RECEIVED
JUN 25 2019
BY: 2:30 PM

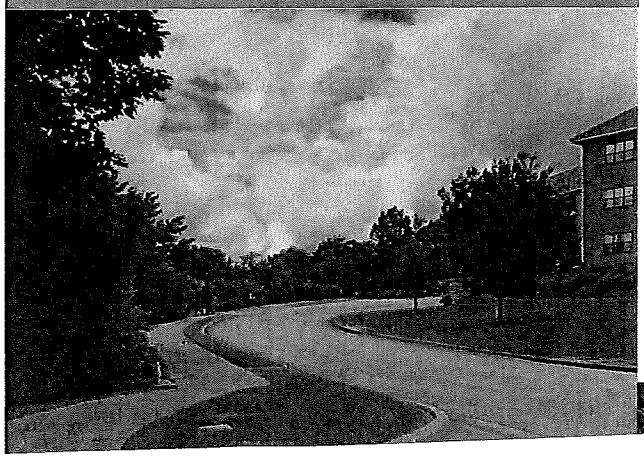
CFS
cfse.com
ENGINEERS

City of Branson, Missouri

Proposal No. 2493-25

- Lift Station 17 Force Main Replacement
- Spring Creek Neighborhood Water System Upgrade
- Spring Creek Neighborhood Sanitary Sewer System Upgrade

June 25, 2019



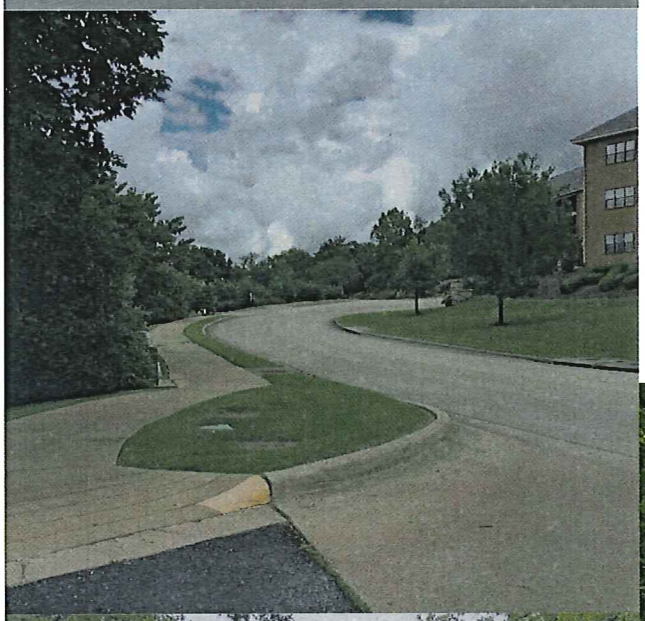
CFS
cfse.com
ENGINEERS

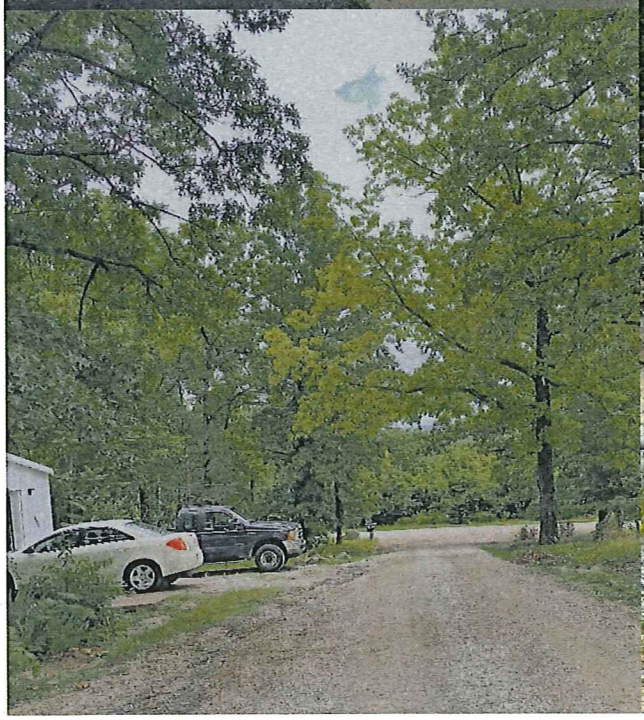
City of Branson, Missouri

Proposal No. 2493-25

- Lift Station 17 Force Main Replacement
- Spring Creek Neighborhood Water System Upgrade
- Spring Creek Neighborhood Sanitary Sewer System Upgrade

June 25, 2019





CFS ENGINEERS
cfse.com

One Vision. One Team. One Call.

June 25, 2019

City of Branson
Purchasing Office
110 W. Maddux Street, Suite 200
Branson, Missouri 65616

Re: Request for Proposal 2493-25 | Engineering & Design Services

To: The Selection Committee

CFS Engineers is pleased to submit our proposal to provide Engineering Design Services for the Lift Station 17 force main and Spring Creek Neighborhood water & sewer improvements. CFS is a full-service civil engineering firm with senior staff experienced in all phases of infrastructure planning, design & construction, including surveying, geotechnical, design, landscape architecture, construction administration and inspection. In the past few years we have completed Engineering Studies and Design for multiple communities for Wastewater and Drinking Water improvements. Included among the recent projects are the following:

- *Spirit of 76 Waterline, from Presley's west to Ripley's, Branson, MO*
- *City-wide water study, design & construction inspection for Osceola, MO*
- *City-wide water study, design and bid documents for Warsaw, MO*
- *Sanitary Sewer Main Influent Lift Station Improvement - Warsaw, MO*
- *Design for multiple Water Main replacements & extensions. Kansas City, MO*
- *Sanitary Sewer Extensions along Commercial Street and Jefferson Street - Warsaw, MO*

Capacity and Capability of the Firm - Our current workload in the region is low. We are hungry for work and have a large staff of senior experienced personnel available to work on this project as needed. Charles LePage, P.E., will be assigned to manage and coordinate this project with the City and the permitting agencies. He is a resident of the Branson area and will be readily available. His experience and capabilities are ideal for these projects. Todd Polk will also be heavily involved with this project. His familiarity with Branson's design criteria, existing relationships with local utilities and experience with water infrastructure, sewer infrastructure and development will provide additional benefits for this project. The qualifications of additional staff are also provided in this proposal.

