

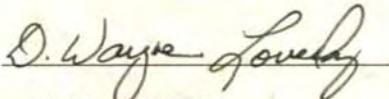
# Quarterly Progress Report

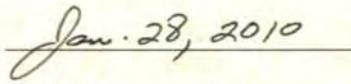
Volume 19

**Third Quarter Report  
October 1 through December 31, 2009**

**Submitted to EPA on January 28, 2010**

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.

  
D. Wayne Loveday

  
Date



# Table of Contents

<b>Executive Summary</b>	<b>i</b>
<b>Section 1 Phase 1 Corrective Action Plan/Engineering Report (CAP/ER) and Phase 2 CAP/ER</b>	<b>1</b>
<b>Section 2 Comprehensive Performance Evaluation Program and Composite Correction Plan</b>	<b>9</b>
<b>Section 3 Process Controls Program</b>	<b>10</b>
<b>Section 4 Capacity Assurance Program</b>	<b>11</b>
<b>Section 5 Transfers of Ownership</b>	<b>12</b>
<b>Section 6 Compliance and Non-Compliance With the Consent Decree</b>	<b>13</b>
6.1 Submission of Deliverables	13
6.2 Violations Subject to Stipulated Penalties	13
<b>Section 7 Sanitary Sewer Overflows (SSOs), Bypasses, Diversions, and Effluent Limit Violations</b>	<b>15</b>
7.1 SSOs	15
7.2 Building Backups	15
7.3 Bypasses	15
7.4 Diversions	15
7.5 Effluent Limit Violations	15
<b>Section 8 Water Quality Monitoring Data</b>	<b>17</b>
8.1 Sampling Conducted and Results	17
8.2 Projected Data Collection	19
<b>Appendices</b>	
Appendix A Capital Projects and Rehabilitation Credits	
Appendix B SSOs	
Appendix C Building Backups	
Appendix D Water Quality Monitoring Program Sampling Results	

# 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 2009 from October 1 through December 31. This is the nineteenth 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, 2009

- Submitted to EPA – Quarterly Progress Report 3rd quarter 2009

## 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 will be completed by June 30, 2013. The Phase 2 CAP/ER was submitted to EPA on September 9, 2009.

### Requested Project Extensions and Changes Requested in Phase I CAP/ER Annual Report 2009

Project and Reason	Original Completion Date	Revised Completion Date
<b>2-2 Lower Second Creek Replacement/Rehabilitation at Woodland</b> – Construction has been completed of the lower trunkline work. Upper portion is currently in design and will require permitting from two different railroad owners. End date was initially extended to FY 08/09. New alignment for trunk sewer construction required easement acquisition and railroad permitting and requires an additional extension.	FY 08/09	FY 10/11
<b>3-6 Interstate 40 and Middlebrook Pike Trunk Replacement Project</b> – Constructability issues and permitting require that the project completion date be extended until FY 11/12. Project will require coordination with future TDOT road improvement project and extensive railroad permitting, environmental permitting, and property acquisition.	FY 09/10	FY 11/12
<b>4-2 Gleason Drive Collector Rehabilitation Project</b> – See justification below	FY 08/09	FY 09/10
<b>4-3 Middlebrook Pike Rehabilitation (Sub-basin 27C3) Project</b> – See justification below	FY 08/09	FY 09/10
<b>4-4 Northshore Drive Trunk Replacement Project</b> – See justification below	FY 08/09	FY 10/11
<b>4-6 Shadyland Drive Rehabilitation (Sub-basin 36A2) Project</b> – See justification below	FY 08/09	FY 09/10

Preliminary design of these projects were shifted from FY 07/08 to FY 08/09 to allow resources to focus on other projects in First Creek, Second Creek, Loves Creek, and Williams Creek that were determined to be higher risk areas for overflows. The shift in starts has led to a need for

extension in completion of one year. In the case of the Northshore trunk, a two-year extension is requested due to difficult construction on a major street. All projects are well underway and should complete in the requested time frame.

### **EPA Approved Project Extensions and Changes**

EPA approved schedule changes for the following projects in a letter dated October 30, 2009:

- **2-2 Lower Second Creek Replacement/Rehabilitation at Woodland** – revised completion date of June 30, 2011.
- **3-6 Interstate 40 and Middlebrook Pike Trunk Replacement Project** – revised completion date of June 30, 2012.
- **4-2 Gleason Drive Collector Rehabilitation Project** – revised completion date of June 30, 2010.
- **4-3 Middlebrook Pike Rehabilitation (Sub-basin 27C3)** – revised completion date of June 30, 2010.
- **4-4 Northshore Drive Trunk Replacement Project** – revised completion date of June 20, 2011.
- **4-6 Shadyland Drive Rehabilitation (Sub-basin 36A2) Project** – revised completion date of June 30, 2010.

All previously approved project extensions and changes are listed below.

- **1-1 Upper First Creek Collector Project (Mini-basin 1A1, 2A2, and 3D1)** – End date extended from FY 06/07 to FY 07/08. Due to the expanded scope, an additional extension was requested in the Phase I CAP/ER Annual Report 2008. End date was extended from FY 07/08 to FY 08/09 and was completed on schedule.
- **1-20 Vine Middle School Rehabilitation Project** – End date extended from FY 06/07 to FY 07/08 and was completed as scheduled.
- **2-4 Dutch Valley Collector Rehabilitation (Sewershed 10B1)** – End date was extended to September 2007 and was completed as scheduled.
- **2-5 Rickard and Wilson Collector Rehabilitation (Sewershed 10C1)** – End date was extended to September 2007 and was completed as scheduled.
- **S-1 Ginnbrook Pump Station Rehabilitation** – End date was extended from FY 06/07 to FY 08/09 and 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** – End date scheduled as FY 08/09 and was completed as scheduled.
- **2-1 Lower Second Creek Replacement/Rehabilitation at I40/I275 Junction** – End date was extended from FY 08/09 to FY 09/10 and is on schedule.
- **2-2 Lower Second Creek Replacement/Rehabilitation at Woodland** – End date was extended from FY 07/08 to FY 08/09. Approximately half of the project is complete. Delays due to railroad permitting on the remaining half. Requesting additional extension to FY 09/10.

### **Current Capital Improvement Plan for FY 04/05 - FY 09/10**

The following is a list of facility improvement projects included in the Capital Improvement Plan for fiscal years 04/05 to 09/10. These projects were in various stages during the reporting period, including preliminary engineering, design, construction, and completion. Many of these projects are “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 are trunkline capacity improvements or wet-weather storage. Each of these projects is considered part of the overall Phase 1 CAP/ER.

## Ongoing Projects

### First Creek

1. **1-19 Edgewood Drive Rehabilitation Project** – Find and fix work to identify and address cause of overflow in the vicinity of 1620 Edgewood Drive. Project is in preliminary engineering. The expected completion date for construction is June 2010.
2. **1-23 Oglewood Avenue Rehabilitation Project** – Find and fix work to identify and address cause of overflow in the vicinity of 1307 Oglewood Avenue. Project is in preliminary engineering. The expected completion date for construction is June 2010.

