structural failure MSD discovered on August 19.

To date, crews have completed 110 feet of this ring-beam and lagging system. Once the extra structural support is complete, crews can begin building a new pipe inside the damaged one. They will do this by installing corrosion-resistant PVC panels that fit together by hand and are sealed to the unique shape of the pipe. MSD is creating the new pipe between Fourth and Seventh streets, and the underground repairs should be complete by the end of the year.

MSD Executive Director Tony Parrott states, "MSD and its contractors continue to work as diligently and safely as possible to repair this essential piece of infrastructure that provides service to 40 percent of Jefferson County. We will continue to communicate our message about the need to repair and even replace infrastructure that is vital for not only the health and safety of our community but for economic vitality as well."

This link contains video of the installation of the ring beam and lagging system. *(The sound you hear is the ventilation system to keep the workers safe. This is best viewed in Chrome, Internet Explorer or MS Edge.)*

<https://youtu.be/8iVFpO6qeA0>

For high-res photos of inside the pipe go to this page and scroll to the bottom for a WebCargo link.

<http://louisvillemsd.org/westmainrepair>

Inspection reveals structural failure compounded by heavy rains

On August 19, a routine in-pipe camera inspection revealed that the potential cave-in had become a reality. Contractors discovered a 5- by 2-feet section of the Main Street pipe had collapsed just west of Fourth Street. Further inspections revealed a large void, or empty space, under the pavement just west of Fourth Street. The void was 40-50 feet across in both directions, and 25 feet deep at the worst spot. The void left the roadway unsupported in the area with a gas and water line suspended in the void.

Heavy rains in August compounded the problem by washing the loose sandy soil through into the pipe the hole in the side of the pipe. The force of the water carried this soil downstream in the pipe. The area received more than 4 inches of rain from August 1 through 26, when filling of the void began. Crews worked 24/7 to slowly fill the void with a light-weight grout, making sure the suspended gas and water lines were protected. Surveys show the pavement rose 1.5 to 1.75 inches after the void was filled, as compared to surveys before the void was filled.

Traffic was reduced to only one lane on the north side of Main Street midway between Third and Fourth streets to ensure public safety. An early inspection of the pipe from June 21 shows a deteriorated pipe with exposed rebar, but no cave-in.

Background

MSD commissioned an inspection of the concrete Ohio River Interceptor — an 84-inch sewer pipe — in November 2017 and used technology that allows engineers to analyze the pipe without having to empty it. The resulting March 2018 report, reveals that some of the concrete and rebar support systems have worn away between Fourth and Seventh streets.

MSD closed the southside parking lane on Main Street between Fourth and Seventh streets in April to ensure public safety from the threat of a potential cave-in of the pipe. Work then began with a team of consultants to develop a plan to repair this vital infrastructure with the least disruption to this vibrant area of our community.

The \$20 million repair project requires a “pump-around” to remove wastewater flow from the damaged section of pipe so that workers can go underground and make repairs from within the 7-foot tall pipe. Workers enter the pipe through existing hatches in the pavement at Fourth and Main streets.

Constructing the pump-around required seven weeks of basically building a temporary sewer system on the surface with four parallel pipes, which total three linear miles. Wastewater pumped out of the damaged pipe is temporarily re-routed west along River Road to Ninth Street where it re-enters the large sewer pipe and continues its path to MSD’s Morris Forman Water Quality Treatment Center for treatment and release to the Ohio River.

Completion date

The repair to the pipe and dismantling of the pump-around system should be complete by the end of the year.

More Information

For more information on MSD’s West Main Repair visit <http://louisvillemsd.org/westmainrepair>.

MSD’s Customer Relations will answer your call 24/7/365.



LouisvilleMSD

About MSD

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MEDIA ADVISORY

July 9, 2018

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Repair to one of city's largest sewer pipes moves to next phase **MSD to keep key downtown roadways open during day** **as pump-around is installed overnight**

LOUISVILLE, KY – MSD will keep roads open during the day to minimize traffic disruption as crews work overnight to trench sections of 6th, 7th and 8th streets immediately south of River Road and Washington Street from July 9 to 19. River Road will remain open. The trenching is needed to establish a "pump-around" that will allow MSD to empty a section of one of the city's largest and most vital sewer lines, located under West Main Street, that is at risk of collapsing.

These streets will each be closed at night between 6 p.m. and 6 a.m. as workers trench the roadway, lay piping, and cover the pipe with a driveable surface. Dates of nighttime closures are as follows:

- July 9 – 6th Street at River Road (extending into July 10th if needed)
- July 11 – 7th Street at River Road (extending into July 12th if needed)
- July 17th to 19th – 8th Street at Washington Street
- July 23rd – Washington Street will close at 9th street for the duration of the project

MORE:

Known as the Ohio River Interceptor, the damaged section of pipe carries about 40 percent of the community's wastewater flow to MSD's Morris Forman Water Quality Treatment Center so that it can be treated before being released into the river. It is the same pipe that experienced a cave-in last August at Main and Hancock streets that took six weeks to repair.

The \$20 million repair project involves MSD building a temporary "pump-around" system to remove wastewater flow from the damaged section of pipe, so that workers can go underground and make repairs from within the 7-foot wide pipe. The pump-around will be in place by the end of July. Then, workers will enter the empty pipe through small existing hatches in the pavement at 4th and Main streets. The interior of the pipe will be lined with corrosion-resistant PVC panels fit together by hand and sealed to the unique shape of the pipe itself – essentially creating a sturdy new pipe inside the damaged pipe. This will eliminate the need to close and excavate Main Street. MSD plans to complete the repair by the end of November.

For more information on MSD's West Main Repair visit <http://louisvillemسد.org/westmainrepair>.

About MSD

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MEDIA RELEASE

December 6, 2018

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MSD investigates cave-in at Second and Liberty streets

Work to take place in the overnight hours

LOUISVILLE, KY – MSD has discovered a cave-in under the intersection of Second and Liberty streets. Crews will begin investigation of the site tonight at 11 PM. During the overnight hours, traffic will be blocked from the two southbound lanes on Second Street, and the far right lane on Liberty Street. If possible, crews will plate the site and open the roadway to traffic for rush hour on Friday morning.



LouisvilleMSD

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MEDIA RELEASE

September 14, 2018

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Safe Swimming Pool Draining Tips Offered as Summer Closes

MSD encourages residents to drain pools in a safe, environmentally friendly way

DO NOT DRAIN YOUR POOL DURING OR UP TO 48 HOURS AFTER A RAIN EVENT

Many people begin to drain their pools as summer days come to a close. However, it's essential for Louisville residents to be aware of how to properly drain their pools, so they don't harm Louisville waterways or cause problems for neighbors.

"When the chlorine in swimming pools, which protects humans from harmful bacteria, goes into our creeks and streams it can kill fish and make it harder for other aquatic life to breathe," states MSD Development and Stormwater Services Director David Johnson.

The average pool has a chlorine concentration that is 10 times higher than some aquatic life can withstand. When chlorinated water is drained into storm drains, streets or gutters, and flows to local streams, harmful byproducts are produced, which are highly toxic and carcinogenic. That's why **MSD recommends that a pool sits for at least 10 days after chemical treatment before draining** any water. The recommendations apply to both above and in-ground pools.

Improper draining can also become a nuisance for residents and their neighbors. "We can see problems with basements backing up or a neighbor's yard flooding when their neighbor's pool is drained at too fast of a rate or drained in a small yard, which overwhelms the system," said Johnson.

Residents should never discharge water into the stormwater system, such as with catch basins or the street because this water directly reaches a natural body of water and is not filtered.

MSD offers these guidelines for residents to follow as they drain their swimming pools:

- Do not drain your pool during or up to 48 hours after a rain event.
- The pool should sit at least 10 days after chemical treatment before draining any water.
- Test the pool water to ensure that it is essentially chlorine-free before draining (about 0.1 parts per million total chlorine). Bubbling, cascading, or other forms of aeration will help to remove chlorine from water.

- The pool's pH should be in a normal range of 6 to 8 before draining.
- Drain to a grassy area in your yard if the yard is large enough to absorb the water.
- Discharge water slowly, at no more than 30 gallons per minute, to prevent soil erosion, flooding, or damage to adjacent properties, including backups into homes and businesses.
- For more information, call MSD Customer Relations at 502.540.6000 with your pool draining questions.



LouisvilleMSD

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FACT SHEET

July 25, 2018

Churchill Downs Green Infrastructure Project

Project Background:

Churchill Downs' storied history includes the annual Kentucky Derby, Kentucky Oaks and hosting the Breeders' Cup eight times. But the Kentucky institution can now be recognized for its efforts to help maintain safe, clean waterways in Louisville Metro with its participation in Louisville MSD's Green Infrastructure Program.

The track is nearing the completion of Phase Two of its parking renovation, where 96-inch pipes have been installed underneath the parking area. The pipes – covering approximately 33 acres – will act as a storage basin during heavy rainfall events. Phase One of the project saw similar pipes installed across 22 acres. In total, the project will provide 3 million gallons of stormwater storage.

Collected stormwater will be allowed to permeate into the sand under the parking lot into the Ohio River Alluvial Aquifer. Such basins keep stormwater out of the sewer system, reducing sewer overflows and stress on wastewater treatment facilities. It is estimated the project will reduce 12 million gallons of combined sewer overflows into the Ohio River.

Additional Facts about the Churchill Downs Infiltration Basins:

- Each basin is the length of a football field and roughly 17 feet underground
- Basins have 3 million gallon storage capacity total - equivalent to 4.5 Olympic-size swimming pools
- They will capture more than 60 million gallons of water each year and will prevent about 12 million gallons of sewer overflow each year
- And are large enough to handle a 2.13" rain event - this is the largest rain event in a typical year of rainfall.
 - This means that, in a typical year, every drop of rain that falls on the 55 acre parking lot will infiltrate back into the ground
- More than 900 trees will be planted at Churchill Downs as part of this project

For more information regarding MSD's green infrastructure incentive program, please contact

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LouisvilleMSD

About MSD

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MEDIA ADVISORY

July 12, 2018

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Sewer leak into South Fork Beargrass Creek leads to dead fish in the stream

LOUISVILLE, KY – MSD stream sampling crews discovered dead fish the South Fork of Beargrass Creek near Trevilian Way and Joe Creason Park. They tested and found low dissolved oxygen in the water, low current volume and higher than normal water temperatures. MSD and Kentucky Division of Water staff members located a leaking sewer line approximately one-half mile upstream from the dead fish. MSD sanitary crews conducted dye tests to confirm the location of the leak. An MSD tele-inspection — which is putting a mobile camera into the pipe — identified a defect in the sewer line.

MSD has diverted the sewer flow to other pipes in the area so that the damaged pipe can be emptied and repaired. No one has lost sewer service, and the pipe is no longer discharging to the creek.

Signs are posted advising the public to not fish, swim or wade in the area. Approximately 200 dead fish and trash that were in the stream have been removed.

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MEDIA RELEASE

October 23, 2018

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President Trump signs Water Resources Development Act *MSD and partners across the country applaud passage*

LOUISVILLE, KY – President Donald Trump today signed the biennial Water Resources Development Act (WRDA), which includes significant provisions that benefit drinking water, wastewater and stormwater infrastructure and policy. Included in WRDA is a \$1 million per year competitive Water Workforce Development Program grant, which is championed by Louisville MSD and its partner utilities in the Water Agency Leader's Alliance (WALA), the National League of Cities and the National Association of Clean Water Agencies. Utility agencies from both rural and urban communities will be eligible to apply for the grant funding, which can be used for a variety of job training and workforce development programs.

Earlier this month, Congress voted on — and passed nearly unanimously by a vote of 99-1— this legislation, which was sponsored by U.S. Senators Cory Booker (D-NJ) and Shelley Moore Capito (R-WV). The conference report for the bill, known as "America's Water Infrastructure Act (S. 3021)" was passed unanimously by the House on September 13.

Louisville Metro Mayor Greg Fischer states, "Louisville Metro and MSD are committed to continuing long-standing partnerships with our local schools and workforce development agencies in preparing our future leaders for good-paying, stable jobs in the water industry. Programs like this are good for our young people, and they're good for the economic and social development of our community."

The influx of infrastructure work is projected to generate \$524 billion in economic activity and create nearly 300,000 job opportunities across the country. The competitive grant program will help train workers to build and repair essential water systems throughout the country while providing pathways to careers with competitive wages and benefits.

"As Louisville MSD plans for a \$4.3 billion Critical Repair & Reinvestment Plan, we recognize the need for a qualified and skilled workforce to meet our infrastructure challenges," said Louisville MSD Executive Director Tony Parrott. "In Louisville alone, the economic impact will be \$5 billion and 3,700 jobs per year throughout the next 20

years in sustaining our Critical Repair & Reinvestment Plan. This grant will ensure that funding is available for MSD to collaborate with workforce development agencies, technical schools, and others to get employees in the diverse neighborhoods we serve the training and skills needed for our industry. Additionally, our labor need is compounded by the expect to loss of 19 percent of our workforce to retirement in the next 5 to 10 years. The time is now to prepare for this upcoming shortage of skilled workers in our industry."

"Cities across the country are facing a severe shortage of skilled workers to operate our nation's water systems," said Clarence E. Anthony, CEO and Executive Director of the National League of Cities. "At the same time, there is a looming workforce challenge to build new water infrastructure systems that meet the needs of the 21st century. We are thankful to Senators Cory Booker and Shelley Moore Capito for their bipartisan leadership to help secure the inclusion of this important workforce development and training program in the final water resources bill, 'America's Water Infrastructure Act.' Investments such as these equip cities with the tools to develop the next generation of workers and provide clean and safe water to American communities, which is essential to driving our nation's economy forward."

"At the San Francisco Public Utilities Commission (SFPUC), nearly 50 percent of our employees are eligible to retire in the next 5 to 10 years," said SFPUC General Manager Harlan L. Kelly, Jr. "We must act now to ensure that we are prepared to replenish our workforce ranks and that we do so with employees who reflect the diversity of our communities. I want to thank Senators Capito and Booker for their leadership on tackling this critical issue, and to our own Senator Harris for her support for this important legislation."

With climate change increasing the likelihood of extreme and volatile weather events, building and maintaining the nation's critical water infrastructure is more important than ever. Over the next decade, the country's 30 largest water utilities are estimated to spend \$23 billion on water infrastructure projects, according to the Water Environment Research Foundation.

"We strongly supported this legislation and its inclusion in the 2018 WRDA package," said Adam Krantz, Chief Executive Officer of the National Association of Clean Water Agencies (NACWA). "Clean water agencies provide quality jobs in every State which are vital to protecting local water quality and public health. Developing the next generation of skilled workers is a significant challenge that utilities are facing head-on. This new grant program will help address the challenge while facilitating the development of new approaches and best practices for addressing the water workforce pipeline. Senator Capito and Senator Booker have been leaders on this issue, and we thank them for their efforts."

More than 30 percent of the nation's water and wastewater workers are eligible to retire in the next 5 to 10 years, making this grant program a vital opportunity to train the next generation of industry employees.

For every \$1 million invested in water infrastructure improvements, there is a direct, indirect and induced impact of 15.5 jobs," said Commissioner Kishia L. Powell, City of Atlanta Department of Watershed Management. "That is why we are pleased that Congress unanimously passed bipartisan legislation to assist municipalities in improving local water infrastructure, creating well-paying jobs and securing the future of our most valuable resource. The provision outlined in the 2018 Water Resources Development Act for a water workforce development grant will provide the necessary funding to continue our innovative workforce development programs that support the department's strong resolve to ensure water remains safe and accessible to residents of Atlanta by investing in training Atlantans to join our workforce."

Many of the careers in the water and wastewater industries have low-educational barriers to entry, and the openings are often permanent, civil service positions. When paired with strong community partnerships and intentional strategies to address barriers to employment for hard-to-serve communities, these training programs can help reduce income inequality and address the shrinking middle class.

"The Camden County Municipal Utilities Authority is very grateful to our own Senator, Cory Booker of New Jersey, and to Senator Shelley Moore Capito of West Virginia, for sponsoring the water workforce bill," said Andrew Kricun, Executive Director and Chief Engineer of the Camden County Municipal Utilities Authority. "This will make such a huge impact in our water industry and the communities we serve both rural and urban communities. Water utilities need replacement workers, and we are often located in communities where people need jobs. The new water workforce bill will help provide the resources so that our neighbors who need jobs can get the necessary training to become the replacement workers that water utilities need. It is a true win-win for everyone."

The partner agencies in WALA advised on a recent [study from the Brookings Institution](#) that found workers in the water industry tended to be older and lacked racial and gender diversity in certain areas. The report recommended new strategies at the local, regional, state and national level to attract younger and more diverse employees. The competitive grant program—the first of its kind for the water industry—can help achieve those goals.



LouisvilleMSD

About MSD

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MEDIA ALERT

August 8, 2018

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Mellwood Avenue — one-lane closure begins August 13

— Between Muncie and Delmont avenues —

LOUISVILLE, KY—Mellwood Avenue — between Delmont and Muncie avenues — will reduce to one-alternating lane of traffic beginning August 13, for an MSD construction project. Temporary traffic lights will control the flow of traffic. The roadway is expected to be fully open by September 15.

Local access for area residents and businesses, including the Mellwood Art and Entertainment Center, is open at all times.

The work is part of MSD's Clifton Heights Combined Sewer Overflow (CSO) Basin.

Background

The Clifton Heights CSO Basin will capture 7 million gallons of combined sewer overflow, in an average rainfall year. This underground-covered basin will offer the public and Beargrass Creek protection from combined sewer overflows during periods of wet weather. When completed, the project will be largely invisible to the public.

Underground storage is part of MSD's larger endeavor to prevent sewage from overflowing into Louisville's waterways. These underground storage areas retain the mixture of rainwater and sewage until the rain subsides and capacity is available for treatment, then gradually release it back into the sewer system.



[LouisvilleMSD](https://www.facebook.com/LouisvilleMSD)

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MEDIA RELEASE **UPDATE**

October 10, 2018

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MSD Market Street sewer line repair is complete

LOUISVILLE, KY – MSD has completed the repair of two portions of the sewer line that runs under Market Street between Brook and First streets. The roadway is open to traffic. Final paving and application of roadway markings will take place on Monday and Tuesday — October 15 and 16. Rain can delay this schedule by a day or two.

MSD Construction Inspector Ron Henderson states, "This was the easiest emergency repair I have worked on in my 20 years of sewer line repair work. There were no complications of other utility lines. Only two abandon water pipes were in the path of the repair."

The cave-in of the sewer pipe was discovered during a routine in-pipe camera inspection of the sewer line. This pipe 24-inch brick sewer was installed before 1900.