We feel that we are well qualified to provide thorough, high quality planning and engineering with special attention to detail, and the experience to identify challenges and provide affordable solutions that use project funds wisely. We appreciate the opportunity to submit our qualifications and would be extremely pleased to work with the City of Branson.

Respectfully submitted,

Charles C. LePage

Charlie LePage, P.E.
Vice President
clepage@cfse.com | 816.729.2134

EXPERIENCE WITH SIMILAR TYPE OF WORK

CFS provides long term solutions for drinking water and wastewater systems. CFS has conducted studies, modeling and design for water and wastewater systems to help municipalities plan and implement improvements to their systems. CFS offers the essential planning and design services geared to supporting municipal Public Works and Utilities. We provide site specific solutions for projects of all types including the collection, conveyance, storage and treatment of water and wastewater. CFS Engineers has a staff of 80 design professionals. Please see our 2019 SOQ.

SIMILAR PROJECTS: The following projects are a small representative of similar work:

Spirit of 76 Complete Streets Waterline Improvements - Branson, Missouri
CFS prepared plans for a 12" water line to replace the existing 8" water line along the north side of Route 76 and a new 12" waterline along the south side of Route 76, in Branson, Missouri. The project included approximately 1.5 miles of 12" water line with new valves and hydrants from Ripley's Believe it or Not to Presley's Theater. CFS was responsible for all aspects of project coordination, including survey, utility coordination, easement and right-of-way document preparation and coordination, water line design and plan preparation and project cost estimation. This project allowed CFS to become very knowledgeable of the City's requirements, expectations and design criteria.
Key Staff: Charles LePage, Todd Polk, Charles Sullivan, Elliot Duenow, Louis LePage

City-Wide Water Main Replacement - Warsaw, Missouri
CFS prepared the preliminary engineering report, surveys, engineering design, geology, permitting and easement documents for over 19,000 linear feet of waterline with new hydrants, valves, meters and service connections with boring and casing for a new crossing under US 65 Highway. CFS was responsible for all aspects of project coordination, including survey, utility coordination, easement and right-of-way documentation, construction administration, plans, estimates, specifications and bid preparation. Construction of this $1.6 Million project was completed in the Spring 2013.
Key Staff: Charles LePage, Tom Ingram, Lance Scott, Louis LePage

Evergreen Parkway Roadway, Water and Sewer Improvements - Lebanon, Missouri
This project consisted of 220' of Evergreen Parkway reconstruction, 800' of Slate Street construction, and a roundabout intersection at an existing curve in Evergreen Parkway. This project also included 1,810' of 12" waterline and 1,940' of 8" sanitary sewer line. Construction included clearing, grading, storm sewers, paving, street lighting, signing, and pavement marking. CFS provided engineering services including design of a roundabout, storm sewers, water lines and sanitary sewer. CFS designed a roundabout so that part of the existing roadway could be used as a right turn bypass to the roundabout. Doing this allowed us to lower construction costs to the customer. CFS worked with the City of Lebanon to coordinate the design with construction completed by the City of Lebanon to connect to a new school currently under construction in the area. Key Staff: Todd Polk, Elliot Duenow

Longview Road Water Line and Sanitary Sewer Replacements - Kansas City, Missouri
The Longview Road Water Line Project was a 2 mile 6"-12" water line project constructed by the City of Kansas City, MO Water Services Department. The project spanned between Hickman Mills Drive and Spring Valley Road. CFS designed this water line project in conjunction with the Longview roadway and sanitary sewer improvement project. The roadway improvement project consisted of the widening of Longview Road from a two-lane rural-type roadway to a three-lane urban roadway, sidewalks, street lighting, and improved storm drainage. CFS provided utility coordination, and easements, design and plan preparation. Key Staff: Charles LePage, Tom Ingram, Louis LePage

Phase II Sanitary Sewer Main Extension - Warsaw, Missouri
The project scope involved preliminary studies, survey, permitting, engineering design, construction plans, specifications and bid documents for approximately 3,500 feet of 15" gravity sewer, 650 feet of 18", 2,000 feet of sanitary force main and a 1,350 gpm design pump station. The project included a 10" waterline extension, horizontal directional bores and reconnection of many sewer service lines.

The duties also included coordination and construction administration. Key Staff: Charles LePage, Tom Ingram, Lance Scott, Louis LePage

KEY STAFF: The following professionals will be integral to the success of this project:

CFS' team leaders, Charlie LePage and Todd Polk have designed many miles of new water and wastewater lines, sewer rehabilitation, lift stations as well as treatment upgrades. Charlie resides in the Branson area, while Todd is located just 30 minutes north of downtown. Both will be readily available and responsive to the City's needs. CFS has additional local and extended staff available. CFS also has a staff of experienced senior engineers and certified inspectors to assist as needed.

CHARLIE LEPAGE P.E., Principal, Project Manager. Mr. LePage has 30 years of design and management of civil engineering projects. Charlie currently serves as the City Engineer for Warsaw. In this role, he has managed numerous capital improvement projects including major upgrades to the wastewater collection and treatment system, drinking water distribution system, complete streets projects, street lighting, parking improvements, channel repairs, a new maintenance building, multiple trail and sidewalk projects, golf course improvements and many planning and funding studies Charlie will serve as Project Manager, Lead Designer and liaison with the City.