### Second Creek

1. **2-1 Lower Second Creek Replacement/Rehabilitation at I40/I275 Junction** –Project scope has been redefined in lieu of storage placement upstream of the Second Creek trunk sewer running from Dameron south to Interstate 40. Revised project scope will only include line work beginning at MH 19-133 and continuing to MH 19-107. Design of revised trunk project is underway. Construction of CCP storage at Bernard Avenue is underway.
2. **2-2 Lower Second Creek Replacement/Rehabilitation at Woodland** – Perform sewer system assessment and design rehabilitation and replacement of various trunk and collector lines located in sub-basin 23 near Woodland Avenue. Sewer assessment is underway. Design is complete for the northern section, and railroad permits are being acquired. Construction has been completed for the southern portion of this project.
3. **2-11 Burnside Rehabilitation Project** – Find and fix work to identify and address cause of overflow in the vicinity of 2523 Burnside Street. Design underway.
4. **2-12 Camelia Road Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of Camelia Road and Merchant Drive and 412 Merchant Drive. Construction underway.
5. **2-13 Cedar Heights Road Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 5511 Cedar Heights Road and 5605 Pinecrest Road. Design underway.
6. **2-14 Central Avenue Pike Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 5500 Central Avenue Pike. Construction underway.
7. **2-15 1000 Block Elm Street Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 1025 Elm Street. This project is currently in the design phase.
8. **2-16 1600 Block Elm Street Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 1611 Elm Street and 801 West Oldham Avenue. This project is currently in the design phase.
9. **2-17 Shasta Drive Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 5108 Fennel Road and 805 Shasta Drive. Construction underway.
10. **2-18 Nicholas Road - Clinton Highway Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 4500 Nicholas Road and 4200 Clinton Highway. Construction underway
11. **2-19 Cumberland Avenue Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 1000 Phillip Fulmer Way, 1509 Cumberland

Avenue, and Seventeenth Street and White Avenue. This project is currently in the design phase.

12. **2-20 Sierra Road Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 5609 Sierra Road. Construction underway.
13. **2-21 Morelia Avenue Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 120 E. Morelia Avenue. This project is currently in the design phase.
14. **2-22 Dale Avenue Rehabilitation Project** - Find and fix work to identify and address cause of overflow in the vicinity of 345 Dale Avenue. This project is currently in the design phase.

#### **Third Creek**

1. **3-6 Interstate 40 and Middlebrook Pike Trunk Sewer Replacement** – Design is underway.
2. **3-7 Neyland Drive Trunk Replacement** – Project is at 90% engineering design as part of the CCP storage being evaluated at the Kuwahee WWTP. Original scope has changed from replacement work along Neyland Drive to work on the existing trunk south of Tyson Park.
3. **3-8 Third Creek Bike Trail Trunk Replacement** – Phase 1 project is at 90% engineering design.

#### **Fourth Creek**

1. **4-2 Gleason Road Rehabilitation** – The Notice to Proceed was issued on May 14, 2009. This project is included in the Fourth Creek SSO project. Substantially complete.
2. **4-3 Middlebrook Pike Rehabilitation** – The Notice to Proceed was issued on May 14, 2009. This project is included in the Fourth Creek SSO project. Substantially complete.
3. **4-4 Northshore Drive Trunk Sewer Replacement** – Replace approximately 3600 ft of existing 24-inch trunk sewer with 36 inch. Construction should commence in the 4th quarter 2009. Design is underway with anticipated construction start in first quarter of 2010. EPA approved extension to 2011.
4. **4-6 Shadyland Drive Rehabilitation** – The Notice to Proceed was issued on May 14, 2009. This project is included in the Fourth Creek SSO project. Substantially complete.

#### **South Knox**

1. **S-11 Ford Valley Pump Station Upgrade Project** –. Design is complete. Construction has begun and is expected to be complete in June 2010.
2. **S-15 Trunk Replacement in Sub-basin 40A2 Project** – Design is underway and is projected to be completed in 1<sup>st</sup> quarter 2010. Construction is projected to begin in the Spring of 2010.
3. **S-9 Ellis Road Rehabilitation Project** – Rehabilitate approximately 3,940 ft of sewer in the vicinity of 6555 Chapman Highway, 6516 Jackie Lane, 212 Ellis Road, and 6528 Jackie Lane. Project is currently in design.

#### **Loves Creek and Eastbridge**

1. **L-1 Asheville Highway west of I-40 Trunk Replacement** – Upgrade 4,786 LF of existing 18-inch pipe into 24-inch and 30-inch pipe. Project is under construction. The expected completion date is June 2010, two years ahead of schedule.
2. **L-2 Boyds Bridge Pike and Holston Hills Trunk Replacement** – Replace approximately 4,190 LF of existing 10-inch, 500 LF of 12-inch, and 330 LF of 15-inch pipe. Project is under design. The expected completion date for construction is June 2011, one year ahead of schedule.

3. **L-3 River View Rehabilitation** – Find and fix work to identify and address cause of overflow in the vicinity of 4102, 4200, 3722, 3716, and 4014 Holston Hills Road. Project is in preliminary engineering.
4. **L-4 Asheville Highway Rehabilitation** – Find and fix work to identify and address cause of overflow in the vicinity of 5411 Asheville Highway. Project is in preliminary engineering.
5. **L-5 Brentwood Shortline Repair** – Find and fix work to identify and address cause of overflow in the vicinity of Brentwood Road. Project is in preliminary engineering.
6. **L-6 Holston Hills Road Rehabilitation** – Find and fix work to identify and address cause of overflow in the vicinity of 4716 Holston Hills Road. Project is in preliminary engineering.
7. **L-7 Magnolia Avenue Rehabilitation** – Find and fix work to identify and address cause of overflow in the vicinity of 3301 Magnolia Avenue. Project is in preliminary engineering.
8. **L-8 McDonald Drive Rehabilitation** – Find and fix work to identify and address cause of overflow in the vicinity of 3415 McDonald Drive. Project is in preliminary engineering.
9. **L-10 Washington Court Rehabilitation** – Find and fix work to identify and address cause of overflow in the vicinity of 4436 Washington Court. Project is in preliminary engineering.