[LouisvilleMSD](http://LouisvilleMSD.org)

About MSD

The Louisville/Jefferson County Metropolitan Sewer District (MSD) works to achieve and maintain clean, environmentally safe waterways for a healthy and vibrant community. The organization's more than 630 employees provide wastewater management, drainage and flood protection services across the 376 square miles of Louisville Metro. In addition to operating and maintaining Louisville Metro's sewer system, floodwall system, water quality treatment centers and flood pumping stations, MSD invests in water quality projects each year, plants more than 1,000 trees and other vegetation annually to enhance water filtration and reduce runoff, and provides numerous outreach programs to inform and educate the community about protecting our waterways.



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MEDIA RELEASE

October 4, 2018

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MSD to close a portion of Market Street for repair of sewer line cave-in

LOUISVILLE, KY – MSD will close a portion of Market Street on Saturday morning, October 6 to begin repairs to a sewer cave-in under the roadway, between Brook and First streets. The north side turning lane and driving lane will close. Traffic will divert to the two south side driving lanes. The bike lane and parking lane on the southside of the roadway will remain open.

The cave-in of the sewer pipe was discovered during a routine in-pipe camera inspection of the sewer line. This pipe 24-inch brick sewer was installed before 1900.

The work is estimated to be complete by October 14. There is no interruption to sewer service in the area during the repair.



LouisvilleMSD

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MEDIA RELEASE
UPDATE

September 24, 2018

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**MSD repair of sewer line under Muhammad Ali Boulevard
delayed due to heavy rains**

LOUISVILLE, KY – Work to repair a sewer pipe that runs under Muhammad Ali Boulevard between Fifth and Sixth streets has been delayed due to heavy rains. Work to repair the pipe is delayed until Wednesday, September 26, after morning rush hour.

Background

A cave-in of a sewer pipe was discovered during a routine in-pipe camera inspection of the sewer line under Muhammad Ali Boulevard, between Fifth and Sixth streets. Additional above-ground inspections revealed two areas where some of the supporting ground under the pavement has washed away due to holes in the pipe.

MSD will close a portion of the roadway after rush hour on Wednesday morning, September 26. The southside parking lane will convert to a driving lane. The two driving and northside parking lanes will close for the repair. No turns are allowed from Muhammad Ali Boulevard onto Armory Place during construction.

This pipe is a 24-inch brick sewer that was installed in 1900.

There is no estimate on the repair timeline yet. There is no interruption to sewer service in the area during the repair.



[LouisvilleMSD](https://www.facebook.com/LouisvilleMSD)

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year, plants more than 1,000 trees and other vegetation annually to enhance water filtration and reduce runoff, and provides numerous outreach programs to inform and educate the community about protecting our waterways.



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MEDIA RELEASE

September 21, 2018

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MSD to close a portion of Muhammad Ali Boulevard for repair of cave-in

LOUISVILLE, KY – A cave-in of a sewer pipe was discovered during a routine in-pipe camera inspection of the sewer line under Muhammad Ali Boulevard, between Fifth and Sixth streets. Additional above-ground inspections revealed two areas where some of the supporting ground under the pavement has washed away due to holes in the pipe.

MSD will close a portion of the roadway after rush hour on Monday morning, September 24. The southside parking lane will convert to a driving lane. The two driving and northside parking lanes will close for the repair. No turns are allowed from Muhammad Ali Boulevard onto Armory Place during construction.

This pipe is a 24-inch brick sewer that was installed in 1900.

There is no estimate on the repair timeline yet. There is no interruption to sewer service in the area during the repair.



LouisvilleMSD

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MEDIA UPDATE

August 24, 2018

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End of repair for Broadway sewer collapse in sight

LOUISVILLE, KY – After rain delayed progress on the repair of a large brick sewer line in Broadway at the intersection with South Preston Street, the project is back on track. Crews estimate that the center driving lanes will be drivable by the end of next week. Work will continue in the curb lanes to repair a couple of stormwater catch basins. The entire intersection will receive a fresh layer of asphalt when all work is complete.

There is no disruption of sewer service during the repair, and access to local businesses is maintained.

Why does heavy rain interfere with sewer line repairs?

The damaged sewer pipe is in MSD's combined sewer system — which means the pipe holds both wastewater and rainwater. The sewer pipe must be empty for the repair to take place. To do this, MSD establishes a "pump-around," which is a temporary sewer line on the surface of the roadway to allow wastewater service to continue in the area.

When it rains, combined sewer pipes in the downtown area quickly fill with water. The large sewer pipe that runs under Broadway is no exception. Rainwater creates too much volume for the pump-around to handle, so the sewer line must be allowed to fill and flow as it usually would. Opening the impaired line during rain events prevents overflows from manholes in the area and backups into homes and businesses.

Crews need a stretch of 3-4 dry days to complete the repair to the pipe itself. To date, Louisville has experienced nearly 6 inches of rain in August. The average precipitation for August is 3.33 inches.

Cave-ins are a challenge for MSD employees and contractors, as they stretch resources thin. For information about our Critical Repair and Reinvestment Plan — a 20-year outline for how to answer these needs proactively, visit: <http://louisvillemsd.org/CriticalRepairPlan>

BACKGROUND

Broadway at Preston: This three-layer brick sewer installed in 1866, has experienced similar failures in different locations as recently as 2015, 2014 and 2009. On July 22 — after 152 years of service — the bricks that form this pipe began to unravel at a joint where another repair was made in 1989. The small breaks in the joint, together with heavy rain, caused a 10- by 15-foot void, or open space, under the pavement that was 8-feet deep.

These brick sewers that run under our city are connections to a past, which continue to serve us every day. Both the sewer line on Broadway dating to 1866, and the sewer line on East Liberty dating to 1871, represent a time of tremendous growth and change for the city.

By 1860, Louisville's population had grown to more than 68,000, but the underground sewer system was less than two miles long, dwarfing the needs of residents. In comparison, Louisville MSD now maintains more than 3,300 miles of sewer lines – enough to stretch from California to Maine.

Additionally, the Louisville Water Company began operations, pumping water from the river to the downtown area. Soon there was more water available, and more water that needed to be disposed.

Following the end of the Civil War, the city returned to its pre-war prosperity, as manufacturing expanded, factories were built, and goods were shipped by train. And while the city continued to grow, its wastewater disposal needs also grew, necessitating the building of more sewer lines. The construction of brick sewer lines expanded to meet these needs, such as the three-layer 96-inch sewer pipe underneath Broadway at South Preston, and the 30-inch brick sewer underneath East Liberty Street.

ADDITIONAL INFORMATION

In the past 12 months, MSD has responded to more than 1,100 cave-ins across the community. To view a map of cave-ins during the past year, visit: LouisvilleMSD.org/prevent-collapsing-sewers.



LouisvilleMSD

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MEDIA UPDATE

August 6, 2018

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Work continues on two sewer collapses in the downtown area — E Broadway at S Preston Street and E Liberty at Baxter Avenue — — Lexington at Baxter to reopen —

BROADWAY AT PRESTON — traffic restrictions

Work is ongoing to repair a broken sewer pipe that runs under the middle lanes of Broadway at South Preston Street. Currently, crews are constructing a junction or connection box to bring together several sewer lines in the area. Work at this site will continue for approximately two more weeks. There is no disruption of sewer service during the repair, and access to local businesses is maintained.

E LIBERTY AND BAXTER — traffic restrictions

Crews continue to repair a sewer line cave-in at East Liberty Street and Baxter Avenue. About 100-feet of additional pipe remains for installation. There is no disruption of sewer service during the repair, and access to local businesses is maintained. The roadway should open no later than August 15.

LEXINGTON AND BAXTER —opening to traffic tomorrow

Work is complete and the roadway will open to traffic on Lexington Road by rush hour Tuesday afternoon, August 7. Traffic on Baxter will be restricted due to the sewer repair work at East Liberty Street and Baxter Avenue. Sewer line work at Lexington and Baxter is part of MSD's Waterway Protection Tunnel and will allow capture of nine sewer overflow points that currently discharge to Beargrass Creek.

BACKGROUND

Broadway at Preston: This three-layer brick sewer installed in 1866, has experienced similar failures in different locations as recently as 2015, 2014 and 2009. On July 22 — after 152 years of service — the bricks that form this pipe began to unravel at a joint where another repair was made in 1989. The small breaks in the joint, together with heavy rain, caused a 10- by 15-foot void, or open space, under the pavement that was 8-feet deep.

E Liberty and Baxter: On August 2, a section of a 30-inch brick sewer line — installed in 1871 — caved in revealing 15- by 30-feet and 12-feet deep void under the pavement. This site is very close to a cave-in that happened in June on a different section of this sewer line.

These brick sewers that run under our city are connections to a past, which continue to serve us every day. Both the sewer line on Broadway dating to 1866, and the sewer line on East Liberty dating to 1871, represent a time of tremendous growth and change for the city.

By 1860, Louisville's population had grown to more than 68,000, but the underground sewer system was less than two miles long, dwarfing the needs of residents. In comparison, Louisville MSD now maintains more than 3,300 miles of sewer lines – enough to stretch from California to Maine.

Additionally, the Louisville Water Company began operations, pumping water from the river to the downtown area. Soon there was more water available, and more water that needed to be disposed.

Following the end of the Civil War, the city returned to its pre-war prosperity, as manufacturing expanded, factories were built, and goods were shipped by train. And while the city continued to grow, its wastewater disposal needs also grew, necessitating the building of more sewer lines. The construction of brick sewer lines expanded to meet these needs, such as the three-layer 96-inch sewer pipe underneath Broadway at South Preston, and the 30-inch brick sewer underneath East Liberty Street.

ADDITIONAL INFORMATION

In the past 12 months, MSD has responded to more than 1,100 cave-ins across the community. To view a map of cave-ins during the past year, visit: LouisvilleMSD.org/prevent-collapsing-sewers.



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MEDIA ADVISORY

July 27, 2018

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Work continues on E Broadway at S Preston Street to repair sewer collapse

Traffic changes for 11 AM to 3 PM today

LOUISVILLE, KY – There are more lane changes to come today from 11 AM to 3 PM at the intersection of East Broadway and South Preston Street.

Motorists going eastbound on Broadway have the option to continue straight or turn south onto Preston.

Motorists going westbound on Broadway can only continue straight on Broadway. (No turn onto Preston.)

Traffic on southbound Preston Street will only be able to turn right (westbound) onto Broadway.

- No traffic will be able to cross the center part of the intersection.
- Flaggers will be on duty to assist pedestrians.
- There is no estimate on a total completion date for the repair at this time.

BACKGROUND

Work is underway to repair a broken sewer pipe that runs under the middle lanes of Broadway at South Preston Street. This three-layer brick sewer installed in 1866, has experienced similar failures in different locations as recently as 2015, 2014 and 2009.

There is no disruption of sewer service in the area during the repair.

After 152 years of service, the bricks that form this pipe began to unravel at a joint where another repair was made in 1989. The small breaks in the joint, together with heavy rain, caused a large void, or open space, under the pavement. The void is approximately 10-feet by 15-feet and 8-feet deep. No injuries have been reported.

The work is complicated by the location of two large water pipes in the area. Precautions are underway to protect those water pipes during the sewer line repair work.

MSD maintains more than 3,300 miles of sewer lines – enough to stretch from California to Maine, and many dating back 75 years or more. In the past 12 months, MSD has responded to more than 1,100 cave-ins across the community, including recent collapses of a stone sewer at 2nd and Main streets and a brick sewer at Liberty Street between East Chestnut and Baxter Avenue, both more than 150 years old. To view a map of cave-ins over the past year, visit: LouisvilleMSD.org/prevent-collapsing-sewers.



LouisvilleMSD

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MEDIA ADVISORY

July 22, 2018

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Portion of E Broadway at S Preston Street is closed due to cave-in of 152 year-old sewer line

LOUISVILLE, KY – Work is underway to repair a broken sewer pipe that runs under the middle lanes of Broadway at South Preston Street. This three-layer brick sewer installed in 1866, has experienced similar failures in different locations as recently as 2015, 2014 and 2009. The five center lanes of Broadway have been blocked to traffic, leaving one eastbound and one westbound lane open in the area.

There is no disruption of sewer service in the area during the repair.

After 152 years of service, the bricks that form this pipe began to unravel at a joint where another repair was made in 1989. The small breaks in the joint, together with heavy rain, caused a large void, or open space, under the pavement. The void is approximately 10-feet by 15-feet and 8-feet deep. No injuries have been reported.

The work is complicated by the location of two large water pipes in the area. Precautions are underway to protect those water pipes during the sewer line repair work.

There is no estimate on a completion date at this time.

Background

MSD maintains more than 3,300 miles of sewer lines – enough to stretch from California to Maine, and many dating back 75 years or more. In the past 12 months, MSD has responded to more than 1,100 cave-ins across the community, including recent collapses of a stone sewer at 2nd and Main streets and a brick sewer at Liberty Street between East Chestnut and Baxter Avenue, both more than 150 years old. To view a map of cave-ins over the past year, visit: LouisvilleMSD.org/prevent-collapsing-sewers.



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MEDIA ADVISORY

August 2, 2018

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MSD closes portion of East Liberty Street and Baxter Avenue due to cave-in

LOUISVILLE, KY – MSD received a call from Metro Safe concerning a hole in the center intersection of East Liberty Street and Baxter Avenue late this afternoon. MSD inspectors were immediately dispatched and discovered a hole in the pavement that was 5-feet by 8-feet and appeared to be growing. Initial inspections indicate that the void under the pavement is approximately 15-feet by 30-feet, and 10- to 12-feet deep.

LG&E has been notified concerning two exposed natural gas lines. The protection of these gas lines must occur before repairs can begin. MSD crews are reducing East Liberty Street to one lane, and the intersection with Baxter Avenue is partially closed.

This site is very close to a cave-in that happened in June that was the result of a break in a 30-inch brick sewer line, installed in 1871.

There is no estimate on the repair timeline. There is no interruption to sewer service in the area.



LouisvilleMSD

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MEDIA ADVISORY

July 23, 2018

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Louisville MSD Sets Path to Expand Contract Opportunities for Minority- and Women-Owned Businesses

Utility Releases Results of 2018 Disparity Study

LOUISVILLE, KY — Today Louisville MSD's Board reaffirmed their commitment to ensuring minority- and woman-owned businesses have equity in the award of MSD contracts. The Board accepted the findings of a Disparity Study that was completed this month by Mason Tillman Associates, Ltd.

MSD has a proud tradition of connecting minority- and woman-owned businesses with opportunities that help grow their companies while at the same time developing an exceptional supply base that benefits our customers and communities where we live and work. MSD commissioned the Disparity Study to evaluate its current supplier diversity and develop recommendations.

"We believe our efforts will create not only economic inclusion but an economic boom for area businesses," states MSD Executive Tony Parrott. "As a large organization, it is our responsibility to assume leadership to increase supplier diversity with our procurement that will reflect the community in which we live and work. Our capital program will sustain thousands of jobs annually and offer the opportunity for more local businesses to perform work for MSD."

The Disparity Study, completed in July 2018, analyzed MSD contracting over a five-year period to determine whether a statistically significant disparity existed in MSD awarded contracts to ready, willing and able minority- and woman-owned business enterprises. The Study included an evaluation of MSD procurement policies and contract data, as well as, interviews with vendors to ensure a comprehensive assessment of the utility's procurement practices. Industries included in the study were construction, construction-related services, engineering and professional services — including architecture and engineering; materials; and, commodities and services.

The study found statistically significant evidence of disparity in the award of MSD prime- and sub-contracts to these groups, in particular African American and non-minority female vendors. MSD's Board accepted these findings as well as a plan to increase these group's participation in the utility's spending.

"I commend the MSD Board and staff for taking a leadership role to improve equity in the water utility sector, particularly in the areas of economic inclusion, workforce development and job creation. I look forward to reviewing the study and pursuing efforts to build a more equitable system," said Mayor Greg Fischer.

MSD staff will now look to revise its procurement policies and provide the Board with recommendations by January 2019. As an organization with a 2018-2019 capital budget of \$202 million, MSD recognizes the significance of its work to not only improve public health, but also create jobs and economic growth.

"I would like to commend MSD for leading the efforts for economic inclusion of all sectors of the community, said Kentucky Senator Gerald Neal. "They are setting the standard for all public/private institutions to follow in the state and region."

Louisville's branch of the NAACP confirmed its commitment to MSD's efforts with this statement: The Louisville Branch NAACP applauds MSD for conducting the disparity study. Equal opportunity programs such as this disparity study are a tool that gives qualified individuals and companies equal access to contribute; access they might not otherwise have. The NAACP looks forward to receiving the study and working with MSD to ensure equal opportunity for all.

MSD will present the findings of this study at a public meeting on July 24, at 5:30 PM. The public is welcome to attend. View a copy of the Disparity Study at LouisvilleMSD.org/Doing-Business-Us

Mason Tillman Associates, Ltd, is an Oakland, California based minority woman-owned public policy consulting firm. The firm has conducted 141 disparity studies nationwide since 1990.

MSD Public Presentation on Disparity Study:

Tuesday, July 24, 2018

5:30 to 7:30 PM

St. Stephen Church Family Life Center

1508 W Kentucky Street, Louisville KY, 40210



LouisvilleMSD

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FOR IMMEDIATE RELEASE

July 23, 2018

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Louisville MSD Board Sets Focus and Rates

Monthly wastewater/stormwater bills increase an average of \$3.87 on August 1

LOUISVILLE, KY — Large cranes and construction sites are signs of progress for Louisville MSD as it significantly reduces sewer overflows into local waterways. On July 23, the MSD Board approved the utility's 2018-19 fiscal year budget that includes more than \$128 million for projects in the federal Consent Decree.

Twelve years ago, MSD began approximately \$900 million effort to eliminate sanitary sewer overflows and reduce combined sewer overflows by 98 percent in a typical rainfall year. Because much of Louisville's sewer system was installed nearly 100 years ago, rainwater can mix with wastewater and overwhelm the pipes. Rain can cause a combination of wastewater and stormwater to overflow into the Ohio River and our local streams. This work to significantly reduce overflows — MSD consent decree work — will be complete at the end of 2024.

In 2018-2019, MSD will focus on three basin projects and the Waterway Protection Tunnel to prevent combined sewer overflows:

- Clifton Heights Basin is scheduled to be complete by the end of this year.
- Portland Basin is scheduled for completion by the end of 2019.
- Shawnee Park Basin is on schedule for completion in Summer 2019.
- MSD began work on the Waterway Protection Tunnel in January 2018. This fall, a tunnel boring machine will arrive to start carving a 20-foot diameter tunnel some 18 stories underground. The tunnel is unique in that it will capture 25 combined sewer overflow points that can discharge 439 million gallons of wastewater and rainwater into Beargrass Creek and the Ohio River. The tunnel must operational by the end of 2020 to meet the federal consent decree deadline.

