

CITY WATER & LIGHT

JONESBORO, ARKANSAS



CORRECTIVE ACTION PLAN

**SANITARY SEWER OVERFLOWS: SUMMARY OF ONGOING ACTIONS
AND PLAN FOR ADDITIONAL CORRECTIVE MEASURES**

NPDES Permit Number: AR0043401

AFIN: 16-00936

March 28, 2016

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Acronyms

ADEQ - Arkansas Department of Environmental Quality

CAP – Corrective Action Plan

CCTV – Closed Circuit Television Video

CMOM - Capacity, Management, Operations, and Maintenance Program

CWB - CWB Engineers, Inc.

CWL - City Water and Light Plant of the City of Jonesboro, Arkansas

FOG - Fats, Oils and Grease

FSE – Food Service Establishment

I&I - Inflow and Infiltration

MW&Y - McGoodwin, Williams & Yates, Inc.

NE Interceptor - Northeast Interceptor Sewer Main (42"/36")

NPDES - National Pollutant Discharge Elimination System

O&M - Operation and Maintenance

PLC - Programmable Logic Controller

POTW – Publicly Owned Treatment Works

RJN - RJN Group, Inc.

SCADA – Supervisory Control and Data Acquisition

SSES – Sanitary Sewer Evaluation Study

SSO – Sanitary Sewer Overflow

SSR - Smith Seckman Reid, Inc.

WWTP – Wastewater Treatment Plant

1 Executive Summary

For the period of March 1, 2013 through February 28, 2016, CWL identified thirty-nine (39) SSOs and reported these to ADEQ for NPDES Permit Number AR0043401. In a letter dated March 3, 2016 ADEQ noted the SSOs and stated that CWL should prepare and submit a CAP to address the SSOs.

CWL has maintained a longstanding effort in the effective and continuous management, operation, and maintenance of the collection system capacity and performance. This ongoing effort includes recent significant investments in collection system capital improvements and sewer equipment purchases, as well as the current CMOM Program development. In fact, CWL has several CMOM programs and processes currently in place and active, including a comprehensive Mainline and Manhole Inspection and Repair Program, Sewer Lateral Repair Program, Root Control Program and FOG Management Program.

CWL, for many years, has demonstrated a culture of compliance and a commitment to SSO mitigation. Since 2011, CWL has documented collection system capacity, management, operation and maintenance expenses totaling **\$18.39 million**. These expenditures include funding of an extensive collection system flow study and the development of a system hydraulic model with RJN. Also included is the development of a CMOM, currently in draft form, with CWB and a collection system evaluation with MW&Y.

These actions, along with the additional SSO mitigation efforts outlined in Appendix A, have contributed to the downward trend in identified SSOs, as seen in Chart 2.1.

In addition to the ongoing comprehensive mitigation efforts, CWL plans to perform the following corrective actions:

- i. Expand Quarterly Grease Interceptor Inspections
- ii. Begin FOG Outreach to Public Schools
- iii. Expand Residential FOG Outreach
- iv. Complete CMOM Program
- v. Selection of CMOM Software

The ADEQ understands that SSO mitigation is an iterative and ongoing activity. CWL has already been active in evaluating the effectiveness of alternatives, and scheduling/implementing appropriate mitigation actions to address SSOs prior to receipt of the ADEQ letter of March 3, 2016. As requested in the ADEQ letter, this CAP formally documents our actions and plans for future actions regarding SSO mitigation.

2 General Information

2.1 Description of Wastewater Utilities

CWL is a Publicly Owned Municipal Improvement District, organized and existing under the provisions of Arkansas Code Annotated (ACA) 14-218-101 *et seq.* CWL owns and operates the water, wastewater, and electric utilities in the City of Jonesboro, Arkansas. The Eastside and Westside WWTPs serve as the POTWs for the City of Jonesboro. The Eastside WWTP effluent is discharged under authority of NPDES Permit No. AR0043401, AFIN 16-00936. The Westside WWTP effluent is discharged under authority of NPDES Permit No. AR0037907, AFIN 16-00152.

CWL’s sanitary sewer system consists of gravity and force main components serving the City of Jonesboro. The Jonesboro wastewater collection system consists of approximately 400 miles of publicly maintained gravity sewer mains ranging in size from 6" to 42" in diameter, approximately 9,089 manholes, twenty-seven (27) lift stations of various pumping capacities, and twenty-three (23) miles of force main ranging in size from 4" through 20" in diameter. Table 1-1 provides the system profile.

Table 1-1: Sewer System Profile (As of March, 2016)

Population of Jonesboro	71,551 (U.S. Census Bureau, 2013 Estimate)
Total Customers	23,451
Residential Customers (estimated)	20,129
Commercial Customers (estimated)	3,045
Industrial Customers (estimated)	277
Treatment Plant Name(s)	Westside WWTP & Eastside WWTP
Plant Design Capacity	3.0 MGD (West) & 9.0 MGD (East)
Average Daily Flow 2015 (Westside)	1.80 MGD
Average Daily Flow 2015 (Eastside)	7.82 MGD
Miles of Gravity Sewers	400.1
Miles of Force Mains	23
Number of Pump Stations	27
Number of Manholes	9089
Number of Total Employees	196

2.2 Description of Legal Authority

CWL is provided legal authority through Ordinance 12:010 - General Sewer Use Ordinance (GSUO) and Ordinance 12:009 - Pretreatment Ordinance (PTO). Both were adopted by the City of Jonesboro, Arkansas on March 20th, 2012, amending Part 1, Chapter 70, Article III, Division 2, Sewer Use – Pretreatment Ordinance of the Jonesboro Municipal Code and replacing the codified Ordinance No. 3126. CWL and consulting firm MW&Y developed extensive revisions in the years

prior to ensure, in part, the authority for the proper management, operation, and maintenance of CWL's collection system and WWTPs. These revisions included enhanced language addressing CWL's authority for the management of FOG in the collection system.

2.3 Sewer Rates & Budgeting

In anticipation of residential and commercial growth, recognition of changing environmental regulations, and expectation of collection system and WWTP expansions/upgrades, CWL began annual Consumer Price Index (CPI) sewer rate adjustments in February, 2007 and small incremental base sewer rate adjustments in January, 2009. Including a preapproved base rate adjustment for 2017, CWL will have adjusted base rates eight (8) times over the period January 2009 through January 2017. These rate increases demonstrate the CWL Board of Directors and management team's commitment to the proper management, operation, and maintenance of the sanitary sewer system and to the funding of future capital investments.

CWL develops an annual budget for capital expenditures, ensures that water and sewer billings specifically support those functions, and maintains a "Water & Sewer Additions & Improvements Fund" for replacement of system components at the end of service life and for system improvements, such as CWL's NE Interceptor (Appendix A, #1).

