Jacobs

Proposal for

Water Treatment Plant Expansion

2021 RFP WTP

Submitted to
Village of Johnstown, Ohio

June 28, 2021

Jacobs Engineering Group Inc.
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June 28, 2021

Mr. Jack Liggett
Assistant Village Administrator
Village of Johnstown
599 South Main Street
Johnstown, OH 43031

Re: Proposal for Water Treatment Plant Expansion, RFP No. 2021 RFP WTP

Dear Mr. Liggett and Review Committee:

Jacobs has assembled a qualified team to lead the design and construction services for the Village of Johnstown's (Village) upgrades to their exiting water treatment plant. As the original design firm for the plant when it was designed and constructed in the early 90's, our team is excited to a part of your treatment plant expansion project. Our enclosed technical proposal is organized in accordance with the Request for Proposal (RFP) requirements and includes our proposed team and representative relevant past experience, and meets the minimum qualifications. We provide clear and compelling examples of our team's experience providing water treatment process alternatives evaluations, detailed design, and construction services. Our proposal showcases the expertise we will provide for this project, including the following benefits:

Demonstrated Water Treatment Upgrade and Expansion Experience: The Jacobs team brings over 30 years of local successful delivery in water treatment plant (WTP) work, including over $300M in construction projects over the last 5 years, including:

- Dublin Road Water Plant Capacity Increase Project
- Parsons Avenue Water Plant Upgrades Project
- Wapakoneta WTP Iron Filter Expansion and Lime Softening upgrades Project
- Dublin Road Water Plant UV Disinfection Project
- Middletown WTP Upgrades
- Franklin County (OH) Timberlake WTP Upgrades

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Such experience demonstrates the technical competence we bring as one of the industry leaders in WTP evaluations and design. We will leverage this experience to provide the Village with the level of expertise required to assess the water plant's needed upgrades and design a plant expansion that meets your expectations.

Thorough Understanding of the Village's Project Objectives: Jacobs understands that the Village's primary objectives for the project are as follows:

1. Expand the existing WTP capacity from 1.0 to 2.0 MGD while designing with future increases in mind.
2. Evaluate other softening methods; options to decrease finished water hardness to 110 mg/l; options to improve existing operations; re-rating existing filters; expansion layouts to include space for a fluoride chemical storage and feed system; filter backwash holding tank expansion; and lime sludge holding tank expansion alternatives.
3. Installation of a SCADA system.

Columbus-based Project Team with National Treatment Expertise = Confidence in Project Delivery: Our team is comprised of a Columbus-based project team led by our **Project Manager Mike Giangiordano, PE** who has led and designed multiple treatment plant upgrades over his career. Mike is supported by our **Design Manager Melanie Gamez, PE** and **Quality Manager, Permitting, and Funding Lead Chad Roby, PE, BCEE**. Our team also comprises national experts is lime softening and other treatment technologies, most notably **Senior Technologist Chris Catlin, PE** who has over 30 years of experience in water treatment design and operations and the design of several ClariCone systems. Jacobs has extensive operating experience with lime softening and nano-filtration plants—including a 30 MGD side-by-side nanofiltration and lime softening plant, a 15 MGD lime softening plant, and we are currently operating a pilot scale plant ahead of a large expansion project. Our key staff will lead a Columbus-based design team that has over 30 years of experience delivering successful WTP design project.

Corporate Commitment and Resource Reachback from a Local Team: We are committed to continuing our successful relationship with the Village and have dedicated our best engineers and managers to this contract—providing the Village maximum opportunity for successful project execution. These professionals are best qualified to understand the Village's project goals and work with you to effectively expand your WTP and plan for future expansion in years to come. Our local Columbus office has supported the Village with engineering services in the past and will leverage this experience, and guidance from **Gary Long, PE,** project manager from the design of the original plant, to deliver a successful project.

Should you have any questions or would like additional information, please contact Mike at 614-403-4798 or michael.giangiordano@jacobs.com. Thank you for your consideration.

Respectfully submitted,

JACOBS ENGINEERING GROUP INC.

Michael Giangiordano, PE
Project Manager

Shawn Thompson, PE
Operations Leader

Jacobs Business Organization

Jacob's Legal Structure:
Jacobs Engineering Group Inc., is a publicly traded corporation. Jacobs Engineering Group Inc. and its subsidiaries and affiliates form an organization that is comprised of over 300 global operating entities, with approximately 100 operating entities in the United States and Canada, having a total current employment complement of over 50,000 persons and revenues of approximately $13 billion.

Local Office and Project Manager
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Federal ID: 95-4081636

Signature Authority:
Shawn Thompson, located in our Columbus (OH) office, has the authority to make decisions related to RFP No. 2021 RFP WTP and to bind the consultant. Upon award of project, a copy of signature authority for Shawn will be provided during contract negotiations.

Minimum Qualifications:
Our Columbus office has worked with a number of clients throughout Ohio on similar water projects. This includes our work with the Village which began in 1960 and includes the initial WTP in 1961 and the new WTP in 1995.

Discrimination:
Jacobs Engineering Group Inc. complies with all laws with respect to employment and discrimination related to race, color, religion, sex, veteran status, sexual preference, national origin, or disability. A copy of our US Equal Employment Opportunity and Affirmative Action Policy can be provided upon request.

Addendums:
We acknowledge receipt of answers to our questions on 6/15/2021 and affirm that no addendums were received for RFP No. 2021 RFP WTP.

Firm Background and Relevant Experience

Primary Contact

Jacobs Engineering Group Inc. (Jacobs)
Two Easton Oval
Suite 500, Columbus, OH 43219
Mike Giangiordano, PE
614-403-4798 | michael.giangiordano@jacobs.com

Firm Background

Founded in 1947, Jacobs is one of the largest global providers of technical, professional, and construction services. As a full-service, multi-discipline firm, our in-house engineering staff includes environmental, electrical, civil, structural, mechanical, and geotechnical engineers. Services include scientific and specialty consulting, as well as all aspects of engineering, architecture, construction, program and construction management, and operations and maintenance.

ENR Ranking #1 DESIGN FRIM 2021 Engineering News Record

Jacobs has been recognized by industry publications and organizations, which further supports our commitment to outstanding achievements in our fields. According to recent rankings of *Engineering News-Record* (ENR 2021), **Jacobs is ranked No. 1 in its list of Top 500 Design Firms in the world**. Jacobs has held a top five position in the Top 500 list since ENR's rankings began in 2003, and for a fourth consecutive year, we're excited to be at the top spot. We pride ourselves on listening to and collaborating with our clients, delivering quality engineering, project service and delivery, and offering competitive fees.

Water Treatment Experience

Jacobs water treatment engineers, planners, operators, and scientists have been assisting our clients, including the Village of Johnstown (Village), to provide high-quality drinking water for more than 70 years. Jacobs (as BBS) designed and provided construction services for the current Village Water Plant in the early '90s, in addition to multiple projects for the Village over many years.

We provide a proven and experienced team to partner with the Village to realize project success. Our blend of local and regional lime system experience coupled with our longstanding success delivering high-value solutions provides the necessary qualifications and assurance to the Village that we can provide a modernized facility that enhances water quality, minimizes operating costs, and creates a safe working environment for your employees.

Permitting Services

In addition to our treatment designs, Jacobs provides regulatory support services to cities across the country in the areas of water quality and associated environmental regulations. These services are related to the potential impact of state and federal regulations on utility operations and helping utilities develop policies and practices for compliance. Recent experience includes the following:

- **Wapakoneta Water Treatment Plant (WTP) Lime Softening Upgrades**: Prepared an NPDES permit application for a new discharge of decant flow from two new water lime/soda ash sludge storage lagoons, including an antidegradation review. Also prepared a permit to install (PTI) application for the lagoons. Both are currently under review by Ohio EPA.
- **City of Columbus Projects—Hap Cremean Water Plant (HCWP), Dublin Road Water Plant (DRWP), Parsons Avenue Water Plant (PAWP) Upgrades:** Prepared numerous permits for each project including Ohio EPA WTP Reviews, PTI's, NPDES, and building permits.

We help our clients plan for and adapt to these regulatory initiatives by evaluating the potential effects of pending criteria on existing facilities, conducting the appropriate engineering, monitoring, and/or modeling, and developing the most appropriate approach for continued and future compliance.

Ohio American Council of Engineering Companies (ACEC) Recognizes Dublin Road Water Plant with Grand Award (June 2019)—One of the largest infrastructure upgrades in Columbus, Ohio's recent history resulted in the largest nitrate removal ion exchange facility in the United States and the first ozone and biologically active filter treatment combination to be commissioned in Ohio. *Pictured Proposed Project Team Members include: Mike Giangiordano, Matt Leach, and Ian Hammons.*

Ohio Grant/Funding Services

Jacobs has worked closely with clients to tap State and Federal funding sources and identify the full array of funding opportunities available to communities undertaking infrastructure projects. Our experience with various funding programs includes the preparation of applications and other required materials for the major funding agencies in Ohio.

Relevant Experience

Our firm has completed dozens of lime system upgrades and expansions at lime softening water plant projects across Ohio and the United States. Our proposed team members for the Village's WTP expansion have been key contributors to many of these projects and will share that knowledge with the Village.

Exhibit 1 provides a list of projects delivered by our proposed team members that demonstrate our experience with the critical aspects of your expansion project—many of which were designed in our Columbus office, as well as additional relevant projects delivered by our proposed national technology experts. Projects outline in blue are explained in greater detail following this exhibit.

Jacobs Assists Washington Court House (OH) Obtain a 100 Percent Division of Environmental and Financial Assistance (DEFA) Loan

Jacobs recently assisted Washington Court House (City) with obtaining a 100 percent DEFA loan for their wastewater treatment plant (WWTP) upgrade. Starting this process early was the key to obtaining the loan approval without difficulties and delay. The loan processing schedule for the City was kept on track by being aware of the project standards established by other applicable state entities and their document filing requirements. Besides Ohio EPA ,the process involved interaction with Ohio Department of Natural Resources (ODNR) and SHPO (State Historical Preservation Officer). Our team also coordinated the application with the county Floodway Coordinator. Each of these interactions was completed prior to the submittal of the construction loan application.

A key portion of the loan application required revenue analysis of previous years and projections of revenues for the life of the loan to ensure that the City would have adequate funds for repayment. Jacobs assisted the City with a user rate analysis and adjustments were found to be needed to demonstrate the financial fitness of the City. The subsequent rate submittal met the standards of Ohio EPA and resulted in timely review and approval of the applications.

Jacobs also assisted the City with identifying and documenting factors that resulted in reductions in both the loan principal and the interest rate to be paid. A principal reduction of $50,000 was achieved due to the inclusion of backup electrical power in the project. Interest rate reductions totaling 0.34 percent were gathered from the inclusion of specific treatment processes in the construction contract and the City gained an additional reduction of 0.06 percent by agreeing to mentor a smaller municipality applying for a DEFA loan.

EXHIBIT 1—JACOBS RELEVANT PROJECTS DELIVERED BY OUR FULL-SERVICE PROJECT TEAM

City-Project | Team Members Involved	Lime Softening	Other Softening Technologies	Pilot Test/Proof of Concept	Alternative Treatment Analysis	Capacity Increase	Chemical Feed/Systems Additions/Upgrades	Sludge/Residuals Handling/Recycle	Recarbonation	Filter Modifications or Additions	Permitting	Pump Replacement	I&C/SCADA/Electrical Upgrades	Bid/Construction Services	Startup	O&M Manuals
Johnstown (OH) New WTP | *G. Long*	✓		✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓
Wapakoneta (OH) WTP Iron Filter Expansion and Lime Softening Upgrades Projects | *M. Giangiordano, C. Roby, P. Anderson, T. Bechtel, T. Dodge, T. Elliott, M. Gnandt, I. Hammons, G. Long, J. Ramos, C. Winter, M. Witwer*	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Columbus (OH) Dublin Road Water Plant (DRWP) Capacity Increase | *M. Giangiordano, M. Gamez, M. Leach, P. Anderson, T. Bechtel, J. Decker, M. Gnandt, I. Hammons, M. Hill*	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Columbus (OH) Parsons Avenue Water Plant (PAWP) Upgrades | *M. Giangiordano, M. Gamez, M. Leach, P. Anderson, T. Bechtel, J. Decker, T. Elliott, I. Hammons, M. Hill*	✓		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
Columbus (OH) Hap Cremean Water Plant (HCWP) Sludge Handling Improvements and Upgrades | *M. Giangiordano, M. Gamez, M. Leach, P. Anderson, T. Bechtel*	✓						✓				✓	✓			✓
Greenville (OH) WTP Lime Slaker Replacement | *M. Gamez, P. Anderson, I. Hammons, G. Long*						✓				✓		✓			
Versailles (OH) New WTP | *M. Gamez, T. Bechtel, G. Long*	✓			✓		✓	✓	✓	✓	✓		✓	✓	✓	✓
Franklin County (OH) Timberlake WTP Upgrades | *P. Anderson, G. Long, M. Witwer*		✓				✓			✓	✓	✓	✓	✓	✓	✓
Middletown (OH) WTP | *C. Roby, P. Anderson, T. Bechtel, M. Gnandt, G. Long*	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
Fort Wayne (IN) WTP Lime Slaker Replacement Project Phase 1 | *M. Giangiordano, P. Anderson, T. Elliott, I. Hammons*	✓					✓						✓	✓	✓	✓
Ann Arbor (MI) WTP | *T. Elliott*	✓		✓	✓	✓	✓		✓	✓			✓	✓	✓	✓
Saint Paul (MN) McCarrons WTP | *M. Gamez, T. Elliot, C. Winter*	✓		✓	✓	✓	✓			✓			✓	✓	✓	
Minneapolis (MN) Fridley WTP | *C. Catlin, T. Elliott, C. Winter*	✓			✓	✓	✓		✓				✓	✓	✓	
Cedar Rapids (IA) J. Avenue WTP | *C. Catlin, T. Elliott*	✓		✓	✓	✓	✓		✓				✓	✓	✓	✓
Marco Island (F) Dual Membrane Pilot Study | *M. Witwer*		✓	✓	✓	✓										
Lee County (FL) Green Meadows WTP Expansion | *T. Elliott, M. Witwer*		✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓
Marine Corp Air Station Cherry Point WTP Design (NC) | *M. Witwer*		✓			✓	✓			✓	✓	✓	✓	✓	✓	✓

New Water Treatment Plant, Village of Johnstown, OH

WTP Operations Building.