West Main Street Repair

Right now, MSD has another large focus — repairing a 7-foot diameter pipe that carries 40 percent of the city's daily wastewater flow to MSD's Morris Forman Water Quality Treatment Center. A section of the 60-year-old pipe underneath West Main Street between Fourth and Seventh streets is at risk of caving in. MSD began the repair project for this section of pipe in June. The repair work will conclude in November 2018.

MSD Board Approves Rate Resolution

MSD's Board approved a 6.9 percent increase to monthly residential wastewater, drainage and EPA Surcharge Fees. The average residential bill will increase by \$3.87 on August 1, 2018. This increase helps cover daily operating costs for wastewater, drainage, flood protection and the Consent Decree projects. MSD continues to offer a 30-percent discount on the surcharge and wastewater charges to qualified senior citizens.

Long-term Community Needs

Despite the improvements underway, Louisville still has pressing needs for public health and safety. In 2017, MSD completed an extensive analysis of the wastewater, stormwater and flood protection systems that protect the community and identified the critical needs in these areas in a 20-year Critical Repair & Reinvestment Plan.

However, the solutions come with a significant price tag — \$4.3 billion over the next 20 years. With the federal requirements for the Consent Decree projects, MSD is unable to start the critical repair work to our vital wastewater, stormwater and flood protection systems without additional funds. Right now, MSD has placed improvement projects for these essential systems including drainage and odor reduction on hold until it can secure additional funds, or until the Consent Decree work is complete in 2024.



LouisvilleMSD

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MEDIA ADVISORY

July 12, 2018

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Protecting Louisville from Ohio River Flooding ***Louisville MSD Receives \$3 million to identify repairs***

Following the rainiest February in Louisville in 134 years, Louisville MSD will receive \$3 million from the U.S. Army Corps of Engineers (USACE) to identify risks to the city's flood protection system and develop a repair plan. U.S. Senate Majority Leader Mitch McConnell (R-KY) announced the funding on Thursday morning as part of the Bipartisan Budget Act of 2018.

One of MSD's core functions is to maintain the Ohio River Flood Protection System that protects \$24 billion in property throughout 110 square miles of Louisville Metro. The system includes 29 miles of flood wall and earthen levee, 16 flood pumping stations, nearly 150 floodgates and 80 floodwall closures.

The recent flooding in February and March ranks among the 10 worst floods in Louisville as approximately 40 billion gallons of rain fell across the city in five days. Inspections have revealed that MSD lost 17 percent of its flood protection capacity from damages suffered during that recent flood. "Evaluations of the system are ongoing, but the figure to date is \$2.5 million and climbing," stated MSD Chief of Operations Brian Bingham.

Louisville has an aging flood protection system. The 1937 Ohio River flood led to the construction of the system MSD operates today. The floodwalls constructed in the 1940s and '50s are still in service. The pumping stations that redirect flood waters away from homes and businesses are more than 60 years old and operate with parts that are no longer available for replacement. MSD needs to update this infrastructure to keep up with Louisville's growing population. "We are grateful for Leader McConnell's support to secure funding," said MSD Executive Director Tony Parrott. "We're ready to get started to work with the USACE and develop a plan to protect Louisville for future generations."

The flood protection study will look at the potential failures in the flood protection system, the impact to homes and businesses and options for repair. MSD had already started to identify improvements as part of its Critical Repair & Reinvestment Plan, a 20-year outline of projects for flood protection, wastewater and drainage. However up to this point, funding the projects has been a challenge.

The study will take 18 months for the USACE and MSD to complete, and then develop a list of recommended improvements.

About MSD

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700 West Liberty Street | Louisville, KY 40203-1911
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MEDIA ADVISORY

July 12, 2018

CONTACT:

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MSD awarded \$3 million in funding for Flood Protection System study

WHAT: Louisville MSD Chief of Operations Brian Bingham and Wes Sydnor Director of Intergovernmental Affairs will speak about the \$3 million in funding MSD will receive from the U.S. Army Corp of Engineers (USACE) for a study to determine the repairs needed for Louisville's aging flood protection system.

WHEN: 2 p.m. Thursday, July 12

WHERE: MSD Beargrass Flood Pumping Station, 1731 Brownsboro Road

MORE: U.S. Senate Majority Leader Mitch McConnell (R-KY) announced the USACE has approved \$3 million in funding for MSD to conduct a feasibility study on Louisville's flood protection system. The funding is a result of the *Bipartisan Budget Act of 2018*. Part of this act includes the USACE completing flood and coastal storm damage reduction studies in 14 states and two territories that will focus on the opportunities to reduce the overall flood risk in the United States.

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MEDIA RELEASE

June 21, 2019

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An engineering success with a community benefit...

*MSD Shawnee Park Basin is now in service,
preventing up to 20 million gallons of wastewater pollution
in the Ohio River with each rainfall*

LOUISVILLE, KY – Under the Great Lawn in Shawnee Park, sits the MSD Shawnee Park Combined Sewer Overflow (CSO) Basin. The top of the basin is approximately 12 feet below grade, with three-foot-thick reinforced concrete walls. When it rains, the basin is hard at work protecting the Ohio River, the Park and the neighborhood from combined sewer overflows. Today, MSD along with Mayor Greg Fischer and Shawnee Park neighbors celebrated the end of more than two years of construction work on the basin.

How it works

Rainwater enters the combined sewer system through stormwater pipes and catch basins. This added water can overwhelm the sewer system sending a combination of wastewater and rainwater into the Ohio River. The Shawnee Park CSO Basin is a sealed, watertight concrete structure that captures and stores 20 million gallons of wastewater and stormwater during rain events and gradually release it back into the sewer system when treatment capacity is available. The mixture of rainwater and wastewater then flows through the sewer system to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release into the Ohio River. When the basin is empty, water is flushed across the structure floor to clean any remaining debris.

Project amenities

The project was a collective effort between MSD, Louisville Metro Parks, the Olmsted Parks Conservancy, community leaders, and local residents to also feature new park amenities including an open-air pavilion, restrooms, restoration of Paul Hornung Field, refurbished basketball courts, a new paved parking area for the spray ground and a resurfaced Loop Road. Also, funds were provided to Louisville Metro Parks for additional renovations in the park.

"This project is a great leap forward in restoring Shawnee Park, while at the same time addressing the health and safety of our entire community by capturing combined sewer overflows. My thanks to Tony Parrott and his team at MSD for their work," says Louisville Metro Mayor Greg Fischer.

Job opportunities

The Shawnee Park CSO Basin project also included a pledge from the Design-Build contractor Ulliman Schutte to utilize local labor. The project had 225 Jefferson County residents working in positions such as carpenters, ironworkers, electricians, masons, pipefitters, heavy equipment operators, and more. Ulliman Schutte reported an 83 percent local labor usage, with 21 percent Minority Business Enterprise (MBE) and 14 percent with Women Business Enterprise (WBE) participation.

"I appreciate all MSD does to ensure that contractors utilize local labor whenever possible. These efforts do not go unnoticed by the community, states Joseph Scott, owner of Joash Construction. Scott is not only a neighbor of the project but was also the sub-contractor for the basketball courts and concrete work associated with the courtyard, pavilion and restrooms.

"This project is a model example of how all of our processes, communications, and policies came together for a community benefit and a big win for MSD and the community. We believe that by hiring local labor on our construction projects, we invest in the health, safety, and quality of life for our contracting community and ratepayers," states MSD Executive Director Tony Parrott.

The big picture

The \$78 million Shawnee Park CSO Basin is part of a \$1.15 billion mandate from the U.S. Environmental Protection Agency to clean up local waterways. The Shawnee Park Basin is the largest of 10 underground CSO basins. The basins and the 4-mile long Waterway Protection Tunnel will work together to greatly reduce combined sewer overflows by the end of 2020.

Underground storage is part of MSD's endeavor to prevent wastewater from overflowing into Louisville's waterways. MSD has recently completed – or is close to completing the last four of ten basins.

- Logan Street CSO Basin, operational December 2017, complete
- Clifton Heights CSO Basin, operational December 2018, wrapping up site work
- Shawnee Park CSO Basin, operational March 2019, site work nearly complete
- Portland CSO Basin, operational date of November 2019, construction continues

Construction of the Waterway Protection Tunnel is underway. The tunnel is expected to be operational by the end of 2020.

History

Combining wastewater and stormwater in a single pipe and designing the system to overflow during periods of heavy rainfall was considered state-of-the-art wastewater technology in the late 19th and early 20th centuries when Louisville's combined sewers were constructed. It was a typical infrastructure design for the time, though later in the 20th century, experts realized that the CSOs were contributing pollution to urban streams and rivers.

For photos of the basin during construction, visit:

<https://www.webcargo.net/l/pTzKlh3ayQ/>



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MEDIA ADVISORY REVISED

June 20, 2019

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MSD 20-million-gallon Shawnee Park Basin is in service

Officials cut the ribbon on environmental project with benefits for historic park

MSD's Shawnee Park Combined Sewer Overflow (CSO) basin is in service and storing up to 20 million gallons of combined wastewater and rainwater during periods of heavy rain until sewer system capacity is available. The **\$78 million** project is a key component in MSD's effort to greatly reduce combined sewer overflows by the end of 2020.

MSD has recently completed – or is close to completing the last four of ten basins.

- Logan Street CSO Basin, operational December 2017, complete
- Clifton Heights CSO Basin, operational December 2018, wrapping up site work
- Shawnee Park CSO Basin, operational March 2019, site work nearly complete
- Portland CSO Basin, operational date of November 2019, construction continues

MSD will hold a ribbon-cutting ceremony for the Shawnee Park CSO Basin on Friday, June 21 at 10 AM at the basin site in Shawnee Park.

What: Ribbon cutting and tour of basin (tour is weather permitting)

When: Friday, June 21, 10 AM

Where: MSD Shawnee Park CSO Basin, located under the Great Lawn in Shawnee Park

Who: Tony Parrott, MSD Executive Director
Greg Fischer, Louisville Metro Mayor

More: Media access inside the basin is weather permitting. Those going in the basin must wear long pants and flat-close-toe sturdy shoes.
Interviews with MSD Executive Director Tony Parrott, Mayor Greg Fischer and MSD Basin Project Manager Brandon Flaherty.

Those going in the basin must wear long pants and flat-close-toe shoes.

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MEDIA RELEASE

May 22, 2019

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MSD Clifton Heights Basin now in service *Preventing up to 7 million gallons wastewater pollution in Beargrass Creek*

LOUISVILLE, KY – Built into a grassy hillside next to the Mellwood Arts and Entertainment Center, sits the MSD Clifton Heights Combined Sewer Overflow (CSO) Basin. When it rains, the basin is hard at work protecting Beargrass Creek and the neighborhood from combined sewer overflows.

Rainwater enters the combined sewer system through stormwater pipes and catch basins. This added water can overwhelm the sewer system sending a combination of wastewater and rainwater into Beargrass Creek. The Clifton Heights CSO Basin will capture and store 7 million gallons of wastewater and stormwater during rain events and gradually release it back into the sewer system when treatment capacity is available. The mixture of rainwater and wastewater then flows through the sewer system to MSD's Morris Forman Water Quality Treatment Center for proper treatment and release into the Ohio River. When the basin is empty, water is flushed through the structure to clean any remaining debris.

The basin, which is now complete, is mostly underground and invisible to the public. The hillside covering the part of the basin is an unmowed meadow. A mowed grassy flat area at the bottom of the hillside provides a place for the neighbors to enjoy the park-like setting. A wetlands area contains a mix of 25 diverse native meadow plant species providing pollinator habitat and erosion control.

Underground storage is part of MSD's larger endeavor to prevent wastewater from overflowing into Louisville's waterways. MSD has recently completed – or is close to completing the last four of ten basins.

- Logan Street CSO Basin, operational December 2017, complete
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- Shawnee Park CSO Basin, operational March 2019, site work continues
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MEDIA RELEASE

June 15, 2019

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Volunteers support local effort to clean banks of the Ohio River

LOUISVILLE, KY— Volunteers gathered on the banks of the Ohio River and Beargrass Creek this morning to “sweep” the shorelines. Local organizers of the 30th annual Ohio River Sweep—Louisville MSD, Louisville Water, and LG&E and KU—provided support to 325 folks who combed the banks for trash. Last year during the event, 200 volunteers collected more than 50 tons of trash. Numbers for the amount of trash collected this year will be available early next week.

Among items found today were single use plastic containers, bottles and bags; glass bottles; aluminum cans; fishing equipment; tent parts; seat cushions; buckets; parts of fencing; dishes; chairs; and, tires. There are always tires.

Ohio River Sweep is a volunteer, shoreline cleanup of the Ohio River, which is sponsored regionally by the Ohio River Valley Water Sanitation Commission (ORSANCO). The annual six-state initiative stretches the entire length of the Ohio River from Pittsburgh, Pennsylvania to Cairo, Illinois. In Jefferson County, the event is held annually on the Saturday before Father's Day. MSD employees coordinate each site and supply volunteers with gloves, trash bags and a commemorative T-shirt provided by ORSANCO.

For more information about the Louisville cleanup sites, visit LouisvilleMSD.org/OhioRiverSweep

River Sweep also takes place on other waterways throughout Kentucky and Indiana. Visit www.OhioRiverSweep.org for information about other locations.

About MSD

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June 15, 2019

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MEDIA ADVISORY

June 12, 2019

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Local utilities announce Ohio River cleanup event

Volunteers needed for annual effort to clear riverbank of trash

What: Ohio River Sweep Press Conference

When: Thursday, June 13, 10 AM

Where: Carrie Gaulbert Cox Park, 3730 River Road

Who: MSD, Louisville Water Company and Louisville Gas and Electric Company

Event Information

Local organizers of the Ohio River Valley Water Sanitation Commission (ORSANCO), Ohio River Sweep event, will gather at Cox Park to provide details on this year's cleanup effort in Jefferson County, scheduled for Saturday, June 15, from 9 AM to Noon.

Ohio River Sweep is a volunteer, shoreline cleanup of the Ohio River. During a single day, volunteers remove litter from the banks of the river and many of its tributaries, such as Beargrass Creek. The cleanup connects people to the river and encourages stewardship of this vital resource.

The annual six-state initiative stretches the entire length of the Ohio River from Pittsburgh, Pennsylvania to Cairo, Illinois. Each year during River Sweep, volunteers collect approximately 40 tons of trash from the shoreline in Jefferson County. An MSD employee will coordinate each site, supplying volunteers with gloves, trash bags, and a commemorative T-shirt.

There are a total of six cleanup sites along the Ohio River in Jefferson County:

(Locations listed from upstream to downstream)

Hays Kennedy Park – 7003 Beachland Beach Road

Carrie Gaulbert Cox Park – 3730 River Road

Eva Bandman Park – 1701 River Road

Karen Lynch Park/Beargrass Flood Pumping Station – 1731 Brownsboro Road

Shawnee Park – W Market Street (between Northwestern Parkway and Fontaine Landing Court)

Riverview Park – 8202 Greenwood Road (Greenwood Road and Cane Run Road)

ORSANCO sponsors the event regionally, while MSD, Louisville Gas and Electric Company and Louisville Water provide support at the local level—coordinating volunteer efforts at cleanup locations in Jefferson County.

For more information about the Louisville cleanup sites, visit LouisvilleMSD.org/OhioRiverSweep

River Sweep will also take place at other waterways throughout Kentucky and Indiana. Visit www.OhioRiverSweep.org for information about other locations.
<attach site map>



About LG&E

Louisville Gas and Electric Company and Kentucky Utilities Company, part of the PPL Corporation (NYSE: PPL) family of companies, are regulated utilities that serve nearly 1.3 million customers and have consistently ranked among the best companies for customer service in the United States. LG&E serves 328,000 natural gas and 414,000 electric customers in Louisville and 16 surrounding counties. KU serves 555,000 customers in 77 Kentucky counties and five counties in Virginia. More information is available at www.lge-ku.com and www.pplweb.com.



About Louisville Water Company

Louisville Water began as Kentucky's first public water provider in 1860 and today delivers an average of 119 million gallons of drinking water to nearly one million people in Louisville and surrounding counties. To highlight the quality of its drinking water, Louisville Water trademarked its tap water as Louisville pure tap® in 1997, and this year is celebrating 21 years of pure perfection. To learn more, visit LouisvilleWater.com



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MEDIA RELEASE

June 27, 2019

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Louisville Leaders Release First Ever Water Equity Roadmap *Report Describes Strategies for Expanding Opportunity in Louisville's Infrastructure Workforce*

LOUISVILLE, KY — Today, Louisville Metro Mayor Greg Fischer and leaders from Louisville MSD, Louisville Water Company, Transit Authority of River City (TARC) and the Louisville Urban League, in partnership with the US Water Alliance, released *An Equitable Water Future: Louisville*. The report is a roadmap for building equity in Louisville's infrastructure workforce and contracting practices, so that all residents have an opportunity to enjoy the economic and social benefits resulting from investments in the city's infrastructure. The report is available online [here](#).

An Equitable Water Future: Louisville was collaboratively developed by leaders from the MSD, Louisville Water, TARC, Louisville Urban League, Louisville Metro Government, Where Opportunity Knox, and Jacobs Engineering, with support from the US Water Alliance. This work builds on Louisville's participation in the 2018 Brookings Institution study, [Renewing the Water Workforce](#), which outlined infrastructure workforce challenges and general recommendations for addressing them.

"As we continue investing in our infrastructure, it's important to make sure all citizens have opportunities to benefit from those investments. That's what the recommendations in this report are intended to do. I'm proud of how our local agencies have collaborated to seize the workforce opportunity tied to investing in our infrastructure, and I appreciate their continued efforts toward implementing these recommendations," said Louisville Mayor Greg Fischer.

Louisville's vulnerable communities face a range of challenges related to water, from aging infrastructure and affordability. Low-income people and communities of color in Louisville have historically been affected by a legacy of redlining, and today are disproportionately impacted by water affordability, aging infrastructure, and flooding issues, as well as barriers to participating in the local infrastructure workforce and contracting opportunities. Among the report's recommended actions are changes to procurement and hiring policies, as well as more intensive cross-agency collaboration on workforce and skills training and mentoring potential employees from the city's vulnerable communities.

According to MSD Executive Director Tony Parrott, "Water has the power to put people to work. At MSD, we've been making good progress toward understanding and tackling the barriers to workforce participation and contracting that confront minorities and low-income residents. This roadmap lays out specific steps we can take, at MSD and beyond, to deepen our impact. We'll keep driving to make sure

all Louisville's residents have access to the economic benefits resulting from our community's investments in infrastructure."

"We're proud of Louisville Water and MSD for leading the way on workforce equity, taking an honest look at existing inequities and working to include our most vulnerable," added Sadiqa Reynolds, CEO of Louisville Urban League. "The policy change and inter-agency collaboration recommended in this roadmap will translate into better workforce access for the people who stand to benefit the most."