2.4 System Management, Operation and Maintenance

CWL has maintained a longstanding effort in the effective and continuous management, operation, and maintenance of the collection system capacity and performance. Proper sewer rehab, maintenance, and identification of capital improvements have been used to achieve these goals, as well as extending the life of the system.

Since 2012, an increased focus has been placed on I&I efforts, SSO mitigation, and targeting areas of concern in the sanitary sewer collection system. Appendix A (SSO Mitigation Efforts) outlines SSO mitigation efforts previously implemented and currently under implementation. CWL has already begun many of the actions outlined in CWL's draft CMOM (App A, #2), including a comprehensive Mainline and Manhole Inspection and Repair Program (App A, #6 & #7), Sewer Lateral Repair Program (App A, #9), Root Control Program (App A, #10), and FOG Management Program (App A, #8).

CWL's actions listed in Appendix A demonstrate not only a commitment to move towards more proactive versus reactive maintenance, but also an increased emphasis on management and engineering support of and direction for the collection system operations department.

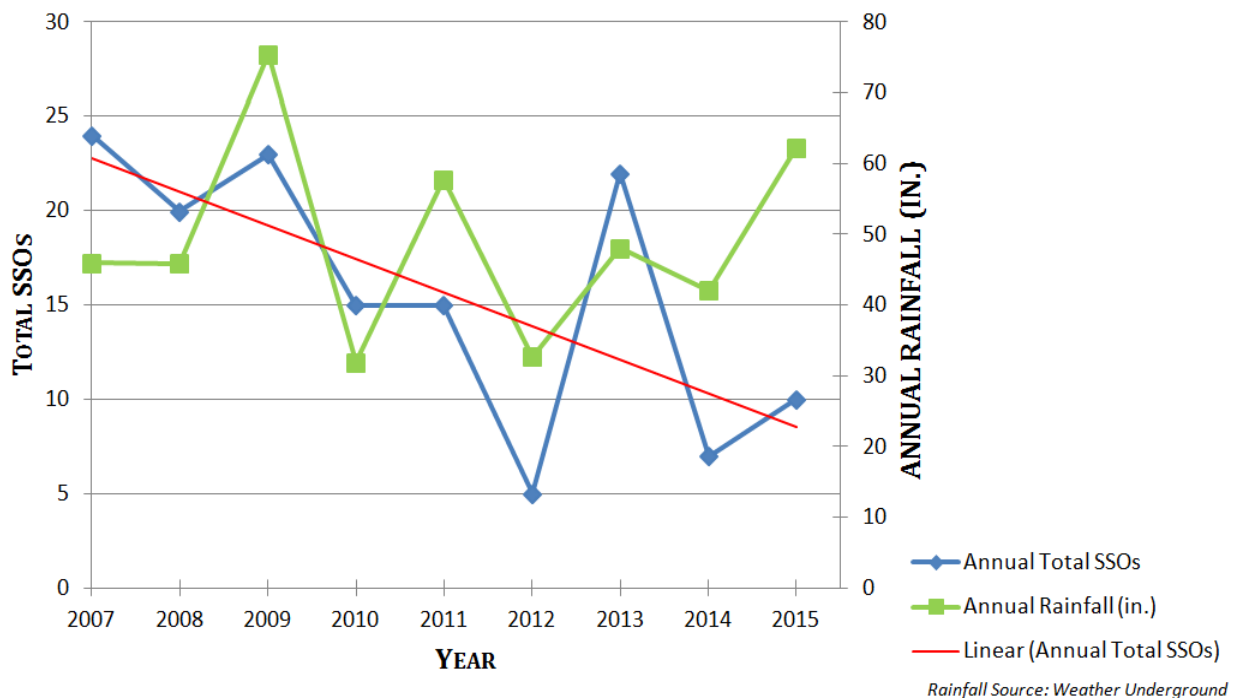
Since 2011, CWL has documented collection system capacity, management, operation, and maintenance expenses totaling **\$18.39 million**. These expenditures include the purchase of additional assets, collection system capital improvements, and development of various O&M

processes and programs. These expenditures also include an extensive collection system flow study (App A, #5), which aided in basin prioritization, and the development of a system hydraulic model (App A, #4), both with the assistance of outside consulting firms.

2.5 SSO Trends

The mitigation efforts outlined in Appendix A have contributed to the downward trend in identified SSOs as seen in Chart 2.1 below.

Chart 2-1: SSO Trends with Annual Rainfall (2007 thru 2015)



The identified SSO increases in 2013 can primarily be attributed to:

- i. Twelve (12) total grease related SSOs, which is five (5) more than the previous 6-year average for grease related SSOs. Several of these SSOs were related to apartment complexes.
- ii. Seven (7) total I&I related SSOs, which is three (3) more than the previous 6-year average for I&I related SSOs. Two (2) of these SSOs were the result of a rainfall event greater than a 2-year storm (3.86" for Jonesboro. Source: NOAA National Weather Service). The other five (5) were the result of a 2.11" rain event, with a three-day total of 3.40".

As an example of CWL's efforts to address the 2013 SSOs, CWL increased collection system maintenance and SSES efforts resulting in a **\$637,000** increase in labor and materials for 2014. As summarized in App A, #9, CWL enhanced the Sewer Lateral Repair Program during 2013. In

2014, CWL began the evaluation of a chemical Root Control Program (App A, #10), which was implemented in 2015; conducted a system-wide baseline flow study (App A, #5) with the assistance of RJN; began developing a hydraulic model (App A, #4) of the collection system with RJN; executed a contract with MW&Y for a collection system evaluation (App A, #15); and added an additional sewer truck (App A, #3) to the fleet.

2.6 Compliance

CWL strives to maintain and implement policies, processes, and procedures that protect water quality, public health, and the environment. CWL takes maintaining compliance with Federal, State and Local regulations seriously and understands the value of partnering with ADEQ to make our community a safer place to live and to protect the environment for future generations.

