

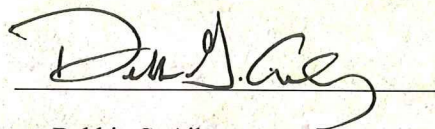
Quarterly Progress Report

Volume 47

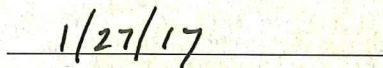
Fourth Quarter Report
October 1 through December 31, 2016

Submitted to EPA on January 27, 2017

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.



Debbie G. Ailey



Date



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Executive Summary

On February 11, 2005, the Knoxville Utilities Board (KUB) entered into a Consent Decree with the United States, the State of Tennessee, the Tennessee Clean Water Network, and the City of Knoxville. The following Quarterly Progress Report is submitted to fulfill the reporting requirements described in Section XIX of the Consent Decree.

Consent Decree language, pages 82-83: *“Beginning thirty (30) Days after the first Calendar Quarter following the Date of Entry, and thirty (30) Days after each Calendar Quarter thereafter until termination of the Consent Decree, KUB shall submit to the Parties, and simultaneously place in the PDR, a Quarterly Progress Report. Quarterly Progress Reports shall not be subject to the Public Review Requirement of Section VI.A.2. However, KUB shall receive questions and comments from the public for KUB’s review for a period of twenty (20) Days following placement in the PDR. Each Quarterly Progress Report shall contain:*

1. *A summary of compliance with and activities related to implementation of the Phase 1 CAP/ER and Phase 2 CAP/ER, including: the status of construction projects in comparison to the schedules that have been established pursuant to the Consent Decree for those projects; and schedule deadlines and milestones achieved during Calendar Quarter and expected during the next Calendar Quarter;*
2. *A summary of compliance with and activities related to implementation of the CPE and CCP;*
3. *A summary of implementation of and compliance with the Process Controls Program;*
4. *A summary of the implementation of the Capacity Assurance Program for the Calendar Quarter, including the number of, and anticipated flow from, sewer connections that have been authorized, by Sewerbasin, a description of the projects that have been authorized and the number of credits earned and banked by KUB that will be expended for those projects, by Sewerbasin, and any exceptions granted for connections for essential services;*
5. *Identification of any transfer of an ownership interest, operation, management, or other control of the Treatment Works, or any portion thereof.*
6. *A description of the status of compliance or non-compliance with the requirements of this Decree and, if applicable, the reasons for non-compliance, including a list of all violations that are subject to stipulated penalties under Section X of this Decree.*
7. *A spreadsheet and summary of all SSOs, Bypasses, Diversions and effluent limit violations that occurred during the previous Calendar Quarter. Information on Building Backups may be provided in separate spreadsheets and summaries from other SSOs. The spreadsheets and summaries shall identify:*
 - a. *For all SSOs, the location, source, date, time, duration, pathway (if any), receiving water (if any), the reason for each SSO, the total SSO volume, the volume returned to the WCTS, and the volume not captured;*
 - b. *For all Bypasses and Diversions, the location, date, time, duration, volume and reason for each Bypass and Diversion; and the total Bypass and Diversion volumes;*
 - c. *For all effluent limit violations, all information required to be reported on KUB’s Discharge Monitoring Reports.*
8. *The water quality monitoring data and other information required pursuant to Section VII.D.1.(e).(v).”*

KUB compiled this Quarterly Progress Report to detail the events that occurred during the fourth quarter of 2016 from October 1 through December 31. This is the forty-seventh quarterly report required of KUB under this Consent Decree.

Report Organization

Section 1: Phase 1 CAP/ER and Phase 2 CAP/ER – Summarizes the compliance with and activities related to implementation of the Phase 1 CAP/ER and Phase 2 CAP/ER, including the status of construction projects in comparison to the schedules that have been established pursuant to the Consent Decree for those projects; and schedule deadlines and milestones achieved during the Calendar Quarter and expected during the next Calendar Quarter.

Section 2: Comprehensive Performance Evaluation and Composite Correction Plan – Summarizes the compliance with and activities related to the implementation of those deliverables.

Section 3: Process Controls Program – Summarizes the implementation of and compliance with the deliverable.

Section 4: Capacity Assurance Program – Summarizes the implementation of the Capacity Assurance Program for the Calendar Quarter, including the number of, and anticipated flow from, sewer connections that have been authorized, by sewerbasin, a description of the projects that have been authorized and the number of credits earned and banked by KUB that will be expended for those projects, by sewerbasin, and any exceptions granted for connections for essential services.

Section 5: Transfers of Ownership – Identifies any transfers of ownership interest, operation, management, or other control of the treatment works, or any portion thereof.

Section 6: Compliance and Non-Compliance with the Consent Decree – Describes the status of compliance or non-compliance with requirements of the Consent Decree.

Section 7: SSOs, Bypasses, Diversions, and Effluent Limit Violations – Provides a spreadsheet and summary of all SSOs, Bypasses, Diversions, and effluent limit violations.

Section 8: Water Quality Monitoring Data – Summarizes all sampling that was conducted, the results of the sampling, and the projected data collection for the reporting period.

Status of Deliverables

Below is a list of significant dates on which KUB submitted deliverables to EPA or received approval for deliverables. To date, KUB has submitted all deliverables in accordance with the schedule set forth in the Consent Decree.

October 28, 2016

- Submitted to EPA – Quarterly Progress Report third quarter 2016

Section 1 Phase 1 CAP/ER and Phase 2 CAP/ER

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... A summary of compliance with and activities related to implementation of the Phase 1 CAP/ER and Phase 2 CAP/ER, including the status of construction projects in comparison to the schedules that have been established pursuant to the Consent Decree for those projects; and schedule deadlines and milestones achieved during Calendar Quarter and expected during next Calendar Quarter.”*

KUB began developing a Corrective Action Plan/Engineering Report (CAP/ER) in January 2004, following the completion of the Phase I Sanitary Sewer Overflow Evaluation Report (SSOER) required by the Agreed Order with the Tennessee Department of Environment and Conservation (TDEC) and, subsequently, the Consent Decree. The objective of the Phase I CAP/ER is to identify facility improvements needed to address the conditions causing SSOs occurring in the collection system during the period of 2001–2004 with the goal of eliminating the SSO locations on the Long-Term List and to support future growth needs. KUB submitted the Phase 1 CAP/ER to EPA on October 28, 2005. Comments were received from EPA on February 23, 2006. Per EPA’s letter, KUB submitted a 30-day response to EPA’s comments on March 27, 2006. The Revised Phase 1 CAP/ER was submitted to EPA on May 22, 2006, and subsequently approved by EPA on June 30, 2006. **All work necessary to meet the objectives of the Phase 1 CAP/ER was completed by the June 30, 2013, deadline.** The Phase 2 CAP/ER was submitted to EPA on September 9, 2009, and approved on March 22, 2010. **All work necessary to meet the objectives of the Phase 2 CAP/ER was completed by March 31, 2014, prior to the June 30, 2016, deadline.**

EPA Approved Project Extensions and Changes

All previously approved project extensions and changes are listed below.

- **1-1 Upper First Creek Collector Project (Mini-basin 1A1, 2A2, and 3D1)** – revised completion date was FY 08/09 and was completed on schedule.
- **1-19 Edgewood Drive Rehabilitation Project** – revised completion date was FY 11/12. Project was completed ahead of schedule.
- **1-20 Vine Middle School Rehabilitation Project** – revised completion date was FY 07/08 and project was completed as scheduled.
- **1-21 College Park Rehabilitation Project** – revised completion date was FY 11/12. An additional extension to January 31, 2013, was requested and approved. Project was completed ahead of schedule.
- **2-1 Lower Second Creek Replacement/Rehabilitation at I40/I275 Junction** – revised completion date was FY 09/10 and project was completed as scheduled.
- **2-2 Lower Second Creek Replacement/Rehabilitation at Woodland** – revised completion date was FY 10/11. Additional extensions to FY 11/12 and then to January 31, 2013, were requested and approved. Project was completed ahead of schedule.
- **2-4 Dutch Valley Collector Rehabilitation (Sewershed 10B1)** – revised completion date was September 2007 and was completed as scheduled.
- **2-5 Rickard and Wilson Collector Rehabilitation (Sewershed 10C1)** – revised completion date was September 2007 and project was completed as scheduled.
- **3-6 Interstate 40 and Middlebrook Pike Trunk Replacement Project** – revised completion date was FY 11/12. An additional extension to FY 12/13 was requested and approved and the project was completed as scheduled.

- **3-7 Neyland Drive Trunk Replacement (Lower Third Creek Trunk Replacement)** – revised completion date was FY 12/13. Project was completed ahead of schedule.
- **4-2 Gleason Drive Collector Rehabilitation Project** – revised completion date was June 30, 2010, and project was completed as scheduled.
- **4-3 Middlebrook Pike Rehabilitation (Sub-basin 27C3)** – revised completion date was June 30, 2010, and project was completed as scheduled.
- **4-4 Northshore Drive Trunk Replacement Project** – revised completion date was FY 10/11. An additional extension to FY 11/12 was requested and approved. Project was completed ahead of schedule.
- **4-6 Shadyland Drive Rehabilitation (Sub-basin 36A2) Project** – revised completion date was June 30, 2010, and was completed as scheduled.
- **4-28 Queensridge (Queensbury) Pump Station Upgrade Project** – revised completion date is FY 11/12. Project was completed ahead of schedule.
- **S-1 Ginnbrook Pump Station Rehabilitation** – revised completion date was FY 08/09 and project was completed as scheduled.
- **S-5 South Knoxville/Knob Creek Storage Facility** – Project was removed from CAP/ER and replaced with the project below.
- **Revised S-5 Neubert Springs Collector and West Ford Valley Trunk Rehabilitation** – revised completion date was FY 08/09 and project was completed as scheduled.

Capital Improvement Plan for FY 04/05 – FY 13/14

The following is a list of facility improvement projects included in the Capital Improvement Plan for fiscal years 04/05 to 13/14. Many of these projects were “find and fix” rehabilitation projects. Find work is defined as the inspection (i.e. flow monitoring, CCTV, manhole inspections, smoke testing, etc.) and design phase of the project. Fix is defined as the construction phase that may include manhole rehabilitation/replacement, main line rehabilitation/replacement, and lower lateral rehabilitation/replacement. Other projects were trunkline capacity improvements or wet-weather storage. Each project was considered part of the overall Phase 1 or Phase 2 CAP/ER.

Phase I CAP/ER Ongoing Projects

All Phase I CAP/ER projects have been completed.

Phase I CAP/ER Completed Projects

First Creek

1. **1-1 Upper First Creek Collector Project (Mini-basin 1A1, 2A2, and 3D1)** – Estimated total quantities: 10,235 ft. gravity sewer replaced/rehabbed; 32 new manholes installed; 175 manholes rehabbed; 69 private laterals reinstated.
2. **1-2 Lower First Creek Collector Project (Sub-Basin 8B2)** – Replaced approximately 10,525 ft. of 8 in. – 12 in. sewer, and rehabilitated approximately 14,000 ft. of 8 in. sewer.
3. **1-3 First Creek Storage Tanks** – Designed and built 9 million gallon (MG) wet-weather storage tank to control sewer overflows near Old Broadway during rain events. Designed and built 5 MG wet-weather storage tank to control sewer overflows near North Hoitt Avenue during rain events.
4. **1-4 Lower Fountain City Pipe Replacement Project** – Replaced 20 manholes. Replaced approximately 2,715 ft. of sewer mains and rehabilitated 142 ft. of sewer.
5. **1-5 Upper Fountain City Trunkline Replacement Project** – Replaced and upgraded approximately 6,000 ft. of trunk sewer connecting lines in upper Fountain City to Upper

First Creek storage tank. The project addressed SSOs along Broadway, Cedar Lane, and Fountain Road.