An Equitable Water Future: Louisville discusses local factors that influence water equity. While the primary focus is on the infrastructure workforce, the report also explores local issues around water affordability, aging infrastructure, flooding and climate impacts, and funding constraints. For each of these areas, the report outlines recommendations that agencies and organizations in Louisville can take to advance equitable water management.

"The challenges facing Louisville's vulnerable communities are significant, but we can help people thrive by expanding access to water workforce and contracting opportunities. I applaud Louisville's leaders for recognizing the benefits of working toward greater social equity, and I'm proud of the Louisville Water Equity Taskforce for setting a course to grow opportunities for all," said Radhika Fox, CEO of the US Water Alliance.

This report is part of the Water Equity Taskforce, a network of cities convened by the US Water Alliance that work together to develop more equitable water policies and practices. The Taskforce comprises cross-sector teams in the cities of Atlanta, Buffalo, Camden, Cleveland, Louisville, Milwaukee, and Pittsburgh.

For more information on the Water Equity Taskforce project, visit <http://uswateralliance.org/initiatives/water-equity/taskforce>.

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MEDIA ADVISORY

June 26, 2019

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MSD and Community Partners Complete a Study on Workforce Opportunities in the Utility Sector

Review is part of a national effort with the US Water Alliance

For the past year, Louisville MSD has lead a review of utilities procurement practices and contracting in the infrastructure sector. The review highlights water equity workforce opportunities and identified unique challenges faced by vulnerable populations. *An Equitable Water Future: Louisville* was collaboratively developed by leaders from the Louisville Urban League, MSD, Louisville Water Company, Transit Authority of River City, Louisville Metro Government, formerly Where Opportunity Knox, and Jacobs Engineering, with support from the US Water Alliance.

What: Release of *An Equitable Water Future: Louisville*

When: Thursday, June 27, 9:15 AM

Where: The Brown Hotel, 335 W Broadway, 16th Floor

Who: **Tony Parrott**, Executive Director, Louisville MSD
Ellen Heslen, Deputy Mayor/Chief of Staff, Louisville Metro
Radhika Fox, Chief Executive Officer, U.S. Water Alliance
Ferdinand Risco, Executive Director, Transit Authority of River City
Sadiqa Reynolds, President/CEO, Louisville Urban League

More: This report is part of the **Water Equity Taskforce**, a network of cities convened by the US Water Alliance that work together to develop more equitable water policies and practices. The Taskforce comprises cross-sector teams in the cities of Atlanta, Buffalo, Camden, Cleveland, Louisville, Milwaukee and Pittsburgh.



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MEDIA RELEASE

March 19, 2019

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MSD Tunnel Boring Machine now at work 200-feet below Louisville

LOUISVILLE, KY — Eighteen stories underground, Louisville's largest infrastructure project is underway. MSD's massive tunnel boring machine is carving through bedrock to build the Waterway Protection Tunnel. Nicknamed "Bumblebee" in honor of Muhammad Ali, the 412-foot long machine will ultimately bore a four-mile-long tunnel to store combined stormwater and wastewater to prevent it from overflowing sewers and polluting our river and streams.

Bumblebee is currently under the Ohio River near 10th Street. Over the next several months, the machine will continue east, moving deep under the river along the shore with downtown Louisville to Butchertown, then turning southeast and advancing to near Lexington Road and Grinstead Drive.

[The process](#) to remove the five-hundred-million-year-old rock, from 18 stories underground, is intense. First, MSD dug and blasted two shafts into the bedrock and connected them by digging a tunnel between them. Cranes lowered the boring machine's parts down the shafts for the underground assembly of Bumblebee.

How does Bumblebee work?

As the boring machine excavates the tunnel route, crews install locomotive tracks behind the machine. As the machine maneuvers through the rock, the rock fills a series of "muck cars." A mini-locomotive then pulls the muck cars along the underground rail to the shaft near 12th and Rowan streets. A crane on the surface then lifts muck cars filled with rock from the tunnel through that 48-foot diameter vertical shaft. Once the muck cars are empty, the crane lowers them back into the tunnel to repeat the process. Recently, crews installed a second set of locomotive tracks and muck cars to speed up the work. The excavated rock is loaded into dump trucks and transported to a local quarry.

After excavation is complete, the entire length of the tunnel is lined in concrete, making it watertight. The Waterway Protection Tunnel will store up to 55 million gallons of combined wastewater and stormwater during periods of heavy rain until capacity is available in the MSD sewer system. The contents are then

pumped back into the system, conveyed to MSD's Morris Forman Water Quality Treatment Center for proper treatment and later released into the Ohio River. The tunnel is slated to be operational by the end of 2020.

To track Bumblebee's progress Louisville, please visit LouisvilleMSD.org/Tunnel.



LouisvilleMSD

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MEDIA ADVISORY

March 18, 2019

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MSD Tunnel Boring Machine now at work 200-feet below the Ohio River

Eighteen stories underground, Louisville's largest infrastructure project is underway. MSD's massive tunnel boring machine is carving through bedrock to build MSD's Waterway Protection Tunnel.

Nicknamed "Bumblebee" in honor of Muhammad Ali, the 412-foot long boring machine will ultimately carve a four-mile-long tunnel to store combined stormwater and wastewater to prevent it from overflowing sewers and polluting our river and streams. Bumblebee is currently under the Ohio River near 10th Street.

- WHAT:**
- See crane lifting 40-ton muck cars filled with rock from tunnel shaft
 - Interview MSD Project Manager Jacob Mathis, PE
 - Interview Construction Manager for Black & Veatch Alston Noronha, PE

WHEN: Tuesday, March 19
10 AM to 11 AM

WHERE: 12th Street entrance to MSD Waterway Protection Tunnel site
12th Street and Rowan Street
(Visitors will not be allowed on site, but can view/shoot from the entrance area.)

Note: For safety, attendees must wear sturdy, close-toe shoes.



LouisvilleMSD

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MEDIA RELEASE REVISED

May 20, 2019

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Louisville MSD's commitment to Supplier Diversity earns the utility regional recognition

This year, businesses owned and operated by minorities will oversee millions of dollars of work for Louisville MSD. The agency is focused on supplier diversity, and the Tri-State Minority Supplier Development Council (TSMSDC) has recognized the effort by awarding MSD its 2019 Impact—Corporation of the Year Award. MSD received the award during an event on May 2, in Nashville Tennessee. The council represents corporations, government agencies and other nonprofit organizations in Kentucky, Tennessee and West Virginia.

MSD faced competition for the "Corporation of the Year Award" from Messer Construction Company, Nashville Electric Service, Nissan North America and Toyota North America.

The Impact Awards recognizes organizations for their outstanding efforts in advancing minority supplier development, leadership engagement, influence, active TSMSDC participation, and purchasing opportunities for certified Minority Business Enterprises (MBE) affiliated with the National Minority Supplier Development Council and TSMSDC.

"MSD is honored to receive this recognition," says MSD Executive Director Tony Parrott. "We believe it is important that we spend our ratepayer dollars in a way that reflects the diversity of the community. Investing in the health, safety, and quality of life for our contracting community and ratepayers is an investment worth making. I encourage other companies to join our efforts."

"Our commitment is shown in our numbers. In our fiscal year 2018, MSD spent more than \$26 million with MBE firms, many within the Greater Louisville Metro Area," states One Water Chief Procurement Officer Rene' Thomas.

"TSMSDC values its continued strategic relationship with Louisville MSD, and being selected as 'Corporation of the Year' rewards its commitment to and support of diversity and inclusion. Congratulations for the outstanding and extraordinary contributions in developing and expanding business opportunities for minority suppliers" noted Cheri K. Henderson, President & CEO at TSMSDC.



About MSD

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700 West Liberty Street | Louisville, KY 40203-1911
Phone: 502.540.6000 | LouisvilleMSD.org

MEDIA RELEASE

May 6, 2019

CONTACT:

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502.919.0325

City of Crestwood approves Louisville MSD to purchase City of Crestwood sewer system — Crestwood residents to see lower rates —

LOUISVILLE, KY – The City of Crestwood Council approved the purchase by Louisville MSD of the City of Crestwood's sewer system at their meeting on May 1, 2019. MSD already operated and maintained the Crestwood sewer system. This agreement moves the ownership of the system to MSD and will **lower** the sewer bills for Crestwood customers by removal of the City of Crestwood surcharge.

Benefits to Crestwood

Crestwood customers will continue to receive high-quality service from MSD and will see a reduction in their current monthly sewer bills. Customers now pay a minimum \$10 monthly surcharge—which is based on usage—to cover the debt payment incurred by the City of Crestwood with building the sewer system. As part of the purchase, MSD will assume and pay off the debt estimated at approximately \$2 million, and Crestwood customers will no longer pay the surcharge fee.

MSD Executive Director Tony Parrott states, "Crestwood residents will see lower rates and will benefit from being a part MSD's larger system that can provide economies of scale, access to greater resources, more employees to respond to issues, and a dedicated customer service call center."

"MSD has maintained rates that are among the lowest in the region by balancing rate increases with appropriate borrowing in order to fund system improvements that benefit our customers. Our debt management practices allow us to maintain strong ratings with credit agencies that enable us to keep interest low," says MSD Chief Financial Officer Chad Collier.

Background

In April 2018, the Kentucky State Legislature passed a bill that allows utilities to own assets outside of their originally chartered borders. Upon approval of that legislation, City of Crestwood leadership and MSD negotiated the purchase agreement.

MSD began operating and maintaining the Crestwood sewer system in 1996, which today includes 1,800 homes and businesses. The wastewater flow from Crestwood will continue to receive treatment at MSD's Hite Creek Water Quality Treatment Center for proper treatment and release to Hite Creek as it has for 20 years. The new legislation now allows MSD to own the sewer system assets it has maintained and operated for two decades. The purchase—initially negotiated under an Interlocal Agreement approved in April 2019—will not require any additional staff for MSD and will have no impact on MSD customer rates in Louisville Metro. The Interlocal Agreement also allows MSD to continue to utilize its regular rate schedule for customers in Crestwood.



About MSD

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700 West Liberty Street | Louisville, KY 40203-1911
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MEDIA ADVISORY

April 22, 2019

CONTACT:

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502.919.0325

MSD experiences cave-in at Dixie Hwy and Wilson Avenue

LOUISVILLE, KY – MSD experienced a cave-in to a sewer line at Dixie Highway and Wilson Avenue on Sunday, April 21. Repairs are underway.

MSD received a call from Metrosafe concerning a hole in the roadway in the late afternoon on Sunday. MSD inspectors were dispatched to the scene and the area blocked from traffic. The 30-inch brick sewer line dates to 1900. Work today included the removal of once buried trolley tracks to allow access to the pipe.

After 119 years of service, the brick that make up this sewer line began to unravel and caused the pavement to collapse. Small cracks in pipes, together with heavy rain, can lead to this unraveling. Crews are working to replace a section of this damaged pipe with a new PVC pipe. There is no disruption of sewer service in the area during the repair. A traffic detour is in place.

Repairs will continue through Wednesday, with the roadway open by Thursday evening.



LouisvilleMSD

About MSD

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700 West Liberty Street | Louisville, KY 40203-1911
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MEDIA RELEASE

April 16, 2019

CONTACT:

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A smart sewer system— *Louisville MSD wins international award for its innovation*

LOUISVILLE, KY — Throughout Louisville, there is an underground system where technology is in charge of keeping stormwater and sewage from entering the city's waterways. Louisville MSD in partnership with Canadian engineering services firm Tetra Tech, pioneered the first major application of Csoft® Real-Time Control (RTC) for system-wide sewer optimization. Last night, in Austin, Texas, MSD and Tetra Tech received the 2019 INFORMS Franz Edelman Award.

The Award

The 2019 INFORMS Franz Edelman Award competition recognizes incredible ways that operations research and analytics are improving how people work and live around the world. MSD was one of six finalists for the 2019 honor. Other nominees were Boston Public Schools, IBM, Microsoft Corporation, Spanish National Aviation Authority (EASA) and Vattenfall.

A system with big benefits and global impact

During periods of heavy rain, Louisville's sewer system can exceed capacity. When this happens, rainwater mixes with wastewater and can overflow into the Ohio River and area streams. MSD enlisted engineering services firm Tetra Tech to implement Csoft® as part of its Long-Term Control Plan seeking to greatly reduce these overflows, and the technology is an integral part of MSD's Integrated Overflow Abatement Plan.

Csoft® is a Real-Time Control software solution developed by Tetra Tech to efficiently manage sewer networks in real-time based on rain forecasts and sensor readings. It has been successfully implemented in the U.S., Canada and France. MSD's fully automated Real-Time Control system responds to rainfall and actual system conditions with the software in the ground determining how to maximize MSD systems that manage the excess water.

"Csoft® and real-time control has dramatically changed the way we operate our system," Louisville MSD Chief Engineer Angela Akridge said. "At MSD we are letting science and innovation guide what we do, and

the benefits are unmatched. Real-Time Control has saved MSD more than \$200 million in infrastructure costs and has helped us provide safe, clean waterways for Louisville."

MSD's fully-automated Real-Time Control system is not only a part of the underground sewer system, but this technology is integral to all of its critical infrastructure. This includes MSD's largest infrastructure project, the 4-mile long Waterway Protection Tunnel and more than 15 storage basins throughout the city.

The Franz Edelman Award

For more than 40 years, winners of the Edelman Award have been recognized for transforming how organizations approach some of the world's most complex problems. First awarded in 1972, the prize is named in honor of Franz Edelman, who founded the Operations Research division within RCA, one of the first corporations to embed research as a business imperative.



LouisvilleMSD

About MSD

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700 West Liberty Street | Louisville, KY 40203-1911
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MEDIA RELEASE

January 17, 2019

CONTACT:

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502-540-6552
502-919-0325

Repair of underground floodgate is extended to January 25 due to higher than expected river levels

Intersection of Franklin and Buchanan streets closed to traffic

LOUISVILLE, KY – Work to repair an underground floodgate in the intersection of Franklin and Buchanan streets has been extended through Friday, January 25 due to higher than expected river levels.

MSD is maintaining local access area residents and businesses, and detours are marked. There is no interruption of service to our customers.

The underground gate helps control wastewater and stormwater flow. This gate, which was designed for intermittent use, was put into constant use during the underground repair of the sewer line on West Main Street in downtown Louisville.



LouisvilleMSD

About MSD

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MEDIA RELEASE

January 10, 2019

CONTACT:

Sheryl Lauder
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502-540-6552
502-919-0325

Repair and roadway closure required due to floodgate failure — *Intersection of Franklin and Buchanan streets closed to traffic*

LOUISVILLE, KY – One of Louisville MSD's underground floodgates has failed. To make the repairs, MSD will take the gate out of service and close the intersection of Franklin and Buchanan streets beginning in the morning of January 11. MSD will maintain local access for the area residents and businesses. Detours will be marked.

The repair is expected to be complete by end of day January 18.

Even though Louisville is not in flood stage, MSD must make an immediate repair of this infrastructure. The underground gate helps control wastewater and stormwater flow. It allowed the now complete underground repair of the sewer line on West Main Street in downtown Louisville to take place.

There is no interruption of service to our customers.



LouisvilleMSD

About MSD

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700 West Liberty Street | Louisville, KY 40203-1911
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MEDIA ADVISORY

March 8, 2019

CONTACT:

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World Plumbing Day and why you need to treat your plumbing right

What is the consequence when items that should not be flushed through plumbing end up at MSD's water quality treatment centers? Monday, March 11, is World Plumbing Day and MSD will highlight the big problem for home plumbing and MSD's pipes and pumps of flushing inappropriate materials.

MSD Collections Supervisor Claude Rottet will highlight the importance of treating your plumbing right. Rottet will show actual flushed items and why flushing inappropriate materials can wreak havoc on your pipes and MSD's system. MSD will also offer a brief tour with an inside look of how MSD properly treats your wastewater.

- WHAT:**
- Visual showing what flushing wipes and other non-flushable items does to a wastewater treatment facility, and your home or business plumbing system
 - Tour of wastewater treatment process

WHEN: Monday, March 11
10 AM to 11 AM

WHERE: MSD Cedar Creek Water Quality Treatment Center
8405 Cedar Creek Road
Louisville, KY 40291

Note: For safety, attendees must wear sturdy, close-toe shoes. (You will be glad you did.) Hardhats, and safety vests will be provided at the site.



LouisvilleMSD

About MSD

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700 West Liberty Street | Louisville, KY 40203-1911
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MEDIA UPDATE

February 12, 2019

CONTACT:

Sheryl Lauder

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502.919.0325

MSD flood protection crews working to protect the city from the rising Ohio River

LOUISVILLE, KY – As the Ohio River waters rise, MSD is taking steps to protect Louisville Metro from flooding. River levels are projected to continue to rise today and tomorrow with a crest of 28.4-feet on the Upper Pool, and 60.5-feet on the Lower Pool by Friday. Then the river is expected to slowly recede.

However, upstream gauge readings indicate the river will trend down for a couple of days, then it is projected to rise. At this time, MSD **does not** anticipate the need to install any floodwall roadway closures. This could change next week if river levels increase.

Currently, MSD has 12 of our 16 Flood Pumping Station in service, with three more in service later today or early tomorrow.

Comparison to Flooding in February and March 2018

The rain fell much harder and faster in February and March of 2018. River levels on the Upper Pool reached a depth of 35.64-feet. While on the Lower Pool, levels rose to 67.13-feet. MSD has not yet pumped 1 billion gallons with this event. Last February and March, we pumped more than 26.5 billion gallons of water out of the city and into the river.

Background

MSD maintains Louisville Metro's Ohio River Flood Protection System—keeping the river at bay and out of the city.

The system protects more than 200,000 people, 87,000 homes and \$24 billion in property throughout 110 square miles of Louisville Metro. It includes 29 miles of floodwall and earthen levee, 16 flood pumping stations, nearly 150 floodgates and 80 floodwall closures.

Where creeks and storm drains pass through the floodwall, gates can be closed to keep the river from flowing up the streams, and large pumps at the flood pumping stations are used to lift the water from the creeks into the river. Additional gates and pumping stations keep the river from backing up through storm drains and pipes, pumping the stormwater into the river.

The U.S. Army Corps of Engineers built the system after the city's two highest floods of record in 1937 and 1945. MSD has been responsible for the Flood Protection System since 1987.

About MSD

The Louisville/Jefferson County Metropolitan Sewer District (MSD) works to achieve and maintain clean, environmentally safe waterways for a healthy and vibrant community. The organization's more than 650 employees provide wastewater management, drainage and flood protection services across the 376 square miles of Louisville Metro. In addition to operating and maintaining Louisville Metro's sewer system, floodwall system, water quality treatment centers and flood pumping stations, MSD invests in hundreds of infrastructure improvement projects each year, plants more than 1,000 trees and other vegetation annually to enhance water filtration and reduce runoff, and provides numerous outreach programs to inform and educate the community about protecting our waterways.



