

City of Memphis

Semi-Annual Report

April 1, 2019 through September 30,
2019

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



Bobby D. Allen, P.E.



Date

Section 1

Introduction

On September 20, 2012, the United States District Court for the Western District of Tennessee entered a CD (CD) between the City of Memphis (the City) and the United States, the State of Tennessee, and the Tennessee Clean Water Network.

To fulfill the reporting requirements defined in Paragraph VIII.25. of the CD, the City has prepared this Semi-Annual Report, which includes the following information:

- A description of projects and activities completed and milestones achieved during the previous six month period pursuant to the requirements of the CD.
- A summary of significant projects and activities anticipated to be performed, and milestones anticipated to be achieved, in the next six month period pursuant to the requirements of the CD.
- Additional information determined to be appropriate to demonstrate implementation of the remedial actions required under the CD.

This report is organized into six sections:

- **Section 1** provides an introduction.
- **Section 2** documents recent progress and anticipated continuing activities related to development and implementation of the Management, Operations, and Maintenance (MOM) Programs noted in the CD.
- **Section 3** identifies recent progress and anticipated continuing activities related to the Priority Rehabilitation Projects noted in the CD.
- **Sections 4 and 5** provide a summary of additional actions that the City has recently completed and anticipates completing over the next six months.
- **Sections 6** identifies past CD projects and non-CD projects performed.

Section 2

Management, Operations, and Maintenance Programs

As defined in Paragraph V.10 of the CD, the City shall develop and implement specific Management, Operations, and Maintenance (MOM) Programs. These MOM Programs are listed below along with a summary of activities completed in the previous six months and activities anticipated to be performed during the upcoming six months. A chart showing the status of compliance is presented as **Figure 2-1**.

2.1 Sewer Overflow Response Plan

Activities Completed During Previous Reporting Periods

The City submitted a Sewer Overflow Response Plan (SORP) to the U.S. Environmental Protection Agency (EPA) and Tennessee Department of Environment and Conservation (TDEC) on March 11, 2011, before the CD was entered. A copy of the SORP is included in Appendix B of the CD.

The City updated Section 3 of the document and submitted it to EPA on March 30, 2016. The City identified these updates as “form” and not of “substance”. A copy of the document was submitted to the public document repository.

The City reviewed the SORP in February 2019 and determined that no changes were necessary other than the one change it submitted in March 2019. Based upon prior discussion with EPA, by letter dated March 6, 2019 the City updated Section 7.1 of the SORP.

Activities Completed During This Reporting Period

The City was notified by EPA by letter dated May 20, 2019 that the changes submitted on March 6, 2019 were disapproved. The City continued to operate under the approved SORP as modified in 2016.

Activities Anticipated to be Performed During the Next Reporting Period

The City will continue to operate under the approved SORP.

2.2 Fats, Oils, and Grease Management Program

Activities Completed During Previous Reporting Periods

The City submitted a Fats, Oils, and Grease (FOG) Management Program (FOG Program) to EPA and TDEC on March 11, 2011, before the CD was entered. A copy of the FOG Program is included in Appendix C of the CD.

In 2013, the City made minor changes in form, not substance, to the FOG Program and submitted to EPA on October 30, 2013. Subsequently, on April 22, 2014 EPA approved the updated FOG Program submitted by the City.

The City reviewed the approved updated FOG Program and made additional minor changes of form and not substance. These changes were submitted to EPA on January 18, 2017.

Based upon prior discussion with EPA, by letter dated March 6, 2019 the City updated Section 1.1 Purpose of the FOG Program.

Activities Completed During This Reporting Period

The City was notified by EPA by letter dated May 20, 2019 that the changes submitted on March 6, 2019 were disapproved. The City submitted revisions to the FOG to the EPA dated May 30, 2019. The City subsequently submitted a letter dated July 22, 2019 where the City further provided minor changes to the FOG Program identifying these updates as “form” not of “substance.” A copy of the document was submitted to the public document repository on July 22, 2019. The City operated under the processes described in the FOG Program as updated. In addition to conducting inspection and reporting activities, the City has continued public outreach efforts, such as the use of vehicle wraps and bus stop advertising and the distribution of “Can the Grease” door hangers and can lids to discourage residents from discarding cooking oils and other FOG in the sewer system.

Activities Anticipated to be Performed During the Next Reporting Period

The City will continue to operate under the FOG Program as modified on July 22, 2019.

