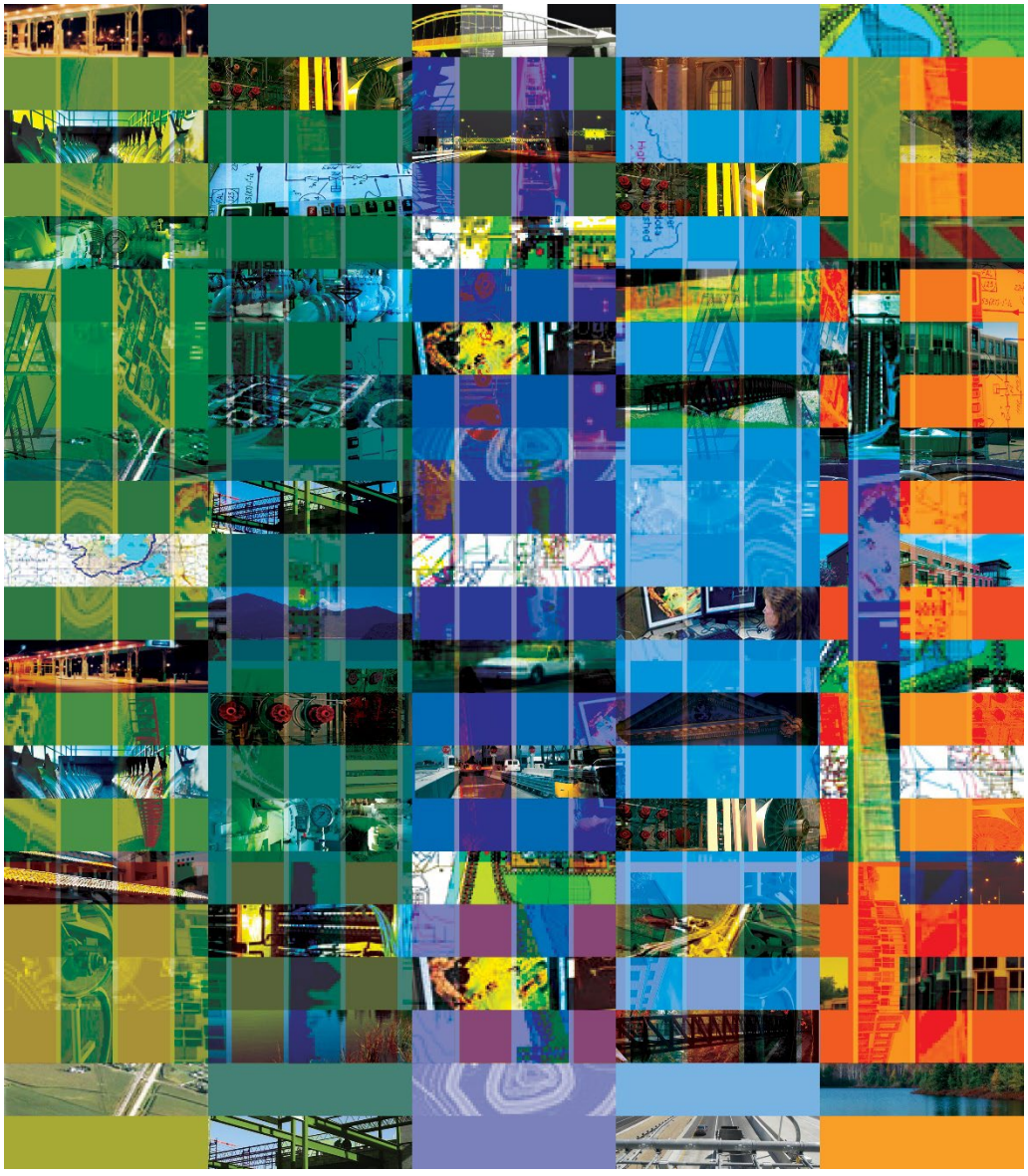
Professional

Engineering

Services

Water Plant Expansion and Replacement



Statement of Qualifications

Village of Ashville, Ohio

March 14, 2022

STRAND ASSOCIATES®

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Strand Associates, Inc.®
425 W. Nationwide Boulevard, Suite 100
Columbus, OH 43215
(P) 614.835.0460

March 14, 2022

Mr. Franklin Christman, Village Administrator
Village of Ashville
200 East Station Street
Ashville, OH 43103

Re: Statement of Qualifications for the Water Plant Expansion/Replacement

Dear Mr. Christman:

On behalf of Strand Associates, Inc., thank you for the opportunity to submit our Statement of Qualifications (SOQ) for Professional Engineering Services for the Villages Water Treatment Plant Expansion/Replacement project. We believe that our experience with the Village and experience with similar projects makes us the right firm for the Village to team with to deliver this important project.

We are very interested with continuing our working relationship with the Village. We are also truly interested in this project and the impact it will make for the Village and the surrounding area. As shown in our Project Understanding, our active presence in the Village since 2015, discussing the future of your water treatment facilities, helps us to efficiently and accurately address your water system needs.

By selecting our Firm, the Village is supported by the following:

- **Our Understanding and Approach to your project achieves regulatory approval and construction of new facilities in a timely manner to meet future water system demands.**
- **Our firm brings over 76-years of organizational strength, stability, and commitment to quality within close proximity to the Village.**
- **Our qualified team brings the necessary experience to rehabilitate and replace aged water treatment facilities in a way that improves upon the value of your water system and level of service.**
- **Our engineering value is demonstrated through projects that are successfully completed on time and budget, resulting in long-term success and operability for the Village.**

The enclosed proposal outlines how these benefits will materialize with our approach and commitment to the Village's success. Thank you again for the opportunity to submit this proposal. Please call if you have questions or need additional information regarding this submittal.

Sincerely,

STRAND ASSOCIATES, INC.®

Brian Hackman, P.E., P.H., BCEE
Project Manager

Jamie Mills, P.E.
Client Liaison

Firm Profile

Seventy-Six Years of Service Signifies Organizational Strength, Stability, and Commitment to Quality

We at Strand Associates, Inc.® (Strand) have been providing exceptional civil and environmental engineering services to our clients since 1946. We attribute our organizational strength and stability to our talented engineers, effective management, and, most of all, commitment to nurturing long-term client relationships.

Through trust, reliance, and professional relationships, our clients have enabled us to achieve 76 years of excellence in engineering.

Our designs have gained local and national acclaim and our firm has consistently been included in *Engineering News-Record's* list of the Top 500 Design Firms; **our current ranking is 178.** Our areas of specialization include the following:

- Water supply engineering
- Wastewater treatment and conveyance
- Stormwater management
- Building/facility engineering, architecture, and sustainable design
- Natural gas distribution
- Ecosystem study and restoration
- Surveying and right of way acquisition
- Construction-related services
- Transportation engineering
- Civil and municipal engineering
- Electrical and HVAC engineering
- Wetland delineation, mitigation, and restoration
- Aviation
- GIS and mapping
- Land development
- Funding assistance

RANKED 178th IN THE NATION
TOP 500 DESIGN FIRM 2021
by Engineering News-Record

Proximity of the Client Liaison Ensures Responsiveness to the Village's Concerns

To serve our national client-base effectively, we have 12 offices throughout the country. Our Columbus, Ohio office, located at 425 West Nationwide Boulevard, Suite 100, will be responsible for project coordination as it has on our past projects with the Village Jamie Mills, as client liaison, will support Brian Hackman, as project manager, in communication with the Village. Jamie Mills has served as manager on projects with the Village and has developed relationships with Village staff which will benefit this project. The project will also be served by other Strand offices. We will utilize virtual platforms for meetings amongst the internal team, which was standard practice for us even before the onset of the COVID-19 pandemic, to minimize travel costs. Additionally, the team members identified from other offices are actively working on other projects throughout Ohio which will allow us to coordinate travel with this project further minimizing costs should travel be needed.

Office Location of Work:
Strand Associates, Inc.®
425 Nationwide
Boulevard
Suite 100
Columbus, OH 43215

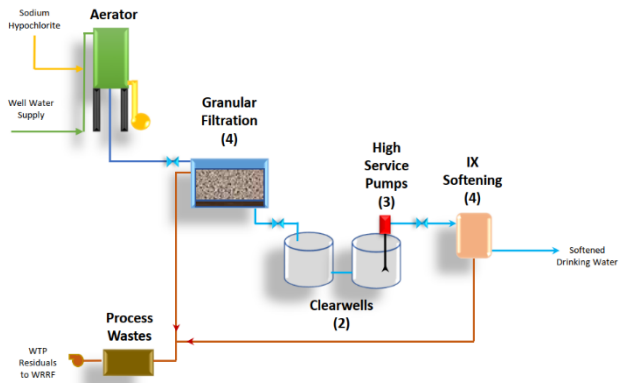
Client Liaison:
Jamie Mills, P.E.,
(614) 835-0460
Jamie.Mills@strand.com

Key Personnel	Location	Years with the Firm
Project Manager – Brian Hackman, P.E., P.H., BCEE	Madison, WI	23
Client Liaison - Jamie Mills, P.E.	Columbus, OH	7
Quality Control Engineer – Scott Stearns, P.E., BCEE	Madison, WI	29
Lead Process Engineer - Andrew Esarey, P.E.	Louisville, KY	14
Mechanical Engineer - Christopher Wright, P.E.	Madison, WI	9
Electrical Engineer – Shane Zenz, P.E.	Madison, WI	33
Structural Engineer - Elizabeth Dienst, P.E.	Lexington, KY	19
Residual Handling Engineer – Matthew Smith, P.E.	Columbus, IN	18
Surveyor - Brian Oyer, P.S.	Cincinnati, OH	3
Funding Coordinator - Kristopher Ruggles, P.E., SI	Columbus, OH	16

Project Understanding

Our Understanding and Approach Achieves Regulatory Approval and Construction Of New Facilities In A Timely Manner To Meet Future Water System Demands

Over the last six years we have attended Village Council and Committee Meetings to remain engaged with Village needs regarding the Water Treatment Plant. We have met with Village Staff specific to this project; taken several walking tours of the existing water treatment plant to better understand the existing conditions and the Villages treatment preferences, submitted three proposals for water treatment plant improvements and operational needs reviews; and have had countless conversations specific to this project. We have done this to best prepare ourselves to develop this proposal to specifically showcase our understanding and abilities because we want to help the Village make this project a success.



Village's General WTP Schematic

The Village of Ashville owns and operates a ground water treatment plant (WTP) with a capacity of 0.660 MGD. The WTP was originally built in 1934 and was expanded in 1948 and again in 1970. Further WTP improvements were provided after 2001. The WTP is supplied water via three ground water wells. Two wells were developed with the original WTP and are located at the WTP site. The third well, which is also the largest, is artesian and capable of supplying approximately 1,100 GPM. The artesian well is located south of the Village near Walnut Creek.

Raw ground water from the supply wells is pumped to the WTP and flows through an aerator to oxidize iron and manganese. It has been reported that the aerator has limited functionality due to equipment age so approximately 3.0 parts per million (ppm) of sodium hypochlorite is dosed at the aerator location to further oxidize iron and manganese. There are four gravity filter beds, two of the beds were original to the 1934 WTP and the other two were installed during the 1970 expansion. The filters were installed to remove iron and manganese from the groundwater ahead of the two clearwells that operate in series. The clearwells have been a challenge for operational staff to maintain, given the inability to isolate sections for inspections and repair for limited periods of time. Water is pumped from the clearwells via three high service pumps to four strong acid ion exchange tanks that were installed to remove hardness from the groundwater. Finished water that has been disinfected, filtered, and softened exits the ion exchange tanks to the Village's distribution system at approximately 1.0 pmm chlorine. Further WTP operating criteria is provided in the table below.

We understand the Village wishes to explore alternatives to expand its WTP infrastructure from an existing 0.660 MGD capacity facility to 1.2 MGD and expandable to a future of 2.0 MGD. The Village is anticipating significant growth in the near future with increased residential housing and commercial warehouses. The future growth is anticipated to require additional water supply infrastructure and an increase in treatment capacity of the existing WTP.

Criteria	Quantity
Design Capacity	0.660 MGD
Average Capacity	0.480 - 0.510 MGD
WTP Water Loss	12%
Iron Concentrations	0.15 mg/L
Hardness Concentrations	255 mg/L (Finished Water) 420 mg/L (Raw Water)
Manganese Concentrations	0.02 mg/L
Chlorine Usage	10 gpd
Free Residual	0.93 mg/L
Total Residual	1.56 mg/L
Regeneration Cycle	80,000 gal
Monthly Salt Use	26 tons/month

Village's General WTP Operating Criteria.

We understand the Village is in the process of installing a secondary artesian supply well at the existing artesian well location and wishes to demolish the two existing smaller supply wells located at the WTP site due to their age. The Village prefers to stay with ion exchange technology due to performance and operational familiarity but is open to other treatment technologies. The Village also wishes to have a water processing facility that preserves the Villages unique history and small-town feel, while also being energy efficient and aesthetically appealing as an extension of the Villages Community Park.

Given the current regulatory climate towards future discharge permits, The Village will need to understand the impact of the treatment processes on local streams and wastewater treatment facilities. Currently, the existing WTP discharges it residuals to the water resource recovery facility (WRRF) and the Village prefers to stay with this method of residuals handling. The current ion exchange process discharges a high concentration chloride brine which may be limited by future permit limits at the WRRF related to permitted total filterable residual (TFR) concentrations. Or, a reverse osmosis softening system may increase the need for additional wells and send additional flow to the WRRF, which may be bottlenecked to handle the additional capacity. To remedy this concern, we plan to engage the Ohio Environmental Protection Agency (OEPA) early in the process to determine and negotiate the details and expectations for permitting a new WTP. Following review of the existing site and anticipated capacity of a new WTP provided by the Village; it is anticipated that the size of the existing site should accommodate expansion of the existing WTP or construction a new WTP to an anticipated ultimate capacity of 2.0 mgd. Furthermore, the proposed one-year schedule for the project appears reasonable to be able to complete the Detailed Design Memo (DDM), provide funding assistance, provide preliminary and detailed engineering design, and permitting from April 25, 2022 through April 25, 2023.

From our familiarity with the Village and understanding it needs and preferences for water treatment; an alternatives analysis for improving the existing WTP or building a new WTP will be reviewed as part of the DDM as stated in the Villages Preliminary Scope of Services; setting the path forward for successful design, permitting, bidding and construction efforts. We understand the Village prefers to have a new WTP with emphasis on the listed features below, which are represented through our conceptual renderings:

- Exterior brick facade building walls with tall, tinted block windows.
- Process automation with control through a supervisory control and data acquisition (SCADA) system. SCADA system is intended to provide process control for the WTP and the associated water towers.
- Operation and maintenance friendly equipment and controls.
- A treatment alternative, from the list below, that improves upon the Village's level of service related to water quality.
    - Pretreatment for iron and manganese using gravity or pressure filters
    - Ion exchange softening
    - Membrane softening
    - Fluidized Bed Reactor Softening
- Desire to have two isolatable clearwell sections that connect to a single high service pump station with three pumps and operator flexibility to set the clearwells in series and parallel.
- Desire to have ultrasonic level sensor and no floats for level measurements.
- Desire to have a loading dock to new WTP from driveway that transverses through WTP from East Station Street to Gary Street (Alley) for deliveries.
- Interest in WTP to be Leadership in Energy and Environmental Design (LEED) Rated to provide increased sustainability, eco-friendliness, energy efficiency and cost savings. Anticipated energy efficient alternatives include a green roof for new structures, solar panels, light emitting diode (LED) lighting.
- Desire to preserve the Villages unique history and be aesthetically pleasing as an extension of the Villages Park.
- Desire to demolish the 1934 and 1948 portions of the existing WTP and repurpose and renovate the 1970 portion of the existing WTP as an educational center for the Village.
- Include Administration Building to include office, laboratory, meeting room, bathroom, locker room, and control room.
- Addition of roof canopy to connect the Administration Building and new WTP.
- Ability for the Village to understand the transfer of operations from the old to the new WTP, with observable 3D renderings of the new facility, for public review and comment.
- Approval of the project by OEPA to move into construction in 2023-2024.

We look forward to working with your Committee and the Water System operators to provide a comprehensive design that meets the Village's long-term needs.

Firm Qualifications

Our Qualifications Support Tailored, Proven Solutions Necessary for the Success of Your Water Treatment Plant Expansion/Replacement Project

Our 76-plus years of applicable corporate experience in water system planning and design extends throughout the region to include projects in Kentucky, Indiana, Illinois, Iowa, Ohio, West Virginia, Wisconsin, and Virginia. Our projects have included everything from relocations of existing water mains to complete planning, design, and construction administration for multimillion-dollar systems and treatment facilities.

As a long-standing, full-service engineering design firm, selecting Strand for this project results in a project that will successfully sustain the Village for many years to come.