700 West Liberty Street | Louisville, KY 40203-1911
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MEDIA RELEASE

February 7, 2019

CONTACT:

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502.540.6552

502.919.0325

MSD makes preparation due to rising Ohio River

LOUISVILLE, KY – As the Ohio River rises, MSD is taking steps to protect Louisville Metro from flooding. River levels are projected to rise fairly quickly today and tomorrow, then slow over the weekend. The river is expected reach 20.6-feet is on the Upper Pool, and 50.9-feet on the Lower Pool on Monday.

Currently, MSD has one of our 16 Flood Pumping Station in service. We expect to have a total of nine in service by Sunday.

No floodwall roadway closures are needed at this time.

Media Interview Opportunity

- JP Carstone, MSD's Emergency Preparedness and Operational Resiliency Administrator
- MSD Beargrass Flood Pumping Station
- 1731 Brownsboro Road (meet in lower parking lot in front of facility)
- 1:30 PM today

Background

MSD maintains Louisville Metro's Ohio River Flood Protection System—keeping the river at bay and out of the city.

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The U.S. Army Corps of Engineers built the system after the city's two highest floods of record in 1937 and 1945. MSD has been responsible for the Flood Protection System since 1987.

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Appendix G Organizational Chart

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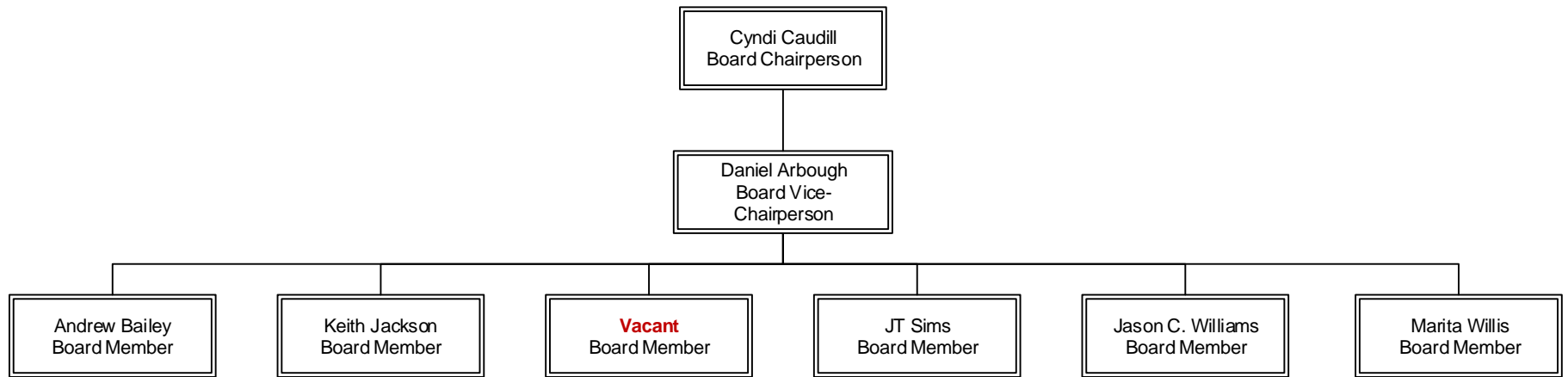
Louisville and Jefferson County Metropolitan Sewer District

Organizational Chart
Effective 07/05/19

Organizational Summary

	<u>Total</u> <u>Positions</u>	<u>Current</u> <u>Actual</u>	<u>Vacant</u> <u>(Budgeted)</u>	<u>New/</u> <u>Unbudgeted</u> <u>(Vacant)</u>	<u>Exempt</u>	<u>Non-</u> <u>Exempt</u>	<u>Unit</u>	<u>Net</u> <u>Overbudget</u>
Executive Offices Division								
Executive Offices	9	9	0	0	8	1	0	0
Customer Relations & Communications	18	13	5	0	4	14	0	0
Facilities, Safety & Security	18.5	17.5	1	0	10	8.5	0	0
Supply Chain and Economic Inclusion Division	23	20	3	0	10	13	0	0
Legal Division	11	7	4	0	8	3	0	0
Human Resources Division	18	17	1	0	12	6	0	0
Information Technology Division	32	27	5	0	28	4	0	0
Finance Division	25	23	2	0	10	15	0	0
Engineering Division								
Eng Admin, Reg Compliance, Records & GIS	18.5	16	2.5	0	10	8.5	0	0
Engineering Technical Services	36	26	10	0	27	9	0	0
Development & Stormwater Services	45	42	3	0	22	23	0	0
Operations Division								
Administration	3	2	1	0	2	1	0	0
Treatment Facilities	92	85	7	0	20	18	54	0
Treatment Facilities (Maintenance)	38	35	3	0	5	0	33	0
Collections System and Flood Protection	77	70	7	0	15	22	40	0
Wastewater and Drainage	118	114	4	0	10	11	97	0
Wastewater and Drainage (Sanitary)	76	70	6	0	8	2	66	0
Support Services	36	29	7	0	11	25	0	0
Fleet Services	19	17	2	0	4	1	14	0
DISTRICT TOTAL	713	639.5	2 73.5	0	224	185	304	0

Board Members

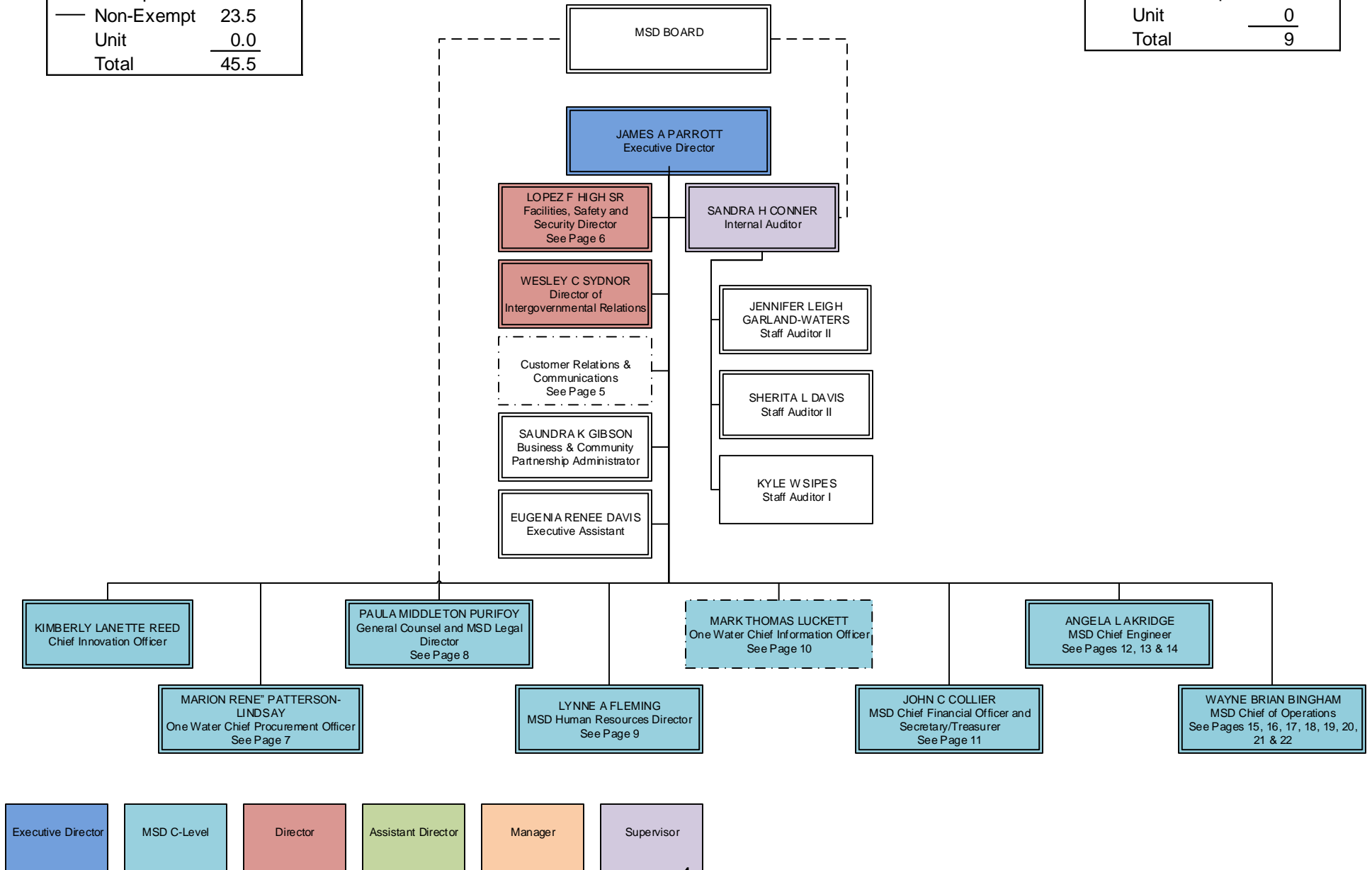


Executive Offices Division

Executive Offices

DIVISION BUDGET STATUS	
Actual	39.5
Vacant	<u>6.0</u>
Authorized	45.5
■ Exempt	22.0
— Non-Exempt	23.5
Unit	<u>0.0</u>
Total	45.5

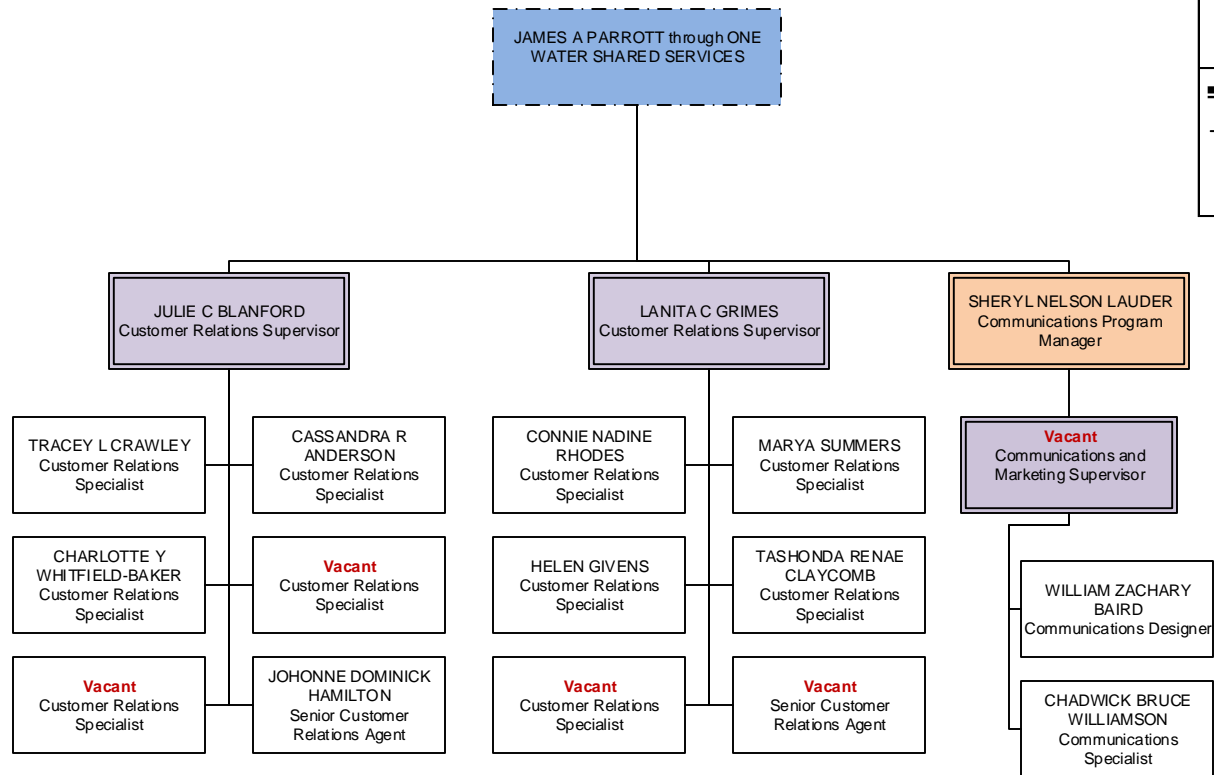
BUDGET STATUS	
Actual	9
Vacant	<u>0</u>
Authorized	9
■ Exempt	8
— Non-Exempt	1
Unit	<u>0</u>
Total	9



Executive Offices Division

Customer Relations & Communications

BUDGET STATUS	
Actual	13
Vacant	<u>5</u>
Authorized	18
<hr/>	
== Exempt	4
— Non-Exempt	14
Unit	<u>0</u>
Total	18



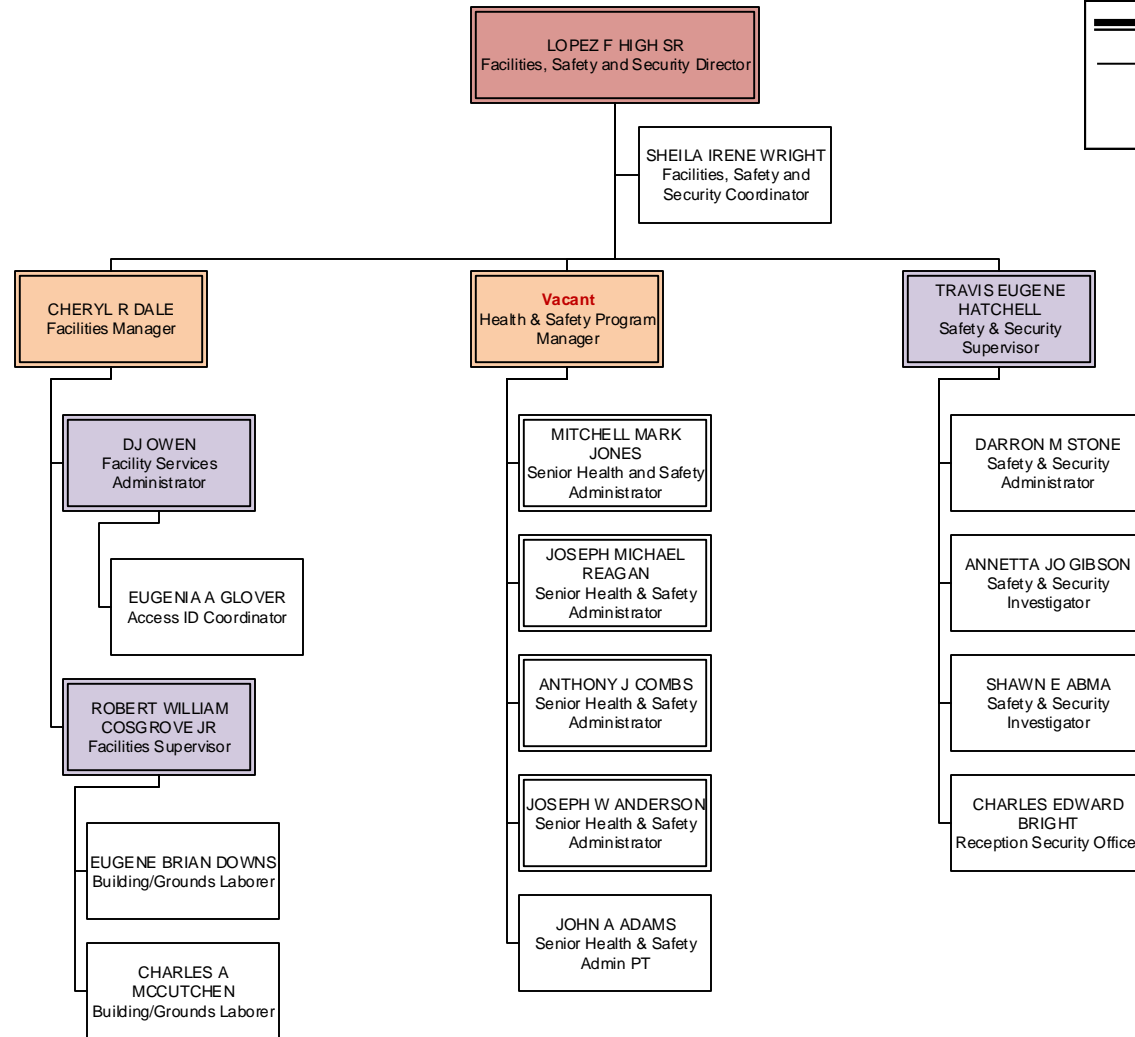
Note:

- Customer Relations Supervisors also report to Manager – Customer Care (LW) through One Water Shared Services
- Communications Program Manager also reports to VP – Communications, Marketing & Economic Development (LW) through One Water Shared Services