Jacobs provided a feasibility study for the new WTP that included an including engineering study to determine and recommend improvements for the rehabilitation and upgrade of the plant; extensive structural evaluation, plumbing and heating, ventilation, and air conditioning (HVAC) evaluation, and all process (hydraulics) evaluation; and a new treatment plant. The new WTP design included the following facilities and equipment:

- Lime sludge storage tank
- Two new clearwells
- Backwash recycle tank
- Upflow solids contact clarifier system for softening
- Lime storage and feeding equipment for carbonate hardness removal
- Polymer storage and feeding equipment for coagulation
- Sodium hypochlorite storage and feeding equipment for disinfection
- All pumps and related equipment
- All related electrical and control systems, HVAC and plumbing
- Administration Building containing offices, personnel facilities, an Ohio EPA-approved laboratory, HVAC room and equipment, 3 rapid-sand, dual-media filters, and recarbonation system

The performance increase over the Village's old lime softening WTP is significant. Total hardness removal increased from 62- to 71-percent and noncarbonate hardness removal increased from 6- to 38-percent.

The design of the plant also included Ohio's first approved municipal application of a cone upflow solids contact clarifier for softening. An advantage of this alternative technology is the cost savings, not only in construction but also in operation and maintenance.

Jacobs worked closely with the Village in evaluating this new technology and its feasibility and appropriateness for the Village's treatment plant. Jacobs also spearheaded the presentations to the Ohio EPA that were instrumental in receiving approval for the technology. The effort required numerous meetings with the Ohio EPA as well as the operation of and data review from a pilot test plant at the WTP.

Water Treatment Plant Iron Filter Expansion and Lime Softening Upgrades, Wapakoneta, OH

Photo courtesy of Peterson Construction Company.

Jacobs provided planning and design services to expand capacity and convert the previous ion exchange softening WTP to a lime-soda ash softening WTP. The total dissolved solids (TDS) produced from the ion exchange softening system in combination with the increased demand and TDS loading from a new industry resulted in exceeding permitting allowances. Two solutions were provided – an increase in capacity to meet current and future demand and a conversion to lime-soda ash softening to decrease TDS discharges to the WWTP. These changes allow the city to accommodate future industry growth while still maintaining compliance with the Ohio EPA regulations. An aggressive schedule was developed to meet Ohio EPA Director's Final Findings & Orders (DFFO) for the WWTP. And Jacobs worked closely with the City in order to outline a schedule that would meet the DFFOs. Jacobs' solutions included additional filters and re-rating of existing equipment, a Detailed Design Memorandum (DDM) to evaluate softening alternatives, onsite jar testing to optimize the softening process, a basis-of-design for future capacity increases, funding and permitting assistance, and detailed design and construction administration services (starting fall 2021). Jacobs identified innovative ways to provide future expansion capacity increases without additional infrastructure.

Dublin Road Water Plant (DRWP) Capacity Increase, Columbus, OH

What would become one of Department of Public Utilities' (DPU) largest infrastructure upgrade projects began when Jacobs' project team led a blue-ribbon panel of Columbus staff and industry experts to evaluate treatment alternatives to meet the DPU's challenges. The panel selected improvements that resulted in approximately $100M in construction cost savings.

Jacobs served as the prime design professional for this conventional WTP with lime softening for the $200M construction project to expand the capacity of the plant from 65 MGD to 80 MGD. Early in the design process Jacobs engaged senior technologists to clarify project objectives and develop treatment alternatives to the original plan of implementing microfiltration and reverse

osmosis. In addition to expanding capacity, the project enabled the plant to meet new United States drinking water regulations: the Long Term 2 Enhanced Surface Water Treatment Rule and the Stage 2 Disinfection By-Product Rule, by incorporating ozone and biological granular activated carbon (GAC) filters into the plant process; supplemented by the largest potable water ion exchange facility in North America to be used during periodic nitrate events. These processes were validated by an expedited pilot test program, which provided valuable data for refining the process design and provided needed justification for regulatory permitting. This change reduced the capital project cost by approximately $100M.

This project also included a new lime solids pump station and conveyance line, sludge recirculation improvements, plant electrical and SCADA, chemical systems, high service pumps, backwash storage tank, and improvements to all aging equipment and systems in the plant.

This project exceeded the City's expectations by meeting their goals at a lower cost to the community. It provided opportunities for technical innovation through process evaluations and tests resulting in state-of-the-art advanced treatment including the current world's largest drinking water ion exchange facility for nitrate removal. Jacobs also providing services during construction for the five constructions projects which were completed in 2019.

This project was awarded the Grand Award at the ACEC of Ohio's 2019 Engineering Excellence Awards.

Parsons Avenue Water Plant (PAWP) Treatment Upgrades, Columbus, OH

The PAWP, which originally went into service in 1984, draws water from wells and provides 16 percent of the water in the service area. For the recent $65M upgrade, we provided extensive construction sequencing of many connection points to existing facilities with no disruptions to water production during construction and startup.

Jacobs provided engineering and construction services to the City for upgrading the PAWP to be capable of reliably treating 50 MGD of groundwater. Engineering services included process upgrades and significant improvements to the electrical and instrumentation and controls (I&C) systems.

Upgrades to the PAWP included the Primary Softening Basin equipment and associated influent piping and meters, new Recarbonation Building and recarbonation equipment, new Recarbonation Basin and dewatering pumps, new carbon dioxide storage tanks were provided, new filter media and surface wash agitators, new conveyance equipment for the bulk storage lime and soda ash, new 11 MG clearwell was constructed, new

The PAWP historically used a direct gas recarbonation feed system. Due to limited detention time, this system did not provide consistent pH causing issues with downstream processes. During preliminary design, direct gas recarbonation was compared to a pressurized solution feed system. Ultimately the City selected a new direct gas feed system based on the experience of the staff having operated the existing direct gas feed system.

The PAWP obtains its water from collector wells. The existing collector wells combined capacity is not sufficient to supply 50 MGD to the treatment plant. Future source water quantity and quality will vary depending on the blend of raw water from multiple sources, including existing collector wells, future collector wells, and a future surface water intake in the quarry created by anticipated mining operations. Therefore, a goal of the design was to plan improvements in treatment that offer flexibility regardless of the source water that is chosen in the future.

Detailed design was completed in 24 months and the plant was kept in service during the duration of the project and met capacity demands with the exception of a 4 week planned outage to replace large influent valves.

Hap Cremean Water Plant (HCWP) Sludge Pump Station Renovations and Electrical Upgrades, Columbus, OH

Innovative approach to add electrical room to existing Chemical Storage Building.

Jacobs was responsible for the design and construction administration of new sludge handling facilities and electrical upgrades to the plant.

Sludge Conveyance and Pumping Upgrades involved the design of a new sludge pumping station to convey wasted lime and coagulation sludge to the City's McKinley Avenue Quarry. Project also included design of a new lime sludge control house. The design included improved sludge wasting and eliminated main drain back-ups during basin draining events.

The electrical upgrades project involved constructing a new outdoor main substation serving both A Plant and B Plants, as well as a fence and screening around the substation to comply with the recommendations of the City's vulnerability assessment. The substation included walk-in

arc-resistant type 15 kV and 5 kV switchgear. Arc detection relays were also used to provide another level of personnel safety and to minimize potential damage to equipment if a fault occurred. Complete breaker/substation monitoring of all 15 and 5kV breakers at the both the main substation and main electrical room were connected to the existing supervisory control and data acquisition (SCADA) system by a fiber optic Ethernet network.

Water Treatment Plant Lime Slaker Replacement, City of Greenville, OH

These two lime slakers were replaced with new Chemco slakers for improved maintenance..

Jacobs provided engineering services to the City of Greenville for its 4.9 MGD WTP Improvements to improve WTP performance and reduce maintenance. This work was provided over two projects that included replacing both of the aged lime slakers.

The first project included a new Bulk Water Station with improved water accounting outside the main WTP fence for improved WTP security; new finished water meter and vault for improved maintenance and reliability; lime silo improvements including a new control panel, dust collector, and lime transfer piping between the bulk lime silo and the lime day bins to improve the lime feed operation; conversion of the gas chlorination system to a liquid hyperchlorination system for operator safety; replaced the filter surface wash system with new a new improved surface wash system for improved filter backwashing; replaced one of the existing painted lime slakers with a new Chemco stainless steel lime slaker for better maintenance; and improved lime slaking operation.

The second project included adding an air dryer to the intake of the blower transferring lime from the bulk lime silo to the lime day bins to eliminate the addition of moisture from air when transferring lime. The moisture from the air was reacting with the lime in the day bins and causing bulking issues. Also replaced the bulk lime transfer auger and isolation slide gate, at the bottom of the lime silo, to the air transfer system for improved performance and reliability; and replaced the second existing painted lime slaker with a new Chemco stainless steel lime slaker for better maintenance

New Water Treatment Plant, Village of Versailles, OH

Versailles new 1.5 MGD lime-soda-ash softening WTP.

The Village commissioned Jacobs to replace their existing WTP with a new 1.5 MGD lime-soda-ash softening WTP. Jacobs' design included the following specific equipment and processes:

- Induced draft aerator and rapid in-line mixer on the raw water line
- Modular four-cell rapid sand filter with air wash capability
- WTP building that houses the clarifier, filter, and recarbonation tank as well as administrative and personnel areas, an Ohio EPA-approved laboratory, and electrical, mechanical, and chemical rooms
- Two 225,000-gallon clearwells and four high-service pumps
- Solids contact clarifier
- Recarbonation system
- Backwash recycle tank
- Lime sludge handling system
- Chemical storage and feed equipment
- High-service pumping station
- All required electrical and I&C systems

Chemical storage and feed systems include the following:

- **Alum (coagulation)—**Bulk alum is stored in a 4,800-gallon tank and flows by gravity to a day tank. The makeup and dilution of alum in the day tank is controlled automatically by the SCADA system. Alum solution is discharged to a rapid mixer by a positive displacement metering pump.
- **Lime (softening)—**Bulk pebble lime is stored in a 75-ton storage silo with dual bottom cone bin activators, control valves, lime feeders, and lime slakers.
- **Soda Ash (softening)—**Bulk soda ash is stored in a 30-ton storage silo that is similar to the lime storage silo except that the soda ash feeder discharges the chemical to a slurry tank.
- **Carbon Dioxide (pH control)—**Bulk liquid carbon dioxide is stored in an external 14-ton insulated storage tank provided with a refrigeration system, safety equipment, vaporizer, vapor heater, and pressure regulator.
- **Chlorine (disinfection)—**Chlorine gas is withdrawn from 150-pound cylinders through an automatic switchover device and conveyed under a vacuum to one of two wall-

mounted chlorinators that include an injector for mixing the chlorine gas with water to make up a chlorine solution.

Timberlake WTP Improvements, Franklin County, OH

Membrane Softening Process.

The Franklin County Department of Sanitary Engineering implemented upgrades to the existing Timberlake WTP. The existing plant was an iron removal filtration plant that included green sand filtration and sodium permanganate and sodium hypochlorite chemical feed systems. The primary focus of the upgrade project was to add a membrane softening process to the plant to reduce the total hardness of the treated water from values as high as 540 mg/l as $CaCO_3$ to approximately 120 mg/l as $CaCO_3$.

Jacobs provided engineering services for design, bidding phase services, construction administration and inspection, and services during construction. The project included preliminary through final design with treatment alternatives, evaluation of life cycle costs, preliminary engineering report, and preparation of bid documents. The existing plant was a green sand iron removal facility treating a very hard water with high alkalinity and iron concentrations near the secondary standard. The upgraded plant makes use of the filters upstream of a new dual train nano-filtration plant with bypass blending. The design includes new pre- and post-chemical treatment, the nanofiltration skid, modifications to the existing system and upgrade to the controls system. As part of the design effort Jacob's worked with the County to establish an implementation plan to slowly introduce the softened water to the distribution system while conducting a sample plan and public information plan to minimize changes in the distribution system water quality and ensure the public is well informed of these changes.

In addition to the improvements at the WTP, the project identified and included startup plans to mitigate potential temporary impacts to water quality in the distribution system caused by introducing treated water with a much lower level of total dissolved solids.

Water Treatment Plant and Distribution System, Middletown, OH

Jacobs is currently serving as the city engineer for the City of Middletown and provides a variety of water and environmental services that includes planning, design,

Jacobs supports a variety of project for the Middletown WTP including limes sludge management options and increasing capacity of their system.

studies, and sampling related to operation of the City 20 MGD groundwater lime-softening WTP, raw water pumping, and water distribution system. Jacobs recently completed a Lime Solids Residual Management Study that developed alternatives to dispose of lime sludge. The alternatives included gravity thickeners, sludge pumping, filter presses or other dewatering techniques, and reusing existing infrastructure. The study determined options to management recycles streams which included reuse within the plant, a NPDES permit, and discharge to the City sewer. Other recent projects for the City include upgrade of a 24 MGD pump station, corrosion control optimization study, distribution system modeling, design of new raw water pumping system, design of a filter to waste line, design of a new elevated storage tank, and design of two new generators.

Project Team and Organization

Project Team Commitment and Capacity

We understand the Village is seeking a consultant team to provide continuity and flexibility throughout the duration of the WTP expansion. Our project team is fully committed for the duration of all three phases of this project (August 2021 through January 2024).

We commit to the availability of this project team at the dedicated levels and at the appropriate times to successfully accomplish tasks associated under this project within the schedule associated with each assignment. In addition to these local resources, our firm is structured to offer access to technical experts and professional resources, as well as design production staff, within Jacobs throughout the company—45 Columbus-based, 400+ Ohio-based, and 55K+ professionals around the world. Our firm is organized to allow seamless delivery of the right technical resources to our clients, regardless of where they are located.