2.3 Lift Station and Force Main O&M Program

Activities Completed During Previous Reporting Periods

On February 5, 2015, the City received comments from EPA on the Lift Station and Force Main Operations and Maintenance Program (LSFM O&M Program). The City revised the LSFM O&M Program to address these comments and submitted the revised version to EPA and TDEC on April 8, 2015. The City received the approval letter from the EPA dated March 13, 2017, and began to implement the approved program. The City reviewed the LSFM O&M Program in February 2019 and determined that no changes were necessary other than the one change it submitted in March 2019. Based upon prior discussion with EPA, by letter dated March 6, 2019 the City updated Section 1, second paragraph, of the LSFMOM Program.

Activities Completed During This Reporting Period

The City was notified by EPA on May 20, 2019 that the changes submitted on March 6, 2019 were disapproved. The City continued to operate under the LSFM Program as approved on March 13, 2017.

Activities Anticipated to be Performed During the Next Reporting Period

The City will continue to operate under the LSFM Program as approved March 13, 2017.

2.4 Gravity Sewer System O&M Program

Activities Completed During Previous Reporting Periods

On February 4, 2015, the City received comments from EPA on the Gravity Sewer Operations and Maintenance Program (GS O&M Program). The City revised the GS O&M Program to address these comments and submitted the revised version to EPA and TDEC on April 8, 2015. The City received new comments from EPA on March 13, 2017 and submitted responses on May 16, 2017. These responses were discussed during a July 17,

2017 meeting between the City and EPA and TDEC, and the City submitted follow-up comments on August 21, 2017. The City received approval of the revised GS O&M Program on November 9, 2017. Based upon prior discussion with EPA, by letter dated March 6, 2019 the City updated Section 1, second paragraph, of the LSFMOM Program.

Activities Completed During This Reporting Period

The City was notified by EPA on May 20, 2019 that the changes submitted on March 6, 2019 were disapproved. The City continued to operate and maintain the gravity sewer system in accordance with the GS O&M Program as approved on November 9, 2017.

Activities Anticipated to be Performed During the Next Reporting Period

The City will continue to operate and maintain the gravity sewer system in accordance with the GS O&M Program as approved on November 9, 2017.

2.5 Inter-Jurisdictional Agreement Program

Activities Completed During Previous Reporting Periods

The City continued negotiations with the Town of Collierville. The City issued draft IJAs and initiated discussions with the City of Millington and City of Lakeland. Also, , the City initiated discussions with the Horn Lake Creek Basin Sewer District ("Sewer District"), which serves as the authorized sewer district for the cities of Horn Lake and Southaven, Mississippi and issued a draft agreement for the Sewer District's review. Negotiations are ongoing with these municipal satellite sewer systems. In addition, the City met with MDEQ and the Sewer District on March 27, 2019.

Activities Completed During This Reporting Period

The City continued negotiations with the Town of Collierville, City of Millington, City of Lakeland, and Horn Lake Creek Basin Sewer District. The City issued a draft IJA and initiated discussions with the City of Bartlett. Negotiations remain ongoing with these municipal satellite sewer systems.

Activities Anticipated to be Performed During the Next Reporting Period

The City intends to initiate negotiations with the City of Germantown and expects to issue a draft IJA during the next reporting period. Once a draft IJA has been issued to Germantown, the City will be in active negotiations with each satellite sewer system discharging to its sanitary sewer system. Additionally, the City will participate on a conference call with TDEC, MDEQ, EPA, and the Horn Lake Sewer District on October 16, 2019 to discuss the draft agreement within the context of pretreatment issues.

2.6 Continuing Sewer Assessment Program

Activities Completed During Previous Reporting Periods

The Continuing Sewer Assessment Program (CSAP) was approved on September 10, 2014. The Year 1 and Year 2 priority areas specifically outlined in the CSAP were

completed during previous reporting periods in accordance with the CD Year 1 and Year 2 deadlines and the City is continuing to assess the Wastewater Collection and Transmission System (WCTS) outside of the specified areas. The City submitted a revision to the CSAP on June 8, 2018. The City identified this an update of “form” and not of “substance”. The City received approval of the revised CSAP in a letter from the EPA dated November 5, 2018 and began to implement the approved program.

Activities Completed During This Reporting Period

The City continued to implement the November 5, 2018 CSAP in accordance with the CD.

