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Stantec

SAINT PAUL REGIONAL WATER SERVICES

PROPOSAL | Prepared for
St. Paul Regional Water Services

Owner's Representative for WTP Process Improvements

February 20, 2019

Design-build Insight and Technical Expertise for an Outcome-Focused Procurement

30 Seventh Street East., Suite 2500
St. Paul, MN 55101

T: 651.298.0710

February 20, 2019

Confidential

Ms. Tiffany Audette
St. Paul Regional Water Services
McCarrons Center
1900 Rice Street
St. Paul, MN 55113

031804-010

Subject: Proposal for Owner's Representative for Design-Build Project:
Water Treatment Plant Process Improvement Project (Event #788)

Dear Ms. Audette:

The Saint Paul Regional Water Services (SPRWS) is embarking on a $130-million capital improvements project at its McCarrons Water Treatment Plant. This project represents one of the largest capital undertakings in the history of SPRWS, and the project features include new lime softening facilities, recarbonation facilities, and ozone disinfection system facilities. The decision to use progressive design-build for a major upgrade project such as this represents a significant milestone in SPRWS' mission to provide reliable, quality water and services at a reasonable cost.

Given the scale and importance of this project, a key measure of its success will entail the strategy and effectiveness of the overall delivery of this project. With the decision to pursue a progressive design-build project delivery method, we believe SPRWS will be best served by an Owner's Representative that brings proven progressive design-build experience, coupled with the requisite water treatment, pilot plant, and operations expertise.

To successfully deliver on progressive design-build's collaborative potential, the role of an effective Owner's Representative is critical to transforming your project objectives into a constructed project that *performs*. The Brown and Caldwell (BC) team provides SPRWS the depth of resources to successfully achieve its project delivery objectives. In association with Stantec Consulting, Inc, (Stantec) the specific attributes and success criteria that we provide SPRWS include:

- A complete, thorough, and proven understanding of progressive design-build best practices with insight to where standard delivery approaches should be tailored for the specific needs and objectives of your project;
- Demonstrated technical expertise in the design and operation of lime softening, recarbonation, and ozone systems;
- An appreciation for the impact that moving to progressive design-build has on organizations and a proactive approach to making this transition positive for your leadership and your operators;
- An understanding for how the progressive design-build process can support innovation, accountability for performance, and better long-term operations and lower lifecycle costs—the insight to couple progressive design-build principles with the technical project features of the project;

- A primary focus to keep the McCarrons Plant in complete operation and compliance during this multi-year endeavor;
- Recognition that this role requires a focus on collaboration, team-building, and focus on the overall project outcome throughout the project definition, solicitation, design, and construction phases; and
- A commitment to accountability and transparency while representing SPRWS' interests throughout delivery, to support your vision as a regional and national water industry leader emphasizing quality product, services, and cost containment.

Our approach to being an Owner's Representative is focused on project outcomes and reliable advocacy of the project: our scope should support your vision for project success and our primary task is to represent SPRWS' interests while attracting the best qualified design-build firms, supporting a fair and transparent solicitation, and facilitating the selected design-build firm's technical and commercial success.

As noted above, BC is teamed with Stantec to combine the water sector's best treatment process expertise with progressive design-build thought leadership in support of your project. Our two firms bring a successful track record of working together as evidenced in Section 3 of our proposal. Our team's broad national expertise is supported by 68 people in our mutual local offices and our team is supported by proven local SBE, MBE, WBE firms, Sambatek, Building Consulting Group (BCG), and PRO-OPS, Inc. Our team features an experienced local project manager in Harold Voth, who will be actively supported by BC's Owner's Representative national expert Leofwin Clark, other national technical subject matter experts, and approximately 70 professional staff in the Saint Paul/Twin Cities area. Our guiding goal will be to represent and support your vision and business objectives for this important project, collaboratively develop a fair and transparent solicitation for attracting top Design Build Teams' interest in proposing on the project, and successfully facilitate the targeted budgetary, schedule, technical, and commercial deliverables intended for this very important project at the McCarrons Plant.

The attached proposal describes our experience and our approach to leading a successful project. We very much look forward to the opportunity to work with you on this important and exciting project. As an extension of your vision as a regional and national water industry leader, we wish to affirm our steadfast commitment to continuously represent SPRWS' interests throughout the delivery of this important multi-year project. Thank you for your consideration of our team.

Very truly yours,

Brown and Caldwell

Harold Voth, PE
Project Manager
651.468.2073

Leofwin Clark
Owner's Representative
720.837.1020

Brown AND Caldwell

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Section 1

Company Information

Brown and Caldwell www.brownandcaldwell.com

Business Background. Brown and Caldwell (BC) is a full-service environmental engineering and construction firm with 52 offices and 1,600+ professionals in the United States. For more than 70 years, our creative solutions have helped municipalities, private industry, and government agencies successfully overcome their most challenging water and environmental obstacles. As an employee-owned company, BC is passionate about exceeding our clients' expectations and making a difference for our employees, our communities, and our environment. Each BC office is supported by an experienced staff of environmental professionals, engineers, and construction specialists who provide the firm's full range of services and draw from our nationwide network of specialists as needed.

Our teaming partner for this project is Stantec Consulting Services Inc. (Stantec), who will provide support services based on their Owner's Representative (OR) experience in addition to their extensive piloting and lime softening, recarbonation, and ozone water treatment expertise in the Midwest. Stantec also brings billions of dollars of experience as a progressive design-builder. Together, our team will provide the full suite of services needed to advocate for SPRWS as an experienced and trusted OR for this project.

BC Primary Contact

Harold Voth, PE

Project Manager

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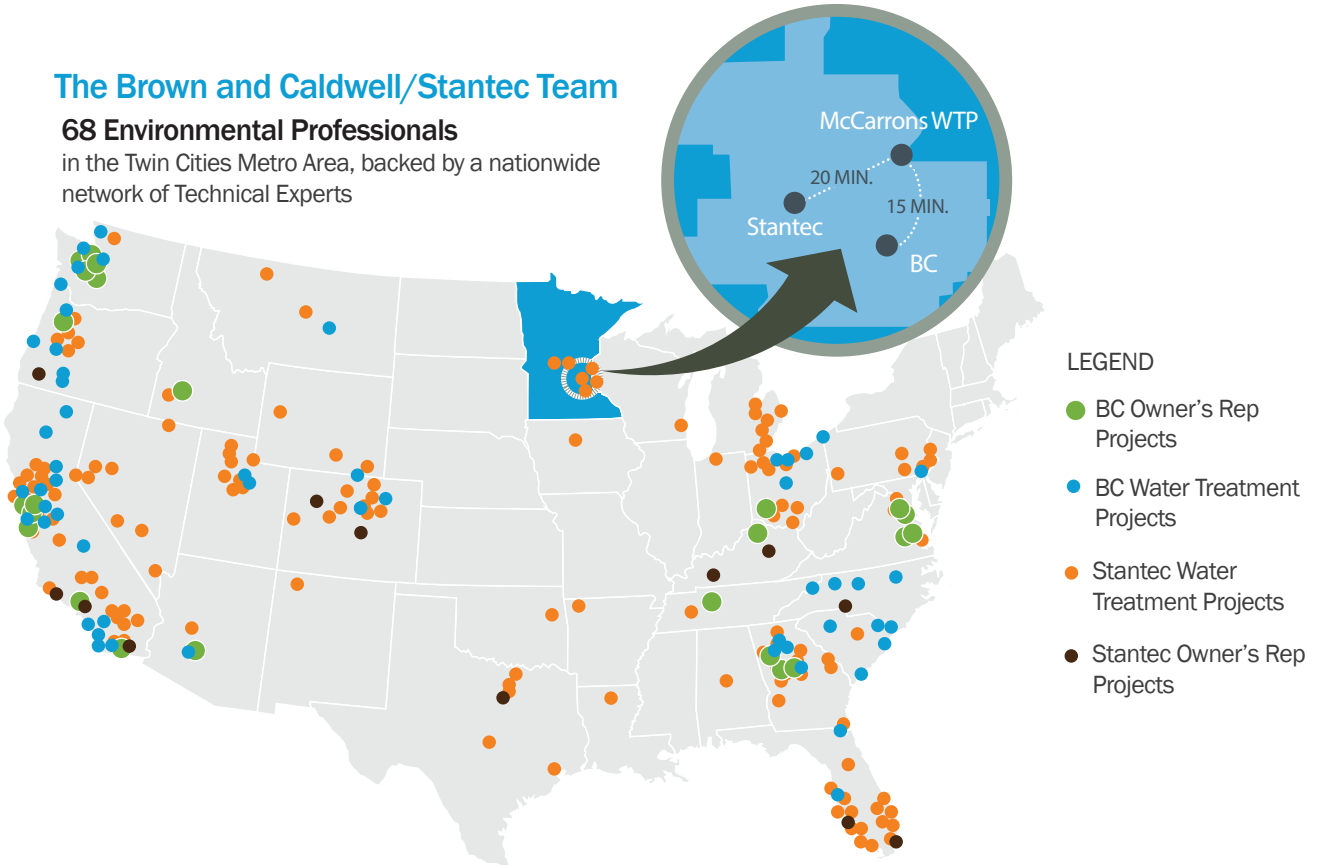
The Brown and Caldwell/Stantec Team

68 Environmental Professionals
in the Twin Cities Metro Area, backed by a nationwide network of Technical Experts



A History Delivering Successful Owner's Representative Services

BC and our OR expert staff, bring more than 30 years of OR experience to your project. As an experienced provider of OR services, BC understands the pros and cons of various design-build (DB) delivery models, including progressive DB, fixed-price DB, and design-build-operate. While implementing best practices, we also recognize that this is not a "cookie cutter" process, and tailor the selected delivery model to best achieve the owner's schedule, cost, and risk allocation objectives for the project. We also work closely with owners to help them implement the organizational and cultural changes needed to effectively implement a successful DB project. Our advice is informed by an in-depth knowledge of the current state of the DB market including what it will take to make a project stand out in a competitive environment.

BC routinely applies an in-depth understanding of DB methods to craft procurement documents, establish technical requirements, negotiate contracts, and provide oversight during design and construction. In addition, we have taken an active role in establishing DB best practices via leadership in the Water Design-Build Council (WDBC) and the Design-Build Institute of America (DBIA), with advisor Leofwin Clark having served as recent WBDC president. As a result, **we can provide valuable access to industry leaders, knowledge of the optimal balance of risk and reward, and efficiency using existing templates and precedents to the extent applicable.**

BC'S EXTENSIVE EXPERIENCE IN...	CAN HELP YOU SUCCESSFULLY...
> Understanding what it takes to successfully implement DB as an owner	Integrate new staffing, protocols, and procedures into your organization
> Evaluating procurement strategies to achieve project objectives	Select the strategy that best meets your needs
> Progressive Design-Build (PDB) contracts and risk allocations	Identify critical business/risk issues from both owner and PDB contractor perspectives
> Administering DB contracts as both owner's representative and DB contractor	Avoid costly errors that result from lack of familiarity with standard DB administration practices
> Project pricing structures	Develop an RFP that defines the preconstruction services and approach to setting the GMP in a way to obtain the most favorable pricing
> Working as a unified technical/ procurement team	Navigate the process while leveraging our technical, procurement, and contractual expertise

Stantec www.stantec.com

Business Background. Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why Stantec always designs with community in mind.

Stantec cares about the communities they serve—because they're our communities too. This allows them to assess what's needed and connect their expertise, to appreciate nuances and envision what's never been considered, to bring together diverse perspectives so they can collaborate toward a shared success.

At Stantec, they are designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

Water Treatment. **As designers of plants around the world, including many large lime softening and ozone plants in the Midwest, Stantec's experience and commitment maximizes a community's investment by providing the best overall value, lowest life cycle cost, and fairest rates for the user.**

As water treatment experts, Stantec addresses current needs while keeping an eye to the future by meeting capacity requirements using easily upgradable processes. They design efficient and reliable systems that achieve capital cost savings and minimize long-term expenditures. For complex treatment processes such as lime softening, recarbonation, and ozone, Stantec implements the most appropriate options for each specific situation. Providing safe and abundant clean water requires thoughtful investments by our communities. That's why Stantec invests so much of themselves into the process of selecting the best treatment technology for their client's specific needs.

Stantec Primary Contact

Renée Willette, Principal

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Minneapolis, MN 55402

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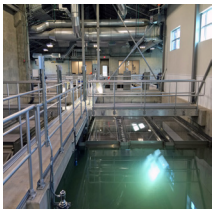
STANTEC'S EXTENSIVE EXPERIENCE IN...	CAN HELP YOU SUCCESSFULLY...
> Water treatment, particularly lime softening	Ensure the best technical solution for your project
> Piloting	Plan and oversee piloting to gain regulatory approval and drive cost down










A Programmatic Approach to Health and Safety

Health and safety (H&S) incidents are costly and can have a significant negative impact. BC fosters a culture-based H&S program focused on providing our employees with the skills, knowledge, and equipment necessary to deliver safe projects. We strive to provide clients with safe designs that prevent hazards and reduce risk. BC empowers our employees to take ownership for safety and environmental issues by taking whatever actions are consistent with project goals to eliminate injuries. This dedication to H&S is what makes BC the company of choice for our clients and our employees.

BC's H&S program meets or exceeds federal and state Occupational Safety and Health Administration (OSHA) requirements. Our H&S program requires H&S plans for projects involving activities outside the office. The plans provide appropriate procedures for the unique characteristics of each project. For example, work activities could be covered by OSHA's Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, take place at a construction site, involve confined space entry inspection, or entail various other activities requiring tailored H&S planning. Once H&S plans are developed, company H&S managers review and approve them, and project managers distribute them to their teams.

Award Winning

The BC H&S program has received multiple industry and client-nominated H&S awards including

the National Safety Council's Industry Leader and Safety Leadership awards as well as awards from the New York City Department of Environmental Protection, LyondellBassel, BP, Jacobs Engineering, and El Paso Energy.

Commitment to Safety

Excellence in safety performance, project delivery, and project execution are inter-related. The same fundamental corporate behaviors that produce successful projects also lead to outstanding safety results. Aside from reduced costs and increased productivity, solid safety performance provides one of the essential building blocks in establishing a company's corporate identity. Responsibility, accountability, dependability, and, to a large extent, creativity and innovation, are impossible to achieve without first demonstrating a commitment to safety.

"Health and safety is one of BC's five core values, and we are committed to fostering a work environment where safety is a consideration at each phase of project execution . . . employees should feel confident in bringing safety issues to light and doing whatever it takes to perform their jobs safely."

- Lydia Crabtree,
Safety Unit Manager

Section 2

Experience and Qualifications

The BC/Stantec team provides proven design-build experience with industry-leading water treatment expertise to advocate for and represent SPRWS's goals and objectives.

Our team offers:

- A project manager, Harold Voth, with 40 years of large treatment plant engineering experience including design-build experience as the owner's project manager for the $180M MCES Solids Handling Facility.
- An Owner's Representative, Leofwin Clark, who is an industry leader in design-build delivery methods with over 25 years of practical experience working with both public and private clients.
- A technical task leader, Dr. Dave Pernitsky, Stantec's global water practice leader with 26 years of water treatment experience.
- A supporting team of BC and Stantec engineers with an environmental engineering staff of more than 65 professionals in our combined St. Paul and Minneapolis offices.

As your Owner's Representative (OR), the BC team draws on specialized expertise and market knowledge to assist you in assessing critical risks, developing the procurement documents (RFQ and RFP), obtaining the most favorable pricing and achieving the correct technical solution. This is accomplished based on 20 years of design-build execution involving more than 50 projects including some of the country's largest and most complex—such as enhanced surface water treatment and pumping facility in Texas, a major new water delivery system in Colorado, biosolids improvements in the nation's capital, or the first-time use of design-build in Ohio.

The BC/Stantec team members have been selected for their proven experience providing OR services and in-depth technical and managerial expertise. Our team understands the water business, design-build methods, bringing the right expertise, and equally important - the right people - to deliver outstanding service. Our success is built in the water sector by planning for the long term, investing in our employees and in the systems that support them, and bringing the best people and the right solutions to our clients.