Principal-in-Charge Matt Leach has the authority to ensure that all the necessary local and regional resources that have been assigned to this work will be made available accordingly. As Principal-in- Charge, Matt will drive the successful completion of the project by working with our **Project Manager Mike Giangiordano**, and the Village's

representative to make sure we are meeting project deadlines and quality objectives.

Project Team Organization

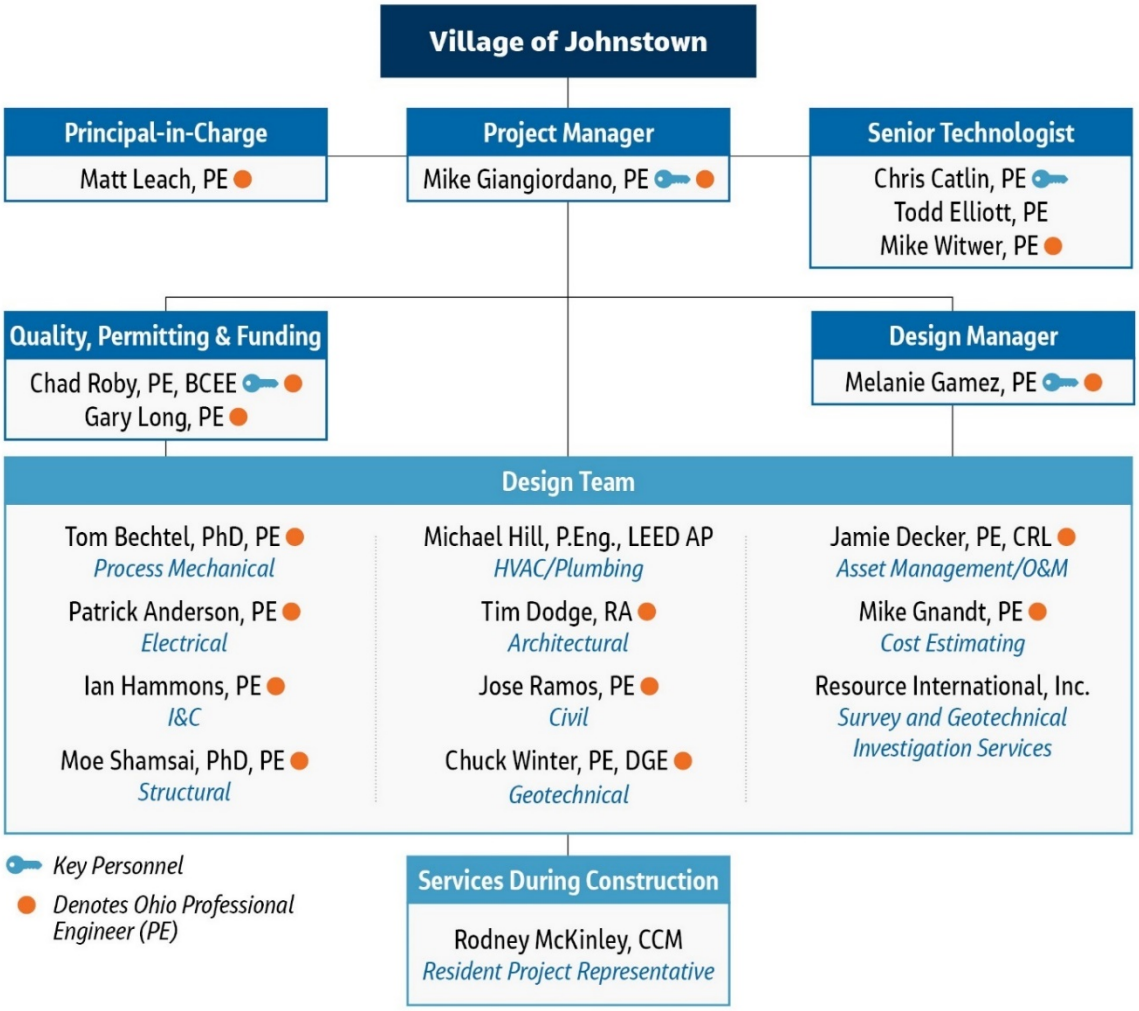
As shown in **Exhibit 2,** the Jacobs team is organized to provide the Village with a single point of accountability for the development and delivery of all services required for your WTP expansion. We composed our team to fully align with the project scope, maximize your project vision and objectives, and engage the extensive experience and expertise of our local team and nationally recognized senior technologists. This team offers a deep bench of best-in-class treatment system alternatives evaluation and design experts for your WTP expansion project.

Jacobs has included **Resource International Inc.** (Rii) to provide survey and geotechnical investigation services. Jacobs and Rii have worked together on several Ohio WTP projects including the Columbus DRWP Capacity Increase and PAWP Improvements projects—this familiarity with Jacobs and track record of successful collaboration with be a success factor for their project assignments.

Our key team members include **Project Manager Mike Giangiordano** supported by **Design Manager Melanie Gamez; Quality, Permitting and Funding Lead Chad Roby;** and **Senior Technologist Chris Catlin**. This leadership team is currently working with most of the team members proposed for this project.

Mike Giangiordano, PE (Project Manager) has 13 years of experience managing, planning, and designing water treatment facilities and understands the intricacies of guiding a project through successful completion. His experience includes several traditional and advanced water treatment technology process designs and commissioning efforts with both office and field assignments including designs for coagulation, softening, recarbonation, ozone, ion exchange, UV disinfection, and clearwells as well as corrosion control technique evaluations. Mike currently serves as a member of the Ohio

EXHIBIT 2—ORGANIZATION CHART OF JACOBS' WTP EXPANSION TEAM



Jacobs

American Water Works Association (AWWA) Technology Community, where he works to jointly develop, with Ohio EPA, technical guidance that positions the Agency to approve Emerging Technologies and to establish Approved Capacities for Ohio water systems. Mike also serves as the Group Leader for our Columbus office water group, where he manages our staff and ensures proper project staffing. As the Group leader, Mike will ensure that this project will have the resources available for successful delivery.

Mike will be responsible for delivery of the negotiated scope of services, maintaining schedule, and controlling costs. He will serve as the day-to-day manager of the work and point-of-contact for the Village. As project manager, he will also make sure Quality Assurance and Quality Control (QA/QC) procedures are being followed and maintain collaboration with senior technologist throughout the project.

Melanie Gamez, PE (Design Manager) brings 21 years of design and management experience for municipal infrastructure projects. Her experience includes managing multi-disciplinary design teams for water projects with a "hands-on" approach to managing projects and is a strong advocate of collaborative work, successfully delivering projects with multiple subcontracts. Melanie is a lime softening and feed expert who recently delivered a similar large lime softening design and installation for the City of Columbus PAWP. She will work in tandem with Mike and Village staff to deliver an efficient and timely WTP expansion that will satisfy your goals and objectives.

Chad Roby, PE, BCEE (Quality, Permitting, and Funding Lead) brings 18 years of experience in water and wastewater treatment, conveyance, and distribution which is often driven by economic growth; a major project driver for the Village. He is experienced with permitting, funding assistance, and lime solids residual management. He recently led the effort to obtain approval for the recycle filtrate from a lime solids sludge press for Massillon (OH)—the first in Ohio.

Chris Catlin, PE (Senior Technologist) brings over 30 years of experience of experience in water treatment and distribution including experience as an operator, lead operator, trainer, system manager, design engineer and operations consultant. Chris brings to the team his unique experience of having designed multiple ClariCone® systems ranging in size from 3 to 20 MGD. In addition to helping the team with the process design, Chris brings his unique operations experience to help with startup, commissioning and Operations and Maintenance (O&M) manuals.

In addition to our Key Team Members, **Gary Long**, our Project Manager from the design and construction of the current Village WTP, will serve as a member of our team to impart lessons learned from the construction of the plant and his 35+ years of experience as part of our quality assurance process.

Ohio-Based Design Engineering Team

For preliminary engineering, and final design and construction services, our local team brings proven planning and design experience with WTP upgrades projects. Our team has a wealth of experience with lime softening plants, as well as other water treatment softening technologies such as ion exchange and membranes, should the Village wish to explore these options. In addition to our experience with softening, we are well versed in sludge recycling, thickening, dewatering, and disposal with our work at all three City of Columbus (OH) water plants, and smaller Ohio municipalities like the City of Wapakoneta, Versailles, and Middletown. Our local team has the experience needed to deliver your project and has the support of national experts for all treatment technologies and systems.

Team Resumes

Brief resumes for our project team are provided below. Full detailed resumes can be provided to the Village upon request.

Mike Giangiordano, PE—Project Manager

Mike has over 13 years of experience in project and design management specializing in the design and construction of drinking water treatment facilities improvements.

Education and Professional Registration

- BS, Civil Engineering (Environmental Engineering Emphasis), Pennsylvania State University
- Professional Engineer: OH (#80472), MI

Relevant Experience

Project Manager, Water Quality Assurance Laboratory (WQAL) and Plant Laboratory Upgrades, Columbus, OH. Managed the $12M, 12,000 sf complete renovation of the City of Columbus WQAL compliance laboratory and renovations to the DRWP and PAWP plant operation laboratories.

Project Manager, Rapid Response Tests, Erie, PA. Manager for Optimal Corrosion Control Technique (OCCT) rapid response test pipe loop used to evaluate various orthophosphate and polyphosphate dose impacts to harvested distribution pipe and scale. Less costly and with faster results than a traditional pipe loop, the rapid response tests will be used to recommend a robust OCCT strategy.

Project Manager, Water Facility Master Planning and Continuity of Service, Erie, PA. Manager for a conditions assessment of two WTPs and master planning for future continuity of service. Alternatives include evaluation and recommendation for investing in the historic non-reliable WTP, the recently upgraded WTP or in a new WTP for redundancy and continuity of supply.

Process Lead, WTP Lime Softening Upgrades, Wapakoneta, OH. Lead for 5.6 MGD design max day flow lime and soda ash softening retrofit. Unit processes include aeration, lime and soda ash storage, lime and soda ash slurry feed, solids contact clarifier softening, pressure solution feed (PSF) recarbonation. Additional finished water (clearwell) storage, miscellaneous treatment improvements and plant hydraulics were also included with design.

Process Lead, Lime Slaker Replacement Project; Three Rivers Water Filtration Plant, City of Fort Wayne, IN. Addition of 3,500 pph pebble lime batch slaker. Design included study between pebble lime batch slaker and hydrated lime high-density continuous batch slaker. Improvements include for the new batch slaker include a modified day bins, new slaker, grit classifier, slurry aging tank and lime pumping feed loop system.

Design Manager, DRWP Capacity Increase, Columbus, OH. Design manager for the design of the 80 MGD ozone facility and softening basin expansion. The project included several items like chemical storage/generation/conveyance and dissolution, plant capacity expansion sequencing and hydraulics. Managed day-to-day technical reviews and responses for services during construction across all disciplines and subconsultants for Contract 3, plus technical work for all contracts totaling $200M.

Design Manager, DRWP UV Disinfection Facility, Columbus, OH. Managed Jacobs' work on the civil/site utilities and process systems. Managed project work restrictions, finished water flow path evaluations, and regulatory compliance documentation. Performed detailed hydraulic evaluations and provided the design for chemical storage and conveyance, finished water sampling, and site/civil improvements.

Melanie Gamez, PE—Design Manager

Melanie has 21 years of experience specializing in civil and process engineering including planning, designing, bidding, constructing, and commissioning. She manages multi-disciplinary design teams for large and small water treatment facilities throughout Ohio.

Education and Professional Registration

- BE, Civil/Environmental Engineering, Youngstown State University
- Professional Engineer: OH (#69069)

Relevant Experience

Project Manager/Design Manager, PAWP Upgrade, Columbus, OH. Managed the design team to complete softening basin equipment replacement and rehab, new recarbonation and polymer systems, new recarbonation basin, filter upgrades, new 11 MG clearwell, chemical transfer system upgrades and major electrical upgrades. Work also included managing and performing groundwater study sampling and evaluation, bench scale polymer testing, and polymer full scale demonstration. Managed services during construction.

Project Manager, PAWP Concept Plan Update, Columbus, OH. Responsible for groundwater sampling, evaluation of surface water vs bank filtration raw water intake, and future treatment recommendations. Evaluated potential sites for future lime sludge disposal and met with Ohio EPA to determine permitting requirements.

Design Engineer, HCWP Sludge Pump Station and Electrical Upgrades, Columbus, OH. Responsible for initial layouts and pump sizing for sludge control houses and new sludge pump station. Coordinated with electrical engineer for sizing of rooms, electrical requirements, and required I&C.

Design Engineer, New WTP, Village of Versailles, OH. Participated in preparing process and civil drawings and performing hydraulic and process calculations and lime sludge pumping system for the new groundwater softening plant. Responsible for civil designs including a new waterline and sanitary force main servicing the plant, site grading, a new pump station, and a culvert. Managed services during construction and provided shop drawing review.

Project Manager, Greenville (OH) WTP Lime Slaker Replacement. Managed the replacement of lime slaker equipment and associated equipment and implementation of instrumentation and controls with existing equipment and controls.

Chad Roby, PE, BCEE—Quality, Permitting and Funding

Chad brings 18 years of experience in planning and design of municipal WTPs. He has a strong technical background in treatability/pilot testing, detailed design, services during construction, startup and commissioning, and plant troubleshooting and optimization.

Education and Professional Registration

- MS, Environmental Engineering, University of Tennessee; BS, Environmental Engineering, Murray State University
- Professional Engineer: OH (#77402), GA, MD, NC, PA

Relevant Experience

Permitting and Funding Lead, WTP Lime Softening Upgrades, Wapakoneta, OH. Managed and provided permitting and funding for the planning and design services to convert ion exchange softening WTP to lime-soda ash softening plant to meet regulatory requirements resulting from a new industry discharging to the City's WWTP.