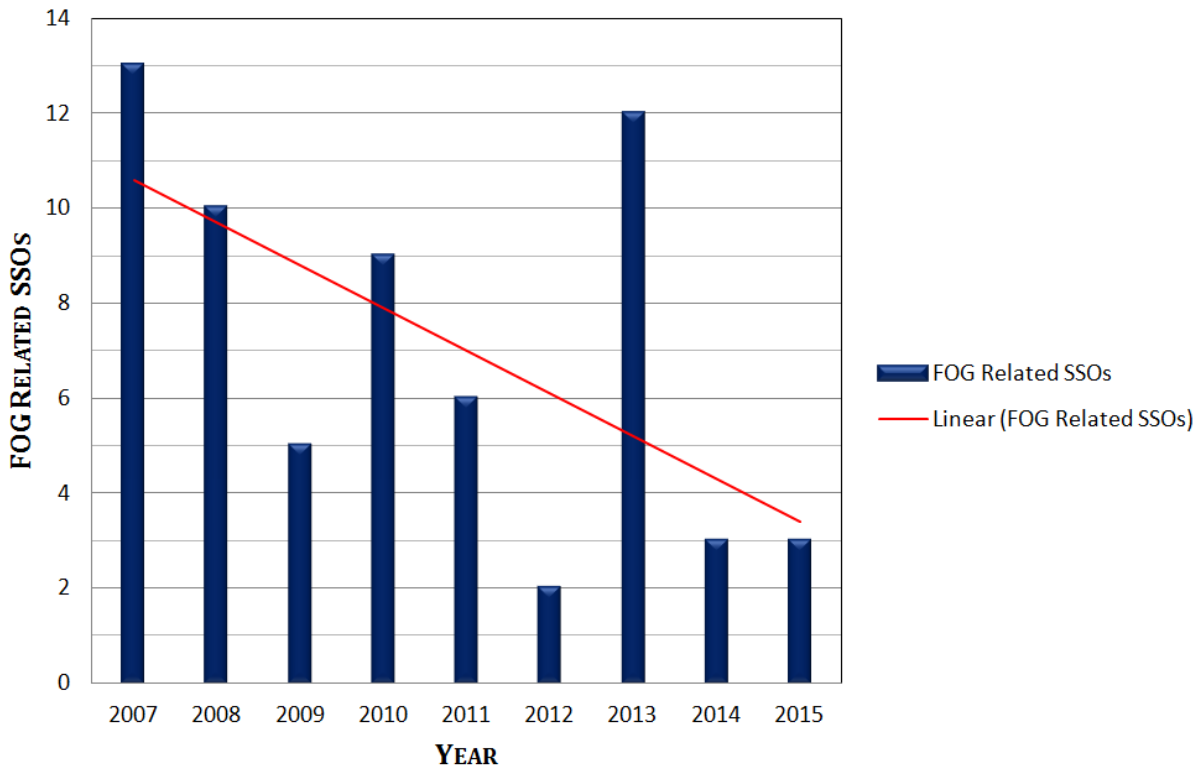
This culture of compliance and partnering with regulators, customers, and consultants begins with our Board of Directors and is embraced throughout the organization. As an example of CWL's team approach to compliance, the CMOM program responsibilities were divided among thirteen (13) subject matter experts in the recent CMOM (I&I) monthly meeting on February 23, 2016. Currently, the status of the CMOM Program is also reported monthly to the Board of Directors in the Progress Reports.

3 CWL Analysis to Evaluate SSOs and Ongoing/Planned Corrective Actions

As a result of numerous SSO mitigation efforts (App A) already in place, the chart provided in Appendix B (Individual SSO Responses) details the actions already taken that specifically addressed the thirty-nine (39) SSOs identified by CWL.

Of the thirty-nine (39) SSOs, 46% were related to FOG. As seen in the downward trend in grease related SSOs (Chart 4.1), CWL's FOG management program is producing favorable results. CWL plans to expand on the success of this program. See Section 2.5, SSO Trends, for details and actions taken to address the 2013 increase of grease related SSOs.

Chart 4-1: FOG Related SSOs (2007 thru 2015)



However, in an effort to further mitigate SSOs in the collection system, with an emphasis on grease management, CWL plans to perform the following corrective actions.

- i. Expand Quarterly Grease Interceptor Inspections – Add schools, nursing homes, hospitals, and quick shops to the list of quarterly grease interceptor inspections.
- ii. Begin FOG Outreach to Public Schools – Develop a FOG outreach program that targets grade school children in local schools. Provide program to fourth graders in the 2016/2017 school year and, if successful, continue in future school years.
- iii. Expand Residential FOG Outreach – As of May 2015, CWL has utilized the organization’s website to educate the public on things to not put down the drain, including grease, pharmaceuticals, and baby wipes. In January/February 2016, CWL distributed approximately 200 educational flyers concerning FOG, as shown in Appendix D (FOG Public Outreach Flyer), to local FSEs. CWL is exploring additional opportunities for FOG outreach to residential customers through billing, newspaper, or other media outlets. CWL plans to begin additional public outreach in the next quarter and continue this practice on a routine, practical schedule thereafter.
- iv. Complete CMOM Program – CWL has been working with CWB to develop a CMOM program (App A, #2). CWL is committed to completing the CMOM document by September 30, 2016. This will allow CWL to attend the CMOM Workshop in Austin, TX prior to finalizing the document. CWL realizes, however, that the CMOM will need to

be a living document as we move forward with complete implementation of the program.

- v. Selection of CMOM Software – As summarized in Appendix A, #2(b), CWL formed an internal CMOM software selection committee in October, 2015. This software will be selected by the end of this year and administered in the following year(s).

Table 4-1 outlines the corrective actions planned with proposed completion dates.

Table 4-1: SSO Corrective Actions

Corrective Action	Target Completion Date
Expand Quarterly Grease Interceptor Inspections	April 11, 2016
Begin FOG Outreach to Public Schools	2016/2017 School Year
Expand Residential FOG Outreach	2 nd Quarter 2016
Complete CMOM Document	September 30, 2016
Selection of CMOM Software	December 31, 2016

In addition to the corrective actions outlined in Table 4-1, CWL is awaiting a capacity evaluation report from RJN based on the dynamic hydraulic model (App A, #4) RJN developed of the CWL system. Further, MW&Y is currently conducting a collection system evaluation (App A, #15) for CWL. Therefore, any potential capital improvement projects are contingent on the results of the report and evaluation. CWL plans to address, as appropriate, issues identified in the hydraulic model report and MW&Y evaluation.

CWL enjoys several longstanding relationships with wastewater consultants that understand the CWL system, culture of compliance, and proactive approach to utility management. These relationships, in CWL's opinion, will ease the implementation of any capital improvements and/or complex CMOM program improvements identified in the future. In addition, CWL currently has nine (9) engineers on staff, with seven (7) registered as professional engineers.

4 Conclusions

SSO mitigation is an iterative, ongoing process. With this in mind, CWL is committed to continual improvement of the management and operation of the collection system and maintaining adequate capacity of the system. CWL believes that our proactive efforts in this

regard and our dedication to improvements are demonstrated by the actions already taken and the future corrective actions identified in this CAP.

This CAP constitutes CWL's response to the requirements in ADEQ's March 3, 2016 letter.