Whatever the size, scale or complexity of your project, our team's hands-on OR experience provides you with the comprehensive insights and knowledge necessary to make it a success.

Our teaming partner for this project, Stantec, provides key national and regional water treatment expertise with extensive experience in pilot testing, preliminary design, detailed design, operational support and related services during construction and commissioning. They have recent experience with implementation of all the water treatment technologies and processes proposed for the current assignment. The Stantec staff proposed for SPRWS's project implemented the first major use of ozone with

"Brown and Caldwell provided a high level of client service, with a keen understanding of how to best tailor the Design-Build delivery process to meet the City of Tacoma's performance, operational, and risk management objectives. BC's advice and guidance played a crucial role in the successful delivery of the highly complex upgrade to our Central Wastewater Treatment Plant."

— Eric Johnson, Assistant Division Manager, City of Tacoma

biological activated carbon filtration in Columbus, OH as part of the largest water plant upgrade in the Midwest. The Stantec process team has completed similar assignments working on behalf of the Owner in developing designs for a non-traditional delivery method such as for Tacoma, WA where Stantec completed the design in a collaborative manner working closely with both the Owner's staff and the selected CM contractor.

Figure 2-1 illustrates the organization of our team for this project. Summaries of our key personnel's experience and the value they will bring to this project are provided on the following pages. Resumes for the staff shown in the organizational chart below are provided at the end of this section, providing the general background and similar experiences of each team member.

FIGURE 2-1
The BC/Stantec team will provide SPRWS with the most experienced OR and water treatment experts in the Midwest.

SAINT PAUL REGIONAL WATER SERVICES

PROJECT MANAGER
- Harold Voth, PE

OWNER'S REPRESENTATIVE
- Leofwin Clark

COMMUNITY ENGAGEMENT
- Renée Willette

PROCUREMENT
TASK LEAD
- Pat Tangora, PE

CONTRACTS AND DOCS
- Michael McWhirter, PMP
- Guy LePatourel, PE

MARKET OUTREACH
- Jonathon Johnson

TECHNICAL REQUIREMENTS
- Patrick Weber, PE

ESTIMATING
- Scott Turner

BID EVALUATIONS
- Maria Thomas

PROCESS TECHNICAL
TASK LEAD
- Dave Pernitsky, PhD

- Erin Mackey, PhD, PE
- Kati Bell, PhD, PE

PILOT TESTING
- Tim Wolfe, PhD
- Melissa Ingalsbe, PE

PERMITTING
- Ryan Capelle, PE
- Bob Peplin, PE

FUNDING
- Heidi Peper

PLANT OPERATIONAL BEST PRACTICES
TASK LEAD
- Charles Bromley, PE

TRAINING, MANUALS, SOPS
- Cynthia Hoffman, PE
- Rhonda Harris
- Naeem Qureshi, PE
- Ryan Capelle, PE

ASSET MANAGEMENT
- Anne Kennedy

DESIGN AND CONSTRUCTION BEST PRACTICES
TASK LEAD
- Dave Muenzner, PE

STRUCTURAL
- Phil Caswell, PE
- Dan Popler, PE

HYDRAULICS/PROCESS MECHANICAL
- Mark Rolfs, PE
- Bob Peplin, PE

ELECTRICAL/I&C
- Chuck Oehrlein
- Ron Armstrong, PE

I&C INTEGRATION
- John Abrera, PE

CONSTRUCTION SERVICES
- Jason Bordewyk, PE

KEY
Brown and Caldwell | Stantec | Sambatek
PRO-OPS | Buildings Consulting Group

Project Management and Task Leaders

Harold Voth, PE

Project Manager

As Project Manager, Harold will serve as SPRWS's primary point of contact. He will lead all elements of the project, working closely with SPRWS staff, the task leaders and technical experts to allocate project resources to deliver a project to meet your performance, schedule, and budget objectives. The majority of his project management experience over the last 20 years has focused on the integration of capital improvements with existing complex drinking water and wastewater treatment processes, while maintaining plant operations and permit compliance. This experience includes project management of the design-build delivery of the MCES Solid Management Building at the Metropolitan Wastewater Treatment Plant.

40 years

Value to SPRWS

By understanding the unique aspects of design-build project delivery, the challenges of retrofitting complex treatment processes and with more than 40 years of engineering experience, Harold is well positioned to lead this assignment.

Leofwin Clark

Owner's Representative

Leofwin brings more than 25 years of experience developing collaborative delivery approaches as both an owner and a consultant. He advises owners on project delivery methodology analyses and procurement document and evaluation criteria. His experience includes staff workshops, proposer evaluation support, and selection methodology strategy, as well as business development for large water and wastewater DB and public-private partnership (P3) projects. For this project he will serve as the primary Owner's Representative, focusing on defining project objectives, procurement strategies, and market outreach. He will remain involved as-needed through project completion.

28 years

Value to SPRWS

As a recent Water Design-Build Council (WDBC) president, Leofwin brings a broad industry perspective of practices that optimize procurement and evaluation. Leofwin will support SPRWS's best interests while creating the broad market acceptance and competitive environment that attracts the best team to design and build this project.

Pat Tangora, PE

Procurement

Pat brings more than 35 years of experience helping clients develop and implement strategies to effectively deliver major capital projects and programs. Pat has served as both an owner's representative and as a leader on design-build project delivery teams for communities of similar size, facing similar challenges. She specializes in evaluating the use of project delivery methods, such as design-build (DB), construction manager at risk (CMAR), design-build-operate (DBO), design-build-own-operate-transfer (DBOOT), general contract/construction manager (GC/CM), long-term service contracts, and public-private-partnerships (P3). She frequently works closely with clients to develop public outreach and communication strategies encompassing the owner, owner's representative, and design-build contractor. For this project, Pat will support procurement development, integrating technical requirements with solicitation documents and commercial terms. She will support negotiations and will be available as-needed through completion of the project.

Value to SPRWS

During her career, Pat has helped clients with the procurement, contract negotiations, and contractor oversight for more than 20 of these projects. Using lessons learned from numerous Owner's Representative projects, she will work closely with SPRWS ensure the right Progressive Design-Build contractor is selected.

Dave Pernitsky, PhD, P.Eng

Process Technical

Dave has 26 years of environmental engineering experience on many challenging studies and design projects in the areas of drinking water treatment, groundwater remediation, wastewater reuse, industrial water and wastewater treatment, and water resource management. Dave has recent and relevant experience in projects with similar treatment process requirements to SPRWS and has both conducted pilot testing, process selection and design for many projects involving state of the art technological solutions including biological activated carbon (BAC) filtration, dissolved air flotation (DAF), ozonation, granular activated carbon (GAC), ion exchange, membrane filtration, reverse osmosis, and high rate granular media filtration systems.

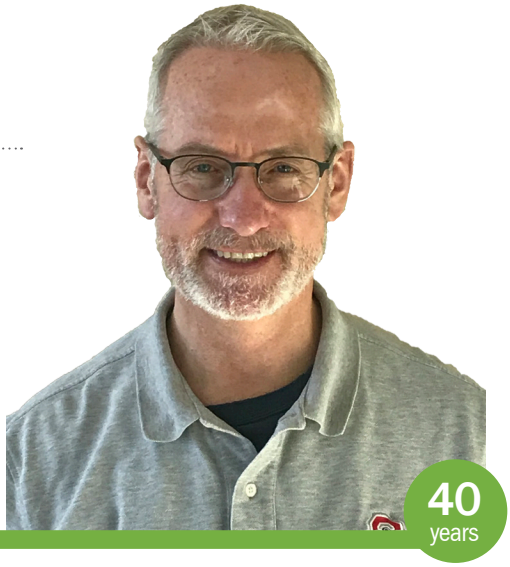
For this project Dave will lead the development of the process technical requirements for the RFP, with care to identify the critical key design criteria without resorting to prescriptive detailed design.

Value to SPRWS

As Global Practice Leader for Water Treatment, Dave has regular input and insight to the latest technology trends and can provide expert guidance on these to SPRWS, particularly in the case of any innovative solutions being proposed by PDB teams.

Charles Bromley, PE

Plant Operational Best Practices



Charles (Charlie) brings 40 years of broad experience in the planning, design, construction, commissioning and operation of municipal water treatment facilities. He has served as lead designer for many large-scale conventional water treatment facilities including the 125 mgd Hap Cremean WTP in Columbus OH, which incorporates lime softening, recarbonation, ozone, BAC filtration and UV disinfection. In addition to serving as design lead, Charlie has extensive expertise in operational support for these water treatment processes and has provided key guidance to operations in maintenance of plant operation during construction.

For this project, Charlie will lead the review of plant operations and coordinate with SPRWS staff in developing minimum standards for the water treatment processes and appropriate guidelines for staging /layout to maintain plant operations.

Value to SPRWS

Charlie has already had to face and resolve critical operational and interface issues between sequential lime softening/ recarbonation/ozonation/BAC processes and knows what to look for in a design of this type. Critically, has also experienced doing this as part of design-build delivery method where cooperating as a team is critical for success.

Dave Muenzner, PE

Design and Construction Best Practices

Dave is the process mechanical portfolio lead in Brown and Caldwell's east business unit with 18 years of design and construction experience. He has extensive experience as an engineer and design manager for water and wastewater treatment projects that have encompassed multiple forms of project delivery in both the public and private sector. His project experience includes both conventional treatment processes as well as advanced water treatment systems including superfund groundwater remediation. He has been a lead designer or design manager on multiple design-build projects with a combined construction value of more than $125M.

Value to SPRWS

Dave brings 18 years of engineering experience that includes design, design management and consruction management. His experience spans multiple process technologies for private and publice sector projects with multiple project delivery methods.

Key Project Support

Each member of our team brings qualifications that are both unique and complimentary to other team members' qualifications. The table below features our key support staff and the relevance they bring to this important project. Abbreviated resumes for all members of our team are included at the end of this section.

TABLE 2.1 // The knowledge and expertise of our key team members will provide technical horsepower to represent SPRWS' interests throughout design and construction.

Team Member	Qualifications and Value
Community Outreach	
Renée Willette Community Engagement	**Renée will use her experience to work closely with the SPRWS and the PDB firm to bring community engagement as a key part of the project Charter and overall objectives.** Renée is Water Sector Leader for Stantec's Minneapolis office and brings significant leadership experience in cross-sector partnerships, program implementation and community engagement. Renée believes in building authentic and effective relationships with utility professionals, community leaders and key stakeholders to advance projects that positively impact communities. Prior to joining Stantec, Renée served as the Director of Strategic Initiatives for the San Francisco Public Utilities Commission, where she led the agency's place-based revitalization strategy for the $2.7 billion Sewer System Improvement Program. Renée's work centered on enrolling broad political and community coalitions to advance priority capital projects and securing outside resources to align with utility priorities such as workforce development, beneficial secondary land use, environmental justice and diversity and inclusion.
Procurement Support	
Michael McWhirter Commercial and Risk Review	**Michael will use his experience to ensure necessary items are in the RFP for the PDB contractor to allow them to innovate and use their experience, but still provide sufficient control to the Owner. He will also help review and guide the PDB's plans for packaging work in procurement.** Mike brings extensive involvement in design-build projects having worked on design-bid-build, design-build, construction management at risk, and progressive design-build project set-ups in a variety of roles. He is currently the Commercial Manager for Stantec's Design-Build business unit and provides oversight on commercial, risk and delivery aspects of several design-build projects at any given time. Michael has been project manager for a 70 MGD ozone/BAF filtration plant during design and also for the 125 MGD Hap Cremean ozone project during construction.
Guy LePatourel Contract Documents	**Guy will use his experience to work closely with SPRWS staff on Contract Document preparation, including participating in Chartering seasons to develop key success factors for the project and incorporation of these into the teaming agreements.** Guy is the Midwest Water Business Leader for Stantec and has more than 35 years of varied experience in the evaluation, design, and delivery of solutions in the water, wastewater, and waste management sectors. He has extensive experience in a variety of Alternative Delivery Projects, including Progressive Design Build, Fixed Price Design Build and EPCM. This includes acting both in an Owner's Advisor role, preparing RFP and Design Criteria Packages, as well as Lead Design role on the Design-Builder team.
Jonathon Johnson Market Outreach	**Jon will apply his expertise to ensure SPRWS's procurements are attractive to prospective design-builders.** Jon brings more than 20 years of experience developing successful projects for state agencies and municipalities focused on design-build. He has conducted several market outreach efforts for progressive DB and fixed price DB projects, including preparing questionnaires, conducting interviews, and evaluating results to help ensure DB project procurements are attractive to prospective design-builders
Patrick Weber Technical Requirements	**Patrick will use his experience to adapt traditional design deliverables for use with a design-build solicitation.** Patrick's experience includes water treatment and system design, water system planning, and water system hydraulic modeling. He has worked closely with Pat Tangora on several DB projects, to develop the minimum technical requirements included in DB RFPs.
Scott Turner Cost Estimating	**Scott will use his expertise to develop an initial project estimate and, after transition to the design-builder, validate costs through construction** Scott's experience includes the development of large design/build cost estimate proposals ranging from $4-million to $1.3-billion. He has estimated many jobs with capital costs ranging from $150,000 to over $1.35-billion.
Maria Thomas Bid Evaluations	**Maria will use her experience to evaluate contractor bids and negotiate the best price and terms and conditions for SPRWS's project.** Maria's experience includes providing procurement, technical and administrative expertise on complex water, power, and capital improvement projects. She serves as a lead procurement specialist for integrated project delivery projects at BC where she routinely evaluates contractor bids to obtain the best price for our clients, helping to mitigate risk with respect to cost reductions or enhanced delivery schedule and obtain approval from our clients.

TABLE 2.1 // The knowledge and expertise of our key team members will provide technical horsepower to represent SPRWS' interests throughout design and construction.

Team Member	Qualifications and Value
Process Technical Support	
Kati Bell, PhD Process Technical	**Kati's broad technical background allows her to support project coordination and QA/QC to ensure appropriate technology is implemented to meet SPRWS' long-term regulatory goals.** Kati brings more than 25 years of experience on feasibility testing, design, construction, start-up and operations optimization for a wide range of drinking water treatment processes. She has conducted treatability and pilot studies to inform plant design and with her background in regulatory/compliance and research, she can utilize her technical expertise in advanced treatment to help advise clients on treatment methods and protocols that are critical in meeting future challenges, such as nitrogenous disinfection by-products which are slated for future regulation by the US EPA.
Erin Mackey, PhD Process Technical	**Erin will use her experience to provide key technical and operational support on this project.** Erin brings more than 18 years of experience in process engineering for a wide range of drinking water, processes. Her technical expertise includes UV disinfection; advanced oxidation processes and adsorptive processes; membrane filtration; and research. She has been integrally involved in all aspects of water treatment plant design from treatability studies and piloting testing, through design, construction and system acceptance testing, as well as operational support, process optimization and regulatory compliance.
Tim Wolfe, PhD Pilot Test Technical Lead	**Tim will use his experience to lead the development of the minimum required Pilot Testing criteria and review the PDB Firm's Pilot testing plans for compliance to these agreed protocols.** Throughout his career, Tim has contributed to more than 200 bench, pilot, and full-scale demonstration studies for utilities across the US, resulting in over $750 million in capital cost savings. In particular, he led the treatability testing for the upgrades to the Hap Cremean WTP in Columbus, OH for implementation of intermediate-ozonation and BAC filtration where new recarbonation and ozone contact chambers were retrofitted into an existing sedimentation basin a to avoid the need for intermediate pumping.
Melissa Ingalsbe, PE Pilot Test Coordinator	**Melissa's experience expediting the design, procurement, and installation of an advanced water treatment pilot will ensure timely and informative pilot testing to select the best treatment solution.** Melissa has over 20 years of experience in project management and execution. She recently completed the DT Tillman Advanced Water Pilot project with an accelerated schedule for equpment procurement, installation, and startup of a pilot plant to be operational within seven months. Melissa managed all efforts on the project, including development of the pilot test protocol, coordination and engagement of a Technical Advisory Committee, design and installation of the advanced water purification pilot facility, and data evaluation and development of design/operating criteria for the full-scale facility.
Ryan Capelle, PE Permitting and Training	**Ryan will support Dr Wolfe in preparing the piloting testing protocols based on close dialogue with MDH and SPRWS staff and confirmation of the permitting requirements.** Ryan has 22 years experience with the planning, design, permitting and implementation of municipal water treatment and water supply projects. Ryan has provided service on over 50 water treatment facilities and other water infrastructure projects during his career. Through years of interaction with design and implementation of various facilities in Minnesota Ryan has demonstrated the ability to successfully navigate the permitting process required by the Minnesota Department of Health (MDH).
Bob Peplin, PE Permitting and Process Design	**Bob will provide permitting and process support, based on his diverse water treatment experience and long-term working relationships with MDH staff.** Bob brings over 35 years of practical design experience with both public and private sector clients. His design experience includes a pilot plant for effluent reuse that employed ultrafiltration and ozone to achieve 12 log cryptosporidium removal. This work required close coordination and approval from the MDH and the US Department of Agricultural Food Safety. Bob's experience includes multiple groundwater treatment plants as well as engineering services for the cities of Minneapolis and St. Cloud, both with surface water treatment plants on the Mississippi River.
Heidi Peper Funding	**Heidi will work closely with SPRWS to explore available opportunities to use State and/or Federal funding support.** Heidi is Stantec's local funding specialist who has more than 20 years of experience in community and economic development. Heidi has worked on solving complex funding problems on numerous significant projects, ranging from pedestrian trails to highways, wastewater to drinking water projects, essentially most any community infrastructure project imaginable.