The following are other services that we anticipate providing as part of this project:

- **General, Contingency, and Asset Management Plans** - Depending on the type of funding and agency, communities in Ohio, like Wilmington, Marietta, Portsmouth, and others that we have worked with, have a need to complete detailed reports beyond an Operational Needs Review (ONR) report. We have the capability to develop these plans to allow the Village to successfully obtain low interest funding for this project. We will use our funding approach to help identify if these additional services are required.
- **Water Rate Analysis -** If requested by the Village, we have the ability to evaluate the current water rate structure to understand the impact of the project towards future Village of Ashville water rates.
- **O&M Manual Development** - Depending on client and funding requirements, we can assemble the drawings and shop drawings into a complete process O&M manual for use by Village staff. These documents take manufacturer's shop drawings and O&M information and provide an overarching document that describes all the components of the facility in one resource.
- **SCADA-Human Machine Interface Development (HMI)** - Our electrical engineers have the ability to program in Wonderware SCADA HMI programs to update the screens and information presented to help operate the plant through the Village's new SCADA system. We also have the ability to help maintain or improve the WTP's Information Technology (IT) infrastructure, from servers, to network and cabling, to desktop computers throughout the facility.
- **Start-Up and Training Assistance -** Our construction documents typically call for the contractor to bring factory representatives on site to conduct commissioning and training on newly installed equipment. Like we have done for the Logan Todd Regional Water Commission in Rockford, Illinois, and other treatment facilities, we can prepare specific training presentation materials for group training at the Village's facilities to understand the entire, upgraded, WTP process.
- **Bench and Pilot Scale Testing** - Whether it is to understand how coagulants and polymers might work or designing facilities that are not currently allowed by OEPA, we have the capability to conduct and assist the Village through bench and pilot scale studies. For instance, in Cedar Rapids, we conducted jar testing to evaluate potential coagulant and polymer dosing for their facility to work with their new solids contact clarifiers. The end result of our study had a direct impact on the overall project. With our ability to confirm design parameters at the Village's WTP using bench and/or pilot scale testing, we can help prove the process will work prior to making a large financial commitment.

Our holistic asset management planning approach is centered on maximizing the Village's return on investment and meeting funding agency requirements

The Table below highlights some of our additional water supply qualifications that can compliment the Villages WTP Expansion/Replacement Project.

Other Water Supply Services

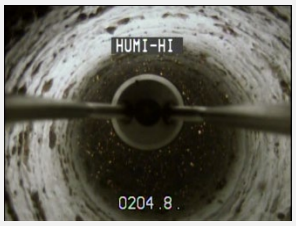
ADMINISTRATION

- Utility establishment
- Rate studies
- Agency coordination and permitting
- Intergovernmental and developer agreement review
- Consent order negotiations
- Vulnerability assessments and emergency response plans
- Asset management
- Public Relations and Public Meetings

Public Relations Support

SOURCE WATER

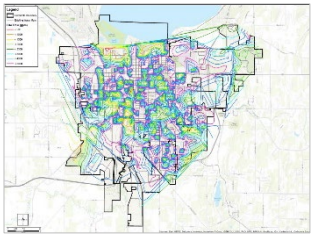
- Well siting studies
- Wellhead protection plans
- Shallow and deep aquifer well design and rehabilitation
- Easements and acquisitions
- Pilot studies
- Well system evaluations and design



Representative well survey video stills: well wall below production zone at 205-foot depth.

DISTRIBUTION SYSTEM EVALUATION AND PLANNING

- Survey and GIS mapping
- Hydraulic evaluations and investigations
- Water model creation and evaluation
- Demand and population forecasting
- Supply and storage capacity review
- Pressure zone evaluation and planning
- Condition assessments
- Pipeline route studies
- Pipeline replacement prioritization plans
- Water model training



Water System Model Results.

STORAGE FACILITIES

- Inspections
- Planning and design
- Glass lined, cast-in-place concrete, prestressed concrete, composite, steel, water spheroid design
  - Rehabilitation and repainting
  - Maintenance procurement
  - Code upgrades
  - Life-cycle analysis
- Tank Mixing

Strand designed elevated storage tank in Piqua, Ohio.

WATER MAIN DESIGN

- Capacity design
- Transmission main design
- Network planning
- Survey, easements, and acquisition
- Material alternative analysis
- Construction method alternative analysis
- Waterway, wetland, highway, railroad, and other challenging crossings
- Cathodic protection

Unique design challenges can be met using trenchless pipe installation.

OPERATION AND MAINTENANCE

- Storage facility inspections and rehabilitation
- Well and pump rehabilitation design
- SCADA system design and upgrades
- Automatic meter reading procurement
  - Unidirectional flushing plans

PUMPING FACILITIES

- Siting and permitting
- Hydraulic design
- Architectural design
- Mechanical, electrical, and structural design
- Equipment selection

SUSTAINABILITY

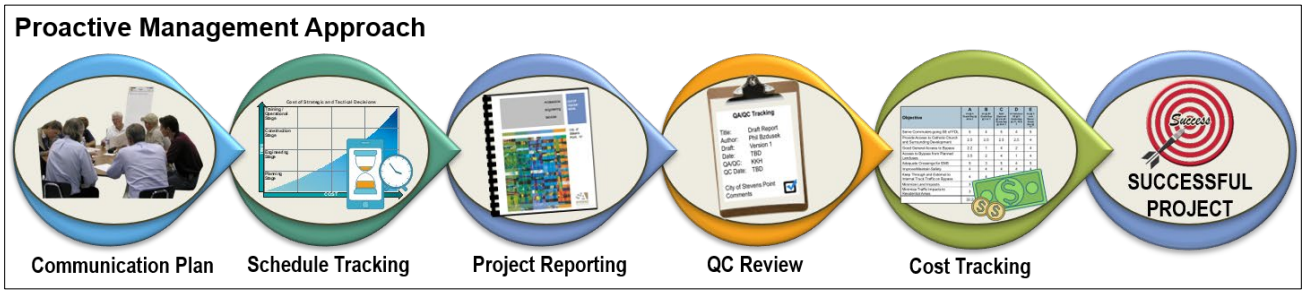
- Pump selection and optimization
- Variable Frequency Drive (VFD) retrofits
- System-wide energy evaluations
- Automatic meter reading procurement
- Pressure zone evaluation and planning
- Pump efficiency studies
- Comprehensive project delivery

PROJECT MANAGEMENT

Our Project Management Approach Provides Cost-Effective Improvements Designed and Executed Efficiently

We firmly believe that the foundation of project management is effective communication. This communication must be completely, vertically and horizontally integrated across a project team and include the Village, Strand, and our team. Decades of practice has proven that when the entire project team is communicating projects progress seamlessly. To be certain that valuable communication is happening, we rely on a combination of tools that enhance our Project Managers' inherent skills.

The figure below graphically illustrates the key components in our Project Management approach. This is not a linear process - each component is engaged repeatedly throughout the life of a project. Administering projects is much more than just meeting budgets and schedules. It is also about communicating, engaging, collaborating, and problem solving. Our project team has a long history of successful project management, and we encourage the Village to contact our references to verify the effectiveness and success of this management style.



Schedule Tracking Verifies the Availability of Staff and Identifies Potential Bottlenecks for Proactive Resolution

We can confidently state that the capacity and availability of our proposed project team will be able to deliver the project on schedule. We use a customized staff scheduling database for our employees, which serves as a tool to determine staff availability relative to project deadlines. This provides confidence that our team will not be overcommitted throughout the duration of projects. Our scheduling system is an integral part of our project management system, as it enables us to closely monitor the earned value of our progress in comparison to the remaining workload.

By utilizing our internal scheduling system to project current staff workload and upcoming project deadlines, we can determine if completing tasks or meeting deadlines for any specific project will become an issue, and we can reallocate internal efforts and resources, as necessary, before a concern becomes a problem.

Our Culture of Cost Tracking Results in Confident Planning and Low Change Orders

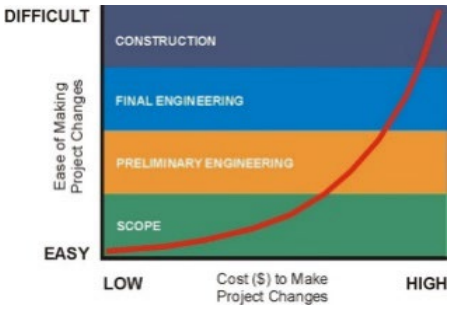
Controlling costs is a pillar of our corporate culture. Engineering cost tracking is a continuous process for every project. We understand that engineering fee adjustments can be difficult to justify to Village Management and Councils, and, therefore, we are careful to establish a fair fee up front and then commit to getting the engineering project done for that fee. Timesheets are completed daily, and project reports are reviewed each week to compare engineering effort expended to the value of services accomplished in that week. Any adjustments necessary to maintain the overall project engineering budget are then made.

Our construction cost development starts during the plan development phase of the project when budgets are first calculated. The first project budget is developed after the requirements of the project are defined, and are based on actual equipment quotes, basic take-offs, past project experience, and our internal cost database of hundreds of projects.

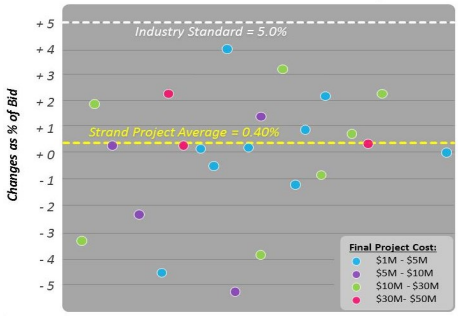
During the design phase, the project budget will be updated at the 30, 60, and 90 percent completion stages of the design, which coincides with detailed design review meetings.

Change orders are a measure of an engineer's design accuracy, understanding of construction, and cost control in all phases of a capital project. Generally, a low ratio of change-order-dollars to bid-dollars indicates a high level of planning and design accuracy, which improves cost control on the project. The following graph depicts the overall change order percentage on engineering projects we have designed. Each of these projects represents multimillion-dollar investments. We are pleased that total construction costs of Strand projects exceed the actual bid price, on average, by only 0.40 percent, whereas the industry standard is approximately 5.0 percent. We believe this is truly indicative of the engineering performance the Village should expect from its consultant and the level of commitment we are prepared to provide.

Using the estimated $7 million project cost provided in the plant expansion alternatives memo, our ability to accurately design your project to Strand's average of 0.4% in change orders compared to the industry standard average of 5% results in value difference of $322,000 that could be used by the Village to complete other improvements.



Costs associated with project changes increases significantly in later project phases. Detailed engineering minimizes the costs.



Our thorough designs reduce unexpected costs, Strand projects average 0.4% change orders compared to 5.0% industry standard.

Project Reporting – Status Reports Maintain Consistent Communication

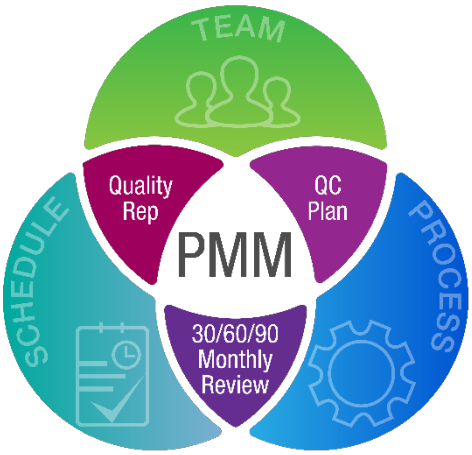
Our approach allows the Village to keep Village officials and the public informed about their project as our approach communicates through regular documentation about the project. This step demonstrates our team's progress and identifies items that we need the Village's input towards, so that the entire project team remains engaged and involved. We typically provide written project status reports throughout the plan development, design, and construction phases of the project that describe tasks completed, tasks underway, upcoming tasks, budget status, percent complete, and earned value, so that you can communicate progress to your public officials throughout the course of the project.

Public Relations Support

Quality Control (QC) Measures Are Integral to Successful Project Delivery

QC tracking is performed for each project deliverable. Overseeing the quality of our engineering work is a continuous process throughout the life of the project to help control the overall project costs.

Managing engineering quality is a continuous process from the beginning of a project through completion. At the preparation of the initial project work plan, and at all critical junctures during completion of the project, the project work will be reviewed by our QC staff for conformance with good practice and project goals. We understand that quality is not defined by end-of-the-line checking. During project scoping, a Project Management Memorandum (PMM) is issued that describes the individual QC plan for the project. This plan identifies the QC engineers; individuals who are responsible for reviewing the calculations, projected costs, proposed technologies, the operational needs report, and the design deliverables (30/60/90). The QC engineers are experienced with projects of similar scope and have knowledge of the project elements but are not typically

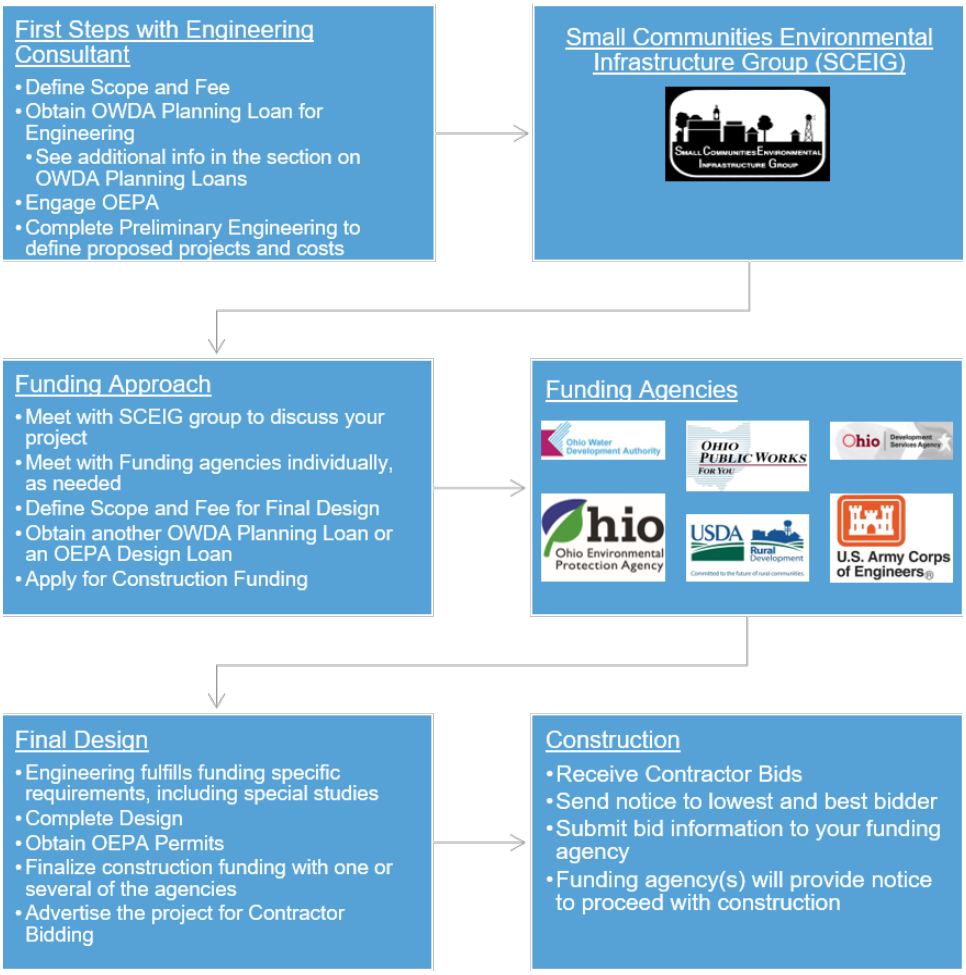


part of the day-to-day project team. This enables the QC engineers to provide objective perspectives when reviewing the work. By assembling the QC plan early in project scoping, our team members are aware of the stages at which quality reviews will take place and can plan accordingly. At plan completion, the QC engineers sign the QC plan, indicating that all reviews have been completed.

By strictly adhering to these practices, we provide quality engineering work and projects that are within budget, meet client goals, and are on schedule. The QC form and the schedule will be presented during the project kickoff meeting and the completed form will be included with all deliverables.

Funding Source Evaluation

A goal of our funding approach is to minimize the project impact on the Village's water rates and bottom line. Our holistic approach to the financial and technical aspects of the project will deliver cost control throughout the project, including the plan development, design, and construction phases. In addition to controlling costs, our expertise in available funding sources will help provide the additional resources needed to address the technical issues of the WTP. The following flow chart depicts the funding process.



We have experience working with all these funding agencies. For the planning and design phases, most communities utilize the OWDA or the OEPA Water Supply Revolving Loan Account (WSRLA). The OEPA distinguishes between planning loans and design loans, whereas OWDA does not. OEPA loans have lower interest rates but come with additional requirements, such as schedule constraints, specific structure and content of the planning documents, and OEPA review of the planning and design documents. Either

type of planning/design loan can be rolled into an OEPA, OWDA, or USDA RD construction loan, so our clients have often found it simpler to start with an OWDA planning loan and then evaluate construction loan options once a project scope, cost estimate, and schedule are defined. Also, because of being able to roll the planning/design loans into the construction loan, typically no payments are made towards the planning/design loan, and no payments are due on the construction loan until January 1st or July 1st following 1 year after the loan closing. We will assist the Village with determining which funding source is the best fit for this project.