Activities Anticipated to be Performed During the Next Reporting Period

The City will continue implementation of the November 5, 2018 approved CSAP.

2.7 Infrastructure Rehabilitation Program

Activities Completed During Previous Reporting Periods

The City completed the development of the Infrastructure Rehabilitation Program (IRP), as required in Paragraph V.10.g of the CD, and submitted the document to EPA and TDEC for review on February 25, 2015. The EPA approved the IRP on July 13, 2016.

Activities Completed During This Reporting Period

The City continued to prioritize rehabilitation in accordance with the IRP and rehabilitation in the North and South Priority Rehabilitation Areas (as designated in Appendix G of the CD) through the Group 1 Relay and Group 1 CIPP construction contracts. Group 1 Relay project consists of approximately 19,000 linear feet (LF) of 6” and 8” pipe replacement. In this reporting period, approximately,11,500 linear feet have been completed. The project is anticipated to be completed at the beginning of 2020. Group 1 CIPP project consists of rehabilitation of approximately 54,000 linear feet of 8” to 36” diameter gravity mains. The contractor has begun point repairs to allow segments to be CIPP.

Activities Anticipated to be Performed During the Next Reporting Period

The City will continue to prioritize rehabilitation in accordance with the IRP. Rehabilitation of prioritized assets designated in Appendix G is anticipated to continue.

**Figure 2-1
MOM Programs Progress**

Program	CD Reference	CD Milestone	Progress Last Six Months						Anticipated Activities Next Six Months					
			Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Sewer Overflow Response Program	V.10.a	-	Continued to implement program.						Continue to implement program.					
Fats, Oils, and Grease Management Program	V.10.b	-	The City revised program July 22, 2019 and operated per updated program						Continue to implement program.					
Lift Station & Force Main O&M Program	V.10.c	9/19/2013	Continued to implement program.						Continue to implement program.					
SCADA installation at lift stations	V.10.c.iii	3/19/2013	Previously completed. SCADA is operational.											
Gravity Sewer System O&M Program	V.10.d	9/19/2013	Continued to implement program.						Continue to implement program.					
Inter-Jurisdictional Agreement Program	V.10.e	3/19/2018	Continued to implement program.						Continue to implement program.					
Continuing Sewer Assessment Program	V.10.f	9/19/2013	Continued to implement program.						Continue to implement Program.					
Infrastructure Rehabilitation Program	V.10.g	3/9/2015	Continued to implement program.						Continue to implement program.					

Section 3

Priority Rehabilitation Projects

As defined in Paragraph V.11 of the CD, the City shall complete various Priority Rehabilitation Projects. These projects are listed below along with a summary of activities completed in the previous six months and activities anticipated to be performed during the upcoming six months. A chart showing the status of compliance is presented as **Figure 3-1**.

3.1 Priority Areas Projects

Paragraphs V.10.f and V.11.a of the CD identify areas of the WCTS that are to be assessed during the first and second years following approval of the CSAP. These areas are shown in Appendix E and F of the CD, respectively. Additionally, Appendix G identifies North and South Priority Rehabilitation Areas that will be completed within six years and seven months of the IRP approval received on July 13, 2016 (i.e., completed by February 13, 2023).

Activities Completed During Previous Reporting Periods

Required condition assessment and rehabilitation prioritization was completed in accordance with the deadlines specified in the CD, and this progress was discussed in detail in previous Semi-Annual Reports. A mainline relay project (Group 1 Relay) continued in the North and South Priority Rehabilitation Areas (Appendix G). This project consists of the replacement of approximately 19,000 linear feet (LF) of 6" and 8" diameter gravity mains with new 8" diameter pipe. Additionally, the procurement process was initiated for the Group 1 CIPP contract and a pre-bid meeting was held. This project consists of rehabilitation of approximately 54,000 linear feet of 8" to 36" diameter gravity mains in the North and South Priority Rehabilitation Areas. The Interim Priority Areas Project Report was submitted to USEPA and TDEC on October 11, 2018 and was approved by USEPA on November 5, 2018.

Activities Completed During This Reporting Period

In this reporting period, approximately 11,300 linear feet of relay was completed for Group 1 Relay. The contractor for the Group 1 CIPP project has begun point repairs to allow for segments to continue CIPP rehabilitation. In addition, 22 point repairs were completed in the Year 1 and Year 2 (Appendix E and F, respectively) areas in preparation for annual City paving projects to minimize post-paving construction.