TABLE 2.1 // The knowledge and expertise of our key team members will provide technical horsepower to represent SPRWS' interests throughout design and construction.

Team Member	Qualifications and Value
Plant Operational Best Practices Support	
Cynthia Hoffman, PE Training, Manuals, SOPs	**Cynthia will lead the criteria development and oversight for training, O&M manuals and development of SOPs.** Cynthia has over 40 years of environmental engineering experience with an emphasis in water and wastewater facilities management, startup, training and operation. She also has extensive experience with helping utilities improve operations by using techniques in business process improvement, workflow analysis, efficiency improvement and work process re-engineering.
Rhonda Harris Training, Asset Management	**Rhonda will apply her nationally recognized O&M expertise to identify solutions for effective and integrated operations.** Rhonda has 40 years of experience in water facility operations, including developing and implementing training programs for public- and private-sector personnel, developing regulations for the U.S. Environmental Protection Agency (EPA), condition assessment, construction, and O&M renewal.
Naeem Qureshi, PE Training, Manuals, SOPs	**Naeem will leverage his many years of water industry experience in assisting in the development of criteria for training, O&M manuals and SOPs** Naeem has 50 years of experience in water facility engineering and operations having worked for both a major water utility as well as providing consulting services for multiple public water utilities. He has written over 25 articles for regional publications and has presented at over 100 regional and statewide AWWA conferences.
Anne Kennedy Asset Management	**Anne will provide asset management expertise as new equipment is installed and integrated into the SPRWS CMMS system.** Anne has over 25 years experience and is a leading BC practioner of asset management strategies. With an abundance of new equipment coming on line, Anne will help establish guidelines for integration of this equipment into the SPRWS CMMS so that proper maintenance procedures are in place from day one.
Design and Construction Best Practices	
Phil Caswell, PE Structural	**Phil will participate in the implementation phase, assisting with design review and construction stage QA tasks of the PDB Firm's structural and foundation support designs.** Phil serves as Stantec's Structural Team Leader in our Minneapolis Paul, MN office where his responsibilities include structural design, specification preparation, and quality assurance. His experience includes structural design and construction of a wide variety of project types, including dams, pumping stations, water and wastewater treatment facilities, flood control projects, new buildings, tanks and structures, structural condition assessments, building and tank repair, renovations and demolition.
Dan Poppler, PE Structural	**Dan will provide expertise in structural engineering design and construction best practices.** Dan has over 20 year of structural engineering experience with a specialty in the aras of structural design, buidling evaluation, repair design and construction inspection. Dan's expertise will be particularly valuable related to integration of new construction with existing facilties.
Mark Rolfs, PE Hydraulics/Process Mechanical	**Mark will participate in the implementation phase, assisting with design review and construction stage QA tasks of the PDB Firm's hydraulic designs.** Mark has 35 years of experience with Stantec's Twin City water/wastewater group with primary responsibilities for engineering of both water and wastewater facilities. For water systems, he is proficient in hydraulic modeling analysis, well pumphouses, water pumping stations, and water storage reservoirs. He is skilled at using multiple software's to perform computer hydraulic analyses for water distribution systems, lift stations, and pump house designs.
Chuck Oehrlein Electircal/I&C	**Chuck will participate in the implementation phase, assisting with design review and construction stage QA tasks of the PDB Firm's electrical, power supply and SCADA designs.** Chuck has over 30 years of electrical engineering experience with responsibility for writing specifications, preparing plans, and conducting construction inspection for electrical and control systems for water and wastewater facilities, generator design, and Supervisory Control and Data Acquisition (SCADA) Systems.
Ron Armstrong, PE Electrical/I&C	**Ron will support electrical engineering design and construction best practices, based on his extensive electrical design experience with water treatment plants, power generation systems, industrial sites and electrical utility facilities.** Ron's more than 25 years of electical design experience has included power distribution systems, motor drives and controllers, diesel generators, transformers, paralleling switchgear, and electrical materials. He has also designed protective and control schemes for substations, protective device coordination and short circuit studies, underground electrical distribution systems, and related control systems.

TABLE 2.1 // The knowledge and expertise of our key team members will provide technical horsepower to represent SPRWS' interests throughout design and construction.

Team Member	Qualifications and Value
John Abrera, PE I&C Integration	**John will work closely with SPRWS and the project team to explore opportunities for I&C and SCADA integration support to maximize use of data for process operations and asset management.** John is BC's Smart Utility Applications Leader and as a licensed operator and engineer with more than 30 years of experience, he understands how to bridge various aspects of project delivery and solve complex challenges on significant projects. With the complexities of the new processes to be implemented at SPRWS, John will provide guidance to the team with streamlining the critical elements of data collection and management so that operations staff and management can leverage advanced analytics for operations and asset management decision support.
Jason Bordewyk, PE Construction Services	**As a resident of Stantec's Minneapolis office, Jason will provide ready access to the project site for immediate resolution of issues and support to the SPRWS plant staff.** Jason has more than 17 years of experience with water system planning, construction engineering, and design of water and wastewater related projects. Jason has experience in all phases of water treatment implementation including preparation of Construction Documents, conducting construction site inspection and providing Contract Administration services. Jason recently completed resident construction services for a radium removal treatment plant and assisted with construction oversight of the fast-track installation of a treatment plant for Cottage Grove MN to address PFAS contamination. Jason's experience with local projects, local vendors, and local contractors will provide insight into the capabilities and practices of these local trades.

Vendor Outreach Program

BC has strategically selected a minority-owned, women-owned, and small business enterprise firms as complimentary partners on our Owner's Representative team. These three subconsultants bring value through their respective areas of expertise and ability to integrate their skills into the project.

Our MWSBE partner assignments will span a variety of assignments that leverage their specific areas of expertise. The BC team is dedicated to enriching the health of our local firms by guiding and collaborating with our MWSBE teaming partners throughout our work together on this contract. We have worked with our chosen subs in the past and we will continue to help foster broader roles and higher quality deliverables through these efforts. We review all MWSBE deliverables, confirm that the quality is up to our standards, and share feedback with MWSBE firms for their consideration and continual involvement.

BC affirms its commitment to achieve the Vendor Outreach Program goals as follows:

- **5% Minority Owned Business Enterprise:**
  Building Consulting Group
- **10% Women Owned Business Enterprise:**
  PRO-OPS, Inc.*
- **10% Small Business Enterprise:**
  Sambatek

**Certification pending. PRO-OPS, Inc. is a certified WBE in the state of Texas. They have applied for certification with the City of St. Paul and are awaiting confirmation. Should PRO-OPS fail to achieve WBE certification with the City of St. Paul, we will maintain our commitment to the Vendor Outreach program and affirm our commitment to achieve the WBE goals for the project.*

Overview summaries of our MWSBE Partners are provided on the following pages.

Buildings Consulting Group (BCG) (MBE)

Structural Engineering

BCG is a certified MBE that specializes in consulting engineering services for structural design, including feasibility studies, design, value engineering, and inspection. They currently have a total of 10 dedicated staff, that are committed to engineering excellence and the assurance the quality of every project.

BCG has been serving as a structural engineering consultant for the design teams on many Twin Cities Metropolitan water and wastewater treatment plants, including:

- **McCarron's Water Treatment Plant Switchgear & Electrical Equipment Replacement (2016-2017).** BCG served as a structural sub-consultant for the structural design of the electrical vault, screen wall, and transformer slabs.
- **City of Minneapolis Water Main at 10th Ave Bridge (2018-2019).** BCG served as a structural sub-consultant for replacement design of the 54" diameter steel water main in a tunnel underneath the Mississippi River.
- **Seneca WWTP Solids Improvements (2019-2020).** BCG served as a structural sub-consultant performing special inspection, testing, and reporting as part of the MCES Seneca WWTP Solids Improvements Projects.

The exposure to a variety of complex structures has provided valuable opportunities for our engineering staff to enhance their structural engineering and drafting knowledge. Based on these opportunities with BC, BCG has had additional opportunities to provide structural engineering support for other architecture and engineering firms..

—Lewis Y. Ng, P.E.
BCG Principal

Sambatek (SBE)

Process Technical Engineering

Sambatek is a certififed SBE with decades of experience designing water/wastewater treatment plants, trunk sanitary sewers, lift stations, and municipal infrastructure improvement projects.

The Sambatek water treatment team is led by Bob Peplin who has provided project management and process engineering on several water projects throughout Minnesota, including two large water treatment projects for the cities of Brooklyn Park (iron/manganese/volatile organic compounds) and St. Cloud (taste and odor/lime softening). The Brooklyn Park project included an alternate project delivery approach using a construction management approach requiring the development of multiple bid packages. The St. Cloud project evaluated the effectiveness of taste and odor compound removals over the distinct seasonal water quality changes followed by lime softening. Each project had substantial involvement with the Minnesota Department of Health. In addition, Bob has previous experience working at the SPRWS plant with the filter upgrades and the chemical building addition.

Supporting this effort will be Naeem Qureshi. As the principal owner and lead process engineer for PCE, one of the most published authors in Minnesota on water supply. Naeem's career initiated with the City of Minneapolis Water Department and successfully transitioned to Sambatek after 37 years at PCE. Naeem's career includes more than 100 projects on process water, water distribution, and rate studies throughout Mineesota. He successfully completed a rate study project at the water plant for SPRWS.

Your [BC's] training initiative and mentorship have helped expand our service capabilities.

—Sirish Samba, P.E.
Sambatek President

PRO-OPS, Inc. (WBE, pending)

Process Technical Engineering

PRO-OPS, Inc. is a certified WBE in the state of Texas. They have applied for certification with the City of St. Paul and are awaiting confirmation. Should PRO-OPS fail to achieve WBE certification with the City of St. Paul, we will maintain our commitment to the Vendor Outreach program and affirm our commitment to achieve the WBE goals for the project.

PRO-OPS was established in the fall of 1992 with the specific goal of focusing the knowledge and experience of its staff directly on the challenges faced by municipal and other utilities in operating their environmental facilities.

PRO-OPS is dedicated to economical, cost-effective and efficient system/facility operations and management of municipal and privately-owned utilities. These services are offered using a wide variety of engineering and management consulting assistance, operations and performance reviews, and technical training. PRO-OPS' staff dedication is the result of many years of experience in design, construction, operation and troubleshooting for environmental facilities.

PRO-OPS staff is experienced in all aspects of management and operations, including:

- Operation of water and wastewater facilities and systems
- Management consulting
- Engineering and design
- Asset Management
- Operability and Constructability Reviews
- Shop Drawing Reviews
- Commissioning and Training
- Pilot Operations

PRO-OPS firm brings value by virtue of extensive "hands-on" experience in utilities management and operation based on real-world experience in the operation and management of systems and equipment, rather than just a theoretical technical knowledge.

Experience Summary

Mr. Voth has 40 years of experience as a project engineer, project manager and engineering manager for large scale water and wastewater projects. As an engineering manager, he was responsible for the delivery of capital improvements at all wastewater treatment facilities operated by the Metropolitan Council Environmental Services in St. Paul, MN. As a project manager he had direct responsibility for major improvements at their 250 MGD Metropolitan Wastewater Treatment Plant including headworks rehabilitation, implementation of biological phosphorus removal and construction of a new state of the art bio-solids dewatering and incineration facility. His unique experience in the areas of capital planning and major project implementation at complex treatment plants has included a focused attention on integration of new projects into existing facilities, maintenance of plant operations during construction and project commissioning.

Assignment

Project Manager

Education

B.S., Civil Engineering, Valparaiso University

Registration

Professional Engineer, Minnesota # 17045

Experience

40 years

Joined Firm

2010

Relevant Expertise

- *Design Build Experience with the $180M MCES Solids Management Building*
- *Integration of Major Capital Projects at Complex Treatment Facilities*
- *Maintenance of plant operations during major capital projects*
- *Project Commissioning*

Project Management Experience

Dewatering Plant Improvements, Minneapolis Water Works, Minneapolis, Minnesota

Project Manager A new sludge thickening and dewatering facility for processing of residual lime sludge from the water softening process was constructed at the 90 MGD Fridley Water Treatment Plant. Improvements included two new gravity thickeners, three plate and frame filter presses and related mechanical, electrical and control systems. This facility incorporated the flexibility to add additional equipment as required to meet future capacity needs.

Chemical Storage & Feed Building, Minneapolis Water Works, Fridley, Minnesota

Project Manager A new chemical storage and feed facility at the 90 MGD Fridley Water Treatment Plant provided storage and feed facilities using 1-ton chlorine cylinders, eliminating the need for on-site delivery of chlorine in 90-ton rail cars. Special safety and security measures were incorporated into the design to address the challenges associated with storage and feed of gaseous chlorine.

Membrane Filtration Plant, City of East Chicago, Indiana

Project Manager A preliminary engineering report was prepared for the city of East Chicago, Indiana recommending replacement of the existing conventional surface water treatment plant with a new ultra-filtration plant for treatment of Lake Michigan source water.

Solids Improvements Project, Metropolitan Wastewater Treatment Plant, Metropolitan Council Environmental Services, Saint Paul, Minnesota

Project Manager and Commissioning Coordinator The $180M Solids Improvements Project at the 250 MGD Metropolitan Wastewater Treatment Plant included new sludge dewatering centrifuges, three fluid bed incinerators, advanced air pollution control equipment, energy recovery, a 4 MW turbine generator and related mechanical, electrical and control systems. Multiple equipment procurement contracts, constructions contracts and a separate design build contract were successfully integrated and managed to produce one of the largest and most technically advanced sewage sludge incineration facilities in North America.

Experience Summary

Leofwin Clark has 28 years of experience in infrastructure advisory services, business development, and sales, with a focus on design-build (DB), design-build-operate (DBO), and public-private partnership (P3) efforts for water/wastewater and transportation projects. He is considered an industry thought-leader for collaborative delivery education, training, research, and the application of P3 delivery models for the water and wastewater industry. Leofwin offers expertise in the development of decision criteria and analysis tools for the full spectrum of current project delivery methodologies. He is also a facilitator with extensive experience in leading workshops and training for diverse groups.

Assignment

Owners Representative

Education

M.S., Urban Planning, Columbia University Graduate School of Architecture, Planning, and Preservation, New York

B.A., Urban Studies, Columbia University, New York

Experience

28 years

Joined Firm

2016

Relevant Expertise

- *Delivery method analysis and procurement support*
- *P3 project development*
- *Training and workshop facilitation*

Owner's Advisor and Operation Services Experience

Owner's Advisor Public-Private Partnership (P3) Services, Colorado Springs Utilities, Colorado Springs, Colorado

Principal in Charge. Provided feasibility assessment and procurement support to leverage existing biogas production and waste digestion infrastructure assets into an economically sustainable program. Initial analysis includes Value for Money and economic feasibility analysis. Follow-on scope includes development of risk allocation and deal structure, followed by procurement documents.