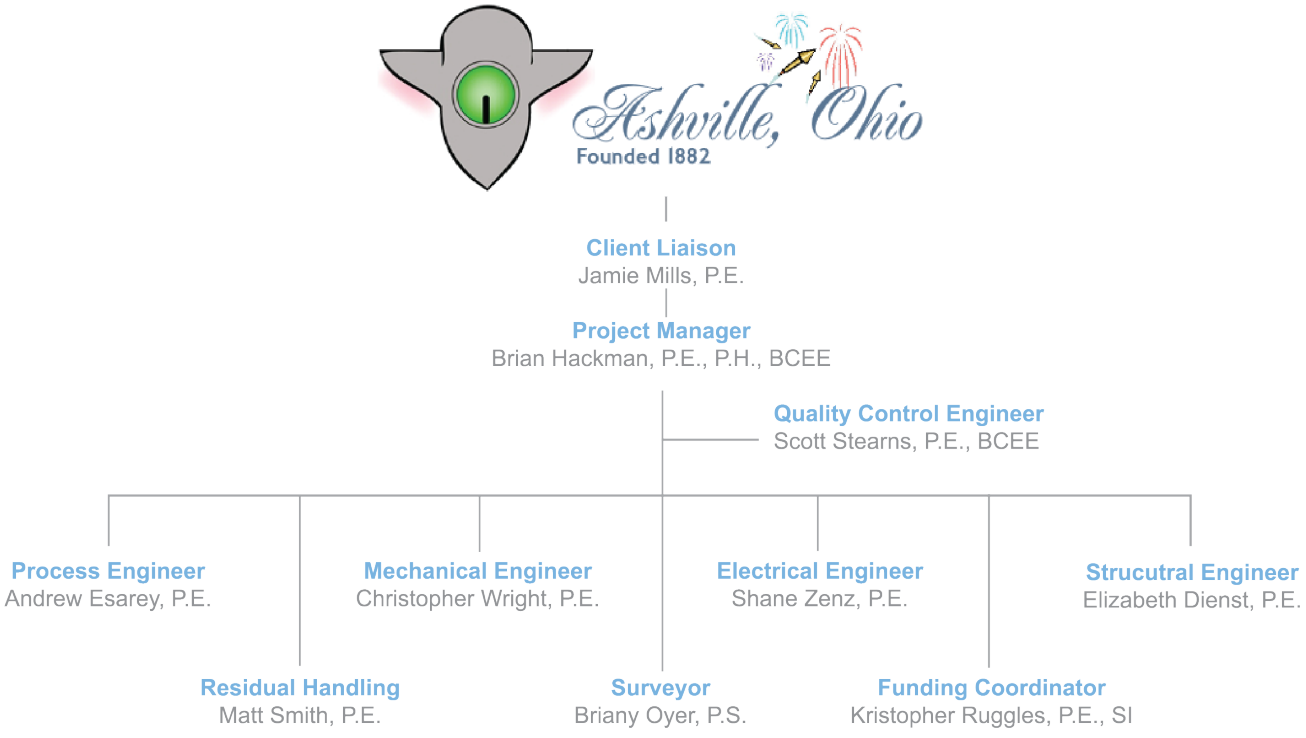
Key Personnel

Our Team's Responsive Service, Quality Engineering, and Attention to Details Will Result in Successful Long-Term Solutions for Ashville

Strand Associates, Inc. is a full-service civil engineering firm. Water supply engineering is a major focus of our environmental division, within which we provide a full range of services including treatment planning and design, system modeling, electrical upgrades, SCADA upgrades, supply, storage, pumping, studies, reports, and many other services. We have designed projects for WTPs ranging in treatment capacity from less than 1 MGD to more than 60 MGD. The successful completion of both large and small water system projects is an indication of our ability to deal with not only the details of design and construction, but also a variety of management functions.

Our team has the capacity and knowledge needed to be responsive to the Village's needs with a cost-conscious and thorough approach to this study. **Brian Hackman, P.E., P.H., BCEE** will serve as the Project Manager for the Village of Ashville for the Water Treatment Plant Expansion/Replacement Project. The overall project team brings more than 185 years of combined engineering experience, with an array of experience levels spanning between 9 and 33 years. The average amount of time our proposed staff has been with Strand is more than 17 years. This longevity with the firm assures the Village that those individuals that start the Village's project will be the same people that see the project through to completion.

Our project team is fully committed and excited about the opportunity to provide Ashville with services associated with this effort. Our Project Manager will administer the staff resources using our internal personnel scheduling system. This computerized, corporate-wide scheduling system provides up-to-date status reports on the schedule of every technical staff member in the firm. Brian will use this system to confirm the right person is available at the right time to complete assigned tasks for this project. Below is an organizational chart that highlights the proposed structure and roles for our team. Following the chart are brief resumes and detailed resumes are provided in the appendix at the end of our Statement of Qualifications.



Jamie Mills, P.E. – Client Liaison

Jamie will be the **Client Liaison** for the Village. He has over 11 years of experience and has been project manager and lead process engineer for several water and wastewater treatment facility improvements. Jamie has attended Village Council and Committee Meetings for the past 7 years to remain engaged and informed of Village needs. Additionally, growing up in Village, he understands the Village dynamics, is well accustomed with Village staff, plant operations, and project needs. He is passionate about successfully delivering this project and ensuring the project meets the Village's goals and needs. He received his Master's degree in Civil/Environmental Engineering from The Ohio State University. Jamie is a registered professional engineer in the state of Ohio and is a class II wastewater operator with hands-on treatment experience. His water and wastewater treatment experience includes facility planning, design, operations, construction management, and equipment startup.

Brian Hackman, P.E., P.H., BCCE – Project Manager

Brian will serve as the **Project Manager** for this project to help Jamie communicate the design details of our Project Team to the Village. He is currently our Director of Practice for Water Supply within our firm, and has been instrumental in our development of plans and designs involving conventional and state-of-the-art technologies in drinking water treatment, during his 23 years with our firm. Brian has led all aspects of facility, piping, and process designs for new systems and improvements to existing water systems in Ohio, Arizona, Kentucky, Illinois, West Virginia, and Wisconsin. He has been in responsible charge of integrating equipment and facility construction for facilities representing more than $26 million of treatment equipment, and more than $111 million in total construction costs for facilities ranging in capacity from 1 to 60 MGD. From a quality and cost-conscious standpoint, Brian has worked closely with the entire design staff and technical experts within our firm through a variety of projects involving site work, process and chemical design, structural design, mechanical and electrical systems, and input from outside design firms. He has managed more than 124 water supply engineering projects of various sizes and complexities since 2001 with our firm. He is fully committed to providing a quality project for the Village.

Scott Stearns, P.E. – Quality Control Engineer

Scott will serve as the overall **Quality Control Engineer**. He has more than 29 years of water and wastewater engineering experience – all with our firm – and is the coordinator of our water and wastewater group. He has been responsible for facilities plans, designs, and construction projects for water and wastewater treatment and conveyance facilities throughout Wisconsin, Illinois, Ohio, Kentucky, and West Virginia, serving populations of up to 300,000 and resulting in construction projects ranging up to $84 million. Scott's extensive WTP design experience includes a $30 million upgrade for the Morgantown, West Virginia, WTP; a new 10 mgd greenfield microfiltration membrane project for the Logan/Todd County Regional Water District WTP in Kentucky; the upgraded reverse osmosis WTP for Marietta, Ohio, the energy improvements project in Athens, Ohio, and the master plan and upgrades for the 40 mgd J-Avenue WTP in Cedar Rapids, Iowa.

As overall QC Engineer, Scott will utilize his vast experience to provide useful and comprehensive feedback when reviewing the various design elements of this project for key deliverables. He will consider the Village's preferences and requirements as detailed in the project agreement, input from team members, and applicable codes and standards in his efforts. Scott also has significant responsibilities with overall firm scheduling and will make the team available to complete the project within the expedited timeframe identified for this project.

Andrew Esarey, P.E. – Lead Process Engineer

Andrew will serve as the **Lead Process Engineer** for this project. Andrew is a registered Professional Engineer in Kentucky and Ohio and is Strand's Water Supply Discipline Coordinator for the Louisville Office. He has 14 years of experience that has focused on a range of water treatment studies and design projects, including both surface water and ground water treatment facilities. Andrew was the project manager Operational Needs Review for the Portsmouth, OH New Water Treatment Plant, which was a needs-based assessment that reviewed the current condition of the WTP and reviewed options for replacement or rehabilitation. Andrew is now managing the final design of the Portsmouth New WTP project which includes a new 8 mgd facility with new intake on the Ohio River, presedimentation basin, high-rate ballasted clarification, dual media filters, clearwells, high service pumping, and associated chemical feed systems. He was a lead process engineer on the Central City, KY WTP expansion project that included new intake pumps, sedimentation basins, clearwells, high service pumps, and chemical building. Andrew is also currently the lead design engineer for the Logan-Todd WTP Expansion Project in Guthrie, KY which includes the addition of four new ultrafiltration membrane skids and associated supply pumps to increase the firm capacity of the WTP from approximately 9 mgd to 13 mgd.

Christopher H. Wright, P.E. – Mechanical Engineer

Christopher will serve as the **Mechanical Engineer**, providing heating, ventilation, and air conditioning (HVAC) and plumbing design. Chris has been with our firm for nine years and received his Bachelor's in Mechanical Engineering from the University of Wisconsin-Platteville. Chris has been involved in a variety of municipal and industrial projects as a Mechanical Engineer with our firm. His expertise includes plumbing, fire protection, and HVAC engineering. Chris was also the primary HVAC Design Engineer for the Waukesha Wastewater Treatment Plant Upgrades, where he provided mechanical design for Phase 1 and 2 upgrades for Salem Lakes. His experience with HVAC and plumbing design for water supply and wastewater facilities will be directly applied to this project to ensure that mechanical systems support reliable operation of the station.

Shane P. Zenz, P.E. – Lead Electrical Engineer

Shane will serve as the **Lead Electrical Engineer** for the project. Shane has 33 years of water and wastewater engineering experience – all with our firm – and is the coordinator of our electrical group. He has been responsible for all facets of the electrical designs and construction observation on projects for water and wastewater treatment and conveyance facilities throughout Wisconsin, Illinois, Ohio, Kentucky, and West Virginia. Shane's extensive WTP design experience includes a $30 million upgrade for the Morgantown, West Virginia, WTP; a new 10 mgd greenfield microfiltration membrane project for the Logan/Todd County Regional Water District WTP in Kentucky; the upgraded reverse osmosis WTP for Marietta, Ohio, the Waterworks Improvements project for the WTP in Athens, Ohio, and design of the Phase 2 upgrades for the 40 mgd J-Avenue WTP in Cedar Rapids, Iowa.

As lead electrical engineer, Shane will utilize his vast experience to provide guidance on the electrical design based on successfully completed projects in the past. He will consider the Village's preferences and requirements as detailed in the project agreement, input from team members, and applicable codes and standards in his efforts.

Elizabeth Dienst, P.E. – Lead Structural Engineer

Elizabeth will be the **Lead Structural Engineer** for this project. She is a licensed professional engineer in Kentucky with more than 19 years of experience. She has a variety of project management experience covering municipal, water, wastewater, and structural design and construction administration projects. Her project management experience has ranged from small, short-term projects up to multiyear construction administration projects with construction budgets up to $26 million. Elizabeth's design capabilities include structural design, architectural related tasks, as well as sanitary sewer design and studies. Her structural project assignments have given her experience with steel framed buildings, reinforced concrete structures of all shapes and sizes, reinforced masonry structures, retaining structures in a variety of materials, and precast structures. Through the variety of projects, she has worked on she has gained the ability to analyze buildings in a variety of situations and geographical locations, for compliance to building codes, including buildings in Hazardous occupancies.

Matt Smith, P.E. –Residual Handling

Matt will service as our **Residuals Handling Engineer** for this project. He has over 18 years of experience with project planning, evaluation, and design efforts for water and wastewater facilities. He has experience working in the planning, design and construction phases for water and wastewater treatment facilities and distribution and collection systems. Matt prides himself on taking a "real world" approach to projects that certifies his client's projects are thoroughly evaluated with respect to other concerns such as constructability, long-term operation and maintenance requirements, and life cycle costs. He has helped lead water and wastewater treatment plant facilities planning studies, renovations and upgrades, process improvements, pumping station upgrades, associated distribution and collection system improvements, and various other projects relating to water and wastewater treatment. Matt led the design efforts on the Bargersville Utilities Water Treatment Plant No. 2 project, which is a 6.0 mgd fluidized bed reactor facility, was a part of the design team for the $34 million, 16 mgd WTP process improvements for the Morgantown Utility Board, and was the Project Manager for the City of Oxford, Ohio's WTP water softening alternatives analysis project. Matt's experience working with both the water and wastewater disciplines is critical to understanding the unique problem that water treatment plant residuals play and the technical and regulatory challenges associated with addressing them. Matt plays a key role in our Ohio water and wastewater treatment group and has an excellent working relationship with all of our proposed team members.

Brian Oyer, P.S. – Surveyor

Brian will service as our **Surveyor** for this project. He has 10 years of experience performing all surveying tasks associated with civil engineering projects, from data collection to writing legal descriptions. This experience includes transportation projects for ODOT and utility projects, such as sanitary sewer and water. He also has experience using GIS software to deliver better organized and easily visualized spatial data. His GIS skills involve working in geodatabases, using online tools to share GIS data in the field or with the public, analyzing and maintaining existing data, and creating new data that can further expand and improve upon the GIS data. He has experience gathering data in the field and using GIS tools as quality assurance to create new data in a well-organized manner or to make sure the new data is inserted seamlessly into existing databases. Brian is adept at confirming the highest quality of field data is collected and maintaining a structured, methodical set of data because of his experience both as a surveyor and a GIS specialist.

Kristopher Ruggles, P.E., SI – Funding Coordinator

Kris will serve as **Funding Coordinator** and will assist the Village in securing funding for this project. He has a Bachelor of Science degree in Civil Engineering from Ohio University and 16 years of practical experience in municipal water, wastewater, stormwater, wastewater, and construction engineering. His background includes leading public meetings, permitting, studies, planning, evaluation, design, and construction observation of utility and treatment projects.

Kris also has ample experience helping our clients achieve their project goals by assisting with the identification of funding sources and development of funding applications. He has developed relationships with staff at funding agencies, including, but not limited to, OEPA DEFA, OWDA, USDA RD, OPWC, Ohio Development Services, JobsOhio, and the Army Corps of Engineers. These agencies all have programs that may be applicable to the Villages project, but each also has different requirements for obtaining the funding. For instance, DEFA has prescribed windows when the nomination and application process is open to obtain funding, separately, for planning, design, and construction, while OWDA operates essentially as a bank, but offers no opportunities for grants or principal forgiveness. There are advantages, disadvantages, and caveats associated with all of these funding agencies. Guided by his experience, Kris will work collaboratively with Village staff to identify and pursue the funding that best fits the Villages goals and schedule.

Geotechnical Investigations

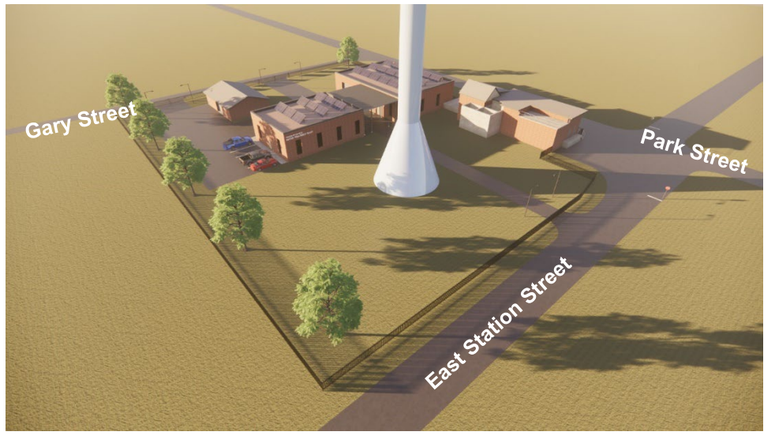
We recommend that geotechnical investigations be completed as part of this project. Soil borings will identify the depth of bedrock, if present, the depth of groundwater, and the characteristics of the soil to inform the design of the foundations. It will also allow the contractor to submit an informed bid knowing the conditions that will be encountered below the surface. For this project our recommended approach will be for the Village to hire the geotechnical engineer directly. We can assist the Village by preparing a request to solicit proposals from geotechnical engineers for the Village to evaluate and hire directly. We will send this request to geotechnical engineers the Village has worked with in the past and those with which we have successfully worked. This approach gives the Village more input into the process and it is more budget friendly by removing Strand from the contract between the Village and the geotechnical engineer.

Project Approach

Conceptual Renderings of a New WTP Enhance Operational Discussions and Design Reviews

Our understanding of the Village's goals for the new WTP is reflected in our REVIT conceptual rendering for a potential layout of the new WTP, shown below. On the following pages, we will outline our approach to delivering a success New WTP for the Village of Ashville. In the conceptual drawings below, it is anticipated the footprint of a new WTP that is expandable to 2.0 MGD with the addition of an Administration Building will be able to fit on the existing site. The renderings incorporate Village preferences for a new WTP and Administration Building, which include:

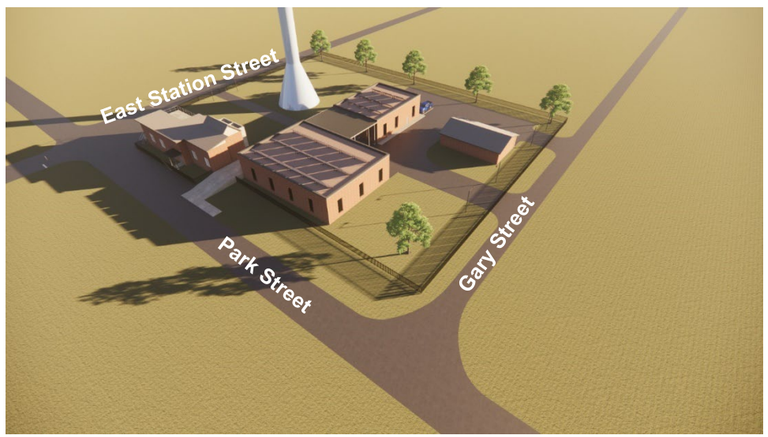
- Exterior brick facade that closely matches the existing bricks.
- Tall, tinted block windows.
- Driveway access from East Station Street to Gary Street (Alley) for improved clearance and accessibility for chemical and salt deliveries.
- Salt storage basin hatch access is anticipated to be located in the driveway near the overhead door and loading dock of the new WTP.
- Roof solar panels have been added to improve energy efficiency of the WTP. It is understood the Village wishes the new WTP to be LEED rated.
- The existing WTP has been left as-is in the conceptual renderings, but the 1934 and 1948 portions of the existing WTP in addition to the ramp for the salt storage basin are anticipated to be demolished. The 1970 portion is anticipated to be repurposed.
- Trees have been added along the east fence line of the existing site to provide a view breakpoint for neighbors.
- A roof canopy adjoining the new WTP and Administration Building roofs. The Administration Building is anticipated to include an office, laboratory, meeting room, bathroom/locker room, and control room.