Project Manager, Lime Lagoon Alternatives Study, Middletown, OH. Developed a high-level plan that included evaluation of solids management alternatives. Evaluation considered reusing existing components in addition to evaluating other technologies such as gravity thickeners and dewatering presses. Alternatives were developed with costs that included various discharge options such as to the City sewer or a new NPDES permit. Various residual recycle options were also considered within each alternative.

Project/Design Engineer, WTP Sludge Dewatering, Massillon, OH. The new facility will consist of two 150,000 gallon above ground bolted steel covered tanks for thickening and storage of the lime sludge prior to the filter press, a dewatering building to house two new 250 cubic foot plate and frame filter presses, and ancillary equipment. Ancillary equipment includes air operated diaphragm pumps, sludge cake conveyors, and a solids storage building sized to provide 4 to 6 months of storage capacity of the dewatered product.

Process Engineer, Blacklick WTP Filter Addition, Columbus, OH. Responsible for the chemical feed systems, clearwell disinfection analyses, and detailed plant hydraulics for this existing 1.44 MGD plant that uses two Aerolators and was replaced with three vertical pressure filters utilizing chemical oxidation with permanganate and hypochlorite. The plant was also upgraded to comply with the impending groundwater virus inactivation requirements.

Chris Catlin, PE—Senior Technologist

Chris has 30+ years of experience in water treatment and distribution including experience as an operator, lead operator, trainer, system manager, design engineer and operations consultant. Chris has acted as temporary plant manager for two utilities for one- and three-year durations and completed numerous plant startups.

Education and Professional Registration

- MS, Civil and Environmental Engineering, University of Iowa, Iowa City, Iowa; BSE, Chemical Engineering, University of Iowa, Iowa City, Iowa
- Professional Engineer: IA, MN

Relevant Experience

Superintendent/Operations and Maintenance, Minneapolis, MN. Managed surface WTP including staff of 140. Operations, maintenance, water quality departments within the water utility. Developed staff, created Rehabilitation and Replacement (R&R) program, optimized staffing, optimized treatment and sludge disposal. Created standard operating procedures for seasonal treatability issues.

Lead Process Engineer, WTP Upgrades, Iowa City, IA. Designed 20 MGD ClariCone® lime softening plant including chemical feed systems.

Acting Plant Manager, Staff Augmentation, North Miami Beach, FL. Managed the 30 MGD lime softening/ nanofiltration/reverse osmosis treatment plant for utility serving 175,000 population. Prepared standard operating procedures (SOPs) for numerous plant and distribution system activities.

Lead Process Engineer, WTP Upgrades, Pella, IA. Designed and oversaw construction and startup of 3 MGD ClariCone® lime softening plant and chemical feed systems.

Lead Process Engineer, University of Iowa Water Plant, Iowa City, IA. Designed a ClariCone® based backwash reclaim system for a 6 MGD lime softening plant.

Lead Process Engineer, Denison Utilities WTP Upgrades, Denison, IA. Designed 7 MGD ClariCone® lime softening plant including chemical feed systems.

Acting Plant Manager/Acting Water Quality Manager, Gilbert, AZ. Provided management services on an interim basis (approximately 1 year) for water utility serving 220,000. Managed and developed staff, oversaw correction of deficiencies in certified water quality lab, provided response to trihalomethanes (THM) exceedance and corrective action. Became Lab Manager of record on interim basis. Assisted with recruiting and hiring process for permanent staff.

Matt Leach, PE—Principal-in-Charge

Matt brings over two decades of design leadership at a variety of water and wastewater treatment projects throughout Ohio, including the award-winning Columbus DRWP Capacity Increase project. His primary engineering focus is on water treatment, with extensive expertise in plant, pump and pipeline design, system sizing, detailed final design, and services during construction.

Education and Professional Registration

- BS, Civil Engineering (Environmental Engineering Emphasis), The Ohio State University
- Professional Engineer: OH (#43017), WA

Relevant Experience

Principal-in-Charge, Water Quality and Assurance Laboratory (WQAL) and Plan Laboratory Upgrades, Columbus, OH. Serve as the principal in charge for the $12M WQAL upgrades and upgrades at the DRWP and PAWP Laboratories.

Project Manager, DRWP Capacity Increase, Columbus, OH. Managed the design and services during construction for $200M in WTP upgrades, including a new 29 MGD ion exchange facility, ozone and biological activated carbon (BAC) filters, sludge handling and chemical handling facilities, plant-wide electrical, architectural and HVAC upgrades, and replacement of high- and low-service pumps. This project was awarded the Grand Award at the ACEC of Ohio's 2019 Engineering Excellence Awards.

Project Manager, PAWP Hypochlorite Disinfection Improvements, Columbus, OH. Managed the selection and design of the conversion of gaseous chlorine disinfection to bulk sodium hypochlorite at the WTP. Preliminary design evaluations included both onsite hypochlorite generation and bulk hypochlorite delivery.

Project Manager, General Engineering Services, Columbus, OH. Responsible for engineering services to the Water Supply Group, including the DRWP Low-Service Pumps Replacement and numerous other projects.

Project Manager, HCWP Sludge Pumping Renovation and Electrical Upgrades, Columbus, OH. Led the final construction services portion of the project for the sludge control and pumping improvements, and electrical improvements on a $32.5M sludge pumping and electrical upgrade at the plant. Also completed the selection and design for the new sludge pumps for pumping at an increased system head to the McKinley Avenue quarry.

Todd Elliott, PE—Senior Technologist

Todd brings 20 years of experience with design and construction services, water quality treatment studies, and security services. His experience in water treatment process design includes drinking water treatment process selection, equipment and design; lime softening designs; bench-scale/pilot testing; project alternatives analysis using economic and non-economic criteria; equipment testing and plant commissioning; and process optimization.

Education and Professional Registration

- MS, Environmental Engineering, University of Wisconsin-Madison; BS, Civil and Environmental Engineering, University of Wisconsin-Madison
- Professional Engineer: IA, IN, MN, WI

Relevant Experience

Pilot Testing Lead, McCarrons Water Treatment Plant Upgrades, St. Paul, MN. Leading 12-month pilot study evaluating new high rate solids contact lime softening clarification technology in advance of 84 MGD water plant design upgrade. Conducted jar testing regime to identify optimal lime, coagulant, and solids recirculation doses. Evaluating lime residual concentrations for impacts on dewatering systems. Coordinating with regulator to translate pilot study results to full scale design approval.

Senior Technologist, Fridley Softening Plant Process Assessment, Minneapolis, MN. Reviewed existing raw and finished water quality data, plant design information, chemical treatment and operational information, and previous reports. Developed and implemented an evaluation plan including bench and full-scale testing. Bench scale tests identified optimal lime, coagulant, and sludge recycle dose for turbidity and organics removal.

Project Engineer, Water Master Plan, Ann Arbor, MI. Conducted series of jar tests to evaluate lime, coagulant, and solids recirculation doses on turbidity and organics removal. Evaluated addition of magnesium hydroxide and soda ash for enhanced hardness removal.

Pilot Operator, Colorado Springs Utilities, Southern Delivery System Pilot Water Treatment Plant, Fountain, Colorado. Testing consisted of parallel conventional treatment and lime softening treatment trains. Operated pilot-scale DensaDeg® solids-contact clarifier units up to 100 gpm for the following softening methods: single-stage lime with single-stage recarbonation, single-stage caustic soda with single-stage recarbonation, single-stage lime with two-stage recarbonation, two-stage lime/soda ash with two-stage recarbonation.

Patrick Anderson, PE—Electrical Lead

Patrick has more than 28 years of experience providing electrical engineering services for water facilities and specializes in electrical layout and installation. He is a union-trained electrician and licensed electrical engineer that brings a unique hands-on perspective to his designs.

Education and Professional Registration

- BS, Mechanical Engineering, The Ohio State University
- Professional Engineer: OH (#81735)

Relevant Experience

Electrical Engineer, DRWP Capacity Increase, Columbus, OH. Responsible for electrical for the valve motor replacement and electrical upgrades to the filter gallery including powering new and existing Valve Motors, new pipe gallery Lighting, implementing new Chemical Mixers, tying new into the existing SCADA System, powering new Local and Area Control Panels and running duct bank to the new Valve Vault.

Resident Project Engineer, HCWP Sludge Pump Station Renovations and Electrical Upgrades, Columbus, OH. Oversaw all phases of electrical construction, including the electrical and instrumentation systems for new sludge control houses, a new lime sludge control house, and a new sludge pump station.

Electrical Engineer, PAWP Hypochlorite Disinfection Improvements, Columbus, OH. Responsible for the design of the electrical upgrade including all electrical and instrumentation to complete softening basin equipment replacement and rehabilitation, new recarbonation and polymer systems, new recarbonation basin, filter upgrades, new 11 MG clearwell, chemical transfer system upgrades and major electrical upgrades.

Electrical Engineer, WTP Lime Softening Upgrades, Wapakoneta, OH. Responsible for the electrical rehabilitation of MCC's, generator and high service. New MCC's with addition of new building and processes.

Lead Electrical Engineer, WTP Effluent Pump Station and Pond Improvements, Fort Wayne, IN. Responsible for all electrical and instrumentation for the installation of new Lime Slaker that required 480 and 120 volt power, a new control cabinet with programmable logic controller (PLC) and associated new I/O and integration of new system into existing SCADA.

Lead Electrical Engineer, WTP Lime Slaker, Greenville, OH. Responsible for all electrical and instrumentation for the installation of new Lime Slaker. Two Lime Slakers were installed requiring 480 and 120 volt power, a new control cabinet with PLC and associated new I/O and integration of new system into existing SCADA.

Tom Bechtel, PhD, PE—Process Mechanical Lead

Dr. Bechtel brings 35 years of experience in chemical and mechanical engineering. He specializes in providing engineering services in the water and wastewater fields. His primary responsibilities include contract drawings and specifications preparation, process system modeling and construction phase engineering services.

Education and Professional Registration

- PhD, Chemical Engineering, University of Missouri-Columbia; MS, Mechanical Engineering, Southern Illinois University-Carbondale; BS, Chemical Engineering, Iowa State University
- Professional Chemical Engineer: OH (#43026), IL, IN, MI

Relevant Experience

Process Mechanical Quality Control Reviewer, WTP Lime Softening Upgrades, Wapakoneta, OH. Performed project quality control review, including drawings, specifications and calculations.

Process Engineer, PAWP Upgrade, Columbus, OH. Performed quality control review for the chemical dosage and hydraulic calculations and design of process systems for this greater than $50M project. This project includes upgrades to the softening basins, raw water flow controls, dry material handling systems and filters, and new recarbonation system and clearwell.

Process Engineer, HCWP Sludge Pumping Renovations, Columbus, OH. Performed a detailed rheological study of sludge behavior under pumping conditions, including data analysis and calculations, and served as a senior technical advisor for a $32.5M sludge pumping and electrical upgrade at the Plant.

Process Engineer, DRWP Capacity Increase, Columbus, OH. Responsible for the design of 12 new fiberglass reinforced plastic alum storage tanks and the refurbishment and relining of eight existing caustic soda/zinc orthophosphate storage tanks.

Process Engineer, DRWP Low Service Pump Addition, Columbus, OH. Assisted with hydraulics calculations and performed Quality Control for the addition of two 30-inch low service vertical turbine pumps in the plant pump station, each sized to deliver 23,000 gpm. Contract value is $1.2M.

Design Engineer, New WTP, Village of Versailles, Ohio. Responsible for plant hydraulic calculations for the new $6.2M 1.5 MGD softening WTP.

Jamie Decker, PE, CRL—Asset Management / O&M

Jamie has 19 years of experience with civil engineering, project management and asset management (AM). He specializes in implementing AM and O&M best practices, strategies and tools for water, wastewater, and stormwater systems, including risked-based decision models, prioritization of capital and operational expenditure plans, and effectively utilizing software solutions.

Education and Professional Registration

- BS, Civil Engineering, Ohio State University
- Professional Engineer: OH (#43085); Certified Reliability Leader

Relevant Experience

Project Manager, General Engineering Services; Village of Johnstown, OH. Duties as municipal engineer include the following attend council meeting and other necessary public meetings; assist in development of the capital improvement plan and fiscal planning; compile/develop Village construction specifications, regulations, and procedure manuals; prepare feasibility studies; conduct plan reviews of potential private developments; prepare funding applications; provided general counsel regarding infrastructure; and provide construction administration and oversight for proposed private developments.

Consultant, DRWP Capacity Upgrade, Columbus, OH. Served as a task consultant that developed a risk-basis for reviewing waste disposal options based upon the capital cost, operations and maintenance and the permitting requirements for the plant upgrades. The report was used to determine the most effective path forward for the City to handle waste disposal from the plant. Also assisted with the O&M Ready task for this project. This was a new process developed for DPU to ensure that when the project is completed and turned over to the City, all of the asset data, required spare parts and maintenance activities are already loaded into the City's CMMS, WAM.

AM Task Lead, As-Needed Engineering Contract, Water Asset Management Plan (AMP) Task, Cleveland, OH. Developed Water AMP for the city's water treatment and distribution systems, along with subsequent updates to the AMP. The task focused on developing an AMP in compliance with Ohio Environmental Protection Agency's AM requirements. The AMP included documenting asset inventory, condition assessment data, risk, levels of service, O&M procedures, Capital and Operations expenditure protocols and improvement initiatives. Jamie also implement an asset risk scoring that was the basis for defining priority process areas to evaluate in an Excel-based risk model.

Tim Dodge, RA—Architectural Lead

Tim has more than 35 years of architectural design experience for water treatment facilities, including new facilities, retrofits, renovations, and expansions. Through specializing in the design of large water infrastructure projects, he offers his clients knowledgeable contribution and oversight of the complete architectural design process.