REPRESENTATIVE PROJECT EXPERIENCE:

- *City-wide Drinking Water Improvements 2011- Warsaw, Missouri*
- *City-wide Sanitary Sewer Improvements 2010 – Warsaw, Missouri*
- *E. Main Street/Frontage Road Waterline & Sewer Well #4 to Route 7 - Warsaw, Missouri*
- *New Main Influent Lift Station & Forcemain – Warsaw, Missouri*
- *Phase II Lift Station, Forcemain & Gravity Extension- Warsaw, Missouri*
- *Spirit of 76 Waterline Improvements- Branson, Missouri*
- *Longview Rd Water Mains, Phase I & II, Hickman Mills Dr. to Springvalley Rd., KCMO*
- *Longview Rd Sanitary Sewers, Phase I & II, Hickman Mills Dr. to Springvalley Rd., KCMO*
- *39th Street Waterline Replacement, Cleveland to Elmwood - Kansas City, Missouri*

TODD POLK P.E. Associate. Mr. Polk has over 30 years' engineering and design experience. Todd has extensive experience in land planning, residential and commercial site design, storm drainage analysis and design, roadway, water and utility design, land disturbance, water quality design, permitting, and military facility design. Todd has provided planning and design services for multiple Branson developments and had a key role in the Spirit of 76 Project. Todd is very familiar with Branson's design criteria and will handle utility coordination and assist with design and specifications.

REPRESENTATIVE PROJECT EXPERIENCE:

- *Spirit of 76 Waterline Improvements- Branson, Missouri*
- *Evergreen Parkway & Water & Sewer Improvements, Lebanon, MO*
- *Catherine Street Roadway, Water and Sewer Improvements, City of Lebanon, MO*
- *Branson Chamber of Commerce and CVB Headquarters*
- *Bethel Estates of Gardner Public Water and Sewer Improvements - Gardner, KS*
- *Estates at Midwest City Public Water and Sewer Improvements - Midwest City, OK*
- *Benton County Sheriff's Office Public Sewer Improvements, Warsaw, MO*
- *Branson West Marine Public Water & Sewer Relocation, Branson West, MO*
- *Evan-Brook 7th Plat - Raymore, Missouri*
- *Alexander Creek Interceptor Sewer Improvement, City of Raymore, MO*
- *Family Housing Water Main Replacement, Whiteman Air Force Base, Knob Noster, MO*
- *Grain Valley North Interceptor Line D, City of Grain Valley, MO*
- *Grain Valley North Duncan Road Water Main Extension, City of Grain Valley, MO*
- *Grant Ave. Water Main Relocation & Sanitary Sewer Relocation, Fort Leavenworth, KS*

TOM INGRAM P.E., Senior Engineer, VE Team & Design. Mr. Ingram has 33 years of design and analysis for infrastructure improvements in multiple municipalities. The aspects of design, research and analysis include basic pressure and gravity flow analysis of pipelines and pipe systems, drainage inlet analysis, watershed and sewerage-shed hydrology and flow generation, detention and retention, design of Best Management Practices, cost-estimating and cost-benefit analysis, flooding and open-channel analysis of floodways, preparation of administrative and technical specification documents for bidding construction projects. Tom will assist with review of design and construction documents.

REPRESENTATIVE PROJECT EXPERIENCE:

- *City-Wide Water Main Replacement - Osceola, Missouri*
- *Water Distribution Study - Osceola, Missouri*
- *Multiple commercial and residential developments including waterlines*
- *Various Sanitary Sewer Improvements - Warsaw, Missouri*
- *Wastewater Treatment Facility Upgrades - Warsaw, Missouri*
- *Watermain Replacements (3) - Kansas City, Missouri*
- *Watermain Replacements Edwardsville & Wyandotte County, Kansas*
- *Longview Road Waterlines & Sewers - Kansas City, Missouri*
- *Maplewoods Waterline - Kansas City, Missouri*

CHARLES SULLIVAN P.E. Project Engineer, VE Lead and Construction Administration. Mr. Sullivan joined CFS in 2016 bringing 28 years MoDOT and 7 years IDOT operations and project development experience. While with MoDOT he held management positions of Resident Engineer, Area Engineer, Project Manager and Assistantant to the District Construction Engineer. Throughout his entire career Mr. Sullivan has worked on multiple teams. These teams were comprised of city, county, state and federal transportation officials coming together to plan and implement projects in areas of transportation design, construction and maintenance. Charles will lead the Value Engineering Team.

REPRESENTATIVE PROJECT EXPERIENCE:

- *Commercial & Truman Dam Access Intersection Improvements – Warsaw, Missouri*
- *Bledsoe Ferry Trail Improvements - Warsaw, Missouri*
- *Benton House & Osage Bluff Roads – Benton County, Warsaw, Missouri*
- *MoDOT Route OO & Route UU - Boone County, Missouri*
- *City-Wide Water Main Replacement - Osceola, Missouri*
- *Highway 76 Master Plan - Branson, Missouri*
- *South Liberty Road Low Water Crossing - Cole County, Missouri*
- *Spirit of 76 Waterline Improvements- Branson, Missouri*
- *On-Call Inspection Services - Clay County, Missouri*

ELLIOT DUENOW - ENGINEERING INTERN - Mr. Duenow joined CFS in 2015 as an Engineering Intern. He is a graduate from Missouri University of Science & Technology. Before coming to CFS, Mr. Duenow gained experience with estimations, concrete design, site layouts and designs, land development, and project management. Since joining CFS, Mr. Duenow has collaborated and planned design and construction phases on complete streets, intersections, water main, sewer mains, storm sewer and trails. He has primarily been responsible for private development and transportation projects. He has also evaluated and facilitated data to produce GIS Mapping in order to strengthen projects. Elliot will provide design, plan development, easements, quantities and other duties as needed.