6. **1-6 Sub-basin 08A1 Rehabilitation Project** – Rehabilitated approximately 21,067 ft., and replaced approximately 10,273 ft. of sewer.
7. **1-11 Fountain City Trunkline Replacement Phase IV Project** – Replaced approximately 2,991 ft. of sewer.
8. **1-12 Cedar Lane Area Sanitary Sewer Rehabilitation Project** – Rehabilitated approximately 8,500 ft. of sewer.
9. **1-13 Fair Drive Phase II** – Rehabilitated 3,691 ft. and replaced 2,458 ft. of existing 8-12 in. gravity sewer along Fair Drive.
10. **1-14 Wilderness Road Area Gravity Sewer Replacement Project** – Replaced approximately 5,440 ft. of sewer.
11. **1-15 Replace trunk sewer upstream of lower storage unit** – Replaced 1,600 ft. of existing 42 in. and 130 ft. of 24 in. pipe.
12. **1-16 Clearview Street Sewer Project** – Replaced approximately 4,468 ft. of sewer.
13. **1-17 Fountain Road Trunkline Sewer Improvement Project** – Upsized 3,700 ft. of gravity sewer using open cut and pipe bursting methods. Replaced manholes and services.
14. **1-18 Greenfield Drive Rehabilitation Project** – Replaced approximately 3,300 ft. of existing sewer with 8 in. and 12 in. PVC and ductile iron pipe.
15. **1-19 Edgewood Drive Rehabilitation Project** – Replaced 519 ft. of 8 in. sewer, 179 ft. of 12 in. sewer; rehabilitated 22,300 ft. of 8 in. sewer, and 60 ft. of 12 in. sewer using CIPP and pipe bursting. Project also included rehabilitation of 662 vertical ft. and replacement of 10 manholes.
16. **1-20 Vine Middle School Rehabilitation Project** – Completed find and fix work to identify cause of overflow in the vicinity of 214 Bertrand Street. Replaced approximately 200 ft. of 8 in. and 100 ft. of 15 in. sewer and rehabilitated 987 ft. of 16 in. sewer.
17. **1-21 College Park Rehabilitation Project** – Replaced approximately 446 ft. of 8 in. PVC and rehabilitated 1,581 ft. of 8 in. sewer using pipe bursting. Project also included replacement of six manholes.
18. **1-22 E. Jackson Avenue Rehabilitation Project** – Replaced 3,485 ft. of 8 in. sewer using pipe bursting, replaced another 84 ft. of 8 in. gravity sewer, rehabilitated 425 ft. of sewer using CIPP, and replaced 17 manholes.
19. **1-23 Oglewood Avenue Rehabilitation Project** – The summary above for the Edgewood Drive Rehabilitation Project includes the Oglewood Avenue Rehabilitation Project, since those projects were combined.
20. **1-24 Fulton Short Line Project** – Replaced approximately 520 ft. of sewer that contributes to the cause of overflow in the vicinity of 214 Bertrand Street.
21. **1-25 First Creek Sub-basins 3 and 4 Rehabilitation Project** – Rehabilitated 26,500 ft. of line and replaced 10,500 ft. Project included CCTV, smoke testing, and manhole inspections.
22. **1-26 Cherry Street Rehabilitation Project** – Upsized approximately 1,150 ft. of sewer trunklines and replaced two manholes and rehabilitated two manholes.
23. **1-27 Fair Drive Rehabilitation Project** – Preliminary engineering work discovered that 567 ft. of 8 in. gravity main and three manholes were rehabilitated after the SSO occurred. No additional work is necessary to address the overflow at this location.

Second Creek

1. **2-1 Lower Second Creek Replacement/Rehabilitation at I40/I275 Junction** – Replaced 280 ft. and three manholes, pipe burst 1,959 ft.; CIPP was used to rehab 2,313 ft., 29 manholes were rehabbed, and 50 laterals were reinstated.
2. **2-2 Lower Second Creek Replacement/Rehabilitation at Woodland** – Replaced approximately 1,700 ft. of trunk sewer and rehabilitated approximately 600 ft. of trunk sewer and replaced ten manholes.
3. **2-3 Second Creek 23E1** – Inspected a total of 28,067 ft. of pipe for find and design rehabilitation needs for Mini-basin 23E1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
4. **2-4 Dutch Valley Collector Rehab (Mini-basin 10B1)** – Assessed and rehabilitated, where needed, approximately 16,400 ft. of collector pipe. This project was combined with the Rickard and Wilson Collector Rehab project below.
5. **2-5 Rickard and Wilson Collector Rehab (Mini-basin 10C1)** – Assessed and rehabilitated, where needed, approximately 19,000 ft. of collector pipe. Project was combined with Mini-basin 10B1.
6. **2-6 Second Creek Pilleaux PS Collector** – Rehabilitated 19,600 ft. of collection system piping in mini-basin 05A4. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
7. **2-8 Second Creek Sub-basin 15 Rehabilitation** – Rehabilitated approximately 23,500 ft. of pipe in mini-basin 15D2. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
8. **2-9 Second Creek Trunk Sewer Improvements Phase I** – Replaced approximately 4,100 ft. of existing trunkline with 30 in. sewer.
9. **2-10 Second Creek Trunk Sewer Improvements Phase II** – Replaced approximately 3,700 ft. of existing trunkline with 30 in. sewer and replaced approximately 1,400 ft. of existing trunkline with 36 in. sewer
10. **2-11 Burnside Rehabilitation Project** – Replaced 517 ft. of 8 in. sewer and 1,651 ft. of 12 in. sewer using pipe bursting. Six manholes were replaced and 3 were rehabbed.
11. **2-12 Camelia Road Rehabilitation Project** – Replaced 430 ft. of 8 in. pipe and two manholes. 220 ft. of 8 in. pipe was rehabbed using CIPP.
12. **2-13 Cedar Heights Road Rehabilitation Project** – Replaced 123 ft. of 8 in. pipe and rehabbed 263 ft. of 8 in. pipe with CIPP.
13. **2-14 Central Avenue Pike Rehabilitation Project** – Replaced 102 ft. of 10 in. pipe, 25 ft. of 18 in. pipe, two manholes. CIPP was used to rehab 659 ft. of 8 in. pipe.
14. **2-15 1000 Block Elm Street Rehabilitation Project** – Replaced 632 ft. of 8 in. sewer and nine manholes. Rehabbed 1,400 ft. of 8 in. sewer using CIPP and rehabbed three manholes. One lateral was reinstated.
15. **2-16 1600 Block Elm Street Rehabilitation Project** – Pipe burst 285 ft. of existing 8 in. sewer and replaced two manholes.
16. **2-17 Shasta Drive Rehabilitation Project** – Replaced 714 ft. of 8 in. pipe and 6 manholes. CIPP was used to rehab 2,149 ft. of 8 in. pipe.
17. **2-18 Nicholas Road - Clinton Highway Rehabilitation Project** – Replaced 405 ft. of 8 in. pipe and one manhole.
18. **2-19 Cumberland Avenue Rehabilitation Project** – Replaced 1,448 ft. of 8 in. sewer and 10 manholes. Rehabbed 525 ft. of 8 in. sewer using CIPP and reinstated 12 laterals.
19. **2-20 Sierra Road Rehabilitation Project** – CIPP was used to rehab 969 ft. of 8 in. pipe.
20. **2-21 Morelia Avenue Rehabilitation Project** – Replaced 382 ft. of 8 in. sewer and two manholes. Rehabbed three manholes, 2,375 ft. of 8 in. sewer using CIPP, and reinstated 74 laterals.

- 21. 2-22 Dale Avenue Rehabilitation Project** – The 8 in main was replaced in 2003 with a 12 in. ductile iron main in Dale Avenue. No additional overflows have occurred.

Third Creek

- 1. 3-2 Third Creek Basin 11** – Assessed and rehabilitated approximately 129,657 ft. in Sub-basin 11. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
- 2. 3-3 Third Creek Basin 9 Phase I** – Assessed and rehabilitated collector sewer in 9A1, 9A2, 9A4, and 9D1 (CAP/ER Scope). **Phase II** – Designed rehabilitation methods for collectors in Sub-basin 9 (approximately 177,900 ft.). Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
- 3. 3-4 Upper McKamey Trunk Sewer Replacement** – Project replaced approximately 1,600 ft. of 12 in. and 15 in. trunk sewer. This project further enhanced improvements already made in Third Creek to address overflows along McKamey Road. **Third Creek Road Trunk Sewer Replacement** – Project included approximately 3,100 ft. of 24 in. and 30 in. trunkline. The project replaced and upgraded the trunkline from Western Avenue along Third Creek to the Third Creek storage facility. It addressed overflows occurring at 5600 Western Avenue. Project was extended approximately 2,000 ft. to reach the new location of the Third Creek Storage Facility at the KUB Hoskins Center.
- 4. 3-5 Third Creek Storage Facility** – Designed and constructed 4.5 MG wet-weather storage tank to control sewer overflows near Western Avenue and Third Creek Road during rain events.
- 5. 3-6 Interstate 40 and Middlebrook Pike Trunk Replacement Project (East Fork of Third Creek Trunk Replacement)** – Replaced 11,973 ft. of sewer, rehabilitated 783 ft., of sewer, replaced 77 manholes, and rehabilitated eight manholes.
- 6. 3-7 Neyland Drive Trunk Replacement (Lower Third Creek Trunk Replacement)** – Replaced approximately 4,600 ft. of sewer with 48 in. CCFMP, slip-lined 685 ft. of sewer with 42 in. CCFMP and replaced 34 manholes. The inverted siphon near the mouth of Third Creek was also replaced.
- 7. 3-8 Third Creek Bike Trail Trunk Replacement** – Improvements to the sewer hydraulics were made at the connection of the 12 in. main to a 36 in. trunk sewer running south of Sutherland Avenue along Third Creek bike trail. Improvements included approximately 50 ft. of 12 in. line and a new manhole. Additionally, rehabilitation in SB 28B1 has reduced the peaks to the 12 in line.
- 8. 3-11 Sutherland Avenue Collector Rehabilitation Project (Sub-basin 28B1)** – Replaced 303 ft. of existing sewer and rehabilitated 3,332 ft. of existing sewer collectors in mini-basin 28B1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
- 9. 3-12 Clinch and 21st Street Collector Rehabilitation Project (Sub-basin 35B3)** – Replaced approximately 2,563 ft. of existing sewer, rehabilitated 3,094 ft. and replaced/rehabbed 25 manholes.
- 10. 3-14 McKamey Road Interconnection Project** – Analysis that occurred during preliminary engineering for this project determined that it had been adequately addressed by previous construction work.
- 11. 3-15 Ball Camp Pike Improvement Project** – Analysis that occurred during preliminary engineering for this project determined that it had been adequately addressed by previous construction work.
- 12. 3-16 Painter Avenue Trunk Replacement Project** – Original scope was changed from trunkline upsizing to collection system rehabilitation/replacement in Mini-basin 28B1. Pipe burst approximately 17,800 ft. of existing sewer, rehabilitated 550 ft. and replaced/rehabbed 61 manholes

13. **3-17 McKamey Road Relief Project** – Replaced approximately 3,600 ft. of 15 in. and 1,400 ft. of 18 in. sewer.
14. **3-20 Citico Street Rehabilitation Project** – Project was combined with 3-23 Hillvale Circle Rehabilitation Project, 3-24 Montgomery Avenue Rehabilitation Project, and 3-27 Montgomery Avenue Rehabilitation Project. Combined projects replaced approximately 22,500 ft. of 8 in. sewer and 28 manholes.
15. **3-21 Deerfield Road Rehabilitation Project** – Pipe burst approximately 600 ft. of existing gravity sewer and replaced two manholes.
16. **3-22 Fountain Drive Rehabilitation Project** – Replaced approximately 750 ft. of existing sewer, rehabilitated 800 ft. and replaced/rehabbed nine manholes.
17. **3-23 Hillvale Circle Rehabilitation Project** – Project was combined with 3-20 Citico Street Rehabilitation Project, 3-24 Montgomery Avenue Rehabilitation Project, and 3-27 Montgomery Avenue Rehabilitation Project. Combined projects replaced approximately 22,500 ft. of 8 in. sewer and 28 manholes.
18. **3-24 Montgomery Avenue Rehabilitation Project** – Project was combined with 3-20 Citico Street Rehabilitation Project, 3-23 Hillvale Circle Rehabilitation Project, and 3-27 Montgomery Avenue Rehabilitation Project. Combined projects replaced approximately 22,500 ft. of 8 in. sewer and 28 manholes.
19. **3-25 Rolling Ridge Interconnection Project** – Pump station was decommissioned and 1,950 ft. of new gravity sewer was installed to divert flow from the station into existing gravity sewer.
20. **3-26 PCP, CPE and CCP** – Completed wastewater evaluation studies of the Kuwahee WWTP.
21. **3-27 Montgomery Avenue Rehabilitation Project** – Project was combined with 3-20 Citico Street Rehabilitation Project, 3-23 Hillvale Circle Rehabilitation Project, and 3-24 Montgomery Avenue Rehabilitation Project. Combined projects replaced approximately 22,500 ft. of 8 in. sewer and 28 manholes.
22. **3-29 Highland Hills Road Rehabilitation Project** – Project was combined with 3-20 Citico Street Rehabilitation Project, 3-23 Hillvale Circle Rehabilitation Project, 3-24 Montgomery Avenue Rehabilitation Project, and 3-27 Montgomery Avenue Rehabilitation Project. Combined projects replaced approximately 22,500 ft. of 8 in. sewer and 28 manholes.

Fourth Creek

1. **4-1 Chukar Road Rehabilitation** – Replaced 1,600 ft. of pipe and nine manholes; rehabbed 900 ft. of pipe and nine manholes.
2. **4-2 Gleason Road Rehabilitation** – Replaced 980 ft. of 8 in. pipe and 12 manholes. CIPP was used to rehab 640 ft. of 8 in. pipe and 480 ft. of 12 in. pipe.
3. **4-3 Middlebrook Pike Rehabilitation** – Replaced 190 ft. of 8 in. pipe and two manholes. CIPP was used to rehab 2,000 ft. of 8 in. pipe. Two manholes were rehabbed as well.
4. **4-4 Northshore Drive Trunk Sewer Replacement** – Installed approximately 3,375 ft. of 36 in. trunk sewer, 260 ft. of smaller diameter trunk sewer, and replaced 29 manholes.
5. **4-6 Shadyland Drive Rehabilitation** – Replaced 1,700 ft. of 10 in. pipe and 9 manholes. CIPP was used to rehab 1,000 ft.
6. **4-17 Walker Springs Storage Facility** – Designed and constructed 3.25 MG wet-weather storage tank to control sewer overflows near Walker Springs Pump Station during rain events.
7. **4-18 Papermill Drive Phases I, II, and III** – Designed and constructed replacement of approximately 4,000 ft. of 15 in., 18 in., and 2,100 ft. of 36 in. sewer in the Papermill Drive area to increase conveyance capacity and reduce sewer overflows.