Education and Professional Registration

- MA, Architecture, University of Florida; BS, Design, University of Florida
- Registered Architect: OH (#1817507), FL, GA, NE, NC

Relevant Experience

Architectural Design Lead, WTP Lime Softening Upgrades, Wapakoneta, OH. Project will convert the City's WTP from IX treatment to lime softening treatment, eliminating the brine wastewater discharge associated with IX treatment. This treatment change will significantly reduce the WTP's TFR loadings, allowing the WWTP to meet its discharge limits. Design and construction administration (CA) for CMAR delivery method. Design includes renovation of existing water treatment facility to repurpose existing process mechanical equipment space to office-use and laboratory space and new chemical softening building.

Architectural Design Lead, Columbus Quality Assurance Laboratory, Columbus, OH. Design of completely renovated 12,434 sf second floor laboratory space in the City's existing office complex. The laboratory is used to complete over 35 analytical tests, both certified and non-certified. The tests are performed to demonstrate regulatory compliance for all three of the City's drinking WTPs by analyzing water quality from each raw water source, treatment process, and finished water throughout the large and complex distribution system. The project includes design of a temporary laboratory complex of prefabricated buildings for use during renovation work.

Architectural Design Lead, Claude H. Dyal WTP Surface Water Plant Clearwell Addition and Reject Pond Rehabilitation, City of Cocoa, FL Design and CA of a new surface water transfer pump station building equal to 2,065 sf. The building houses transfer pumps and associated electrical equipment and features integrally colored split face concrete masonry unit veneer walls and low-slope membrane roofing. Responsible for directing team members in producing plans, details, and specifications for building construction. CA duties included responding to requests for information and reviewing submittals and substantial completion inspection and punch list.

Mike Gnandt, PE—Cost Estimating

Mike has 26 years of experience and serves as a Program Level Cost Estimating Technical Advisor providing guidance for multiple programs in a quality checking and assurance role. As a detail cost estimator, he provides high level detail cost estimates for design and construction projects.

Education and Professional Registration

- BS, Civil Engineering, University of Cincinnati
- Registered Architect: OH (#67538)

Relevant Experience

Cost Estimating, WTP Lime Softening Upgrades, Wapakoneta, OH. Responsible for the preliminary and detailed cost estimating of the design of Lime Softening Upgrades to WTP. Including costs for aeration tanks, softening basin, recarbonation basin, clearwells, solids lagoon, softening chemical building CO2 storage and stormwater detention.

Prime Cost Estimating, DRWP Treatment Capacity Increase, Columbus, OH. Led the cost estimating for Contract 4 of the $200M treatment capacity increase project to expand DRWP treatment capacity to 80 MGD. Served as cost estimator for design of the $100M in treatment plant upgrades, including new 29 MGD Ion Exchange Facility; new chemical handling facilities; plant wide electrical and architectural upgrades; replacement of existing high and low service pumps; replacement of plant HVAC system; plant site work; and other miscellaneous plant upgrades.

Cost Estimator, Relocation of Fields Ertel Booster Pump Station, Warren County, OH. Responsible for the detailed cost estimating of the design of the replacement and abandonment of an existing booster pump station with a new station. Estimating also included provisions for a new metering vault for the source connection to Greater Cincinnati Water Works' supply force main and will include new tie-ins of the pump station. Construction Cost: Estimated $1,370,000.

Cost Advisor/Cost Estimator, Jaysville to St. Johns Lift Station Study, City of Greenville, OH. Responsible for the cost advisement and estimating of the design of the sanitary sewer lift station valve vault and sewer that serves a growing industrial park. The study purpose was to assess the existing lift station, project future flows based on current flows and projected growth of the industrial park, and develop alternatives and recommendations for improvements at the pump station. Construction Cost: $863,500.

Ian Hammons, PE—I&C Lead

Ian has 18 years ears of experience in electrical engineering and I&C design for water and WWTPs. He specializes in I&C design including field instrumentation, piping and instrumentation diagram (P&ID), control panel layout design, voltage drop calculations, and SCADA applications.

Education and Professional Registration

- BS, Electrical and Computer Engineering, The Ohio State University
- Professional Engineer: OH (#72665), KY, MI, WV

Relevant Experience

I&C Engineer, WTP Lime Softening Upgrades, Wapakoneta, OH. Lead instrumentation engineer for the design of an expansion to the existing WTP. Responsibilities included selecting and integrating new PLCs and instruments into the existing network, providing a new SCADA system, and re-working the existing 900 MHz wireless telemetry system for remote sites to communicate back to the WTP.

I&C Engineer, DRWP Capacity Increase, Columbus, OH. Performed detailed electrical design for Contract 1 which included the new Electrical Substation for the plant, Contract 2 which replaced the existing SCADA system, Contract 3 which included a new Ozone facility, and Contract 4 which included a new Ion Exchange Facility. Responsibilities included performing a detailed short circuit study to be used for arc flash purposes during construction, lighting calculations, replacement of all existing RTU's with PLC's, creation of electrical plans and creation of electrical specifications.

I&C Engineer, PAWP Hypochlorite Disinfection Improvements, Columbus, OH. Performed detailed electrical design for an upgrade project which included a new Electrical Building for the plant. Responsibilities included performing a detailed short circuit study to be used for arc flash purposes during construction, replacement of several existing PLC's with new, modern PLC's, creation of electrical plans and creation of electrical specifications.

I&C Engineer, DRWP UV Facility, Columbus, OH. Performed detailed electrical design for the UV Facility planned to be constructed in an existing clearwell. Responsibilities included performing a detailed load analysis, lighting calculations, creation of electrical plans and creation of electrical specifications.

Michael Hill, P.Eng., LEED AP™—HVAC/Plumbing Lead

Michael is a mechanical engineer with over 10 years of experience in energy modeling and sustainable design. He is a member of the company's Advanced Design and Simulation Practice, a team of engineers providing engineering modeling, simulation, visualization, testing, and design programming services for projects across all of Jacobs' client sectors.

Education and Professional Registration

- BASc, Mechanical Engineering, University of Toronto
- Professional Engineer in Ontario
- Leadership in Energy and Environmental Design Accredited Professional™ (LEED AP)

Relevant Experience

Mechanical Engineer, DRWP Capacity Increase, Columbus, OH. Performed energy simulations to demonstrate with LEED energy performance requirements. Key challenges included demonstrating improvements in process energy savings from the high and low lift pumps compared to "standard practice". Given the high process energy usage of water treatment facilities, even reaching the minimum energy savings required to qualify for LEED can prove very challenging. A 20 percent energy cost savings compared to the LEED v3 baseline was demonstrated for a total contribution of 6 points under LEED v3.

Mechanical Engineer QC, PAWP Hypochlorite Disinfection Improvements, Columbus, OH. Provided QC review for subconsultants design documents.

Mechanical Engineer, Pleasant Run Sewage Pump Stations, Metropolitan Sewer District of Greater Cincinnati, OH. Performed an assessment of the condition of existing HVAC and plumbing assets at three sanitary pump stations to determine whether to rehab existing stations or to demolish and rebuild. HVAC and Plumbing design lead on proposed new sanitary pumping station which was deemed to be the best option due to the findings of the assessment.

Mechanical Engineer, Capital Improvement Study, Combined Sewage Outfall (CSO) Facilities Assessment, Great Lakes Water Authority, Detroit, MI. Assessed existing HVAC and Plumbing assets at nine large CSO facilities in Detroit Michigan and gave recommendations for capital improvements based on the condition/operation of HVAC and Plumbing assets versus industry standard practice. Facilities assessed included Seven Mile, Conner Creek, St Aubin, Leib, Puritan Fenkell, Oakwood, Hubbell Southfield, Belle Isle, and Baby Creek.

Gary Long, PE— Quality, Permitting and Funding

Gary has 35+ years of experience in the planning and design of water facilities systems. He specializes in systems ranging in size from <1 MGD to 20+ MGD for small to medium sized communities with a construction costs of these projects range from $100K to $30M.

Education and Professional Registration

- BS, Civil Engineering, The Oho State University
- Professional Engineer: OH (#50552)

Relevant Experience

Project Manager, New WTP, Village of Johnstown, OH. Responsible for managing the design, construction services and startup assistance for a new $2.1M, 1.0 MGD groundwater lime softening treatment plant. Lime sludge handling facilities include a decanting lime thickening/storage tank with pumped removal of the settled lime sludge to truck loading for land application. The new plant included the first Ohio municipal application of an upflow solids contact clarifier system.

Project Manager, WTP Lime Slaker Replacement, Greenville, OH. Responsible for managing the engineering services for the 4.9 MGD WTP Lime Slaker Replacement project that includes replacing the aged south lime slaker with a new slaker sized for current plant operations; and replacing the lime silo isolation knife gate and feed auger at the bottom of the lime silo.

Project Manager, WTP Lime Softening Upgrade and Iron Filter Expansion, Wapakoneta, OH. Responsible for managing a fast track development, design, regulatory approval, construction services and Ohio Water Development Authority (OWDA) Funding procurement to double the filtration capacity, from 2.5 MGD to 5.0 MGD to meet increased capacity required by a new industry. The filters were designed to be converted from iron filters to finished water filters during the Phase 2 Improvement when the WTP is converted from Ion Exchange Softening to Lime Softening. Project included planning, detailed design, permitting, funding procurement and construction coordination to add three Gravity Iron Filters.

Project Engineer, New WTP, Village of Versailles, OH. Responsible for the design of a $6.2M, 1.5 MGD conventional lime-soda softening WTP for a groundwater supply. Processes include aeration, solids contact clarifier, recarbonation, rapid sand filters, clearwell and high service pumping. Other processes include a lime sludge tank for solids concentration and storage and a waste pump station to convey sanitary flows to the WWTP. Chemical processes include lime, soda ash, carbon dioxide, alum and chlorine.

Rodney McKinley, CCM—Resident Project Representative

Rodney has 14 years of experience performing construction and design related services for water and wastewater treatment facilities.

Education and Professional Registration

- BS, Construction Systems Management, Ohio State University; AS, Architectural Drafting and Design, Central Ohio Technical College; AS, Mechanical Drafting and Design, Central Ohio Technical College
- Certified Construction Manager

Relevant Experience

On-Site Design Professional Representative, DRWP Capacity Increase, City of Columbus, OH. Provide analysis, design, and construction services for the $200M improvements project that was separated into 5 construction contracts. Responsibilities included drafting and design of treatment process systems; construction observation for compliance with plans and specifications; preparing Requests for Proposals (RFPs); responding to Requests for Information (RFIs); preparing construction cost estimates; reviewing schedules; and assist with commissioning process equipment systems.

On-Site Design Professional Representative, DRWP UV Disinfection Facility, City of Columbus, OH. Provide analysis, design, and services for a UV disinfection facility. The project consists of five UV reactors, major structural modifications to an existing clearwell, and a UV reactor clean in place system with a construction cost of over $23M. Investigated field construction related challenges; prepared RFPs; responded to RFIs; prepared construction cost estimates; reviewed construction schedules; and assisted with the commissioning of process equipment systems.

Assistant Construction Manager, Jackson Pike WWTP Primary Clarifier Electrical Upgrades, City of Columbus, OH. Provide analysis, design, and construction services for the rehabilitation of the 150 MGD WWTP's primary clarifiers, replacement of two motor control centers, rehabilitate two existing motor control centers. Removal and replacement of all longitudinal, cross collector, and tilt tube motors and drives. Removal and replacement of all exterior and interior associated electoral wiring, conduit, junction boxes, and control panels. Responsibilities included reviewing submittals; coordinating special purpose meetings; investigating field construction related challenges; preparing RFPs; responding to RFIs; preparing construction cost estimates; reviewing construction schedules.

Jose Ramos, PE—Civil Lead

Jose has 19 years of experience in water and WWTP site civil design. He has a strong site civil engineering background in all phases of design, from conceptual to final design, permitting, bidding support, and support during construction.

Education and Professional Registration

- ME, Civil Engineering, University of Florida; BS, Civil Engineering, University of Puerto Rico, Mayagüez Campus
- Professional Engineer: OH (#85361), AL, GA, PR, WV

Relevant Experience

Civil Engineer Lead, WTP Lime Softening Upgrades, Wapakoneta, OH. Leading the design of site improvements associated with the new lime softening treatment system within the City's WTP. Responsibilities included, site and facilities layout, underground utilities, grading and drainage, stormwater management, and erosion control for improvements to existing WTP. Scope of work included preliminary design, detailed design and contract document production.

Civil Engineer Lead, WTP Iron Filter Expansion, Wapakoneta, OH. Led the design of site improvements and geotechnical recommendations for the design of three new gravity filters to increase the plant's capacity from 2.5 MGD to 5 MGD. Scope of work included preliminary design, detailed design and contract document production.

Site Civil Design Lead, Wyckoff WTP Filter Building Rehabilitation and Electrical Improvements, Acworth, GA. Site Civil Lead designer and engineer of record in charge of designing site improvements, underground utilities, grading and drainage, and erosion control for improvements to existing WTP.

Site Civil Engineer, Quarles WTP Chlorine Conversion to Onsite Hypochlorite Generation Project, Marietta, GA. Lead civil engineer in charge of the site civil design for modifications to existing WTP. Responsibilities included site design, site demolition, stormwater management system design and permitting, utilities and yard piping design, and erosion and sediment control design.

Lead Civil Engineer, Reverse Osmosis WTP, Dunes Development Community District, Palm Coast, FL. Site civil design and analysis for new WTP. Prepared environmental resource permit application documents for St. John River Water Management District. Provide services during construction support.

Moe Shamsai, PhD, PE—Structural Lead

Dr. Shamsai is a senior structural engineer skilled in all phases of engineering operations and has 25 years of experience in various concrete, steel, timber, and masonry design including concrete tanks, channels, retaining walls, and shallow and deep foundations.

Education and Professional Registration

- PhD, Civil/Structural Engineering, The Ohio State University; MS, Structural Engineering, Sharif University of Technology; BS, Civil Engineering, Sharif University of Technology
- Professional Engineer: OH (#71740), AR, IN, LA, MN, OR, VA

Relevant Experience

Structural Engineer, DRWP Concrete Inspections and Repairs, Columbus, OH. Full inspection and rehabilitation of the WTP. Responsible for preparation of all design documents for scope which included all metal rehabs including ice breakers, metal access platforms, ladders, grating and supports, and concrete masonry repairs. Review of concrete rehab design prepared by other engineering firm. Preparation of cost estimate for the entire project.

