CITY WATER & LIGHT

JONESBORO, ARKANSAS

2019 PROGRESS REPORT
CORRECTIVE ACTION PLAN

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

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CITY WATER & LIGHT

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I certify under penalty of law that this document and all appendices 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 the information, the information 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.

Jake Rice III, Manager
City Water and Light
Jonesboro, AR

12/16/19
Date

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Acronyms

ADEQ - Arkansas Department of Environmental Quality
CAP – Corrective Action Plan
CCTV – Closed Circuit Television Video
CIPP – Cured-In-Place Pipe
CMAR – Construction Manager at Risk
CMOM - Capacity, Management, Operations, and Maintenance Program
CWL - City Water and Light Plant of the City of Jonesboro, Arkansas
FOG - Fats, Oils and Grease
FSE – Food Service Establishment
GIS – Geographic Information System
gpm – gallons per minute
Hp - Horsepower
I&I – Inflow and Infiltration
ICEAS® - Intermittent Cycle Extended Aeration

kW - kilowatt
MGD – Million Gallons per Day
MW&Y - McGoodwin, Williams & Yates, Inc.
NPDES - National Pollutant Discharge Elimination System
Olsson – Olsson, Inc.
RAS – Return Activated Sludge
RJN - RJN Group, Inc.
SBR – Sequencing Batch Reactors
SCADA – Supervisory Control and Data Acquisition
SL-Rat® - Sewer Line Rapid Assessment Tool by InfoSense, Inc.
SSES – Sanitary Sewer Evaluation Study
SSO – Sanitary Sewer Overflow
SSR – Smith Seckman Reid, Inc.
TDH – Total Dynamic Head
UV – Ultraviolet
Van Horn – Van Horn Construction, Inc.
VFD - Variable Frequency Drive
WAS – Waste Activated Sludge
WWTP – Wastewater Treatment Plant

1. Executive Summary

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 continued in 2019 through the corrective action activities that CWL committed to in both the CWL CAP submitted to the ADEQ on March 28, 2016 and Addendum to CWL CAP submitted to the ADEQ on April 14, 2016. As of November 1, 2019, the corrective actions outlined in CWL's CAP and follow-up Addendum have been accomplished or are on schedule to be achieved by the respective target completion date. For 2019, these activities included:

i. Progress on Phase I Capital Improvements
ii. Progress on CMOM Software Solution/Sewer GIS Implementation
iii. Final Solutions/Installations for Lift Station Emergency Power
iv. FOG Management Program Expansion
v. Lift Station & Force Main Evaluation & Maintenance Program
vi. Identification/Design of Northwest (Main) Lift Station Replacement as a Phase II Capital Improvement
vii. Performed SSES of Approximately 31 Miles of the Collection System
viii. Performed Resultant Repairs for 2016, 2017, 2018, & 2019 SSES Basins

In addition to the corrective actions performed this year, CWL continued ongoing comprehensive SSO mitigation efforts through the routine inspection and maintenance programs for the collection system and lift stations and the CMOM programs and processes currently in place and active.

CWL, for many years, has demonstrated a culture of compliance and a commitment to SSO mitigation and, as outlined in this progress report, 2019 was no exception. For the period of November 1, 2018 thru October 31, 2019, CWL has documented CMOM expenses totaling over **$1,420,000** and capital costs totaling over **$11,036,000**. Also, CWL has made significant progress on Phase I capital improvements to-date in 2019 and, based on updated figures, estimates additional capital expenditures over **$10,500,000** to achieve the Phase I goals.

The ADEQ understands that SSO mitigation is an iterative and ongoing activity. CWL is pleased to present the activities outlined in this report as evidence of CWL's ongoing efforts in SSO mitigation. CWL believes that these proactive efforts and associated capital expenses, as well as the future corrective actions identified in CWL's CAP, demonstrate CWL's dedication to collection system improvements.

This CAP report represents CWL's fulfillment of ADEQ's request for an annual progress report and constitutes CWL's sincere interest in ongoing and transparent communication with the ADEQ beyond the fulfillment of our voluntary commitment of a Progress Report every two years, as presented in item IV of the Addendum to CWL CAP.

2. Corrective Action Plan Activities – 2019

CWL is pleased to report the corrective actions, as presented in the following sections, achieved in 2019 toward efforts to further mitigate SSOs in the collection system. To-date, the milestones outlined in CWL's CAP submitted to the ADEQ on March 28, 2016 and Addendum to CWL CAP submitted to the ADEQ on April 14, 2016 have been achieved or are on schedule to be achieved by the respective target completion date. For the period of November 1, 2018 thru October 31, 2019, CWL has documented CMOM expenses totaling over **$1,420,000** and capital costs totaling over **$11,036,000**.

2.1. 2019 CAP Milestones

CWL is pleased to report the corrective action progress, as presented in the following sections, accomplished in 2019 toward final efforts to achieve Milestone #4 of Phase I, targeted for completion by December 31, 2019. To-date, these milestones, as outlined in CWL's CAP Addendum, are on schedule to be achieved by the 2019 target completion date.

2.1.1. Equipment Installations and/or Procedures to Address Emergency Lift Station Operation

In the 2016 Progress Report for the CWL CAP, 13 lift stations were identified for permanent generator and transfer switch installations. A summary of the evaluation for lift station emergency power needs (Phase I, Milestone #1 of CAP Addendum) and a prioritized schedule was presented in Section 2.2.3 and Appendix A of the 2016 Report, respectively. The generator acquisitions began in 2017 and the subsequent installations are part of the scheduled fulfillment of the Equipment Installations and/or Procedures to Address Emergency Lift Station Operation proposed for the end of 2019 (Phase I, Milestone #4 of CAP Addendum).

As reported in the 2018 Progress Report, CWL installed new standby generators at the Turtle Creek, Northwest (Main), and Minx Hill lift stations. CWL installed, as scheduled in the 2018 report, new standby generators at the Horseshoe Trail and Sage Meadows #3 lift stations in 2019.

Due to planned capital improvements, property acquisitions, ongoing residential development, and defining of response times, the locations, timing, and type of standby power have been adjusted. The standby power solutions for the remaining lift stations currently without a permanent on-site generator consist of the following:

1. Three lift stations are scheduled for decommission as part of the Midtown Interceptor capital improvement project.
2. Two lift stations are scheduled for upgrades in 2020, including an on-site generator sized for upgrades.

3. Due to site restrictions, long response times, and potential decommissions due to development, the standby power solution for six lift stations has been changed to dedicated portable generators. CWL currently owns three portable generators that have been dedicated to lift station emergencies and is in the process of acquiring a fourth. In addition, CWL has identified the need to install a manual transfer switch at these lift stations to allow for a safer and quicker connection process. All transfer switches are planned to be installed by the end of the first quarter of 2020.

An updated summary of final standby power solutions for CWL's lift stations is provided in Appendix C.

2.1.2. FOG Management Program Expansion

As presented in the CAP, CWL's FOG Management Program monitors FSEs through quarterly grease interceptor inspections while also conducting FOG public outreach by means of educational brochures, company website, customer billing, newspaper, television, and/or other media outlets. Since the initial CAP, CWL has made significant efforts to further enhance its FOG Management Program, as presented in the 2016, 2017 and 2018 Progress Reports, with the expansions of quarterly grease interceptor inspections and FOG outreach to public schools, development of a residential FOG brochure, and enhancement of FSE monitoring activities within the collection system.

CWL's FOG Management Team is comprised of representatives from the following departments: Water and Sewer Service/Maintenance, Water and Wastewater Treatment, Laboratory, Engineering and General Operations. The Team meets routinely to review and evaluate current FOG Management Program elements; identify potential ways to enhance the program; and ensure implementation of the previously mentioned inspection and outreach activities.

The FOG Management Team has worked diligently this past year to further enhance and expand its outreach efforts through increased monitoring and sampling efforts and door hanger and postcard distributions. Increased monitoring and sampling within the collection system has allowed CWL opportunities to collaborate with FSEs and also distribute outreach material concerning the proper disposal of FOG. CWL has utilized the door hanger (as shown in Appendix E) to distribute to residents in areas where evidence of FOG has been identified in the collection system. The Team also coordinated the development and distribution of a postcard (as show in Appendix D) to 43,005 residential and post office box customers.