8. **4-19 Northshore Drive Rehabilitation Project** – Raised manholes 6, 7, and 8 to create additional storage in the trunkline upstream of the Fourth Creek WWTP.
9. **4-21 Black Bear Road Project** – Replaced approximately 261 ft. of existing 8 in. sewer and rehabilitated one manhole. Project included CCTV, manhole inspections, and smoke testing.
10. **4-22 Nightingale Lane Project** – Completed repairs of two manholes to address overflows in the vicinity of 6614 and 6617 Nightingale Lane.
11. **4-23 5205 Bent River Blvd Project** – Replaced air release valves, flushed the low pressure force main, and replaced the grinder pump at 5205 Bent River Blvd.
12. **4-24 Kerri Way Project** – Replaced approximately 439 ft. of existing 8 in. sewer and five manholes. Approximately 92 ft. of existing 8 in. sewer was rehabilitated. Project included CCTV, manhole inspections, and smoke testing.
13. **4-25 Lonas Drive Project** – Replaced approximately 326 ft. of existing 8 in. sewer and five manholes. Approximately 4,688 ft. of existing 8 in. sewer and nine manholes were rehabilitated. Project included CCTV, manhole inspections, and smoke testing.
14. **4-26 Midpark Drive Project** – Replaced two manholes. Approximately 440 ft. of existing 8 in. sewer and three manholes were rehabilitated. Project included CCTV, manhole inspections, and smoke testing.
15. **4-27 Southfork Project** – Project was completed in conjunction with 4-1 Chukar Road Rehabilitation Project. Replaced 88 ft. of 8 in. pipe and two manholes. Rehabilitated 140 ft. of 8 in. pipe using CIPP.
16. **4-28 Queensridge (Queensbury) Pump Station Upgrade Project** – The terminal manhole for the Queensbury force main has been replaced and the piping configuration for this manhole was also adjusted to lessen pressure restrictions allowing access to the force main for cleaning. Both pumps were also replaced.
17. **4-31 Kingston Pike @ Gallaher View Project** – Replaced one manhole. Approximately 1,068 ft. of existing 8 in. sewer and six manholes were rehabilitated. Project included CCTV, manhole inspections, and smoke testing.
18. **4-32 PCP, CPE and CCP** – Completed wastewater evaluation studies of the Fourth Creek WWTP.

South Knox

1. **S-1 Ginnbrook Pump Station** – Evaluated pump station and force main to ensure adequate capacity. Also included improvements to wet-well, pump system, and valve vault. The force main was re-routed.
2. **S-2 Blount Avenue Trunkline and Goose Creek Siphon Upgrade** – The trunkline upgrades between the siphon inlet structure and manhole 63-2 are complete. This work was included in phases I and II of the Blount Avenue Trunkline Replacement/ Rehabilitation Project. This construction successfully addressed historical overflows.
3. **S-5 (Revised) Neubert Springs Collector and West Ford Valley Trunk Rehabilitation** – Rehabilitated 10,000 ft. of 15 in. to 18 in. trunk sewer along West Ford Valley Road. Completed find work in sub-basins 41C1, 41C2, and 41A2. Completed trunkline rehabilitation on West Ford Valley. Rehabilitated collector line in sub-basin 41C1, C2, and A2.
4. **S-6 Sevier Avenue and Jones Street Collector Project** – Rehabilitated approximately 3,100 ft. of existing sewer and rerouted approximately 352 ft. of 8 in. sewer.
5. **S-9 Ellis Road Rehabilitation Project** – Rehabilitated 2,250 ft. of gravity sewer and replaced six MHs.
6. **S-10 Mini-basin 41A6 Rehabilitation Project** – Rehabilitated approximately 21,000 ft. of sewer in Sub-basin 41A6.

7. **S-11 Ford Valley Pump Station Rehabilitation Project** – Replaced pump station and added additional pump and generator to convey two-year storm within Capacity Assurance Program requirements.
8. **S-14 Stone Road Rehabilitation** – Rehabilitated approximately 13,500 ft. of sewers in Mini-basin 41B1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
9. **S-15 Trunk Replacement in Sub-basin 40A2 Project** – 3411 ft. of gravity sewer was replaced, 16 manholes were rehabbed, and 13 laterals were reinstated as part of this completed project.
10. **S-16 Woodson Drive Trunk Replacement and Pump Station Upgrade Project** – Replaced approximately 260 ft. of existing sewer and performed upgrades at the pump station.
11. **S-17 Island Home Rehabilitation** – Rehabilitated 9,400 ft. and replaced 1,200 ft. of collector sewers to reduce I/I.
12. **S-18 South Haven Phase I and Phase II** – Relocated, rehabilitated, and upsized approximately 4,700 ft. of existing collector sewers to increase conveyance capacity and reduce inflow and infiltration (I/I).
13. **S-19 Maryville Pike** – Designed and replaced 800–1,200 ft. of 24 in. sewer located in Witherspoon Superfund site. Design rerouted sewer around site.
14. **S-20 Avenue A Rehabilitation Project** – CIPP was used to rehabilitate 1,585 ft. of sewer. Seven manholes were rehabilitated, and 25 service lines were replaced.
15. **S-21 Alpine Avenue Rehabilitation Project** – Replaced approximately 2,790 ft. of sewer, and used CIPP to rehabilitate approximately 600 ft. Twenty-four manholes were rehabilitated and ten were replaced.
16. **S-24 East Ford Valley Rehabilitation** – Rehabilitated approximately 16,000 ft. of sewers in Mini-basin 41A4. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
17. **S-25 South Haven Rehabilitation Phase III** – Rehabilitated approximately 21,700 ft. of sewers in Mini-basin 40F1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
18. **S-26 Trunk Sewer Replacement Project in Sub-basin 40F1** – This project was constructed as part of the South Haven Phase III work. Replaced 704 ft. of 8 in. sewer and six manholes. Five laterals were reinstated.
19. **S-27 Trunk Sewer Replacement Project in Sub-basin 41A4** – Replaced approximately 175 ft. of existing sewer with 12 in. sewer and 3,700 ft. of existing sewer with 15 in. sewer.
20. **S-28 Trunk Sewer Project** – This project was combined with Project S-2. Please see description above.
21. **S-29 4500 Block Sevierville Pike Rehabilitation Project** – Completed find and fix work to identify and address cause of overflow in the vicinity of 4523 Sevierville Pike.

Loves Creek and Eastbridge

1. **L-1 Asheville Highway West of I-40 Trunk Replacement** – Upgraded 4,688 ft. of existing pipe and replaced 20 manholes. Project was completed in FY 09/10, two years ahead of schedule.
2. **L-2 Boyds Bridge Pike and Holston Hills Trunk Replacement** – Replaced 4,456 ft. of trunkline and 31 manholes.
3. **L-3 River View Rehabilitation** – Rehabilitated 4,627 ft. of gravity sewer along with eight manholes and replaced one manhole. This work addressed the SSO located on Riverview Drive. Project was completed in FY 09/10.
4. **L-4 Asheville Highway Rehabilitation** – Rehabilitated 1,560 ft. of sewer mains and 12 manholes.

5. **L-5 Brentwood Shortline Repair** – Rehabilitated 440 ft. of gravity sewer. This work addressed the SSO located on Brentwood Road. Project was completed in FY 09/10.
6. **L-6 Holston Hills Road Rehabilitation** – Rehabilitated 1,356 ft. of sewer mains.
7. **L-7 Magnolia Avenue Rehabilitation** – Replaced 7,378 ft. of sewer, rehabilitated 1,271 ft. of sewer, replaced two manholes, and rehabilitated 22 manholes.
8. **L-8 McDonald Drive Rehabilitation** – Rehabilitated 285 ft. of sewer main, replaced 316 ft. of sewer main and two manholes.
9. **L-9 Shelbourne Road Rehabilitation** – 26,900 ft. of gravity sewer was rehabilitated along with 30 manholes in sub-basins 6A4 and 6A5. This work addressed the SSO located on Shelbourne Road.
10. **L-10 Washington Court Rehabilitation** – Rehabilitated 872 ft. of gravity sewer. This work addressed the SSO located on Washington Court. Project was completed in FY 09/10.
11. **EB-1 Maloneyville Road Rehabilitation** – Mechanical grinder was installed at Knox County Detention Facility to remove paper debris prior to discharge. Paper debris clogging the pumps was the cause of previous SSOs at Maloney Road pump station.
12. **EB-2 Strawberry Plains Pike Rehabilitation Project** – Replaced approximately 750 ft. of 8 in. PVC and three manholes.

Williams Creek

1. **W-1 Sub-basin 19A2 Rehabilitation** – Performed rehabilitation in Sub-basin 19A1, 19B1, and 19A2/A3 to reduce R-value to 2 percent. Investigative work was performed on the approximately 105,000 ft. in the entire Sub-basin 19 area. Completed rehabilitation projects in 19A1, 19B1, and 19A2/A3. The original CAP/ER completion date for the 19A2 project was in FY 10/11. This project was shifted to higher priority due to the large number of private lateral problems and CSSAP rating. Project coincided with water quality monitoring program work in Williams Creek. Replaced approximately 14,000 ft. of 8 in. – 12 in. sewer and rehabilitated approximately 9,500 ft. of 8 in. – 12 in. sewer.
2. **W-2 Williams Creek Trunk Line Replacement** – Designed and replaced approximately 3,700 ft. of 24 in. sewer to correct structural problems. In addition, the following project was completed to address force main issues in the area. **Delrose Force Main Replacement** – Replaced approximately 5,000 ft. of 16 in. ductile iron pipe force main that had severe structural problems.
3. **W-3 Trunk Sewer Rehabilitation** – Replaced approximately 6,100 ft. of existing sewer with 24 in. sewer.
4. **W-4 E. Fifth Avenue Sewer Replacement Project** – Replaced 956 ft. with 8 in. PVC and four manholes.
5. **W-5 Groner Avenue Rehabilitation Project** – Replaced approximately 1,000 ft. of sewer and rehabilitated approximately 3,600 ft. of sewer and replaced 14 manholes.
6. **W-6 Selma Avenue – Harrison Street Rehabilitation Project** – Replaced 650 ft. with 8 in. PVC and four manholes, and rehabbed 600 ft. of 8 in. concrete.
7. **W-7 Sunset Avenue Rehabilitation Project** – Replaced 102 ft. with 8 in. PVC.
8. **W-8 South Elmwood Street Rehabilitation Project** – Replaced 200 ft. with 8 in. PVC and three manholes, and rehabbed 400 ft. of 8 in. concrete.
9. **W-9 Williams Creek Trunk Line Replacement (Sub-basin 19A1)** – Performed rehabilitation in Sub-basin 19A1, 19B1, and 19A2/A3 to reduce R-value to 2 percent. Investigative work was performed on the approximately 105,000 ft. in the entire Sub-basin 19 area. Completed rehabilitation projects in 19A1, 19B1, and 19A2/A3. The original CAP/ER completion date for the 19A2 project was in FY 10/11. This project was shifted to higher priority due to the large number of private lateral problems and CSSAP rating. Project coincided with water quality monitoring program work in Williams Creek. In lieu of replacement of 360 ft. of 12 in. concrete with 15 in. sewer, problem was

addressed by comprehensive rehab of Mini-basin 19A1. Project included replacement with 8,900 ft. of 8 in. PVC, 97 ft. with 10 in. PVC, 179 ft. with 12 in. PVC, and 76 manholes. Also rehabbed 21,200 ft. of 8 in. concrete and 180 ft. of 12 in. concrete.

Phase II CAP/ER Ongoing Projects

All Phase II CAP/ER projects have been completed.

Phase II CAP/ER Completed Projects

First Creek

1. **FCR-1 1235 Watercress Drive** – Rehabilitated 32,500 ft. of pipe through use of CIPP and pipe bursting, and replaced 2,500 ft. of sewer by open cut replacement. Replaced 39 manholes, rehabilitated 1,050 vertical ft. of manholes (approximately 150 manholes), and replaced 350 laterals.
2. **FCR-2 4600 Upchurch Road** – Completed in conjunction with FCR-1 1235 Watercress Drive project, see above for details.

Second Creek

1. **SCR-1 4105 Central Avenue Pike** – Rehabilitated 10,316 ft. of pipe through use of CIPP and pipe bursting, and replaced 771 ft. of sewer by open cut replacement. Replaced 17 manholes, rehabilitated 37 vertical ft. of manholes (5 manholes), and replaced 92 laterals.