Mountain Home Air Force Base Water Supply, Department of Water Resources, Idaho

Owner Advisor, Procurement. Provided procurement analysis and method selection, request for qualifications (RFQ) and request for proposal (RFP) documents, and technical support for a surface water intake, multi-mile conveyance and pumping facility, and greenfield WTP to provide a reliable supply to the Mountain Home Air Force Base.

Ocean Water Desalination Program Delivery Models/Value for Money Analysis, West Basin Municipal Water District, Carson, California

Senior Project Analyst. Developed a delivery analysis methodology tailored for a new seawater desalination facility. Conducted staff interviews, executive leadership and Board workshops, and coordinated with a value-for-money analysis task to identify a preferred set of procurement strategies.

AlexRenew RiverRenew Program, Alexandria, Virginia

Owner Advisor/Task Lead. Working with the overall program management team and client program office to identify the best delivery method for the overall program and individual projects to meet client-specific priorities and needs, including client interviews, delivery and risk workshops. In addition, the task involves industry outreach and procurement planning, with future scope to develop the RFQ and RFP documents for the primary Fixed-Price Design-Build tunnel and pumping stations project and other associated program projects using traditional design-bid-build procurement.

Procurement Owner Advisor, PureWater Program, Soquel Creek Water District, Soquel, California

Task Lead. Developing design, build, and operate delivery methodology and procurement documents for a new indirect potable reuse system for seawater intrusion protection. Supported the program in coordinating a multi-agency participation in treatment development within grant funding parameters and multiple construction sites and conveyance scope. Integrated operations and lifecycle approaches into the planned design-build procurement process.

Biosolids Treatment Facility P3 Project, City of Hamilton, Ontario, Canada

Technical Advisor for Design-Build. As a sub consultant to Deloitte, supported the P3 procurement of a new biosolids treatment facility and marketing/disposal agreement for at Hamilton's existing WWTP. Provided insight and advice on design-build best practices, risk allocation, and evaluation methodology as part of a P3 advisory team.

Delivery Method Analysis and Owner Advisory Services, Various Clients

Owner's Advisor. Provides insight to the full spectrum of collaborative delivery methods, guiding Owners in identifying key issues, priorities, and preferences. Uses training and workshops to refine and document Owner priorities, followed by efficient procurement processes and evaluation methodologies.

Piscataway Wastewater Treatment Plant (WWTP) Bio-Energy Project, Washington Suburban Sanitary Commission (WSSC), Washington, D.C.

Procurement Advisory Support. Supported the HDR/BC Program Management team to develop a procurement process and accompanying documents for progressive design-build of a bio-energy conversion project, including Cambi.

Bureau of Engineering, City of Los Angeles, Los Angeles, California

Owner Advisor. Supported the Bureau of Engineering's first design-build procurements for rehabilitations of large diameter sewer infrastructure. Developing a single-step QBS procurement model and an on-call, two-step selection methodology.

Mississippi River Sediment Diversion Program Alternative Delivery Options Analysis, Louisiana State Coastal Protection and Restoration Authority (CPRA), Baton Rouge, Louisiana

Senior Project Manager for Alternative Delivery Analysis Task. Led the Alternative Delivery Analysis for CPRA's Mississippi River Diversion Program through the selection of a preferred procurement methodology. This effort, including a Market Sounding, included analysis of CMAR, design-build, and P3 options for two large Mississippi River sediment diversions with an estimated capital value of over $1.5 Billion.

Solid Waste Organics Program Alternative Delivery Options Analysis, City of Calgary, Calgary, Alberta, Canada.

Practitioner Advisor. Supported the development and implementation of a DBO procurement to establish a new composting facility for City of Calgary's Solid Waste Organics program. Identified potential design-build and P3 procurement options for a greenfield solid waste facility. Scope included a delivery methods workshop for City staff, development of project ranking criteria for the City's project management team, and participation in a value-for-money analysis in support of the City's P3 procurement policy. After identification of DBO as the preferred procurement method, supported the procurement implementation to align contract terms, risk allocation, and evaluation criteria with industry best practices.

Alternative Delivery Analysis for City of Omaha Combined Sewer Overflow (CSO) Program, City of Omaha, Omaha, Nebraska

Design-Build Consultant. Developed and facilitated Alternative Delivery workshop to City of Omaha staff and stakeholders in support of Program Management services for the City's long-term CSO program. Used decision science methodology to assess owner's project delivery priorities, rank criteria, and developed survey to collect and analyze rankings for specific program projects. Provided ongoing support to define alternative delivery best practices, identify candidate projects for CMAR and design-build, and to review and revise legislative statutes to enable alternative delivery procurement on the Program under state law.

Asset Management Services/North End Water Pollution Control Centre (NEWPCC), City of Winnipeg, Winnipeg, Manitoba, Canada

Alternative Delivery Methodology Advisor. Participated in the City of Winnipeg's program to improve their Capital Program Project management improvement effort, developing alternative project delivery analysis criteria for the Asset Management Program with a focus on major improvements to their largest WWTP.

Renée Willette

Community Engagement

Education

- Executive Education, Senior Executives in State and Local Government, Harvard University, Kennedy School of Government, Cambridge, Massachusetts, 2016
- MA, Public Policy, University of California, Berkeley, California, 2009
- BA (magna cum laude), Political Science, Carleton College, Northfield, Minnesota, 2002

A native of Minneapolis, Renée brings significant leadership experience in local government, cross-sector partnerships, program management and community engagement. She is results-oriented and enjoys delivering projects through complex, intergovernmental systems. Renée believes in building authentic and effective relationships with utility professionals, community leaders and key stakeholders to advance projects that positively impact communities. Prior to joining Stantec, Renee served as the Director of Strategic Initiatives for the San Francisco Public Utilities Commission, where she led the agency's place-based revitalization strategy for the $2.7 billion Sewer System Improvement Program. Renee's work centered on enrolling broad political and community coalitions to advance priority capital projects and securing outside resources to align with utility priorities such as workforce development, beneficial secondary land use, environmental justice and diversity and inclusion.

Relevant Experience

Sewer System Improvement Program*, San Francisco, California (Director of Strategic Initiatives)
As part of San Francisco's $2.7 B Sewer System Improvement Program, Renée led all place-based partnership efforts in the Bayview Hunters Point Neighborhood. Her work centered on gaining community support for over $72 million in capital investments. She developed and led the political and community outreach strategy that secured the first ever community-endorsed decision to invest in a rebuild of a historical mitigation property and to create an innovative community greenhouse grant program. Through door-knocking, online surveys, focus groups and joining community events, her work reached over 2500 residents and helped build trust between the SFPUC and community residents. This effort resulted in securing community support for both the mitigation properties and the larger rebuild of the Southeast Treatment Plant.

Regional Utility Workforce Strategy Development*, San Francisco, California (Executive Officer)
Elected as an Executive Officer for Baywork, a regional consortium of Bay Area Water and Wastewater Utilities, Renée served as chair for the workforce development and recruitment committee. In this role, she led a partnership-based effort that secured the first ever California Workforce Investment Board grant to conduct a regional analysis of workforce opportunities in mission-critical careers at local utilities. This work resulted in an up-to-date regional map showing future career opportunities in the region and data-based recommendations for philanthropic funding into training programs for instrument technicians, machinist/mechanics and electricians. In addition to this work, Renée also guided Baywork efforts to increase awareness of water-related careers and to connect local youth and young adults to opportunities in water and wastewater, hosting the largest annual utility career fair in the Bay Area.

San Francisco Public Utilities Commission*, San Francisco, California
Directed a Community Benefits Program in the areas of neighborhood revitalization, education, workforce, arts and culture, environmental justice, land use and firm investments through direct supervision of 7 FTE, management of team of 20 FTE, 4 partner bureaus and 2 consulting firms. Led agency's Place-Based Revitalization strategy for the $2.7 billion Sewer System Improvement Program, resulting in community and political support for neighborhood investments and support for the program. Created collaborative work environment to deliver capital projects, community investments, effective stakeholder engagement, strategic partnerships at agency-owned community properties.

Senior Fiscal and Policy Analyst*, San Francisco, California
Advised Mayor on policy decisions that eliminated more than $900 million in general fund deficits. Led collaborative effort among departments and non--profits to coordinate services for transitional age youth. Directed budget--related outreach for Mayor, including 10 town halls and inaugural online budget forum.

* denotes projects completed with other firms

Experience Summary

Pat brings more than 35 years of experience helping clients develop and implement strategies to effectively deliver major capital projects and programs. Over the past 20 years, she has focused on helping clients evaluate and implement alternative contracting methods for delivering water, wastewater, stormwater, and solid waste projects. In doing so, she works closely with utility managers and executives, and facilitates client workshops that bring together individuals with a wide range of perspectives, including engineering, environmental, legal, and financial. Pat has led the evaluation, strategy development, procurement, contract negotiations, and contract oversight for more than 25 projects delivered using a variety of alternative delivery methods, including progressive and fixed-price design-build (DB), construction manager at risk (CMAR), design-build-operate (DBO), design-build-own-operate-transfer (DBOOT), long-term service contracts, and public-private-partnerships (P3).

Assignment

Procurement Task Lead

Education

B.A., English, Whitman College, 1976

B.S., Civil/Environmental Engineering, University of Washington, 1979

Graduate course work in environmental engineering, University of Washington

Registration

Professional Engineer, Washington 25835, 1988

Experience

35 years

Joined Firm

2012

Relevant Expertise

- *Progressive design-build (PDB) delivery strategies and implementation*
- *Owner's representative for the first-ever DBO water treatment project involving ozone*
- *DB procurement documents and minimum technical requirements*

Mountain Home Air Force Base Water Supply, Department of Water Resources, Idaho

Procurement Lead. This project was intended to reduce reliance on declining aquifers by providing a new source of supply from the Snake River. The infrastructure project was envisioned to include a new 6 MGD water treatment facility, raw water pump station, intake structure, and 14-mile transmission pipeline. Pat prepared materials and led workshops to develop the overall procurement strategy, was responsible for drafting the RFQ and RFP documents, advised DWR during short-listing, and participated in confidential meetings with short-listed proposers. The project is currently on-hold while the State determines revenue options with the U.S. Air Force.

North City Renewable Energy Project Facilities and Services, City of San Diego, California. Senior Advisor.

San Diego is procuring a P3 contractor to design, construct, finance, operate and maintain the Project and perform other related contract services as part of the City's Pure Water program. The Project is intended to generate electricity from landfill gas and from digester gas. Pat is a senior advisor on BC's team, which is providing technical input to the procurement documents and process.

Cedar River Water Treatment Facility Design-Build-Operate Project, Seattle Public Utilities, Washington

Project Manager. Approximately two thirds of the drinking water for over 1.25 million people in the Seattle area is supplied by SPU's Cedar River source. Working with a multidisciplinary team of senior consultants, Pat helped SPU develop an overall development strategy that involved using DBO contracting for the treatment facility, phased development of the facility and CMAR contracting for fish passage and dam improvements at Landsburg where SPU diverts water from the Cedar River. Pat led preparation of DBO solicitation documents for the water treatment facility, was responsible for reviewing DBO proposals, interviewing teams, participating in selection of the DBO contractor and supporting negotiation of the $109M DBO contract. The Project included ozonation and UV disinfection. She continued to oversee project delivery (design and construction) and initial operations following acceptance.

Front of Plant, Progressive DB Owner's Advisor, Silicon Valley Clean Water (SVCW), Redwood City, California

OA and Procurement Lead. Pat led development of an overall procurement strategy and risk allocation for this $122 million PDB project to install an influent pump station, new headworks, and improved odor control and

associated features at SVCW's existing wastewater treatment plant. She developed and conducted staff workshops on project delivery, led development of the RFQ and RFP for the project, and participated in the evaluation of SOQs and proposals. One unique aspect of this project was that it needed to be closely integrated with SVCW's planned tunnel project for delivery of wastewater, which was also being developed using progressive DB in parallel with the Front of Plant project. The design-builder guaranteed price has been negotiated for this project, which is currently in construction.

Southwestern Parkway CSO Basin Progressive DB Project Owner's Advisor, Louisville-Jefferson County Metropolitan Sewer District (MSD), Louisville, Kentucky

OA and Procurement Lead. Pat led the process for selecting a DB contractor for this $60 million fast-track PDB project under Consent Decree with USEPA. Because of the need to select the design-builder as fast as possible, the procurement strategy involved intensive market outreach to alert potential proposers of the upcoming procurement, coupled with a one-step Request for Qualifications and Proposals (RFQP) procurement process. Pat led development of the RFQP, and assisted with the evaluation of proposers and with contract negotiations. The procurement started in March 2016 with the DB contractor selected by June 2016. Pat also assisted with negotiations of Guaranteed Maximum Prices (GMPs) for the two phases of construction. The Project is currently completing the second phase of construction.

Jefferson and Hood Street Surface Water Interceptor Progressive Design-Build Project, City of Tacoma, Washington

Project Manager and OA Lead. Pat worked with the City to procure a progressive DB contractor for the design and construction of a major stormwater interceptor through downtown Tacoma. Project challenges include an aggressive schedule, the need for construction in the downtown core, complex permitting, crossings of interstate highways and rail corridors, and construction through various areas containing remediated and suspected site contamination. Pat assisted with development of the overall procurement strategy and risk allocation, development of RFQ and RFP documents, and with evaluation of SOQs and proposals. The selected progressive DB contractor.

Buckman Direct Diversion Design-Build Project, City of Santa Fe and Santa Fe County, New Mexico

Commercial Project Manager. This $190 million project included major conveyance pipelines from the Rio Grande River and an advanced water treatment plant to provide drinking water to the City of Santa Fe and Santa Fe County. The project was delivered under a DB contract. Pat was responsible for managing and overseeing major business functions including contract compliance, risk management, change management, procurement and sub-contracting, claims management, project scheduling, and project closeout.

Central Treatment Plant Design-Build Project, City of Tacoma, Washington

Project Manager and Senior Consultant. Pat directed the consulting team advising the City on the delivery of this $70 million expansion and upgrade of the City's main WWTP. She led a team of technical advisors and City staff through a series of workshops, which resulted in the City selecting fixed-price DB contracting. She also led the preparation of procurement documents, participated in the review of statements of qualifications and proposals, advised the City during the selection process, and participated in DB contract negotiations. She continued to advise the City during project delivery.

LT2 Project Owner's Advisor for GC/CM Delivery, City of Walla Walla, Washington

Project Manager. Pat advised the City of Walla Walla on the procurement of a GC/CM contractor for this $23 million project. Her work included helping the City to obtain necessary state approval, developing procurement documents, and advising the City in reviewing proposals and during contract negotiations with the selected contractor. She most recently led a kickoff partnering workshop with the City, its engineer, and the contractor. She is advising the team during the pre-construction phase of the project.

David Pernitsky

PhD, P.ENG

Process Technical Task Lead

Solving water treatment problems starts with understanding root causes, which are not always obvious. That's why, as global practice leader for water treatment, David works to avoid solutions that only address the symptoms of deeper issues. With his background in water chemistry—and solid focus on treatment fundamentals—he helps to produce efficient engineering results without wasted effort.