Executive Offices Division Facilities, Safety & Security

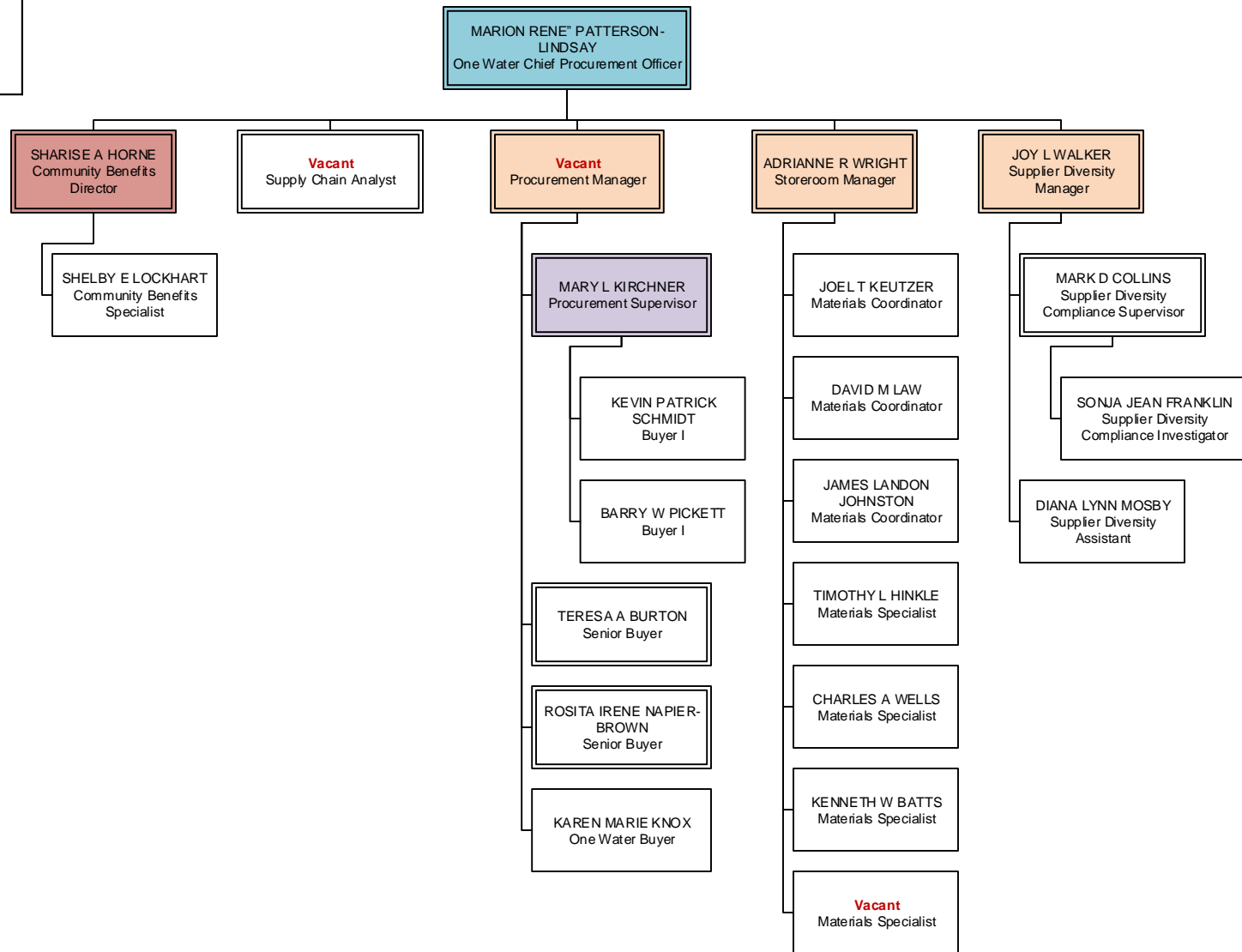
BUDGET STATUS	
Actual	17.5
Vacant	1.0
Authorized	18.5
Exempt	10.0
Non-Exempt	8.5
Unit	0.0
Total	18.5



DIVISION BUDGET STATUS	
Actual	20.0
Vacant	3.0
Authorized	23.0
Exempt	10.0
Non-Exempt	13.0
Unit	0.0
Total	23.0

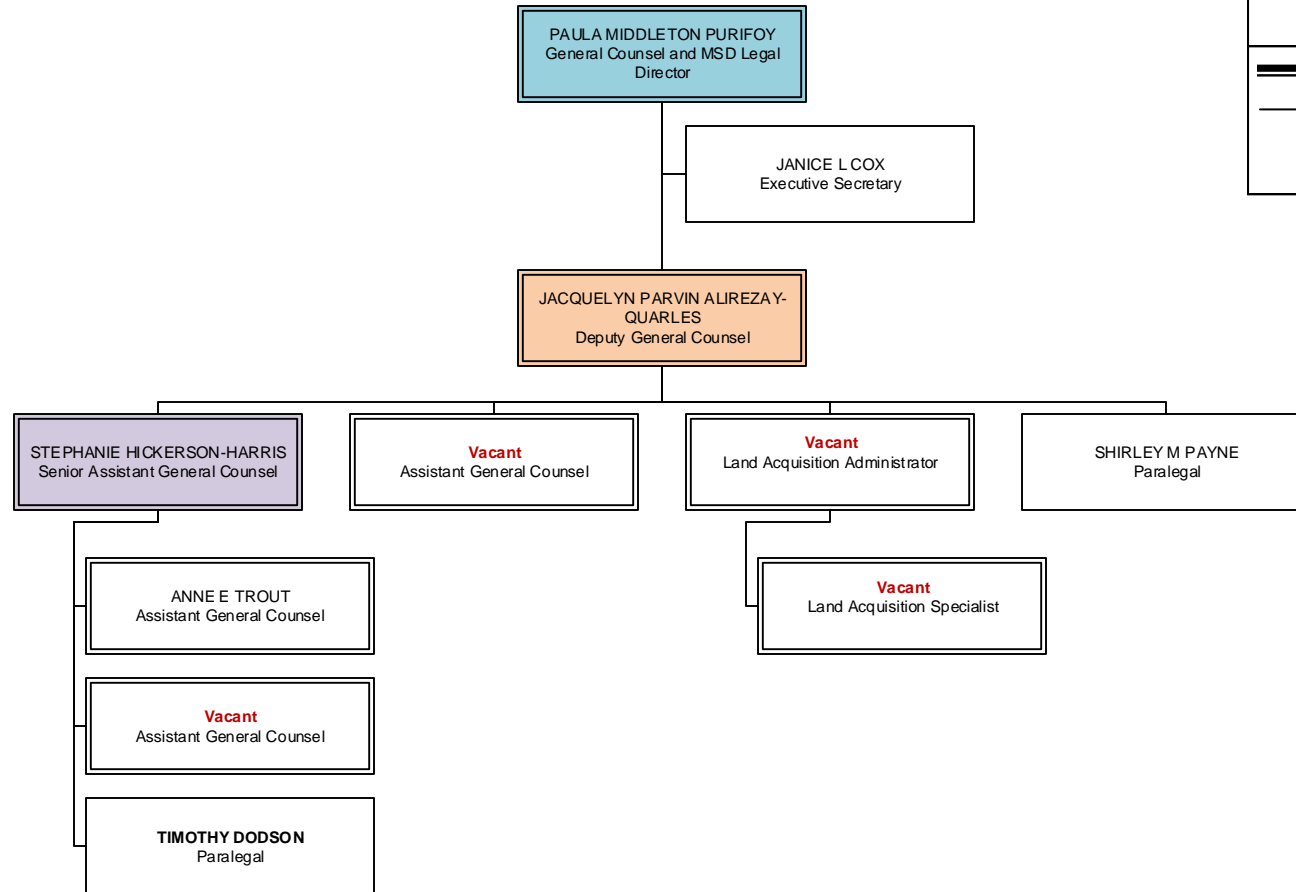
Supply Chain and Economic Inclusion Division

Community Benefits, Procurement, Storeroom & Supplier Diversity



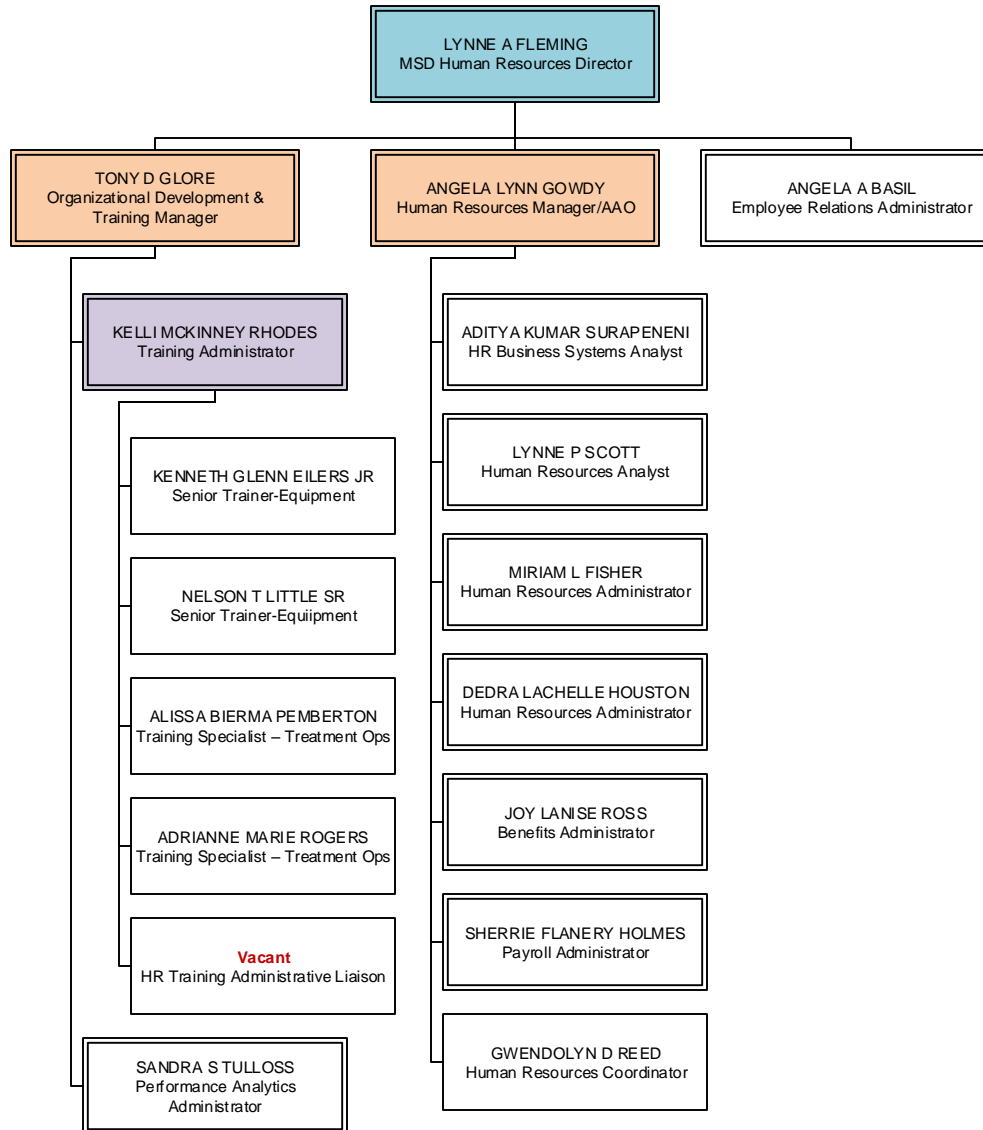
Legal Division

BUDGET STATUS	
Actual	7
Vacant	<u>4</u>
Authorized	11
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Exempt	8
Non-Exempt	3
Unit	<u>0</u>
Total	11



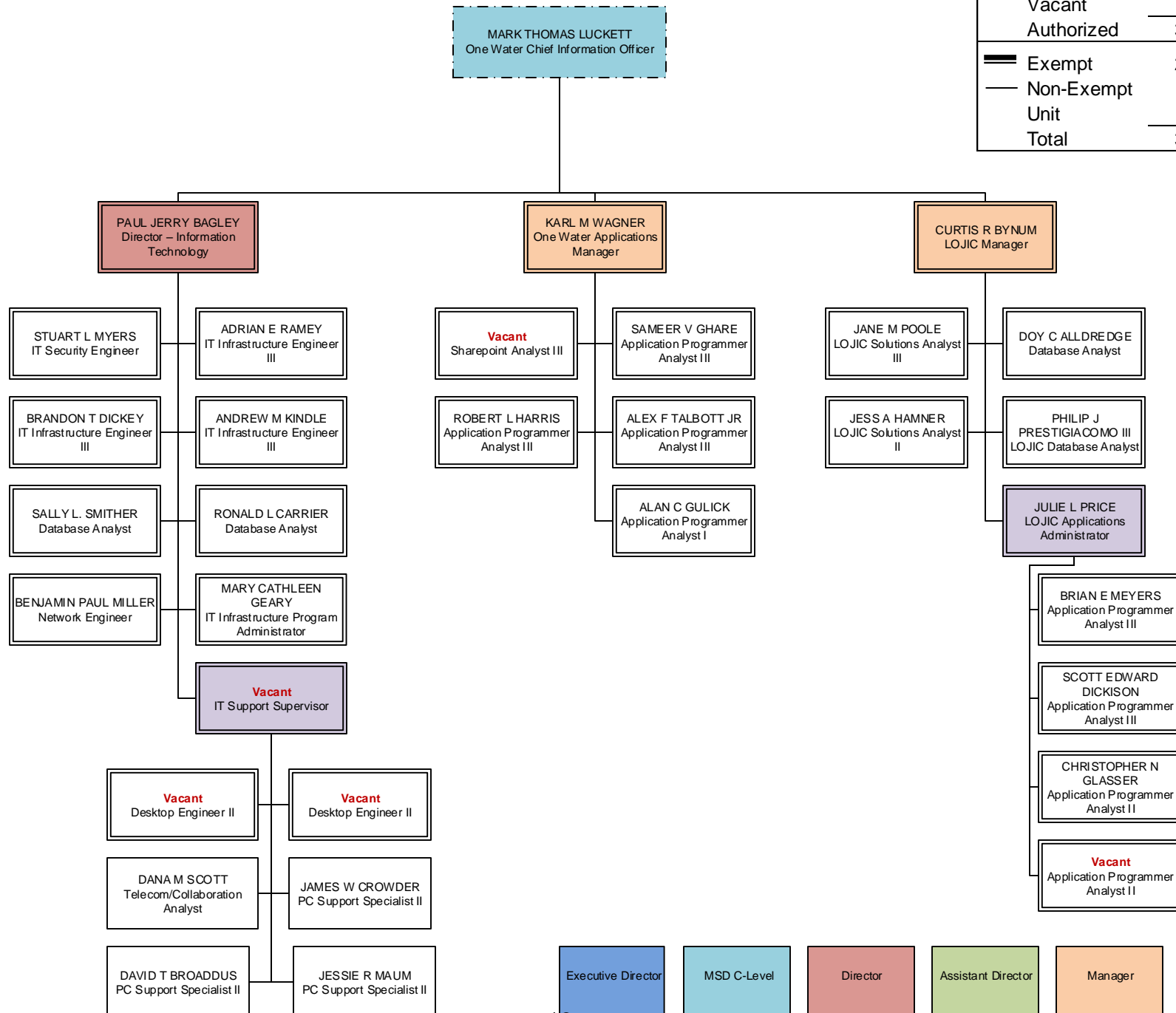
Human Resources Division

BUDGET STATUS	
Actual	17.0
Vacant	<u>1.0</u>
Authorized	18.0
<hr/>	
Exempt	12.0
Non-Exempt	6.0
Unit	<u>0.0</u>
Total	18.0



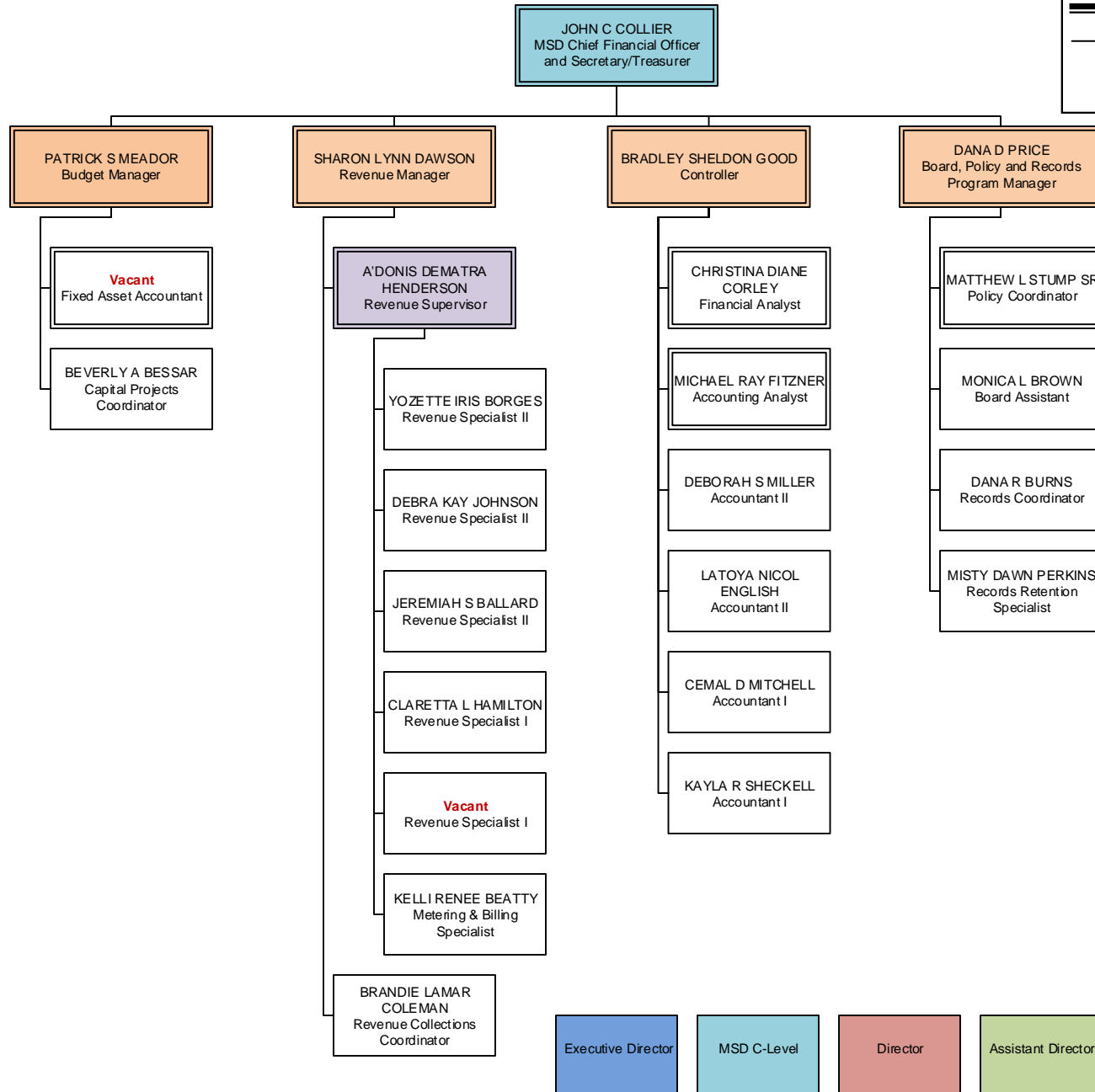
Information Technology Division

BUDGET STATUS	
Actual	27
Vacant	5
Authorized	32
<hr/>	
Exempt	28
Non-Exempt	4
Unit	0
Total	32



Finance Division

BUDGET STATUS	
Actual	23
Vacant	<u>2</u>
Authorized	25
Exempt	10
Non-Exempt	15
Unit	<u>0</u>
Total	25