REPRESENTATIVE PROJECT EXPERIENCE:

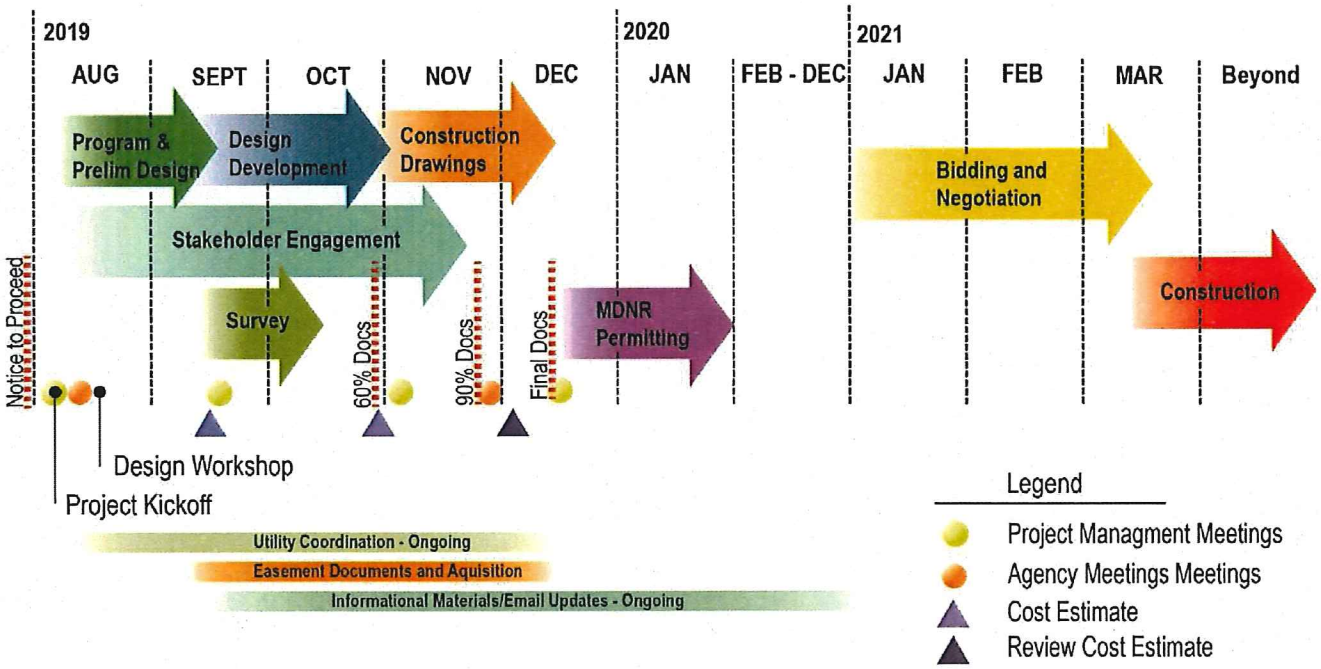
- *Bethel Estates of Gardner Public Water and Sewer Improvements - Gardner, KS*
- *Estates at Midwest City Public Water and Sewer Improvements - Midwest City, OK*
- *Benton County Sheriff's Office Public Sewer Improvements, Warsaw, MO*
- *Branson West Marine Public Water & Sewer Relocation, Branson West, MO*

PROJECT SCHEDULE

While a specific deadline for project completion has not been established, we understand the goal is to have design and construction documents completed and approved through MoDNR prior to funded construction in 2021. While this allows for approximately 17 months to complete the design process, it has been our experience that focused, diligent project development better serves all parties, minimizing scope slide and eliminating design fee overruns. It is our intent to compress design and document preparation delivery allowing a maximum backend time for MoDNR permit review and approval, and easement acquisition. CFS will make every effort to expedite the preparation of the preliminary plans, easement documentation and bid documents. We have prepared the following schedule based on the proposed scope of services and would anticipate the project taking six to nine months to complete depending on time required for MoDNR approvals and easement acquisition.

Detailed discussions about each phase of the project schedule is provided in the section of this proposal with the heading "HOW PROJECT IS TO BE COMPLETED - PROJECT APPROACH". This section of the proposal includes discussion about Data Collection, Conceptual Design, Preliminary Plans, Easements, Final Plans, the Bidding Phase and Construction. We would anticipate the Construction Phase to begin in early 2021 be completed by the end of summer.

Throughout the duration of this project, our Project Manager will meet weekly with the City's Project Manager to discuss the details of how the project is progressing, review data collected, and work performed and determine what additional information and assistance is needed. On a monthly basis the Project Manager will provide a schedule of expectations for the coming month. At the end of each month, a progress report will be provided. The Project Manager will work with the City to establish dates and times for meetings and send notices to the appropriate personnel when required.



The 5 project examples where schedules and expectations were met are those listed under "PAST PROJECTS ON BUDGET AND SCHEDULE" in this proposal. The various methods used to maintain schedules are discussed in that section.

PAST PROJECTS ON BUDGET AND SCHEDULE

1. Sanitary Sewer Main Influent Lift Station Improvement - *Warsaw, Missouri*

CFS provided a preliminary engineering report, design and construction documents and part time construction administration for improvements to the city's main influent lift station. The existing lift station has adequate capacity; however, the pumps had flooded on occasion leaving the system inoperable and creating major issues for the city. Maintenance of the existing lift station requires staff to work in a hazardous environment and clogging has also been an issue with the pumps.