## Completed Projects

### First Creek

1. **Fountain Road** - Upsized 3700 ft of gravity sewer using open cut and pipe bursting methods. Replaced manholes and services.
2. **Fair Drive Phase II** - Rehabilitated 3691 ft and replaced 2458 ft of existing 8-12 inch gravity sewer along Fair Drive.
3. **Greenfield Lane** - Replaced approximately 3300 ft of existing sewer with 8-inch and 12-inch PVC and ductile iron pipe.
4. **Whites Creek Phase III** - Replaced 300 ft of 12-inch, 300 ft of 16-inch, 2700 ft of 24-inch, and 5000 ft of 36-inch sewer.
5. **First Creek Sub-basins 3 and 4 Rehabilitation** – Rehabilitated 26,500 ft of line and replaced 10,500 ft. Project included CCTV, smoke testing, and manhole inspections.
6. **Lower First Creek Storage** - Designed and built 5 million gallon (MG) wet-weather storage tank to control sewer overflows near North Hoitt Avenue during rain events.
7. **Upper First Creek Storage** - Designed and built 9 MG wet-weather storage tank to control sewer overflows near Old Broadway during rain events.
8. **Fountain City Trunkline Replacement** - Replaced and upgraded approximately 6000 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.
9. **Sub-Basin 8B2** – Characterized the condition of 24,900 ft of pipe to determine rehabilitation needs.
10. **1-20 Vine Middle School Rehabilitation Project** – Completed find and fix work to identify cause of overflow in the vicinity of 214 Bertrand Street.
11. **First Creek 8A1** - Rehabilitated approximately 21,067 ft, and replaced approximately 10,273 ft of sewer.
12. **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 MHs installed; 175 ft MH rehab; 69 private laterals reinstated.

## Second Creek

1. **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.
2. **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.
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. **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. **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. **Second Creek Trunk Sewer Improvements Phase I** - Replaced approximately 4,100 feet of existing trunkline with 30-inch sewer.
7. **Second Creek Trunk Sewer Improvements Phase II** - Replaced approximately 3,700 feet of existing trunkline with 30-inch sewer and replaced approximately 1,400 feet of existing trunkline with 36-inch sewer.

## Third Creek

1. **Mynderse, Western, and Canna** - Replaced approximately 1700 ft of 8-inch sewer and pipe-burst approximately 3400 ft of 8-inch up to 10-inch and 12-inch pipe to address wet-weather capacity restrictions resulting in overflows near Pleasant Ridge Road.
2. **Third Creek 28B1\*** - Investigated rehabilitation needs for collectors in mini-basin 28B1 (approximately 7900 ft of pipe). Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair. Plans are being developed for a future rehabilitation project. No construction is planned in the short-term.  
\*The project named Third Creek 28B1 replaces Third Creek 28C1 that appeared in the Quarterly Progress Report for the Second Quarter 2005. After additional studies, it was determined that flows from 28B1 more likely contributed to overflows along Sutherland Avenue and North Bellemeade, as listed in the SSOER.
3. **Third Creek Storage** - Designed and constructed 4.5 MG wet-weather storage tank to control sewer overflows near Western Avenue and Third Creek Road during rain events.
4. **Upper McKamey Trunk Sewer Replacement** – Project replaced approximately 1600 ft of 12-inch and 15-inch trunk sewer. This project further enhanced improvements already made in Third Creek to address overflows along McKamey Road.
5. **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.
6. **Third Creek Road Trunk Sewer Replacement** – Project included approximately 3100 ft of 24-inch and 30-inch 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 2000 ft to reach the new location of the Third Creek Storage Facility at the KUB Hoskins Center.
7. **Third Creek Basin 9 Phase I** – Assessed and rehabilitated collector sewer in 9A1, 9A2, 9A4, and 9D1 (CAP/ER Scope).
8. **Third Creek Basin 9 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.

9. **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.
10. **3-12 Clinch and 21st Street Collector Rehabilitation Project (Sub-basin 35B3)** – Replaced approximately 3,400 lf of existing sewer, rehabilitated 1,900 lf and replaced/rehabbed 25 manholes.

#### Fourth Creek

1. **Pinebrook Drive Sewer Replacement** – Replaced 330 ft of 8-inch gravity sewer partially exposed by erosion of the bank of the adjacent drainage channel.
2. **Walker Springs Rehabilitation (Mini-Basin 32A4)** – Performed find, and design work in Mini-basin 32A4 in the Walker Springs area. Inspection included 43,000 ft of smoke testing, 43,000 ft of CCTV, and 228 manhole inspections. Plans will be developed for future rehabilitation work.
3. **Walker Springs Storage** – Designed and constructed 3.25 MG wet-weather storage tank to control sewer overflows near Walker Springs Pump Station during rain events.
4. **Papermill Drive Phases I, II, and III** – Designed and constructed replacement of approximately 4000 ft of 15-inch, 18-inch, and 2100 ft of 36-inch sewer in the Papermill Drive area to increase conveyance capacity and reduce sewer overflows.
5. **4-1 Chukar Road Rehabilitation** – Replaced 1,600 ft of pipe and nine manholes; rehabbed 900 ft of pipe and nine manholes.

#### South Knox

1. **Maryville Pike** – Designed and replaced 800–1,200 ft of 24-inch sewer located in Witherspoon Superfund site. Design rerouted sewer around site.
2. **South Haven Phase I and Phase II** – Relocated, rehabilitated, and upsized approximately 4700 ft of existing collector sewers to increase conveyance capacity and reduce inflow and infiltration (I/I).
3. **Island Home Rehabilitation** – Rehabilitated 9400 ft and replaced 1200 ft of collector sewers to reduce I/I.
4. **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.
5. **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.
6. **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.
7. **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.
8. **Neubert Springs Collector and West Ford Valley Trunk Rehabilitation** – Rehabilitated 10,000 ft of 15- to 18-inch 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.
9. **Mini-basin 41A6 Rehabilitation Project** – Rehabilitated approximately 21,000 ft of sewer in sub-basin 41A6.
10. **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.

11. **S-6 Sevier Avenue and Jones Street Collector Project** – Rehabilitated approximately 3,100 ft of existing sewer and rerouted approximately 352 ft of 8-inch sewer.

#### **Williams Creek**

1. **Delrose Force Main Replacement** – Designed and replaced approximately 5,000 ft of 16-inch ductile iron pipe force main that had severe structural problems.
2. **Williams Creek Trunk Line Replacement** – Designed and replaced approximately 3,700 ft of 24-inch sewer to correct structural problems.
3. **Williams Creek Sub-basin 19 Rehabilitation** – Performed rehabilitation in sub-basin 19A1, 19B1, and 19A2/A3 to reduce R-value to 2%. 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.
4. **W-4 E. Fifth Avenue Sewer Replacement Project** – Replaced 956 ft with 8" PVC and four manholes.
5. **W-6 Selma Avenue – Harrison Street Rehabilitation Project** – Replaced 650 ft with 8" PVC and four manholes, and rehabbed 600 ft of 8" concrete.
6. **W-8 South Elmwood Street Rehabilitation Project** – Replaced 200 ft with 8" PVC and three manholes, and rehabbed 400 ft of 8" concrete.
7. **W-9 Williams Creek Trunk Line Replacement (Sub-basin 19A1)** – In lieu of replacement of 360 ft of 12" concrete with 15" sewer, problem was addressed by comprehensive rehab of mini-basin 19A1. Project included replacement with 8,900 ft of 8" PVC, 97 ft with 10" PVC, 179 ft with 12" PVC, and 76 manholes. Also rehabbed 21,200 ft of 8" concrete and 180 ft of 12" concrete.

#### **Loves Creek and Eastbridge**

1. **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.
2. **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.

### **Phase II CAP/ER**

The Phase II CAP/ER was submitted to EPA on September 9, 2009.