Conceptual New WTP (Northeast View)

Conceptual New WTP (Northwest View)

Conceptual New WTP (Southeast View)



Conceptual New WTP (Southwest View)

Conceptual New WTP (South View of New WTP Building and Administration Building)

Conceptual New WTP (North View of New WTP Building and Administration Building)

Project Approach

Our Approach Results in A Constructable Facility That Is Centered Around Your Needs to Improve the Value and Resilience of Your Water System

APPROACH

The Village identified a detailed scope of services to guide the planning, design, and construction of its new water treatment plant (WTP). Given the phases of this project, our *Project Schedule*, in following sections of this proposal, has been based on the review times by the Village and regulatory schedules established for the Ohio Environmental Protection Agency (OEPA) permitting processes. The provided detailed scope of services is listed below and represented graphically in the image below to provide sequencing of each phase. The provided scope of services goes into more detail in this Project Approach Section to discuss the task and milestones that are worked on or completed through each phase.

Phase 1 - Planning

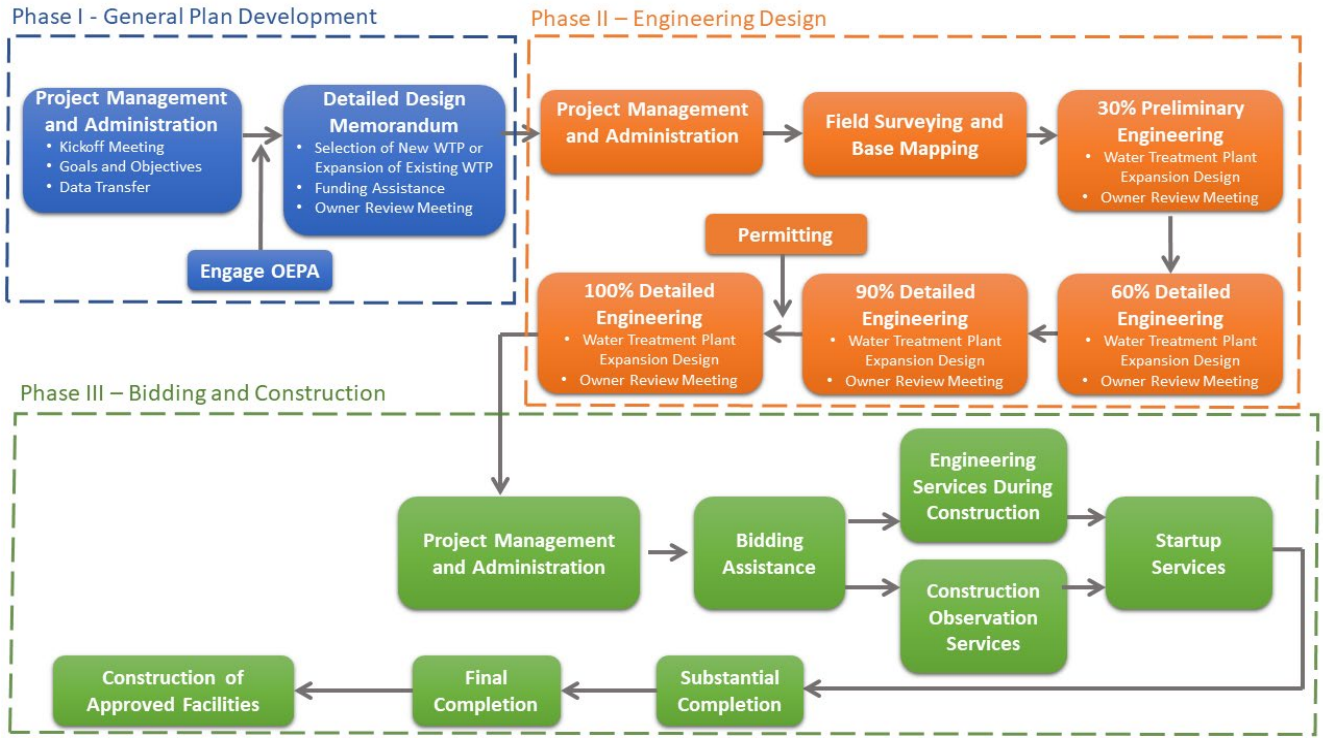
- Develop Detailed Design Memorandum
- Project Management and Administration
- Funding Assistance

Phase 2 - Engineering Design

- Project Management and Administration
- Field Surveying and Base Mapping
- Preliminary (30%) Water Treatment Plant Expansion Design
- Detailed (60% and 90%) Water Treatment Plant Expansion Design
- Final (100%) Water Treatment Plant Expansion Design
  Permitting

Phase 3 - Bidding and Construction

- Project Management and Administration
- Bidding Assistance
- Engineering Services During Construction
- Construction Observation Services Startup Services
- If-Authorized Services



If the Village should choose to use new treatment alternatives because of an equipment or process advantage, additional tasks for bench and pilot scale studies can be provided by an amendment to adjust the project's scope, schedule, and compensation accordingly. The OEPA may also make recommendations towards additional water quality and process testing that may be identified during the General Plan and Detailed Plan review process that would be in addition to the services presented below.

Given the age and location of the facilities, our firm can also help the Village competitively solicit for independent geotechnical engineering services, building hazardous materials identification (lead and asbestos), environmental and archeological site reviews, and other special services necessary to carry out the project to support the project's and OEPA requirements.

Our professional capability to perform the approach below is demonstrated by our *Project Team* in completing the various recent projects identified in the *Project Experience* sections in this proposal.

Phase I - Planning: Detailed Design Memorandum (DDM)

Our firm will approach your DDM in a format and level of detail that matches the General Plan review requirements for OEPA. We suggest titling the end product as a 'General Plan' to build consensus with OEPA through the permitting and funding process. OEPA has established a General Plan checklist that can guide the details so that the necessary details can be addressed to gain approval for the Village to move forward into Final Design, Bidding, and Construction in a timely manner.

We also are familiar with the US Department of Agriculture (USDA) Rural Water funding requirements to include details related to the number of manufacturers for 'or equal' conditions, or sole manufacturer purchase conditions (if necessary), and related USDA Rural Water supplemental special conditions that are used to competitively fund and bid water system projects.

The detailed scope of services for this task is presented below:

Task 1.1 - Project Management and Administration

- The consultant shall assign a project manager who will be the Village's primary contact and be responsible for the consultant's work (including sub consultant work if applicable).
- Perform project management and administration throughout Phase I of the WTP Expansion Project.
- Schedule and participate in a project kickoff meeting with the Village.
- Prepare meeting agenda and minutes for the kickoff meeting.
- Schedule and participate in monthly update and coordination meetings or conference calls with the Village.
- Prepare meeting agendas and minutes for monthly meetings or conference calls.
- Prepare monthly invoices for services rendered.
- Develop and update the project schedule and communicate any changes to the Village.

Task 1.2 - Develop DDM

- Prepare a report to identify the current condition and capacity of the WTP and future needs to accommodate growth and increased water strength. The DDM for the WTP improvements is anticipated to include: Introduction and Project Description, Basis of Planning, Existing Facilities and Performance, Capacity Analysis, Alternatives Analysis, Cost Analysis, and Description of Recommended Improvements.

- Review population projections and potential development projects provided by the Village.
- Use the water population projections to determine if any intermediate operational measures are required before the WTP reaches its planned 2.0 MGD capacity.
- Meet with the WTP operators to review Operations and Maintenance (O & M) issues.
- Review existing As-Built drawings of the WTP.
- Evaluate up to three (3) alternatives to expand each process of the plant. An alternative shall be up to three (3) different equipment manufacturers, different process technologies, or a combination of the two. Develop a summary table or matrix for analyzing the processes and equipment of the WTP.
- Evaluate WTP expansion alternatives including objectives mentioned above.
- Perform a field review of the existing mechanical, electrical, and HVAC equipment ancillary to the process equipment and buildings, and recommend upgrades to lighting, heating, ventilation, and plumbing systems in the existing buildings at the WTP. Lighting will be evaluated in the existing building and recommendations will be made to improve lighting efficiency and reduce power consumption.
- Provide capital costs for equipment in each alternative and a Present Worth Analysis (PWA) of operational, maintenance, and replacement costs over a 20-year life cycle.
- Provide a process flow diagram, preliminary site plan, and figures showing the process equipment based on the preferred equipment and alternatives. Up to three (3) process flow diagrams and preliminary site plans shall be provided.
- Provide quality control reviews of internal work and provide quality assurance reviews of deliverables prior to submitting to the Village and reviewing agencies.
- Submit one (1) electronic (PDF format) copy and two (2) paper copies of the DDM to the Village for review and comment. The Village shall provide written review comments to ENGINEER within 30 calendar days from submittal of the DDM.
- Incorporate all comments received into a Final DDM for submission to the Village and Ohio EPA for approval. One (1) electronic (PDF format) and two (2) paper copies of the Final DDM will be provided.

Task 1.3 - Funding Assistance

- Assist the Village with funding strategy, applications, and procurement. This task includes assisting with identification of applicable State/Federal funding programs, preparation of funding applications, coordinating with funding agencies, and other work associated with securing low-interest loans or grant funds for the project.
- Identify applicable funding sources for the implementation of the recommended WTP expansion improvements. Potential funding sources include OhioEPA Water Supply Revolving Loan Account (WSRLA), Ohio Water Development Authority (OWDA), Ohio Development Services Agency (ODSA), Ohio Public Works Commission (OPWC), and General Obligation (GO) or Revenue Bonds (RB).
- Perform a general evaluation of the Village's current revenue system and sewer rates as well as the impact of the proposed improvements on those rates.
- If the Village would like to pursue United Stated Department of Agriculture Rural Development (USDA RD)funding, the DDM will need to be modified in

the USDA Preliminary Engineering Report (PER) format with additional environmental and other requirements. If known prior to commencing work on the DDM, there shall be no additional compensation.

Phase II - Engineering Design Services

This phase will be used to take the Village and OEPA approved DDM document and develop the Final Design details of your facility.

Task 2.1 Project Management and Administration

- Perform project management and administration throughout Phase II of the WTP Expansion Project.
- Schedule and participate in monthly update and coordination meetings or conference calls with the Village.
- Prepare meeting agendas and minutes for monthly meetings or conference calls.
- Prepare monthly invoices for services rendered.
- Maintain and update the project schedule and communicate any changes to the Village.

Task 2.2 Field Surveying and Base Mapping

- Perform all field surveys, site investigations, and base mapping necessary to facilitate and prepare the preliminary design, final construction drawings, specifications, and bid documents for the WTP Expansion project. All survey work shall be performed under the direction of a Professional Surveyor licensed in the State of Ohio and data shall be collected in the State Plane Coordinate System South and NAVD datum 1988. The anticipated survey area at the Ashville WTP site is approximately one and 3/4 acres (1.75 acres).
- The Village shall clearly mark utilities, to the best of their ability, inside the WTP property.

Task 2.3 Preliminary (30%) Water Treatment Plant Expansion Design

Preliminary 30-percent Design will include civil, structural, architectural, process, mechanical, and electrical disciplines, including:

- Prepare engineering construction documents to a 30% Design Plans level including civil, structural, architectural, process, mechanical, and electrical disciplines.
- Design plans shall be prepared in AutoCAD 2018 (or newer) software.
- All design plans (preliminary and detailed) shall be developed in accordance with the Village of Ashville Design Criteria.
- Civil design will include yard piping, and other site improvements. Provide structural design for new tanks, buildings, and other process design support. Architectural services will include any modifications to existing buildings and new buildings to match the existing WTP structures.
- Develop an opinion of probable construction costs to accompany the 30% design submittal. Costs will be based on manufacturer's quotes, cost estimating manuals, and the ENGINEER'S experience.
- Develop an estimated construction schedule.
- Submit one (1) electronic (PDF format) copy, two (2) full-sized (22-inch x 34-inch) paper copies, and two (2) half-sized (11-inch x 17-inch) copies of the plans and specifications to the Village for review and comment.
- The Village shall provide written review comments to ENGINEER within 30 calendar days from submittal of the Preliminary Design documents.
- Develop a hydraulic profile to analyze the hydraulic grade line of the WTP.

- Analyze the existing WTP conditions at 0.650 MGD and at the proposed 1.2 to 2.0 MGD.
- Provide quality control reviews of internal work and provide quality assurance reviews of deliverables prior to submitting to the Village and reviewing agencies.

Task 2.4 Detailed (60% and 90%) Water Treatment Plant Expansion Design
60-Percent WTP Expansion Design, includes:

Advance the Preliminary (30%) Design and provide the detailed design configurations and parameters established for a singular (1) alternative for public bid. The 60% design submittal shall consist of the following items:

- Draft set of Engineering Design Plans illustrating the proposed WTP expansion improvements.
- Draft Specifications, including draft Bid Lump Sum Forms
- Draft Permit Applications, including:
    - Notice of Intent (NOI) for Ohio EPA stormwater permitting requirements.
    - Ohio EPA Water Plan Approval application.
    - Ohio EPA NPDES permit modification application for increases in discharge from the treatment waste tanks (if needed).
    - Ohio EPA Antidegradation Addendum (if needed).
    - Ohio EPA Antidegradation Addendum (if needed).
- Draft Engineer's Estimate of Opinion of Probable Construction Cost.
- The Design Specifications will set forth the kind and quality of various materials to be used in construction, the type, capabilities, operating requirements, pertinent tests, guarantees to be met, and similar information needed to solicit competitive bids for construction of the Project. Specifications shall be prepared with the Construction Specifications Institute (CSI) Master Format 2008, Ashville Design Criteria, ODOT Construction and Material Specifications, and requirements per the funding/reviewing agencies.
- Prepare for review and approval, the standard Front-End Documents including Contract Bond, Bid Guaranty and Contract Bond, Owner-Contractor Agreement forms, General Conditions, Bid Forms, Notice to Bidders, and Instructions to Bidders, and other related documents based on Engineers Joint Contract Documents Committee C-700 Standard General Conditions of the Construction Contract, 2018 edition, technical specifications, engineering drawings, and USDA Rural Water Supplemental Special Conditions.
- Submit one (1) electronic (PDF format) copy, two (2) full-sized (22-inch x 34-inch) paper copies, and two (2) half-sized (11-inch x 17-inch) paper copies of the plans and specifications to the Village for review and comment.
- Provide quality control reviews of internal work and provide quality assurance reviews of deliverables prior to submitting to the Village and reviewing agencies.

90% WTP Expansion Design, includes:

Advance the 60% Design and provide the detailed design configurations and parameters established for a singular (1) alternative for public bid. The 90% design submittal shall consist of the following items:

- Draft Final set of Contract Drawings illustrating the proposed water treatment facilities, including:

  - Title sheet, sheet index, general notes, abbreviations, nomenclature, legends, etc.
  - Process drawings
  - Architectural drawings
  - Structural drawings
  - Mechanical drawings
  - Electrical drawings Instrumentation drawings
- Draft Final Specifications, including draft Bid Forms (lump sum)
- Draft Final Permit Applications, including:
  - Draft Notice of Intent (NOI) for Ohio EPA stormwater permitting requirements. Draft Ohio EPA Water Plan Approval application.
  - Draft OhioEPA NPDES permit modification application. Draft Ohio EPA Antidegradation Addendum (if needed).
  - Draft Final Engineer's Estimate of Opinion of Probable Construction Cost
- Update for review and approval, the standard Front-End Documents including Contract Bond, Bid Guaranty and Contract Bond, Owner-Contractor Agreement forms, General Conditions, Bid Forms, Notice to Bidders, and Instructions to Bidders, and other related documents.

Submit one (1) electronic (PDF format) copy, two (2) full-sized (22-inch x 34-inch) paper copies, and two (2) half-sized (11-inch x 17-inch) paper copies of the plans and specifications to the Village for review and comment.

Submit appropriate electronic (PDF format) and paper copies of the plans and specifications to the funding agencies and permitting agencies as required. The Village shall provide written review comments to ENGINEER within 30 calendar days from submittal of the 90% Design documents.
Provide quality control reviews of internal work and provide quality assurance reviews of deliverables prior to submitting to the Village and reviewing agencies.

Task 2.5 Final (100%) Water Treatment Plant Expansion Design
Finalize all Engineering Design Documents in preparation for project bidding. The Final Design will be represented in the documents to be used for bidding purposes and building permits. This includes final drawings, specifications, and cost opinions. The Final Design submittal will incorporate the Village's, Ohio EPA's, and funding agencies' comments and will be complete and suitable for bid purposes.