Appendix A

SSO Mitigation Efforts

1. Northeast Interceptor Sewer

In June of 2012, CWL hired RJN to perform an evaluation of the Northeast Jonesboro sanitary sewer collection system by means of flow monitoring and field investigation. CWL purchased six (6) flow monitors to facilitate this investigation. After conducting an extensive SSES, RJN determined that the Ellis Lane Lift Station and/or force main serving this basin were contributing to capacity constraints upstream of the station. CWL invested over **\$215,000** on the RJN evaluation and report.

As a result of RJN's findings, CWL contracted with MW&Y on December 18, 2012 to analyze the area's projected future flows and to assist CWL in determining the best alternative to address the capacity issue. MW&Y issued a report to CWL in June 2013 that analyzed multiple alternatives, but ultimately recommended the construction of an interceptor sewer from the Ellis Lane Lift Station area to the Eastside WWTP. CWL paid MW&Y **\$54,500** for the study. CWL agreed with the study recommendation and contracted with MW&Y to design the Northeast Interceptor Sewer (Section I contract date: June 14, 2013; Section II contract date: October 23, 2013).

Rosetta Construction, LLC was the successful bidder on both Section I and Section II of the NE Interceptor. The construction contract for Section I was executed on September 11, 2013 and the Section II contract was executed on March 19, 2014, shortly after construction of Phase I. Section I consisted of approximately 8,000' of 42"-diameter gravity sewer, while Section II contained approximately 13,000' of 36"-diameter gravity sewer. The interceptor sewer was placed in service on September 4, 2014 and the total cost of the project was **\$6.17 million**.

In addition to addressing capacity constraints upstream of the Ellis Lane Lift Station, the 21,000 feet NE Interceptor laid the groundwork to address other potential capacity constraints in the system.

2. CMOM Development

CWL has committed to the development and maintenance of a CMOM Program for its wastewater collection system. The program will be utilized to allow multiple departments to work efficiently towards maintaining and operating the system, collecting data, planning for future needs, and documenting program information.

To date, CWL has spent over **\$81,000** with CWB Engineers, Inc. in the development of the program. CWL has set a completion date of September 30, 2016.

- a. **Monthly CMOM Meetings** - CWL has regularly scheduled monthly meetings of the CMOM team. These meetings began as Inflow & Infiltration meetings. The scope broadened to CMOM in 2013. These meetings are attended by representatives from the Wastewater, Engineering, Customer Service, General Operations, Management and Administrative Services departments, and are focused on the continued efforts of CWL to maintain the highest quality wastewater collection system.
- b. **Software Committee** - The CMOM Program Software Committee, formed in October, 2015 and made up of representatives from Wastewater, Engineering, Lab, Customer Service, IT, General Operations, and Administrative Services, is reviewing several potential software solutions for managing the different attributes and data associated with the CMOM Program. This committee is tasked with providing viable solutions to CWL Management. CWL has given the committee a deadline of the end of 2016 to have a solution ready for management to decide on, purchase, and begin implementation in the following year(s).
- c. **CMOM Subject Matter Expert Assignment** - EPA uses guidance to divide its recommendations for the CMOM into eight (8) major categories and forty-two (42) sub-categories. At the meeting on February 23, 2016, CWL's CMOM team divided the responsibilities of these categories between thirteen (13) subject matter experts who work to ensure that their portions of the program are completed and maintained for the future.
- d. **CMOM Workshop Attendance** – In the fall of 2015, CWL began attending the annual CMOM Workshop in Austin, Texas. CWL sent three (3) employees in 2015 at a cost of approximately **\$2,200**. CWL plans to send four (4) employees to the Workshop this fall.

3. **Expanded Assets**

CWL invested approximately **\$35,000** in an easement (back lot) machine in November 2013. In May 2014, CWL ordered an additional sewer truck at a cost of **\$250,000**. The truck was delivered and placed in service in December 2014. In January 2016, CWL purchased an additional CCTV at a cost of approximately **\$52,000**. The camera is currently in service.

4. Hydraulic Model

CWL signed a contract with RJN on July 10, 2014 for the development of a hydraulic model of CWL's sewer system and associated services. RJN and Associated Engineering, Inc. surveying crews surveyed many portions of CWL's sanitary sewer system as part of the model development. With RJN's assistance, CWL installed rain gauges and flow meters throughout CWL's service area and gathered rainfall and corresponding sewer flow meter data (Flow Study, App A, #5). In addition, CWL provided sewer system information and representative residential and industrial water usage data, both pertinent to model development. This information was used by RJN modelers to construct CWL's hydraulic model.

The stages of the project are: 1) model development; 2) model calibration; and 3) alternative evaluation. Stages 1 and 2 are complete. The stage 3 alternative evaluation is dependent on RJN's schedule, but based on their projections, CWL anticipates the alternative evaluation to take place in mid-2016.

The model will aid in capacity analysis of CWL's system under both current conditions and future growth and will be a valuable tool in future analyses of capital improvement alternatives as the system is upgraded. The model will be an ongoing dynamic tool that CWL plans to update as the system grows. As of March 10, 2016, CWL has paid RJN over **\$261,000**. In addition, CWL paid Associated Engineering approximately **\$27,900** for surveying on this project.

5. Flow Study

In 2014, RJN assisted CWL in a baseline flow study to provide data for basin prioritization and for calibration of the hydraulic model. The study consisted of forty-two (42) flow monitors, Lift Station and WWTP logs, eight (8) rain gauges, three (3) Mag meters on Lift Stations, SCADA data, and pump curves. RJN divided the CWL sanitary sewer system into forty (40) basins (App C, Basin Delineation), allowing for about 50,000 feet of sanitary sewer lines in each basin.

CWL purchased ten (10) flow monitors, in addition to the six (6) CWL already owned, and rented twenty-six (26) flow monitors for the baseline study. The data from the forty-two (42) flow monitors was retrieved via the cellular network. The data from the eight (8) rain gauges was retrieved by CWL's SCADA system. All of the data was placed onto a FlowWorks platform to monitor the equipment and verify flows and rain events.

CWL calculated inch-diameter-miles and did house counts to estimate design flows in each basin. Measured peaking factors were compared to design flows. With the help of

RJN, the resultant data was evaluated for data integrity and analyzed for basin SSES prioritization. See App A, #6 for SSES work to-date.

In 2015, ten (10) flow monitors were deployed into sub-basins to analyze branch lines. This helped to further refine the prioritization process in each basin.

To-date, a sum of over **\$199,000** has been invested in the CWL Flow Study program.

- a. **Rain Gauges** – Currently, CWL has eight (8) rain gauges that can be remotely read from the CWL Dispatch Center. These rain gauges are strategically placed across town with three (3) located at wastewater lift stations and five (5) at water stations.

Rain gauges, along with flow monitoring, allows CWL to compare flow increases during monitored rain events and determine I&I into the collection system. Approximately, **\$4400** has been invested in rain gauges at CWL.