## **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 posted in the public document repository on June 19, 2007, and comments were accepted until July 18, 2007. The CCP was submitted to the EPA on July 23, 2007.

On November 19, 2007, KUB received notice from EPA extending their review period of the CCP until December 22, 2007. On January 4, 2008, KUB received a letter from EPA disapproving the CCP. In a letter dated February 20, 2008, KUB requested to extend the deadline for responding to EPA’s comments until March 25, 2008, which was approved by EPA.

KUB submitted the Revised CCP to EPA on March 21, 2008.

Following the submittal of the Revised CCP in March 2008, KUB, EPA, TDEC, and DOJ participated in several discussions to address both technical issues related to the work outlined in the CCP and legal issues pertaining to the relationship between the CCP, Consent Decree, and outstanding appeals of KUB’s NPDES Permits. These discussions culminated in all parties agreeing to a revised schedule for the CCP plant upgrades. Among the changes agreed upon by all parties was to issue an amendment to the Consent Decree, which specifically addresses extending the compliance schedule for completing the work outlined in the Revised CCP.

The Revised CCP was submitted to EPA on January 5, 2009 and subsequently approved on January 20, 2009.

Chemically Enhanced Primary Treatment (CEPT) continues to be studied. Benchtop testing of various polymers as well as iron salts has been completed. Recommendation is to remain with a single-source polymer with no iron salts needed. Full-scale trials continue to reflect the results of the benchtop testing.

## **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 26 times during this reporting period resulting in 4 Diversion events (2 at Fourth Creek WWTP and 2 at Kuwahee WWTP).

## 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 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 an ownership interest, operation, management, or other control of the Treatment Works, or any portion thereof, during this reporting period.

## 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 2009

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, 2009, KUB submitted to EPA and placed in the PDR the Quarterly Progress Report for the third quarter 2009. This deliverable was not subject to the Public Review Requirement of Section VI.A.2, but was available for public comment from October 28, 2009, until November 17, 2009. No comments were received during that period.

### 6.2 Violations Subject to Stipulated Penalties

During this reporting period, KUB incurred 6 Unpermitted Discharges. Table 1 below lists all violations subject to stipulated penalties as outlined in the Consent Decree.

**Table 1. Violations Subject to Stipulated Penalties**

<b>Violation</b>	<b>Date</b>	<b>Address</b>	<b>Cause</b>
Unpermitted Discharge	10/20/09	1408 Middle Drive	Collapse
Unpermitted Discharge	12/9/09	1500 Lyons Bend Road	Electrical failure
Unpermitted Discharge	12/9/09	2004 Neyland Drive	Electrical failure
Unpermitted Discharge	12/12/09	5227 McNutt Road	Blockage
Unpermitted Discharge	12/15/09	1411 Davanna Street	Heavy rainfall
Unpermitted Discharge	12/16/09	4315 Clinton Highway	Blockage

## 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 17 SSO events. Of that number, three were due to heavy rainfall; eight were due to blockages by either grease, debris, roots, or a combination thereof; two were due to construction failure; two were due to electrical failure; two were due to process failure of a construction bypass pumping system. Of the 17 SSO events, eight were in the 0 – 1000 gallons volume range, six were in the 1001 – 10,000 range, two events totaled greater than 10,000 gallons, and the volume was unknown for one event. Durations for events during this period are as follows: 13 ranged from 0 – 2 hours, none ranged from 2.1 - 5 hours, three were greater than 5 hours, and the duration was unknown for one event.

### 7.2 Building Backups

Appendix C lists all Building Backups that occurred during this reporting period. During this period, there were three Building Backups. Two were due to construction failure, and one was due to blockage by grease.

### 7.3 Bypasses

No Bypasses occurred during this reporting period.

### 7.4 Diversions

Table 2 contains all Diversion event information that occurred during this reporting period. During this reporting period, there were 2 Diversions at Kuwahee, 2 Diversions at Fourth Creek, and zero Diversions at Loves Creek, and Eastbridge WWTPs.

### 7.5 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 Kuwahee, Loves Creek, or Eastbridge WWTPs. There were five Effluent Limit Violations at Fourth Creek WWTP.

**Table 2: Bypasses and Diversions**

WWTP	Did an event occur?	Type of Event	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
Fourth Creek	Yes	Diversion	12/09/2009	03:00	12/09/2009	20:30	12/09/2009	17.50	4.62	17.50	4.62	High flow event due to excess rainfall
Fourth Creek	Yes	Diversion	12/18/2009	17:00			12/18/2009	7.0	2.18	10.5	3.0	High flow event due to excess rainfall
					12/19/2009	03:30	12/19/2009	3.5	.82			
Kuwahee	Yes	Diversion	12/09/2009	02:00	12/09/2009	15:00	12/09/2009	13.00	19.58	13.00	19.58	High flow event due to excess rainfall
Kuwahee	Yes	Diversion	12/18/2009	19:30			12/18/2009	4.5	5.36	10.0	7.26	High flow event due to excess rainfall
					12/19/2009	05:30	12/19/2009	5.5	1.9			
Loves Creek	No											
Eastbridge	No											

**Table 3: Effluent Limit Violations**

WWTP	Did an event occur?	Date	Parameter	Type	Limit	Value
Kuwahee	No	-	-	-	-	-
Fourth Creek	Yes	10/02/2009	TSS	Daily Min % Reduction	40%	No sample
Fourth Creek	Yes	10/02/2009	BOD	Daily Min % Reduction	40%	No sample
Fourth Creek	Yes	12/09/2009	TSS	Daily Max	45 mg/l	63 mg/l
Fourth Creek	Yes	12/09/2009	BOD	Daily Min % Reduction	40%	14.6%
Fourth Creek	Yes	12/09/2009	MLSS	Washout	30%	41%
Loves Creek	No	-	-	-	-	-
Eastbridge	No	-	-	-	-	-
SS - Settleable Solids	mg/l - milligrams per liter					
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 the reporting period and the results thereof. In addition to routine monitoring in all creeks, and responding to Sanitary Sewer Overflows (SSO), KUB Water Quality Personnel conducted investigative sampling on Baker Creek and Second Creek. Also, KUB continued to utilize RT-PCR *Bacteroides* analysis on selected routine samples to investigate high *E. coli* counts when necessary.

#### First Creek

KUB submitted four samples from First Creek routine sampling for *Bacteroides* testing during this quarter because of elevated *E. coli* counts (Table 1 and the Routine Water Quality Report) and low levels of human source were detected in the samples collected in September and October at site 1.74. KUB will continue to monitor First Creek and increase sampling around routine site 1.74, especially when the ambient temperature begins to rise again.

#### Third Creek

KUB submitted two samples from Third Creek routine sampling from September for *Bacteroides* analysis due to elevated *E. coli* or fecal coliform counts (Table 2). Routine site 0.87 did not contain human *Bacteroides*, however, routine site 2.08E, which had an elevated fecal coliform count but low *E. coli* count did exhibit some human *Bacteroides* content. This site had tested negative before for human source when the *E. coli* count was elevated. There were not elevations in bacterial counts from subsequent samples this quarter. KUB will continue to monitor Third Creek and investigate areas of *E. coli* elevation further.