- The Final Design submittal shall include the following:
  - Advertisement for Bid and Information to Bidders.
  - Lump Sum proposal forms.
  - Technical Specifications.
  - Special instructions to the Contractor regarding the sequence of construction to maintain WTP operations.
  - Final Engineering Design Plans and Specifications.
  - Final Engineer's Estimate of Opinion of Probable Construction Cost.
  - Completion of permits and approvals.
- Submit one (1) electronic (PDF format) copy, two (2) full-sized (22-inch x 34-inch) paper copies, and two (2) half-sized (11-inch x 17-inch) paper copies of the plans and specifications to the Village.

- Shall submit one (1) electronic (PDF format) and one (1) paper copy of the Advertisement for Bid, Information to Bidders, Lump Sum Proposal Form, Bond Forms, Contract Documents, and detailed technical specifications to the Village.
- Submit appropriate electronic (PDF format) and paper copies of the plans and specifications to the funding agencies and permitting agencies as required.
- Provide quality control reviews of internal work and provide quality assurance reviews of deliverables prior to submitting to the Village and reviewing agencies.

Task 2.6 Permitting

- Assist the Village with permitting applications and procurement. This task includes assisting with permit applications, coordinating with regulatory agencies, and other work associated with securing required permits for the project. Permit fees shall be paid by the Village.
- Schedule and participate in up to two (2) government agency coordination meetings or conference calls to seek input on permit applications and incorporate agency input into the project.
- Coordinate with the permitting agency to identify any potential future regulations that may impact the operation of the WTP.
- Prepare meeting agendas and minutes for government agency meetings or conference calls.

Phase III - Bidding and Construction Services

Prepare bidding documents for advertisement. The Bidding Phase will commence upon notice to proceed from the Village that the Project is ready to bid and terminate upon ENGINEER furnishing the Village with an engineering recommendation concerning the award of the construction contract. We recognize that the Village commented that there may be a separate Request for Proposal at this stage of the project.

Our firm has the capability to perform this phase of services, including Resident Project Representation (RPR), in addition to Operation and Maintenance Manual Preparation, Start-up and Training, Correction Period Support, and Long-term Operational Assistance Related Services, as appropriate and authorized.

This phase shall consist of the following services:

Task 3.1 Project Management and Administration

- Perform project management and administration throughout Phase III of the WTP Expansion Project.
- Schedule and participate in monthly update and construction progress meetings with the Village.
- Prepare meeting agendas and minutes for monthly progress meetings.
- Prepare monthly invoices for services rendered.
- Maintain and update the project schedule and communicate any changes to the Village.

Task 3.2 Bidding Assistance

The following services are included in Bidding Assistance:

- Provide the Final Engineering Design Documents, Technical Specifications, and Contract Documents to a hosting agency (such as Builders Exchange and/or Key Blueprints) to advertise the project to potential bidders, obtain construction bids, distribute addenda, and maintain a list of plan holders.

- Conduct a pre-bid meeting to review the Project requirements and address questions that may arise. Prepare meeting minutes and distribute as an addendum.
- Prepare written addenda to address questions, and to clarify, correct or revise the Contract Documents prior to the bid opening.
- Attend the bid opening and tabulate the construction bids received. Bids are to be tabulated on a spreadsheet and submitted to the Village.
- Assist the Village in evaluating the bids received and the bidders. Recommend award of the Contract based upon the evaluation of bids for the "Lowest and Best Bidder.
- ENGINEER shall provide a written notice of award for execution by the Village and Contractor.

Task 3.3 Engineering Services during Construction

Perform the following tasks for the estimated 18-month construction duration of the improvements:

- Coordinate and conduct the pre-construction meeting, including distributing agenda prior to and minutes subsequent to the meeting.
- Attend monthly construction progress meetings to maintain the project schedule and address issues that may arise.
- Answer contractor's questions and requests for information (RFIs) during construction.
- Review and approve contractor shop drawing submittals and provide feedback on submittals as appropriate.
- Review contractor's pay applications, review contractor's quantities, and provide technical assistance during construction activities.
- Review any potential contractor's claims for additional costs, assist the Village in negotiations, and prepare change orders as may be necessary.
- ENGINEER shall perform all field surveys to facilitate and prepare the as-built construction documents for the WTP Expansion project. All survey work shall be performed under the direction of a Professional Surveyor licensed in the State of Ohio and data shall be collected in the State Plane Coordinate System South and NAVD datum 1988. This survey work is limited to the location of installed improvements designed and constructed as part of this WTP Expansion project.
- ENGINEER shall provide a final set of record drawings in electronic and paper formats to the Village incorporating information from the as-built survey.
- Assist the Village in preparing and submitting funding reimbursement requests from the applicable funding agencies.

Task 3.4 Construction Inspection (Observation) Services

- Provide a full-time Resident Project Representative (RPR) for 16 months during construction of the Project. The RPR shall be on-site for observation of the construction work. The RPR shall attend construction meetings that are required, provide field checks of the materials being used and quality of workmanship, calculate the quantities of materials installed, review contractor payment applications, and review any deviations from the contract documents or existing conditions.
- Only be responsible for determining the provisions of the Contract: materials, quantities, equipment placement, quality of work, etc., to meet compliance with the Contract. Such review and approval shall not extend to means, methods, sequences, procedures of construction or to safety precautions and programs incident thereto, as such are the responsibility of the contractor(s). It is the

contractor(s) responsibility to adhere to the General Conditions and Special Provisions, as well as all other specifications outlined in the Contract.

- Maintain daily project Observation and Special Inspection Reports, which record the work in progress, pay quantities, labor and equipment employed, site conditions, weather, visitors, accidents, plan revisions, complaints, conversations, and other information affecting the work being performed. This will be performed using ENGINEER'S in-house, web-based, construction management program, APPIA. All reports will be entered directly into the program by the RPR in the field using a tablet and shall be approved by ENGINEER'S Construction Manager. Project pay estimates will also be generated using this software, as required in the construction contract, to allow timely reviews by Engineer and Owner.

Task 3.5 Startup Services: Assist the Village during the startup and testing of the new equipment and processes at the WTP to demonstrate that the equipment meets the functional, technical, and process design criteria in the contract documents.

If-Authorized Services

The following services will be included in the scope of work for Phase II and III services. None of the services will be performed without written authorization from the Village. No services shall be invoiced unless prior authorization from the Village to perform the services is granted.

1. Subsurface Utility Engineering: ENGINEER (or subcontractor) shall perform up to 12 SUE Level A investigations to identify the location and depth of buried utilities within the WTP site.
2. Geotechnical Investigations: ENGINEER (or subcontractor) shall perform up to four (4) soil borings at the WTP site and laboratory testing to determine soil bearing capacity, depth to groundwater, depth to bedrock, and other standard geotechnical parameters for the site.
3. Operation and Maintenance Manual: ENGINEER shall prepare an Operation and Maintenance (O & M) Manual for the WTP equipment to supplement O & M instructions furnished by the equipment manufacturers during construction. The objective will be to prepare guidance documents in language which will be understood by the plant operators.

The anticipated scope of work for the O & M Manual shall include:

- Summarize the equipment and facilities applicable to operation and maintenance.
- Prepare schematic flow diagrams, figures, and necessary drawings of the facilities to explain relationships of the various facilities and treatment processes.
- Summarize the design criteria and describe the intended methods of operation of the facilities.
- Outline reasonably foreseeable emergency operation procedures where applicable.
- Prepare an index of equipment manufacturer's operation and maintenance data furnished by Contractor.

Our proposed schedule for the above Scope of Services can be found on the next page.

Project Schedule

Our understanding and experience with WTP design enables us to efficiently assist the Village in meeting this projects objectives on time. The following schedule provides intermediate milestones for completing tasks and key coordination points with the Village within the overall project. Our team will keep in constant communication with the Village to certify we are on task and continually meeting the Villages goals and objectives. We have developed the project schedule below based on a notice to proceed on April 25, 2022.

Village of Ashville - Water Treatment Plant Expansion/ Replacement Schedule	2022									2023												2024											
Tasks	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Firm Selection and Notice to Proceed																																	
Data Collection and Kickoff Meeting																																	
Phase 1 - Detailed Design Memorandum (DDM)																																	
Review Conditions and Capacity of Existing Facilities																																	
Review Anticipated Growth and Future Water Demand																																	
Schematic Design (Emphasis on Expansion to 2.0 MGD)																																	
Village Review Meeting																																	
Spatial Design (Emphasis on Expansion to 2.0 MGD)																																	
Village Review Meeting																																	
Complete Design Criteria and Alternatives Analysis																																	
Develop Preliminary Process Equipment Information																																	
Develop Hydraulic Profile																																	
Develop Control Strategy																																	
Develop Preliminary Site Layout																																	
Develop Preliminary Structure Elevations																																	
Acquire Preliminary Geotechnical Information																																	
Acquire Permit Requirements from Regulatory Review																																	
Identify Preliminary Funding Sources																																	
Develop Preliminary Opinion of Probable Construction Costs																																	
Provide Technical Memorandum and Recommended Improvements																																	
Village Review Workshop																																	
Phase 2 - 30% Detailed Design																																	
Develop Preliminary P&IDs																																	
Update Preliminary Site Layout																																	
Develop CAD Drawing Plan Views for Process Facilities																																	
Develop Preliminary Structural Section Views																																	
Develop Power Distribution One-Line Diagram																																	
Develop Preliminary Front End Specifications																																	
Draft Final Geotechnical Report																																	
Constructability Review																																	
Operability Review																																	
Review of Preliminary Code Review																																	
Update Opinion of Probable Construction Costs																																	
30% Village Review Workshop																																	
Phase 2 - 60% Detailed Design																																	
Finalize P&IDs																																	
Update CAD Drawing Plan Views for Process Facilities																																	
Update Site Layout																																	
Update Section Views																																	
Update Power Distribution One-Line Diagram																																	
Develop Lighting Plan																																	
Complete I/O List																																	
Complete Equipment Control Descriptions																																	
Develop Plumbing and Fire Protection System Plans																																	
Develop HVAC Plans																																	
Update Front End Specifications																																	
Develop Major and Subprocess Equipment Specifications																																	
Complete Equipment Manufacturer Review																																	
Finalize Geotechnical Report																																	
Constructability Review																																	
Operability Review																																	
Update Opinion of Probable Construction Costs																																	
60% Village Review Workshop																																	
Phase 2 - 90% Detailed Design																																	
Complete Permitting Requirements																																	
Finalize Drawings and Specifications																																	
Finalize Construction Documents																																	
90% Village Review Workshop																																	
Phase 2 - 100% Detailed Design																																	
Provide Village - Final Advertisement for Bid and Information to Bidders																																	
Provide Village - Final Lump Sum Proposal Forms																																	
Provide Village - Final Technical Specifications																																	
Provide Village - Final Construction Sequencing																																	
Provide Village - Final Design Drawings and Specifications																																	
Provide Village - Final Opinion of Probable Construction Costs																																	
Provide Village - Final Permits and Approvals																																	
Phase 3 - Bidding and Project Award																																	
Phase 3 - Construction																						Anticipated 18 month Construction to Finish March 2025											

Softening Technology Alternatives

The table below summarizes the advantages and disadvantages of each softening alternative that is anticipated to be evaluated and a brief commentary regarding the feasibility of each alternative for the Village of Ashville.

Process	Advantages	Disadvantages	Comments	Recent Strand Experience	Photo
Lime Softening	• Versatile, established process • Ability to meet various finished water characteristics • Good total hardness removal based on pH endpoint of reaction • Can have low lifecycle cost of ownership • 100 percent of flow is treated (no bypass of process)	• Generation of large amounts of residual • Significant chemical use • Large number of unit processes necessary • Overall cumbersome process • Not useful for removal of future contaminants of concern	• Lime softening would fit well with the existing footprint of the site and hydraulically upstream of the filters. • Lime softening is the most common type of softening, however is gradually being replaced with other technologies	• Decatur, IL • Cedar Rapids, IA • Beaver Dam, WI • Waupun, WI • Morgantown, WV	 *Cedar Rapids, IA*
Fluidized Bed Reactor Softening (FBR)	• Low residual generation • Technology is mechanically simple • Relatively low energy use • Good compatibility with existing gravity filter plant • Low maintenance requirements • 100 percent of flow is treated (no bypass of process)	• Process has limited ability to remove magnesium hardness • Process is limited regarding how soft water can be made (typically to 150 - 170 mg/L)	• Oxford has relatively high magnesium hardness (120 mg/L), which will limit how soft finished water can be made • Other water utilities in the area (Southwest Regional Water District) successfully use FBR softening	• Jackson County, OH • Bargersville, IN • HECLA Water Association, OH	 *Bargersville, IN - Fluidized Bed Reactor*
Ion Exchange Softening	• Simple process • Good control of finished water quality and hardness levels • Relatively low operational input	• Generation of significant amount of wastewater with high dissolved solids concentrations • Waste stream can create at wastewater treatment plant discharge if site specific discharge is not obtained. • Will require significant use of salt for regeneration • Ammonia in raw water can affect softening	• Oxford is a relatively large facility for ion exchange softening • Softening facility will have large footprint • Location of softening facility will likely be downstream of gravity filters, which will require additional pumping to fit within hydraulic grade line	• Carrollton, KY • Romeoville, IL • Illinois American Water Company • Greendale, IN • Hustisford, WI	 *Romeoville, IL*
Membrane	• Ability to meet various finished water characteristics • Ability to treat for future contaminants of concern • Provides consistent finished water quality • Relatively low operational input	• Significant amount of wastewater generated, reducing the capacity of the facility • Concentrate waste disposal can be a problem, similar to ion exchange softening • Significant energy use • More corrosion control concerns than with other technologies • Significant replacement cost of membrane elements	• Location of softening facility will likely be downstream of gravity filters, which will require additional pumping to fit within hydraulic grade line • Pre and post treatment necessary for successful treatment • Oxford's significant additional capacity allows for installation of membranes without need to expand raw water capacity	• Aledo, IL • Marietta, OH • North Liberty, IA • Grimes, IA	 *Aledo, IL*

Anticipated Budgetary Costs

The table below summarizes anticipated budgetary costs for a new WTP for different softening treatment alternatives. These costs are budgetary at this stage of the project and will be more defined during preliminary and detailed engineering design. Furthermore, the presented budgetary costs are dependent on factors represented in the asterisks below the table.

Village of Ashville, Ohio - Anticipated Budgetary WTP Replacement Project Costs			
Description	Treatment Alternatives		
	Reverse Osmosis	Ion Exchange	Lime Softening
Capital Cost (1.2 MGD Capacity)	$6,560,000	$4,360,000	$7,640,000
Contingency (20%)	$1,312,000	$872,000	$1,528,000
Total Construction	$7,872,000	$5,232,000	$9,168,000
Technical Services and Legal (20%)	$1,574,400	$1,046,400	$1,833,600
***Total Basic Project**	**$9,446,400**	**$6,278,400**	**$11,001,600**

*Costs do not include demolition, complex sequencing, additional pretreatment and chemicals beyond chlorine, fluoride, corrosion control, basic treatment

*Annual Operation and Maintenance per alternative varies.

*The Budgetary WTP Replacement Project Cost is based on 2021 dollars and is from bid histories and other historical data. Strand does not guarantee the Budgetary WTP Replacement Project Cost provided will be the actual cost for the project experienced in a competitive bidding environment. Actual costs may vary depending on inflation, supply chain, contractor availability, etc. Costs shown are based on the present understanding of the project and for budgeting purposes only. Actual fees will be based on the agreement executed and scope of services therein with the Village. The Budgetary WTP Replacement Project Cost is provided to the Village of Ashville for its budgeting purposes.

Similar Projects and References

WRRF Corrective Action Plan, Ashville, OH

The Water Resource Recovery Facility (WRRF) Corrective Action Plan project is not a water treatment project. However, the WRRF receives residuals from the existing WTP, which will be reviewed as a component of the Village's Water Treatment Plant Expansion/Replacement project. We have been working with the Village reviewing improvements to the WRRF and are very familiar with the existing facility processes; which will be an asset when reviewing residuals handling for the WTP Expansion/Replacement project.

We assisted the Village of Ashville with a Corrective Action Plan of their WRRF in 2022. Village staff reported experiencing equipment issues and operational challenges shortly after WRRF construction was completed. We assisted the Village in reviewing the following:

- Site Drainage near Solids Handling Building
- Fiber Optic Communications
- Influent Pump Nos. 1, 2, 3
- RAS and WAS Pumps Nos. 1 and 2
- RAS and WAS Valve Vault and Valve Actuators
- RAS Pumps MCC Bucket Indicator Lights
- Headworks Building Evoqua panel power failure
- Headworks Building Pressurization and Corrosion Control Unit

The Corrective Action Plan recommendations have been reviewed with the Village and the project is currently in progress.