Activities Anticipated to be Performed During the Next Reporting Period

Group 1 Relay and Group 1 CIPP projects are anticipated to continue.

3.2 Critical Infrastructure Areas Projects

Activities Completed During Previous Reporting Periods

As discussed in Paragraph V.11.b of the CD, three areas within the WCTS were identified to receive prioritized rehabilitation due to the critical nature of the infrastructure and the potential consequences of large sanitary sewer overflow volumes in the event of a failure. A map showing the locations of these areas is included as Appendix H of the CD. Rehabilitation of these areas was completed during previous reporting periods and

prior to the revised completion date of October 22, 2017. The Final Critical Areas Projects draft report was submitted to EPA and TDEC on April 23, 2018, and placed in the Public Document Repository. As such, these projects are now included in Section 6.1 Projects Completed in Previous Reporting Periods. Table 3-1 displays the progress completed as of this reporting period and the anticipated progress of the next reporting period.

3.3 Prior Assessment Areas Projects

As discussed in Paragraph V.11.c of the CD, four additional rehabilitation projects were identified based on previous inspection and assessment activities. These projects were to be completed by September 20, 2016, i.e., four years after the effective date of the CD. The four projects were completed during previous reporting periods and prior to the September 20, 2016 date established in the CD. As such, these projects continue to be included in Section 6.1 Projects Completed in Previous Reporting Periods. Table 3-1 displays the progress completed as of this reporting period and the anticipated progress of the next reporting period.

Figure 3-1
Priority Rehabilitation Projects Progress

Project	CD Reference	CD Milestone	Progress Last Six Months						Anticipated Activities Next Six Months						
			Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Priority Area Projects	V.11.a	9/9/2015	Previously completed.												
Assess areas identified in Appendix E		9/9/2016	Previously completed.												
Assess Year 2 areas (including Appendix F)		Via implementation of IRP	Previously completed.												
Prioritize areas identified in Appendix G		2/13/2023	Rehabilitation of Appendix G areas continued.			Rehabilitation of Appendix G areas anticipated to continue.									
Complete Appendix G rehabilitation projects		8/13/2018 - 10/13/2018	Previously completed.												
Interim Priority Areas Project Report		Within six months of rehabilitation projects completion	No work this period.						No work is anticipated.						
Final Priority Areas Project Report															
Critical Infrastructure Areas Projects	V.11.b	4/23/2018	Previously completed.												
Complete Appendix H rehabilitation projects		4/23/2018	Previously completed.												
Final Critical Areas Project Report															
Priority Assessment Area Projects	V.11.c.(i)	9/19/2016	Previously completed.												
Nonconnah Interceptor		V.11.c.(ii)	9/19/2016	Previously completed.											
Mud Island Manholes		V.11.c.(iii)	9/19/2016	Previously completed.											
Burchart-Horn Manholes		V.11.c.(iv)	9/19/2016	Previously completed.											
Wolf River Interceptor															

Section 4

Additional Measures

In addition to the projects and activities described in the previous sections, the measures described below are related to the City's ongoing CD compliance.

4.1 M.C. Stiles WWTP Foam Study and Outfall Improvements

As described in Paragraph V.12 of the CD, the City was required to implement the M.C. Stiles Wastewater Treatment Plant (WWTP) Foam Study and Outfall Improvements Work Plan that was included as Appendix I of the CD. On May 19, 2014, the first amendment of the CD, which identified a preferred alternative design consisting of a vortex structure and which included a revised construction schedule, was approved and filed with the court. The vortex structure was completed, and plant effluent flow was directed through the vortex on September 19, 2017. This project has been moved to Section 6.1 Projects Completed in Previous Reporting Periods.

4.2 State Projects

As stated in previous Semi-Annual Reports, the two State Projects: the Color Study and the Geographic Information System, have already been completed and therefore have been moved to Section 6.1 Projects Completed in Previous Reporting Periods.

4.3 Program Administration Activities

Since entering into the CD, the City has conducted several administrative activities for the implementation of the CD program, known as the Sewer Assessment and Rehabilitation Program (SARP10).