David is a Stantec Global Practice Leader and lead water treatment resource for Stantec's municipal and industrial water treatment projects. David has 26 years of environmental engineering experience on many challenging studies and design projects in the areas of drinking water treatment, groundwater remediation, wastewater reuse, industrial water and wastewater treatment, and water resource management. He is responsible for tracking and implementing current research developments, ensuring that appropriate technologies are used on projects, and providing treatment process assistance and QA/QC support to Stantec staff and clients. He has led many projects involving state-of-the-art technological solutions, including dissolved air flotation (DAF), ozonation, granular activated carbon (GAC), ion exchange, membrane filtration, reverse osmosis, and high-rate granular media filtration systems. His water supply management exp

Education

- B.Sc., University of Alberta, Civil Engineering (Co-op), with Distinction, Alberta, 1991
- M.Sc., University of Alberta, Environmental Engineering, Alberta, 1993
- Ph.D., University of Massachusetts at Amherst, Environmental Engineering, Massachusetts, 2001

Registrations

- Professional Engineer #52725, Association of Professional Engineers and Geoscientists of Alberta

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David Pernitsky Relevant Experience

New Water Treatment Plant*, Winnipeg, Manitoba (Ozonation Lead Engineer and Operational Support)
Project Value: CAD 300,000,000
This project included piloting, conceptual, preliminary, and detailed design of a new 105 MGD WTP, consisting of DAF, ozonation, deep bed GAC filter adsorbers, chlorine and UV primary disinfection. The source water for this plant is subject to severe algae blooms, leading to frequent taste and odour events. Algae, taste, and odour control processes for the new plant included DAF, O3/H2O2 for geosmin and MIB oxidation, and biologically active GAC filter-adsorbers. While working for CH2M, David was lead pilot plant operator during the 1994 and 1997 pilot tests; he was a key member of the conceptual and preliminary design phases for the overall WTP; and he was the lead process engineer for the detailed design of the ozone systems. In 2010, David participated in the overall WTP commissioning and with coagulation optimization. In 2018, now a member of Stantec, David led a study investigating the use of zeta potential instrumentation for coagulation optimization at the plant.

EPCOR, Water Treatment Plant Long-Term Master Plan, Edmonton, Alberta (Technical Lead)
Project Value: CAD 125,000
WTP Master Plan study to develop a 50-year upgrade plan for the City's two conventional WTPs: Rossdale (current capacity 53 MGD) and EL Smith (90 MGD). The plan addressed process expansion to meet projected increases in demand and projected changes in regulations, elimination of single points of failure, process improvements to account for changes in water quality due to climate change, and the addition of taste and odor control processes. Ozone-BAC and H2O2-UV were considered for taste and odor control.

Water Treatment Program*, St. Johns, Newfoundland (Lead Process Engineer)
Project Value: CAD 72,000,000
David worked as process lead for upgrades to the Bay Bulls Big Pond Water Treatment Plant and the Petty Harbour Long Pond WTP as part of the City of St. John's overall Water Treatment Program. Later as an employee of Stantec, David provided support to the City of St. John's in responding to a coloured water incident. For the 32 MGD Bay Bulls direct filtration plant, David was involved in this project from the initial pilot testing to the detailed design. For Petty Harbour Long Pond, David was the process lead for treatability testing, process selection, and design of a greenfield 7 MGD filtration plant. Finally, David responded to a rash of coloured water complaints due to elevated Manganese levels in 2018.

Chemical Systems Improvements*, Saskatoon, Saskatchewan (Project Manager)
Equipment selection and detailed design of new chemical feed systems, including: lime slakers and feeders, ammonium sulfate, fluoride, and sodium hypochlorite.

City of Calgary, Bearspaw/Glenmore WTP Upgrade Studies*, Calgary, Alberta (Lead Process Engineer)
Project Value: CAD 300,000,000
Upgrade program for Calgary's two WTPs to improve treated water quality and to increase capacity to 145 MGD each. Study scope includes regulatory review and formulation of treated water quality goals and the conceptual design of several upgraded unit processes. As part of this project, three pretreatment processes (DAF, Actiflo, and Plate Settlers) were evaluated. The evaluation included an Actiflo pilot program at the Glenmore WTP, and a DAF pilot at the Bearspaw WTP. Disinfection processes (UV and Cl2) for Giardia and Cryptosporidium inactivation and chemical system capacities were also evaluated at the increased plant capacity. Plant residuals handling facilities were also reviewed and piloted and a conceptual design for clarifier/thickeners and centrifuge dewatering equipment was prepared.

Sweetwater Authority, Purdue Water Treatment Plant (WTP) DAF Retrofit*, Chula Vista, California (DAF Process Design Lead)
Project Value: CAD 11,000,000
Detailed design of a DAF retrofit into existing sedimentation basin at the 40 MGD Purdue WTP. Scope includes preparation of a pre-treatment master plan incorporating the addition of DAF, powdered activated carbon (PAC) for taste and odour control and membrane filtration, pre-purchase of the DAF equipment, and a 2 month pilot testing program.

250 MW Grayson Repowering Project, Glendale, California (Senior Water Treatment Engineer)
Owners engineer for the development of the EPC procurement package for the water treatment facility for a 262 MW power plant. The power plant will consist of two combustion turbine generators operating in simple cycle and two combined cycle units. The facility is designed to use recycled municipal wastewater from the City of Los Angeles Glendale Water Reclamation Plant for boiler feed water, non-potable process water, cooling tower and evaporation coolers. Recycled water treatment consists of a reverse osmosis based treatment plant followed by a mixed bed demineralizer to produce high quality demineralized water suitable for the SGT-A65-TR NOx water injection, power augmentation, and fogging systems, the HRSG make-up water, and CTG cleaning.

Water Treatment Plant Long-Term Capital Development Plan*, Saskatoon, Saskatchewan (Lead Engineer)
This project included a review of future water supply and treatment needs to meet a 30-yr design horizon. Scope included establishment of peak and average demand data, a detailed review of water conservation alternatives, and an assessment of the capacity of the existing lime softening plant and storage reservoirs. Alternatives for meeting the City's future treatment needs were summarized in the form of a capital development plan.

** projects completed prior to working at Stantec*

Charles Bromley

PE, BCEE

Plant Operational Best Practices Task Lead

Given the ever-growing importance of clean water quantity and quality for communities of all types, an integrated and sustainable approach to water treatment is essential. Such an approach applies cost-effective alternatives to protect the health of people and environment, while ensuring sufficient supply and reducing waste.

Charlie is an experienced civil and environmental engineer with more than 39 years with an emphasis on the planning, design, and construction of municipal water facilities. He has served as a leading designer for both large-scale conventional water treatment facilities and leading-edge membrane technical processes. Charlie has expertise in all water treatment processes, as well as construction of the water treatment infrastructure necessary to achieve the design specifications. He establishes key design criteria for water treatment process and confirms that the design criteria are met in preparing contract documents.

Education

- MS/MSc, Environmental Engineering, Johns Hopkins University
- BS/BSc, Civil Engineering, University of Toledo

Registrations

- Professional Engineer – OH, VA, PA, MD, WA, NV, CO, CA, NM
- American Academy of Environmental Engineers and Scientists Board Certified Environmental Engineer, Annapolis, Maryland, 2018

Memberships

- Board Certified Environmental Engineer, American Academy of Environmental Engineers & Scientists
- Member, American Water Works Association
- Member, International Ozone Association

Publications

- “Managing Risk And Delivering $20 Million Construction Cost Savings For The Tacoma Water Green River Filtration Facility Project.”, 2013.
- “Expanding Capacity And Improving Performance By Converting From Conventional Sedimentation Treatment To Dissolved Air Flotation.”, 2013.
- “Planning and Design of a 168 mgd Hybrid Conventional and Direct Filtration Treatment Facility”., 2012.
- Application of Submerged Membranes and Media Filtration for a Low Turbidity and Low Alkalinity Surface Water”, 2011.
- Changing Tides: A Hybrid Approach for Desalinating Waters with Fluctuating Water Quality, AWWA Annual Conference & Exposition, 2010.
- Ozone Treatment of Secondary Effluent at U.S. Municipal Wastewater Treatment Plants, The Journal of the International Ozone Association, 2010.
- Columbus to Use Ozone and Biologically Active Filtration to Control Disinfection Byproducts, AWWA Ohio Section Newsletter, 2010.

Charles Bromley Relevant Experience

Soldier Canyon Filter Plant: Soldier Canyon Water Treatment Authority, Fort Collins, Colorado

Mr. Bromley is currently serving as project engineer for development of a planning document which will expand the plant to 60 mgd. The project will add new flocculation basins, a high rate sedimentation process, granular media filters, solids management systems, extensive chemical storage and dosing improvements, powdered activated carbon control of taste and odor-causing compounds, and related facilities. Work was initiated in 2016. The project is on-track for completion and commissioning in 2020.

Green River Filtration Facility: City of Tacoma, Washington

Mr. Bromley served as project manager for the new 168 mgd conventional treatment plant serving the City of Tacoma and three other regional water supply agencies. The plant consists of new flocculation and sedimentation facilities, new deep bed rapid gravity filters (up to 10 gpm/sf), new chemical systems, ozone system modifications, and new sludge handling and dewatering systems, and will incorporate existing treatment systems and buildings for reduced project cost. Design was finished on schedule and under budget. Mr. Bromley and Stantec engineers worked closely with agency operators to develop the site and select favorable treatment processes and write and implement the startup plan. Ten workshops were held over a nine month period. Stantec prepared operational procedures for the new facility and assisted with commissioning, startup and training. All project budgets and schedules were met, with the new treatment facility commissioned in December 2014.

Treatment Plant Expansion and Upgrade: Lake Oswego and Tigard, Oregon

Mr. Bromley served as project technical reviewer during the design phase for the WTP upgrade, and led operator training at commissioning. The upgrade increased capacity from 16 to 38 MGD and include high rate ballasted flocculation, intermediate ozonation, deep-bed GAC filtration, and chlorine disinfection. The project was heavily impacted by neighborhood concerns, requiring numerous meetings and agreements which affect design and siting. A construction sequencing plan was developed to minimize plant shut-downs and associated construction activities. The new facilities were successfully commissioned in 2016. Mr. Bromley assisted with operator training.

Southern Delivery System Bailey Water Treatment Plant: Colorado Springs Utilities, CO

Mr. Bromley assisted Colorado Springs Utilities in the performance and operations evaluation of the Bailey WTP to address peak TOC, manganese, sodium and iron concentrations. Part of the work includes planning for temporary and long-term solutions to remove these constituents, including new chemical fed facilities, and to prepare recommendations for water quality monitoring. The Bailey WTP was commissioned in 2015 and has experienced a number of raw water quality excursions.

Hap Cremean Water Plant: City of Columbus, Ohio

Mr. Bromley served as project engineer for the implementation of new ozone facilities for the existing 125 mgd Hap Cremean Water Plant. Work includes new ozone generators, new liquid oxygen feed systems, new ozone sidestream injection process, and related elements. Existing basins were converted for use as ozone contactors, representing a significant capital cost financial savings to the agency. Design was based on multiple workshops held with operations and maintenance staff. The project was completed and commissioned in 2016. Mr. Bromley assisted with startup and training as well.

Minot Water Treatment Plant Phase II Upgrades, City of Minot, North Dakota

Mr. Bromley is serving as project engineer for the detailed design of multiple plant improvements. The existing 18 mgd facility receives both groundwater and surface water. A completely new integrated clarification and pretreatment building with lime softening is being provided. New systems include new solids contact clarifiers, disinfection facilities, coagulant chemical facilities, rapid mixing, raw water flow metering and control, a recarbonation tank, laboratory, break room and training room, and chemical systems. Process units are being housed within a new structure to protect from severe inclement weather. Construction was initiated in 2018 with commissioning scheduled for 2020.

Mesa Water Treatment Plant: Colorado Springs Utilities, Colorado

Mr. Bromley served as project engineer for the implementation of new coagulation, sedimentation, solids handling, and finished water blending processes for the 50 mgd facility. Located in a on a highly visible site in west Colorado Springs, the project will demolish and replace existing processes which were originally installed in the 1940s with new high rate units that will be designed for enhanced coagulation and fluoride removal, paving the way for future replacement of existing aged rapid gravity filters. A new three-stage flash mix system consisting of pumped jet diffusers will be implemented, while new vertical turbine flocculators and plate settlers will form the backbone of the pretreatment process. Since the plant is subject to high fluoride in its raw water source, a new high capacity blending system will mix finished water with from several sources to achieve the desired fluoride goal. Additional facilities being furnished as part of this project include new sulfuric acid and caustic soda storage and feed systems, new sludge thickening and drying beds, new ozone contactors, and extensive yard piping modifications for improved raw water conveyance and metering. Predesign was initiated in 2015 and commissioning is anticipated in 2020.

H. David Muenzner, PE

Experience Summary

Mr. Muenzner is the process mechanical portfolio lead in Brown and Caldwell's east business unit with 18 years of design and construction experience. In addition to his process mechanical design responsibilities, he is also tasked with resource allocation and qualtiy reviews for projects within the business unit. Mr. Muenzner's extensive experience as an engineer and design manager for water and wastewater treatment projects has encompassed multiple forms of project delivery in both the public and private sector.

Assignment

Design and Construction Best Practices Task Leader

Education

M.S., Civil Engineering, University of Minnesota, 2001

B.S., Microbiology, Ohio State University, 1992

Registration

Professional Engineer:

Minnesota

Wisconsin

Iowa

Experience

18 years

Joined Firm

2000

Nicollet Island Pump Station, Minneapolis Water Treatment and Distribution Services, Minneapolis, Minnesota

Process Mechanical Lead. This project involved the design and construction of a potable water booster pump station Nicollet island in the Mississippi River to improve water quality and mitigate seasonal freezing concerns. The station included two booster pumps and instrumentation to monitor water flow, pressure, and temperature. The station also included features to allow backflow for fire flow demands and emergency bypass in the event of pump failure or power loss. The station is located in a historic part of Minneapolis with high visibility from residents and tourists.

Phase 3 and 4 Selenium Removal, Valero Wilmington Refinery, Wilmington, California

Process Mechanical Design Lead. Mr. Muenzner led the design effort for Phases 3 and 4 for the Selenium Removal project which involved precipitation and removal of selenium in the stripped sour water at the refinery. The project included design of dissolved nitrogen flotation units, sulfuric acid and hydrogen peroxide storage and metering equipment, and modifications to the existing wastewater piping systems and tankage to accommodate the selenium oxidation process. Responsibilities included leading the process mechanical design, development of the process and instrumentation drawings, coordination with the client on equipment and instrument tagging, coordination of process mechanical design with structural, electrical, and civil engineering disciplines, oversight of the development of the equipment procurement packages, review of the vendor proposals, and coordination with a subcontractor to complete the fabrication level pipe drawings. The design required coordination with Valero structural design, subconsultants, and the City of Los Angeles for permitting requirements.

American Cyanimid Superfund Site, Wyeth Holdings LLC., Boundbrook, New Jersey

Process Mechanical Design Lead. The Groundwater Treatment Facility (GWTF) for the American Cyanamid Superfund Site is constructed to treat groundwater contaminated with regulated compounds from a former chemical production facility. The GWTF consists of groundwater equalization tanks, a Fenton's Oxidation Tank, metals precipitation and clarification units, a biological reactor, a membrane ultrafiltration system, granular activated carbon adsorption units, arsenic adsorption units, and conveyance pumps and piping to both extract groundwater from the site but also to reinject treated groundwater back into the ground. The facility will also contain solids storage and centrifuges for dewatering the metals hydroxide and biological sludge generated in the GWTF processes. Responsibilities include layout of the GWTF building and equipment within a limited footprint, pump and equipment selection, preparation of detailed specifications and procurement packages, coordination with civil, structural, and electrical and instrumentation disciplines, and preparation of process and instrumentation diagrams for the systems. Additional responsibilities include coordination with the client and contract operators and preparation of exhibits for regulatory review.

Phase 3 OPDES Permit Compliance Project, Valero Ardmore Refinery, Ardmore, Oklahoma
Process Mechanical Design Lead. Phase 3 Engineering Services involve advancing a design to 60% completion, developing detailed bid packages for equipment procurement, and providing a +/- 10% cost estimate. The Valero Ardmore Refinery project involved rehabilitation and improvement of the process water/storm water treatment systems to comply with OPDES permit requirements. The project included rehabilitation and improvement of influent lift station pumping, addition of stormwater holding tanks and associated pumping systems, addition of dissolved nitrogen flotation units for oily solids removal, conversion of existing bioreactors to an activated sludge system including addition of secondary clarifiers and associated pumping systems, addition of an effluent filter, relocation and rehabilitation of an existing oily solids centrifuge dewatering system, and replacement of miscellaneous chemical handling systems, tanks, piping, and pumps. Responsibilities included leading the process mechanical design, development of the process and instrumentation drawings, coordination with the client on equipment and instrument tagging, coordination of process mechanical design with structural, electrical, and civil engineering disciplines, and oversight of the development of the equipment procurement packages.