Name of Owner:
Village of Ashville

Project Contact:
Adam Kehoe
WRRF Manager
3219 State Route 752
Ashville, OH 43103
740-983-6367

Key Personnel:
Jamie Mills
Scott Stearns
Shane Zenz
Tyler Wright
Aaron Craig

RAS & WAS Splitter Structure

Sludge Cake Pad

WTP Expansion – Morgantown, WV

We provided master planning, design, and construction-related services for the $34 million, 16-mgd WTP process improvements for the Morgantown Utility Board (MUB). The treatment train consists of rapid mix, flocculation, and sedimentation followed by microfiltration. Our initial efforts with MUB included:

- Installation of a new semi-automated filter control and monitoring system
- Replacement of the existing granular filter media with new media
- Addition of filter-to-waste piping, valves, and controls with the existing system
- Addition of new turbidity meters with each of the eight filter cells

Following this effort, we were again selected by MUB to provide plan development, preliminary and final design, bidding-related assistance, and construction-related services. As part of this process we identified that the existing 16-mgd WTP was delivering only 13 mgd because of hydraulic constraints within the plant. Based on our Master Plan, MUB was able to prioritize treatment system upgrades designed to improve water quality and treatment capacity, including:

- Two 500 pounds per day batch lime slaking systems for pH control
- New intake structure and flat panel prescreens on the Monongahela River
- Low-lift pumping station improvements

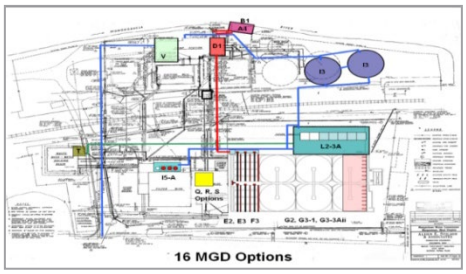
Name of Owner:
Morgantown Utility Board

Project Contact:
Greg Shellito
Manager of Treatment and Production
304-599-2111

171 Don Knotts Blvd,
Morgantown, WV 26501

Key Personnel:
Brian Hackman
Scott Stearns
Andrew Esarey
Shane Zenz
Chris Wright
Kris Ruggles

- New rapid mix and flow splitting facilities
- Flocculation equipment and baffling upgrade
- Sedimentation optimization by installing an influent baffling wall and effluent weirs
- New intermediate pumping station following granular media filtration
- Membrane filtration facility with pretreatment and bypass options
- Various chemical feed system replacements and improvements
- Two, new 1-mg clearwells
- High-service pumping improvements
- Membrane backwash and residuals treatment systems
- Existing facility infrastructure and equipment rehabilitation and/or replacement



Recommended membrane filter expansion.


MUB's Water Treatment Facility (2013).

The membrane design process for this facility was a unique feature, involving procurement of the membrane filtration system prior to pilot testing, design, and State approvals. By selecting a single submerged membrane system manufacturer upfront, MUB and the design team were able to work hand-in-hand with the selected manufacturer, leading to an efficient engineering process. This planning and design approach provided several key benefits:

- Rehabilitation of the existing 1981 WTP facilities to extend its useful life, including structural, mechanical, electrical, and HVAC improvements.
- Incorporation of membrane treatment technology to promote improved water quality and reduce long-term costs for future expansion.
- Flexibility to isolate unit treatment processes for operations and maintenance.
- Increased clearwell storage for improved disinfection capabilities.
- Ability to expand up to 24 mgd within the existing site and infrastructure.
- Improved residuals handling and sanitary system.
- Construction sequencing that allowed MUB to maintain and monitor plant operations through its SCADA system, while installing new and updated facilities.

2019 Water Treatment Plant Improvements –Lawrence County, OH

In 1969 we assisted with the formation of the Hecla Water Association, Inc. Since then we have provided the majority of their consulting engineering services, allowing the Utility to grow from a startup utility to a county-wide system serving more than 13,000 customers and providing water supply to 12 of the 14 townships in the county.

Currently, Hecla operates a 3.4 MGD water treatment plant, 8 groundwater wells, 900 miles of water mains, 22 water storage tanks, and 23 pumping stations.

In 2018, Hecla hired Strand to complete an operational needs review (ONR) for their water plant. The review determined that a new chemical feed system was needed for the plant. It also recommended that Hecla transition from using lime to caustic soda for their fluidized bed reactor softening process. Additional recommendations included replacing one set of filters and updating the intermediate pumps.

With the conclusion of the ONR, Hecla hired Strand to prepare a Rural Development Preliminary Engineering Report that used the ONR as a basis for the recommended alternative. With this report Hecla was able to secure both grant and loan funding from Rural Development.

Name of Owner:
Hecla Water Association, Inc.

Project Contact:
Tony Howard
General Manager
740-533-0526

3190 State Route 141
Ironton, OH 45638

Key Personnel:
Scott Stearns
Shane Zenz
Kris Ruggles

Strand is currently completing design of an improvement project to the Hecla water plant. The project involves completing the recommendations made by the ONR which included the design of a caustic soda feed system, a catalyst feed system, recirculation pumps and repainting the existing fluidized bed reactors. The fluidized bed reactor softening process will use caustic soda to increase the pH to allow for the Calcium hardness entering the plant to be precipitated out of solution. The catalyst process will allow Hecla to easily add the catalyst (sand) to the reactor to create larger particles that more quickly fall out of the water allowing for a shorter detention time in the reactor. The catalyst, or sand, is loaded into a bulk bag unit that facilitates the transfer of catalyst up to the top of the reactors. Finally, the recirculation pumps are added in this case to keep the sand suspended when the well pumps are not being operated. This is one of several ways Strand evaluated to keep the sand fluidized. Other options that were considered included using compressed air or increasing the head on the well pumps. Construction for these water treatment improvements is scheduled to begin in the first half of 2020.

Existing Fluidized Bed Reactors at HECLA Water Treatment Plant. Renovations to fluidized bed reactors and conversion of facility from lime to caustic soda for pH control are currently under design by Strand.

Water Treatment Plant Expansion for the Countywide Underserved Project – Carrollton, KY

Strand was selected by Carrollton Utilities (CU) to provide engineering services for the Countywide Underserved Project. The project has two major parts, (1) the expansion of the Carrollton Utilities Water Treatment Plant (WTP) utilizing ion exchange softeners and (2) numerous water distribution extensions and enhancements to both CU and West Carroll Water District (WCWD).

CU previously operated a 1.5 MGD lime softening plant with conventional filters. Raw water quality from local groundwater wells was good but very hard with average hardness exceeding 400 mg/l. Initially CU intended to expand their existing lime process at the WTP by installing lime sludge dewatering equipment, a new filter train, and low lift pump as part of this project. The primary goals of the WTP expansion include:

- Reduced operational requirements at the WTP to one manned shift a day.
- Addressing reduction in available sludge lagoon volume due to revised land use.
- Increased treatment redundancy to accommodate equipment maintenance.

Name of Owner:
Carrollton Utilities.

Project Contact:
Terry Roach
Utility Engineer
502-732-1217

900 Clay Street
Carrollton, KY 41008

Key Personnel:
Scott Stearns
Andrew Esarey
Shane Zenz
Liz Dienst

A Preliminary Engineering Report (PER) was developed by Strand to analyze the pros and cons of expanding the existing lime process and two other treatment alternatives, ion exchange softening and fluidized bed reactors (FBR) and determine which alternative best accomplished CU's operational goals.

Our knowledge of numerous water treatment processes, experience with water softening systems, and detailed PER convinced CU to shift course and proceed with the ion exchange process instead of expanding their existing lime process. Strand identified critical benefits of adding the ion exchange process over expanding the existing lime process which include:

Expand Lime Process

- Operator required for at least 12 hours per day
- Increased sludge production
- Additional upgrades required for full redundancy
- New building or building expansion required
- Several pieces of equipment would be working at maximum rated capacity
- Transmission main improvements required to accommodate higher flows during operation

Ion Exchange Process

- Operator required for less than 8 hours per day
- Sludge production eliminated
- Two independent treatment trains
- No building expansion required
- All equipment operated within recommended levels
- Automated operation produces same volume but over longer period of time per day, reducing peak flows and eliminating need for transmission main improvements

The small footprint and modular installation of the ion exchange units will be placed in CU's existing treatment building with no building expansion required.

The CU WTP is currently in operation as the largest and 2nd operating ion exchange WTP in Kentucky. The design allows the use of an existing pump and an additional redundant pump to discharge to either the existing lime softening processes or the new ion exchange processes saving CU the capital cost of separate pumping equipment. The facility now operates uniquely in the state as both a Class A and B operated WTP.

The water distribution system improvements of the project included extending water service to new customers and providing improved service to existing customers throughout Carroll County. The project included two new booster pump stations equipped with new telemetry and SCADA systems and approximately 49,600 linear feet of 3-inch, 4-inch, and 6-inch water mains. The project provided improved service to large portions of the CU and WCWD service areas along with extending service to 25 new customers in Carroll, Henry, and Trimble Counties.

WTP and Distribution System Improvements – Decatur, IL

We have been providing services to the City of Decatur since 1998 to study and plan for alternative treatment processes (UF/RO piloting), SCADA Technology Plan, and Water System Master Planning for this 34-mgd, two stage, lime-soda, ash treatment facility (constructed in 1988). We continue to provide services to the City today, as we are currently conducting an Extended Period Simulation based water modeling study to evaluate water age and chlorine residuals within the City's water system. Out of the planning efforts, we have been tasked by the City to design the following improvements:

- Phase I - Water System Improvements
- Phase II - Water System Improvements
- Fluoride FRP Storage Tank Replacement
- William Street Reservoir Pump Station MCC Replacement
- Powdered Activated Carbon Feed System Retrofit
- SCADA Computer Replacement

Name of Owner:
City of Decatur, IL

Project Contact:
Keith Alexander Director of Water Production
217-424-2863

1155 South Martin Luther King Jr. Drive
Decatur, IL 62521

Key Personnel:
Brian Hackman
Scott Stearns
Shane Zenz

The SCADA Technology Plan included review of the City's existing instrumentation, equipment, process controls, and communications. A list of all the instrumentation and equipment was identified and a rating system (1 to 5) was established to prioritize the need for upgrade/replacement. Items with a priority 1 were recommended to be upgraded in the first phase, while items with a priority 5 were recommended for replacement in the last phase. The process control optimization review entailed working sessions with plant staff to discuss and document existing control strategies and present ideas on where improvements could be made. Finally, the communication review covered in-plant communications, remote communications, SCADA computers, SCADA software, process, inventory, maintenance reporting, and staff training. The technology plan created a 10-year roadmap for phased implementation of the automation process.

Installed lime slaker with automated gravimetric feed.

Nonproprietary PLC-based controls were installed at key locations.

We provided the following improvements as part of the City's SCADA Technology Plan:

- Telemetry network for all sites
- Control descriptions and input/output (I/O) list for all improvements.
- Replacement of lime slakers No. 2 and 3. (2,000 lbs. per hour pug mill type)
- Replacement of lime sludge blow-off system (four basins)
- Installation of a National Pollutant Discharge Elimination System (NPDES) discharge facility with continuous monitoring
- Automation of six multimedia granular filters (air scour included)
- Automation of lime chemical feed system based on flow pacing and water quality
- Planning for a water distribution system monitoring network
- Consideration for expansion and future phases
- Local and remote security camera installation
- Solids contact basin sludge rake controls
- Replacement of lime slaker No. 1 (2,000 pounds per hour pug mill type)
- Fluoride chemical tank ventilation
- Powdered activated carbon (PAC) feed system replacement
- Filter headloss monitoring sensors
- Polymer coagulant storage, makeup, and feed system
- Polyphosphate chemical makeup and feed system
- Chemical storage to day tank transfer automation

WTP Process Improvements Evaluation – Cedar Rapids, IA

We were hired by the City of Cedar Rapids to perform a process improvements evaluation at the J Avenue WTP. The J Avenue WTP was originally constructed in 1929, with upgrades and expansions occurring in 1949, 1967, and 2009. The plant has begun to experience age-related issues not readily correctable through preventative maintenance. The City identified several critical processes for further evaluation. Our mission was to identify improvements to maintain reliable and efficient water production and treatment for the next 50 years.

Name of Owner:
City of Cedar Rapids, IA

Project Contact:
Keith Alexander Director of Water Production
217-424-2863

1111 Shaver Road
Cedar Rapids, IA 52402

Key Personnel:
Brian Hackman
Scott Stearns
Chris Wright
Jamie Mills

Lime softener clarifier basins.

Lime slaker system.

The study evaluated and recommended improvements for the following components:

- Existing lime softener clarifier basins.
- Automation of the dosage systems for chlorine, carbon dioxide, fluoride, and zinc-orthophosphate.
- Existing lime slaker system.
- Existing lime lagoons.
- Existing backwash supply piping.
- Filter backwash process.
- Filtration technologies.
- Existing sludge dewatering process.
- Chemical storage space for chlorine, carbon dioxide, fluoride, and zinc-orthophosphate.

The study included at least two alternatives for each component. The alternatives were evaluated by examining both monetary considerations and non-monetary considerations. The monetary considerations included capital, operational, and maintenance costs during a 20-year total present-worth. Nonmonetary considerations included performance, operations, maintenance, and complexity to implement. The study also included a phased approach to each alternative to limit impact on plant operations. The opinion of probable cost for the recommended improvements was approximately $37 million and broken down into five phases. The City subsequently budgeted for this work in a 10-year CIP, with one phase being completed every 2 years.

James I. Mills, Jr., P.E.

AREAS OF EXPERTISE

- Water and Wastewater Treatment Unit Processes
- Water and Wastewater Plant Design and Operations
- Collection and Distribution System Planning and Design

PROFESSIONAL EXPERIENCE

Water experience:

- Water treatment plant Operations and Needs Review (ONR) and surveying assistance for Marietta, Ohio.
- WTP ONR for Portsmouth, Ohio
- Waterline Replacement and surveying assistance for Upper Arlington, Ohio.
- Kimes Reservoir Booster Station Improvements for Athens, Ohio.
- Hollow Road Waterline Extension and Booster Station Design for Southwest Licking Community Water and Sewer District.
- Impact Fee Analysis for Village of Plain City, Ohio.

Wastewater experience:

- Equalization basin and service water design for Village of New Lenox WWTP Improvements.
- Village of New Boston CSO Improvements, Phase 8A Construction Administration and oversight.
- Headwork improvements for the Village of New Holland, Ohio.
- Phosphorus removal testing, planning, and anaerobic digestion needs assessment for Mount Vernon, Ohio.
- Nutrient Removal Facilities Planning and Design for the City of London, Ohio.
- WWTP Facility Plan Update for the Village of Manhattan, Illinois.
- Influent pump and mechanical fine screen replacement as well as channel sizing for the City of Greensburg, Indiana, Wastewater Facility.
- WWTP sludge handling improvements and phosphorus removal study for Chillicothe Department of Corrections.
- Feasibility study to evaluate installation of a digester gas conditioning system for vehicle fuel use in Dubuque, Iowa.
- WWTP solids handling improvements, flow monitoring study, and collection system improvements for Athens, Ohio.
- WWTP Improvements, O&M Manual, onsite construction assistance and a flow metering study for Parkersburg Utility Board, West Virginia.
- Flow metering study and phosphorus removal study for the City of East Liverpool.
- WWTP Improvements in Andrews, Indiana.
- WWTP Improvements, Construction Administration, Equipment Startup and Funding Assistance for the Star City Wastewater Facility in Morgantown, West Virginia.
- WWTP Aeration System Upgrade and on-site installation assistance in Delaware, Ohio.
- WWTP influent pump assessment and Lawson Run Sewer Separation Feasibility Study for Portsmouth, Ohio.
- WWTP Operation Needs Review and design improvements for Chillicothe, Ohio.
- WWTP improvements and construction services for the Town of Bargersville, Indiana.

Stormwater experience:

- Evaluation and hydraulic design for stormwater conveyance as well as green infrastructure installation for Columbus, Ohio.
- Stormwater Pollution Prevention Plan (SWPPP) in East Liverpool, Ohio.
- SWPPP for Chillicothe Correctional Institution, Ohio.

YEARS OF EXPERIENCE

11

YEARS WITH FIRM

7

EDUCATION

M.S. Civil/Environmental Engineering – The Ohio State University, Columbus, Ohio, 2015

B.S. Microbiology – The Ohio State University, Columbus, Ohio, 2010

Minor Mathematics – The Ohio State University, Columbus, Ohio

REGISTRATION

Professional Engineer in Ohio

Class II Wastewater Operator

James I. Mills, Jr., P.E.

Research experience:

- Filter treatment design for flue gas desulfurization (FGD) wastewater included testing for turbidity, conductivity, pH, and performing serial filtrations to manage particle size distribution and colloidal removal targeting sulfate, chloride, calcium, magnesium and TKN contaminants.
- Investigated the industrial application of downstream recombinant protein purification using affinity tag technology coupled with a self-cleaving elastin-like protein (ELP) platform for bioseparations.
- Investigated the survival and metabolic characteristics of BSL-2 pathogens following lipid modification.
- Investigated modified central carbon metabolism, photosynthesis, motility and phenotypic characteristics following bacterial conjugation of *E. coli* and *R. sphaeroides.*

PRESENTATIONS

- A Look into Phosphorus Removal Design. Ohio Water Environment Association (OWEA), Huron, Ohio, 2019.
- No Space No Problem: Membrane Bioreactors and Silo Digester Expand Capacity. Presentation and article. One Water Technical Conference, Columbus, Ohio, 2018. The Ohio Water Environment Association – Buckeye Bulletin Magazine, Volume 92:3, Issue 3, 2019.
- A Look Forward – How to Handle Low Level Phosphorus Limits with Creative Solutions. OWEA Technical Conference and Exposition, Annual Conference, Cincinnati, Ohio, 2017.
- Industrial Pretreatment Considerations. Ohio Water Environment Association Southeast Section (SEOWEA) Meeting, Newark, Ohio, 2017.
- City of London Wastewater Treatment Facility. Article, The Ohio Water Environment Association – Buckeye Bulletin Magazine, Volume 90:4, Issue 4, 2017.