Structural Engineer, HCWP Upgrades, Columbus, OH. Full inspection, rehabilitation, and mechanical and electrical upgrade of the WTP. Responsible for preparation of cost estimates for the entire project.

WTP Concrete Inspections and Repairs, Springfield, OH. Full inspection and concrete rehabilitation of all structures at the WTP. Responsible for preparation of all design documents related to the concrete rehabilitations of all flocculation, primary, secondary basins, chain pits, sludge pits, channels, troughs, etc. Preparation of cost estimate for the entire project, and onsite engineering support during construction.

Structure Engineer, WWTP Expansions for Water Reclamation Facility, Wapakoneta, OH. Design of new Water Reclamation Facility for WWTP expansion to 6 MGD average capacity and 12 MGD peak hydraulic capacity. $5.3M design fee and estimated $65M construction fee. Responsible for the design on numerous facilities/areas of the WWTP WRF expansion. Responsible for preparation of all design documents and calculations for the assigned facilities. Review of design documents prepared by other structural engineers for other facilities.

Charles Winter, PE, DGE—Geotechnical Lead

Charles serves as a Principal Technologist within Jacobs' geotechnical engineering practice. He has more than 24 years of experience in geotechnical engineering exploration, design and construction, with a recent emphasis on water treatment and conveyance facilities. He is skilled in deep foundation design and construction, design of cut-and-cover tunnels, piling, and cast-in-place (CIP) cantilever concrete wall systems.

Education and Professional Registration

- MS, Civil and Environmental Engineering (Geotechnical), University of Wisconsin-Madison; BS, Civil Engineering, University of Wisconsin-Madison
- Professional Engineer: OH (#82707), IL, IN, IA, KY, MI MN

Relevant Experience

Geotechnical Lead, WTP 2020 Improvements Project, Wapakoneta, OH. Reviewing recommendations and plans for new basins, aeration tanks, clearwells and lagoons for upgrade to existing facility. The project will reduce the total dissolved solids loading to the City's WWTP, upgrade existing operations facilities, and provide more treatment capacity. Project delivered using CMAR.

Geotechnical Lead, McCarrons WTP Expansion, St. Paul, MN. Responsible for exploration and characterization of soils and groundwater for the significant ($150M) addition of lime softening, recarbonation and ozone facilities to the 40 MGD facility. Project involved demolition of several facilities and reuse of century-old water tanks for laboratory/control space.

Geotechnical Lead, Recarbonation System Support, Fridley WTP, Minneapolis, MN. Responsible for formulation of deep foundation (helical and micropile) recommendations for support of two large carbon dioxide tanks adjacent to an existing below-grade critical structure. Also reviewed project plans, produced related specifications, reviewed submittals and fielded contractor questions.

Geotechnical Lead, St. Joseph WTP Expansion, St. Joseph, MI. Responsible for exploration and geotechnical design for a new chemical building and new high lift pump station at an approximate 16 MG water facility. Challenges included constructing facilities in the side of a steep lake bluff consisting of loose aeolian sands and into shallow groundwater hydraulically connected to adjacent Lake Michigan.

Mike Witwer, PE—Senior Technologist

Mike has 19 years of experience in the water treatment industry with extensive experience in planning, pilot testing, design, and commissioning of membrane facilities including pre-treatment, reverse osmosis, nanofiltration and low-pressure membrane filtration.

Education and Professional Registration

- ME, Environmental Engineering, University of Florida; BS, Environmental Engineering (with Honors), University of Florida
- Professional Engineer: FL

Relevant Experience

Lead Process Engineer, Timberlake WTP Improvement, Franklin County, OH. Led the improvement for the addition of nanofiltration system to existing facility. Project included the evaluation of the existing green sand filtration facility and integrating a new membrane softening process into existing equipment in and existing building. The design includes two trains on a single skid, CIP system, sodium hydroxide and scale inhibitor feed systems. Part of the design included integration and modification of process control and instrumentation to make use of existing equipment. Included in the project was the development of startup and community communication plans to mitigate impact of changing distribution system water quality.

Process Lead, Green Meadows WTP Expansion, Lee County Utilities, Lee County FL. Led the design of a 16 MGD WTP treating water from three sources. The process trains include a combination of reverse osmosis treatment of a brackish groundwater with bypass blending of high-quality intermediate aquifer groundwater and a separate treatment process for a surficial groundwater using cation and anion resin. The Ion exchange system is designed to use bulk virgin brine or an alternative brine source from a backup deep injection well for cation resin regeneration. Plant was awarded Water Project of the Year 2019 by Global Water Intelligence.

Senior Technologist, Cherry Point MCAS WTP Design (P193), Havelock, NC. Responsible for the design of 6 MGD nanofiltration potable WTP to replace existing softening plant and reduce disinfection byproducts in the distribution system. Design included evaluation of ongoing pilot testing with recommendations to modify the testing to better support the process design. The design includes a new membrane facility treating existing freshwater wells containing high concentrations of iron and disinfection by-product precursor with new pretreatment, post treatment facilities, storage and high service pumping facilities, as well as bypass blend treatment for iron removal.

Project Understanding and Approach

Project Understanding

Located in Licking County, the Village was developed at the beginning of the 19th century. Population slowly grew until the turn of the next century, where the Village saw the population triple. That trend appears to be continuing at the start of the 21st century as the Village has seen rapid population growth and development interest in the area since the year 2000. Based on the most recent 2020 population Census, **the Village of Johnstown is expecting to become the *City* of Johnstown**.

The first WTP in the Village was constructed in the 1930s and expanded in 1962 to be able to provide up to 0.5 MGD. In 1991, the Village hired Jacobs to conduct a condition assessment and reliability study. The *Water Treatment Plant Feasibility Study* published in 1991 found that the treatment plant was at the end of its service life and that the demand had the facility operating at its maximum capacity. To keep up with the existing demand, the facility needed to be expanded or replaced. Because it was not feasible to expand at the previous site, the current WTP was designed (1992), constructed and commissioned (1993-95) at its current location, 395 W. Jersey Street.

Approved at 1.0 MGD, the WTP treats water from three groundwater wells located at Belt Park adjacent to the Plant. The raw water is softened in a solids contact clarifier (ClariCone® by CB&I) with the addition of hydrated lime to a pH of around 11. A polymer is added during the softening process to maintain sludge blanket consistency. Carbon dioxide is then added to the softened water to lower the pH and stabilize the water prior to filtration. Three 12-foot diameter dual media filters provide filtration before disinfection with sodium hypochlorite for 4-log virus inactivation. Two finished water storage clearwells provide the volume required for virus inactivation and on-site storage for peak and off-shift demand. The three finished water pumps draw the treated water from the clearwells and pump into the distribution system.

The lime softening treatment process and associated equipment at the WTP have been reliable and the Village has been able to provide consistent high-quality drinking water. The Plant was *designed* nearly 30 years ago and there have been many improvements to lime softening equipment over the last three decades.

The WTP is classified by Rule 3745-7-03 as a Class II treatment plant. It does not operate continuously 24 hours

per day and is subject to the staffing requirements of Rule 3745-7-03. The Village's goal to increase the approved capacity to 2.0 MGD (3.0+ future) is well below the 5.0 MGD threshold that would change the plant classification from a Class II to Class III public water system. Therefore, this project is not anticipated to impact the staffing requirements.

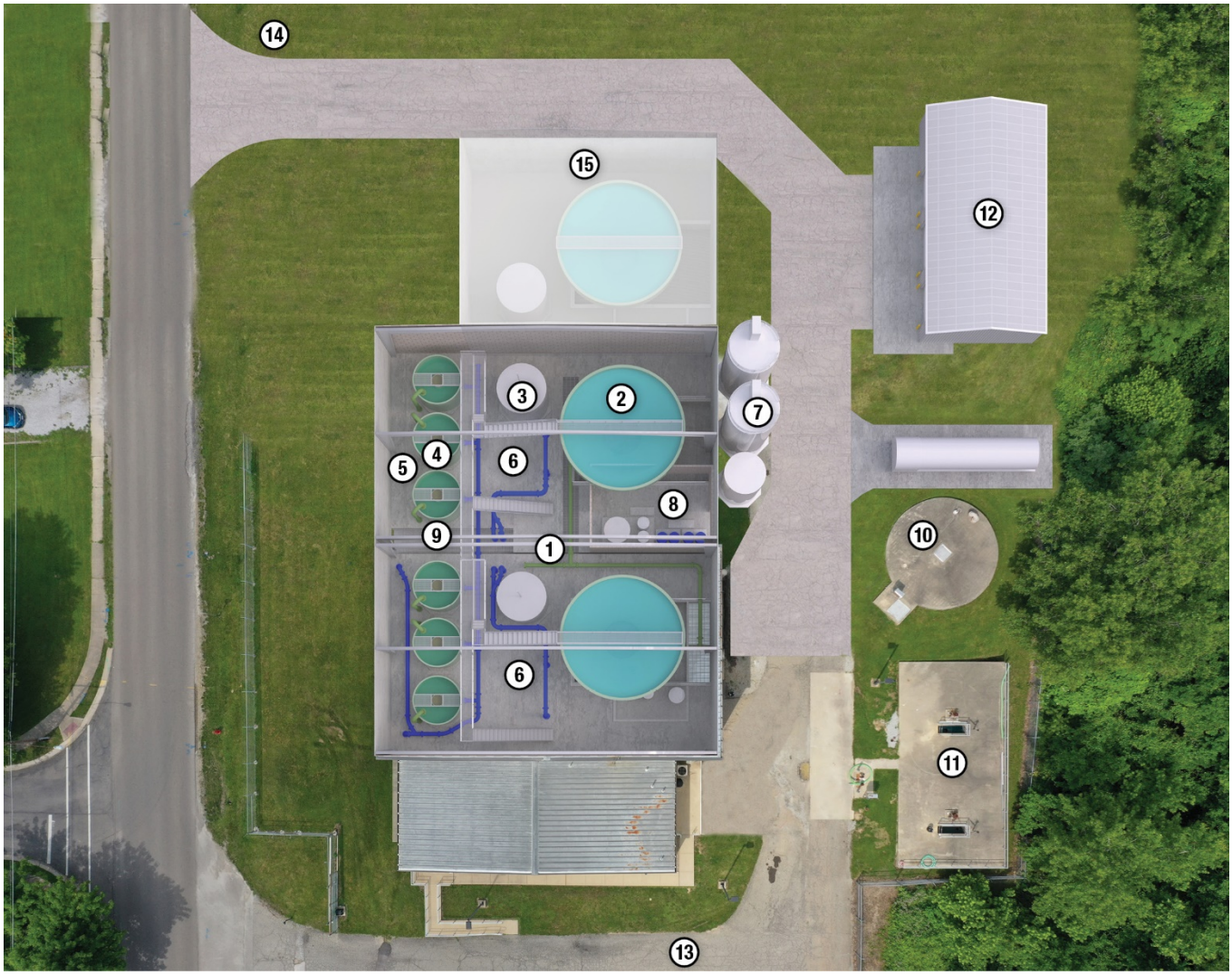
Project Approach

Jacobs offers a whole plant design technical approach using our experience and innovative design tools. This means we develop each unit process for a specific purpose that fits into the overall treatment strategy. Using information gathered through discussions with the Village and our historic records as the current plant design engineer, we have developed a 3D rendering of proposed unit processes and overall site considerations (**Exhibit 3**). The rendering provides an initial site layout and component capacity review of key items, identified by numbers, that will be further refined in Phase I and Phase II with input from the Village. The information shown accounts for construction sequencing that will allow the new additions to be constructed with minimal impact to daily water treatment operations. Overall, the rendering represents our in-depth understanding and approach for the project, which translates to quickly defining critical input and key decisions from the Village.

1 Source Water

The Village currently has a separate project to increase source water capacity to 2.0 MGD and anticipates a future approved capacity of 3.0 MGD or more. No changes to the source water are anticipated to be necessary for this project. Minimal onsite yard piping changes may be required to avoid conflict with new facilities but the existing 12-inch piping is adequate for up to 4.0 MGD. Since the Village anticipates a future rating of 3.0 MGD for the well field, a minimum future (not project) component capacity

EXHIBIT 3—PROPOSED UNIT PROCESSES 3D RENDERING *(Information for each number provided in this rendering is presented in the Project Approach discussion.)*



Jacobs

matches that value for all treatment components. New softening inlet connections will be made to the existing exposed bypass piping but still maintaining bypass capabilities.

② Softening

An additional 1.0 MGD rated solids contact clarifier will be added adjacent to the existing unit for a total of 2.0 MGD through softening. However, there is a potential to increase the approved component capacity rating of the new solids contact clarifier and utilize turndown to meet a potentially lower demand. Without this, a third solids contact clarifier will be required to meet future desired capacity increases. Evaluation of sludge thickness and quality will also be assessed with respect to sludge handling processes. Blind flanges for both softening and recarbonation will be provided for future connections.

③ Recarbonation

The current recarbonation tank is directly connected to the solids contact clarifier outlet. Jacobs will duplicate this process for the additional softening unit, resulting in recarbonation tanks that are dedicated each respective solids contact clarifier. This will create "trains" for softening and recarbonation. The new recarbonation tank will be sized to match the component capacity of the upstream solids contact clarifier.

The existing gaseous diffuser style recarbonation mixing and detention tank will be the basis-of-design (BOD) for the new train. The existing gas system will be enhanced with the addition of a flow and pH feedback control loop. A newer technology, PSF recarbonation systems, will be considered during the Phase I evaluations. These systems provide more efficient transfer of carbon dioxide into the water saving chemical cost, but also use a carrier water for dissolution and mixing which can sometimes make it undesirable.