Warsaw experiences significant I&I, such that it was cost prohibitive to install a new lift station capable of handling flows in excess of 4MGD. The wastewater treatment plant can only process about 900,000 gpd, with the remainder of the I&I flows pumped to the existing storage lagoons. The City had a **budget** of about **$400,000** for solving problems at the lift station. Options were looked at for retrofitting the existing lift station with 3 new submersible pumps on rails, but after exploring this option with several pump companies, it was determined that the configuration of the wet well was prohibitive and the cost too great to achieve the desired results. The solution that CFS came up with was to install a new package lift station capable of handling up to 1MGD, with the excess overflow gravity feeding back to the existing lift station during times of severe I&I. This improvement should allow the new lift station to handle most daily flows, while the existing lift station will occasionally pump excess flows to the lagoons and then to the treatment plant when flow levels subside.

*To establish and control project budget estimates and costs, CFS worked with several companies to gather information about the operation, benefits and costs of numerous package lift stations. Bids from similar projects were compared. Meetings were conducted with sewer plant operator, utilities superintendent and city staff to work out an affordable solution. The winning bidder was awarded the project for **$375,958.** CFS scrutinized the awarded contractors bid and found a **$2,000 deduction**. There have been **no change orders** and the project is scheduled for completion in July of 2019.*

2. City-Wide Water Main Replacement - *Osceola, Missouri*

CFS prepared the engineering study, design and construction documents to replace all of Osceola's water line facilities (approximately 11 miles). This includes a new well supply and telemetry system, raised standpipe, site work for Well #3, concrete storage tank, induced draft aerator, meters, booster pump station, chlorination modifications and electrical improvements. The project consists of 5,000 feet of 8" Water Main Pipe, 32,125 feet of 6" Water Main Pipe, 20,110 feet of 4" Ductile Iron Water Main Pipe and 1,640 feet of 2" Water Main Pipe. Construction will be completed in early July of 2019.

CFS identified State funding for the City to cover the cost of the entire project. Our team coordinated meetings with state officials, assisted with the grant applications, handled paperwork to ensure the funding requirements were met, and has provided full-time inspection and construction administration.

*The project budget estimate was **$4.75 Million.** To estimate the project costs, CFS reviewed bid tabulations from recent water projects and contacted multiple vendors and contractors to determine budgetary costs for various system improvements. CFS looked at the site conditions to consider if there would be constructability or access issues that would affect the costs. CFS prepared the bid documents which included Alternates and Add Alternates to allow flexibility to add or drop alternates to stay within budget. The awarded contractor's bid was **$4,570,753.** Additions to the project that were requested by the City during construction adjusted the final project cost to $4,848,905. Close monitoring of construction allowed CFS to remedy issues as they arose and avoid change orders.*

3. American Reinvestment and Recovery Act (ARRA) Projects - *Warsaw, Missouri*

As City Engineer for Warsaw, CFS assisted the City in obtaining ARRA funds from multiple state and federal agencies. With the aid of CFS, Warsaw received the 3rd largest ARRA funded project in Missouri. Once funding was approved, CFS had **6 weeks** to complete plans on four separate

projects with a **total budget of $4,273,900.** CFS was able to complete the project within this time frame in large part to our extensive knowledge of the city's sewer system and wastewater engineering experience. CFS had provided video inspection and review of sewer mains and manhole inspections, preliminary planning and conceptual design prior to the City receiving funding. *To expedite the schedule and control engineering costs, CFS utilized previous survey information and aerial imagery to begin the design, while additional survey was being performed where needed.* The project required great coordination and a large task force to get the project completed within 6 weeks. This project included over 3.6 miles of new sanitary sewer through, slip-lining 4.0 miles of sanitary sewer, 58 manholes, 64 point repairs, 115 manhole repairs and converting the sewer treatment facilities to U.V. disinfection. Additional projects included a new maintenance building and a channel realignment and bank stabilization of the Town Branch Creek. The project was completed in late 2010.

CFS was responsible agency coordination & permitting, engineering design, survey, geotechnical, construction administration and inspection. **CFS' construction cost estimate was $3,722,270.48, with final construction costs for the combined projects completed at $3,680,121.10.** Total final costs including engineering, inspection and administration was **under the overall budget**. *Extensive coordination, thorough examination of the project locations and video inspections, communication with product representatives, comparison of bids for similar projects and excellent construction administration helped to track, manage and control the project budget.*

4. Shoal Creek Parkway Waterline Improvements - *Kansas City, Missouri*

This project included design of 1/2 mile of 16" water line to be constructed by the Kansas City, MO Water Services Department. The project started at the intersection of Harrison Street and Shoal Creek Parkway and extended east along the proposed Shoal Creek Parkway to Maplewoods Parkway. CFS completed design of this water line project in conjunction with the Shoal Creek Parkway roadway improvement project. CFS was responsible for all aspects of project coordination, including survey, utility coordination, easement and right-of-way document preparation and coordination, water line design and plan preparation, and project cost estimation.

CFS' Original Construction **Cost Estimate was $514,000**. The Construction **Contract was awarded for $406,628** and there were **no change orders**. *During the design process CFS looked for ways to minimize costs by optimizing manhole locations and value engineering the design to reduce the overall material and trenching quantities.*

5. Sanitary Sewer Extensions along Commercial Street and Jefferson Street - *Warsaw, Missouri*

CFS provided permitting, surveys, easement documentation, and design for two gravity sewer extension projects let in combination for the City of Warsaw. Project A included 510' of 10" pipe and 105' of 4" pipe, 3 manholes, tree removals, service connections, pipe encasement and waterline adjustments, as well as stub outs for future extension. Project B included 311' of 10" pipe, 3 manholes, 6 service connections, tree removals, ditch lining and extension of a drainage pipe.

The City had a **budget of $90,000 and the low bid for the combined projects was $59,152.51**. *CFS performed thorough site inspections to identify obstacles and determine the best path for the sewer mains. CFS designed the project by selecting alignments that minimized costs and easement needs. CFS assisted the City with acquiring easement donations. CFS also provided very detailed information to the bidders in the bid documents and during the pre-bid meeting. A local contractor was the low bidder and CFS worked closely with them through construction to ensure that the project went smoothly and according to schedule.*

QUALITY ASSURANCE/QUALITY CONTROL

Controlling costs, providing superior quality and meeting project deadlines require dedication and attention to detail. For this project we will prepare QA/QC checklists for various milestones and deliverables that we will share with the City and provide updates at each phase.