With the assistance of the FOG Management Team, CWL's Pretreatment Department developed a written FOG Management Plan. The Plan provides a uniform resource that

identifies CWL's FOG mitigation efforts. The FOG Management Plan is on schedule to be completed by the target completion date of December 31, 2019.

The on-going efforts of the FOG Management Team will allow CWL to continually evaluate and improve, as identified, the current components of the FOG Management Program, with a goal of heightening its effectiveness in SSO mitigation.

2.1.3. Lift Station & Force Main Evaluation & Maintenance Program

While the proper operation and maintenance and adequate capacity of CWL's lift stations and force mains have been and will remain a priority for CWL, the Lift Station and Force Main Evaluation and Maintenance Program was proposed by CWL as a milestone in the CAP Addendum as an opportunity for current staff to thoroughly re-evaluate the suitability, overall performance and condition of the system and enhance and formalize the maintenance program. To ensure a holistic evaluation, CWL formed a team composed of Engineering, Operations, and Wastewater Treatment personnel to achieve this goal.

The team began periodic meetings in 2018 and identified key tasks (with assignments) including, but not limited to: lift station inventory; force main inventory; lift station dry-weather critical response time; lift station firm capacity through field measurement; identification of any lift station remedial measures; identification of any force main remedial measures; review and potential enhancement of lift station maintenance program; and full implementation of a computerized lift station maintenance program.

Concerning the task of the lift station dry-weather critical response time, CWL worked with RJN, utilizing the CWL sewer hydraulic model, to develop a Failure Assessment Summary for 22 of CWL's now 26 lift stations. The remaining 4 lift stations are scheduled for upgrades/ decommissioning or do not have dry weather flow and were therefore not included in the evaluation. RJN's report is available upon request. CWL then compared RJN's results to field measurements of the 22 lift station's firm capacity, with interpolations of high level alarm to SSO response times. CWL used these comparisons to identify each station's most conservative response time for the lift station evaluation and any applicable remedial measures.

Key team members have also worked to enhance CWL's Lift Station Maintenance Program through the development of written standardized procedures and the use of Ignition, CWL's water and wastewater SCADA software. The Ignition software allows CWL employees to document and track routine and non-routine maintenance activities. Ignition also allows CWL employees to set-up reminders for upcoming maintenance tasks.

In 2019, CWL identified key individuals in Water and Sewer Service, Wastewater Treatment, Maintenance, Electric Maintenance, Compliance, Engineering and General Operations to

complete a field assessment of CWL's lift stations. The team performed an on-site evaluation of the 26 lift stations concerning detailed criteria, including but not limited to: Pump Station Location & Site Features; Pumps, Valves, & Piping; Architectural Features; Life Safety Considerations; Structural Features & Conditions; Electrical & Instrumentation Features; Electrical Code Features; and Force Main Considerations.

CWL's Engineering Department compiled and is currently evaluating the field assessments for each lift station, along with the dry weather response time, operating and mechanical failure history, maintenance records, and station capacity to develop any applicable remedial measures for each lift station and force main. The evaluation is being formalized into a written document that CWL is pleased to report is on schedule to be prepared by the target completion date of December 31, 2019.

2.2. Phase I Capital Improvements Status

In the 2017 CAP Progress Report, CWL summarized four capital improvement projects as part of Phase 1 of the CAP. CWL provided the completion of Phase I Capital Improvements as Milestone #5 of Phase I in the Addendum to CWL CAP. These projects were targeted for completion by December 31, 2020. CWL is pleased to report that the Phase I improvements are on schedule to be achieved by the target completion date.

Table 2-1 provides the updated cost estimates and the current project status for each improvement. The following sections also briefly describe each project's current status. In addition, see Appendix A for conceptual maps summarizing the in-progress or planned improvements.

Table 2-1: Phase I Capital Improvements (As of November 1, 2019)

Capital Improvement	Updated Cost Est.	Current Status
Eastside WWTP Wet Weather Hydraulic Upgrade	$15 million	Construction in Progress
Midtown Interceptor	$5.5 million	Construction Contract Executed/Construction Proceeding December 2019
Ridgecrest Lift Station & Gravity Sewer	$1.5 million	Design in Progress
Kitchen Gravity Sewer	$800,000	Contingent on Midtown Interceptor Completion

2.2.1. Eastside WWTP Wet Weather Hydraulic Upgrade

While the CWL Eastside WWTP biological treatment capacity remains more than sufficient as currently designed, the plant's hydraulic capacity under wet weather flows was identified for certain capital improvements to optimize operation. Plans and specifications for a hydraulic upgrade were developed by Olsson and included an 18-MGD head works pump addition, bar screen replacement to increase hydraulic throughput, and construction of one 100'-diameter clarifier and one 120'-diameter clarifier. An automated inlet flow-proportioning weir, RAS and WAS pumps, UV disinfection and additional structures and piping are also included in the upgrades.

The plans were approved by the ADEQ, and the construction permit became effective June 8, 2018. Van Horn was the successful bidder for the project and was issued a formal Notice to Proceed on July 23, 2018. Work is progressing on schedule despite significant rainfall amounts since construction started. CWL has spent over **$1.1 million** with Olsson through October 31, 2019 for their work on this project. This amount does not include significant in-house costs for work performed by CWL Engineering and Management personnel. Van Horn's contract price for construction is over **$13.1 million,** including change orders through October 30, 2019, and CWL has paid Van Horn over **$10.5 million** to date. The total projected cost for this project remains at approximately **$15 million**. The project is planned for completion in the first quarter of 2020.

2.2.2. Midtown Interceptor

In an effort to address capacity constraints in the midtown Jonesboro (i.e. E. Nettleton Ave, Kitchen St, E. Matthews Ave and Arkansas State University) area, CWL has contracted Olsson to assist in the design of the Midtown Interceptor. The targeted area is defined by sanitary sewer basins JB18, JB19, JB20, and JB21, as shown in Appendix B, Basin Delineation. The survey and design work are complete for the approximately four-mile gravity sewer, which will be a 24"-diameter line connecting the midtown area to the Northeast Interceptor sewer, placed in service September 2014. Easement acquisition and permitting for railroad and highway crossings are complete, and a contract has been executed with David Cline Construction Company, Inc. for construction of the project. CWL has projected a total cost of approximately **$5.5 million** for the project and issued a formal Notice to Proceed on November 4, 2019. This should result in a completion date in the third quarter of 2020.

2.2.3. Ridgecrest Lift Station & Gravity Sewer

CWL has contracted with Crist Engineers, Inc., and continues to work with RJN utilizing the CWL sewer hydraulic model, on the third capital project identified for Phase I, the Ridgecrest Lift Station and associated gravity sewer. This project will serve to optimize the functionality of the lift station through a redesign to a lower hydraulic grade line. This modification is proposed to

address capacity constraints in the Ridgecrest St, Sims Ave, Owens Ave, and Parkview St area (basin JB26; see App B, Basin Delineation).

Surveying on the project is complete and the final design, with updated cost estimates, has been approved. The design of the lift station, now in progress, will require gravity sewer upgrades as part of this project to increase upstream conveyance capacity and remove a potential hydraulic throttle downstream of the force main. Crist and CWL have updated, based on the current scope of modifications, the projected total cost to approximately **$1.5 million** for the project. CWL plans to begin construction in the first quarter of 2020 and has invested over **$42,000** in engineering and surveying on this project to date.

2.2.4. Kitchen Gravity Sewer

The final significant capital improvement project scheduled for construction during Phase I involves various upgrades to the existing gravity sewer network in the midtown area bordered by E. Nettleton Ave, Kitchen St, Osler Dr, and E. Washington Ave (JB19 and JB20; see App B, Basin Delineation). The current scope of work is anticipated to include over 4,000 feet of gravity sewer, ranging in size from 10" to 15". Existing utilities and storm drains have been surveyed for this project. CWL has projected a total cost of approximately **$800,000** for these upgrades. As a gravity system upstream of the proposed Midtown Interceptor, the projected start date for these sewer network improvements is contingent on the completion of the interceptor construction and, therefore, is planned for the fourth quarter of 2020.