Michael McWhirter

PMP

Contracts and Documentation

Education

- BEng, Chemical and Process Engineering - Hons 1st Class, Canterbury University, Christchurch, New Zealand, 1999

Registration

- Project Management Professional (PMP)®, Project Management Institute

Michael has a technical basis in water treatment engineering, including managing projects at large lime softening plants. His extensive experiences in alternative delivery projects include design build, construction management at risk, and collaborative alliance project set ups in a variety of roles ranging from Owners Advisor, to design professional, to design-build contractor commercial lead. He is currently the commercial manager and project management lead for Stantec's Design Build business unit and works day to day delivering a $250M progressive design build water project in addition to providing oversight on commercial, risk and delivery aspects of Stantec's national portfolio of design-build projects. The projects he has been involved with include water and wastewater treatment facilities and waste to energy facilities with construction values ranging from $20M to $400+M. Michael is particularly experienced with dynamic stakeholder/contract relationships, contract negotiations, and project document controls.

Relevant Experience

Hap Cremean Ozone and UV Project, Columbus, Ohio
Michael was the project manager for two projects during different project phases at this 125-MGD treatment facility which is based on lime softening. The first project was to upgrade to install ozone and biologically active filtration and the second project is to install UV disinfection. Advanced oxidation with either UV or ozone has been a key planning consideration for both projects and Michael provided specialist input on this topic. Both projects involve significant upgrades to electrical equipment at the facility including a new feed. The work at the Hap Cremean plant are concurrent with similar projects at another treatment facility and Michael is responsible for coordinating between the UV projects to ensure consistency in project execution for the City. Michael's role included management during start-up and preparation of standard operating procedures for this 125-MGD ozone system. In conjunction with operating the filters in a biologically active manner the ozone will provide removal of taste and odor causing constituents in the water.

Water Treatment Plant Design Build Owners Representative, Dunedin, New Zealand
Michael was the owners representative for a $10M design-build contract for the supply of process equipment for the Southern water treatment plant in Dunedin. The general conditions of contract were FIDIC 1987. Work includes extensive involvement with the Bridging Documents and managing the Design Build Contractors work against those documents. The treatment process at the plant includes, coagulation, submersed membrane filtration, UV disinfection and dosing of chlorine and fluoride, lime and carbon dioxide.

Advanced Industrial Water Treatment Design Build, Confidential, Confidential
Michael has been involved in this progressive design build project for the last four years and has managed piloting of treatment technology and the detailed design under a design build procurement. The work has included extensive piloting to prove design concepts and their integration into the progressive DB delivery model. The facility has a construction cost of $400M facility which uses advanced chemistry, biological and membranes to treat 10 mgd of water. The facility also includes zero liquid discharge brine crystallizers and cooling towers. The project was designed in 10 months by a team of more than 100 design engineers and CAD staff with more than 55 FTEs working on the project at its peak.

Piscataway WRRF Bioenergy Project, Washington, District of Columbia
Michael is directing the interaction between design and construction efforts for this $250M progressive design build project to deliver a waste to energy project which uses Thermal Hydrolysis, combined heat and power (THP/CHP) as well as gas to grid energy recover and side stream treatment in addition to traditional technologies such as thickening, dewatering and digestion. The facility is a regional one and accepts dewatered sludge from four other facilities in cake receiving bays. Michael planned the design services for the entire project including for 12 minority sub-consultants. Michael provided overall team leadership with particular engagement in project management, process design and early procurement of key items of equipment including the gas upgrading equipment, the engine generators and the boiler systems.

Sustainable Water Infrastructure Project, Santa Monica, California
The City of Santa Monica is building a project to harvest municipal wastewater, stormwater run-off and impaired groundwater as sources of indirect potable water re-use. To achieve this they are adding RO treatment to an existing run-off facility, collecting brackish groundwater from around an existing below grade tank and building an advanced water treatment facility (AWTF). The project is being delivered as a progressive design build project and Stantec is acting as the Owner's Advisor. One of Stantec's major roles is review of submittals from the PDB contractor, with submittals being issued on a weekly basis and responses required within a week from Stantec as the Owner's Advisor to maintain the project schedule. Michael is providing review of the submittals from a technical basis and considering the procurement mechanisms which the PDB contractor is using.

Guy
Le Patourel

PE, P.Eng., ENV SP, LEED AP

Contract Documents

Education

- B.Sc., Civil Engineering, University of Cape Town, Cape Town, South Africa, 1980
- MBA, University of Witwatersrand, Johannesburg, South Africa, 1993

Registration

- Envision™ Sustainability Professional (ENV SP)
- Professional Engineer, Michigan
- Professional Engineer, Florida
- Professional Engineer, Ontario

Guy has more than 30 years of varied experience in the evaluation, design, and delivery of solutions in the water, wastewater, and waste management sectors. He has extensive experience in a variety of Alternative Delivery Projects, including Progressive Design Build, Fixed Price Design Build and EPCM. This includes acting both in an Owner's Advisor role, preparing RFP and Design Criteria Packages, as well as Lead Design role on the Design-Builder team. Whether acting as consultant, contractor, or client, he has successfully delivered complex multi-disciplinary projects by making maximum use of his team members through exceptional organizational and leadership skills.

Relevant Experience

Progressive Design Build for Water Treatment Plant, Ann Arbor Michigan
Provided Owner's Advisor services for developing RFP and Technical Requirements for Progressive Design Build of SCADA system upgrades. Included a review of current available industry standard contract documents for Alternative Delivery for water and wastewater projects. Developed a customized approach for City of Ann Arbor based on the DBIA standards, modified to suit City Ordinances and local requirements.

EPC design of industrial effluent at Ras Al Khair Industrial City (RIC), Saudi Arabia
Developed RFP and Design Criteria packages for the selection of the EPC contractor using a Lump Sum bid process. This 5 MGD capacity treatment facility provides dual stage lime precipitation of waste streams from phosphate, mineral and aluminum processing industries. The Industrial IWTP is co-located on the same site as a conventional SWTP receiving the city's sanitary sewage. The two plants provide independent treatment trains but share common site facilities such as offices, laboratory, chemical delivery, as well as effluent pumping and sludge thickening. The effluent from both plants is treated to reuse quality to be used for irrigation of the new industrial city.

Port Severn Water Treatment Plant, Muskoka, Ontario
Owner's Advisor for Design Build of new facility. Led the environmental assessment and conceptual design for the water supply, treatment, and distribution system for Port Severn, District of Muskoka. Included detailed treatability study and treatment process design for surface water supply. Prepared RFP and Bid packages for delivery of project under a Fixed Price DB process.

Zuikerbosch Water Treatment Plant*, Johannesburg, South Africa
Planning and preliminary design for a 300 MGD extension to the existing Zuikerbosch 900 MGD water treatment plant. Included innovative new process application of spiral flocculators for the lime softening system.

Carlton Water Treatment Plant, Sarasota, Florida
Comprehensive process selection and design for the upgrade and expansion of the Carlton Electro-dialysis Reversal (EDR) water treatment plant. Responsible for investigating options for upgrading the existing Mark 3 EDR skids with the new Mark 4 membranes supplied by GE Water. The scope included evaluation of the pre and post treatment processes and identification of plant-wide upgrades necessary to maintain safe and reliable operations for another 25 years.

Mannheim Water Treatment Plant Disinfection Upgrade, Kitchener, Ontario
Design and construction supervision of upgrades to the 19 MGD plant. Included the installation of UV primary disinfection to achieve better than 4-log Giardia / Cryptosporidium inactivation, and installation of medium pressure ozone system for taste, odor, and color control.

Toronto Island WTP Summerization Retrofit, Toronto, Ontario
QA/QC review of design to upgrade the 410 MLD Toronto Island Water Treatment Plant for year round operation. This involved improvements to the building envelope and HVAC systems to support the use of the deep water lake intake for an innovative geothermal green-energy source for the city.

Greenbrook Water Supply System, Kitchener, Ontario
Environmental assessment and detailed design of upgrades to the 2,400 GPM Greenbrook water system. This high profile project required investigation and pilot testing of a UV Advanced Oxidation Process for removal of 1,4-dioxane from the groundwater. Also included low-lift and backwash pump upgrades, high-lift pump upgrades, and reservoir rehabilitation and baffling.

Union Water Treatment Plant, Essex County, Ontario
Environmental assessment, process evaluation, and treatability testing for expansion of the Union Water Treatment Plant. This involved filter stress testing to verify re-rating potential and pilot testing of membrane filters over a four-month period. Expansion options were assessed to increase capacity from the current 28 MGD to 48 MGD in two stages.

Jonathan Johnson

Experience Summary

Jonathan (Jon) has more than 20 years of experience working in consulting engineering to develop successful projects for state agencies, municipalities, special districts, and contractors. Much of his career focused on the commercial side of alternative and traditional delivery projects where he was responsible for providing leaderships to capture Design-Build, Program Management, Owner's Representative, Public-Private-Partnerships (P3), and Design-Bid-Build (DBB) projects, with consulting fees ranging from $2 million to $180 million. Jon is currently an Owner Advisor, applying his expertise from the commercial side of complex civil infrastructure procurement in support of clients considering or implementing projects through alternative delivery, including strategy development support, request for questions (RFQ) and request for proposals (RFP) development, legislative research, and workshop facilitation.

Assignment

Market Outreach

Education

B.A., English, University of Wisconsin, Milwaukee, Wisconsin, 1991

Experience

20

Joined Firm

2018

Relevant Expertise

- *Design-build procurement*
- *Commercial and owner advisor experience in alternative delivery in complex infrastructure*
- *Strategy development support for clients to implement alternative delivery projects that best meet client and project objectives*
- *RFQ and RFP development support for alternative delivery projects for local agencies, including legislative research as needed*
- *Facilitation of alternative delivery workshops with design-build contractors*

Owner Advisor, Soquel Creek Water District, PureWater Soquel (PWS) Program, Santa Cruz, California

Owner Advisor. Providing support for procurement strategy and project delivery method selection for various projects under consideration for the Soquel Creek Water District (District) PureWater Soquel (PWS) Program. The primary components of the PWS Program include tertiary treatment facility and advanced water purification facility (AWPF). pump stations and pipelines for the conveyance of source water, purified water, and RO concentrate (brine), and groundwater recharge and monitoring wells. Delivery strategies being considered include traditional design-bid-build (DBB), construction manager at risk (CMAR), and design-build (DB). DB methods include progressive design-build (PDB), fixed-price design-build (FPDB), and design-build-operate (DBO). Provided legislative research support for the evaluation of the various delivery strategies and presented findings to the Soquel Water District Board with recommendations for next steps in the program decision process.

Owner Advisor Biogas P3, Colorado Springs Utilities, Colorado Springs, Colorado

Owner Advisor. Providing feasibility assessment and procurement support to leverage existing biogas production and waste digestion infrastructure assets into an economically sustainable program. As Owner Advisor, BC is working with CSU to define the project and determine the project's economic feasibility and a value for money analysis. The project also includes obtaining market sounding feedback from the industry. Follow-on scope includes development of risk allocation and deal structure, followed by procurement documents. Supporting the team's development of economic feasibility, market sounding, and procurement as well as coordination with the client to support decision-making and effective project delivery. Providing support for a P3 Step 1 RFP and Step 2 RFP development focused on creating positive, competitive tension in the market that will result in award of the project to a P3 Partner that will provide the most beneficial economic results for CSU as well as the most efficient design, construction, and operation of the gas processing facilities on the CSRRRF site.

Gas Turbines Final Design, Milwaukee Metropolitan Sewerage District, Milwaukee, Wisconsin

Sales Manager. Managed pursuit team through the one-step technical proposal process that led to award of this complex project delivered on a highly accelerated schedule that was driven by District's contract terms with landfill gas supplier. Project scope included final design for replacing burners for the Milorganite dyers at the District's Jones Island Water Reclamation Facility with burners that used a blend of 90 percent landfill gas and 10 percent natural gas, and replacement of existing gas turbines with turbines able to burn either landfill or natural gas. By converting landfill gas into energy, the District is able save 10's of millions of dollars over a 20-year period.

Patrick Weber, P.E.

Experience Summary

Patrick is a potable water and water resources engineer. He has experience in potable water system, water resources, and civil infrastructure projects. Potable water experience has included water system planning and analysis, source of supply analysis and source approval, water treatment and distribution system design, and water system hydraulic modeling. Water resources experience has included drainage system analysis and design, National Pollutant Discharge Elimination System (NPDES) compliance, hydrologic modeling, field water quality sampling, stream assessment, and Geographic Information System (GIS) mapping and analysis. Civil design work has included preparing design drawings, specifications, and cost estimates; performing drainage pipeline and structure design; and general civil design. Patrick is a member of AWWA and is part of BC's corporate leadership team for sustainability and charitable support.

Assignment

Technical Requirements

Education

M.S., Civil (Environmental) Engineering, Marquette University, 2006, Trinity Fellow

B.S., Cum Laude, Mechanical Engineering, Santa Clara University, 2003

Registration

Professional Engineer No. 46440, Washington, 2009

Experience

10 years

Joined Firm

2006

Relevant Expertise

- *Project management for planning and design*
- *Stormwater drainage and site civil design*
- *Potable water treatment and distribution system design*
- *Water system planning*
- *NPDES permit compliance*
- *Hydrologic and hydraulic modeling*
- *Alternative delivery and Owner's Advisor support*

Owner's Advisor for GC/CM Delivery, Mill Creek Water Treatment Plan Improvements Project, City of Walla Walla, Washington.

Project Engineer. Patrick supported Owner's Advisor services to the City of Walla Walla on the procurement of a GC/CM contractor for this $23 million project. His work included helping the City to obtain necessary state approval, developing procurement documents, and advising the City in reviewing proposals and during contract negotiations with the selected contractor. As part of the project, he supported a kickoff partnering workshop with the City, its engineer, and the contractor. He also assisted in ongoing support to the team during the pre-construction phase of the project.

Morse Lake Pump Plant, Seattle Public Utilities, City of Seattle, Washington

Project Engineer. With BC in an Owner's Advisor role, Patrick helped to develop performance and design criteria for a design-build project at the Chester Morse Lake reservoir in the Cedar River Watershed. The $30M+ project involved replacement of a floating raw water pump station capable of accessing dead storage in the reservoir as a means of safeguarding water supply in case of drought or climate change. Work included alternatives analysis and development of design concepts and cost estimates for floating pump elements, pipelines, electrical supply, and related improvements.
As part of the construction management team for the project, Patrick provided field oversight and supported environmental monitoring, spill response, cultural resources monitoring, and other activities.

Water System Expansion, Lake Oswego – Tigard Water Partnership, Lake Oswego and Tigard, Oregon

Project Engineer. The cities of Lake Oswego and Tigard formed a partnership to complete a collection of water system improvements to meet future needs of both water systems. BC was tasked to provide program management, including conceptual design of improvements and oversight of one or more detailed design consultants. Completed tasks as part of this ongoing project related to project definition of a new finished water pipeline, water storage tank, and pump station. Assisted with alternatives analysis and route selection for finished water pipeline, alternatives selection for pump station location, alternatives selection for storage tank design, sizing, and location, and development of alternatives for providing enhanced water pressure in low pressure areas.

Experience Summary

Scott has over 10 years of experience in the engineering and construction industry involving water and wastewater treatment facilities, petrochemical, gas plants, power, solar projects, mining, as well as heavy construction. Over the past 6 years, Scott has been involved with the development of large design/build cost estimate proposals ranging from $4-million to $1.3-billion. He has estimated many jobs with capital costs ranging from $150,000 to over $1.35-billion. Scott offers experience in lead estimating, process piping and equipment, and civil estimating and management.

Assignment

Cost Estimating

Education

B.S., Construction Management, Colorado State University, 2008

Experience

10 years

Joined Firm

2016

Relevant Expertise

- *Lump Sum Design Build Estimating*
- *Design-Bid-Build Estimating*
- *Conceptual Capital Cost Estimating*
- *Project Management*
- *Design*
- *Negotiations*
- *Construction Sequencing Plans*
- *Field Construction Management*
- *Subcontractor/Vendor Management*

Design/Build Rainier Wastewater Treatment Plant, J.R. Simplot, Rainier, Washington

Process Equipment/Piping Estimator. The project consisted of design and construction of a new wastewater treatment facility and pipeline. Scott performed quantity takeoffs, priced materials and labor, assisted with scope of work documents, performed market analysis for construction labor. He negotiated with local contractors on scope and pricing to complete the project.