Fourth Creek

1. **4TH-1 6540 Creekhead Drive** – Sewer rehabilitation completed in Mini-basin 32A4.
2. **Pinebrook Drive Sewer Replacement** – Replaced 330 ft. of 8 in. gravity sewer partially exposed by erosion of the bank of the adjacent drainage channel.
3. **Walker Springs Rehabilitation (Mini-Basin 32A4)** – Performed a two-phased construction project to address issues in Mini-basin 32A4. Replaced approximately 275 ft. of 8 in. gravity sewer.
4. **4TH-2 Ten Mile Pump Station Removal** –Decommissioned the Ten Mile Pump Station and force main.

Loves Creek and Eastbridge

1. **LVS-1 1815 Wayland Road** – Replaced approximately 19,000 ft. of 10 in. and 12 in. sewer.
2. **EBR-1 7612 Bud Hawkins Road** – Replaced the pump station with a gravity sewer system consisting of approximately 1,400 ft. of 8 in. sewer, 2,100 ft. of 12 in. sewer, 7,100 ft. of 18 in. sewer and 6,000 ft. of 20 in. sewer.

South Knox

1. **STH-1 820 Goldfinch Drive** – Replaced approximately 1,700 ft. of 8 in. sewer and rehabilitated 2,800 ft. of sewer using CIPP. Four manholes were replaced and 24 were rehabilitated.

Section 2 Comprehensive Performance Evaluation Program (CPE) and Composite Correction Plan (CCP)

Consent Decree language, pages 82-83: *"Each Quarterly Progress Report shall contain... A summary of compliance with and activities related to implementation of the CPE and CCP."*

The CPE was submitted to EPA on February 24, 2006, and was approved on July 24, 2006.

The CCP was submitted to the EPA on July 23, 2007. EPA disapproved it on January 4, 2008. The Revised CCP was submitted to EPA on January 5, 2009, and subsequently approved on January 20, 2009.

Kuwahee Wastewater Treatment Plant (WWTP) Phase I

Work was completed prior to the December 30, 2012, deadline.

Fourth Creek WWTP Phase I

Work was completed prior to the December 30, 2013, deadline.

Fourth Creek WWTP Phase II

Construction documents have been issued to KUB's contractor and work is scheduled to commence in January 2017. The anticipated completion date is prior to the June 30, 2018 deadline.

Section 3 Process Controls Program

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... A summary of implementation of and compliance with the Process Controls Program.”*

The Process Controls Program (PCP) was initiated 14 times during this reporting period. No Diversion events occurred.

Section 4 Capacity Assurance Program

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... A summary of the implementation of the Capacity Assurance Program for that Calendar Quarter, including the number of, and anticipated flow from, sewer connections that have been authorized, by Sewerbasin, a description of the projects that have been authorized and the number of credits earned and banked by KUB that will be expended for those projects, by Sewerbasin, and any exceptions granted for connections for essential services.”*

The Capacity Assurance Program (CAP) was submitted to EPA for review on February 8, 2006. EPA reviewed and approved the program on April 7, 2006. KUB started reviewing building permits based on the approved CAP on June 6, 2006, which was within the 60-day timeframe for implementing the program after receiving EPA approval.

To review building permits more efficiently using the CAP criteria agreed on with the EPA, KUB worked with a consultant, Camp, Dresser, & McKee, to develop an Information Management System (IMS). The IMS assists KUB in managing the CAP program by determining the amount of wastewater each proposed building would add to KUB's wastewater system based on its location. The IMS also helps track rehabilitation credits that KUB earns through its CAP/ER and Management, Operations, and Maintenance (MOM) programs.

Appendix A includes a list of capital projects that KUB performed to gain rehabilitation credit in its sewer system. As stated in the Consent Decree, the list of authorized sewer connections was maintained and updated as necessary until full implementation of the CAP as approved by EPA. Therefore, the list will no longer be included as part of this quarterly report.

There were no exceptions granted for connections for essential services during this reporting period.

Section 5 Transfers of Ownership

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... Identification of any transfer of an ownership interest, operation, management, or other control of the Treatment Works, or any portion thereof.”*

There has been no transfer of ownership interest, operation, management, or other control of the Treatment Works, or any portion thereof, during this reporting period as defined by Section III, Part C of the Consent Decree.

Section 6 Compliance and Non-Compliance With the Consent Decree

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain...A description of the status of compliance or non-compliance with the requirements of this Decree and, if applicable, the reasons for non-compliance, including a list of all violations that are subject to stipulated penalties under Section X of this Consent Decree.”*

6.1 Submission of Deliverables

To date, KUB has submitted all deliverables in accordance with the schedule set forth in the Consent Decree. The following sections detail all activity related to deliverables that occurred during the past quarter. Also noted are the dates each submittal was available for public comment in the Public Document Repository (PDR), when the deliverable was submitted to EPA, when EPA responded with comments, when KUB responded to those comments, and when EPA approval was received.

6.1.1 Quarterly Progress Report Third Quarter 2016

Consent Decree language, pages 82-83: *“Beginning thirty (30) Days after the first Calendar Quarter following the Date of Entry, and thirty (30) Days after each Calendar Quarter thereafter until termination of the Consent Decree, KUB shall submit to the Parties, and simultaneously place in the PDR, a Quarterly Progress Report.”*

On October 28, 2016, KUB submitted to EPA and placed in the PDR the Quarterly Progress Report for the third quarter 2016. This deliverable was not subject to the Public Review Requirement of Section VI.A.2, but was available for public comment from October 28, 2016, until November 16, 2016. No comments were received during that period.

6.2 Violations Subject to Stipulated Penalties

During this reporting period, KUB incurred six Unpermitted Discharges. Table 1 below lists all violations subject to stipulated penalties as outlined in the Consent Decree. Appendix E lists any SSO that occurred during 2016 that resulted in an unpermitted discharge along with its cause, volume, one- and three-day rainfall totals, and rainfall intensity.

Table 1. Violations Subject to Stipulated Penalties

Violation	Date	Address	Cause
Unpermitted Discharge	10/7/2016	513 Stone Pony Lane	Blockage – Grease and Debris
Unpermitted Discharge	10/18/2016	1807 Rocky View Way	Blockage – Grease and Debris
Unpermitted Discharge	11/1/2016	601 South Central Street	Blockage – Grease and Debris
Unpermitted Discharge	11/21/2016	5915 Neubert Springs Road	Pump Station Failure – Electrical
Unpermitted Discharge	12/28/2016	2015 Neyland Drive	Waste Hauler Discharge Process Failure
Unpermitted Discharge	12/29/2016	2400 North Broadway	Blockage – Debris

Section 7 SSOs, Bypasses, Diversions, and Effluent Limit Violations

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... A spreadsheet and summary of all SSOs, Bypasses, Diversions, and effluent limit violations that occurred during the previous Calendar Quarter. Information on Building Backups may be provided in separate spreadsheets and summaries from other SSOs. The spreadsheets and summaries shall identify:*

- a. For all SSOs, the location, source, date, time, duration, pathway (if any), receiving water (if any), the reason for each SSO, the total SSO volume, the volume returned to the WCTS, and the volume not captured;*
- b. For all Bypasses and Diversions, the location, date, time, duration, volume and reason for each Bypass and Diversion; and the total Bypass or Diversion volumes;*
- c. For all effluent limit violations, all information required to be reported on KUB’s Discharge Monitoring Reports.”*

7.1 SSOs

Appendix B lists all SSOs that occurred during this reporting period. During this period, there were 13 SSO events. Of that number, seven were due to blockages, three were due to pump station electrical failures, one was due to construction failure dig in, one was due to grinder pump failure, and one was due to waste hauler discharge process failure.

Of the 13 SSO events, ten were in the 0 – 1,000 gallons volume range, two were in the 1,001 – 10,000 gallons volume range, and one event totaled greater than 10,000 gallons. Durations for events during this period are as follows: 11 ranged from 0 – 2 hours, one ranged from 2.1 – 5 hours, and one was greater than five hours.

7.2 Building Backups

Appendix C lists all Building Backups that occurred during this reporting period. During this period, there were two Building Backups.

7.3 Bypasses

All Bypasses that occurred during this reporting period were in compliance with the Process Controls Program. For purposes of this report, any Bypass in compliance with the Process Controls Program shall be referred to as a “Diversion” (see below). All Bypasses not in compliance with the Process Controls Program shall be referred to as a “Bypass.”

Table 2 contains all Diversion event information for the fourth quarter 2016. During this period, there were no Diversion events at Kuwahee, Loves Creek, Fourth Creek or Eastbridge WWTPs. No Bypasses occurred during this reporting period.

7.4 Effluent Limit Violations

Table 3 contains all effluent limit violations that occurred during this reporting period. The table contains the information as it is reported in KUB’s Discharge Monitoring Reports. During this reporting period, there were no effluent limit violations at the Kuwahee, Loves Creek, Fourth Creek, or Eastbridge WWTPs.

Table 2. Diversions

WWTP	Did a Diversion occur?	Date Diversion gate opened	Time Diversion gate opened	Date Diversion gate closed	Time Diversion gate closed	Date Diversion flow reported	Duration (hrs)	Volume (MG)	Total Event Duration (hrs)	Total Event Volume (MG)	Reason for Event
Kuwahee	No										
Loves Creek	No										
Fourth Creek	No										
Eastbridge	No										

Table 3. Effluent Limit Violations

WWTP	Did an event occur?	Date	Parameter	Type	Limit	Value
Kuwahee	No					
Fourth Creek	No					
Loves Creek	No	-	-	-	-	-
Eastbridge	No	-	-	-	-	-
SS - Settleable Solids	mg/l - milligrams per liter			mpn – Most Probable Number		
TSS - Total Suspended Solids	cfu –Colony Forming Unit					
ml/l – milliliters per liter	lbs - Pounds					

Section 8 Water Quality Monitoring Data

Consent Decree language, pages 82-83: *"Each Quarterly Progress Report shall contain... The water quality monitoring data and other information required pursuant to Section VII.D.1.(e).(v)."*

8.1 Sampling Conducted and Results

Appendix D lists all sampling that was conducted during this reporting period and the results thereof. KUB investigates the source of any high *E. coli* counts that reoccur in the course of routine or investigative monitoring.

First Creek

All bacteriological *E. coli* results except one (1600 cfu/100ml) were below the water quality standard of 941cfu/100 ml for this creek this quarter. The one slightly elevated result was not consistently high throughout the quarter. No investigation is needed at this time. (Routine Water Quality Monitoring Report – Appendix D)

Second Creek

Most bacteriological *E. coli* results were below the water quality standard of 941 cfu/100 ml for this creek, except for elevated results at Site 0.30. Site 0.30 and other nearby sites were investigated on 11/14/16 and again on 12/14/16, as shown in Table 1 in Appendix D. The investigation showed no evidence, visual or microbiological, of a persistent problem in the area and *E. coli* counts steadily dropped going into December. No additional investigation is needed at this time. (Routine Water Quality Monitoring Report – Appendix D).

Third Creek

One bacteriological *E. coli* result above the water quality standard of 941cfu/100 ml for this creek occurred during wet weather conditions when storm runoff can bring surface contamination to the stream. Results at Site 0.87 returned below the water quality standard in samples taken in early January 2017 and monitoring results obtained were not consistently elevated throughout the quarter. No investigation is needed at this time. (Routine Water Quality Monitoring Report – Appendix D).

Fourth Creek

All bacteriological *E. coli* results were below the water quality standard of 941cfu/100 ml for this creek this quarter. No investigation is needed at this time. (Routine Water Quality Monitoring Report – Appendix D).

Baker Creek

Bacteriological *E. coli* results above the water quality standard of 941cfu/100 ml for this creek occurred during both wet and dry weather conditions. Additional monitoring was done at other sites along Baker Creek in order to get better knowledge of the entire stream, which can be seen in Table 2 of Appendix D. *E. coli* counts from samples taken at stream miles 2.00 and 1.10 were significantly lower than current routine sites, although still elevated in November during wet weather conditions. November results were considerably higher due to over a half of an inch of rainfall after 35 consecutive dry days, where storm runoff can bring built up surface contamination to the stream. Results obtained for all monitoring locations returned back below the water quality standard in December; no additional investigation is needed at this time. (Routine Water Quality Monitoring Report – Appendix D).

Goose Creek

Most bacteriological *E. coli* results above the water quality standard of 941cfu/100 ml for this Creek occurred during wet weather. November results were considerably higher than usual due to over a half of an inch of rainfall after 35 consecutive dry days, where storm runoff can bring built up surface contamination to the stream. Monitoring results obtained were not consistently elevated throughout the quarter. No investigation is needed at this time. (Routine Water Quality Monitoring Report – Appendix D).

Loves Creek

All bacteriological *E. coli* results were below the water quality standard of 941cfu/100 ml for this creek this quarter. No investigation is needed at this time. (Routine Water Quality Monitoring Report – Appendix D)

Williams Creek

Some bacteriological *E. coli* results were above the water quality standard of 941cfu/100 ml for this creek this quarter in both wet and dry weather conditions. The two elevated results occurring during dry weather conditions were not consistently high throughout the quarter. *E. coli* results were also slightly elevated in December during wet weather, where storm runoff can bring surface contamination to the stream. No investigation is needed at this time. (Routine Water Quality Monitoring Report – Appendix D)

Spill Impact Reporting

There were six unpermitted discharges during this reporting period. See the Spill Impact Report in Appendix D for the monitoring results.