Activities Completed During Past and This Reporting Periods

- **Coordination with Emergency Personnel:** Through the condition assessment and rehabilitation work, the City and SARP10 staff coordinate with fire and police departments' leadership to keep them abreast of on-going activities and work locations.
- **Coordination with Special Projects:** The SARP10 Team has been working closely with City personnel to identify upcoming City special projects that may require coordination with future sewer improvements. The sewer lines associated with the projects are assessed in advance using CCTV inspection to identify areas in need of repair. The repairs are subsequently conducted to avoid disrupting future construction activities and to avoid patching associated paved areas.
- **Street Paving Projects:** The SARP10 Team has been working closely with City and State personnel to identify upcoming street paving projects. The sewer lines associated with these streets are assessed in advance using CCTV inspection to identify areas in need of repair, and required repairs are subsequently made to avoid patching newly paved

areas. During this reporting period a total of 84 point repairs and 39 manhole adjustments were completed ahead of paving.

- **Workforce Development:** The City continued to implement its workforce development program. The program is comprised of five-stages: assess, recruit, train, place, and retain. The assessment phase identifies the types of jobs that will be needed to complete the CD- related work and that could be filled by local personnel. Subsequently, potential candidates are identified and screened. These personnel are provided training as necessary to avail them for potential employment by contractors working on CD-related projects.
- SARP10 has a program called the “Green Team” which goes door-to-door to distribute information for upcoming condition assessment work. During the previous reporting period, the Green Team distributed information for two phases of assessment work. Therefore, there was no need for the distribution of additional information during this reporting period.

As a result of this program and other initiatives, approximately 175 or more personnel have obtained full-time employment with SARP10 program companies or assessment and rehabilitation contractors working on the program for the City.

- **Public Relations:** After consulting with leaders of various neighborhood associations, the Program determined that distributing emails with relevant information instead of conducting public meetings to the affected neighborhoods was a more efficient use of resources while remaining effective at disseminating the information. SARP10 continues to utilize a website to provide current information, tentative schedules for work, and assessment and rehabilitation contracts.

Activities Anticipated to be Performed During the Next Reporting Period

Implementation of the activities described above are expected to continue through the upcoming reporting period.

4.4 Loosahatchie Interceptor Assessment

The City undertook condition assessment, flow monitoring, and survey of approximately 48,000 linear feet of the Old Loosahatchie Interceptor and 61,600 linear feet of the New Loosahatchie Interceptor to further understand its structural condition, causes and contributions to SSOs, and to evaluate the need for cleaning and rehabilitation. The information gained during this assessment was used to facilitate the Loosahatchie Diversion Project design. The interceptor assessment was completed during previous reporting periods, and as such this section has been moved to Section 6.1 Projects Completed in Previous Reporting Periods.

4.5 Ongoing CSAP Activities

As of September 30, 2019, the City has assessed approximately 1,766 of the estimated 2,808 miles of pipe contained within the WCTS. This equates to approximately 63% of the system (this number does not include the pipe assessed using the SL-RAT technology described in Section 5.2.10). In accordance with the CD,

the City is required to assess approximately 10% of the WCTS per year following approval of the CSAP in September 2014 (i.e., 50% of the WCTS should be assessed by September 2019). The current assessment rate of 63% places the City well ahead of the CD-required schedule. Additionally, 60 lift stations and 38 force mains have been assessed to date.

Activities Completed During Previous Reporting Periods

The City divided the WCTS into 13 watershed basins and subsequently divided these basins into 131 sub-basins and is assessing these areas in phases. To date, assessment has been completed in the pilot area and in Phase 1-5 areas, and assessment was continued in Phase 6 and Fletcher Creek areas. The phases were completed based on the historical sanitary sewer overflow (SSO) occurrences starting with the areas identified in Appendix E, then the area in Appendix F and proceeding from there in general to the next highest SSO area. In addition, the City is doing other work outside WCTS.

Activities Completed During This Reporting Period

Approximately 336,000 LF of gravity sewer was assessed. Phase 6 consists of approximately 1.59 million LF of smaller-diameter pipe assessment and 300,000 LF of large-diameter pipe assessment. Approximately 215,732 linear feet of small-diameter pipe and 14,223 linear feet of large-diameter pipe were assessed in Phase 6 areas.

Condition assessment continued in the Fletcher Creek area, which includes a small section outside the WCTS, and consists of approximately 1.2 million LF of smaller-diameter pipe assessment and 65,000 LF of larger-diameter pipe assessment. Approximately 105,813 linear feet of small-diameter pipes were assessed in Fletcher Creek areas.