#### Baker Creek

Due to a significant increase in fecal coliform and *E. coli* counts during routine monitoring in the previous quarter, KUB submitted samples from Baker Creek for *Bacteroides* analysis (Table 3). None of these samples revealed evidence of a human source contribution. In some previous quarters routine site 0.36 has exhibited low human *Bacteroides* content. Subsequent sampling of the left bank tributary during this quarter also did not exhibit indications of human content. KUB will continue to monitor Baker Creek as well as the left bank tributary in the coming quarters, especially as the ambient temperature increases.

#### Williams Creek

During the previous quarter, Water Quality Personnel conducted additional dry and wet weather investigations on the upper most region of Williams Creek, (upstream from routine site 2.02, where there is a fork in the main stream). Although there were elevations in fecal coliform, *E. coli* and total *Bacteroides* concentrations during August and September, there was only evidence of human content in the September samples (Table 4). These

samples were collected under wet weather conditions, which is consistent with any human content seen previously. Samples from sites 1.70 and 2.02 were also submitted for *Bacteroides* analysis for October and November (see Routine Water Quality Report) and reveal an inconsistent yet low detection of human *Bacteroides* around the middle to upper region of the creek. KUB will continue to monitor this creek on a monthly basis and investigate the possibility of leaking lateral impacting the stream.

#### Fourth Creek

KUB submitted two samples from the September routine monitoring of Fourth Creek for *Bacteroides* analysis due to elevated *E. coli* counts (Table 5), which did not exhibit elevations in human *Bacteroides* content despite elevation in *E. coli* and fecal coliform counts.

On November 3<sup>rd</sup>, Water Quality personnel responded to a call from the City of Knoxville with regards to a ditch on private property near Fourth Creek that contained suspect water. Bacterial counts indicated that the water did in fact contain a high level of fecal coliform (Table 5). Water Quality personnel contacted the City of Knoxville with regards to the area for follow-up since the issue involved a storm drain. November routine monitoring conducted after our sampling of the ditch did not indicate this issue was impacting the creek at that time, but more investigation is underway with the submission of the December routine monitoring samples for human *Bacteroides* content.

#### Second Creek

KUB continued to investigate the area around routine site 5.76 on Second Creek. In previous quarters, KUB had seen high elevations of fecal coliform, *E. coli* and some evidence of human contribution via the *Bacteroides* analysis. Field personnel have observed stagnant water in the area of routine site 5.76 and have investigated a second pipe that also drains to site 5.76. In October, Water Quality Personnel investigated the upper most region of the creek (above routine site 5.76) as well as continued sampling the second pipe and upstream of site 5.76. KUB submitted nine samples for *Bacteroides* analysis this quarter (Table 6). There was only one sample in October with significant elevation in human *Bacteroides* content (Routine Water Quality Report). That sample, collected at routine site 5.76, exhibited a high elevation in fecal coliform but an uncharacteristically low *E. coli* count. This phenomenon has been observed once before. The nutrient plates containing the fecal coliform colonies have been submitted to UT-Center for Environmental Biotechnology for further investigation to determine the actual bacteria that is producing this type of result. The samples taken upstream from site 5.76 did not show the similar elevation in fecal coliform or presence of human *Bacteroides* indicating that the source is most likely in the immediate area of routine site 5.76. However, subsequent routine monitoring of the area did not exhibit elevations in fecal coliform or *E. coli* counts and dye testing of nearby businesses has not revealed any leaking laterals. KUB will continue to investigate this area around the routine site 5.76.

#### Investigative Response

On October 30<sup>th</sup>, Water Quality personnel responded to a line break on the UT campus that had the potential to impact the Tennessee River via a storm drain in front of Neyland Stadium (Table 7). Fecal coliform and *E. coli* analyses were performed on the upstream and downstream river samples collected nearby. This monitoring and routine river

sampling the following Monday did not reveal an elevations in bacterial counts during or after the repair.

## 8.2 Projected Data Collection

During the first quarter of 2010, 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 the first quarter of 2010:

### *Sample Locations by Creek Mile or Site Number*

<b>Creek Name</b>	<b>Creek Mile #</b>	<b>Creek Mile #</b>	<b>Creek Mile #</b>
<b>First Creek</b>	1.74	2.57	6.33
<b>Second Creek</b>	0.30	1.54	5.76
<b>Third Creek</b>	0.87	2.08E	4.80W
<b>Fourth Creek</b>	1.75	2.79	3.29
<b>Baker Creek</b>	0.36	0.53	1.45
<b>Goose Creek</b>	0.40	1.19E	1.80E
<b>Loves Creek</b>	0.85	1.89	3.45
<b>Williams Creek</b>	0.89	1.70	2.02

In the first quarter of 2010, KUB will conduct Wet Weather investigations on Goose Creek and Fourth Creek as weather permits. KUB will also continue to investigate regions of First Creek, Second Creek, and Williams Creek.

# **Appendix A**

## **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

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
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

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
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
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 AVer 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

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
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