8.2 Projected Data Collection

During 2017, KUB will continue to monitor the 24 routine sampling locations in the sewer basins of eight area creeks. KUB will collect samples from the following locations during 2017:

Sample Locations by Creek Mile or Site Number

<i>Creek Name</i>	<i>Creek Mile #</i>	<i>Creek Mile #</i>	<i>Creek Mile #</i>
First Creek	1.74	2.57	6.33
Second Creek	0.30	1.54	5.11
Third Creek	0.87	2.08E	4.80W
Fourth Creek	1.75	2.79	3.29
Baker Creek	0.36	0.53	1.45
Goose Creek	0.40	1.19E	1.80E
Loves Creek	0.85	1.89	3.45
Williams Creek	0.89	1.70	2.02

Appendix A

Capital Projects and Rehabilitation Credits

Capital Projects and Rehabilitation Credits

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
1	Comprehensive Rehab 03B1a	Comprehensive Rehabilitation	1st Creek	Kuwahee	321,030	Project Complete
2	Comprehensive Rehab 03B2a	Comprehensive Rehabilitation	1st Creek	Kuwahee	302,366	Project Complete
3	Comprehensive Rehab 04B1a	Comprehensive Rehabilitation	1st Creek	Kuwahee	334,626	Project Complete
4	Comprehensive Rehab 08A1	Comprehensive Rehabilitation	1st Creek	Kuwahee	1,589,952	Project Complete
5	McC Campbell Lane Sewer Replacement	Find & Fix Gravity Main	1st Creek	Kuwahee	25,543	Project Complete
6	Knox Road Trunkline Replacement	Find & Fix Gravity Main	1st Creek	Kuwahee	36,728	Project Complete
7	vented manhole cover replacement (7A1)	Manhole Cover	1st Creek	Kuwahee	13,333	Project Complete
8	vented manhole cover replacement (7A1)	Manhole Cover	1st Creek	Kuwahee	13,333	Project Complete
9	vented manhole cover replacement (7A1)	Manhole Cover	1st Creek	Kuwahee	13,333	Project Complete
10	Comprehensive Rehab 15D2	Comprehensive Rehabilitation	2nd Creek	Kuwahee	1,450,008	Project Complete
11	Comprehensive Rehab 05A4 & 05A3	Comprehensive Rehabilitation	2nd Creek	Kuwahee	43,904	Project Complete
12	Comprehensive Rehab 09A2	Comprehensive Rehabilitation	3rd Creek	Kuwahee	296,664	Project Complete
13	Comprehensive Rehab 09A1	Comprehensive Rehabilitation	3rd Creek	Kuwahee	219,345	Project Complete
14	Walker Springs Storage Tank	Storage Tank	4th Creek	Fourth Creek	3,250,000	Project Complete
15	Comprehensive Rehab 40F1	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	83,600	Project Complete
16	Comprehensive Rehab 41A4	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	371,994	Project Complete
17	Comprehensive Rehab 41B1	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	152,958	Project Complete
18	Wilson Ave, Chesnut St., Donnell St. (Asset Replacement)	Find & Fix Gravity Main	Williams Creek	Kuwahee	28	Project Complete
19	Williams Creek Trunkline Replacement	Find & Fix Gravity Main	Williams Creek	Kuwahee	168,667	Project Complete
20	Rushland Park Off Site Sewer Rehabilitation	Find & Fix Gravity Main	Loves Creek	Loves Creek	3,803	Project Complete
21	Emily Avenue Pump Station Abandonment	Find & Fix Gravity Main	Loves Creek	Loves Creek	141,600	Project Complete
22	Fair Drive - Phase I	Find & Fix Gravity Main	1st Creek	Kuwahee	130,928	Project Complete
23	Comprehensive Rehab 23E1	Comprehensive Rehabilitation	2nd Creek	Kuwahee	4,215,003	Project Complete
24	vented manhole cover replacements (08B2)	Manhole Cover	1st Creek	Kuwahee	4,669	Project Complete
25	vented manhole cover replacement (16B1)	Manhole Cover	1st Creek	Kuwahee	667	Project Complete
26	vented manhole cover replacements (28C1)	Manhole Cover	3rd Creek	Kuwahee	1,334	Project Complete
27	10" mainline replacement (33A2)	Find & Fix Gravity Main	4th Creek	Fourth Creek	5,409	Project Complete
28	vented manhole cover replacements (22C2)	Manhole Cover	3rd Creek	Kuwahee	16,002	Project Complete
29	vented manhole cover replacements (63)	Manhole Cover	Sinking Creek	Loves Creek	66,665	Project Complete
30	10" mainline replacement (6C1)	Find & Fix Gravity Main	Loves Creek	Loves Creek	24,620	Project Complete
31	Comprehensive Rehab 06A5	Comprehensive Rehabilitation	Loves Creek	Loves Creek	263,358	Project Complete
32	Comprehensive Rehab 06A4	Comprehensive Rehabilitation	Loves Creek	Loves Creek	386,304	Project Complete
33	vented manhole cover replacement (39D2)	Manhole Cover	South Knox / Knob Creek	Kuwahee	667	Project Complete
34	vented manhole cover replacement (39D4)	Manhole Cover	South Knox / Knob Creek	Kuwahee	667	Project Complete
35	vented manhole cover replacement (39D3)	Manhole Cover	South Knox / Knob Creek	Kuwahee	2,668	Project Complete
36	vented manhole cover replacement (20A6)	Manhole Cover	Loves Creek	Loves Creek	1,334	Project Complete
37	vented manhole cover replacement (20A7)	Manhole Cover	Loves Creek	Loves Creek	667	Project Complete
38	vented manhole cover replacement (13A2)	Manhole Cover	3rd Creek	Kuwahee	667	Project Complete
39	vented manhole cover replacement (13B1)	Manhole Cover	3rd Creek	Kuwahee	13,335	Project Complete
40	vented manhole cover replacement (28B1)	Manhole Cover	3rd Creek	Kuwahee	1,334	Project Complete
41	12" mainline replacement (44)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	4,278	Project Complete
42	manhole frame seal repair (67)	Manhole Repair	Loves Creek	Loves Creek	2,304	Project Complete
43	Whites Creek Trunk Line Replacement (02)	Find & Fix Gravity Main	1st Creek	Kuwahee	50,106	Project Complete
44	Comprehensive Rehab 09D1	Comprehensive Rehabilitation	3rd Creek	Kuwahee	381,376	Project Complete
45	Comprehensive Rehab 09A4	Comprehensive Rehabilitation	3rd Creek	Kuwahee	408,317	Project Complete
46	Lower First Creek Storage Tank	Storage Tank	1st Creek	Kuwahee	5,000,000	Project Complete
47	vented manhole cover replacement (11B2)	Manhole Cover	3rd Creek	Kuwahee	13,333	Project Complete
48	vented manhole cover replacement (13C1)	Manhole Cover	3rd Creek	Kuwahee	2,667	Project Complete
49	vented manhole cover replacement (22A2)	Manhole Cover	3rd Creek	Kuwahee	667	Project Complete
50	vented manhole cover replacement (22B1)	Manhole Cover	3rd Creek	Kuwahee	667	Project Complete
51	Creek Head Drive sewer line replacement (32A4)	Find & Fix Gravity Main	4th Creek	Fourth Creek	11,132	Project Complete
52	Manhole replacement (19A3)	Find & Fix Gravity Main	Williams Creek	Kuwahee	207	Project Complete
53	Papermill drive sewer line replacement (33A2)	Find & Fix Gravity Main	4th Creek	Fourth Creek	103,769	Project Complete
54	Wells Rd sewer line replacement (39C2)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	1,728	Project Complete
55	Power Park Manhole Rehab (45)	Find & Fix Gravity Main	Knob Creek	Kuwahee	3,596	Project Complete
56	Blount Ave abandoned lateral (39A1)	Disconnect abandoned lateral	South Knox / Knob Creek	Kuwahee	2,000	Project Complete
57	Woodbine Ave sewerline Rehab (19A2)	Find & Fix Gravity Main	Williams Creek	Kuwahee	2,683	Project Complete
58	Pleasant Ridge Rd Sewer line improvements (09A1)	Find & Fix Gravity Main	3rd Creek	Kuwahee	207	Project Complete
59	Papermill drive sewer line replacement (27A1)	Find & Fix Gravity Main	Fourth Creek	Fourth Creek	18,211	Project Complete
60	Wilson Rd Manhole Rehab (10C1)	Find & Fix Gravity Main	2nd Creek	Kuwahee	831	Project Complete
61	Maryville Pike Trunk Replacement (39C1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	72,880	Project Complete
62	Upper McKamey Trunk Replacement (11B1 11B2)	Find & Fix Gravity Main	3rd Creek	Kuwahee	64,324	Project Complete
63	Fox Manor Blvd sewer line replacement (32A4)	Find & Fix Gravity Main	4th Creek	Fourth Creek	31,510	Project Complete
64	Power Park Manhole Rehab (47)	Manhole Repair	South Knox / Knob Creek	Kuwahee	7,700	Project Complete
65	Sutherland Ave Sewer Line Replacement (28B1)	Find & Fix Gravity Main	3rd Creek	Kuwahee	20,383	Project Complete
66	Fountain City Trunkline Replacement (03B1 03B2)	Find & Fix Gravity Main	1st Creek	Kuwahee	72,512	Project Complete
67	vented manhole cover replacement (11B2)	Manhole Cover	4th Creek	Fourth Creek	13,333	Project Complete
68	vented manhole cover replacement (39D2)	Manhole Cover	South Knox / Knob Creek	Kuwahee	13,333	Project Complete
69	Comprehensive Rehabilitation 19A2	Comprehensive Rehabilitation	Williams Creek	Kuwahee	521,631	Project Complete
70	17B1 Manhole Replacement	Find & Fix Gravity Main	1st Creek	Kuwahee	1,803	Project Complete
71	Vine Middle School sewerline Rehab (24D1)	Find & Fix Gravity Main	1st Creek	Kuwahee	23,491	Project Complete
72	Comprehensive Rehabilitation (08B2)	Comprehensive Rehabilitation	1st Creek	Kuwahee	841,370	Project Complete
73	Third Creek Storage Tank (21A1)	Storage Tank	3rd Creek	Kuwahee	4,000,000	Project Complete
74	Comprehensive Rehabilitation (19A1)	Comprehensive Rehabilitation	Williams Creek	Kuwahee	313,938	Project Complete
75	Comprehensive Rehabilitation (19B1)	Comprehensive Rehabilitation	Williams Creek	Kuwahee	328,300	Project Complete
76	Comprehensive Rehabilitation (10B1)	Comprehensive Rehabilitation	2nd Creek	Kuwahee	191,698	Project Complete
77	Comprehensive Rehabilitation (10C1)	Comprehensive Rehabilitation	2nd Creek	Kuwahee	67,840	Project Complete
78	Disconnected Stormwater Detention Pond Sevier Ave (40C1)	Disconnect Storm Sewer	South Knox / Knob Creek	Kuwahee	97,333	Project Complete
79	Sub Basin 63 Sinking Creek Drainage rehabilitation (63)	Comprehensive Rehabilitation	South Knox / Knob Creek	Loves Creek	72,110	Project Complete
80	West Ford Valley Trunkline replacement (41A1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	236,704	Project Complete
81	Blount Avenue Trunkline Replacement (39A1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	225,376	Project Complete
82	Brookvale Point Repairs (02A3)	Find & Fix Gravity Main	1st Creek	Kuwahee	52,079	Project Complete
83	Park Pump Point Repairs (45)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	11,522	Project Complete
84	Wayland Road Storage Tank (67)	Storage Tank	Loves Creek	Loves Creek	20,000	Project Complete
85	Comprehensive Rehab (19A3)	Comprehensive Rehabilitation	Williams Creek	Kuwahee	325,090	Project Complete
86	Comprehensive Rehab (41A2)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	39,330	Project Complete
87	Comprehensive Rehab (41A5)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	119,327	Project Complete
88	Jersey Ave sewer rehabilitation (SubBasin 23)	Find & Fix Gravity Main	1st Creek	Kuwahee	419	Project Complete
89	East Magnolia sewer rehabilitation (SubBasin 24)	Find & Fix Gravity Main	1st Creek	Kuwahee	846	Project Complete
90	Walker Blvd Sewer Rehabilitation (SubBasin 16)	Find & Fix Gravity Main	1st Creek	Kuwahee	1086	Project Complete
91	Kingston Court Sewer Rehabilitation (SubBasin 29)	Find & Fix Gravity Main	3rd Creek	Kuwahee	3727	Project Complete
92	Clinch Ave Sewer Rehabilitation (SubBasin 30)	Find & Fix Gravity Main	1st Creek	Kuwahee	442	Project Complete
93	Badgett Drive Sewer Rehabilitation (SubBasin 22)	Find & Fix Gravity Main	3rd Creek	Kuwahee	214	Project Complete
94	Dickson Street Sewer Rehabilitation (SubBasin 20)	Find & Fix Gravity Main	Loves Creek	Loves Creek	417	Project Complete
95	W New Street Sewer Rehabilitation (SubBasin 24)	Find & Fix Gravity Main	1st Creek	Kuwahee	2844	Project Complete
96	Rennoc Rd Sewer Rehabilitation (SubBasin 4)	Find & Fix Gravity Main	1st Creek	Kuwahee	2853	Project Complete