Twenty-two lift stations were assessed during this reporting period. An engineering firm completed desktop assessment for nine of the City's force mains and this contract was extended to include fourteen additional force mains.

Activities Anticipated to be Performed During the Next Reporting Period

It is anticipated that assessment work will continue in Phase 6 and Fletcher Creek areas. It is anticipated that procurement of Phase 7 SSES contract will begin. In addition, it is anticipated that assessment of the force main and lift stations will also continue.

4.5 City-Wide Master Plan

The City has undertaken a wastewater master plan for the key sewer sheds within the WCTS.

Activities Completed During the Previous Reporting Period

Work continued on the model and master plans.

Activities Completed During This Reporting Period

Work continued on the model and master plans.

Activities Anticipated to be Performed During the Next Reporting Period

Work will proceed during the next reporting period.

Section 5

Infrastructure Rehabilitation Projects

5.1 Priority Rehabilitation Areas

Pursuant to the CD and IRP requirements, the City shall complete the rehabilitation projects within the priority areas identified in Appendix G of the CD by February 13, 2023, i.e., within six years and seven months after EPA's approval of the IRP which occurred on July 13, 2016.

Activities Completed During Previous Reporting Periods

The Group 1 Relay work continued. Additionally, 4 manholes were adjusted to grade and 5 point repairs were completed.

The procurement process for the Group 1 Cured-In-Place Pipe (CIPP) rehabilitation project was initiated and a pre-bid meeting was conducted.

Activities Completed During This Reporting Period

The Group 1 Relay work (i.e., mainline rehabilitation) continued in the North and South Priority Rehabilitation Areas in accordance with the IRP.

Additionally, 1 manhole was grade-adjusted (i.e., for accessibility) bringing the total to 180; and 4 point repairs were completed, bringing the total to 38 for the North and South Priority Rehabilitation Areas.

The procurement process for the Group 1 Cured-In-Place Pipe (CIPP) rehabilitation project was completed and a contract was awarded.

Activities Anticipated to be Performed During the Next Reporting Period

It is anticipated that the City will continue the Group 1 Relay and Group 1 CIPP work on the prioritized projects in accordance with the IRP.

5.2 Other Rehabilitation Projects

Although not required by the CD, the City has started rehabilitation projects in areas of the WCTS outside of the Priority Rehabilitation Areas.

5.2.1 Point Repairs and Manhole Adjustments

Point repair and manhole adjustment contracts have been procured in order for the City to address high value sewer line defects and buried manholes in real-time so as to address defects that could be causing or that are likely to cause SSOs and to also facilitate access for condition assessment field testing activities.

Activities Completed During Previous Reporting Periods

- Point Repair Contract: Approximately 183 point repairs were completed.
- Manhole Adjustment Contract: Approximately 244 manholes were adjusted.

Activities Completed During This Reporting Period

- Point Repair Contract: Approximately 186 point repairs were completed.
- Manhole Adjustment Contract: Approximately 284 manholes were adjusted.

Activities Anticipated to be Performed During the Next Reporting Period

It is anticipated that both the point repair and manhole adjustment contracts will continue.

5.2.2 John's Creek Interceptor Repair and Evaluation

As stated in previous Semi-Annual Reports, the John's Creek Interceptor Repair and Evaluation Project has already been completed and therefore has been moved to Section 6.1 Projects Completed in Previous Reporting Periods.

5.2.3 Black Bayou Stream Crossing Rehabilitation

As stated in previous Semi-Annual Reports, the Black Bayou Stream Crossing Rehabilitation project has already been completed and therefore has been moved to Section 6.1 Projects Completed in Previous Reporting Periods.

5.2.4 Barksdale Siphon Redesign and Construction

After condition assessment results revealed a deteriorated siphon on S. Barksdale Street, the City selected an engineering firm to collect flow data and provide analysis of the condition of the sewer in the area. With this information, an engineering firm was selected to design a relocation and replacement of the siphon and to relay associated gravity lines in the area. After alternative analysis, a final design was selected and a construction cost estimate and specification package was developed. Construction work associated with installing a new siphon and gravity lines and all other activity was completed during this reporting period and as such will be moved to Section 6.1 in future Semi Annual Reports.