PROFESSIONAL AFFILIATIONS

- The Ohio Water Environment Association, Southeast Section Secretary
- West Virginia Municipal Water Quality Association

Brian L. Hackman, P.E., P.H., BCEE

Director of Practice-Water

AREAS OF EXPERTISE

- Membrane Filtration Treatment
- Water Treatment Unit Processes
- Water Supply and Distribution Studies
- Hydraulic and Pump Analysis
- SCADA Database Development
- Automated Meter Infrastructure

PROFESSIONAL EXPERIENCE

Water System Design of wells, pumps, water treatment unit processes for ground and surface water treatment, water distribution systems, and the automation of water treatment facilities using of Supervisory Control and Data Acquisition (SCADA). Brian has served as the Project Manager for the various projects associated with the 14 MGD water treatment facility improvements in Lake Forest, Illinois ($8.8 million construction), the 15 MGD Correction Actions and 2012 Water System Improvements Projects in Fairmont, West Virginia ($17 million construction), Assistant Project Manager for the 10 MGD Logan Todd Regional Water Commission ($23 million construction) and 16 MGD Morgantown Utility Board membrane treatment facilities ($34 million construction). Brian has also served as the Project Manager for the Procurement of HMO treatment systems for the City of Joliet and Rockford, Illinois (60 MGD total, $12 million in filtration equipment, $85 million total construction), and Preselection of submerged membrane filtration equipment for Paintsville Utilities, Kentucky ($23 million construction). Water treatment project experience includes:

- City of Lake Forest, Illinois – 2017 WTP Improvements Project and Water System Planning
- City of Two Rivers, Wisconsin – WTP Maintenance Plan and Membrane Replacement
- City of Cedar Rapids, Iowa – WTP Master Plan and Phase II Improvements Design
- City of Decatur, Illinois – SCADA Technology Plan, Water Treatment System Improvements, and Water System Master Plan Update

Investigative Designs and Studies using automated bench and pilot scale membrane filtration systems, water system modeling and distribution system analysis, pilot scale filtration systems, removal of NOM and DBP precursors using activated carbon, water chemistry, and process optimization.

RECOGNITION

- Commissioned as a Kentucky Colonel by the Governor of Kentucky for the outstanding service provided during planning, design, and construction of the Logan Todd Regional Water Commission WTP. This award honors those who have made significant contributions to the betterment of the Commonwealth of Kentucky.

PRESENTATIONS/PUBLICATIONS

- Replacement Membranes – Is the Grass Greener With a Different Module? Illinois AWWA Annual Conference, March 2017
- Replacing the First Large Scale Municipal Ultrafiltration Membrane System in Illinois. AWWA and AMTA Membrane Technology Conference, March 2017
- Replacing an Existing Membrane System. Illinois AWWA Annual Conference, March 2016
- Testing to Evaluate Filter Conditions. Wisconsin Water Association Treatment Operations Seminar, April 2015
- UCMR Data and Treatment Technologies – Illinois AWWA Annual Conference, Presented March 2015
- Operation of High-Service Pumps Under Reduced Demand Conditions, Wisconsin Water Association Treatment Operations Seminar, April 2014
- Refurbishing Chemical Feed Systems In-Place, Illinois AWWA Annual Conference, Presented March 2013
- Membrane Module Replacement, West Shore Water Producers, Presented November 2013

YEARS OF EXPERIENCE

25

YEARS WITH FIRM

23

EDUCATION

M.S. Environmental Engineering in Civil Engineering – University of Illinois at Urbana-Champaign, 1998

B.S. Civil Engineering with Honors – University of Illinois at Urbana-Champaign, 1996

REGISTRATION

Professional Engineer in Illinois, Kentucky, Ohio, Tennessee, West Virginia, Wisconsin, and Arizona

Professional Hydrologist in Surface Water by the American Institute of Hydrology

Board-Certified Environmental Engineer by the American Academy of Environmental Engineers

Brian L. Hackman, P.E., P.H., BCEE
Director of Practice-Water

- Automated Meter Reading Infrastructure, Illinois Section AWWA Annual Conference, Presented March 2011
- Expanding an Existing 16 MGD Facility with Membrane Filtration, Illinois Section AWWA Annual Conference, Presented March 2011
- Chlorine System Comparisons, Illinois Potable Water Supply Annual Conference, Presented September 2009
- Surface Water Treatment 101– Illinois AWWA Technical Conferences, Presented March 2007
- Planning for your IDSE Report – Illinois AWWA Annual Conference, Presented March 2007
- Optimizing Surface Water Treatment – Illinois AWWA Technical Conference, Presented May and June 2005
- Village of Kenilworth Water System Improvements – West Shore Water Producers, Presented May 2005
- Enhanced Filtration Piloting on a Difficult Water Source – Illinois AWWA Annual Conference, Presented March 2005
- Membrane Technology – University of Wisconsin-Madison College of Engineering, Short-Course on Retrofitting and Optimizing Drinking Water Treatment Plants, Course Instructor, Annual participation since 2004.
- Understanding the New USEPA Regulations – Illinois AWWA Secondary Effects of Treatment Technologies Conference, Presented April and May 2004
- CE342 – Water Quality Control Processes – University of Illinois – Urbana, Guest Lecturer, Professor Mark M. Clark, Presented, November 2003
- Vulnerability Assessments – AWWA Wisconsin Section Annual Meeting, Co-Presented, October 2003
- Membrane Filtration Piloting on the Cumberland River – AWWA – Wisconsin, Kentucky, Tennessee, and Illinois Section Annual Meetings, Presented March 2001, May 2002, and May 2003
- Membrane Filtration Practice in Water Treatment, Guest Lecturer – University of Wisconsin- Madison, Water Treatment Facility Design Course, Professor Jae Park, Presented 2001– 2014
- Surface Water Quality Monitoring for Plant Design on the Cumberland River – AWWA – Kentucky/Tennessee Section Annual Meeting, Presented September 2000

PROFESSIONAL AFFILIATIONS

- Alpha Lambda Delta, National Freshman Honor Society, Member
- American Society of Civil Engineers, Member
  - Outstanding Student Member, Central Illinois Section, 1996
  - 2000 Spring Technical Conference Committee, Wisconsin Section, Chairperson
- American Water Works Association, Member
  - More than 25 years active membership.
  - Member, Membrane Research Committee, American Water Works Association, 1998-2002
- American Membrane Technology Association (AMTA) Member
- Chi Epsilon, Civil Engineering Honor Society
  - Chapter Trustee, UW-Madison Student Chapter, 1999 – Present
  - Member, University of Illinois at Urbana-Champaign, 1994 – Present
- Course Mentor for Civil and Environmental Engineering 823 – Environmental Engineering Design Project, University of Wisconsin - Madison, Spring 2018 Semester
- Tau Beta Pi, Engineering Honor Society, Member
- Phi Kappa Phi, All Academic Honor Society, Member

Scott W. Stearns, P.E., BCEE
Senior Associate

AREAS OF EXPERTISE

- Water and Wastewater Treatment Unit Processes
- Biosolids Digestion, Thickening and Handling System
- Membrane Systems and Odor Control
- Conveyance System Evaluations
- Project and Construction Management

PROFESSIONAL EXPERIENCE

Water and Wastewater Treatment experience includes facility planning, design, construction, and project management ranging from small plant expansions to a multimillion Greenfield projects. Scott has served as Project Manager for the following:

- 10 MGD ($25 million) – Logan Todd Regional Water Treatment Plant
- 10 MGD ($42.3 million) WWTP Expansion – Parkersburg Utility Board, West Virginia
- 25 MGD ($65 million) WWTP Expansion – Kankakee River Metropolitan Agency, Illinois
- 14 MGD ($41 million) Plant Expansion – Waukesha, Wisconsin
- 22 MGD ($85 million) Plant Expansion – Morgantown Utility Board, West Virginia

Specific areas of process expertise include membrane systems for water and wastewater treatment, wastewater treatment processes such as screening, grit removal, sedimentation, activated sludge, digestion, sludge thickening and dewatering. Water treatment expertise includes surface water treatment processes, including membrane filtration piloting and design, flocculation, sedimentation, lime softening, water treatment residuals management.

Additional experience in process instrumentation, control strategies, and system commissioning and start-up. Experience in permit and regulatory issues, user-charge development, sludge regulations, operator training and system startup, planning, design and startup for water and wastewater plants. Research experience includes radium and radon fate and transport in water distribution systems.

AWARDS

- Commissioned as a Kentucky Colonel by the Governor of Kentucky for the outstanding service provided during planning, design and construction of the Logan Todd Regional Water Commission WTP. This award honors those who have made significant contributions to the betterment of the Commonwealth of Kentucky.

PRESENTATIONS/PUBLICATIONS

- *No Space, No Problem – Membrane Bioreactors and Silo Digester Expand Capacity*, presented at Ohio One Water Joint Conference, 2018, Columbus, Ohio
- *Options for Meeting Stricter, New Ammonia Limits* – Presented at Illinois Association of Wastewater Agencies Technical meeting, 2015, Utica, Illinois
- *An Aging Treatment Plant and New Neighbors and Challenges* – Presented at the South East Ohio Water Environment Federation meeting, 2015, Athens, Ohio
- *Evaluating Equipment with the End in Mind – How Do We Get the Equipment We Want for an Affordable Price?* – Presented at WATERCON Total Water Conference 2014, Springfield, Illinois

PROFESSIONAL AFFILIATIONS

- Water Environment Federation/Central States Water Environment Association
- American Water Works Association/AWWA Wisconsin Section
- Wisconsin Wastewater Operators Association
- American Academy of Environmental Engineers
- West Virginia Municipal Water Quality Association

YEARS OF EXPERIENCE

29

YEARS WITH FIRM

29

EDUCATION

M.S. Civil/Environmental Engineering – University of Iowa, Iowa City, 1993

B.S. Civil/Environmental Engineering – University of Iowa, Iowa City, 1991

REGISTRATION

Professional Engineer in Iowa, Wisconsin, Illinois, West Virginia, and Ohio

STRAND ASSOCIATES®

Andrew Esarey, P.E.

AREAS OF EXPERTISE

- Hydraulic Modeling
- Water Quality Modeling
- Capital Improvement Plan Development
- Water Supply
- Water Treatment
- Property Acquisition

PROFESSIONAL EXPERIENCE

Water Treatment Engineering experience includes all aspects of water treatment design, including various processes, chemical feed systems, raw water pumps, and operator training.

- **Central City Water Treatment Plant Expansion, Central City, KY** – Project Engineer for the preliminary engineering and design and Project Manager of the construction administration for the Central City WTP Expansion. The project involved increasing the capacity of the WTP from 4 mgd to 7 mgd to meet future demands. Andrew was involved in the multi-year project from start to finish, assisting with the initial preliminary engineering report and site assessment of the WTP, leading design efforts for the river water intake pumping station and various chemical systems, and taking over as Project Manager during the Construction Administration portion of the project.
- **Logan Todd Regional Water Commission, Guthrie, KY** – Project Engineer for the Water Treatment Maintenance and Expansion Study. Andrew was a design engineer for the raw water intake improvements and conducted on-site evaluations as part of the study. Andrew, in coordination with Logan Todd staff, also developed and presented "*Kentucky's First Membrane Water Treatment Plant Looks to Tennessee Expansion*" at the 2017 KY/TN AWWA/WEA Water Professionals Conference. The presentation provided a brief history of the WTP and an overview of Stand's findings in the Study.
- **Capital Improvement Plan, Operational Needs Review, and WTP Pilot Study, City of Portsmouth, OH** – Project Manager for the City of Portsmouth WTP Operational Needs Review (ONR), Distribution System Capital Improvement Plan (CIP), and ACTIFLO ballasted sedimentation process Pilot Study. The ONR and CIP were completed concurrently, allowing Andrew and his team to evaluate WTP and distribution needs simultaneously and provide the most cost-effective solutions from a treatment and distribution perspective. The ONR included a detailed on-site assessment of each process at the WTP to identify deficiencies, provide recommendations to address those deficiencies, and develop planning-level opinions of probable construction cost (OPCC). Following the ONR, Andrew managed a six-week pilot study of the ACTIFLO ballasted sedimentation process, where he designed pilot protocols in coordination with the Ohio Environmental Protection Agency (OEPA) and Veolia Water Technologies.
- **Water Treatment Plant Upgrades, City of Morganfield, KY** – Project Manager for the design of aerator improvements, intake improvements, and chemical system upgrades at the Morganfield WTP. The project included the replacement of the raw water intake pumps, three new chlorine application points to allow better control of disinfectant residual entering the distribution system, and the replacement of the concrete tower for the WTP aerators used for iron removal.
- **Countywide Underserved Project, Carrollton, KY** – Project Manager for the Countywide Underserved Project. The project involved the design and construction of a new Ion Exchange process to meet Carrollton Utilities operational goals of (1) reducing operational requirements at the WTP to one manned shift per day, (2) address reduction in available sludge lagoon volume due to revised land use, and (3) increase treatment redundancy to

YEARS OF EXPERIENCE

14

YEARS WITH FIRM

14

EDUCATION

M. Engineering Civil and Environmental Engineering – University of Louisville, Kentucky, 2007

B.S. Civil and Environmental Engineering – University of Louisville, Kentucky, 2007

REGISTRATION

Professional Engineer in Kentucky and Ohio

Andrew Esarey, P.E.

accommodate equipment maintenance. Andrew assisted with the preliminary engineering report, which included a condition and space-needs assessment of the existing WTP facility.

PRESENTATIONS

- Northern Division Connection, KAWC
  - Water Professionals Conference, 2015
  - ASCE Annual Meeting, 2014
  - KSPE Annual Convention, 2014
- Kentucky's First Membrane Water Treatment Plant looks to Tennessee Expansion
  - AWWA/WEA Water Professionals Conference, 2017
- Hydraulic Modeling – Predicting and Resolving Water Quality Issues
  - Bowling Green Municipal Utilities, 2017
  - Indiana Rural Water Association, 2015

PROFESSIONAL AFFILIATIONS

- American Society of Civil Engineers
  - Louisville Branch, Younger Member Group President, 2015-2018

AWARDS AND HONORS

- American Society of Civil Engineers
  - Young Engineer of the Year, 2017

Christopher H. Wright, P.E.

AREAS OF EXPERTISE

- Design Engineering for Plumbing
- Design Engineering for Fire Protection
- Design Engineering for Process Piping
- Design Engineering for HVAC System Design
- Design Engineering for Plant Utilities

PROFESSIONAL EXPERIENCE

Experience in the design of plumbing systems, fire protection systems, process piping systems, and HVAC systems for water and wastewater treatment facilities, educational facilities, commercial facilities, and industrial facilities.

Plumbing Systems – Design of various plumbing systems for commercial, industrial food processing, water treatment, and wastewater treatment facilities. System design has included plumbing for laboratories, including acid waste systems.

Fire Protection Systems – Design of fire protection systems for water treatment facilities and commercial facilities. System designs have included wet and double interlock preaction-type systems.

Process Piping Systems – Design of process piping systems for wastewater treatment systems including cooling incoming influent water with outgoing effluent water.

Boiler Systems – Design of boiler replacements and additions for wastewater treatment and industrial food processing facilities.

Commercial and Industrial Ventilation – Design of make-up air systems, plant clean-up air systems, and boiler room ventilation systems. Design of HVAC systems and controls for commercial facilities.

Water and Wastewater Treatment Plant Facilities HVAC – Designed heating and ventilation systems for a variety of water and wastewaters treatment facilities. System design includes high hazard environment ventilation systems, testing, laboratories, and natural gas distribution systems.

Plant Utility Systems – Design of various plant utility systems for industrial food processing, water treatment, and wastewater treatment facilities. System design has included natural gas, chilled water, heating hot water, cooling tower, steam and condensate systems.

SELECT PROJECTS

Chris served as the Mechanical Engineer for the following projects:

- Well No. 7 – Iron and Manganese Removal – Madison, Wisconsin
- Well No. 10 Iron Removal – Pressure Filtration – Belvidere, Illinois
- Water Treatment Plant Improvements – Lake Forest, Illinois
- J-Avenue Water Plant Process Improvements - Phase 2 – Cedar Rapids, Iowa
- Well No. 26 Facility – Fond du Lac, Wisconsin
- Secondary Well Sites Chemical Room – Rockford, Illinois
- Booster Station 106 - Madison, Wisconsin
- Well 15 VOC Air Stripper – Madison, Wisconsin
- Waukesha Wastewater Treatment Plant Upgrades – Waukesha, Wisconsin
- WWTP Regionalization Improvements – Phase 1 and Phase 2 Upgrades – Salem Lakes, Wisconsin

YEARS OF EXPERIENCE

9

YEARS WITH FIRM

9

EDUCATION

B.S. Mechanical Engineering – University of Wisconsin-Platteville, 2012

REGISTRATION

Professional Engineer in Wisconsin

Shane P. Zenz, P.E.
Senior Associate

AREAS OF EXPERTISE

- Electrical Power Distribution (15 KV and Below)
- Energy Analysis and Review
- Medium and Low voltage Standby Power Systems
- Security and Access Control Systems
- SCADA Systems
- Fire Alarm Systems

PROFESSIONAL EXPERIENCE

Water and Wastewater Treatment experience includes initial project concepts, preliminary designs, and preparation of final drawings and specifications. This experience includes design of the power distribution system, backup power systems, SCADA Systems, and networking ad communication systems. Shane has served as lead electrical engineer for the following:

- 10 MGD ($25 million) – Logan Todd Regional Water Treatment Plant
- ??MGD ($5 million) - Athens, OH WTP Waterworks Improvements
- 10 MGD ($42.3 million) WWTP Expansion – Parkersburg Utility Board, West Virginia
- 22 MGD ($85 million) Plant Expansion – Morgantown Utility Board, West Virginia

Process and system control experience includes PLC controls, fiber optic and radio communications, lighting evaluations, electrical component life-cost cycle analysis, telecommunication infrastructure, fire alarm systems, access control, security systems, video surveillance/public address systems.