CFS Quality Assurance Program has developed into a five-step process and includes (1) project pre-planning, (2) monitoring of document production, (3) technical review and checking, (4) coordination check, and (5) independent Quality Assurance Review.

1. Project Pre-Planning – At the start-up meeting the Project Manager, Project Engineers, Consultants, and the Quality Assurance Manager shall establish criteria, which will be used to evaluate performance on the project. These criteria would include but not be limited to:

a) Scope of services to be provided
b) Construction budget as applicable
c) Time schedule
d) Man-hour allocations for each phase of work
e) Milestones for project review
f) Special City requirements – City of Branson Technical Specifications & Design Criteria

2. Monitoring of Documentation - The flow of information between the City and CFS is critical to the success of the project. The Project Manager will coordinate interaction between the City and team members working on the project. Decisions which are made during the development of the project will be documented in the form of email, telephone contact reports and meeting minutes. Any changes made during the process will be thoroughly checked for conflicts with other portions of the work.

3. Technical Review and Checking - During this document process, the Project Engineers shall review each drawing for content and completeness. A checklist is issued to review general aspects of the drawing completeness. They compare the requirements of the project to the Design Documents, Drawings and Specifications, which have been produced for technical consistency.

4. Coordination - Coordination checks will be conducted by the Project Manager and will involve Project Engineers and Technicians. This will be a total project review to ensure that all technical requirements have been met and that system interfaces and conflicts have been resolved.

5. Quality Assurance Review - When the design is complete, a Quality Assurance review will be conducted. The Project Manager will present the plans and specifications to the Quality Assurance Manager for review. This person will act as an independent reviewer with the technical expertise and project familiarity to competently review each aspect of the design.

Quality Control reviews are conducted by the Project Manager and by a "second eyes" review team of members not regularly associated with the project. The design team gives a presentation of the project to the review team for subsequent review. The QC team then relays comments to the Project Manager. Formal quality control sessions are generally conducted at the following milestones:

- Preliminary Engineering Reports and/or Conceptual Design
- 30% Construction Documents
- 60% Construction Documents
- 90% Construction Documents
- Final Construction Documents

The typical Quality Control Process will be as follows:

1. Receipt of project definition documents (Scope, Owner Requirements, and User Needs).
2. Develop requests for clarifications to project definition documents.

3. Pre-design conference (clarifications received).
4. Internal project planning meetings.
5. Site visits/User interviews.
6. Preliminary Study Phase.
7. Internal QA review.
8. Submit project engineering documents.
9. City review.
10. Internal project planning meetings.
11. Site visits.
12. Final design phase.
13. Internal QA review.
14. Submit 90% documents.
15. City review.
16. 100% design phase.
17. Internal QA review.
18. Submit 100% documents.
19. Project close-out meeting (lessons learned).

As QA/QC pertains to the **conceptual phase**, several aspects will be Value Engineered. Tentative alignment layouts will be reviewed for proper separation between water and sewer and other utilities. Impacts to properties and approximate costs will be determined and scrutinized for alignment adjustments that would minimize impacts and provide potential costs savings. This will include the location and need for manholes, control valves, pressure relief valves, hydrants, etc.

The **design phase**, QA/QC begins with the survey. The team leader will have the field survey and base mapping verified for completeness and that features are called out correctly. A review of land lines and ownership information will be compared with property plats and deeds for accuracy.

Horizontal alignments will be checked for criteria such as deflections, bends, thrust restraints, separation from other utilities, separation from tree lines, slope and terrain conditions, relative location to existing contours, minimal skews at road crossing and allowance for future expansion.

Review of the proposed sewer and waterline profile will include a check of compliance with minimum and maximum depths of cover, minimum slopes, encasement where required, and a check of allowable deflections. Roadway crossings will be checked for depth requirements and limits of encasement as well. Profiles will be reviewed to determine if and where pressure relief valves should be placed. Empire/Liberty and White River Electric as well as other utility companies will be contacted to determine what constraints and limitations may affect the sewer and waterline routes.

Cost estimates at each phase of the project will be reviewed and compared with similar projects and recent bid tabs. We have access to multiple bid sites that allow us to compare the costs of similar projects and our cost estimating is performed by senior engineers with the appropriate experience. Bid Documents and Specifications will be reviewed for clarity, consistency and conformance to industry standards by an assigned member of our Construction Administration Team that specialize in ensuring projects are constructed according to the plans and specifications.

HOW PROJECT IS TO BE COMPLETED - PROJECT UNDERSTANDING

We have reviewed material provided by the City, studied the projects sites through aerial imagery and visited the sites to observe the current conditions and potential challenges for these sewer and water projects. We have also met with City staff to gather further insight into the scope of the project. We understand that the City has new aerial LIDAR that will be available, and that supplemental surveying will likely be needed to pick up existing utilities, property information and other details. Public engagement will be minimal. The consultant will be required to acquire the environmental permitting from MoDNR, write easement and right-of-way descriptions and provide part-time construction administration. No geology will be required, and all excavation and trenching will be unclassified. There are a lot of utilities in the area including Summit Natural Gas, phone, cable, White River Electric and Liberty Utilities/Empire District. The projects will likely be let in combination.