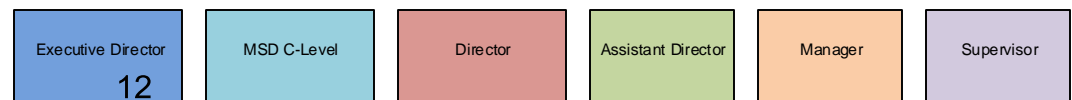
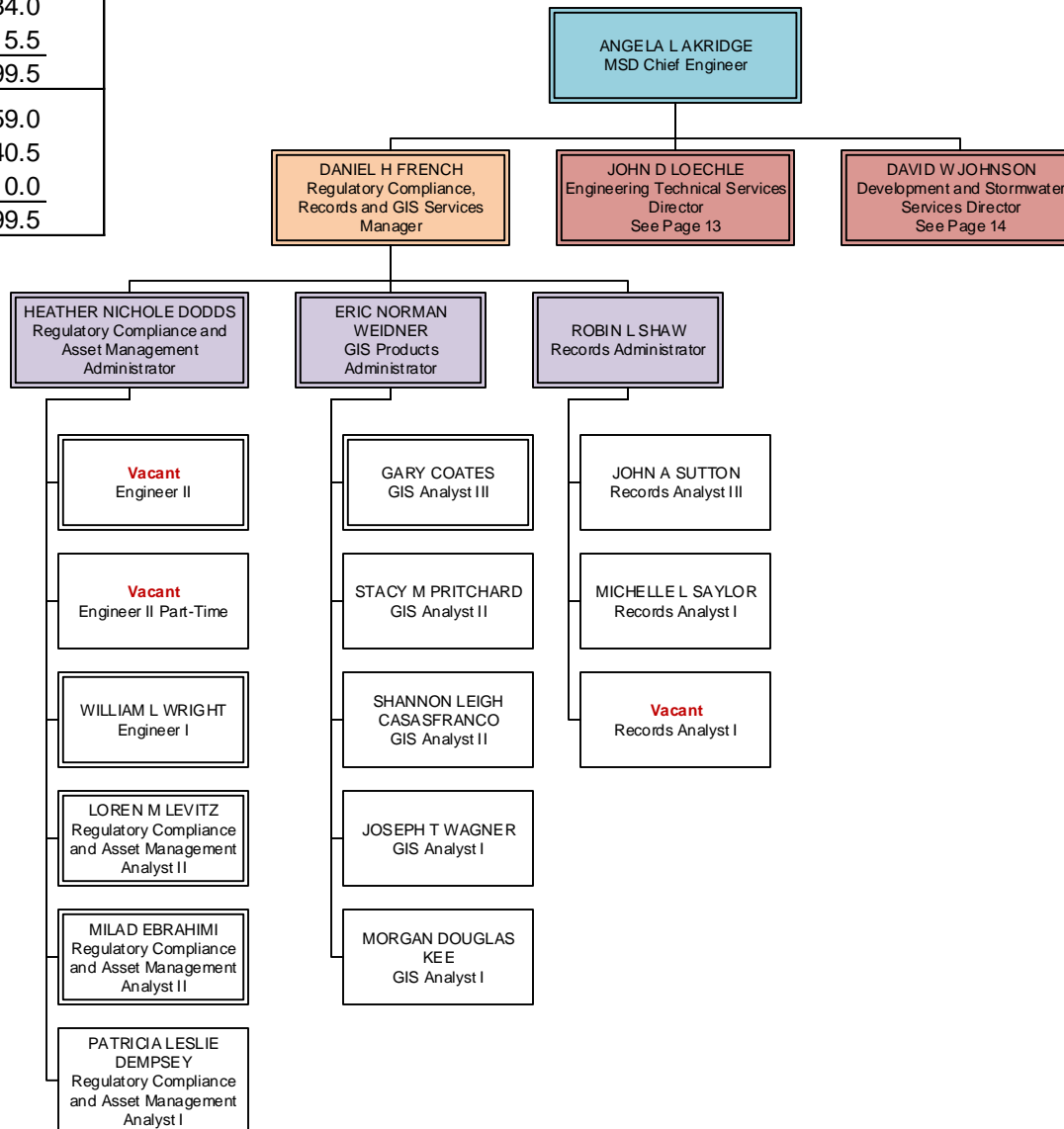


Engineering Division

Engineering Admin, Regulatory Compliance, Records & GIS

DIVISION BUDGET STATUS	
Actual	84.0
Vacant	15.5
Authorized	99.5
== Exempt	59.0
— Non-Exempt	40.5
Unit	0.0
Total	99.5

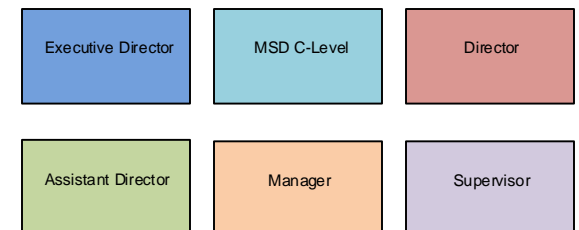
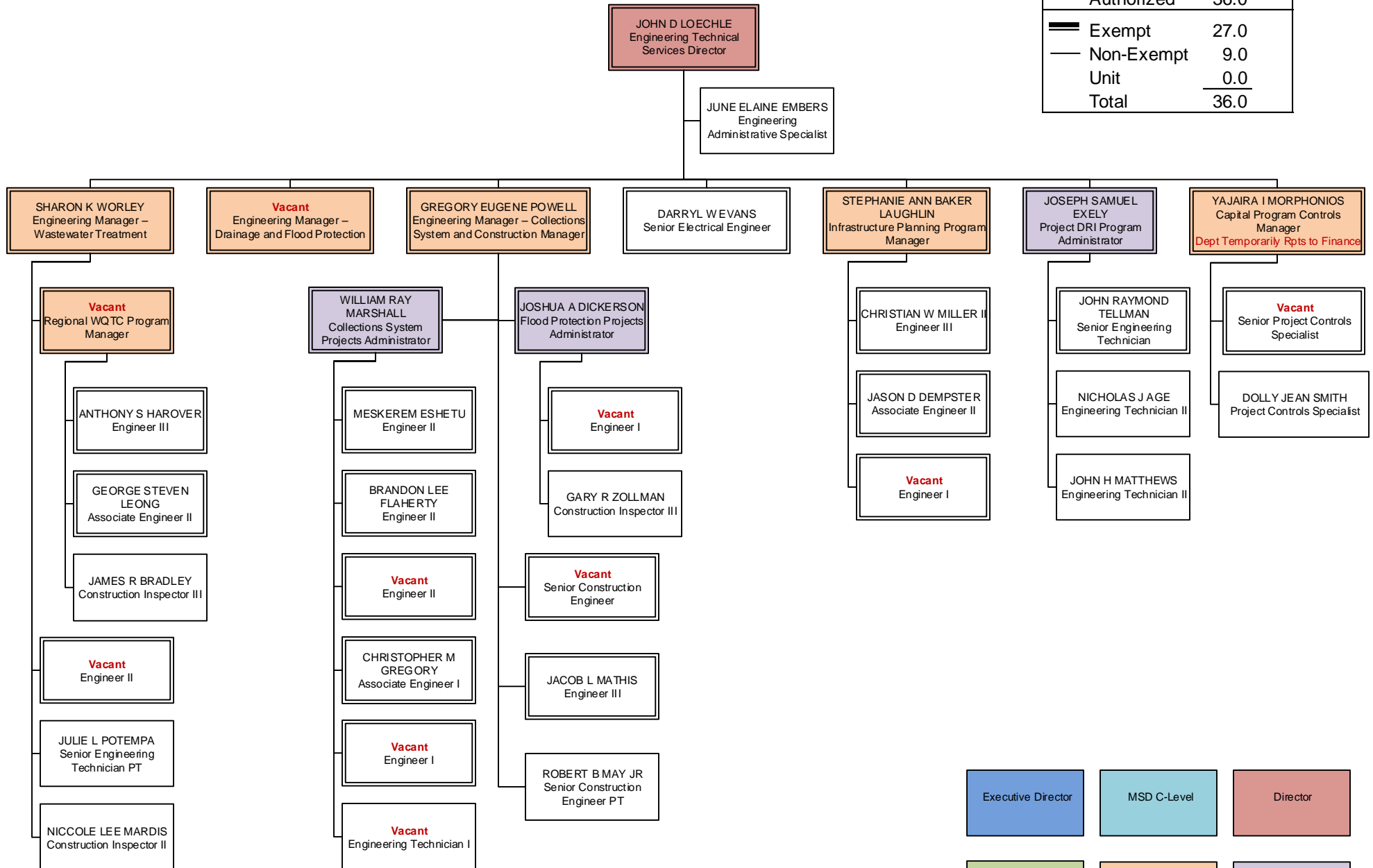
BUDGET STATUS	
Actual	16.0
Vacant	2.5
Authorized	18.5
== Exempt	10.0
— Non-Exempt	8.5
Unit	0.0
Total	18.5



Engineering Division

Engineering Technical Services

BUDGET STATUS	
Actual	26.0
Vacant	10.0
Authorized	36.0
Exempt	27.0
Non-Exempt	9.0
Unit	0.0
Total	36.0



Engineering Division

Development & Stormwater Svcs

BUDGET STATUS	
Actual	42.0
Vacant	3.0
Authorized	45.0
<hr/>	
Exempt	22.0
Non-Exempt	23.0
Unit	0.0
Total	45.0

DAVID W JOHNSON
Development and
Stormwater Services
Director

KIM MICHELLE ROBINSON
Engineering Administrative
Coordinator

WILLIAM JOSEPH
ASHBY
Development Review
Manager

ROBERT E STAUBLE
Construction Inspection
Manager

LORI A RAFFERTY
MS4 Program Manager

Vacant
Floodplain and CRS
Administrator

GARNETT BRADLEY
SELCH
Development Infrastructure
Program Administrator

VIKKI LEANN HUELSMAN
Plumbing Modification
Services Administrator

LACHRISTAL S LEWIS
Engineering Administrative
Coordinator

JORDAN ANTHONY
BASHAM
Engineer II

MATTHEW R SCHAAF
Associate Engineer II

GARY J FELDKAMP
Construction Inspection
Supervisor

PATRICK TEETER
Construction Inspection
Supervisor

Vacant
Engineer II

COLETTE RAE EASTER
Engineer II

ERIN BAKER
WAGONER
Associate Engineer II

BRETT THOMAS CLARK
Engineering Technician II

BRIAN E BRADLEY
Engineer II

DAVID J MULLOY
Engineer II

JOSEPH A KELLY
Associate Engineer II

LISA ACREE HARDLEY
Associate Engineer II

KIMBERLY D LOECHLE
Associate Engineer II

CAROLYN M FUST
Associate Engineer II

JAMES P BOBBITT
Senior Engineering
Technician

Vacant
Engineering Technician II

HORACE GAITHER JR
Engineering Technician I

CHRISTOPHER J CLARK
Engineering Technician I

ANGELA MARIE
SANCHEZ
Engineering Technician I

DENVER CRAFT JR
Construction Inspector III

MICHAEL RAYMOND
HARRETT
Construction Inspector II

JOSHUA I GRAVES
Construction Inspector II

EVERETT E
GREENWOOD JR
Construction Inspector III

TERRY LEE MILLER
Construction Inspector II

RONNIE RICHARDS
Construction Inspector I

RONALD HENDERSON
Construction Inspector III

STEVEN THOMAS
BLANFORD
Construction Inspector II

BENJAMIN L DISMUKES
Construction Inspector II

JERRY EUGENE BOND
JR
Construction Inspector III

TYLER A SMITH
Construction Inspector II

URIAH AHJAH MAUDLIN
Construction Inspector II

LESTER L WURZEL
Construction Inspection
Supervisor

SCOTT THOMAS DOSS
Construction Inspector II

LAUREN BUTLER
Construction Inspector I

BRYON D RICHARDSON
Construction Inspector I

JESSE LEE BARRETT
Construction Inspector I

Executive Director

MSD C-Level

Director

Assistant Director

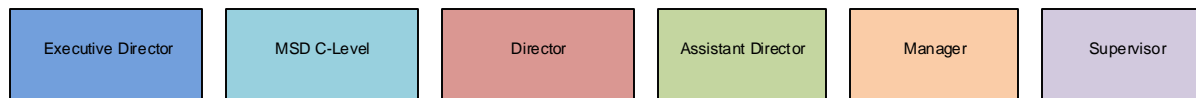
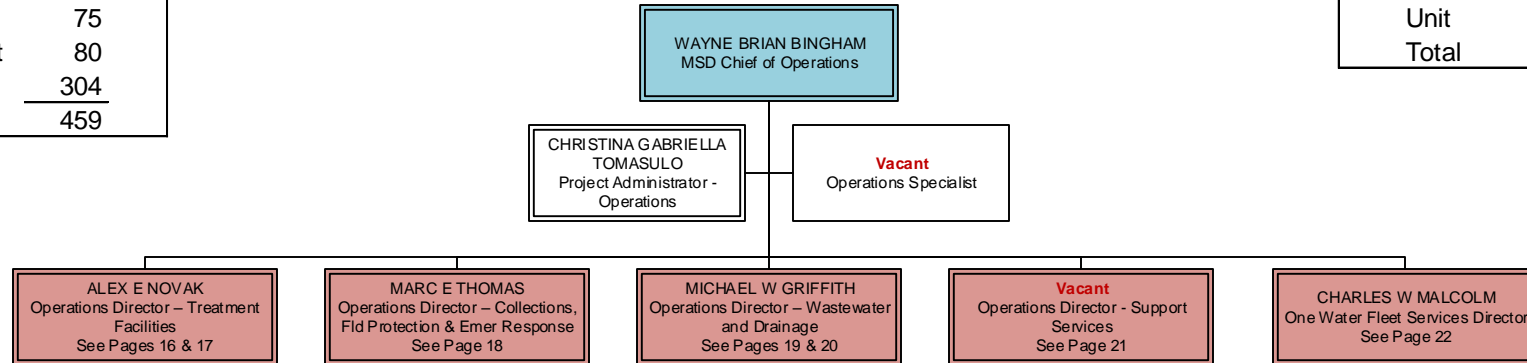
Manager

Supervisor

Operations Division Administration

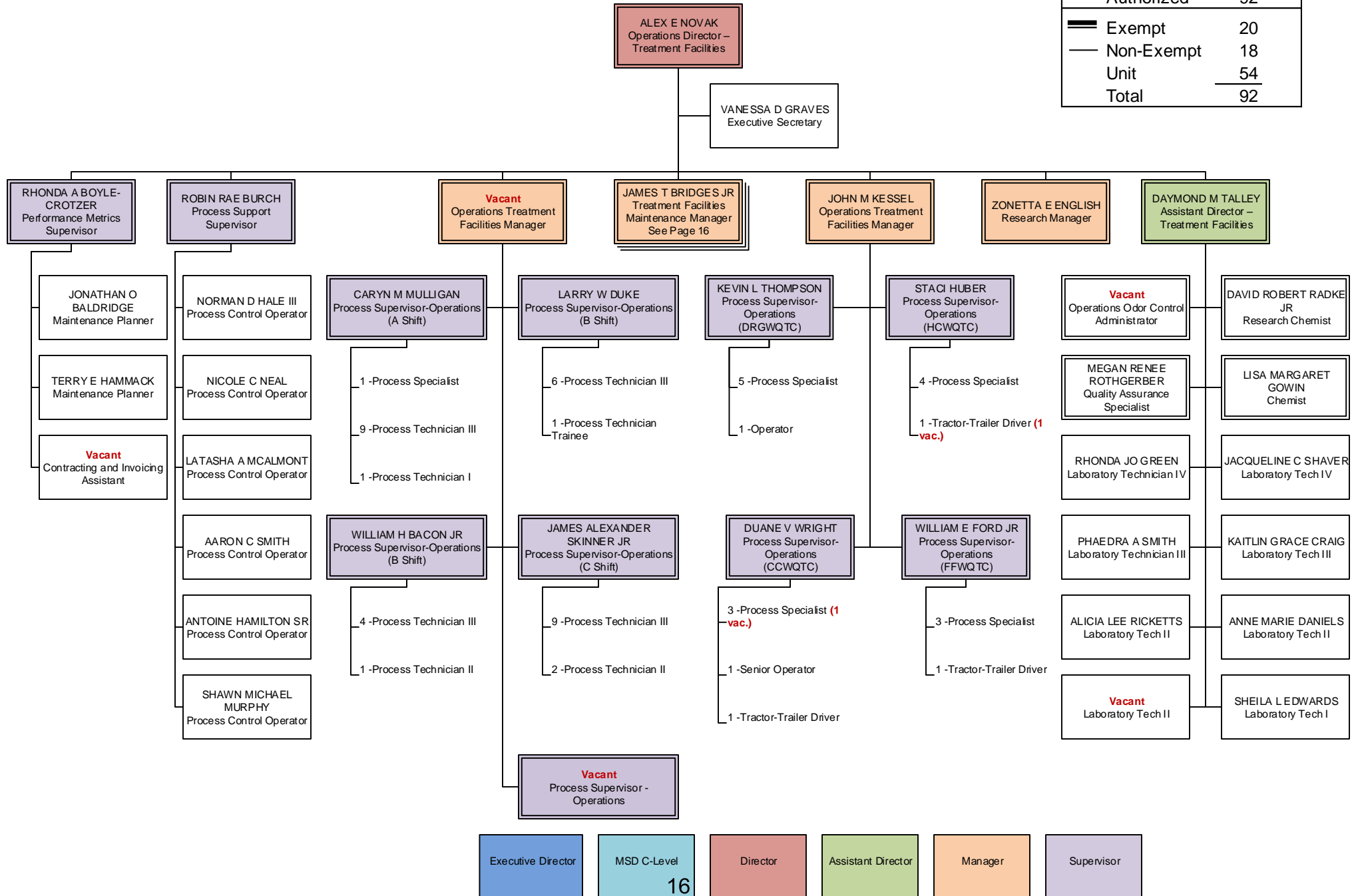
DIVISION BUDGET STATUS	
Actual	422
Vacant	<u>37</u>
Authorized	459
== Exempt	75
— Non-Exempt	80
Unit	<u>304</u>
Total	459

BUDGET STATUS	
Actual	2
Vacant	<u>1</u>
Authorized	3
== Exempt	2
— Non-Exempt	1
Unit	<u>0</u>
Total	3