Capital Projects and Rehabilitation Credits

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
97	Spicewood Lane Sewer Rehabilitation (SubBasin 13)	Find & Fix Gravity Main	3rd Creek	Kuwahee	216	Project Complete
98	Chapman Highway Sewer Rehabilitation (SubBasin 39)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	212	Project Complete
99	McCroskey Ave Sewer Rehabilitation (SubBasin 17)	Find & Fix Gravity Main	1st Creek	Kuwahee	1,076	Project Complete
100	East 5th Ave Sewer Rehabilitation (SubBasin 24)	Find & Fix Gravity Main	1st Creek	Kuwahee	447	Project Complete
101	Simms Rd Sewer Rehabilitation (SubBasin 39)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	2,955	Project Complete
102	Maynard Ave Sewer Rehabilitation (SubBasin 16)	Find & Fix Gravity Main	1st Creek	Kuwahee	423	Project Complete
103	Minibasin 10B1 & 10C1 find & fix	Find & Fix Gravity Main	2nd Creek	Kuwahee	15,689	Project Complete
104	Third Creek Trunkline Replacement	Find & Fix Gravity Main	3rd Creek	Kuwahee	483,793	Project Complete
105	Disconnected Stormwater 15" discharge pipe Island Home Blvd	Disconnect Storm Sewer	South Knox / Knob Creek	Kuwahee	1,720,000	Project Complete
106	Paved Manhole Rehabilitation 40A2	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	20,140	Project Complete
107	Paved Manhole Rehabilitation 40F2	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	6,515	Project Complete
108	Paved Manhole Rehabilitation 40G1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	13,571	Project Complete
109	Paved Manhole Rehabilitation 39E1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	2,576	Project Complete
110	Paved Manhole Rehabilitation 03C1	Find & Fix Gravity Main	1st Creek	Kuwahee	3,615	Project Complete
111	Paved Manhole Rehabilitation 02A1	Find & Fix Gravity Main	1st Creek	Kuwahee	6,491	Project Complete
112	Paved Manhole Rehabilitation SB 38	Find & Fix Gravity Main	3rd Creek	Kuwahee	5,797	Project Complete
113	Paved Manhole Rehabilitation 18A1	Find & Fix Gravity Main	1st Creek	Kuwahee	4,540	Project Complete
114	Paved Manhole Rehabilitation 39E1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	34,671	Project Complete
115	Paved Manhole Rehabilitation 39D1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	8,000	Project Complete
116	Paved Manhole Rehabilitation 39A2	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	13,335	Project Complete
117	Paved Manhole Rehabilitation 39C3	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	26,670	Project Complete
118	Broken Manhole Lid Replacement (67)	Find & Fix Gravity Main	Loves Creek	Loves Creek	26,666	Project Complete
119	Manhole Replacement (61)	Find & Fix Gravity Main	Loves Creek	Loves Creek	2,304	Project Complete
120	Woodbine Awer Sewer Rehab Phase II (19A2)	Find & Fix Gravity Main	Williams Creek	Kuwahee	855	Project Complete
121	Comprehensive Sewer Rehab (41A6)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	951,328	Project Complete
122	Comprehensive Sewer Rehab (41C1)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	161,680	Project Complete
123	Comprehensive Sewer Rehab (41C2)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	94,332	Project Complete
124	Davenport Trunkline Replacement (15A1)	Find & Fix Gravity Main	2nd Creek	Kuwahee	86,423	Project Complete
125	Forks of the River Trunkline Replacement (60)	Find & Fix Gravity Main	Riverdale	Kuwahee	62,037	Project Complete
126	Brooks & Ester Sewer Rehabilitation (25A2)	Find & Fix Gravity Main	Williams Creek	Kuwahee	14,186	Project Complete
127	Grand Ave Sewer Rehabilitation (23B1)	Find & Fix Gravity Main	2nd Creek	Kuwahee	885	Project Complete
128	Clinch Ave & 21st Rehabilitation (35B3)	Find & Fix Gravity Main	3rd Creek	Kuwahee	15,453	Project Complete
129	Blount Ave Trunkline phase II (39A2)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	124,150	Project Complete
130	Trunkline at Woodland Ave	Trunkline Replacement	2nd Creek	Kuwahee	106,558	Project Complete
131	Keowee Ave, Sandusky Rd, and Sutherland Ave	Find & Fix Gravity Main	3rd Creek	Kuwahee	6,367	Project Complete
132	Antietam Rd	Find & Fix Gravity Main	1st Creek	Kuwahee	1,760	Project Complete
133	Cheyenne Dr	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	1,760	Project Complete
134	Chambliss Ave	Find & Fix Gravity Main	3rd Creek	Kuwahee	2,642	Project Complete
135	Godfrey St	Find & Fix Gravity Main	1st Creek	Kuwahee	218	Project Complete
136	Shortline-Ave B	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	7,332	Project Complete
137	Second Creek SSO Abatement	Find & Fix Gravity Main	2nd Creek	Kuwahee	163,471	Project Complete
138	Shortline- Maplehurst	Find & Fix Gravity Main	1st Creek	Kuwahee	6,062	Project Complete
139	Shortline- Parkhill	Find & Fix Gravity Main	4th Creek	Fourth Creek	1,755	Project Complete
140	Shortline- Essary	Find & Fix Gravity Main	1st Creek	Kuwahee	215	Project Complete
141	Shortline- Ridgecrest	Find & Fix Gravity Main	1st Creek	Kuwahee	3,058	Project Complete
142	4th Creek SSO Abatement Project	Find & Fix Gravity Main	4th Creek	Fourth Creek	266,200	Project Complete
143	Ashville Highway Trunkline Replacement (20A3)	Find & Fix Gravity Main	Loves Creek	Kuwahee	372,780	Project Complete
144	Minibasin 06A2 & 06A3 Comprehensive Rehabilitation	Comprehensive Rehabilitation	Loves Creek	Loves Creek	275,630	Project Complete
145	Sevier Ave & Jones Ave Find & Fix Rehabilitation (40C1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	50,537	Project Complete
146	Manhole Rehabilitation - National Drive (60)	Find & Fix Gravity Main	Riverdale	Kuwahee	4,608	Project Complete
147	Washington Ave Sewer Replacement (24B1)	Find & Fix Gravity Main	1st Creek	Kuwahee	14,643	Project Complete
148	Second Creek SSO Abatement phase II	Find & Fix Gravity Main	2nd Creek	Kuwahee	40,973	Project Complete
149	Highland Hills (37A3)	Find & Fix Gravity Main	4th Creek	Fourth Creek	13,017	Project Complete
150	Moses Ave (29D1)	Find & Fix Gravity Main	3rd Creek	Kuwahee	1,761	Project Complete
151	Dance Ave (28A1)	Find & Fix Gravity Main	3rd Creek	Kuwahee	1,889	Project Complete
152	Texas Ave (SB 15)	Find & Fix Gravity Main	2nd Creek	Kuwahee	85,030	Project Complete
153	Ellis Road find & fix (41A3)	Find & Fix Gravity Main	Knob Creek	Kuwahee	61,614	Project Complete
154	Ford Valley Pump Station & gravity sewer	Find & Fix Gravity Main	Knob Creek	Kuwahee	14,520	Project Complete
155	Crestwood Pump Station & Gravity Sewer	Find & Fix Gravity Main	Loves Creek	Loves Creek	3,950	Project Complete
156	Washington Pike Manhole Rehab MH IPID 20414153	Find & Fix Gravity Main	Eastbridge	Eastbridge	576	Project Complete
157	Wassman & 8th Ave	Find & Fix Gravity Main	1st Creek	Kuwahee	8,750	Project Complete
158	Lebanon Street Sewer Improvements	Find & Fix Gravity Main	3rd Creek	Kuwahee	13,145	Project Complete
159	Minibasin 35B2 UT sewer improvements	Find & Fix Gravity Main	3rd Creek	Kuwahee	39,952	Project Complete
160	Minibasin 35B3 UT sewer improvements	Find & Fix Gravity Main	3rd Creek	Kuwahee	27,132	Project Complete
161	Boyd's Bridge Trunkline Replacement	Find & Fix Gravity Main	Loves Creek	Loves Creek	137,695	Project Complete
162	Minibasin 17B1 & 01A1	Find & Fix Gravity Main	1st Creek	Kuwahee	69,883	Project Complete
163	Lake Forest Sewer Improvements 41A6	Find & Fix Gravity Main	Knob Creek	Kuwahee	35,202	Project Complete
164	Bennett Place Sewer Improvements 32B	Find & Fix Gravity Main	4th Creek	Fourth Creek	25,112	Project Complete
165	40A2 Phase I Trunkline Replacement	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	195,583	Project Complete
166	Jersey Ave, Ball Camp & Hiwassee Sewer Improvments	Find & Fix Gravity Main	3rd Creek	Kuwahee	13,059	Project Complete
167	W Glenwood, Nathaniel & Boyd St Shortline project 22B1, 17A1, 01A1	Find & Fix Gravity Main	1st Creek	Kuwahee	13,059	Project Complete
168	Minibasin 23D1/F1	Comprehensive Rehabilitation	2nd Creek	Kuwahee	50,577	Project Complete
169	Minibasin 18B1 find & fix	Find & Fix Gravity Main	1st Creek	Kuwahee	4,929	Project Complete
170	Second Creek Storage Tank	Storage Tank	2nd Creek	Kuwahee	5,500,000	Project Complete
171	Lower Third Creek Storage Tank	Storage Tank	3rd Creek	Kuwahee	6,500,000	Project Complete
172	Noelton Drive Sewer Improvements	Find & Fix Gravity Main	3rd Creek	Kuwahee	5,042	Project Complete
173	Old Kingston Pike Sewer improvements	Find & Fix Gravity Main	3rd Creek	Kuwahee	301	Project Complete
174	Northshore Trunkline Replacement	Find & Fix Gravity Main	4th Creek	Fourth Creek	183,777	Project Complete
175	Subbasin 37 Sewer Improvements	Find & Fix Gravity Main	4th Creek	Fourth Creek	85,039	Project Complete
176	Second Creek SSO Abatement	Find & Fix Gravity Main	2nd Creek	Kuwahee	827	Project Complete
177	Minibasin 42 & 42A1	Comprehensive Rehabilitation	4th Creek	Fourth Creek	118,001	Project Complete
178	East Fork of Third Creek Trunkline	Find & Fix Gravity Main	3rd Creek	Kuwahee	192,992	Project Complete
179	Minibasin 04C1 Trunkline	Find & Fix Gravity Main	1st Creek	Kuwahee	36,480	Project Complete
180	South Knox SSO Abatement	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	50,280	Project Complete
181	Minibasin 22A2 & 22C2 rehabilitation	Find & Fix Gravity Main	3rd Creek	Kuwahee	16,061	Project Complete
182	Lonas Drive - Find & Fix	Find & Fix Gravity Main	3rd Creek	Kuwahee	881	Project Complete
183	Third Creek SSO Abatement Project	Find & Fix Gravity Main	3rd Creek	Kuwahee	105,000	Project Complete
184	Clyde Street Gavity Sewer Replacement	Find & Fix Gravity Main	3rd Creek	Kuwahee	12,250	Project Complete
185	Red Bud Road Gravity Sewer Replacement	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	11,375	Project Complete
186	Fern St Sewer Line Replacement	Find & Fix Gravity Main	Loves Creek	Loves Creek	9625	Project Complete
187	Dallas St Sewer Line Replacement Project	Find & Fix Gravity Main	Loves Creek	Loves Creek	9625	Project Complete
188	Loves Creek Minibasin 20A9 Magnolia ave sewer rehabilitation/replacement	Find & Fix Gravity Main	Loves Creek	Loves Creek	34,125	Project Complete
189	Groner Drive Mini-Basin Sanitary Sewer Rehabilitation	Find & Fix Gravity Main	Williams Creek	Kuwahee	9625	Project Complete
190	Strawberry Plains Pike Mini-Basins	Find & Fix Gravity Main	Loves Creek	Loves Creek	4054	Project Complete
191	Farragut Ave, Kesterwood & Jefferson Ave sewer rehabilitation	Find & Fix Gravity Main	1st Creek	Kuwahee	5,250	Project Complete
192	Minibasins 07A1, -7A2 & 07A3 Sewer Rehabilitation	Comprehensive Rehabilitation	1st Creek	Kuwahee	156,625	Project Complete