Lift Station 17 Forcemain replacement. The City shared their desire to maintain 3,000 gpm flows for the proposed forcemain and to utilize existing City right-of-way and power line easements as much as possible to minimize the need for new easements. We understand that funds will be available in 2021 and the project should be ready to bid for that schedule. A ductile iron forcemain is preferred, but C-900 PVC will also be considered. The pipe will be sized to meet the 3,000 gpm requirement. The force main rises in elevation by about 158 feet between the lift station and the tie in at Dakota Road. The existing lift station is in good condition and does not need upgrading. The proposed forcemain alignment heads eastward from the lift station at the north end of Thelma Doyle Drive along an existing power line easement to S. Falls Avenue, then turns northerly along the roadway to Falls Parkway. At Falls Parkway the alignment turns right and then continues northward to about 360 feet north of Meadows Avenue, then turns eastward along another power line easement to Blue Meadows Road. At Blue Meadow Road the alignment heads northward and runs along the roadway until it connects with the existing sewer main at Dakota Road. The profile of the existing ground along the proposed alignment has two areas (potentially a third) where there are high spots requiring air release valves. These are where Falls Parkway crosses Meadows Avenue and where the proposed alignment exiting the power line easement connects with Blue Meadows Road.

Spring Creek Neighborhood Water System Upgrades. The Spring Creek Neighborhood had a contaminated well when the City connected them to the public water supply. At that time, the City provided a 2-inch main to the master meter at the well. From the well, waterlines are private and meander about the neighborhood with private meters in the lots. New water mains are needed along Spring Creek Road extending from about Residence Lane southward past Hickory Drive, with lines down Lilac Drive, Park Drive and Hickory Drive. New waterlines should loop and connect with existing watermains to the west. New meters are to be set at the property lines and new services will be installed under a separate contract or possibly as an Add Alternate.

Spring Creek Neighborhood Sewer System Upgrades. The Spring Creek sanitary sewers are not having issues but should be replaced when the water lines are installed. The sewer mains will most likely be located on the opposite side of the street as the watermains but should maintain at least 10' of separation. The existing side streets are in very poor conditions with open ditches.

HOW PROJECT IS TO BE COMPLETED - PROJECT APPROACH

Data collection. CFS will review LIDAR mapping, GIS & all topographic features such as edges of pavement, curbing, drainage structures, drainage features, trees, ditches, driveways, buildings, fences and utilities to ensure that all information is accurate. We will contact utility companies to get mapping & information for underground utilities, existing easements & restrictions and discuss ability to share and locate within existing easements. We will also review GIS mapping to identify right-of-way, property lines, easements and land information. Lift Station 17 existing plans and hydraulic data, pump info, etc., as well as existing sewer and water plans for location of proposed connection to the existing systems will be studied. Our team will meet with city to discuss all information collected and determine what is current & accurate and what updates or additional info is needed. At that stage, our subconsultant local surveyor will acquire additional field and record information as needed.

Conceptual Design. Utilizing LIDAR, GIS and aerial mapping, tentative routes will be established for the sewer force main from Lift Station 17 to existing gravity sewer connection, and water distribution lines and sewer collection lines in the Spring Creek Neighborhood. We will determine approximate extent of land disturbance, linear feet of sewer & water, manholes, valves, air release valves, hydrants, service connections, street repairs, pipe encasements, driveway repairs, thrust blocks and other incidentals to prepare preliminary estimates for each project. MoDNR will be contacted to research hazardous sites and underground storage and to establish all the required submittals and time for review to get permits for the water & sewer expansion in Spring Creek if land disturbance permit is warranted. Engineering Reports (Facility Plans) for MoDNR will be submitted early. We will meet with city to discuss the proposed and alternate alignments, the costs and benefits of each and modify them as needed to agree upon the proposed alignments to proceed with.

Preliminary Plans. Preliminary Plans will be prepared along with quantities and construction cost estimates. Where possible, we will adjust the alignments to minimize damage to trees. All existing signs, mailboxes, fences and other features that require removal and replacement or adjusting will be noted on the plans. The width of the pavement repairs will be delineated on the plans. Where existing utilities cannot avoid being crossed, we will get the line potholed for elevations to see if there is a conflict going under/over it, or if it requires adjustment. Proposed easements will be shown on the plans. When Preliminary Plans are completed, our QA/QC will review the plans, quantities and estimate. Our Value Engineering Team will also provide a thorough review to determine if cost savings and/or lesser impacts can be implemented. Plans will then be revised and submitted to the City for review and comment, along with documentation from the QA/QC and VE Teams.

Easement Documents. Once preliminary plans are approved, a Registered Land Surveyor will oversee the preparation of exhibits and legal descriptions for all easements needed for the water and sewer lines. Ownership and encumbrances reports should be obtained for each property requiring permanent easements to identify existing easements and current ownership. If needed, our local surveyor sub will also stake easements for the property owner's benefit. CFS will review these

documents for a second check before providing to the City. CFS will follow up with MDNR to ensure permitting has been cleared or is on track before proceeding with Final Plans.

Final Plans. Final Plans will be prepared to refine the details for the plans and documents such as water valves, air release valves, reducers, tees, hydrants, meters, thrust blocks and trenching and bedding details. Details for type and size of replacement fencing, encasements, pavement and material mix designs, restoration of properties, seed, mulch, sod, driveway repairs, mailbox replacement or resetting details, new signage (if needed), drainage structures and culverts. Details for the force main connection and fence repairs at the lift station will be included.

A VE Study will be performed prior to final plan completion to look for cost savings and added benefits for the projects. CFS will update cost estimates and depending on project construction cost estimates and the budget, additional improvements could be included to enhance the project such as:

- grading of ditches in neighborhoods to better handle storm water runoff
- paving neighborhood streets that are in very poor condition (see photo to the right)
- new street signage (if needed)
- trimming or clearing trees and overgrowth that obstruct sight distance

Temporary sediment and erosion control plans will mostly involve ditch checks, silt socks and seed and mulch. Temporary traffic control plans will include flagger control for road crossings and signage where construction is close to roadways. Trenching across roadways would require one lane to be closed at a time. Metal plates could be used for covering the roadway trenching or the trenches could be backfilled and compacted with aggregate that could be partially removed later when pavement repair and paving is performed.