6. **SSES & Resultant Repairs**

The Flow Study (App A, #5) along with CWL’s knowledge of the collection system allowed for the prioritization of basins for SSES work. Since 2013, SSESs have been completed in basins JB02, JB03, JB04, JB05, JB08, JB11, JB19, and JB20 (App C, Basin Delineation) for an estimated total of 400,000 feet of the sewer system.

Crews used smoke testing and manhole inspections to identify needed repairs in the basin. Identified issues were followed up with CCTV and dye testing. The investigations resulted in manhole repairs, point patches, root cutting, and sewer lateral repairs depending on the type of problem. The following table summarizes the SSES work performed and resultant system repairs from 2013 to 2016. See App A, #7 for associated labor and material costs.

Service	Quantity
Manhole Inspections	2,024
<ul style="list-style-type: none"> • Repair/Seal Manhole 	214
<ul style="list-style-type: none"> • Raised Manhole 	89
<ul style="list-style-type: none"> • Replace Manhole Ring 	7
<ul style="list-style-type: none"> • Remove Roots from Manhole 	4
Line Testing and Repairs	
<ul style="list-style-type: none"> • Dye Test 	62
<ul style="list-style-type: none"> • Point Patch 	253
<ul style="list-style-type: none"> • Replaced Clean Out Cap 	169

Service	Quantity
• Capped Abandoned Lateral	13
• Repaired Main	10
• CCTV	1,041 (recorded 237,708')
• Roots Cut	3,783'

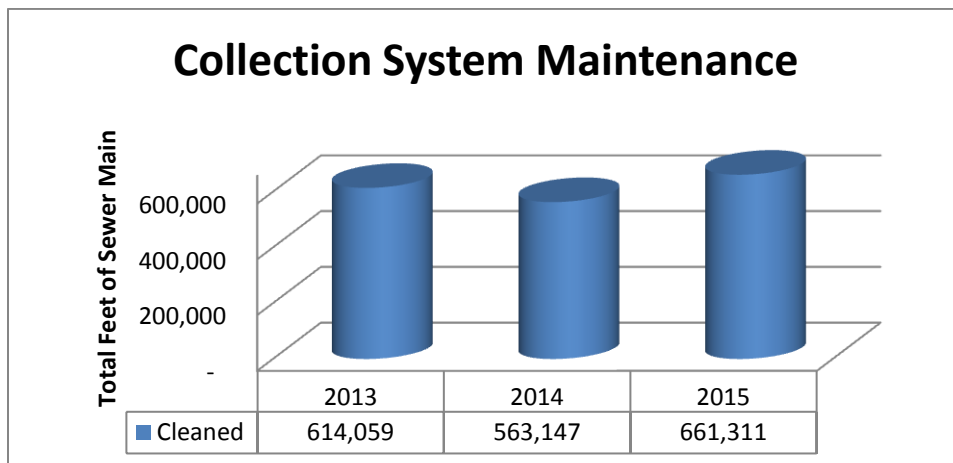
7. Routine Collection System Inspections/Maintenance

CWL sewer service trucks maintain the system through routine cleaning. Over the past three (3) years, CWL cleaned an average of 612,839' of sewer per year. A complete chart of the past three (3) year totals is below.

As part of its annual inspections, trained CWL personnel walk thirty-three (33) back-lot lines to insure the system is intact and working properly. The right-of-way of these lines is also cleared annually.

In January of 2016, CWL personnel inspected all forty-eight (48) ditch crossings located within the system. CWL also inspected and serviced the four (4) air relief valves located on force mains within the system. CWL plans to include these in the annual inspection process going forward.

In the last three (3) years, CWL has spent approximately **\$4.2 million** in labor and materials in the routine collection system maintenance and the SSES work and resultant repairs (App A, #6).



8. FOG Management Program

CWL completed detailed Interceptor Requirements and Installation Guidelines on March 3, 2015. The guidelines were created as a reference to assist customers, contractors, and plumbers in complying with CWL Interceptor requirements.

- a. **Quarterly Grease Interceptor Inspections** - CWL requires all new Food Service Establishments (FSEs), and any existing FSE where upon thorough inspection and/or sampling CWL determines to be necessary, to have an approved grease interceptor, and to thereafter operate and maintain the grease interceptor in a satisfactory and effective operating state as defined by CWL. To ensure that grease interceptors are being properly maintained and serviced, trained CWL employees perform quarterly grease interceptor inspections of all applicable FSEs. Certified letters and follow-up inspections are used when necessary. At the beginning of the inspection program in 2007, there were a total of 106 FSEs inspected. Due to growth, as well as expansion of the inspection program, the first quarter inspections of 2016 resulted in 186 FSE inspections. Beginning April 11, 2016, CWL is expanding the quarterly grease interceptor inspections to include schools, nursing homes, hospitals, and quick shops. CWL invests approximately **\$5,100 per quarter** in labor for these inspections.
- b. **FOG Public Outreach** - In January/February 2016, CWL distributed approximately 200 educational flyers concerning FOG, as shown in Appendix D (FOG Public Outreach Flyer). These flyers were presented to and discussed with the managers of local FSEs during quarterly inspections. The flyer outlined the requirements of the FSE as described in CWL's Pretreatment Ordinance. It also illustrated some "Best Kitchen Practices" to educate the FSE on ways to reduce the amount of FOG entering their grease interceptor and CWL's collection system. CWL also provided approximately 200 clipboards to aid the FSEs in maintaining the required grease interceptor paperwork. CWL spent **\$2,232** on these materials and approximately **\$3,000** in additional labor cost for distribution.

CWL has planned school presentations beginning in the 2016/2017 academic year to local fourth grade elementary classes. Presentations will include education on the water cycle, as well as the effects FOG can have on a community and the collection system. CWL also plans to provide educational material for the students to take home. If successful, CWL plans to continue this practice in future school years.

As of May 2015, CWL has utilized the organization's website to educate the public on things to not put down the drain, including grease, pharmaceuticals, and baby wipes. CWL is currently exploring additional opportunities for FOG outreach to residential customers through billing, newspaper or other media outlets. CWL plans to begin this practice in the second quarter of 2016 and continue this practice on a routine, practical schedule thereafter. CWL also plans to use this year's Business Expo on April 6, 2016 as an opportunity to educate local businesses and the public on FOG through discussion and informative materials.

9. Sewer Lateral Repair Program

CWL has a longstanding history of working with customers on private sewer lateral repairs. In 2008, CWL began a more formal process of notifying owners of necessary lateral repairs via certified letter. Due to CWL's SSES work and the resultant number of sewer laterals identified for repair, CWL enhanced the program and appropriate follow up on lateral issues in 2013. Since 2013, CWL has identified 141 laterals for repair through the SSES work. From 2013 to present, over 68% of the repairs have been made, with inspection by CWL. During this time frame, CWL has also inspected an additional fifty-five (55) sewer lateral repairs that were identified and repaired by the owner.