A conditions assessment and demand calculations will determine if new carbon dioxide storage is required. A new 30-ton tank is shown in a possible location between the Backwash Recycle Tank (10) and Lime Sludge Handling (12). Alternatively, reduced days of storage may be negotiated with Ohio EPA.

④ Filters

Per the Ohio EPA Approved Capacity document, groundwater-supply source WTPs with dual-media filters, like those at the WTP, can be assigned a 4.0 gpm/sf loading rate without any additional data collection. Jacobs recommends submitting to the Ohio EPA to re-rate the existing three filters from 2.0 gpm/sf to 4.0 gpm/sf. This additional allowable loading rate will double the existing approved component capacity. A hydraulics review of internal filter systems will be completed prior to finalizing this recommendation.

Three additional and identical filters approved at a 4.0 gpm/sf loading rate will provide maximum operational flexibility for the Village. By doubling the quantity of filters, the Village can double the volume of water through the entire filtration process without impacting individual filter runtimes (I.e., not impacting individual filter backwash frequency). This quantity will also allow operations to keep a filter out of service for rest after a backwash or maintenance over an extended period of time without disruption to treatment.

The new 12-inch clarified water (not shown), 12-inch backwash waste (not shown) and 12-inch filtered water (shown) pipes will be connected to the existing to provide filtration for any upstream softening train.

⑤ Clearwells

A similar below-grade finished water clearwell system will be constructed underneath the new facility. This additional volume will allow operations to maintain similar clearwell levels they are currently used to with increased demands.

Flow patterns through the clearwell system may need to be revised depending on final location of finished water pumping.

⑥ Finished Water Pumps

Finished water pumps are approved at a peak-hour production to maximum-day production ratio with the largest pump out of service. The existing 600 gpm pumps are not large enough to be re-rated for 2.0 MGD even at a ratio of 1.0 (best case).

Jacobs will review the existing pumps and suction wells to retrofit if feasible. The Village's goal of an approved capacity rating of 2.0 MGD or greater will require the pumps to have at least double the existing capacity. Jacobs will evaluate if additional bowls and new motors can be retrofitted onto the existing vertical turbine pumps and if not, if new larger pumps can fit in the existing suction wells. The evaluation will also review the current Hydraulic Institute Standards to determine if the existing suction well meets the minimal requirements for design, flow approach, vortices prevention and more at these greater flowrates.

The Village should realistically plan for new finished water pumps with a suction well design specifically for the increased flowrates. If desired Variable Frequency Drives will be evaluated and provided if they can cost effectively improve distribution system operations.

⑦ Hydrated Lime Storage and Feed

The existing hydrated lime storage and feed equipment is unable to meet the volume requirements for an increased approved capacity rating. The systems are near or at the end of their useful life and modern systems will improve reliability and operator safety. The existing lime storage and feed silo will be removed and replaced by two silos to match the capacity increase goals. A smaller soda ash storage and feed silo may be required to lower finished water hardness and is shown adjacent to the lime silos.

⑧ Liquid Chemical Storage and Feed

The existing liquid chemical storage and feed equipment and surrounding area is inadequate for additional capacity expansion and may not meet current building codes. A new centralized liquid chemical storage for sodium hypochlorite, polymer, fluoride (as-needed) and corrosion inhibitor chemical (as-needed) will be provided for improved delivery, storage and feeding of chemicals. Safety in our design approach will include items like fire suppression, adequate lighting, spill containment, safety showers and chemical ventilation.

⑨ Finished Water Piping

Maintain access to the existing buried finished water piping by exposing them in a pipe trench. If needed, new piping can tie into the existing system.

⑩ Backwash Recycle Tank

The existing backwash recycle tank appears to be adequately sized for backwash operations and can be kept to save the Village the cost of constructing a similar tank. A more detailed review and coordination with the Village will occur to confirm this. New mechanical equipment and instrumentation will be provided to retrofit the existing structure.

⑪ Lime Sludge Tanks

Depending on Phase I evaluations, maintain or demolish the existing lime sludge tanks. Consideration will be given to repurposing them to backwash recycle tanks if additional storage or flexibility is desired.

Jacobs will quantify and characterize current and future sludge production, including average day, peak day, and 90th percentile sludge production at current average daily flow and future flows. Future increases in plant production will impact the quantity of sludge generated and should be considered.

⑫ Lime Sludge Handling

The Village currently engages in "beneficial-use" of solids in which local farmers haul wet sludge pumped from the lime sludge tanks to use on their fields nearby. Jacobs will evaluate the sludge dewatering facilities on criteria important to the village such as generating a dewatered solids cake material that can be disposed of cost effectively, focusing on dewatering alternatives that reduce the volume of solids generated, reducing truck traffic, and operating and disposal costs.

Many mechanical dewatering options are available that will produce percent solids greater than 30 percent. However, the village will need to consider O&M complexity, energy costs, and site impacts which Jacobs will assist with. We understand that the Village is working with a manufacturer to pilot a volute dewatering press this august. Depending on results, this may be the basis of design for dewatering considerations. However, Jacobs recommends also considering a less O&M intense gravity thickening system that is coupled with an elevated hopper-bottom storage tank for ease of hauling.

⑬ Standby Power

Ohio EPA will require standby generation power that can power the treatment plant processes to produce average daily flow. The existing generator will be replaced with a new generator to comply with this requirement. Jacobs will work with the Village to determine if future power capacity should be planned and provided with this new system.

⑭ Bulk Water Filling Station

We understand that the existing bulk water filling station is adjacent to a waste unloading system at the WWTP. The Village has experienced high traffic volume as a result of the mixed use area. A new location at the WTP will separate the two systems and provide adequate drive for multiple vehicles.

⑮ Future Expansion

This rendering of site conditions has been developed to accommodate future expansions and/or additional treatment processes. The Village owns sufficient property to keep expanding to the north east (plant north) as needed to accommodate future demands and/or regulations. An additional 1.0 MGD ClariCone® and recarbonation system is shown translucent to visualize what a potential expansion could look like.

Additional Considerations

In addition to the information presented in the exhibit above, the following items should be considered:

Finished Water Hardness:

- We understand that the Village has a goal to reduce finished water hardness. Jacobs will analyze the

Village's water and present options for additional hardness reduction using lime feed only as well as with using additional chemicals (I.e., soda ash).

- Jacobs may be able to optimize the existing systems and chemicals to reach your hardness goal without the added expense of an additional chemical.

Fluoride:

- Per Ohio Revised Code 6109.20, public water systems serving ≥5,000 persons need to add fluoride to maintain a fluoride content 0.8 to 1.3 mg/L if the natural fluoride content of supplied water is less than 0.8 mg/L.
- The raw water quality provided as part of the RFP handouts indicate a natural level of 0.80 mg/L (analyzed November of 2020), however, the 2020 Consumer Confidence Report (CCR) indicates a 2018 supplied level of 0.53 mg/L.
- Jacobs will review this requirement with the Village and work together to determine if the addition of fluoride will be required.

Optimal Corrosion Control Evaluation:

- The Village currently does not add a corrosion inhibitor to the supplied water.
- Per Ohio Revised Code 6109.121(A)(6), the Ohio EPA will require the Village to submit a new or updated corrosion control treatment recommendation/plan if the system changes or adds a new source, makes a significant change in treatment, operates outside of acceptable ranges for corrosion control indicators, and any other event determined by the Director to have the potential to impact the water quality or corrosiveness of water in the system.
- This project has the following components that *may* trigger an update to the Village's current corrosion control treatment plan:
  - Increasing capacity
  - Lowering total hardness
- The Village will be required to submit the construction plans to the Ohio EPA at which time they will indicate if a corrosion control evaluation will be required. Jacobs recommends receiving this direction earlier by reviewing this project with the Ohio EPA soon after the Preliminary Design Report has been finalized.

Automation:

- The existing treatment process has a low level of automation and monitoring. Jacobs recommends implementing a Supervisory Control and Data Acquisition (SCADA) system that can perform/assist the following:
  - Automate chemical feed systems using online water quality analyzers, flow pacing, and process control logic loops to optimize water quality and chemical use and provide real-time monitoring of the entire treatment process.
  - Provide both local and remote human-machine interface platforms using secure software to facilitate treatment process monitoring and reduce response time to upsets.
  - Assist with form population for regulatory reporting.

The following sections align with the requirements of the Villages' 2021 RFP and includes the following subjects:

- Phase I: Planning—Detailed Design Memorandum (DDM)
- Phase II: Engineering Design Services (future services)
- Phase III: Bidding and Construction Services (future services)

Phase I: Planning—Detailed Design Memorandum (DDM)

We will start with assembling a well-qualified team with groundwater softening expertise, including ClariCone® and other solids contact clarifier experience. **Our Project Manager Mike Giangiordano** will facilitate a project kickoff meeting with the Village at the beginning of the project to determine the Village's expectations and provide a detailed schedule. This approach will drive the successful completion of Phase I and will facilitate timely decision making on key issues. Our Phase I approach will focus on the following tasks.

Task 1.1—Project Management and Administration

In designating Mike as the project manager, the Village gets a senior water treatment project manager to manage the team, schedule and budget, and a water treatment engineer focused on providing the best technical solutions. In addition to managing the overall project administration, Mike will be involved in all the technical tasks to provide oversight and guidance.

Mike will develop and maintain practices needed for successful project delivery, including monthly tracking, scheduling, reports, invoice preparation, coordination and communications, document control, and QA/QC.

Kick-off Meeting: Jacobs and the Village staff will meet to establish overall goals and objectives for the project team and ensure there is alignment of the planned work and detailed execution. We will also establish lines of

communication, initial data needs, and jump-start the project.

Jacobs team leaders will meet with Village staff prior to the kickoff meeting to discuss the agenda, objectives, handouts, and other issues to ensure the meeting is highly productive. Mike and our task leaders will prepare for and attend the meeting, covering agenda items such as those shown in **Exhibit 4**.

We will also work to build consensus on the following key items as they relate to the project:

- Population projections
- Potential development projects
- Historic and projected water demand
- Existing as-built drawings
- Existing unit process component capacities and re-rating potential
- Alternatives to be evaluated
- Funding expectations and requirements

Project Work Plan: Our proposed Work Plan identifies project objectives and details of all tasks, schedule milestones, team member responsibilities, communication protocols, and QA/QC (**Exhibit 5**). We will identify, document, communicate, and measure the Village's desired outcomes in face-to-face meetings with the Village project manager. Jacobs will confirm Village's preferred communications protocols for inclusion in the Work Plan.

EXHIBIT 5—*Documented processes and tools in Project Work Plan are key for successful project.*

Once under contract, Jacobs will expand the project schedule and work plan to be presented at the project kick-off meeting. The Work Plan will include the work breakdown structure; deliverables and subsequent Village reviews; project schedule including critical path meetings, workshops, and key milestones; document management and controls, and QA/QC processes. The project schedule will be updated each month and will become part of each monthly report.

EXHIBIT 4—KICKOFF MEETING AGENDA

Our Work Plan will include a Quality Management Plan (QMP) outlining the QA/QC procedures throughout project delivery, who will review deliverables, when reviews will be conducted, and review budgets.

The best way to produce quality work for the least cost is to do the work right the first time. **Quality Lead Chad Roby** will develop a QMP to monitor, verify, and document quality through compliance with proven QA/QC guidance that addresses the following:

- Data management, including procedures for obtaining, reviewing, storing, and sharing data
- Procedures for quality reviews of calculations, deliverables prior to submittal
- Procedures for responding to Village review comments on project deliverables
- Templates for all work products and deliverables to the Village, especially technical memorandums and reports

Chad will assist Mike in the preparation of deliverables that will reviewed before delivery to the Village that adhere to the Village's expectations for the project and the industry standard of care

Monthly Reports: Out Project Manager will meet with the Village project manager monthly to discuss project status and prepare for upcoming meetings and review of deliverables. Issues that might be discussed include Village deliverable review status, coordination of work activities, and progress. We will prepare and submit Monthly Progress Reports, which will include task status (percent complete); project budget summary; project schedule updates; work completed since the previous report (milestones, deliverables, other work progress); impediments or other issues affecting the project and/or budget; and changes in the work scope.

TASK 1.2—DEVELOP DDM

This memorandum will address the major decisions prior to beginning Phase II: Engineering Design Services.

Utilizing the information gathered and working with the Village, the Jacobs team will develop the DDM to include the following information:

- Existing conditions and capacity analysis
- Future needs and capacity analysis
- Softening alternatives with cost and space comparison
- Optimization potential of finished water quality
- Optimization of waste streams and solids handling

- Recommendations and BOD
- Preliminary site plan
- Process flow diagram
- Detailed Design Schedule
- Detailed Permitting Requirements and Schedule

Following the kick-off meeting, Jacobs' key discipline leads will walk through the WTP with staff to review current operation and maintenance issues. This will aid in the customization of design for current and future operations. Similar to the study in 1991 **(Exhibit 6)**, we'll work with the village and evaluate historic water demands and compare that to future projection to develop peak hour flow to future peak hour flow and max day flow to future max day flow ratios for equipment sizing.

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EXHIBIT 6—*Table of contents from the Village of Johnstown's 1991 WTP Feasibility Study written by Jacobs*

Our team will provide a feasibility analysis for two alternative treatment technologies and compare to the current lime softening process. As a result, the following three alternatives will be evaluated during Phase I:

- Lime Softening (current approach)
- Membrane Softening
- Ion Exchange Softening

Jacobs recently performed a similar evaluation for the City of Wapakoneta's WTP (2018) with lime softening using hydrated lime the selected alternative for design. The team's experience with this type of evaluation in Ohio groundwaters will be leveraged to provide a recommendation quickly and accurately (**Exhibit 7**). Although it appears unlikely that a softening method other than lime softening will be recommended, the Jacobs team will perform a fair and unbiased evaluation of the softening technologies considering capital and life-cycle costs. For the purpose of this RFP, Jacobs has assumed that lime softening will continue to be the softening method at the Johnstown WTP and the remaining Phase I approach items will be adjusted for other softening methods should it be determined to be more beneficial for the Village.