## **Appendix B**

### **SSOs**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Date	Time	Street #	Street	Plant	1.1.1	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
10/15/2009	1:59 PM	4201	ASHEVILLE HIGHWAY	LC	Loves Creek	20A5	MH 34-23	Pavement to Soil Saturation		Heavy rainfall in the area resulted in high flows in the sewer system.	50	0	50	0.5	No
10/16/2009	9:30 AM	7100	ROTHERWOOD DRIVE	FC	Fourth Creek	36A2	MH 33	Ditch to Soil Saturation, Containment and Recovery		There was a process failure of a construction bypass pumping system. The process was restored	700	75	625	1.5	No
10/20/2009	12:27 PM	850	TALLEY HO DRIVE	KUW	South Knoxville	39	MH 62-21	Soil Saturation		The sewer main was flushed to remove the blockage caused by roots.	1,870	0	1,870	2	No
10/26/2009	2:39 PM	6905	WESTLAND DRIVE	FC	Fourth Creek	36A2	Subsurface	Subsurface to Ditch to Soil Saturation, Containment and Recovery		The sewer main was flushed to remove the blockage caused by roots.	4,745	2,500	2,245	2	No
10/30/2009	10:30 AM	1408	MIDDLE DRIVE	KUW	Second Creek	35A2	Subsurface	Subsurface to Storm Manhole to Tennessee River	Tennessee River	The sewer main was repaired to remove a collapsed section.	7,190	0	7,190	6.5	Yes
11/5/2009	2:29 AM	3108	LANDVIEW DRIVE	LC	Loves Creek	26A4	MH 72-134	Soil Saturation		The sewer main was flushed to remove the blockage caused by roots.	260	0	260	1	No
11/6/2009	11:05 AM	212	DRY GAP PIKE	KUW	Second Creek	5A2	MH 16-67	Soil Saturation		There was a process failure of a construction bypass pumping system. The process was restored	205	0	205	1	No
11/8/2009	7:45 PM	6116	SEVIERVILLE PIKE	KUW	South Knoxville	41	MH 107-2	Pavement to Ditch to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	510	0	510	1	No
11/12/2009	1:21 PM	2126	TENNESSEE AVENUE	KUW	Third Creek	22A2	MH 16-13	Pavement to Soil Saturation		The sewer main was flushed to remove the blockage caused by roots.	310	0	310	1	No
11/24/2009	10:38 AM	601	S. CONCORD STREET	KUW	Third Creek	29B1	MH 8-10	Pavement to Soil Saturation		The sewer main was repaired to remove a collapsed section of sewer main.	60	0	60	1	No
12/9/2009	6:50 AM	2536	CECIL AVENUE	KUW	First Creek	18	MH 30-11	Pavement to Soil Saturation		Heavy rainfall in the area resulted in high flows in the sewer system.	40	0	40	0.5	No
12/9/2009	11:43 PM	1500	LYONS BEND ROAD	FC	Fourth Creek	37	Influent Structure	Fourth Creek	Fourth Creek	There was an electrical failure at the plant. Electrical power was restored to the plant.	480,000	0	480,000	0.45	Yes
12/9/2009	11:43 PM	2004	NEYLAND DRIVE	KUW	Second Creek	35a	MH 1	Tennessee River	Tennessee River	There was an electrical failure at the plant. Electrical power was restored to the plant.	3,300,000	0	3,300,000	0.87	Yes
12/12/2009	4:08 PM	5227	MCNUTT ROAD	KUW	Knob Creek	41	MH 96	Soil Saturation to Ditch to Toll Creek	Toll Creek	The sewer main was flushed to remove the blockage caused by an unknown object.	1,061	0	1,061	1	Yes
12/15/2009	12:28 PM	1411	DAVANNA STREET	KUW	Second Creek	15	MH 8	Pavement to Ditch to Storm Drain to Second Creek and Soil Saturation	Second Creek	Heavy rainfall in the area resulted in high flows in the sewer system.	Unknown	0	Unknown	Unknown	Yes
12/16/2009	5:43 AM	4315	CLINTON HIGHWAY	KUW	Second Creek	10	Lateral Cleanout	Lateral Cleanout to Storm Drain to Second Creek and Soil Saturation	Second Creek	The sewer main was flushed to remove the blockage caused by a protruding lateral, roots, grease and debris.	4,855	0	4,855	48 Intermittently	Yes
12/18/2009	6:08 PM	3410	BORIGHT DRIVE	KUW	First Creek	8	MH 42 & 43	Pavement to Ditch to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	3,310	0	3,310	6	No

## **Appendix C**

### **Building Backups**

1	2	3	4	5	6	7	8	9	10	11	12	13
Date	Time	Street #	Street	Plant	Watershed	Basin	Overflow Location	Cause of BBU/KUB Response	Total Volume (Gallons)	Recovered Volume (Gallons)	Non-Recovered Volume (Gallons)	Duration (Hours)
10/10/2009	2:00 PM	4111	Bruhlin Rd.	KUW	Second Creek	10B1	BBU	The sewer main was flushed to remove the blockage caused by grease.	50	50	0	29 intermit
10/13/2009	4:31 PM	3605	Garden Dr.	KUW	First Creek	03D1	BBU	Customer's lateral not reconnected to sewer main after mainline construction.	5	5	0	0.25
10/21/2009	12:10 PM	1300	Texas Ave.	KUW	Second Creek	15E1	BBU	Customer's lateral not reconnected to sewer main after mainline construction.	5	5	0	0.5

## **Appendix D**

### **Water Quality Monitoring Program Sampling Results**



Routine Water Quality Monitoring Report

10/1/2009 Through 12/31/2009

Knoxville Utilities Board  
 Water Quality Laboratory  
 Debbie Ailey, Lab Supervisor  
 835 East Jackson Avenue  
 Knoxville, Tennessee 37915  
 (865) 594.8288 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)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b>First Creek</b>											
1.74	10/12/2009	12:25	8.3	16	8.7	2200	1700	24.4	12.3	Wet	I
2.57	10/12/2009	12:13	8.2	16	9.0	1000	920	17.3	< 5	Wet	R
6.33	10/12/2009	11:12	7.6	16	7.8	1400	2000	28.6	< 5	Wet	R
1.74	11/19/2009	08:50	8.1	13	9.5	300	340	N/A	N/A	Wet	R
2.57	11/19/2009	08:41	8.2	13	9.7	160	250	N/A	N/A	Wet	R
6.33	11/19/2009	08:30	7.7	14	8.1	230	220	N/A	N/A	Wet	R
1.74	12/10/2009	10:26	7.5	9	10	1800	1400	N/A	N/A	Wet	I
2.57	12/10/2009	09:47	7.7	9	11	1500	2000	N/A	N/A	Wet	R
6.33	12/10/2009	09:31	8.0	11	9.1	200	730	N/A	N/A	Wet	R
<b>Second Creek</b>											
0.30	10/27/2009	09:53	8.1	15	9.3	290	290	N/A	N/A	Wet	R
1.54	10/27/2009	09:37	7.9	20	8.7	450	250	N/A	N/A	Wet	R
5.76	10/27/2009	09:21	7.1	16	4.7	46000	820	138.5	53.3	Wet	R
0.30	11/20/2009	09:12	8.1	12	10	110	330	N/A	N/A	Wet	R
1.54	11/20/2009	08:54	8.0	12	9.7	320	330	N/A	N/A	Wet	R
5.76	11/20/2009	08:38	7.3	15	6.0	36	91	N/A	N/A	Wet	R
0.30	12/21/2009	09:44	8.0	10	10	160	250	N/A	N/A	Wet	R
1.54	12/21/2009	09:27	7.9	10	7.6	350	650	N/A	N/A	Wet	R
5.76	12/21/2009	08:50	7.2	14	7.5	81	62	N/A	N/A	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

10/1/2009 Through 12/31/2009

Knoxville Utilities Board  
 Water Quality Laboratory  
 Debbie Aley, Lab Supervisor  
 535 East Jackson Avenue  
 Knoxville, Tennessee 37915  
 (865) 594-8286 Fax: (865)594-8246