5.2.5 Rodney Baber Project

After condition assessment discovered a sinkhole along the sewer alignment located at Rodney Baber Park, the City conducted further investigation upstream and downstream of the 36-inch sewer that runs through the park. The 36-inch sewer was discovered to have low flow and servicing a minimal number of facilities. The City approved a relay design to bypass the upstream flow to the downstream side of the sinkhole with a 12-inch sewer and abandon the existing 36-inch sewer. Additionally, the design included diverting flow in an existing 24-inch line on Hollywood Street from the 36-inch interceptor to an existing 84-inch interceptor (south of the 36-inch sewer). This project was completed during this reporting period.

5.2.6 Fletcher Creek Stabilization

An exposed 42-inch sanitary sewer was discovered in an open channel tributary to Fletcher Creek. As a result, a contractor was mobilized to implement remedial

measures to stabilize the sewer line. Subsequently, an engineering firm was engaged to design a more permanent solution. Construction of the temporary stabilization and reinforcement of the 42-inch sanitary sewer interceptor was completed and is being monitored. A firm was selected for design of a more permanent stabilization measure. SARP10 has reviewed and approved the construction and design documents. The site will continue to be monitored and if deemed necessary the more permanent solution will be implemented.

5.2.7 Lift Station Rehab Design

Lift Station Assessments were conducted, and summary reports were completed as part of SARP10. Upon review of the assessment data, five lift stations were scheduled for rehabilitation. The stations were chosen based on the condition and criticality of certain aspects of the stations. After assessment of additional lift stations, eleven stations have been identified for rehabilitation. Two design firms have been selected to complete this task.

5.2.8 Loosahatchie Diversion Design

Early in the SARP10 Program, the City identified the New and Old Loosahatchie Interceptors as a priority for condition assessment. These sewer lines were assessed utilizing CCTV and sonar equipment. Furthermore, a calibrated hydraulic model was built in an effort to understand why historic SSO's were occurring. As part of the model calibration, flow meters were installed to capture flows and depths in the sewer lines. The decision was made to divert flow from the Old Loosahatchie Interceptor to the New Loosahatchie Interceptor via 7,900 linear feet of 54-inch gravity sewer. The diversion sends flow from downstream of N. Watkins St. on the Old Loosahatchie interceptor to the New Loosahatchie. A contract was issued for the interceptor design and easement documents necessary to construct the diversion sewer were developed. The project was bid, awarded and the contractor began work.

5.2.9 Pilot Stream Crossing Assessment

Two basins were chosen for a pilot study where a sewer line crossed an open channel stormwater conveyance. A consultant was hired to perform a desktop analysis and subsequent field assessments of the crossings in the Pilot area. The goal of the assessments is to verify sewer line crossings and determine the conditions of the banks of the open channel near the sewer line crossing.

Additionally, the consultant was hired to perform a Stream Crossing Verification on potential stream crossings in the WCTS identified in the GIS Database.

5.2.10 SL-RAT Acoustic Assessment

SARP10 began performing acoustic assessment of gravity sewer mains in a Pilot area. The device used for the testing is called the SL-RAT which stands for Sewer Line Rapid Assessment Tool. The acoustic testing is a very quick and efficient method for determining if there are obstructions in the pipe that might impede flow. If the SL-RAT assessment indicates that there is some type of obstruction in the pipe (such as roots or grease) further assessment may be engaged.

5.2.11 Gayoso Force Main

The City of Memphis is undergoing a new design of the Gayoso Force Main to reclaim the original design capacity. The force main has been sliplined in the past which reduced the original capacity of the force main. A design consultant was selected and began work on the design documents for replacement of the existing force main. Eventually, the design will be complete, and a contractor can begin and complete the construction phase of the project.

5.2.12 Front Street Gate Abandonment

The Front Street Interceptor, that formerly flowed to the Mississippi River and now flows to the North Treatment Plant, was identified to be studied for alternatives to install a second barrier additional to the gate at the end of the outfall.

5.2.13 Stream Crossing Stabilization

There are several locations in the WCTS where a gravity sewer line crosses an open channel stormwater conveyance. Field visits identified nine crossings to complete stabilization of the channels. A professional services firm was contracted to complete the design for the stabilization at each crossing.

5.2.14 Shelby Oaks Main Re-Route

A collapse of a gravity sewer line was discovered at the site and a bypass system was installed until permanent measures are completed. The design for a permanent solution was completed, and the realignment will begin and be completed by a contractor.