- a. **New/Repaired Sewer Lateral Inspections** - CWL maintains a sewer lateral inspection program for new or repaired sewer laterals as part of the sewer permitting process. Over the past three (3) years, CWL has inspected 620 sewer laterals.
- b. **Sewer Lateral Grants and Financing** - CWL has partnered with the City of Jonesboro in helping qualified customers obtain grant funding for their sewer lateral repairs through the City of Jonesboro's Homeowner Emergency and Rehabilitation Assistance Program. Over the past eighteen months, five (5) CWL customers have used grant funding to pay for their lateral repairs.

In cases of financial hardship, CWL also offers customer financing based on the prime interest rate at the time of the sewer lateral repair. CWL is currently financing sewer lateral repairs for four (4) customers.

10. Root Control Program

CWL has long used a sewer rodding machine and sewer trucks equipped with jetter nozzles for controlling roots within the collection system. In May 2015, CWL added a chemical treatment program for root control through a contract with Duke's Root Control, Inc.

Prior to executing the contract, CWL's pretreatment team performed extensive research, with the help of consultants and expert's in the field, to determine if the proposed root control program would be safe to use with regard to the collection system and particularly the WWTPs.

In 2015, CWL treated 14,111' of sewer main at the cost of **\$22,395**. After seeing the successful results in 2015, CWL increased 2016's chemical treatment for roots to cover 21,950' of sewer main at the cost of **\$35,431**. CWL continues to assess the sewer mains for root blockages and is prepared to increase the amount of chemical treatment coverage as appropriate.

11. Lift Stations

CWL realizes how critical the proper operation, maintenance, and monitoring of the system's twenty-seven (27) lift stations are to the overall function of the sanitary sewer collection system and in helping to mitigate potential SSOs from occurring. Since 2011, CWL has spent, including material and labor, over **\$1.4 million** on lift station maintenance and inspection.

- a. **Lift Station Monitoring & Inspection** – Fifteen (15) of CWL's highest capacity lift stations are capable of being controlled in the field or through SCADA. The lift stations have been evaluated and three (3) more lift stations are scheduled to be upgraded to SCADA control in the near future. The lift stations currently on SCADA are monitored 24/7. A wastewater operator and electrical maintenance personnel are on-call to respond to lift station alarms. In addition, a wastewater operator inspects each lift station in the system three (3) days a week and before/during major rain events. During weekly inspections, operators check the lift stations for repairs and cleaning and initiate work orders as necessary.

CWL has also added flow meters, monitored by SCADA, to four (4) of the lift stations. Another lift station flow meter installation is in progress. To-date, CWL has invested over **\$22,000** in lift station flow meters.

- b. **Lift Station Generators** – In case of an emergency power outage, CWL has installed permanent generators at eleven (11) of the highest capacity lift stations. CWL installed seven (7) of these generators in 2011/2012 at a cost of over **\$213,000**.

CWL also has five (5) portable generators that are specifically designated for the next most critical lift stations that do not have permanent generators. CWL

inspects the generators on a weekly, monthly, and quarterly basis by three different departments for fuel and proper operation.

- c. **Lift Station Upgrades and Redundancy** – CWL budgets capital improvements for lift station upgrades when necessary and also budgets funds for maintenance and emergency repairs. Over the past three (3) years, CWL has successfully updated three (3) existing lift stations at a cost of approximately **\$69,000**. CWL is in the process of replacing another lift station and has currently invested approximately **\$37,600** in the project. CWL has plans to begin the replacement process of a fifth lift station later this year.

CWL keeps spare pumps, motors, and lift station parts for timely repairs. The majority of the system's lift stations have duplicate control systems (i.e. both PLC and ultrasonic wet well level controls).

12. CWL Industrial Pretreatment Program

CWL has administered the Industrial Pretreatment Program for the City of Jonesboro since November 1983. One purpose of the program is to provide a mechanism for preventing the introduction of pollutants into the POTWs which would interfere with the operation of the POTWs. CWL issues Industrial Wastewater Discharge Permits to Significant Industrial Users (SIUs) and Non-significant Industrial Users (NSIUs). CWL monitors the wastewater discharge of SIUs to make sure they are meeting the requirements of their permit. One such parameter monitored is FOG.

CWL also inspects the oil/water separators of their permitted Non-Significant Industrial Users (car washes) to make sure they are properly installed. Under the authority of the program, CWL's laboratory also provides FOG sampling to investigate FSEs and other potential sources of FOG. Since 2011, CWL has spent, in labor and materials, over **\$2.95 million** administering the Industrial Pretreatment Program.

13. Wastewater Treatment Plant Capacity, SCADA Monitoring, and Pump Redundancy

As Table 1.1 shows, there is excess wastewater capacity at both of the CWL WWTPs. As the City of Jonesboro and the sanitary sewer collection system grows and continues to develop in size and wastewater capacity needs, CWL has insured enough wastewater capacity at the East WWTP for growth well into the foreseeable future.

CWL maintains multiple redundant pumps in the Eastside WWTP inlet wet well in case of pump failure. In addition, the WWTPs are monitored through the SCADA system 24/7. A

wastewater operator and electrical maintenance personnel are on-call to respond to WWTP alarms.

14. Water & Sewer Specifications Improvements

Since 1992, CWL Water and Sewer Specifications and inspections for developer laid lines have been increasingly improved for I&I considerations. A major change in 2015 was making SDR-26 the CWL minimum standard for gravity sewer lines instead of SDR-35. In 2016, CWL also began requiring developers to include generators and flow meters with any new lift station installations.

In 2014, CWL hired the engineering consulting firm SSR to review CWL's specifications and suggest improvements. This process is underway and planned for completion by the end of 2016. To-date, CWL has invested approximately **\$26,000** in specification improvements with SSR.

Trained CWL personnel perform testing and inspection for all new construction. This includes a mandrel test and a low air test on the sewer main and a vacuum test on the manholes.

15. Collection System Evaluation

In conjunction with the hydraulic model being developed by RJN, CWL executed a contract with MW&Y on June 19, 2014 to assist CWL in the identification, evaluation and ultimately recommendations for potential collection system improvements. Detailed design, bidding assistance and construction administration services for any improvement projects that may be undertaken would be addressed by simply amending this contract.

Much of the work under this project will take place after the completion of the hydraulic model scenarios evaluation. As of March 10, 2016, CWL has spent **\$15,229** with MW&Y on this work.