Select Projects involved a combination of electrical power distribution design, standby power system design, as well as design of instrumentation and controls for each associated SCADA system. Many of these projects involved interfacing with existing processes and instrumentation as part of the new SCADA systems.

- **Water Treatment Plants**
  - Parkersburg, West Virginia
  - Decatur, Illinois
- **Water Utilities**
  - West Bend, Wisconsin
  - Town of Brookfield, Wisconsin
  - Onalaska, Wisconsin
  - Fond du Lac, Wisconsin
- **Wastewater Pollution Control Plants**
  - Dubuque, Iowa
  - Cedar Rapids, Iowa
  - Kankakee, Illinois
  - Parkersburg, West Virginia
  - Fond du Lac, Wisconsin

YEARS OF EXPERIENCE

33

YEARS WITH FIRM

33

EDUCATION

B.S. Electrical Engineering – University of Wisconsin-Platteville, 1989

REGISTRATION

Professional Engineer in Wisconsin, Iowa, Ohio, West Virginia, Arizona, Michigan, and Tennessee

Elizabeth A. Dienst, P.E.
Structural Engineer

AREAS OF EXPERTISE

- Project Management
- Structural Design of Commercial Buildings
- Structural Design of Water and Wastewater Treatment Facilities
- Structural Design of Educational and Industrial Buildings
- Structural Design of Retaining Structures
- Design of Water Supply and Design of Wastewater Collection

PROFESSIONAL EXPERIENCE

RELEVANT EXPERIENCE:

- **Water Treatment Plant, Central City, Kentucky** – Strand and McGhee Engineering were hired by Central City to evaluate their existing treatment plant and distribution system. Strand's main role was in the evaluation and design of water supply and treatment needs. Liz was a structural engineer on the project designing several new structures including the chemical feed building and chemical storage and electrical building. Both of these buildings were reinforced masonry construction with cast in place concrete foundations. Liz's role continued through construction checking shop drawings and answering contractor questions.
- **Water Treatment Facility Expansion, Morgantown, West Virginia** – Liz served as structural engineer for the Morgantown Water Treatment Facility Expansion project. The first phase of this project met the needs for 16 MGD flow through the plant. Structures Liz was involved with included design of sheet piling retaining system on the river for the new intake structure; rapid mix basin; two new 1 MG above ground clearwell reservoirs; along with improvements to the flocculation tanks, sedimentation basins, chemical storage and feed systems, and backwash pumping and treatment.
- **Kentucky American Water 20 MGD Booster Pump, Franklin County -** Liz was the structural engineer for the pump station and 3 MG Water Storage Tank. The new booster pump station building was designed as masonry shear wall construction with truss roof on cast in place foundation including cast in place basement level. The pump equipment room sits on cast in place structural slab with cast in place beam and column support over the basement level. Role included all structural design and project management through construction.
- **Paintsville Water Treatment Plant Paintsville, KY -** Liz was the structural engineer and project manager through Construction. This project consisted of a new water treatment plant consisting of two story treatment building designed with precast frame and precast wall panels on a reinforced concrete retaining wall foundation system, this building was designed as a Hazardous rated building. New raw water intake structure, cast in place 100-ft deep intake well, cassion foundations with precast framed upper building. Cast in place concrete clearwell structure with precast framed pump station building.
- **LCTP Headworks Design - Columbus, IN -** Liz was the structural engineer for the new headworks reinforced concrete structure with multiple levels, channels, and tanks, as well as dry equipment areas, the below grade portion was 40-ft deep. The masonry structure housing process, equipment, and office areas was built partially on top of the below grade structure and partially on grade. The large open process room was framed with precast beams and columns and a precast roof deck with large skylights for equipment openings.

YEARS OF EXPERIENCE

19

YEARS WITH FIRM

19

EDUCATION

B.C.E. Civil Engineering – University of Dayton, Ohio, 2002

REGISTRATION

Professional Engineer in Kentucky

Matthew L. Smith, P.E.

AREAS OF EXPERTISE

- Collection System Design
- Water Treatment Design
- Wastewater Treatment Design
- Wastewater Regulatory Affairs

PROFESSIONAL EXPERIENCE

Water Engineering experience includes design and resident engineering of water main projects. Led design efforts on the Bargersville Utilities Water Treatment Plant No. 2 project, a 6.0 MGD fluidized bed reactor facility. Matt is currently leading a water softening alternatives analysis for the City of Oxford, Ohio. He also played a lead design role for the Morgantown Utility Board water treatment plan expansion.

Wastewater Engineering experience includes design of municipal and industrial treatment plants, gravity sewers, force mains, pumping stations, and long-term service area studies. Led design work on the Michigan Road Wastewater Treatment Plant for TriCo Regional Sewer Utility, the Wastewater Treatment Plant (WWTP) renovations for the City of Tipton, Indiana, the WWTP renovations for the Town of Nashville, Indiana, WWTP renovations in Garrett, Indiana, and the Water Services Company of Indiana WWTP in Demotte, Indiana. Matt was the Project Manager for a phosphorus compliance project at a Pharmaceutical Manufacturer. Matt designed the biological treatment and disinfection systems for the Oak Valley WRF in Homer Glen, Illinois, and the Columbus City Utilities New WWTP. Matt completed Tipton Municipal Utilities Long-Term Control Plan. Provided design of biological, activated carbon and chemical odor control systems, as well as contract administration work on the Kankakee River Metropolitan Agency WWTP upgrades and the Joliet Arbeiter Road Influent Pumping Station. Matt was the lead engineer on the odor control improvements for TriCo Regional Sewer Utility's Michigan Road WWTP. Matt has been involved in biosolids master planning and design for Hamilton Ohio and Connersville, Indiana. Matt provided quality control reviews for the preliminary engineering report for the Sycamore Trails WWTP for Warren County, Ohio.

Conveyance System Engineering experience includes design and resident engineering experience for sanitary sewers and sanitary sewer evaluation studies (SSES). Completed the Joliet Aux Sable Creek Basin's long-term planning area study and design of the influent pumping station and force main. Matt has been involved in several lift station planning design and construction projects for TriCo Regional Sewer Utility. Matt led the long-term conveyance and treatment efforts planning for the Town of Bargersville, Indiana and the City of Columbus, Indiana. Matt was the lead engineer for the lift station and force main project from the Town of Kempton, Indiana to the City of Tipton, Indiana. Matt was the lead engineer for large diameter interceptor projects in Elwood and Tipton, Indiana.

PRESENTATIONS/PUBLICATIONS

- "Alternative Wastewater Biosolids Disposal Study" Presented at 2019 Indiana Water Environment Association Core Conference (Co-Authored with David Jenkins – City of Hamilton, Ohio)
- "Extending Sewers While Eliminating Lift Stations" Presented at 2019 Indiana Water Environment Association Annual Conference (Co-Authored with Wes Merkle– TriCo Regional Sewer Utility)
- "Biological Odor Control System Used to Treat High Strength Odors from Municipal WWTP Headworks" Presented at 2018 Indiana Water Environment Association Annual Conference (Co-Presented with Wes Merkle – TriCo Regional Sewer Utility)

PROFESSIONAL AFFILIATIONS

- Water Environment Federation

YEARS OF EXPERIENCE

18

YEARS WITH FIRM

18

EDUCATION

M.S. Civil Engineering – Purdue University, West Lafayette, Indiana, 2004

B.S. Civil Engineering – Purdue University, West Lafayette, Indiana, 2002

REGISTRATION

Professional Engineer in Indiana and Ohio

Brian J. Oyer, P.S.

AREAS OF EXPERTISE

- Geographic Information Systems (GIS)
- Surveying

PROFESSIONAL EXPERIENCE

Brian has spent his entire professional career working for civil engineering consulting firms in a surveying and GIS capacity to ensure the highest quality of work on water, storm, sanitary, and transportation projects.

Surveying – Conduct all surveying tasks associated with civil engineering projects. Numerous projects over the years provide regular, repeated experience with the following:

- Boundary resolution
- Right of way establishment
- Writing legal descriptions
- Deed research
- ODOT right-of-way plans
- Finding and setting property pins
- Data collection with various total stations and GPS units.
- Quality control of data
- Construction staking

GIS – Use GIS software to provide a variety of clients with better organized and easily visualized data. Involved with data creation and conceptualization to field data collection and everything in between.

- Routinely create and maintain GIS data primarily using SDE geodatabases.
- Manage SDE database for local clients to update citywide GIS when new data becomes available from other sources.
- Create maps and edit GIS data in ESRI's ArcGIS desktop software and ArcGIS Online web maps.
- Publish online maps to be accessed by the public on the Web using ESRI Web App Builder.
- Use ESRI Local Government Model to set up new SDE database for a municipality. Included sorting and categorizing existing data to best fit the template.
- Create and use maps in ESRI ArcGIS Collector App for real time data updates from the field.

GIS Services, City of Mason, Ohio – Managed project to update the citywide ArcGIS geodatabase with information for stormwater and sanitary sewer systems using AutoCAD drawings of new development and scanned engineering plans georeferenced in ArcGIS desktop software.

West Main Street/State Route 41 Corridor, City of Troy, Ohio – Performed the role of R/W Designer, developing right-of-way plans according to ODOT specifications for the improvement of 2 miles of West Main Street through the city, included writing legal descriptions for permanent takes and temporary construction easements for over 130 parcels between the two phases of the project.

CVG Stormwater System Survey Analysis, Cincinnati/Northern Kentucky International Airport (CVG) – Lead survey efforts to perform bathymetric survey of the bottom of multiple retention basins with GPS mounted to remote controlled boat. Process and analyze data of basin floor to determine if sedimentation accumulation is occurring.

King Avenue and Kings Court Roundabout, Warren County Transportation Improvement District, Ohio – Perform boundary and topographic survey for parcels at the intersection of King Avenue and Kings Court in Kings Mills, Ohio for a new mini roundabout. Project required extensive deed research and multiple legal descriptions to create new standard highway and temporary construction easements for parcels at the intersection.

Stormwater Master Plan, City of Hamilton, Ohio – Develop GIS capabilities to facilitate the creation of a stormwater master plan, asset management review, and capital improvement plan for the city. This involved reviewing and organizing existing GIS data, also create maps to highlight specific focus areas and communicate the needs of the infrastructures of the city.

YEARS OF EXPERIENCE

10

YEARS WITH FIRM

3

EDUCATION

B.S. Surveying and Mapping Technology,
A.A.S. Geographic Information Systems,
University of Akron, Akron, Ohio, 2011

B.S. Physics; Minor in Mathematics
The University of Mount Union, Alliance, Ohio, 2007

REGISTRATION

Professional Surveyor in the State of Ohio, P.S. 8732

Professional Land Surveyor in the Commonwealth of Kentucky, P.L.S. 4207

Brian J. Oyer, P.S.

Edgeworth Addition Waterline Replacement - City of Cambridge, Ohio – Provided legal descriptions and exhibits for the city to acquire easements for approximately 1,500 feet of additional waterline to help better improve and connect the city's water infrastructure.

Wastewater Treatment Plant Expansion, City of Ashland, Kentucky – Perform boundary and topographic survey of the entire 6+ acre WWTP, including extensive deed research involving old railroad track maps. Created survey plat for use in land acquisition negotiations and future WWTP site developments.

New Route US 62, Nelson County, Kentucky, Kentucky Transportation Cabinet – Perform deed research and field survey of US Route 62 through the City of Bardstown, KY for intersection improvements with US Route 31E. Created base map of existing conditions for design using Open Roads Designer CONNECT.

Lytle-Five Points Rd and Bunnell Hill Rd Roundabout, Warren County, Ohio – Performed field survey in preparation of construction for a new roundabout. Work included deed records research, writing legal descriptions, and creating new permanent standard highway easements and temporary construction easements for 14 parcels.

Water Main Replacement, City of West Carrollton, Ohio – Complete full topographic survey for 1,900 linear feet of water main replacement in residential neighborhood of North Elm Street in the city. Project included establishing right-of-way of Elm Street by deed research and locating property pins. A complete base map was created for the engineering team for them to fully design the new water main

Various projects for Louisville-Jefferson County Metro Government, Louisville, Kentucky – Organize and perform topographic surveys for multiple projects that include improving small bridges, replacing culverts, and installing new sidewalks throughout Jefferson County surrounding Louisville. Some projects involve establishing right-of-way which include deed research and searching for property pins.

Dry Weather Outfall Screenings, City of Springdale, Ohio – Helped organize GIS data, create maps using ArcGIS desktop, and use the ArcGIS Collector App in the field to update attributes of drainage outfalls throughout the city to reflect the conditions during dry weather.

Evergreen Drive/Ridgeview Drive Sanitary Sewer, Boone County, Kentucky – Lead the survey field data collection efforts for 12,000 feet of brand-new sanitary sewer and removal of existing septic systems. Included creation of base map using AutoCAD Civil 3D as basis for the design. Also performed construction staking for the contractor upon installation of the new sewer system.

Erosion Control Phase 2, Montgomery County Environmental Services, Montgomery County, Ohio – Organized and ran the survey of multiple streams for restoration to prevent further erosion from impacting existing sanitary infrastructure. Also wrote legal descriptions and created exhibit maps for temporary construction easements.

WWTP Upgrades, City of London, Ohio – Lead the survey of the entire 13-acre wastewater treatment plant, including setting project control, field data collection, and creation of survey base map in AutoCAD Civil 3D, in preparation of major upgrades.

Lick Run Wet Weather Strategy Valley Conveyance System, Metropolitan Sewer District of Greater Cincinnati, Ohio – Contributed to the field survey effort during the construction phase of the project.

CSO Elimination, City of Fostoria, Ohio – Perform extensive deed research for properties along existing sewer line to be replaced. Then lead the survey of the wastewater treatment plant, multiple combined sewer outflows, and over 3,000 feet of road where replacement of sanitary sewer will take place. Then Brian created base map for future design work.

PROFESSIONAL AFFILIATIONS

- Professional Land Surveyors of Ohio
- Kentucky Association of Professional Surveyors

Kristopher E. Ruggles, P.E., S.I.

AREAS OF EXPERTISE

- Project Management
- Design
- Construction Observation

PROFESSIONAL EXPERIENCE

Water Distribution, Storage, and Treatment
Kris has been involved with more than 100 miles of water main and transmission line projects.

Water Main Clients
- Hecla Water, Ohio
- EHRWSD, Circleville, Ohio
- New Holland, Ohio
- Athens, Ohio
- Jackson County Water Company, Ohio
- Portsmouth, Ohio
- Pataskala, Ohio
- Piqua, Ohio
- Marietta, Ohio
- Lancaster, Ohio
- Ohio Department of Corrections
- Parkersburg Utility Board, West Virginia

Water System Models
- Hecla Water, Ohio
- EHRWSD, Circleville, Ohio
- New Holland, Ohio
- Athens, Ohio
- Jackson County Water Company, Ohio
- Portsmouth, Ohio

Water Storage Tank Projects
- Fairmont Water, West Virginia – Clearwells
- Piqua Central Water Tower
- New Holland Elevated Tank
- Portsmouth West Side Storage
- Reynoldsburg Storage Rehab
- Ohio Department of Corrections 1.5 mg Tank

Water Treatment Plant Projects
- EHRWSD Plant No. 2
- Fairmont Settling Basins
- Portsmouth Sodium Hypochlorite Disinfection
- Portsmouth Rapid Mix Replacement
- Portsmouth Clarifier Flocculation Basin
- Parkersburg Utility Well Replacement
- Athens WTP Master Plan
- Marietta WTP Master Plan

Wastewater Management – Kris has successfully completed dozens of wastewater collection and pumping station projects. During his 16 years of experience, he has been involved in the design and construction of wastewater treatment facilities ranging from 100,000 to 25 million gpd. He has developed a specialty in wastewater regulatory negotiations and permitting. Kris is the program manager for the City of Portsmouth's Combined Sewer Overflow Long-Term Control Plan (LTCP) and Agreed Order on Consent with USEPA Region 5.

Wastewater Treatment Plant Projects
- Delaware Aeration Upgrades
- Marietta Local Limits Justification
- ODRC Sludge Dewatering and Storage
- Parkersburg WWTP Upgrades
- Athens WWTP Upgrade
- Painesville Digester Heater Project
- New Holland Headworks Upgrade
- Scioto Co. West Portsmouth UV Disinfection
- Portsmouth WWTP Operation Needs Review
- Circleville WWTP Operation Needs Review

Pumping Station Projects
- Marietta Manchester Lift Station
- EHRWSD Tarlton Pump Station
- Portsmouth Munn's Run Pump Station
- Parkersburg 6th Street Pump Station and FM
- Parkersburg 1st Avenue Pump Station and FM
- Parkersburg Agnes Street Pump Station and FM
- Parkersburg Influent Pump Station
- Lithopolis Pump Station

PROFESSIONAL AFFILIATIONS

- Ohio Water and Environment Association Southeast Section Vice President

YEARS OF EXPERIENCE

16

YEARS WITH FIRM

16

EDUCATION

B.S. Civil Engineering – Ohio University, Athens, Ohio, 2005

REGISTRATION

Professional Engineer in Ohio
Surveyor Intern