2.3. Northwest (Main) Lift Station Replacement – Phase II Capital Improvement

CWL's Northwest (Main) lift station is responsible for pumping raw wastewater to the Westside WWTP for treatment. This lift station currently handles approximately 2 MGD, dry weather flow. In 2019, CWL identified replacement of this lift station as a Phase II Capital Improvement (Milestone #1 of Phase II, 1st Quarter 2021 thru 4th Quarter 2025, in the Addendum to CWL CAP), well ahead of the December 31, 2021 target date for this Phase's' capital improvement identifications, and began the design process. The increased capacity of this replacement prepares the Westside system for additional capital improvements in Phase II. In addition, replacing the over 40 year old lift station will address maintenance issues and provide a more reliable, efficient and resilient station.

CWL plans to construct the new lift station just north of the existing station. The current design consists of three pumps, each capable of 6,300 gpm (9.0 MGD) at 95' TDH, with the infrastructure for the installation of a future fourth pump as capacity needs dictate. The capacity of the lift station will be approximately 18 MGD with two pumps running and the third in standby. The design includes VFDs on each pump's 200 Hp motor, which will increase efficiencies and normalize flows into the WWTP for enhanced treatment. To address

emergency operation needs, redundant power line sources and a 300 kW standby generator are planned for the lift station.

CWL is utilizing the CMAR approach for this project. Van Horn is the construction manager for the project, and Olsson is the consulting engineers. The project is scheduled to be bid in the first quarter of 2020, with construction being completed in 2021 at an estimated cost of **$8.0 million**.

2.4. CMOM Software – GIS Implementation

As reported in the 2017 and 2018 Progress Reports, CWL selected ESRI/ArcGIS to develop GIS-based mapping for the sanitary sewer system as the necessary first step toward a long term solution for CMOM data management. The goal, as previously reported, is to further develop internal databases and data collection processes that allow integration with CWL's IBM i server and to develop software and mapping solutions that would add value to CWL's existing system and avoid duplication of many processes.

On March 15, 2018, ESRI conducted a Needs Assessment with CWL leadership and key team members from the majority of CWL departments. The follow up executive briefing provided to the CWL leadership team on May 8, 2018 provided a high level overview of CWL goals, strengths, and challenges as it relates to GIS implementation and a potential road map to this end. As a result of this assessment, CWL identified the need to partner with an experienced consulting firm to assist in developing the GIS strategic plan, geodatabase design and system architecture, and implementation plan. CWL developed and issued a Request for Proposal in August of 2018 and selected CDM Smith Inc. as the consulting firm to assist in the project.

CWL and CDM Smith met on February 6-7, 2019 to begin strategic planning for GIS implementation. CDM Smith met with CWL again on June 18-20, 2019 to review the GIS Strategic Plan and the status of the sewer system GIS mapping. In addition, CDM Smith provided training on the ESRI software CWL purchased in May of this year. CDM Smith continues to work on finalizing the sanitary sewer geodatabase design. The implementation is planned for the first quarter of 2020.

2.5. Phase I SSES Status

As a portion of Milestone #5 of Phase I of CAP Addendum, CWL provided a target completion date of December 31, 2020 for achieving an SSES on 1/3 of the CWL collection system, with an average of approximately 27 miles per year. CWL prioritized basins JB23, JB27, and JB38 to study in 2019 (App B, Basin Delineation) for an estimated total of approximately 31 miles of the sewer system. The status and results of the 2019 activities under this milestone, as of November 1, 2019, are briefly outlined in the following section. CWL has now completed inspection, evaluation, and

resultant repair identification of approximately 128 miles of the collection system under the CAP in the last 3 ½ years.

2.5.1. SSES Activities - Status & Results

The following Table 2-2 provides a summary for SSES activities and current results for JB23, JB27, and JB38.

Table 2-2: 2019 SSES Activities (As of November 1, 2019)

Service	Quantity			
	JB 23	JB 27	JB 38	2019 Basins Total
Manhole Inspections (1)	**333**	**273**	**244**	**850**
Line Testing and Repairs	**8**	**21**	**18**	**47**
Smoke Test (ft) (2)	**50,481**	**58,434**	**55,410**	**164,325**
Dye Test	**11**	**23**	**18**	**52**
CCTV (ft) (3)	**1,073**	**1,420**	**3,453**	**5,946**
Main Cleaned (ft)	**1,628**	**3,596**	**14,699**	**19,923**
Roots Cut (ft)	**0**	**379**	**0**	**379**
SL-Rat® (ft) (4)	**59,943**	**56,824**	**47,108**	**163,875**
Replace Clean Out Caps	**11**	**20**	**63**	**94**
Laterals Identified/Repaired (5)	**6/3**	**15/12**	**16/3**	**37/18**
Resultant Main Repairs	**2**	**5**	**0**	**7**

Notes:

(1) Manhole inspections are 100% complete

(2) 100% of each JB was smoke tested

(3) CCTV footage shown from SL-Rat® assessments and smoke test defects identified.

(4) SL-Rat® assessments of 12" lines and smaller.
Footage includes line segments that were re-assessed due to SL-Rat® score following cleaning of lines.

(5) Customers notified of lateral defects / Laterals repaired by customers and inspected by CWL.

For the 2019 SSES activities, CWL began with 100% inspection of the manholes in each of the three basins selected. As of November 1, 2019, manhole inspections for the three basins are 100% complete. Detailed inspection results are available upon request. The inspections identified 297 manhole resultant repairs. Details and statuses of the repairs are available upon request.

In addition to the manhole inspections, CWL crews cleaned main lines within each basin. The segments cleaned were identified as having potential obstructions based on SL-Rat® evaluations and smoke testing. See Section 3.2 for evaluation method utilized.

Smoke testing is 100% complete in each basin. Through the smoke testing process, CWL replaced at least 94 clean out caps. Smoke testing also identified 47 potential defects within the collection system. Crews completed the review of possible defects identified from smoke testing through CCTV, with the aid of dye testing, on October 22, 2019. CWL identified 2 main line defects through smoke testing and an additional 5 through other SSES or maintenance activities. Appropriate repairs have been completed on all 7 mains identified for rehab. CWL identified and verified 37 lateral defects that will be coordinated through CWL's Sewer Lateral Repair Program, in which property owners will be notified of necessary lateral repairs with appropriate follow up. CWL also identified 8 manhole defects that are included in the 297 manhole resultant repairs listed above.

2.6. Phase I SSES Resultant Repairs

As a portion of Milestone #2 of Phase II (1st Quarter 2021 thru 4th Quarter 2025) of CAP Addendum, CWL provided a target completion date of December 31, 2025 for achieving Phase I SSES Resultant Repairs. The following sections briefly describe the status of Phase I resultant repairs, as of November 1, 2019.

2.6.1. Manhole SSES Resultant Repairs

As described in Section 2.5.1., CWL identified 297 manhole repairs in 2019. As previously reported, CWL identified 135 manhole repairs for the 2018 basins of JB21, JB30, and JB31; 345 manhole resultant repairs for the 2017 basins of JB17, JB18, and JB32; and 91 manhole resultant repairs for the 2016 basins of JB07, JB24, JB25, and JB26. CWL is pleased to report that as of November 1, 2019, 57% of the 868 manholes identified have been repaired. Detailed spreadsheets regarding the status of the repairs identified in 2016 thru 2019 are available upon request.

2.6.2. Brick Manhole Rehabilitation

As stated in previous reports, CWL conducted an evaluation of the brick manholes previously rehabbed in the late 1980s and early 1990s for updated rehab needs. CWL determined that the optimum course of action at this time, considering the current available information, was to contract out a complete rehabilitation of all brick manholes, both previously rehabbed and untouched, within the basins studied. This decision was based on the evaluation and consultation with other utilities and engineering consultants.

As mentioned in CWL's 2017 and 2018 Progress Reports, CWL worked with SSR, in late 2017 and well into 2018, to develop detailed contract specifications for manhole cementitious lining. CWL continued this work internally through the remainder of 2018, including extensive research of contractors certified for this particular rehabilitation work.