Appendix B

Individual SSO Responses

Jonesboro City Water & Light

Sanitary Sewer Overflow Report

Permit Number: 43401

March 1, 2013 through February 28, 2016

Summary Report Code Descriptions				
Cause(s) of SSO		SSO Impact	Action(s) Taken	Ultimate Discharge Location
CO - Construction	D - Debris	NEAH - No Evidence of Adverse Health of	WO - Work Order	CR - Creek/Stream/River
E - Equipment Failure	G - Grease	Environmental Impact	EC - Environmental Clean-up	DI - Ditch
HC - Hydro Clean	LF - Line Failure/Break		HC - Hydro Cleaned	DR - Drop Inlet
R - Rainfall	RG - Roots & Grease	OEHC - Observed or Evidence of Human Contact	HR - Hand Rodded	GR - Ground Surface
RO - Roots	V - Vandalism		EN - Referred to Engineering	PA - Paved Area
		EFK - Evidence of Fish Kill	PN - Public Notification	CB - Contained in Building

Location	Start Date of SSO	End Date of SSO	Estimated Volume	Cause of SSO	SSO Impact	Action(s) Taken	SSO Mitigation Efforts	Ultimate Discharge Location
703 Gladiolus Dr	3/19/2013 10:30 AM	3/19/2013 11:15 AM	500 gallons	G	NEAH	HC & EC	Apartment Complex, Cleaned Inverted Siphon	DI
4701 Southwest Drive	3/28/2013 4:15 PM	3/28/2013 5:00 PM	750 gallons	LF	NEAH	EC	Sewer Line Repaired	DI
1824 Burns Circle	4/1/2013 11:30 AM	4/1/2013 12:15 PM	250 gallons	G & RO	NEAH	HC & EC & TV Line	Cut Roots	DI
1711 Bufford Drive	4/1/2013 7:30 PM	4/1/2013 8:15 PM	100 gallons	G & RO	NEAH	HC & EC & TV Line	Cut Roots, Root Control Chemical Program	GR, DI
1101 Terrace Court	4/15/2013 9:30 AM	4/15/2013 9:50 AM	300 gallons	RO	NEAH	HC & EC & TV Line	Cut Roots, Root Control Chemical Program	DI
2210 Fowler Avenue	4/15/2013 4:00 PM	4/15/2013 4:20 PM	100 gallons	G	NEAH	HC & TV Line	Investigated source of grease, JetPower grease cutting formula applied	DR
2810 Nix Lake Dr	4/16/2013 9:45 AM	4/16/2013 11:15 AM	200 gallons	G & RO	NEAH	HC & EC & TV Line	Cut Roots	Small Lake
3505 Harrisburg Rd	5/3/2013 8:25 AM	5/3/2013 Unknown	2,700+ gallons	R	NEAH	Area Monitored	Cleaned Inverted Siphon, Installed Valve	DR
1312,1316,1320 Kitchen St	5/3/2013 10:30 AM	5/3/2013 5:00 PM	1,170 gallons	R	NEAH	Area Monitored	Deep Cleaned, Smoke Tested, Point Patching	DI
990 Sims Ave	5/3/2013 10:45 AM	5/3/2013 Unknown	1,080+ gallons	R	NEAH	Area Monitored	Manhole Inspections, Flow Monitors installed	GR
3210 Race St	5/3/2013 2:00 PM	5/3/2013 5:15 PM	540 gallons	R	NEAH	Area Monitored	Deep Cleaned, JetPower grease cutting formula applied	DI
1604 Shady Grove Rd	5/3/2013 8:25 AM	5/3/2013 Unknown	360 gallons	R	NEAH	Area Monitored	Cut Roots	DR
2004 Broadmoor	6/1/2013 5:22 PM	6/1/2013 6:00 PM	250 gallons	E	NEAH	Emergency Equipment Repair	Equipment Repaired	DI
3118 Meador Rd	6/3/2013 2:30 PM	6/3/2013 3:00 PM	300 gallons	G	NEAH	EC, HC	FOG Program (Sonic and Domino's Pizza)	DI
4402 Foxwood Cv	6/17/2013 3:35 PM	6/17/2013 4:00 PM	500 gallons	R & G	NEAH	HC, EC	JetPower Grease cutting formula applied	DI
703 Gladiolus	7/17/2013 4:15 PM	7/17/2013 4:40 PM	500 gallons	G	NEAH	HC, EC	Apartment Complex, Cleaned Inverted Siphon	DI
2657 Glenn Place	8/23/2013 4:30 PM	8/23/2013 9:00 PM	200 gallons	G	NEAH	HC, EC	JetPower Grease cutting formula applied	DR
1708 Deerwood Dr	10/09/2013 1:00 PM	10/09/2013 1:30 PM	500 gallons	G	NEAH	HC, EC	TV, Repaired Line and Root Control Chemical Program	DI
1807 Lorene Cv	12/08/2013 12:52 PM	12/08/2013 2:00 PM	300 gallons	G	NEAH	HC, EC	FOG Program (Craighead County Nursing Home)	DI
408 State St	12/09/2013 8:45 AM	12/09/2013 9:30 AM	300 gallons	G	NEAH	HC	Apartment Complex, JetPower Grease cutting formula applied	DI
Rains St & Wilkins Ave	12/21/2013 9:11 AM	12/21/2013 10:00 AM	500 gallons	R	NEAH	WO	Rainfall event greater than 2-year storm	DI
1921 Carolyn Dr	12/21/2013 5:00 PM	12/21/2013 8:00 PM	1,000 gallons	R	NEAH	WO	Rainfall event greater than 2-year storm	DI
400 Scott St	2/08/2014 11:49 AM	2/08/2014 12:20 PM	100 gallons	D	NEAH	HC	Cleaned debris from line	DI