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/L)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b>Third Creek</b>											
0.87	10/13/2009	10:29	8.2	17	8.6	240	210	N/A	N/A	Wet	R
2.08E	10/13/2009	10:19	7.7	17	8.0	160	140	N/A	N/A	Wet	R
4.80W	10/13/2009	09:51	7.9	16	8.3	160	110	N/A	N/A	Wet	R
0.87	11/13/2009	09:14	8.0	12	9.0	270	280	N/A	N/A	Wet	R
2.08E	11/13/2009	08:00	7.9	12	8.8	390	490	N/A	N/A	Wet	R
4.80W	11/13/2009	08:10	7.6	13	8.9	110	190	N/A	N/A	Wet	R
0.87	12/8/2009	08:15	8.0	10	9.9	170	210	N/A	N/A	Wet	R
2.08E	12/8/2009	08:06	8.3	9	9.7	45	63	N/A	N/A	Wet	R
4.80W	12/8/2009	07:50	7.8	12	9.1	150	170	N/A	N/A	Wet	R
<b>Fourth Creek</b>											
1.75	10/19/2009	09:48	7.8	13	9.4	280	260	N/A	N/A	Wet	R
2.79	10/19/2009	09:31	7.8	13	9.0	310	420	N/A	N/A	Wet	R
3.29	10/19/2009	09:21	7.8	13	9.4	240	410	N/A	N/A	Wet	R
1.75	11/13/2009	08:55	7.7	13	9.1	210	340	N/A	N/A	Wet	R
2.79	11/13/2009	08:42	7.8	13	8.9	730	520	N/A	N/A	Wet	R
3.29	11/13/2009	08:31	7.8	13	9.3	240	280	N/A	N/A	Wet	R
1.75	12/2/2009	09:50	7.8	10	9.9	5300	> 2400	N/A	N/A	Wet	R
2.79	12/2/2009	09:36	7.9	10	9.9	4100	> 2400	N/A	N/A	Wet	R
3.29	12/2/2009	09:20	8.7	10	9.7	5000	> 2400	N/A	N/A	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

10/1/2009 Through 12/31/2009

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 Water Quality Laboratory  
 Debbie Ailey, Lab Supervisor  
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 Knoxville, Tennessee 37915  
 (865) 594.6286 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)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b>Baker Creek</b>											
0.35	10/26/2009	09:12	7.9	13	8.7	970	870	N/A	N/A	Wet	R
0.53	10/26/2009	09:21	8.0	13	9.1	1000	730	N/A	N/A	Wet	R
1.45	10/26/2009	09:06	8.0	13	8.7	2200	1600	N/A	N/A	Wet	R
0.36	11/19/2009	12:53	7.8	14	9.1	480	520	N/A	N/A	Wet	R
0.53	11/19/2009	12:37	7.9	14	9.2	510	920	N/A	N/A	Wet	R
1.45	11/19/2009	12:25	7.6	14	8.8	580	820	N/A	N/A	Wet	R
0.36	12/22/2009	08:55	7.7	10	9.5	640	870	N/A	N/A	Wet	R
0.53	12/22/2009	09:07	7.8	10	9.8	1000	460	N/A	N/A	Wet	R
1.45	12/22/2009	09:20	7.4	9	9.0	410	410	N/A	N/A	Wet	R
<b>Goose Creek</b>											
0.40	10/5/2009	11:00	7.9	16	7.8	2200	> 2400	13.3	< 5	Wet	I
1.19E	10/5/2009	10:49	8.0	16	8.2	1400	1700	5.5	< 5	Wet	R
1.80E	10/5/2009	10:34	8.1	15	8.1	820	730	N/A	N/A	Wet	R
0.40	11/4/2009	09:36	7.5	11	8.2	250	210	N/A	N/A	Wet	R
1.19E	11/4/2009	09:20	7.6	11	8.9	190	260	N/A	N/A	Wet	R
1.80E	11/4/2009	09:10	7.8	11	8.9	550	690	N/A	N/A	Wet	R
0.40	12/1/2009	10:35	8.4	10	9.6	730	980	N/A	N/A	Wet	I
1.19E	12/1/2009	10:17	8.9	11	9.7	580	920	N/A	N/A	Wet	R
1.80E	12/1/2009	10:25	8.5	10	9.7	330	330	N/A	N/A	Wet	R

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Routine Water Quality Monitoring Report

10/1/2009 Through 12/31/2009

Knoxville Utilities Board  
 Water Quality Laboratory  
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 (865) 584-8266 Fax: (865) 594-8246

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/L)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b>Loaves Creek</b>											
0.85	10/8/2009	09:45	7.7	16	8.3	350	220	N/A	N/A	Wet	R
1.89	10/8/2009	10:00	7.3	15	7.6	72	80	N/A	N/A	Wet	R
3.45	10/8/2009	10:09	7.6	16	7.9	130	68	N/A	N/A	Wet	R
0.85	11/17/2009	10:10	7.8	13	9.4	260	650	N/A	N/A	Dry	R
1.89	11/17/2009	10:00	7.5	14	8.3	63	62	N/A	N/A	Dry	R
3.45	11/17/2009	09:52	7.8	13	8.9	160	99	N/A	N/A	Dry	R
0.85	12/14/2009	10:31	7.3	12	9.2	320	310	N/A	N/A	Wet	R
1.89	12/14/2009	10:06	7.0	10	8.9	410	310	N/A	N/A	Wet	R
3.45	12/14/2009	09:52	7.4	10	9.5	260	310	N/A	N/A	Wet	R
<b>Williams Creek</b>											
0.89	10/21/2009	10:39	7.8	13	9.3	430	360	N/A	N/A	Dry	R
1.70	10/21/2009	10:15	7.6	14	7.7	730	770	N/A	N/A	Dry	R
2.02	10/21/2009	10:23	7.8	15	8.2	1800	1600	4.6	< 5	Dry	I
0.89	11/16/2009	09:21	7.7	12	9.2	320	220	N/A	N/A	Dry	R
1.70	11/16/2009	09:00	7.8	14	8.4	1300	> 2400	19.0	5.5	Dry	R
2.02	11/16/2009	09:08	7.9	15	8.4	1600	1700	17.4	< 5	Dry	I
0.89	12/15/2009	12:15	7.6	14	9.3	250	130	N/A	N/A	Wet	R
1.70	12/15/2009	12:29	7.4	13	9.0	350	290	N/A	N/A	Wet	R
2.02	12/15/2009	12:35	7.6	14	9.0	160	220	N/A	N/A	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.



**Spill Impact Sampling Results**  
**Water Quality Monitoring Program**

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

**Event Date:** 12/12/2009  
**Street Address:** 5227 McNutt Rd.  
**Description:** The SSO was caused by a partial blockage in the sewer main by an unknown object. The SSO flowed from soil saturation to a ditch to Toll Creek.

**Estimated unrecovered volume:** 1061 gallons

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

<b>Precipitation (McGhee-Tyson Airport)</b>	<b>Date</b>	<b>Total - Day of Event</b>	<b>Total - Prior 4 Days</b>
	12/12/2009	0	2.39

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	12/12/2009	18:28	9.5	8	9.1	99	130
Downstream of SSO Discharge	12/12/2009	18:20	3.5	11	7.5	> 60000	2000
Upstream of SSO Discharge	12/16/2009	08:14	9.6	8	7.6	200	200
Downstream of SSO Discharge	12/16/2009	08:05	8.3	8	7.4	1600	870
Upstream of SSO Discharge	12/28/2009	12:07	10	7	7.9	14	23
Downstream of SSO Discharge	12/28/2009	11:49	8.2	8	7.6	63	82



**Spill Impact Sampling Results**  
**Water Quality Monitoring Program**

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

**Event Date:** 12/15/2009  
**Street Address:** 1411 Davanna Street  
**Description:** The SSO was caused by I and I and high flows due to heavy rainfall. The SSO flowed from a ditch to a storm drain to Second Creek and soil saturation.