In May 2019, CWL let a contract for the cementitious lining of 655 brick manholes, identified in the 2016, 2017 and 2018 basins. As previously reported, several of these brick manholes were also identified as in need of resultant repairs and, as such, are included in the resultant repair totals presented in Section 2.6.1. CWL awarded the contract to Kim Construction Company, Inc. of Steger, IL. Work began in late September 2019 and is anticipated for completion in the first quarter of 2020, depending on weather conditions.

For the 2019 basins, CWL has identified 160 brick manholes for rehabilitation in 2020. Detailed spreadsheets regarding the manhole cementitious lining rehabilitations are available upon request.

2.6.3. Manhole Heavy Ring & Lid Replacements

As previously reported, CWL also determined that replacing the older-style, heavy ring and lids under the influence of sheet flow in rain events had the potential to significantly reduce I&I. From November 1, 2018 to October 31, 2019, CWL utilized in-house personnel to replace 36 of the 38 heavy ring and lids identified in the 2019 basins.

To-date, CWL has replaced 320 heavy manhole ring and lids. Detailed spreadsheets regarding these repairs are available upon request.

2.6.4. Lateral SSES Resultant Repairs

As described in Section 2.5.1., CWL identified and verified 37 lateral defects within the 2019 basins. These defects are currently being coordinated through CWL's Sewer Lateral Repair Program, in which property owners will be notified of necessary lateral repairs with appropriate follow up.

In CWL's 2018 Progress Report, it was reported that CWL was in the process of CCTV and dye testing 51 possible defects identified from smoke testing within the 2018 basins. Of the 51 defects evaluated, 47 were verified to be customer lateral issues. CWL also previously identified 29 and 52 sewer lateral resultant repairs for the 2017 and 2016 basins, respectively. CWL is pleased to report that as of November 1, 2019, 133 of the 165 laterals identified have been repaired, with all of the 29 lateral repairs complete in 2017's basins. Detailed spreadsheets regarding these repairs are available upon request.

2.6.5. Main Line SSES Resultant Repairs

As described in Section 2.5.1., CWL identified 7 main line defects in the 2019 SSES basins. Appropriate rehab repairs have been completed at all locations.

As described in Section 2.6.4., defects identified in the 2018 basins were under evaluation at the time of the 2018 Progress Report writing. Upon completion of the CCTV review, 3 main line defects were identified in the 2018 basins and appropriate rehab methods were determined. As

previously reported, CWL identified 8 and 19 main line resultant repairs for the 2017 and 2016 basins, respectively.

CWL is pleased to report that as of November 1, 2019, 34 of the 37 mains identified have been repaired. The repairs include all of the identified mains in the 2016 and 2019 basins. The Midtown Interceptor will allow for the abandonment of the final outstanding main repair for 2018's basins. Detailed spreadsheets regarding these repairs are available upon request.

In conjunction with these repair efforts, CWL continues to evaluate main line repairs for potential candidates for CIPP lining. CWL continues to develop a list of prospective mains, which includes 1 of the remaining resultant repairs above as well as additional mains outside of the SSES basins. CWL tentatively plans to let a contract for bids on these repairs in 2020. A detailed spreadsheet regarding the main lines identified for potential CIPP lining is available upon request.

3. Routine Collection System Maintenance

In addition to the SSES activities of the three 2019 basins and all SSES resultant repairs outlined in the previous section, CWL performed the SSO corrective actions summarized in Table 3-1 as part of the routine inspection and maintenance of the collection system in various other areas throughout the system.

Table 3-1: 2019 Routine Collection System Maintenance (November 1, 2018 thru October 31, 2019)

Service	Quantity
	Routine Maintenance
Manhole Improvements	
Repair/Seal Manhole	**25**
Adjusted Manhole	**30**
Replace Manhole Ring	**10**
Line Testing and Repairs	
Smoke Test (ft)	**N/A**
Dye Test	**132**
CCTV (ft)	**134,886**
Main Cleaned (ft)	**392,637**
Roots Cut (ft)	**26,349**
SL-Rat® (ft) (1)	**1,716,165**
Laterals Identified / Repaired (2)	**11 / 9**
Point Patch	**68**
Repaired Sewer Main	**1**
Chemical Root Treatment (ft)	**8,856**
Capped Abandoned Laterals	**6**

Service	Quantity
CWL Repaired Laterals	**1**
Ditch Crossings Inspected	**See Note (3)**
Air Relief Valves Inspected	**See Note (3)**
Back-Lot Lines Inspected	**See Note (3)**

Notes:

(1) SL-Rat® assessments of 12" lines and smaller. Footage includes lines segments that were re-assessed due to SL-Rat® score following cleaning of lines.

(2) Customers notified of lateral defects / Laterals repaired by customers and inspected by CWL.

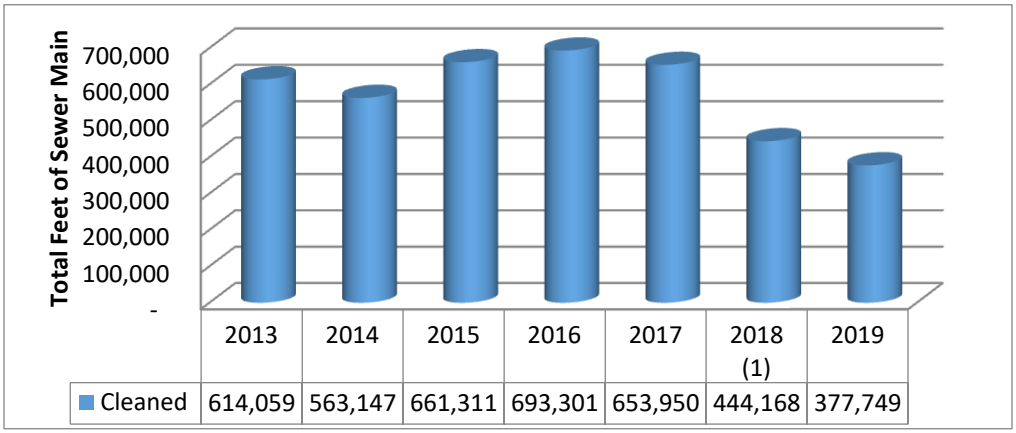
(3) Scheduled for December 2019.

The following sections briefly provide further details for some of these SSO corrective actions.

3.1. Sewer Mains Cleaned

As presented in the CAP, CWL sewer service trucks maintain the system through routine cleaning. Graph 3-1 provides a summary of the past 6 year totals, along with the total footage cleaned for January 1st thru October 31st of 2019.

Graph 3-1: Sewer Mains Cleaned (2013 thru October 31, 2019)



Note:
In the 2018 Progress Report, Total Feet of Sewer Main Cleaned was reported as 409,357'. November (16,924') and December (17,887') 2018 is included in the 2018 total shown.

The reduced cleaning footage for 2018 and 2019, as shown in Graph 3-1 above and in Table 2-2 for SSES basin cleaning footage, can be attributed to the efficiencies CWL is realizing through use of the SL-Rat®. See the following Section 3.2 for additional details.

3.2. SL-Rat® Activities

As previously reported, CWL began utilizing the SL-Rat® in July of 2016 to increase efficiency of sewer line blockage assessment. CWL is currently utilizing the following method: the line is assessed using the SL-Rat® and if the line segment scores a 5 or lower (poor to blocked), the line is hydro cleaned; the line is then re-assessed and if the line continues to score less than a 5, the line segment is then inspected through CCTV to further evaluate the apparent blockage.

As CWL has refined procedures for the effective use of the data produced for different main sizes and material, CWL has found this tool allows for more efficient hydro cleaning efforts and CCTV inspections and thus increased SSES productivity and SSO mitigation. The reduced cleaning footage in both the SSES basins and in CWL's routine maintenance of the collection system illustrates how effective this tool is to concentrate cleaning efforts in locations warranting the effort.

Based on these results, CWL continued use of the SL-Rat® to test 100% of the three 2019 SSES basins, while also continuing to test 100% of the collection system. Table 3-2 shows the ratings of the total line segments, including the approximately 163,875' in the 2019 SSES basin segments, tested with the SL-Rat® from November 1, 2018 thru October 31, 2019. A detailed report of the line segments tested in the 2019 SSES basins and a complete report of all line segments tested in 2019 are available upon request.