Jonesboro City Water & Light

Sanitary Sewer Overflow Report

Permit Number: 43401

March 1, 2013 through February 28, 2016

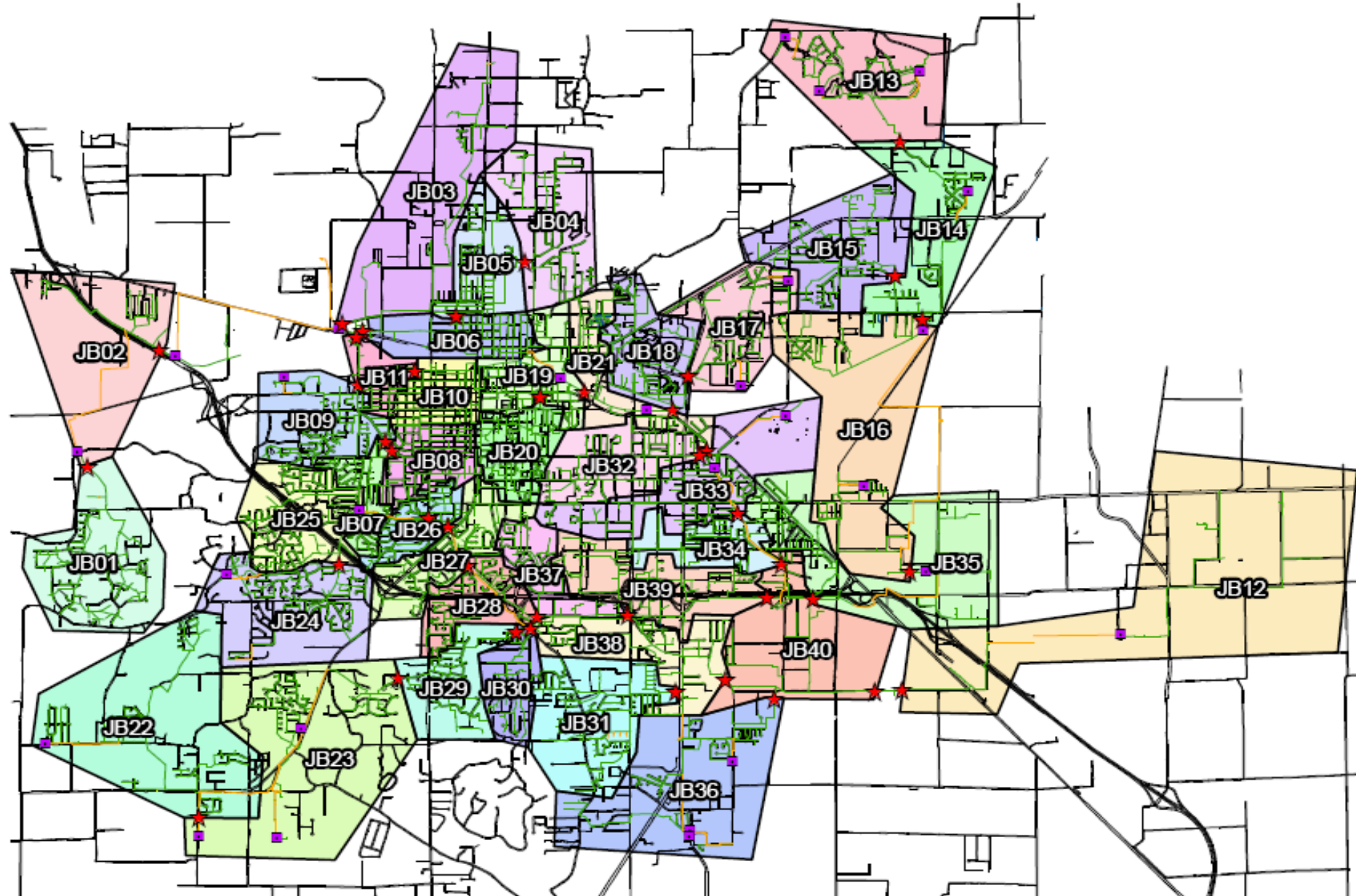
Summary Report Code Descriptions				
Cause(s) of SSO		SSO Impact	Action(s) Taken	Ultimate Discharge Location
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R - Rainfall	RG - Roots & Grease	OEHC - Observed or Evidence of Human Contact	HR - Hand Rodded	GR - Ground Surface
RO - Roots	V - Vandalism		EN - Referred to Engineering	PA - Paved Area
		EFK - Evidence of Fish Kill	PN - Public Notification	CB - Contained in Building

Location	Start Date of SSO	End Date of SSO	Estimated Volume	Cause of SSO	SSO Impact	Action(s) Taken	SSO Mitigation Efforts	Ultimate Discharge Location
2704 Greenbriar	3/06/2014 6:00 PM	3/06/2014 7:00 PM	500 gallons	RO	NEAH	HC, WO	TV, Cut Roots	DI
401 Richmond Ave	3/10/2014 1:30 PM	3/10/2014 2:30 PM	200 gallons	D	NEAH	HC, WO	Cleaned debris from line	DI
2241 S Caraway Rd	3/24/2014 3:00 PM	3/24/2014 3:30 PM	1,500 gallons	G, D	NEAH	HC, WO	Investigated source of grease, JetPower grease cutting formula applied	DI
3715 Stadium Blvd	10/14/2014 11:45 AM	10/14/2014 12:45 PM	250 gallons	G	NEAH	EC, HC	Apartment Complex, Inspect/Clean monthly	DI
703 Gladiolus Dr	10/27/2014 10:00 AM	10/27/2014 10:30 AM	100 gallons	G, RO	NEAH	EC, HC	TV, Cut Roots	GR
4596 Southwest Dr	12/08/2014 5:30 PM	12/08/2014 6:30 PM	10,000 gallons	LF	NEAH	EC, Repaired Main	Sewer Line Repaired	DI
1718 Airport Rd	3/17/2015 12:00 PM	3/17/2015 1:30 PM	450 gallons	G	NEAH	EC, HC	FOG Program (Fat City Restaurant)	DI
1702 Aggie Rd	5/4/2015 4:27 AM	5/4/2015 9:50 AM	500 gallons	D, LF	NEAH	HC, EC	Sewer Line Repaired	DI
509 Marshall St	5/12/2015 2:00 PM	5/12/2015 2:30 PM	200 gallons	G	NEAH	HC, EC	Apartment Complex, Inspect/Clean monthly	DI
1725 Parker Rd	6/11/2015 10:00 AM	6/11/2015 3:00 PM	9,000 gallons	LF	NEAH	EC,	Sewer Line Repaired	DI
125 Dean St	7/4/15 8:00 PM	7/4/15 8:30 PM	200 gallons	D	NEAH	HC	Cleaned debris from line caused by construction	DI
4213 Southwest Dr	7/28/15 10:30 AM	7/28/15 11:30 AM	27,000 gallons	LF	NEAH	EC/ER	Sewer Line Repaired	DI
205 Cater Dr	9/11/15 1:30 PM	9/11/2015 2:00 PM	100 gallons	G	NEAH	HC/EC/WO	Cut Roots	GR
3407 Quail Ridge Rd	10/19/15 3:00 PM	10/19/2015 5:00 PM	500 gallons	R	NEAH	HC, EC	Cut Roots	DI
707 Sims Ave	12/28/15 9:45 AM	12/28/15 3:45 PM	5,000 gallons	R	NEAH	Prioritize I & I study of this area	Flow Meters installed to study area	DI
703 S. Caraway Rd	12/28/15 11:30 AM	12/28/15 6:00 PM	4,200 gallons	R	NEAH	EC	Study area for potential captial improvements	DI

Appendix C

Basin Delineation

Jonesboro, AR



Appendix D
FOG Public Outreach