Operations Division Treatment Facilities

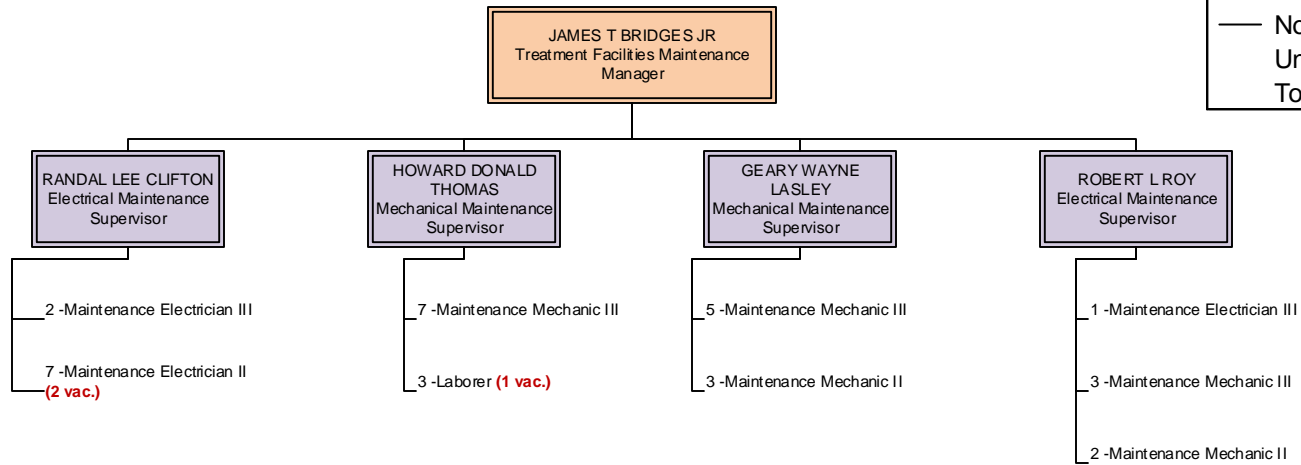
BUDGET STATUS	
Actual	85
Vacant	<u>7</u>
Authorized	92
Exempt	20
Non-Exempt	18
Unit	<u>54</u>
Total	92



Operations Division

Treatment Facilities (Maintenance)

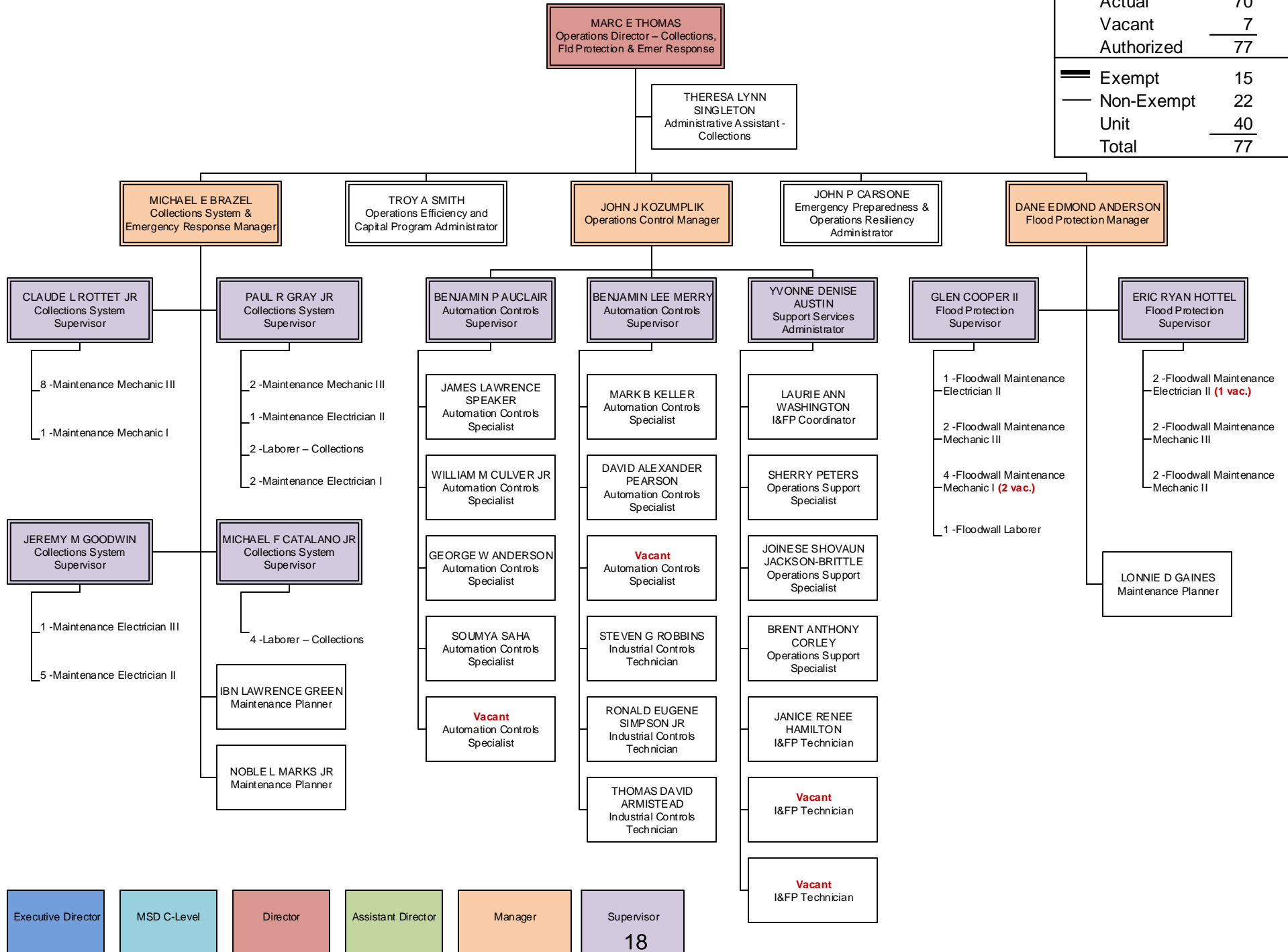
BUDGET STATUS	
Actual	35
Vacant	<u>3</u>
Authorized	38
 Exempt	5
 Non-Exempt	0
Unit	<u>33</u>
Total	38





Operations Division

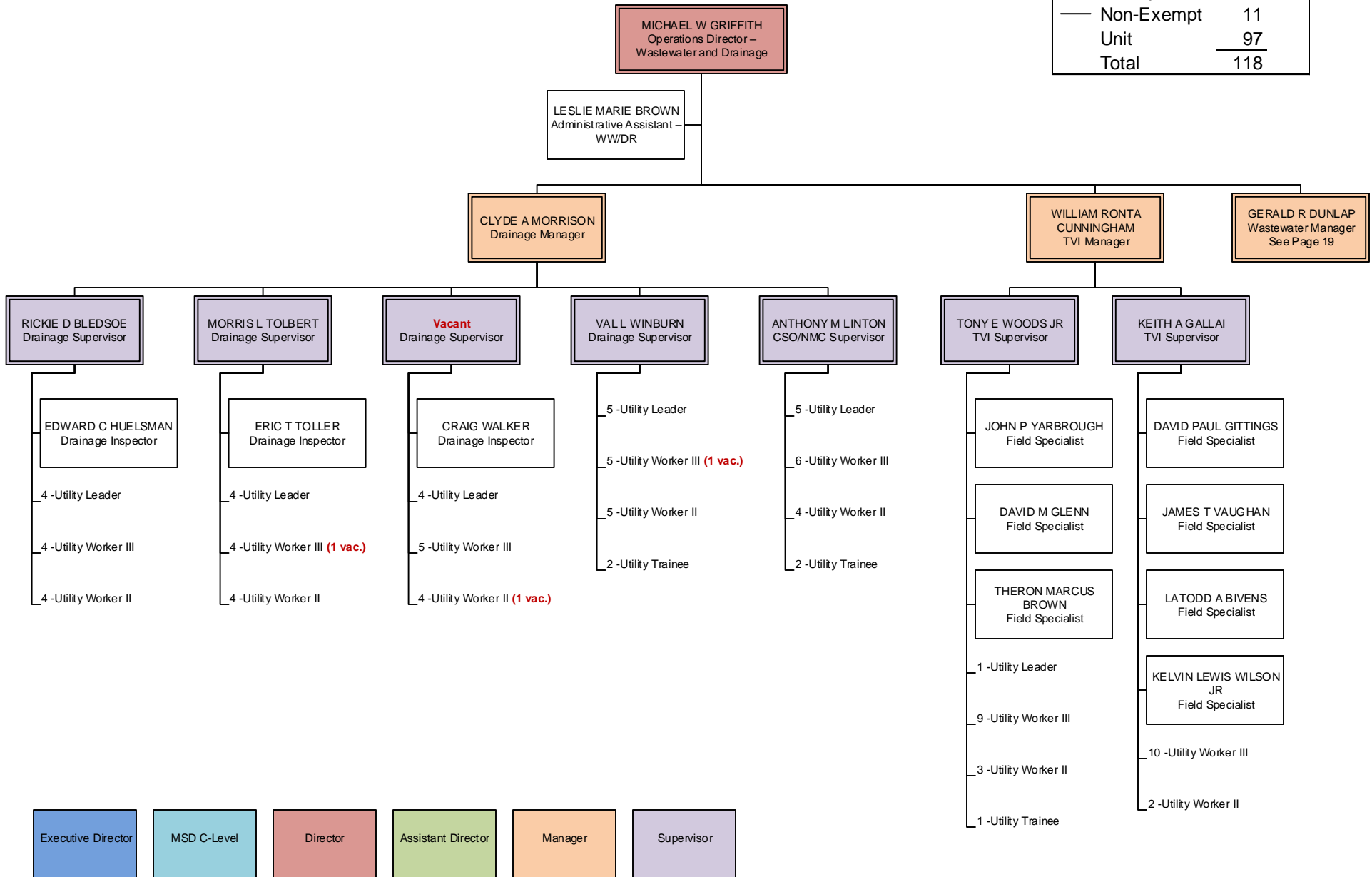
Collections System, Flood Protection & Emergency Response

BUDGET STATUS	
Actual	70
Vacant	7
Authorized	77
<hr/>	
Exempt	15
Non-Exempt	22
Unit	40
Total	77



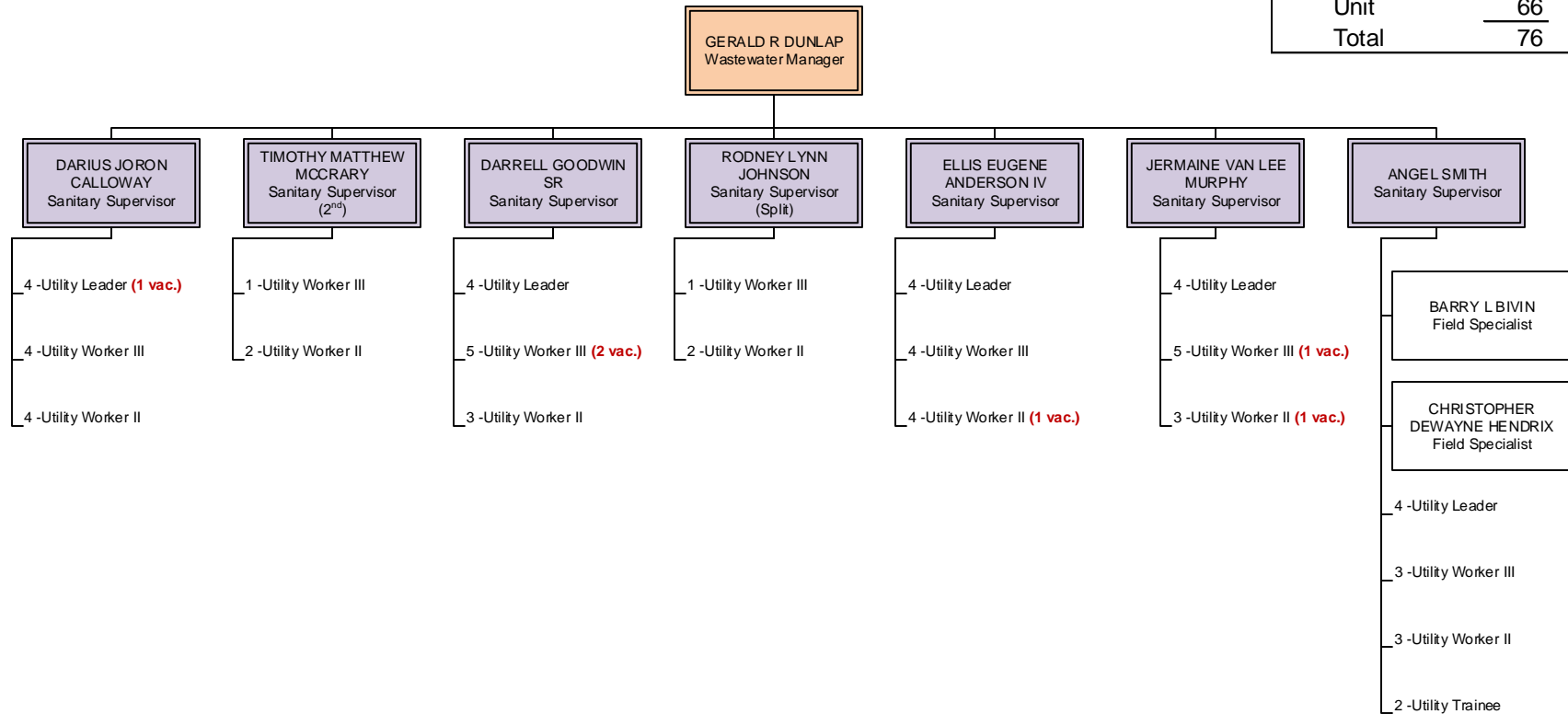
Operations Division
Wastewater and Drainage

BUDGET STATUS		
	Actual	114
	Vacant	4
	Authorized	118
	Exempt	10
	Non-Exempt	11
	Unit	97
	Total	118



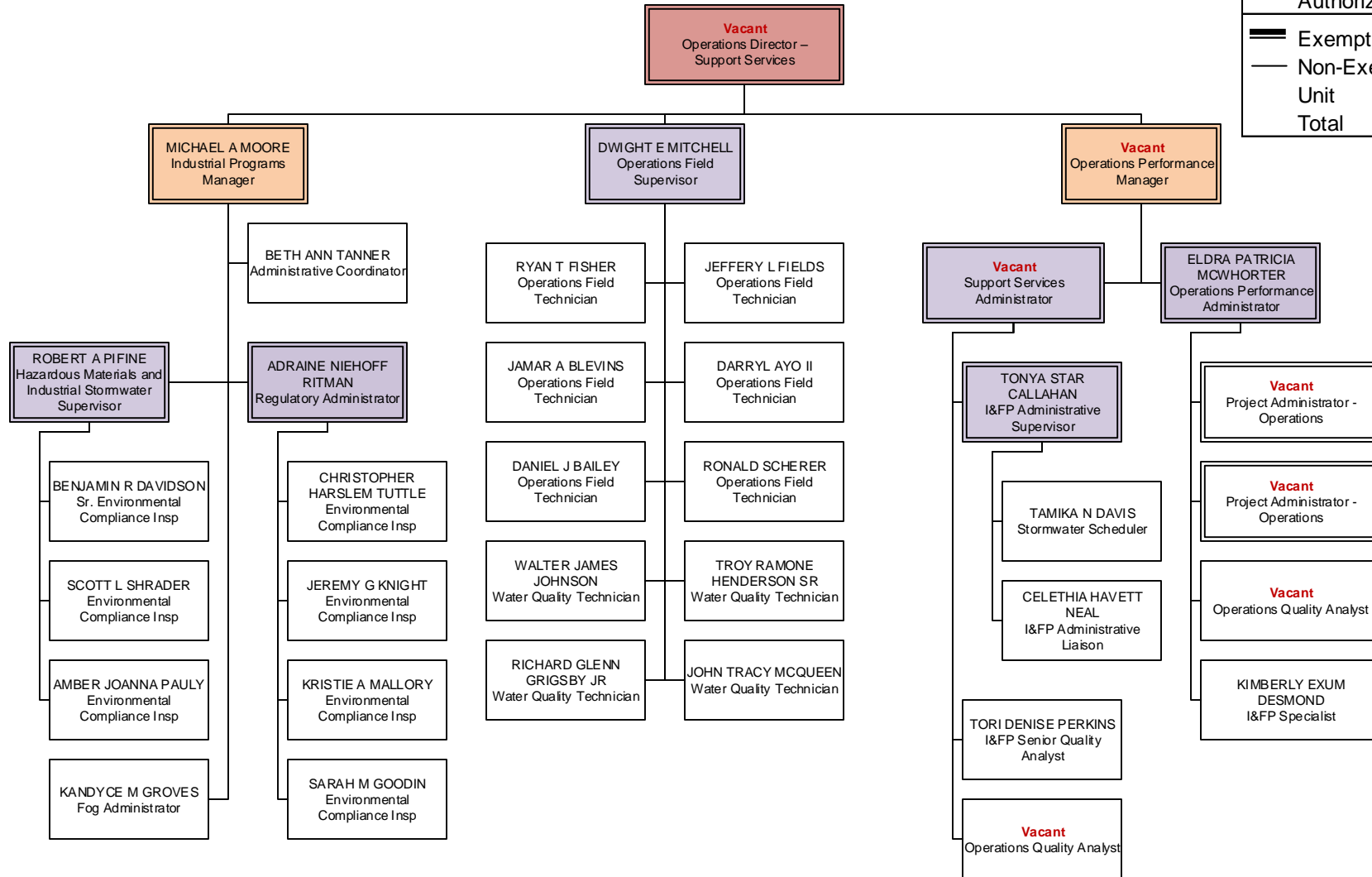
Operations Division Wastewater and Drainage (Sanitary)

BUDGET STATUS	
Actual	70
Vacant	<u>6</u>
Authorized	76
<hr/>	
Exempt	8
Non-Exempt	2
Unit	<u>66</u>
Total	76



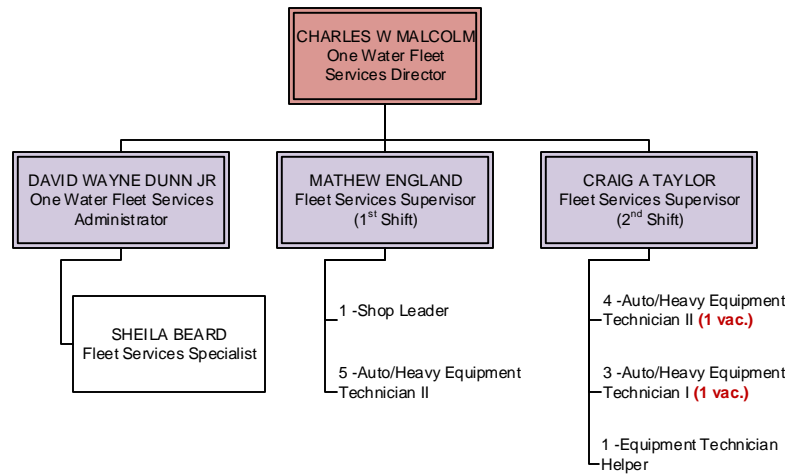
Operations Division Support Services

BUDGET STATUS	
Actual	29
Vacant	7
Authorized	36
<hr/>	
Exempt	11
Non-Exempt	25
Unit	0
Total	36



Operations Division

Fleet Services



BUDGET STATUS	
Actual	17
Vacant	<u>2</u>
Authorized	19
Exempt	4
Non-Exempt	1
Unit	<u>14</u>
Total	19