Table 3-2: SL-Rat® Sewer Line Assessment Results (November 1, 2018 thru October 31, 2019)

SL-Rat® Data for Total System	
Rating (1)	**Quantity (line segments)**
10-6	7,065
5-0	1,360
Footage= 1,880,040	

Note: Scale for rating is 0= Block, 1-3= Poor, 4-6= Fair, 7-10= Good

3.3. Root Control Activities

Through CWL's contract with Duke's Root Control, Inc, 8,856' of sewer mains were chemically treated in 2019. A detailed report of the line segments, located throughout the collection system, chemically treated in 2019 is available upon request.

In addition to chemical treatment, CWL continues its practice of using a sewer rodding machine and sewer trucks equipped with jetter nozzles for controlling roots within the collection system. Approximately 26,728' of sewer mains were root cut throughout the 40 basins of the system November 1, 2018 thru October 31, 2019.

Annual footage treated is based on the roots identified in sewer mains the previous year. In reviewing the 2019 root cut footage of almost 27,000', CWL anticipates a much larger scope of work for the Duke's contract in 2020.

4. Sewer Camera Van Purchase

To better facilitate CWL's ongoing SSO mitigation efforts, CWL purchased a new sewer camera van in August 2019. This purchase will enhance CWL's ability to properly identify sewer main defects both within the SSES basins and across the entire sanitary sewer system. It is also in keeping with CWL's philosophy of ensuring personnel have the appropriate tools for the tasks required of them. CWL invested over **$95,000** for this purchase. In addition, selection of a new sewer camera and associated equipment and software is currently in progress, with plans for the purchase in the first quarter of 2020 at an estimated cost of **$130,000**.

5. Lift Station Maintenance and Improvements

CWL is currently preparing a contract to upgrade approximately 3,200 feet of force main for the Oak Park lift station to 10 inch. This upgrade will not only be a critical part of providing for the growing capacity needs of the Valley View area in Jonesboro but also address a reliability issue that CWL previously worked to resolve through the installation of a sewer surge relief valve.

CWL has identified the Colony Park lift station for potential upgrades in 2020. The improvements are planned to include a generator and manual transfer switch. In addition, CWL's Lift Station & Force Main Evaluation (part of Phase I, Milestone #4 of CAP Addendum) is identifying and/or confirming other lift station improvements for prioritization in 2020.

As previously reported and also detailed in Appendix C, CWL is planning for the decommission of three lift stations as a positive effect of the installation of the Midtown Interceptor. In fact, the replacement of the Hereford lift station with gravity sewer is part of the Midtown Interceptor contract. In addition, CWL has knowledge of the potential decommission, upgrade or relocation of up to four other lift stations as a positive result of residential developments.

AS part of CWL's SSO mitigation efforts, CWL has improved specifications to now require developer installed new lift stations to include, in general: (1) the discharge manhole to be constructed with Spectra Shield (or equal) protective coating; (2) a Rosemount Magnetic (or equal) flow meter to be installed; and (3) a stationary diesel fuel Kohler (or equal) emergency generator with an automatic transfer switch to be installed.

Beyond these steps and planning, CWL continues to evaluate and prioritize future lift station needs and will determine if any lift station projects should be scheduled for 2020 in addition to the Ridgecrest and Main lift stations discussed in Sections 2.2.3 and 2.3, respectively.

6. Westside WWTP Study & Design

In keeping with CWL's culture of effectively managing the sanitary sewer system and ensuring that the future wastewater capacity and treatment needs are adequate well into the foreseeable future, CWL continuously examines where engineering time and resources should be focused to evaluate capital improvement project needs and ensure the appropriate timing of the design process. As with the capital improvement projects already identified, CWL's hydraulic model and consulting firm's evaluations, combined with CWL system knowledge, allowed CWL to identify the Westside WWTP for further study regarding the adequacy of the 1977 trickling filter Plant's biological and hydraulic capacity for the long term system needs. Preliminary efforts with MW&Y (now Olsson) toward this actually began in the first quarter of 2015.

As previously reported, CWL utilized the sanitary sewer system Hydraulic Model and Preliminary Collection System Evaluation, developed in conjunction with RJN and MW&Y respectively, coupled with CWL's knowledge of the collection and WWTP systems to identify the Phase I capital improvements, as defined in Section 2.2. MW&Y provided, as reported previously, a high-level analysis of the potential collection system improvements identified by RJN and either gave their concurrence or recommended modifications. In addition, MW&Y also provided estimates of probable costs for the improvements, as well as a general recommendation on the order of construction of the alternatives.

To build on these initial analyses, CWL contracted with Olsson in 2018 to prepare a detailed Engineering report for the Westside WWTP. CWL's review of the report and continued discussions with Olsson, in 2019, led to the recommendation that the WWTP be replaced in the intermediate future to accommodate estimated flow requirements with system growth and potentially more stringent regulatory requirements in the future.

Building on this decision, CWL contracted Olsson as the engineering firm and Van Horn as the CMAR for this project. This team has been evaluating treatment technologies, including trips to multiple WWTPs in the region, in order to identify the best technology for meeting future demands of the plant reliably and cost effectively. Potential technologies have now been narrowed down to two – the Ovivo Carrousel® System and Xylem, Inc.'s Sanitaire ICEAS® Advanced SBR. Very preliminary designs were completed by Olsson, and Van Horn is estimating the costs for the two different types of plants. CWL anticipates a final decision on the type of treatment technology in early 2020, with detailed design work to follow. CWL and Olsson are currently projecting a 2021 completion of the WWTP's final design and estimated costs. This should place CWL in a good position to determine if this project is the optimal solution for the west side sewer system or if a different approach/solution is needed. At the appropriate time, this will also allow CWL to define this project, if determined optimal, as either a Phase II or

Phase III Capital Improvement under the Addendum to CWL CAP and subsequently determine construction timing.