5.2.15 Mud Island Emergency CIPP

A collapse in a gravity sewer line on the Mud Island Interceptor was discovered. Prices were received from different contractors and technology firms. The contract was awarded, and the contractor began work.

5.2.16 Front Street Cleaning

Following assessment of the Front Street Interceptor, this interceptor was identified as needing to be heavy cleaned. The City will complete cleaning of 4,000 LF.

5.2.17 Group 4 CIPP

By utilizing the prioritization methods outlined in the IRP, the City identified rehabilitation to be completed in the southern downtown portion of the City. The City procured and received bids for this work through Group 4 CIPP on January 31, 2019. This project consists of approximately 47,000 LF of CIPP with associated point repairs and rehabilitation of approximately 375 manholes. The NTP was issued on April 15, 2019 and work is on-going.

Section 6

Past Consent Decree Projects and Non-Consent Decree Projects

6.1 Projects Completed in Previous Reporting Periods

The following projects have been completed during previous reporting periods and included in previous Semi-Annual Reports:

- Cane Creek and Hickory Hill Pilot Assessment Area (last included in April 2015 – Sept 2015 Semi-Annual Report)

Critical Infrastructure Areas Projects (last included in April 2018 – September 2018 Semi-Annual Report)

- The first critical area completed rehabilitation of the 42-inch through 48-inch Wolf River Interceptor, in 2012.
- The second critical area completed rehabilitation of a portion of the 96-inch interceptor at the entrance/exit ramp located at Mile 51 of Interstate 240, in 2017.
- The third critical area completed rehabilitation on the 84-inch interceptor located where McLean Boulevard crosses the Wolf River and Interstate 40, in 2012.

Prior Assessment Areas Projects (last included in April 2016 – September 2016 Semi-Annual Report):

- Cured-in-Place Pipe (CIPP) lining of the Nonconnah Interceptor Between Manholes Numbered N06-119 and N06-127
 - Rehabilitation or replacement of manholes on Mud Island that include manhole number M10-005 plus the two (2) manholes immediately downstream and repair of the liner in the corresponding portion of the 60-inch interceptor near these manholes
 - Rehabilitation of approximately sixty-four (64) manholes identified as having heavy or medium corrosion in Appendix B of a June 6, 2006 study report prepared by Buchart-Horn on behalf of Memphis
 - CIPP lining on segments of the Wolf River Interceptor between demarcation points W05-120 and W05-130
- M.C. Stiles WWTP Foam Study and Outfall Improvements (last included in April 2018 – September 2018 Semi-Annual Report)
 - Loosahatchie Interceptor Assessment (last included in April 2018 – September

- 2018 Semi-Annual Report).
- State Projects (last included in April 2016 – Sept 2016 Semi-Annual Report):
 - Color Study
 - Geographic Information System (GIS)
- Old Loosahatchie Hwy 51 Emergency Sewer Line Replacement
- Snowden Assessment and Rehabilitation (last included in April 2016 – Sept 2016 Semi- Annual Report)
- Woodview Subdivision Rehabilitation (last included in April 2016 – Sept 2016 Semi-Annual Report)
- Lick Creek Interceptor CIPP (last included in April 2016 – Sept 2016 Semi-Annual Report)
- Loosahatchie Interceptor Replacement (last included in April 2016 – Sept 2016 Semi- Annual Report)
- St. Elmo Pipe Bursting (last included in April 2016 – Sept 2016 Semi-Annual Report)
- John’s Creek Interceptor Repair and Evaluation (last included in October 2017 – March 2018 Semi-Annual Report)
- Black Bayou Stream Crossing Rehabilitation Project (last included in April 2018 – September 2018 Semi-Annual Report)
- Barksdale Siphon Redesign and Construction Project (last included in September 2018 – April 2019 Semi-Annual Report)

6.2 Other Rehabilitation Projects Completed by City of Memphis

In addition to the assessment projects completed under the SARP10 program, the City routinely completes improvement projects of the WCTS. During this reporting period, the City estimates that in addition to the SARP10 program work, it has rehabbed 16,660 linear feet of pipe with CIPP. Since September 2012 (effective date of CD), the City has otherwise installed approximately 149,152 linear feet of CIPP and rehabilitated 10 lift stations (Gayoso, Big Orange, Genyth, N. Watkins, Jack Carley, Valero, Kimbrough, Wilson and Harbor, and South Mendenhall).