Water Main Rehabilitation Program, Greenville Utilities Commission, Greenville, South Carolina

Lead Estimator. The project consisted of replacing existing water mains using various replacement methods (cured-in-place pipe, reaming, bursting, open-cut, and boring). Scott performed quantity takeoffs, priced materials and labor, assisted with scope of work documents, performed market analysis for construction labor.

Design/Build Sustainable Water Demonstration Facility, Hampton Roads Sanitation District, Virginia Beach, Virginia

Process Piping Estimator. Project included design and construction of a new educational facility of a working scale model designed to show the water treatment process being used within an existing plant. Scott performed quantity takeoffs, priced materials and labor, wrote scope of work documents, performed market analysis for construction labor. He negotiated with local contractors on scope and pricing to complete the project.

Design/Build Northeast Water Purification Plant Expansion, Houston, Texas

Leading Piping Estimator. Project included design and construction of a new waste water treatment facility. The project increased the current output of 80 MGD to a total of 400 MGD. Scott performed quantity takeoffs, priced materials and labor, wrote scope of work documents, performed market analysis for construction labor. He negotiated with local contractors on scope and pricing to complete the project.

Design/Build Clarified River Water Project, Dow Chemical Company, Freeport, Texas

Lead Piping Estimator/Procurement Support. Project included design and construction of new water treatment facility in the Dow chemical plant. The facility extracted water from a nearby river, went through an ultrafiltration process and was distributed throughout the plant using existing infrastructure. Scott performed quantity takeoffs, priced materials and labor, wrote scope of work documents, performed market analysis for construction labor. He negotiated with local contractors on scope and pricing to complete the project. Scott provided purchasing and procurement support for construction.

Maria Thomas

Experience Summary

Maria is a skilled procurement professional with extensive experience providing procurement, technical, and administrative expertise to support complex water, power, and capital improvement infrastructure projects. She excels at working on fast paced construction projects and she frequently manages multiple tasks to meet project schedules. Maria frequently manages multiple, simultaneous procurement projects, and she is a team player with a commitment to accomplishing project objectives. She has experience managing the entire procurement lifestyle from requisition through contract close, and she often delivers cost savings against project cost estimates. Maria also has experience in contract negotiation and SharePoint site development.

Assignment

Bid Evaluations

Education, Certifications, and Training

Various procurement courses

Supply Management Training

Building and Negotiating a Better Deal

Effective Construction Subcontracting and Procurement E-Learning Course

Experience

15 years

Joined Firm

2015

Relevant Expertise

- *Preconstruction services*
- *Budget estimating*
- *Construction management support*
- *At-risk project delivery*
- *Equipment/materials procurement*
- *Expediting, chain of custody management*
- *Contract administration*

Elk River Digester Cover Replacement, City of Eureka, Eureka, CA

Lead Procurement Manager. Project includes replacement of two digester covers with new Downes-type covers, replacement of digester gas piping, handrail around the digesters and repair of cracked and spalling concrete on the digesters. Maria's role included preparation of bidders list, prequalification of subcontractors, compilation and dissemination of RFQs, RFPs in coordination with design team, bid evaluation reports and negotiation of price, commercial terms and conditions for award, prepare, issue and administration of purchase orders, subcontracts and change orders, maintenance of vendor and subcontract certifications, insurance certificates and payment and performance bonds, invoice and payment application processing.

SUEZ Water Management, Multiple Locations, New York

Lead Procurement Manager. Project includes the SCADA/Plant Control Systems (PCS) upgrade for the New York Regulated Business Unit of SUEZ. Includes four water treatment plants (WTP), four WWTP and over 100 remote sites in New York State Maria's role will include the procurement of any major equipment and all Subcontracting activities through Guaranteed Maximum Price (GMP).

WWTP Improvements, City of Wilsonville, Wilsonville, Oregon

Procurement Specialist. DBO project to expand the plant from 2.5 to 4 MGD with future expansion capabilities to 7 MGD producing Class A biosolids for land application. Maria's responsibilities included completing proposal procurement budgetary activities and supporting project procurement lead to manage project procurement activities.

Prairie Waters Project, Aurora Water, City of Aurora, Aurora, Colorado

Program Strategic Support Coordinator. Project included 34 miles of 60-inch diameter pipeline, three pump stations, a natural purification area and a new water treatment facility. Maria was responsible for performing assisting the contracts manager with procurement, project accounting, and project delivery on this $754 million program.

Biosolids Management Program: Main Process Train DB Project, District of Columbia Water and Sewer Authority, Washington, D.C.

Project Buyer. Managed the solicitation of procurement budgetary quotations and bid evaluation reports to assist in the development of the project proposal.

Global Water Business Group Procurement Support, Englewood, Colorado

Buyer Professional. Completed proposal procurement budgetary activities and supporting project procurement leads to manage project procurement activities on the Hamilton BioGas and Digester Upgrades Project and City of Sugar Land 9 MGD Surface Water Treatment Plant (CMAR) Project.

Erin D. Mackey, PhD, PE

Experience Summary

Dr. Erin Mackey has over 18 years of engineering for a wide range of drinking water projects, ranging from treatability studies to design and regulatory/compliance support. Her technical expertise includes UV disinfection; advanced oxidation processes and adsorptive processes; membrane filtration; regulations (compliance and guidance development); and taste and odor management. Erin is BC's Advanced Treatment and Emerging Contaminants Lead. In addition to conventional process engineering and project management work, Erin has managed municipal, Federal and research projects, and serves as drinking water regulatory expert for drinking water and reuse regulations at State and Federal levels at BC.

Assignment

Process Technical

Education

Ph.D. Environmental Science and Engineering, Rice University, Houston, Texas, 1999

M.S. Environmental Science and Engineering, Rice University, Houston, Texas, 1996

B.S. Environmental Engineering, Rensselaer Polytechnic Institute, Troy, New York, 1992

Registration

Professional Engineer, Civil, California No. 81498, 2013

Professional Engineer, Civil, Idaho No. P-10820, 2003

Experience

20 years

Joined Firm

2015

Relevant Expertise

- *Drinking water and reuse treatment*
- *Advanced oxidation and disinfection processes*
- *Membrane and adsorptive processes*
- *Drinking water and reuse regulations and compliance*
- *Water quality and emerging contaminants*

Purified Water Program Manager, Soquel Creek Water District, CA

Process Design and Regulatory Support. BC serves as the Program Manager for Soquel Creek's Pure Water Soquel, Groundwater Replenishment and Seawater Intrusion Prevention Project, which will replenish local groundwater aquifers via direct injection between 1,500 to 3,000 acre-feet per year of advanced purified recycled water treated using MF-RO-UV-AOP. The team has provided engineering support on all elements of the Program including engineering design, stakeholder engagement, environmental documentation, project alternatives analysis, funding strategy support, and review/ coordination of other consultant's work for the Program. Erin serves as a senior process engineer and water quality specialist, leading development of the UV-AOP and water quality stabilization system designs and leading the water quality analysis for blending treated water with groundwater in the aquifer.

Pure Water San Diego Program, City of San Diego, California

Technical Reviewer. As a Program Manager for the Pure Water San Diego Program, BC is part of team working with the City to develop a reliable drinking water source. Brown and Caldwell is providing engineering services for the review of detailed design and construction of water purification facilities, continued operation of the Advanced Water Purification Demonstration Facility, regulation and legislation development, research on additional treatment barriers for a potential direct potable reuse (DPR) project, and an education and outreach program. Upon completion, this program is expected to produce one third of San Diego's local drinking water. Erin provided technical review of select portions of the project deliverables.

Lake Mary WTP TOC and DBP Evaluation, City of Flagstaff, Arizona

Process Expert. The Lake Mary WTP serves the City of Flagstaff and receives surface water from Lake Mary. The treatment process is conventional and includes enhanced coagulation and optional chlorine dioxide and powdered activated carbon feed for total organic carbon (TOC) removal. In 2015, the utility measured HAA5 levels in excess of the 60 µg/L standard and began an investigation into the cause. This study is conducted in parallel to a distribution system modeling effort being performed by another consultant to identify actions that can be taken to bring DBP levels into compliance and improve TOC removal at the plant. Erin provided technical input on the selection and evaluation of potential process alternatives for TOC removal and QA/QC.

Preliminary Phasing Study for the Development of a Water Treatment Plant, Placer County Water Agency, Auburn, California

Project Manager. The purpose of this phasing plan project was to develop a phasing plan for the initial development and subsequent expansion of two WTPs at the Ophir site to 30 MGD. Work involved project management of a tight, 6-week schedule, evaluation of water quality and evaluation of conventional and advanced treatment processes, and development of an implementation plan.

Experience Summary

Dr. Bell's is BC's Director of Water Strategy, and is responsible for developing and leading BC's Innovation and Applied Research. Her career experience in water treatment exceeds 4 Billion Gallons per Day (BGD) of treatment capapcity and has involved collaboration with clients, regulators, and other industry leaders to identify efficient, sustainable solutions. Kati is experienced in regulatory guidance development, coordination, and negotiations, and along with her professional background she has the necessary skills to identify key areas of research and technolgy application to meet client and regulatory goals. She has conducted selection, design, and optimization of numerous treatment processes, including membrane processes, sorption and advanced oxidation processes for emerging contaminants, and disinfection.

Assignment

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Education

PhD, Environmental Engineering, Vanderbilt University, 2004

M.S., Civil Engineering, Tennessee Technological University, 1997

M.S., Biology, Tennessee Technological University, 1991

B.S., Biochemistry, University of Dallas, 1989

Registration

Professional Engineer 112226, Tennessee

Experience

25 years

Joined Firm

2018

Pure Water Program, City of San Diego, CA

Technical Advisor. The City of San Diego (City) is embarking on the Pure Water Program to reduce the dependence on imported water from Colorado River and Northern California which accounts for about 85% of the current water consumption, and to satisfy the USEPA to advance Pure Water Program to avoid the construction of secondary treatment at Point Loma Wastewater Treatment Plant (PLWTP), which would cost $ 1.8 Billion, during permit renewal. Facilities under the Pure Water Program will be built at three locations including the North City Plan, which is the first of the three facilities. Dr. Bell is providing technical support for process design of various aspects of the North City Advanced Water Purification Plant (NCAWPF) will have a nominal capacity of 34 million gallons a day and will be operational by year 2023. The product water from the NCAWPF will be used as a source of supply for indirect potable reuse.

1,4-Dioxane Water Treatment System Design Services, Confidential Client, Florida

Senior Process Expert. Extensive bench- and pilot testing has been conducted to inform the ongoing design, construction and start up of a groundwater treatment system to address 1,4-dioxane. The treatment process, which includes UV-AOP followed by GAC for hydrogen peroxide quenching and DBP precursor removal, has recently obtained a permit for construction and the design is currently being advanced to 100% under this Design-Build contract.

Potable Reuse Investigation and Demonstration of Alternative Treatment Trains, Confidential Client, California

Technical Specialist. Potable reuse has been identified as an alternative water supply option that could provide additional water supplies for the City's water users. Considering the inland location and the lack of access to a brine disposal line, Dr. Bell is serving as a technical advisor on the team that is conducting a comprehensive potable reuse study that includes stakeholder outreach, regulatory coordination and technical evaluations. Phase I is currently underway with a roll out of the communications program; once implemented, the ongoing stakeholder outreach will continue through a demonstration study that will ultimately be used to support variances in water recycling regulations.
enhancing reuse options.

Water Treatment Plant Disinfection Conversion, Nashville, TN

Project Engineer. Dr. Bell provided engineering support for evaluation of alternative disinfection options at the Omohundro and K.R. Harrington water treatment plants (WTPs). Each of the approximately 50-MGD plants provided disinfection utilizing chlorine gas. While the primary focus was to find alternatives to decrease risk management efforts and increase public safety, it was important to also minimize operation costs. An assessment of the cost and non-economic factors for four different alternatives was conducted; recommendations were to provide a phased conversion to onsite generation of sodium hypochlorite at both facilities, to ease transition of operations. These projects are currently being implemented.

Tim Wolfe

PhD

Pilot Testing Oversight

Education

- MS, Sanitary Engineering, Iowa State University, Ames, Iowa, 1979
- BCE, Civil Engineering, Cleveland State University, Cleveland, Ohio, 1973
- PhD, Sanitary Engineering, Iowa State University, Iowa, 1981

Registration

- Professional Engineer, State of Ohio

Tim interacts extensively with municipalities – assisting clients with development of innovative solutions to their drinking water needs. He works closely with our clients to package specific treatment technology(s) that meets each client's technical, sustainability, regulatory and political needs in a cost-effective manner. Tim stays current on emerging regulations and treatment technologies through his active involvement in professional organizations; particularly AWWA. He is a Professional Engineer, P.E. (retired in good standing) and a Board Certified Environmental Engineer, BCEE (retired in good standing) with the AAEES. Tim has forty-five years of diverse experience in environmental engineering. Before joining Stantec in 2016, he was a Vice President with MWH, earlier Tim was a partner in a regional environmental engineering consulting firm (Havens & Emerson) and an environmental engineering university professor; and even earlier in his career he served on the national staff of a professional engineering society.

Relevant Experience

Hap Cremean Ozone and UV Project, Columbus, Ohio
Tim assisted DOW with full-scale implementation of intermediate-ozonation and biologically-active carbon (BAC) filtration at the HCWP using one of the four implementation options developed during the HCWP Master Plan. This capital improvement project was selected from among five treatment alternatives that were demonstrated at either the bench or pilot scale. New recarbonation and ozone contact chambers were retrofitted into an over-sized existing recarbonation basin (i.e., originally a sedimentation basin) and the ozone generators and related equipment are being retrofitted in a second over-sized recarbonation basin to avoid the need for intermediate pumping. Computational fluid dynamics modeling was used to verify that there was minimal short circuiting in the retrofitted contact basins. The ozone and BAC filtration are being used to remove additional total organic carbon (TOC) prior to addition of chlorine for disinfection. Construction has been completed and the project is currently in operation.

Avon Lake Regional Water Master Plan, Avon Lake, Ohio
Assisted with preparation of a water master plan to lay out more cost-effective, phased expansions of the municipal utility's existing 50-MGD WFP to meet short- and long-term growing finished-water demands. Stantec has assisted Avon Lake Regional Water for decades with cost-effective expansions of the WFP in phases from an approved capacity of 10 to 50 MGD. Most of these expansions have been accomplished by high rating existing components from the rapid-mix units to the clearwells. A (short-term) next expansion from 50 to 60 MGD was evaluated in terms of both further high rating of existing components and constructing new components in parallel with existing ones. Long-term expansions were explored to determine the ultimate capacity of the two Avon Lake owned sites north and south of Lake Road.

Dublin Road Water Plant, Columbus, Ohio
Served on a Blue-ribbon panel to perform a comprehensive peer review of how the Columbus Division of Water (DOW)should proceed with upgrading and expanding the Dublin Road Water Plant (DRWP). The DRWP is one of three existing DOW WPs and is the only one currently located on the Scioto River. The River is challenged with infrequent source-water nitrate and atrazine events, as well as the continual presence of disinfection by-product (DBP) precursor materials. DOW's other surface-water facility, the Hap Cremean WP (HCWP), and its ground-water facility, the Parsons Avenue WP (PAWP) do not experience nitrate or atrazine events. The two surface WPs provide clarification followed by softening, and DOW's ground-water facility provides split-treatment softening. To maintain nitrate levels at acceptable levels in the distribution system, the blue-ribbon panel evaluated treatment and source-water blending at the DRWP, and moving finished-water around the distribution system from DOPW's other two WPs. Several means to remove total organic carbon (TOC) were evaluated to develop a pilot-scale demonstration program to determine the most appropriate technology(s) to manage DBPs.