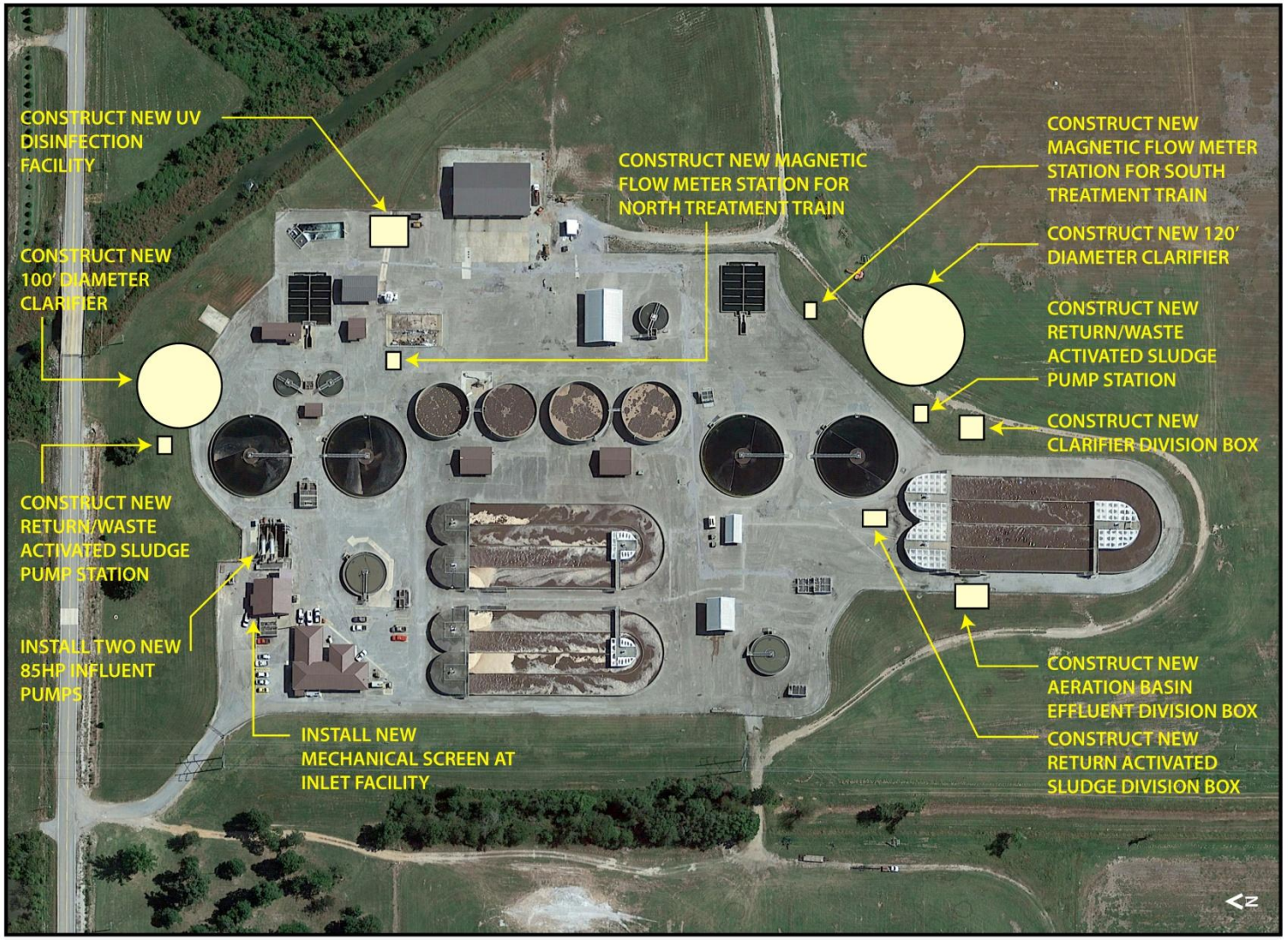
7. Conclusion

CWL is pleased to present the activities outlined in this report as evidence of CWL's ongoing efforts in SSO mitigation. As stated in the CAP, CWL fully understands the iterative, ongoing nature of this process and is committed to continual improvement of the management and operation of the collection system and maintaining adequate capacity of the system. CWL believes that these proactive efforts and associated capital expenses, as well as the future corrective actions identified in CWL's CAP, demonstrate CWL's dedication to collection system improvements.

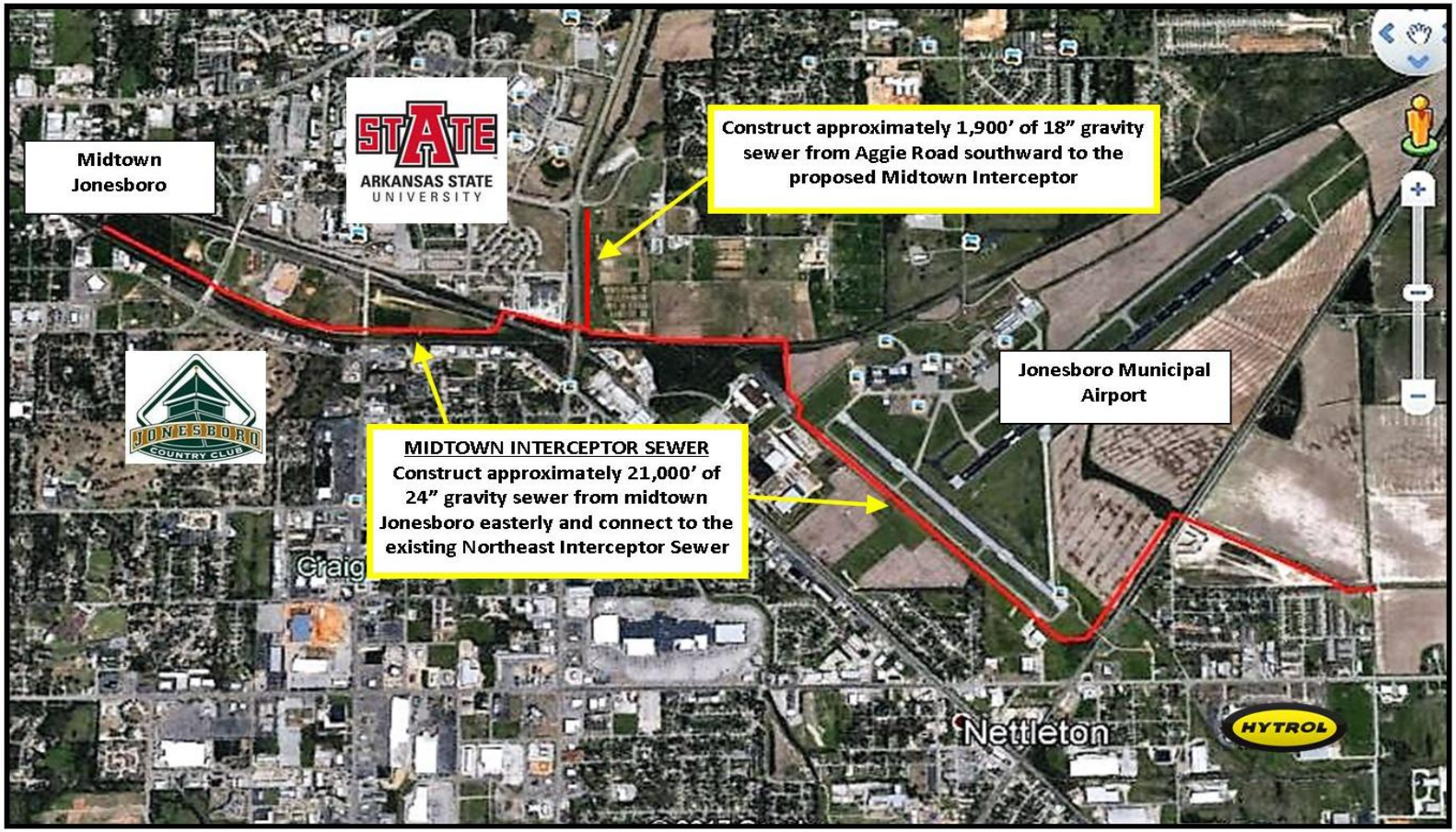
This CAP report represents CWL's fulfillment of ADEQ's request for an annual progress report and constitutes CWL's sincere interest in ongoing and transparent communication with the ADEQ beyond the fulfillment of our voluntary commitment of a Progress Report every two years, as presented in item IV of the Addendum to CWL CAP.