Capital Projects and Rehabilitation Credits

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
193	Maloneyville Road Sewer Improvements	Find & Fix Gravity Main	Eastbridge	Eastbridge	7,031	Project Complete
194	Cedarhill, Lonas Drive & Kenesaw Find & Fix	Find & Fix Gravity Main	3rd Creek	Kuwahee	3,518	Project Complete
195	Lucinda Drive Balsam Dr & others	Find & Fix Gravity Main	3rd Creek	Kuwahee	7,000	Project Complete
196	Cherokee Blvd., Oak Rd., Find & Fix	Find & Fix Gravity Main	3rd Creek	Kuwahee	6,125	Project Complete
197	Petersburg Rd., S Middlebrook Pk., Find & Fix	Find & Fix Gravity Main	4th Creek	Fourth Creek	7,000	Project Complete
198	Holland Rd, Bona Rd, Find & Fix	Find & Fix Gravity Main	4th Creek	Fourth Creek	10,500	Project Complete
199	Fairhill Ln., N. Broadway, Find & Fix	Find & Fix Gravity Main	2nd Creek	Kuwahee	19,250	Project Complete
200	Cluster Ave., Gaines Rd., Find & Fix	Find & Fix Gravity Main	1st Creek	Kuwahee	10,500	Project Complete
201	Bluff Ave., Wells Ave., Find & Fix	Find & Fix Gravity Main	1st Creek	Kuwahee	5,250	Project Complete
202	Bluefield Road Sewer Line	Find & Fix Gravity Main	3rd Creek	Kuwahee	1,750	Project Complete
203	Fourth Creek Mini-Basins 33A4 & 36B4	Comprehensive Rehabilitation	4th Creek	Fourth Creek	59,500	Project Complete
204	First Creek Mini-Basin 08B3 rehabilitation/replacement	Find & Fix Gravity Main	4th Creek	Fourth Creek	108,500	Project Complete
205	Fourth Creek Mini-Basin 36A3	Comprehensive Rehabilitation	4th Creek	Fourth Creek	55,125	Project Complete
206	Fourth Creek Mini-Basin 32B1	Comprehensive Rehabilitation	4th Creek	Fourth Creek	11,375	Project Complete
207	Fourth Creek Mini-Basin 32B2	Comprehensive Rehabilitation	4th Creek	Fourth Creek	36,750	Project Complete
208	Fourth Creek Mini-Basins 36A4 & 36A5	Comprehensive Rehabilitation	4th Creek	Fourth Creek	23,625	Project Complete
209	Westland Drive Trunk Sewer	Find & Fix Gravity Main	4th Creek	Fourth Creek	144,949	Project Complete
210	Mini-Basin 23A1 Rehabilitation	Find & Fix Gravity Main	2nd Creek	Kuwahee	80,500	Project Complete
211	Sub-Basin 22, Mini-Basins 22A2 & 22C2	Comprehensive Rehabilitation	3rd Creek	Kuwahee	75,250	Project Complete
212	Chapman Highway Gravity Sewer Replacement	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	7,000	Project Complete
213	Scottish Pike, Blount Ave, Monmouth St, Kyle St Sewer Replacement	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	4,375	Project Complete
214	First Creek Mini-Basins 07A1 & 07A1a	Comprehensive Rehabilitation	1st Creek	Kuwahee	143,500	Project Complete
215	Fourth Creek Minibasin 27B3 & 32A1	Find & Fix Gravity Main	4th Creek	Fourth Creek	9,625	Project Complete
216	Second Creek Mini-Basin 10B1	Comprehensive Rehabilitation	2nd Creek	Kuwahee	25,375	Project Complete
217	Belt Road Sewer Extension	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	1,766	Project Complete

Appendix B

SSOs

Date	Time	Street #	Street	Plant	Watershed	Basin	Overflow Location	Pathway	Receiving Water	Cause of SSO/KUB Response	Total Volume (Gallons)	Recovered Volume (Gallons)	Non-Recovered Volume (Gallons)	Duration (Hours)	Unpermitted Discharge
10/7/2016	9:27 AM	513	Stone Pony Lane	FC	Fourth Creek	36	Manhole 3-142	Ground to Wet Weather Conveyance to Fourth Creek	Fourth Creek	Blockage - Grease and Debris. The sewer main was flushed to clear the blockage and the area was cleaned.	175	0	175	1	Yes
10/18/2016	10:40 AM	1807	Rocky View Way	KUW	First Creek	8	Manhole 7-143	Soil Saturation to Wet Weather Conveyance to First Creek	First Creek	Blockage - Grease and Debris. The sewer main was flushed to clear the blockage and the area was cleaned.	1,850	0	1,850	2	Yes
10/25/2016	12:28 PM	6313	Old Rutledge Pike	LC	Loves Creek	105	Broken Force Main	Ground to Soil Saturation		Construction Failure - Dig-In. The sewer main was repaired and the area was cleaned.	15	0	15	0.5	No
11/1/2016	1:30 PM	601	South Central Street	KUW	First Creek	23	Manhole 3-32	Pavement to Storm Drain to First Creek	First Creek	Blockage - Grease and Debris. The sewer main was flushed to clear the blockage and the area was cleaned.	200	0	200	0.75	Yes
11/20/2016	7:51 PM	1106	Callaway Avenue	KUW	Second Creek	23	Manhole 19-147	Pavement to Storm Drain		Blockage - Grease. The sewer main was flushed to clear the blockage and the area was cleaned.	19	0	19	1	No
11/21/2016	8:31 AM	5915	Neubert Springs Road	KUW	Knob Creek	41	Manhole 132	Pavement to Storm Drain to Soil Saturation to Knob Creek	Knob Creek	Pump Station Failure - Electrical. The pump station was repaired and the area was cleaned.	57,800	0	57,800	36	Yes
11/21/2016	10:00 AM	5100	West Martin Mill Pike	KUW	South Knox	39	Manhole 142	Soil Saturation		Pump Station Failure - Electrical. The pump station was repaired and the area was cleaned.	47	0	47	1	No
11/26/2016	3:48 PM	115	Tillery Drive	KUW	Second Creek	10	Manhole 16-6	Ground to Pavement to Soil Saturation		Blockage - Grease. The sewer main was flushed to clear the blockage and the area was cleaned.	100	0	100	2	No
12/21/2016	11:00 AM	118	Oglewood Avenue	KUW	Second Creek	15	Lateral Cleanout	Lateral Cleanout to Soil Saturation		Blockage - Debris. The sewer main was flushed to clear the blockage and the area was cleaned.	130	30	100	1	No
12/28/2016	11:06 AM	2015	Neyland Drive	KUW	Third Creek	35b	Waste Hauler Discharge Station	Pavement to Storm Drain to Third Creek and Soil Saturation	Third Creek	Waste Hauler Discharge Process Failure. The sewer main was reinstated and the area was cleaned.	100	0	100	0.25	Yes
12/29/2016	10:46 AM	2400	North Broadway	KUW	First Creek	17	Manhole 4-154	Pavement to Storm Drain to First Creek and Recovery	First Creek	Blockage - Debris. The sewer main was flushed to clear the blockage and the area was cleaned.	225	50	175	3	Yes
12/30/2016	2:29 PM	1720	Polkwright Lane	FC	Fourth Creek	37	Grinder Pump	Soil Saturation		Grinder Pump Failure. The pump was repaired and the area was cleaned.	10	0	10	1.5	No
12/31/2016	12:55 PM	2116	Houser Road	FC	Fourth Creek	43	Pump Station	Soil Saturation		Pump Station Failure - Electrical. The pump station was reinstated and the area was cleaned.	2,000	0	2,000	1	No

Appendix C

Building Backups

BBUs

Date	Time	Street #	Street	Plant	Watershed	Basin	Overflow Location	Cause of SSO/KUB Response	Total Volume (Gallons)	Recovered Volume (Gallons)	Non-Recovered Volume (Gallons)	Duration (Hours)
10/4/2016	8:15 PM	5831	Pepperhill Road	KUW	Third Creek	11	BBU	Blockage - Roots. The sewer main was flushed to clear the blockage. The building was cleaned by Disaster Cleaning and Restoration.	20	20	0	5
10/6/2016	10:37 AM	7100	Shadyland Drive	FC	Fourth Creek	36	BBU	Blockage - Roots. The sewer main was flushed to clear the blockage. The building was cleaned by Serv-Pro.	850	850	0	1

Appendix D

Water Quality Monitoring Program Sampling Results



**Water Quality Monitoring
Report**

Routine Water Quality Monitoring Report

10/1/2016 Through 1/9/2017

Knoxville Utilities Board

Water Quality Laboratory
Debbie Ailey, Lab Supervisor
835 East Jackson Avenue
Knoxville, Tennessee 37915
(865) 594-8286 Fax: (865)594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Precipitation Event	Status
<u>First Creek</u>									
1.74	10/13/2016	12:07	7.8	16	8.8	2200	520	Dry	R
2.57	10/13/2016	11:09	7.7	16	9.2	540	730	Dry	R
6.33	10/13/2016	10:45	7.5	16	7.9	2400	1600	Dry	R
1.74	11/9/2016	10:52	7.9	14	8.8	410	330	Dry	R
2.57	11/9/2016	10:37	8.0	13	9.6	350	360	Dry	R
6.33	11/9/2016	09:27	7.3	15	7.5	280	180	Dry	R
1.74	12/14/2016	12:35	7.6	10	11	340	410	Wet	R
2.57	12/14/2016	12:20	7.8	11	10	340	460	Wet	R
6.33	12/14/2016	09:00	6.9	13	8.6	440	390	Wet	R
<u>Second Creek</u>									
0.30	10/24/2016	12:32	7.9	17	9.2	3700	2000	Wet	I
1.54	10/24/2016	11:17	7.3	16	8.4	190	130	Wet	R
5.11	10/24/2016	11:01	7.1	17	6.4	460	340	Wet	R
0.30	11/9/2016	10:13	7.7	15	9.4	21000	> 2400	Dry	I
1.54	11/9/2016	10:00	7.5	14	8.1	520	410	Dry	R
5.11	11/9/2016	09:42	7.4	15	6.4	270	330	Dry	R
0.30	11/14/2016	11:54	7.5	14	10	1700	> 2400	Dry	I
0.30	12/14/2016	09:50	7.7	12	10	570	650	Wet	R
1.54	12/14/2016	09:35	7.4	12	9.5	540	870	Wet	R
5.11	12/14/2016	09:15	6.7	13	7.8	910	980	Wet	R

*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



Routine Water Quality Monitoring Report

10/1/2016 Through 1/9/2017

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Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Precipitation Event	Status
<u>Third Creek</u>									
0.87	10/24/2016	12:16	7.9	15	8.7	350	330	Wet	R
2.08E	10/24/2016	12:02	7.5	16	7.0	18	43	Wet	R
4.80W	10/24/2016	11:38	7.7	15	8.8	250	220	Wet	R
0.87	11/10/2016	11:00	7.6	12	9.4	370	280	Dry	R
2.08E	11/10/2016	10:42	7.3	12	5.7	180	460	Dry	R
4.80W	11/10/2016	10:26	7.4	12	9.2	270	490	Dry	R
0.87	12/20/2016	11:07	8.4	10	10	29000	1300	Wet	R
2.08E	12/20/2016	10:55	7.9	9	10	370	200	Wet	R
4.80W	12/20/2016	09:56	7.0	12	9.7	240	250	Wet	R
0.87	1/9/2017	12:51	7.6	8	12	120	140	Wet	R
2.08e	1/9/2017	12:40	7.4	7	11	27	41	Wet	R
4.80w	1/9/2017	11:00	6.9	10	11	150	96	Wet	R

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Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Precipitation Event	Status
<u>Fourth Creek</u>									
1.75	10/12/2016	09:46	7.8	14	9.7	820	460	Dry	R
2.79	10/12/2016	10:00	7.9	14	8.8	200	130	Dry	R
3.29	10/12/2016	10:12	7.8	14	9.8	230	180	Dry	R
1.75	11/10/2016	10:10	7.6	13	10	190	110	Dry	R
2.79	11/10/2016	09:57	7.6	12	8.4	210	200	Dry	R
3.29	11/10/2016	09:45	7.8	13	10	170	180	Dry	R
1.75	12/20/2016	10:38	7.7	11	11	510	260	Wet	R
2.79	12/20/2016	10:26	7.5	12	10	300	240	Wet	R
3.29	12/20/2016	10:16	7.3	12	10	350	240	Wet	R
<u>Baker Creek</u>									
0.36	10/18/2016	10:40	7.5	18	7.5	2100	2400	Dry	I
0.53	10/18/2016	10:05	7.5	17	8.1	1400	1600	Dry	I
1.45	10/18/2016	10:18	7.5	16	7.0	1800	1200	Dry	I
0.36	11/29/2016	12:10	7.0	14	7.6	22000	> 2400	Wet	I
0.53	11/29/2016	11:58	7.2	14	7.6	17000	> 2400	Wet	I
1.45	11/29/2016	11:06	7.0	14	7.7	5400	> 2400	Wet	I
0.36	12/28/2016	10:02	7.0	8	9.2	950	870	Wet	R
0.53	12/28/2016	10:14	7.2	10	9.7	180	920	Wet	R
1.45	12/28/2016	10:51	7.4	11	10	320	440	Wet	R