**Estimated unrecovered volume:** Unknown 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
	12/15/2009	0	0.6

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	12/15/2009	13:32	9.7	14	7.8	260	410
Downstream of SSO Discharge	12/15/2009	13:45	9.5	13	7.6	380	550



Water Quality Monitoring  
Report

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**Event Date:** 12/16/2009  
**Street Address:** 4315 Clinton Hwy.  
**Description:** The SSO was caused by a partial blockage in the sewer main caused by a protruding lateral, roots, grease and debris. The SSO flowed from a storm drain to Second Creek and soil saturation.

**Estimated unrecovered volume:** 4855 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
	12/16/2009	0	0.6

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	12/16/2009	19:47	10	14	7.5	27	21
Downstream of SSO Discharge	12/16/2009	19:32	9.8	13	7.4	4100	2000
Upstream of SSO Discharge	12/21/2009	09:06	9.8	12	8.0	63	66
Downstream of SSO Discharge	12/21/2009	09:16	10	12	7.8	130	75

**Knoxville Utilities Board**  
Water Quality Monitoring Program

Investigative Water Quality Monitoring Report  
10/01/2009 Through 12/31/2009

**Table 1: First Creek Routine Sampling**

Sample Location	Collection Date	Collection Time	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform	E. coli	Total Fecal	Human Fecal
			(mg/L)	(°C)		(CFU/ 100mL)	(MPN)	(mpL)	(mg/L)
Routine Site 1.74	9/9/2009	10:23	8.2	20	8.4	4900	980	46.1	18.5

Knoxville Utilities Board  
 Water Quality Monitoring Program

Investigative Water Quality Monitoring Report  
 10/01/2009 Through 12/31/2009

**Table 2: Third Creek Routine Sampling**

Sample Location	Collection Date	Collection Time	Dissolved Oxygen (mg/L)	Water Temp (°C)	Water pH	Fecal Coliform (CFU/100mL)	E. coli (MPN)	Total Fecal (mg/L)	Human Fecal (mg/L)
Routine Site 0.87	9/10/2009	9:53	8.2	19	8.4	2500	1700	22.7	< 5
Routine Site 2.08E	9/10/2009	9:36	5.8	19	8.1	4000	610	70.9	15.7

Knoxville Utilities Board  
 Water Quality Monitoring Program

Investigative Water Quality Monitoring Report  
 10/01/2009 Through 12/31/2009

**Table 3: Baker Creek Routine and Investigative Sampling**

	Collection Date	Collection Time	Dissolved Oxygen (mg/L)	Water Temp (°C)	Water pH	Fecal Coliform (CFU/100mL)	E. coli (MPN)	Total Fecal (mg/L)	Human Fecal (mg/L)
Routine Site 0.36	9/15/2009	9:25	7.5	19	8.0	1400	> 2400	12.5	< 5
Routine Site 0.53	9/15/2009	9:37	8.1	18	8.2	2300	1700	9.7	< 5
Routine Site 1.45	9/15/2009	9:07	8.1	18	8.1	1800	2400	6.9	< 5
Left Bank Tributary, upstream from 0.36	9/15/2009	9:55	7.6	20	8.1	3400	> 2400	23.8	< 5
	10/26/2009	9:56	9.4	10	7.9	1300	820	N/A	N/A
	11/19/2009	12:45	8.7	13	7.8	580	520	N/A	N/A
	12/22/2009	9:31	7.9	7	7.7	490	870	N/A	N/A

**Table 4: Williams Creek Routine Sampling**

	Collection Date	Collection Time	Dissolved Oxygen (mg/L)	Water Temp (°C)	Water pH	Fecal Coliform (CFU/100mL)	E. coli (MPN)	Total Fecal (mg/L)	Human Fecal (mg/L)
Routine Site 1.70	9/24/2009	13:26	7.1	21	7.7	3200	> 2400	75.9	31.8
Routine Site 2.02	9/24/2009	13:10	6.6	22	8.0	4600	1400	46.2	26.2

Knoxville Utilities Board  
 Water Quality Monitoring Program

Investigative Water Quality Monitoring Report  
 10/01/2009 Through 12/31/2009

**Table 5: Fourth Creek Routine Sampling**

	Collection Date	Collection Time	Dissolved Oxygen (mg/L)	Water Temp (°C)	Water pH	Fecal Coliform (CFU/100mL)	E. coli (MPN)	Total Fecal (mg/L)	Human Fecal (mg/L)
Routine Site 1.75	9/21/2009	12:31	8.0	20	8.0	1800	1000	17.9	< 5
Routine Site 2.79	9/21/2009	12:55	8.2	19	8.1	1000	920	9.7	< 5
6312 Kingston Pike	11/3/2009	12:40	N/A	N/A	N/A	> 60000	2000	N/A	N/A

Knoxville Utilities Board  
Water Quality Monitoring Program

Investigative Water Quality Monitoring Report  
10/01/2009 Through 12/31/2009

**Table 6: Second Creek Routine and Investigative Sampling**

	Collection Date	Collection Time	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform	E. coli	Total Fecal	Human Fecal
			(mg/L)	(°C)		(CFU/ 100mL)	(MPN)	(mg/L)	(mg/L)
Second Pipe next to Routine Site 5.76	10/27/2009	9:16	7.5	15	7.7	130	81	N/A	N/A
	11/20/2009	8:43	7.7	14	7.5	45	81	N/A	N/A
~300 yards Upstream from Routine Site 5.76 (behind IHOP)	10/27/2009	9:07	5.5	15	7.2	310	140	N/A	N/A
	11/20/2009	8:27	6.8	13	7.3	54	91	N/A	N/A
	12/21/2009	8:42	7.5	13	7.3	36	62	N/A	N/A
Tributary Mouth (Upper Region of Creek)	10/20/2009	10:05	3.7	16	8.3	1200	920	29.8	< 5
Upstream on Tributary (inside Cemetery)	10/20/2009	10:38	N/A	N/A	N/A	220	220	N/A	N/A
Tributary at Tyson Street	10/20/2009	11:15	8.6	19	7.9	< 10	6	N/A	N/A

Knoxville Utilities Board  
 Water Quality Monitoring Program

Investigative Water Quality Monitoring Report  
 10/01/2009 Through 12/31/2009

**Table 7: Tennessee River Investigative Sampling**

	Collection Date	Collection Time	Dissolved Oxygen (mg/L)	Water Temp (°C)	Water pH	Fecal Coliform (CFU/100mL)	E. coli (MPN)
Upstream at Volunter Landing	10/30/2009	18:00	N/A*	N/A*	7.5	20	63**
Downstream at Third Creek mouth	10/30/2009	18:17	N/A*	N/A*	7.4	100	500**

\* Due to a problem with the DO meter, reading for dissolved oxygen and temperature were not taken.

\*\* Analysis results are estimated due to sample incubation error.