Appendix A

Phase I Capital Improvements



EASTSIDE WASTEWATER TREATMENT PLANT IMPROVEMENTS



Midtown Interceptor Sewer

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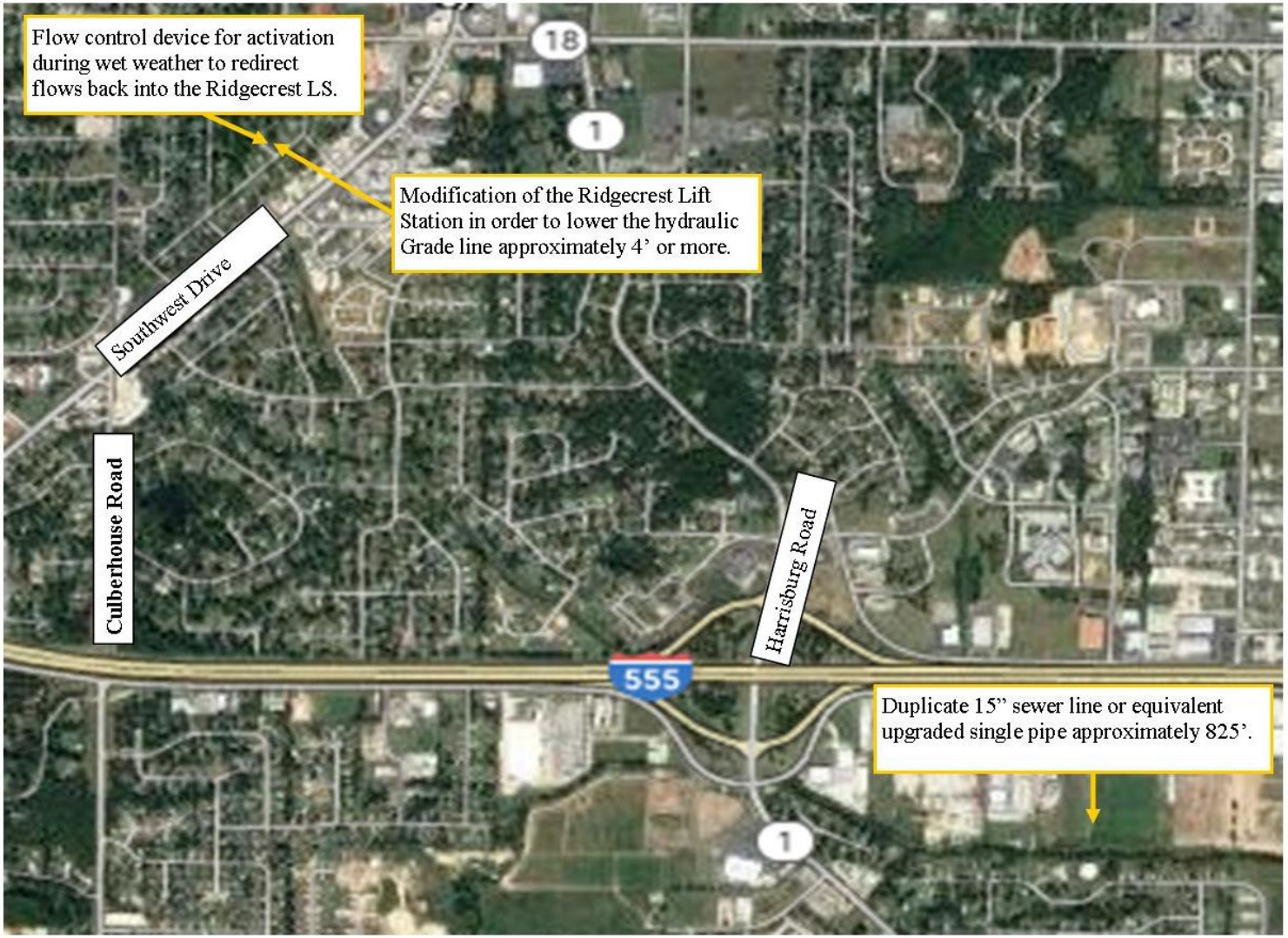
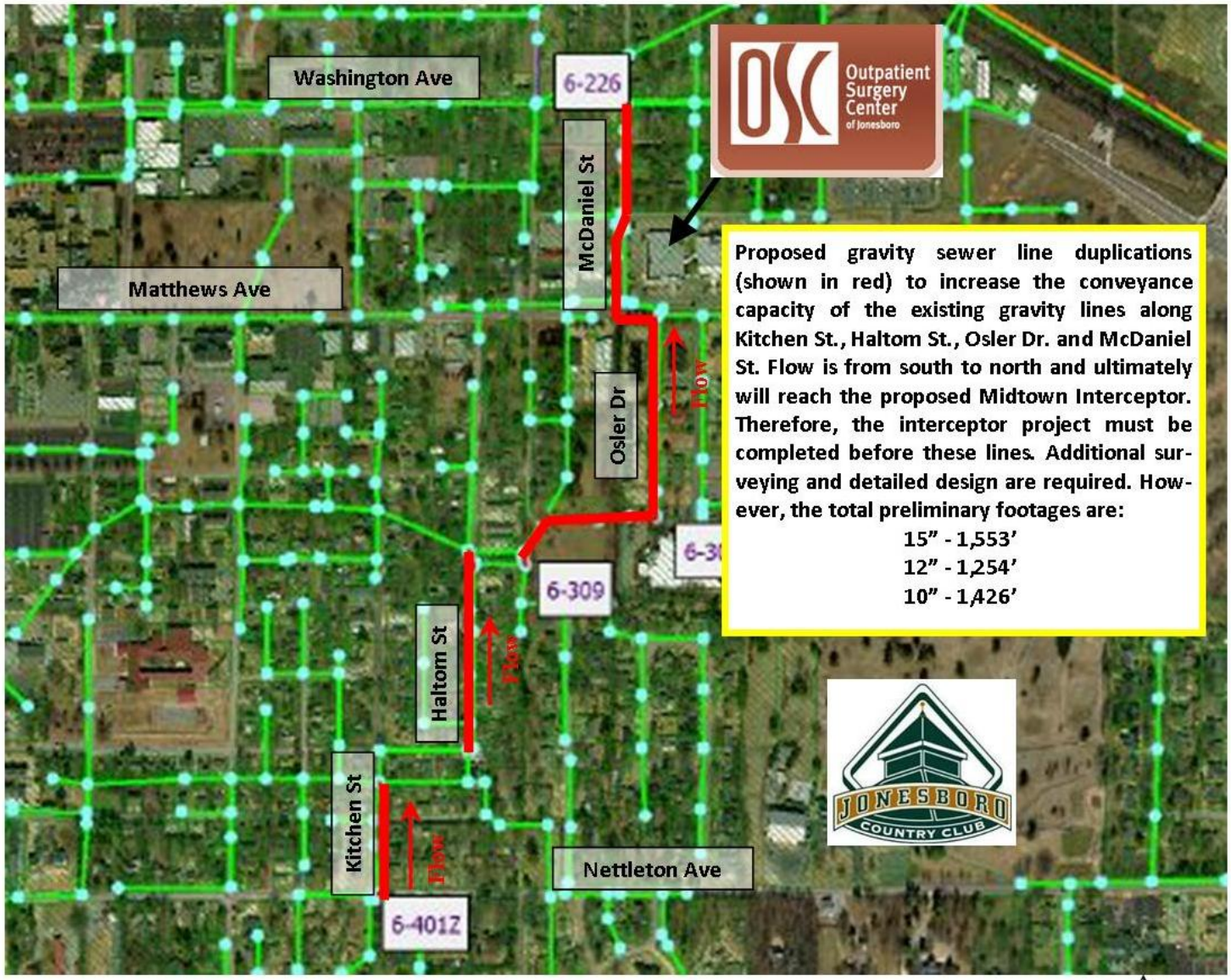
No Scale



Ridgecrest Lift Station and Gravity Sewer



Kitchen Gravity Sewer

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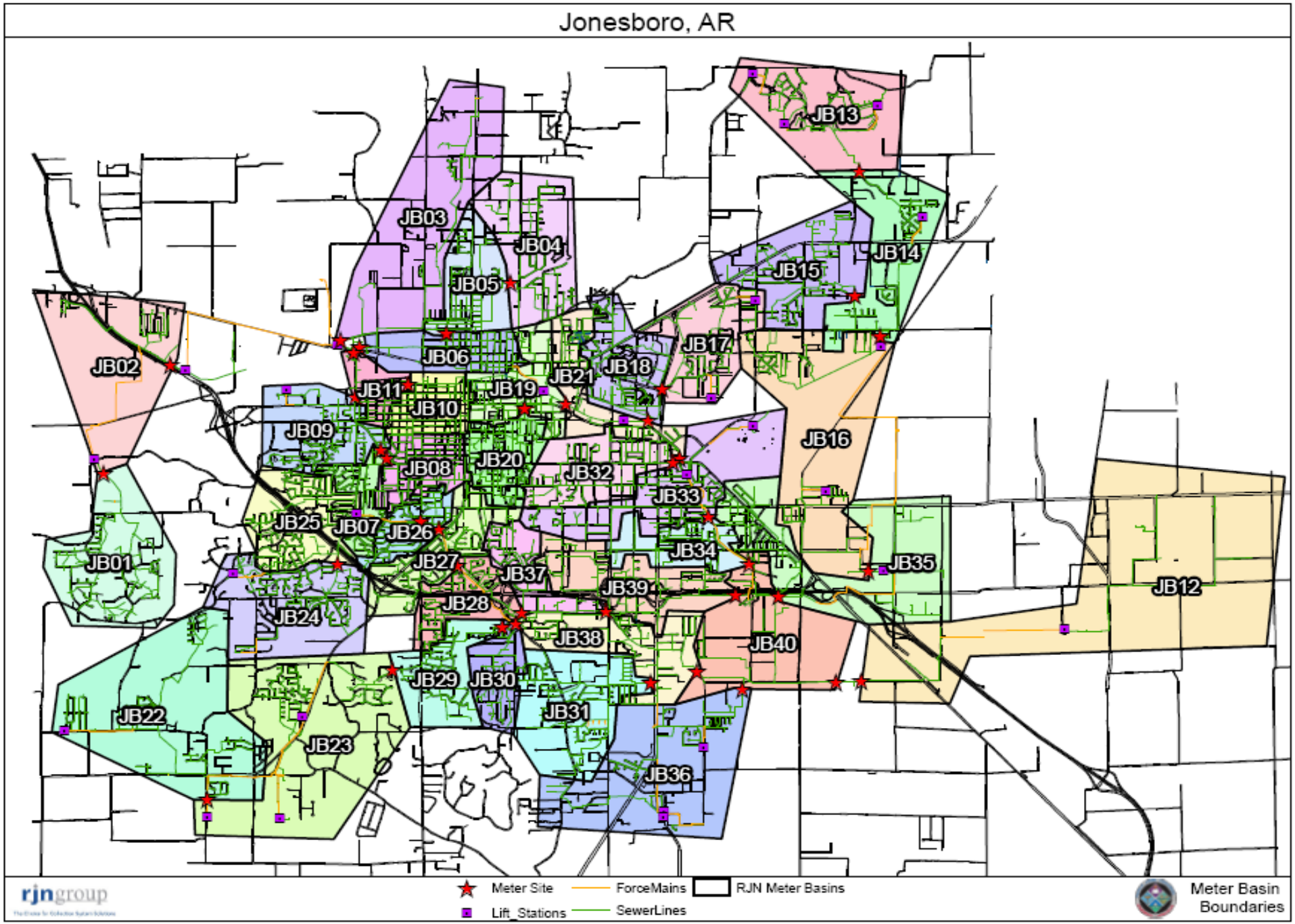
Appendix B