The City of Branson's Standard Technical Specifications will be utilized and supplemented as needed. An estimate of the working days for the contractor will be prepared, discussed with City staff and modified as needed. CFS will assist the City with preparing contract documentation as required. CFS will conduct a QA/QC of the final plans and construction documents and provide documentation to the City with revised plans, specifications, estimates and construction documents.

During the bidding process, CFS will answer bidder's questions, provide addenda and assist the City as required. CFS will provide information and assistance for pre-bid meetings, pre-construction meetings and project startup meetings. CFS will review shop drawings, material certifications, pay applications and other submittals by the contractor as required under the Scope of Services.

We will assist the City in the resolution of any issues that arise during construction and can provide part-time inspection and testing as needed. CFS with help with a final inspection of the project and developing a "punch list" of items for the contractor to rectify. CFS will prepare and assemble as-built drawings and shop drawings of the final constructed project.

Client References are listed as follows:

City of Warsaw, Missouri
181 W. Harrison, PO Box 68
Warsaw, Missouri 65355
Randy Pogue, City Administrator
(660)-438-5522

City of Osceola
210 Olive Street, PO Box 561
Osceola, Missouri 64776
John Fontana
(417) 646-8421

City of Kansas City, MO Water Service Department
4800 East 63rd Street
Kansas City, MO 64130
Reza Zonnooz, Project Manager
(816) 513-0309

City of Lebanon, Missouri
1401 W. Commercial Street
Lebanon, Missouri 65536
Richard Shockley, Public Works Director
(417) 532-2156, Ext. 1360

City of Raymore, Missouri
100 Municipal Circle
Raymore, Missouri 64083
Mike Krass, Public Works Director
(816) 892-3022

VALUE ENGINEERING

The Value Engineering Team will consist of Senior Engineering Staff with design and construction experience combined with City staff during several phases of the project. A workbook and documentation process that suits the City's needs will be established at the start of the project. A VE Study Report will be presented to the City and design time at the end of each phase of the project.

During the Conceptual Phase, Value Engineering will be conducted on the alternate alignments to determine, which is best suited for the new waterline and sewer. Alignments will be looked at for overall cost, ease of access during construction, environmental impacts and future maintenance concerns. A site visit will be included for all VE sessions. The alignments of the proposed forcemain, waterlines and gravity sewers will also be looked at for ease of future access and maintenance. Alignments will also be scrutinized to minimize the amount under existing utilities, drainage structures and pavements for less future maintenance and replacement costs.

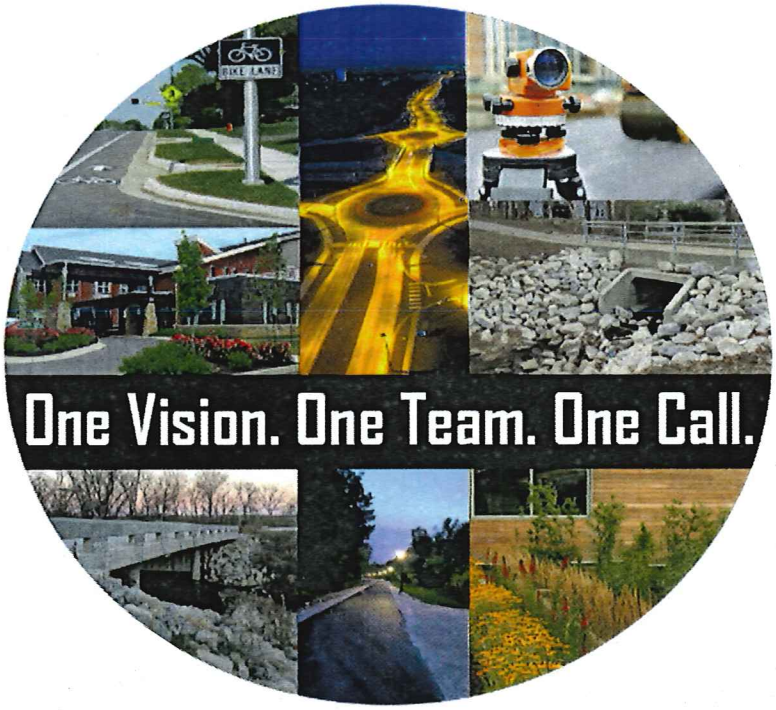
At Preliminary Plans, Value Engineering will again be performed to see if changes to improve the design could provide costs savings, less easement needs or time savings. At this stage, the overall footprint of the alignment is set, but minor adjustments to the profile and alignment will be considered, as well as the location of sewer and water appurtenances such as manholes, hydrants, valves, etc.

At Final Plans, we will look at additional ways to realize cost savings, such as materials being selected and consider whether it is advantageous to have the rock excavation crushed and reused. The VE Team will look at constructability and construction issues, maintenance of traffic, bid ability, alternate materials and opportunities for alternate bidding or add alternates. The VE Team will also scrutinize the construction phasing to determine if adjustments will make construction more efficient and save time.

OTHER RELEVANT INFORMATION

CFS has provided engineering design for 76 Country Boulevard waterlines as well as Master Planning for 5 miles of the Route 76 corridor. We have also provided engineering design for multiple development projects within the city. Our management and design team has worked with City staff, you know us, and we know the Branson area well. Our Project Manager lives here, and we are very familiar with this project's limits and surrounding area. We are very knowledgeable of the City's design criteria, specifications and project deliverables.

We are committed to providing the City of Branson with a very experienced senior design and management team for this project. We will contract with a local surveyor (we have relationships with several) to provide topographic surveys, property information, easements and staking as needed.



CFS
cfse.com
ENGINEERS