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Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Precipitation Event	Status
<u>Goose Creek</u>									
0.40	10/18/2016	09:46	7.6	17	7.0	2000	1300	Dry	I
1.19E	10/18/2016	09:35	7.4	17	7.6	1400	920	Dry	R
1.80E	10/18/2016	09:23	7.4	17	8.4	1300	730	Dry	R
0.40	11/29/2016	10:41	6.3	13	7.3	19000	> 2400	Wet	I
1.19E	11/29/2016	10:32	7.1	13	7.5	14000	> 2400	Wet	R
1.80E	11/29/2016	10:19	6.9	13	7.6	1400	870	Wet	R
0.40	12/19/2016	10:21	7.6	9	11	580	650	Wet	R
1.19E	12/19/2016	09:54	6.9	10	11	180	150	Wet	R
1.80E	12/19/2016	09:41	7.0	11	9.5	250	310	Wet	R
<u>Loves Creek</u>									
0.85	10/4/2016	08:55	7.2	17	7.8	1400	130	Dry	R
1.89	10/4/2016	09:07	7.1	17	7.8	480	130	Dry	R
3.45	10/4/2016	09:16	7.4	18	8.0	72	36	Dry	R
0.85	11/8/2016	11:23	7.3	13	9.6	260	100	Dry	R
1.89	11/8/2016	11:07	7.1	14	8.8	220	160	Dry	R
3.45	11/8/2016	10:59	7.3	15	8.4	< 9	< 1	Dry	R
0.85	12/15/2016	12:01	6.9	9	11	130	96	Wet	R
1.89	12/15/2016	12:16	7.0	10	10	63	69	Wet	R
3.45	12/15/2016	12:30	6.9	9	11	140	170	Wet	R

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Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Precipitation Event	Status
<u>Williams Creek</u>									
0.89	10/4/2016	10:03	7.8	17	8.6	3200	250	Dry	R
1.70	10/4/2016	09:35	7.3	17	7.4	1600	1100	Dry	I
2.02	10/4/2016	09:48	7.5	18	7.9	3500	2400	Dry	I
0.89	11/8/2016	12:08	7.8	13	9.6	160	98	Dry	R
1.70	11/8/2016	11:51	7.4	15	7.8	580	520	Dry	R
2.02	11/8/2016	11:43	7.6	15	7.9	410	260	Dry	R
0.89	12/19/2016	12:11	7.0	9	11	1600	730	Wet	R
1.70	12/19/2016	11:56	7.4	10	10	2300	1100	Wet	I
2.02	12/19/2016	12:26	7.4	9.3	11	7000	> 2400	Wet	I

*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



Water Quality Monitoring
Report

Spill Impact Sampling Results
Water Quality Monitoring Program

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Event Date 10/7/2016
Street Address 513 Stone Pony Ln.
Description Blockage - Grease & Debris

Ground to Wet Weather Conveyance to Fourth Creek

Estimated unrecovered volume 175 gallons

Sampling Notes: There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	10/7/2016	0.05	0.05

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	10/7/2016	12:11	7.8	19	7.3	450	550
Downstream of SSO Discharge	10/7/2016	12:19	6.6	19	7.5	38000	> 2400
Upstream of SSO Discharge	10/12/2016	09:10	8.4	14	7.2	550	460
Downstream of SSO Discharge	10/12/2016	09:17	8.9	13	7.4	500	390



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Event Date 10/18/2016
Street Address 1807 Rocky View Way
Description Blockage - Grease & Debris

Soil Saturation to Wet Weather Conveyance to First Creek

Estimated unrecovered volume 1,850 gallons

Sampling Notes: There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	10/18/2016	0	0

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	10/18/2016	12:56	7.7	20	7.6	430	340
Downstream of SSO Discharge	10/18/2016	13:12	7.7	19	8.2	520	410



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Event Date 11/1/2016
Street Address 601 South Central Street
Description Blockage - Grease & Debris

Pavement to storm drain to First Creek.

**Estimated unrecovered
volume** 200 gallons

Sampling Notes: There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	11/1/2016	0	0

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	11/1/2016	16:00	7.9	19	7.6	370	330
Downstream of SSO Discharge	11/1/2016	15:30	7.7	21	7.4	130	46



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Event Date 11/21/2016
Street Address 5915 Neubert Springs Rd
Description Pumpstation failure - Electrical

Pavement to storm drain to soil saturation to Knob Creek.

Estimated unrecovered volume 57,800 gallons

Sampling Notes: There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	11/21/2016	0	0.09

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	11/21/2016	10:30	10	6	7.2	2700	> 2400
Downstream of SSO Discharge	11/21/2016	10:40	8.3	6	6.9	> 60000	> 2400
Upstream of SSO Discharge	12/9/2016	08:56	11	6	7.2	390	460
Downstream of SSO Discharge	12/9/2016	08:45	11	6	7.3	320	550



**Water Quality Monitoring
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Event Date 12/28/2016
Street Address 2015 Neyland Drive
Description Waste hauler discharge failure.

Pavement to storm drain to Third Creek and soil saturation.

**Estimated unrecovered
volume** 100 gallons

Sampling Notes: There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	12/28/2016	0.34	0.7

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	12/28/2016	13:23	11	12	7.8	45	60
Downstream of SSO Discharge	12/28/2016	13:37	9.2	13	7.2	81	64



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Event Date 12/29/2016
Street Address 2400 North Broadway
Description Blockage - Debris

Pavement to storm drain to First Creek.

Estimated unrecovered volume 175 gallons

Sampling Notes: There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	12/29/2016	0.76	1.43

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	12/29/2016	12:40	9.7	10	6.5	17000	> 2400
Downstream of SSO Discharge	12/29/2016	13:15	10	10	6.8	5600	> 2400
Upstream of SSO Discharge	1/5/2017	09:58	10	9.0	7.0	360	360
Downstream of SSO Discharge	1/5/2017	09:45	10	10	7.0	520	490

Knoxville Utilities Board

Water Quality Monitoring Program

Investigative Water Quality Monitoring Report

10/1/16 - 12/31/16

Table 1: Second Creek Investigative Sampling

Location	Collection Date	Weather	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform	E. coli
			(mg/L)	(°C)	s.u.	(CFU/ 100mL)	(MPN)
Second Creek at Cumberland Ave.	11/14/2016	Dry	9.4	14	7.2	270	120
	12/14/2016	Wet	8.7	13	7.4	820	650
Second Creek at McGhee Ave.	11/14/2016	Dry	9.7	14	7.3	280	230

Table 2: Baker Creek Investigative Sampling

Location	Collection Date	Weather	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform	E. coli
			(mg/L)	(°C)	s.u.	(CFU/ 100mL)	(MPN)
Baker Creek Stream Mile 2.00 at School	10/18/2016	Dry	8.6	16	7.8	390	520
	11/29/2016	Wet	8.4	14	7.1	5600	> 2400
	12/28/2016	Wet	10	10	7.7	210	360
Baker Creek Stream Mile 1.10	11/29/2016	Wet	7.2	14	7.0	22000	> 2400
	12/28/2016	Wet	9.5	11	7.1	480	360

Appendix E

Unpermitted Discharges Subject to Stipulated Penalties

Fourth Quarter 2016 Unpermitted Discharge Data and Analysis

Appendix E lists all SSOs that occurred during 2016 that resulted in an unpermitted discharge along with its cause, volume, one- and three-day rainfall totals, and rainfall intensity.

The table below summarizes unpermitted discharges listed in Appendix E for this quarter that were impacted by factors that were difficult to control or events that had minimal impact on the environment due to their low volume.

Table 6. Unpermitted Discharge Data

Category	Count
Mech/Elec. Failure	1
Vandalism	0
3-day rain > 4 in.	0
1-day > 3 in.	0
Vol 501 - 1000 gal	0
Vol < 500 gal.	4
Intensity > 0.84 in/hr	0

Appendix E										
Unpermitted Discharges in 2016										
	18	Overflow volume of 500 gallons or less			1-day rainfall greater than 3"					
	1	Overflow volume of 501 - 1000 gallons			3-day rainfall greater than 4"					
		Vandalism			Intensity > 0.84 in/hr					
	1	Electrical or mechanical failure								
Reporting Period	Date	Location	Event	Unrecovered Volume (Gal.)	Receiving Stream	Cause	Rainfall Totals		Peak Rainfall Intensity (in/hr)	Force Majeure event
							1-Day*	3-Day**		
1st 2016	1/14/2016	840 Twentieth Street	Unpermitted Discharge	100	Third Creek	Construction Failure	0	0	0	
1st 2016	1/25/2016	2223 Cumberland Avenue	Unpermitted Discharge	130	Third Creek	Broken System - Broken Manhole Lid	0	0	0	
1st 2016	1/29/2016	3222 Kingston Pike	Unpermitted Discharge	50	TN River	Broken System - Broken Gravity Main	0	0	0	
1st 2016	2/3/2016	2706 Boright Drive	Unpermitted Discharge	200	First Creek	Heavy Rainfall	1.86	3.09	0.71	
1st 2016	2/3/2016	4100 Central Avenue Pike	Unpermitted Discharge	500	Second Creek	Heavy Rainfall	1.86	3.09	0.71	
1st 2016	2/3/2016	6803 Stockton Drive	Unpermitted Discharge	15,840	Fourth Creek	Heavy Rainfall	1.86	3.09	0.71	
1st 2016	2/3/2016	2004 Riverside Drive	Unpermitted Discharge	4,700	Williams Creek	Heavy Rainfall	1.86	3.09	0.71	
1st 2016	2/3/2016	7000 Rotherwood Drive	Unpermitted Discharge	350	Fourth Creek	Heavy Rainfall	1.86	3.09	0.71	
1st 2016	2/16/2016	6803 Stockton Drive	Unpermitted Discharge	3,400	Fourth Creek	Heavy Rainfall	0.75	1.78	0.25	
1st 2016	2/24/2016	6803 Stockton Drive	Unpermitted Discharge	500	Fourth Creek	Heavy Rainfall	0.28	1.93	0.66	
1st 2016	2/24/2016	517 Bernard Avenue	Unpermitted Discharge	860,000	Second Creek	WW Storage Facility Failure	0.28	1.93	0.66	
2nd 2016	4/14/2016	2625 Emoriland Boulevard	Unpermitted Discharge	50	First Creek	Blockage - Grease	0	0.25	0.12	
2nd 2016	4/17/2016	2916 Tazewell Pike	Unpermitted Discharge	1,700	First Creek	Blockage - Grease	0	0	0	
2nd 2016	4/25/2016	2900 Tazewell Pike	Unpermitted Discharge	25	First Creek	Blockage-Grease	0	0	0	
2nd 2016	4/27/2016	3908 West Bellemeade Avenue	Unpermitted Discharge	200	Third Creek	Broken System - Broken Gravity Main	0.06	0.06	0.59	
2nd 2016	5/1/2016	5906 Walden Drive	Unpermitted Discharge	20	Fourth Creek	Blockage - Debris	0.19	0.69	0.59	
2nd 2016	5/3/2016	1109 Mechanics Way	Unpermitted Discharge	500	Second Creek	Blockage - Grease	0.13	0.59	0.59	
2nd 2016	6/8/2016	1216 Old Weisgarber Road	Unpermitted Discharge	750	Fourth Creek	Construction Failure - Bypass Pumping Failure	0	0	0	
2nd 2016	6/24/2016	1916 Fenwood Drive	Unpermitted Discharge	2,000	First Creek	Blockage - Debris	0	0	0	
3rd 2016	7/22/2016	857 North Central Street	Unpermitted Discharge	500	Second Creek	Blockage - Grease and Debris	0	0	0	
3rd 2016	8/1/2016	5500 E Governor John Sevier Highway	Unpermitted Discharge	9,550	Holston River	Broken System - Broken Force Main Due to Water Main Break	0	0	0	
3rd 2016	8/10/2016	1620 Edgewood Avenue	Unpermitted Discharge	400	First Creek	Blockage - Grease and Debris	0.01	0.75	0.61	
3rd 2016	9/20/2016	2609 East Martin Mill Pike	Unpermitted Discharge	29,000	Tennessee River	Blockage - Grease	0	0.56	0.41	
4th 2016	10/7/2016	513 Stone Pony Lane	Unpermitted Discharge	175	Fourth Creek	Blockage - Grease and Debris	0	0	0	
4th 2016	10/18/2016	1807 Rocky View Way	Unpermitted Discharge	1,850	First Creek	Blockage - Grease and Debris	0	0	0	
4th 2016	11/1/2016	601 South Central Street	Unpermitted Discharge	200	First Creek	Blockage - Grease and Debris	0	0	0	
4th 2016	11/21/2016	5915 Neubert Springs Road	Unpermitted Discharge	57,800	Knob Creek	Pump Station Failure - Electrical	0	0.16	0	
4th 2016	12/28/2016	2015 Neyland Drive	Unpermitted Discharge	100	Third Creek	Waste Hauler Discharge Process Failure	0.34	0.36	0.41	
4th 2016	12/29/2016	2400 North Broadway	Unpermitted Discharge	175	First Creek	Blockage - Debris	0.76	1.43	0.41	
*1-Day Rainfall Total is the rain that occurred on the day of the SSO										
**3-Day Rainfall Total is the total amount of rain that occurred on the day of the SSO and the 2 days prior										