Jacobs

TECHNICAL MEMORANDUM

Water Treatment Plant Expansion Alternatives Analysis

PREPARED FOR:	City of Wapakoneta
COPY TO:	Gary Long
PREPARED BY:	Todd Elliott, Mike Witwer
DATE:	June 19, 2018
PROJECT NUMBER:	705453
REVISION NO.:	FINAL

Background

The City of Wapakoneta source of supply is a high-quality ground water that comes from the Teays River Valley Aquifer. The groundwater supply consists of six deep wells, located in two well fields, with a firm

EXHIBIT 7—*The Jacobs team recently completed a similar softening alternatives analysis for the City of Wapakoneta.*

The evaluations will include the Village's desire to decrease finished water hardness from 145 mg/L to 110 mg/L and include additional precipatative chemicals for lime softening optimization like:

- Soda Ash, $Na_2(CO_3)$
- Caustic Soda, NaOH

Desktop evaluations are a good planning tool, however, jar testing of actual raw water is preferred and recommended when optimizing softening processes. Jacobs has extensive on-site water quality evaluation experience and can either conduct or assist the Village to dial in the doses for optimal performance and sizing, including completing lime softening jar testing studies for Columbus, Wapakoneta (OH) and St. Paul (MN) (**Exhibit 8**). Additionally, jar tests and full scale test can be used to evaluate benefits of sludge recycle/return and settled sludge concentrations.

Conducting these evaluations now will save the Village operating and maintenance costs for the life of the facility. Evaluations recommended by jar testing include:

- Lime sludge recycle/return
- Optimal lime dose for carbonate hardness removal
- Optimal soda ash and/or caustic soda dose(s) for non-carbonate hardness removal
- Solids production at these doses
- Solids recirculation benefits
- Supernatant water quality evaluation
- Carbon dioxide dose to achieve stable pH

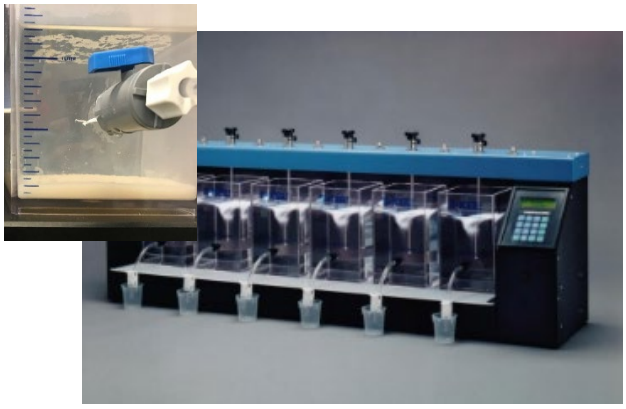


EXHIBIT 8— *Phipps & Bird Jar Tester often used for jar test evaluations and an image of a Jacobs' conducted lime and soda ash hardness optimization and sludge concentration analysis.*

Once the softening process has been determined the BOD for downstream (i.e. recarbonation) and support processes (i.e. chemical storage, waste handling facilities) can also be determined. Additional evaluation with input from the Village will also be provided for items like the following:

- Dry hydrated lime (current) vs liquid lime storage and feed
- Lime sludge dewatering benefits and feasibility
- Finished water chemical needs for disinfection or corrosion control

Recommendations and a BOD will be developed along with a preliminary site plan, process flow diagram (**Exhibit 9**), and a design/permitting schedules to provide for a smooth transition from Phase I to Phase II services.

Early engagement of regulatory stakeholders will be critical to maintaining the schedule and providing a successful project. Jacobs will work with the Village to engage the Ohio EPA during development of the DDM and share the findings and recommendations with them prior to the start of Phase II: Engineering Design Services.

Task 1.3—Funding Assistance

Funding can be a critical component of the Village's plans to expand and upgrade the WTP. Proper planning of how the project will be funded is key to smooth delivery along with bringing the best value to the Village's rate payers. The first step is to understand the tools and resources available to fund water infrastructure projects. Funding can come from the utility itself or in combination with any of several federal and state agencies that offer loans and grants for water infrastructure projects. The most common funding source for drinking water infrastructure is the state revolving fund (SRF) funded through the Water Supply Revolving Loan Account (WSRLA). The WSRLA provides low interest loans to eligible recipients for water infrastructure projects. Repayments of principal and interest plus Ohio EPA funding allows the programs to finance new projects and increase the size of the fund as the moneys "revolve" over time. The WSRLA is jointly administrated by the Ohio EPA and the OWDA. A key component of the WSRLA is that it provides financing to achieve or maintain compliance with the Safe Drinking Water Act (SDWA). This means the project must meet specific criteria in order to be eligible. This includes preparing an application package and then agreeing to adhere to program requirements. A few of the program requirements that should be taken into consideration are:

- Even if the project qualifies, it must make the nomination list which is based on available funding and how critical the project is for SDWA compliance
- Davis Bacon Compliance (Federal Wage Rates)
- American Iron and Steel Requirements
- Infrastructure useful life
- Disadvantaged business enterprise requirements

As an alternative to WSRLA, the OWDA offers the Fresh Water Program among many of the agency's offerings. Jacobs routinely assists communities in obtains funding through the WSRLA and OWDA's Fresh Water Program. Recently, we successfully obtained design loans and construction loans for Washington Court House and Wapakoneta. We will bring that experience and lessons learned to this project to effectively integrate funding into the overall project. Other funding options include Ohio Development Services Agency (ODSA), Ohio Public Works Commission (OPWC), and General Obligation (GO) or Revenue Bonds (RB). Chad Roby was previously a member District 17 Executive Committee of OPWC and has extensive experience with funding.

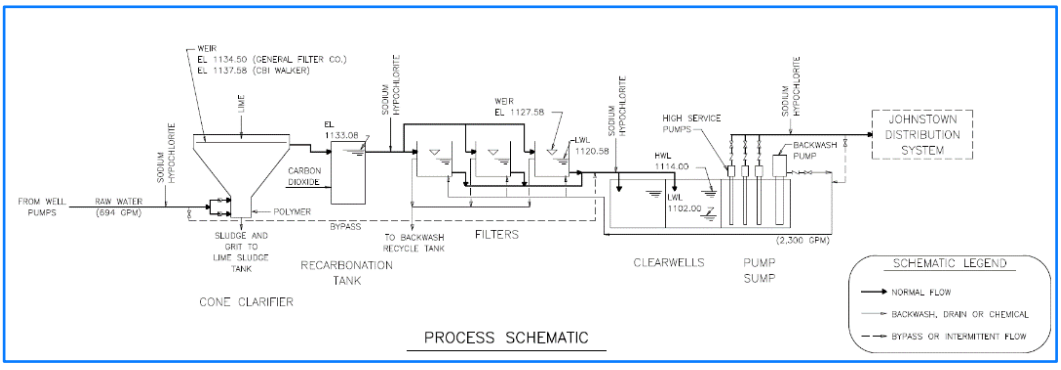


EXHIBIT 9—AS-BUILT CONSTRUCTION DRAWINGS OF THE VILLAGE'S WTP PROCESS SCHEMATIC.

A few key items that we will work collaboratively with the Village on:

1. Engaging stakeholders early (Village leadership, funding agencies, etc.).
2. Determination of what funding sources the project qualifies for.
3. Deciding which funding source brings the most benefit to the project.
4. Developing a schedule that fits into the overall project schedule.

Phase II: Engineering Design Services

For Phase 2, our Project Manager will update the project work plan for this phase and continue with the management tasks described in Task 1.1. We will also engage our subconsultant, Rii, to perform the field surveying and basemapping task (Task 2.2). We will also determine what geotechnical investigations are needed to accommodate the selected WTP expansion alternative. Depending on the location selected for the new facilities, test pits may also be recommended to identify the exact location of buried utilities to minimize impacts to plant operations and the potential for change orders during construction.

Tasks 2.2 through 2.5—Water Treatment Plant Expansion Design

Jacob's 4-Phase Design Process is fully integrated into our project delivery work plan and is our standard methodology for achieving excellence in design delivery. It is an interactive, workshop-based approach and especially effective during the early phases of design when the development of concepts, discussions to clarify project objectives, and decision-making are particularly important. It incorporates input from experts, stakeholders, and Village operations and maintenance staff into the design process so that great ideas can be further developed and refined to achieve their full potential. The 4-Phase Design aligns well with the Village's design tasks (Tasks 2.3 to 2.5) described in the RFP (**Exhibit 10)**.

A specific list of work products and deliverables must be completed by the project team and verified by the quality control team at each phase of design. The process was developed to support proactive communication so that all team members contribute to the successful delivery of the project. The process also ensures that issues that might compromise design quality, facility performance, or permit compliance can be analyzed at the most appropriate stage of design.

The 4-Phase Design Process is a repeatable and proven. It allows our designers to focus on the efficient and cost-effective production of Contract Documents. Efficient implementation can often be a critical component of project success for stormwater, drainage, conveyance projects that tend to have smaller capital budgets in comparison to other types of infrastructure projects.

In accordance with your RFP, design review packages will be submitted at 30-, 60-, 90-, and 100-percent completion levels. Prior to submittal of each design package, the contents will undergo quality control and constructability reviews. Opinions of probable construction cost will be submitted with the 30- and 100-percent submittals During design we will collaborate closely with Village staff and meetings will be held to address key issues related to construction sequencing, scheduling, and required plant outages.

Task 2.6—Permitting

As part of preparing the design documents for the Village's use in soliciting bids for the project, **Permitting Lead Chad Roby** will prepare and submit the necessary permit applications, including the following:

- Notice of Intent (NOI) for Ohio EPA stormwater permitting requirements
- Ohio EPA Water Plan Approval
- Ohio EPA Permit modification
- Ohio EPA Antidegradation Addendum

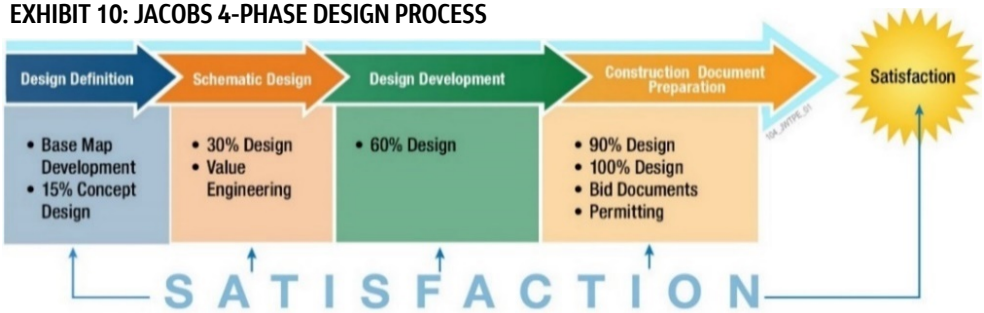
Phase III: Bidding and Construction Services

After completion of the Engineering and Design Services, we will begin the Bidding and Construction Services. As with the previous phases, our Project manager will update the project work plan and continue with the management tasks described in Task 1.1.

Task 3.2—Bidding Assistance

Jacobs will provide the final Engineering Documents to a hosting agency to advertise the project to potential bidders.

EXHIBIT 10: JACOBS 4-PHASE DESIGN PROCESS



We will maintain a list of plan holders, distribute addenda as needed and obtain construction bids. We will also conduct a pre-bid meeting and attend the bid opening and evaluate the bids to provide a written recommendation to the Village and prepare the written notice of award for execution by the Village and the Contractor.

Tasks 3.3 through 3.5—Engineering Services During Construction, Construction Inspection Services, Startup Services

The Jacobs team has provided successful services during construction at numerous water plants in recent years. Our team includes **Resident Project Representative Rodney McKinley**, who currently provides our field representative services at the Columbus DRWP UV Disinfection project, finishing fall 2021, and previously serves as a site representative for the Capacity Increase project at the same plant.

In addition to Rodney, Project Manager Mike Giangiordano and multiple members of our team have extensive experience with startup services after successfully completing multiple WTP design and construction upgrades projects. **Senior Technologist Chris Catlin** has completed numerous plant startups and operated multiple water plants, and will provide his unique experience and guidance to the team.

Our services during construction will include, but not be limited to the following:

- Conduct the pre-construction meeting
- Attend monthly construction progress meetings
- Review of project submittals
- Respond to contractor RFIs
- Preparation of draft RFPs
- Assistance with claims and disputes
- Review and verification of contractor pay requests
- Perform field surveys and prepare record drawings
- Assist the Village in funding reimbursements
- Attend factory witness tests (if required)
- Full time Resident Project Representative
- Assist with startup and testing

If Authorized Services

Jacobs understands that the following services will be included in the scope of work for Phases II and III, and that these services shall not be performed without written authorization from the Village:

- Subsurface Utility Engineering
- Geotechnical Investigations
- Operation and Maintenance Manual

Proposed Schedule

The proposed project schedule is presented in **Exhibit 11**. Based on our prior experience working with the Village, we expect to receive Notice to Proceed (NTP) in early August 2021. Phase I services will conclude by the end of the calendar year and it is planned that scope/fee negotiations for Phase II will be finalized prior to completing Phase I. This way, the project will continue without delay into Phase II services.

The Phase II engineering design schedule is aggressive, but Jacobs understands the importance of this project. We will work with the Village to potentially reduce submittals and review time and to provide early submittals for permitting and funding in order to meet this nine month engineering design schedule.

Phase III will begin the bidding and construction services and is anticipated to be completed in January 2024. To the greatest extent, Jacobs will include innovative design, material and equipment selection, and planned sequencing to assist Contractors in meeting this construction schedule.

Project Fee

Based on the Project Approach presented in this proposal response, Jacobs proposes a competitive Lump Sum amount of **$29,000.00** to assist the Village with Phase 1: Detailed Design Memorandum for the WTP Expansion. We acknowledge this fee will remain valid for 90 days after the date received (June 28, 2021).

EXHIBIT 11—PROPOSED PROJECTS SCHEDULE

Jacobs

Jacobs

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