Basin Delineation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rjngroup
Meter Site
Lift_Stations
ForceMains
SewerLines
RJN Meter Basins
Meter Basin Boundaries

Appendix C

CWL Lift Station Emergency Power

CWL Lift Station Emergency Power						
LIFTSTATION			Station Standby Power			
	Transfer Switch	Quick Connect for Pump	Status	Type	Date (1)	Comments
Airport	No	No	N/A	Portable generator	2019	To be decommissioned pending Midtown Interceptor.
Beaver Creek/Prairie Meadow	No	Yes	N/A	Portable generator	2019	To be decommissioned/moved pending development. On easement and lengthy response time. Installing transfer switch.
Clinton School	Yes	Yes	Present	On-site generator	2013	
Colony Park	No	No	Absent	On-site generator	2020	Generator purchase pending planned upgrades to station in 2020/2021.
Commerce Dr	Yes	Yes	Present	On-site generator	2011	
Congress Cir.-W.Washington	No	No	N/A	Portable generator	2019	On easement and lengthy response time. Installing transfer switch.
Dorton Rd	Yes	No	Present	On-site generator	1990	
Hereford	Yes	Yes	N/A	Portable generator	2019	To be decommissioned pending Midtown Interceptor.
Horseshoe Trail	Yes	No	Present	On-site generator	2019	
Minx Hill (Hwy 226)	Yes	Yes	Present	On-site generator	2018	
Morton & Mitchell	No	No	N/A	Portable generator	2019	To be decommissioned pending Midtown Interceptor.
Northwest (Main Lift)	Yes	Yes	Present	On-site generator	2018	Original installation 1977. Replacement generator purchased 2017.
Oak Park	Yes	Yes	Present	On-site generator	2011	
Ridgecrest	No	No	Absent	On-site generator	2020	Generator purchase pending planned upgrades to station in 2020.
Sage Meadows #1 (Southern Hills)	No	No	N/A	Portable generator	2019	To be decommissioned/moved pending development. Portable generator on-site due to difficult access and response time. Installing transfer switch.
Sage Meadows #2 (Hwy 351)	No	No	N/A	Portable generator	2019	Generator purchase pending planned upgrades to station due to development. On easement and lengthy response time. Installing transfer switch.
Sage Meadows #3 (Lochmoor)	Yes	No	Present	On-site generator	2019	
South Bend	No	No	N/A	Portable generator	2019	To be decommissioned pending development. On easement and lengthy response time. Installing transfer switch.
Southeast (2 generators)	Yes	No	Present	On-site generator	1977	
	Yes	No	Present	On-site generator	2008	1990 model
Southwest	Yes	No	Present	On-site generator	1999	
Sports Complex	Yes	Yes	Present	On-site generator	2011	
Spring Valley	No	No	N/A	Portable generator	2019	On ROW and lengthy response time. Installing transfer switch.
Strawfloor	Yes	No	Present	On-site generator (Manual)	2011	
Turtle Creek	Yes	No	Present	On-site generator	2018	
Valley View	Yes	Yes	Present	On-site generator	2012	
Wimpy Ln	Yes	No	Present	On-site generator	2011	

Notes: **Revised: 12/02/2019**

(1) Year indicates the time standby power was provided or target for standby power to be operational.

Appendix D

FOG Postcard


CWL
NEEDS YOUR HELP
HELP US BY FOLLOWING THESE STEPS
1. After cooking food that contains F.O.G., let the F.O.G. cool to a safe temperature.
2. Put the F.O.G. into a disposable, container (e.g. an empty soup can) and dispose of the container in the trash.
3. Scrape food scraps from the dishes into the trash can. Use a paper towel to wipe F.O.G. out of the pots and pans before washing them.
4. Use sink strainers to catch food waste during dish washing. Empty the strainer in the trash can.
5. Soak up spilled F.O.G. with an absorbent material such as paper towels or kitty litter and throw it into your trash can.
HELP US KEEP F.O.G. OUT OF THE SEWER SYSTEM
WHAT IS F.O.G.?
F.O.G. is Fats, Oils, and Grease and is found in food and food ingredients such as:
meat, butter, cooking oils, mayonnaise, salad dressings, gravies, and food scraps.
BUTTER
MAYO
FOG

HELP US BUST SOME OF THE COMMON MYTHS CONCERNING F.O.G.

MYTH It's ok to pour **F.O.G.** down the drain as long as I use the garbage disposal.

FACT The garbage disposal only grinds up **F.O.G.** and food items before passing them into your sewer pipes. These items can still cause the system to back-up.

MYTH It's ok to pour **F.O.G.** down the drain as long as I run hot water...

FACT The **F.O.G.** will cool and build up in the sewer pipes causing the system to back up.

MYTH It's ok to pour **F.O.G.** down the drain as long as I chase it down with dish soap...

FACT Soap breaks up **F.O.G.**, but the soap will lose its effectiveness, causing the grease to solidify in the sewer pipes.

Contact us at:
jonesboroowl.org

400 E. Monroe Avenue • P.O. Box 1289
Jonesboro, AR 72401

(870) 930-3380

City Water & Light
400 E. Monroe, P.O. Box 1289
Jonesboro, AR 72401

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Local
Postal Customer

Appendix E

FOG Door Hanger


Please Proofread Carefully. Master Group is not responsible for errors after customer approval.
CWL
NEEDS
YOUR
HELP
FOG

Help us keep sewer pipes
running freely and prevent costly clogs
by following these steps:

1. **F.O.G.** stands for Fats, Oils, and Grease. **F.O.G.** is found in food and food ingredients such as: meat, butter, cooking oils, mayonnaise, salad dressings, gravies, and food scraps.
2. After cooking food that contains **F.O.G.**, let the **F.O.G.** cool to a safe temperature.
3. Put the **F.O.G.** into a disposable container (e.g. an empty soup can) and dispose of the container in the trash.
4. Scrape food scraps from the dishes into the trash can. Use a paper towel to wipe **F.O.G.** out of the pots and pans before washing them.
5. Use sink strainers to catch food waste during dish washing. Empty the strainer in the trash can.
6. Soak up spilled **F.O.G.** with an absorbent material such as paper towels or kitty litter and throw it into your trash can.

PLEASE DON'T POUR FATS, OILS, AND GREASE DOWN THE DRAIN!!!

CITY WATER & LIGHT
400 E. MONROE
JONESBORO, AR 72401
(870) 930-3380

jonesborocwl.org