Columbus DOPW Water Master Plan, Columbus, Ohio
This project involved generating both a Distribution System Master Plan and a Comprehensive Master Plan in which individual Master Plans for DOPW's three existing water plants (WPs) and associated sources were compiled. Extensive population forecasting was completed both inside and outside DOPW's existing service boundary. Population and land-use designations were used to project future water demands at five-year intervals to determine where and when additional drinking water might be needed. A 30-year CIP was developed for source and existing WP facilities, and a potential future fourth WP – and, a 15-year CIP was developed for DOPW's extensive distribution system. Master Plan results were used to help prioritize DOPW's CIP so it could be compared with and integrated with the CIP for the Division of Sewers and Drains (DOSD).

Melissa A. Ingalsbe, PE, PMP

Experience Summary

For more than 20 years, Melissa has served as project manager or project engineer on numerous wastewater engineering design projects in Southern California. As a Project Management Institute-certified Project Management Professional, she offers critical project management skills, oversight, and support in executing and delivering high quality projects. Her technical skills include hydraulic analysis and modeling of wastewater collection systems, master plans and planning studies, and rehabilitation and design of infrastructure projects. Melissa's strengths include managing and coordinating design teams, and monitoring and controlling scope, schedule, and budget on large designs involving multi-discipline engineering coordination for wastewater and water reuse projects. She also has experience with environmental site characterization, remedial alternatives evaluation, and soil and groundwater remediation for commercial and municipal clients.

Assignment

Pilot Testing

Education

M.S., Civil and Environmental Engineering, University of California, Los Angeles, 2004

B.S., Civil and Environmental Engineering, University of Wisconsin, Madison, 1996

Registration

Civil Engineer 68924, California, 2003

Certification

Project Management Professional No. 1750570

Experience

20 years

Joined Firm

2009

Relevant Expertise

- *Water and wastewater treatment plant planning and design*
- *Water and wastewater infrastructure design*
- *Multi-discipline engineering coordination and administration*
- *Hydraulic analysis and modeling*

TOS SN19 DC Tillman Ground Water Replenishment Advanced Water Purification Facility Pilot Project, 2012–2017 On-Call Wastewater Engineering Services, City of Los Angeles, Department of Public Works, Bureau of Engineering, Los Angeles, California

Project Manager. This project involves designing and building an advanced water purification pilot facility to evaluate different purification technologies using treated wastewater from the Donald C. Tillman Water Reclamation Plant. The facility will determine an optimal advanced treatment train to produce purified recycled water from the plant. The ultimate goal is to produce purified water to replenish up to 30,000 acre-feet per year at existing spreading grounds and at new injection wells. The pilot involves testing and evaluation of the performance of full advanced treatment (FAT) train [microfiltration (MF)-reverse osmosis (RO)-ultraviolet (UV)-advanced oxidation processes (AOP)] and alternative direct potable reuse (DPR) treatment trains (biological activated carbon-MF-RO-UV- AOP), as well as pre-qualifying MF membrane technologies for the full-scale system. Melissa is managing all efforts on this project, including development of the pilot test protocol, coordination and engagement of a Technical Advisory Committee, design and installation of the advanced water purification pilot facility, and data evaluation and development of design/operating criteria for the full-scale facility.

Irrigation Controller Effectiveness Pilot Project Design, Irvine Ranch Water District, Irvine, California

Project Manager. Melissa prepared the design of a pilot project to study the effectiveness of a residential irrigation control device. The purpose of the project was to determine if a specific irrigation controller was more effective in saving water and to quantify the water savings.

Hyperion Treatment Plant Ultimate Build-Out of Secondary Treatment System, City of Los Angeles, Department of Public Works, Bureau of Engineering, Los Angeles, California

Senior Engineer. Project involved the restoration of the capacity of the existing secondary system to 450 mgd average dry weather flow at a savings of approximately $50 million. Approach included providing, at build-out or sooner, one plant to simplify plant operations and provide an overall secondary effluent quality of 16 mg/l, or less of total suspended solids. Project required hydraulic modeling of the secondary system to assess ultimate capacity and make recommendations for potential upgrades required at ultimate condition flows. She supported the hydraulic modeling effort, including calibration/validation of the hydraulic model and preparation of a technical memorandum summarizing the hydraulic modeling task.

Ryan Capelle

PE

Permitting and Process Design

Education

- Bachelor of Science, Civil Engineering, University of Minnesota, Minneapolis, Minnesota, 1998
- Master of Science, Infrastructure Systems Engineering, University of Minnesota, Minneapolis, Minnesota, 2002

Registration

- Professional Engineer #43142, State of Minnesota

In his 22 years of providing engineering service, Ryan has developed the ability to effectively manage the design, planning, and implementation of municipal, water treatment, and water supply projects. He has provided service on over 50 water treatment facilities and other water infrastructure projects during his career.

Ryan is the water group leader in Stantec's Minneapolis office. His background includes a Master's degree in Infrastructure Systems Engineering from the University of Minnesota, feasibility studies, funding applications, water treatment facility design, lift stations, wells, development reviews, and street/utility reconstruction. His unique range of project management, design and construction experience has enhanced his ability to provide quality designs that result in successful projects.

Relevant Experience

Interim Water Treatment Facilities, Cottage Grove, Minnesota
In 2017 the City of Cottage Grove was notified by the Minnesota Department of Health that 8 of it's 11 wells were over the newly established health index values for perfluoroalkyl substances (PFAS). The response required the full attention of Stantec's multi-discipline team led by Ryan, working in unison with members from various departments of the City to deliver the project under emergency design/build conditions. The project was successful in delivering safe, compliant drinking water for residents within 84 days and was awarded the American Public Works Association (APWA) Project of the Year Award in 2017.

Stacy Water Treatment Plant, Stacy, Minnesota
Ryan served the City of Stacy as the project manager for a state of the art water treatment facility designed to reduce radium to drinking water standards. Ryan guided the City through the funding process and was able to secure the maximum grant to loan value through the USDA – Rural Development funding program. The project included construction of a new well, demolition of an existing water tower, construction of the new Water Treatment Plant and modifications to the City Hall to attain ADA accessibility and compliance. The project was substantially completed in February 2018 and has successfully passed tests for Radium 226/228 with no detection.

Water Treatment Facility, Granite Falls, Minnesota
During the design for this 0.84 mgd lime softening water treatment facility project, Ryan collaborated with City staff to incorporate their desired process and hydraulic design elements. Ryan worked with the City staff to deliver the construction phase of this project.

Water Treatment Plant Expansion, Inver Grove Heights, Minnesota
The City of Inver Grove Heights chose Stantec to design and provide construction assistance of their 6.02 MGD manganese removal water treatment facility. Expansion adds two backwash tanks, four filter cells and laboratory, as well as additional accommodations for staff needs. Ryan served as the project manager, provided process design, construction management, and contract administration.

Water Treatment Facility, Albany, Minnesota
Ryan was responsible for process design. The Albany Water Treatment facility is designed to remove arsenic, iron and manganese at a peak flow rate of 2.0 million gallons per day (MGD). There is a 200,000 gallon clearwell for water storage built into this treatment plant. Currently, there are two 1,000 gpm pumps that serve the High Zone, and one 1,000 gpm pump to serve the Low Zone. This plant is expandable to a 4.0 MG capacity in the future when necessary.

SW Water Treatment Plant, Sartell, Minnesota
Ryan was responsible for process design of a new 6 MGD conventional gravity filter plant for iron and manganese removal. The plant was designed to be easily expanded to 16 MGD.

Water Treatment Facility, Cokato, Minnesota
Ryan was responsible for performing hydraulic design and writing process specifications. This project consisted of the construction of a new water treatment plant to meet demands for the removal of arsenic, iron, and manganese from the City's groundwater supply. Work included select demolition, excavation, dewatering, backfilling, grading, paving, concrete, masonry, process equipment, well work, interior and underground piping, painting, HVAC, plumbing, electrical, and correlated items.

Water Treatment Facility Expansion, Maple Grove, Minnesota
Ryan was assisted with layout and hydraulic design and writing process specifications. Stantec provided comprehensive design services for the 15 mgd expansion to this 15 mgd iron and manganese removal plant, originally designed by Stantec. The project included the design of a new SCADA system incorporating the water system and 15 sanitary and storm lift stations.

BOB PEPLIN

PE, BCEE, Client Service Manager, Water/Wastewater

Mr. Bob Peplin has experience in analysis and design of municipal water and industrial treatment facilities. His design experience includes design development, progress layouts, preparation of contract documents, and construction management.

YEARS

» 36 Years Industry Experience

EDUCATION

» MBA, University of St. Thomas
» MS, Environmental Engineering, Florida Institute of Technology
» BS, Biological Sciences, University of Minnesota

AREAS OF EXPERTISE

» Water/Wastewater/Water Reuse/ Renewable Energy
» Design/Development of water and wastewater municipal, industrial treatment and renewable energy facilities
» Contract document preparation/

LICENSES AND CERTIFICATIONS

» Professional Environmental Engineer: MN, SD, ND, IA, WI
» Board Certified, American Academy of Environmental Engineers (MN Section liaison chair)

PROJECT EXPERIENCE

Water Treatment Expansion—City of Brooklyn Park, MN
For the City of Brooklyn Park water treatment facility. Mr. Peplin, as project manager and process engineer for a 10-mgd water treatment plant expansion (iron and manganese removal) that included a pilot studied direct solids contact and absorption clarification preceding filtration. Developing the process design of treating both Drift and Franconia Ironton Galesville (FIG) raw water qualities. He also coordinated the project team through the development of the multiple construction documents for an alternate construction delivery approach through a construction manager.

City of St Cloud, MN – Water Treatment Facility – Mr. Peplin served as project manager and process engineer for the expansion from 8 MGD to 24-mgd lime softening water treatment plant expansion. In the preliminary design phase this included the development of pilot facilities to determine the effectiveness of coagulant effectiveness for taste and odor compound removals followed by lime softening. This facility, constructed beneath the City park along the Mississippi, receives surface water that varies in water quality throughout the year. Developing the construction documents to phase in the treatment improvements required thorough coordination.

» Designed activated carbon, lime, carbon, dioxide, potassium permanganate, aluminum sulfate, fluoride, polymer, and polyphosphate systems.
  » Coordinated sludge piping/ process management with solids dewatering alternatives for the plate and frame system.
  » Coordinated all of the civil, architectural, process, mechanical, structural, electrical, and instrumentation issues with city staff.
  » Oversaw all of the construction management duties between the contractor(s) and city staff.

City of Minneapolis, Minnesota Water Treatment Plant. Mr. Peplin was project engineer for the treatment/process feasibility study with other participants/owner to determine membrane treatment effectiveness preceding the selection of the membrane technology implemented at the Columbia Heights water treatment plant. Provided engineering assistance in the development of the ultra-filtration pilot test equipment.

Sambatek

Heidi Peper

Funding

Education

- Bachelor of Arts, Saint Cloud State University, Saint Cloud, Minnesota, 1995
- The National Development Council
  -Economic Development Finance
  -Business Credit Analysis
  -Real Estate Finance

Memberships

- Board of Directors (2007-2016), 2015 President, Economic Development Association of Minnesota
- Stearns – Benton Workforce Investment Board (2011-present), 2016-17 Chair

With more than 20 years of experience in community and economic development, Heidi has worked on solving complex funding problems on numerous significant projects, ranging from pedestrian trails to highways, wastewater to drinking water projects, essentially most any community infrastructure project imaginable. She leads a coordinated effort between finding and securing funding, building strong relationships, and identifying opportunities to provide greater value to clients.

Throughout her career, Heidi has successfully secured more than $175M in grants for clients' projects. Her proven experience in project development, securing affordable financing packages – including grants, legislative appropriations, and other financial incentive programs – has been a valuable resource in moving projects to a successful conclusion.

Relevant Experience

Public Facilities Authority State Revolving Loan Funds*
$82.1 M total grants and low-interest loans
Lester Prairie – Richmond – Montevideo – Sauk Centre – Renville – Browntown – Belgrade (2) – Pelican Rapids – North Long Lake Sanitary District – Akeley – Detroit Lakes – Clearwater – Ironton – Winsted – Princeton – Lester Prairie – Rush City – Pierz

Clean Water Legacy*
$15.2 M total grants
North Long Lake – Renville – Princeton (2) – Detroit Lakes – Lester Prairie

Davis-Bacon and Related Acts Administration*
Once funding is secured, Heidi is well-versed in the requirements of the funding sources and can assist with compliance, such as prevailing wages.
Labor Standards Officer providing compliance with funding source requirements. Heidi oversaw compliance with Davis Bacon (prevailing wage) and related acts and Minnesota Prevailing Wage on many multi-million-dollar construction projects:
Detroit Lakes Public Utilities Commission - Holdingford – Freeport – Montevideo – Richmond – Elk River – Pelican Rapids – Renville – Princeton – Rush City – Pine City – Spicer

Minnesota Capital Bonding Bill*
$15. 2 M total grants
Baxter – Glencoe – ROCORI Trail – Cambridge – Maplewood

Community Development Block Grant Program*
$6.9 M total grants
Akeley – Cold Spring – Sauk Rapids (2) – Freeport – Spicer – Richmond (2) – Lester Prairie – South Haven – St. Joseph – Onamia – Emily – Belgrade – Howard Lake

USDA Rural Development – Rural Utility Services*
$41.3 M total grants and low-interest loans
Ogilvie – Richmond – Pine City – Freeport – Holdingford – Princeton – Kimball – Belgrade – Onamia

Minnesota Legacy Trails Grant Program*
$1.8 M total grants
ROCORI Trail – Prairie Line Trail Phase II – La Prairie Connection Trail – Swedish Immigrant Trail

Business Development Public Infrastructure Grant Program*
$3.6 M total grants
Pelican Rapids – St. Joseph – Rockville – Freeport – Hanover – Richmond – Cambridge

Minnesota Redevelopment Grant Program*
$2.6 M total grants
Tower – Virginia – Waite Park

Mn/DOT Transportation Alternatives (TA, formerly SAFETEA-LU)*
$2.6 M total grants
ROCORI Trail (2) – River Country Bike Trail – Gaylord Trail Phase II – Lakeshore HWY 77 Trail
Safe Routes to School – $1.9 M total grants
Royalton – Pierz – Richmond – Rogers

Transportation & Economic Development Grants*
$12.0 M total grants
St. Cloud – Windom – Benton County

* denotes projects completed with other firms

Cynthia J. Hoffman P.E.

Contact Information

Cynthia J. Hoffman
4207 Lyndale Ave. South
Minneapolis, MN 55409
952-838-5578
cjhoffman@pro-ops.net

Education

- University of Michigan, Ann Arbor, B.S. Environmental Engineering, 1977

Registration/Certifications

- Professional Engineer, Texas (1986)
- Licensed Wastewater Treatment Operator, State of California (expired)

Memberships

- Water Environment Federation
- American Water Works Association

Years of Experience

- 40 yrs. in Environmental Engineering consulting

Experience Summary

Ms. Hoffman has over forty years of professional experience in environmental engineering, with emphasis in water and wastewater facilities management, design, construction, startup, training, and operation. She has an extensive background in water and wastewater treatment plant asset management systems, information data management systems, document management systems, facility operations, plant startup and commissioning, overall operations troubleshooting, construction management, and operations process troubleshooting and enhancement.

She also has extensive experience with helping utilities operate better by using techniques in business process improvement, workflow analysis, efficiency improvement, and work process reengineering and improvement.

PROJECTS

Sustainable Water Sector Capacity Development in Albania, (US AID Project) *Training and Certification Expert.* Developed curriculum of training materials which will be used to both qualify candidates for test-based operator certification, and to support certified operators and skilled technicians in the field to continuously upgrade their skills in the water supply and sewerage sector for Albania and the Western Balkans. Developed the structure for test-based certification of water supply and sewerage system operators, where such certification would be a pre-condition of employment in the sector. Working with ABC to develop Certification test questions for all levels of Operators through Managers for the water supply and sewerage sector.

New Earth Grand Parkway Recyling and Composting Facility, Brookshire, TX. *Sub-Consultant to Risa Weinberger & Assoc. – Project Engineer.* Provided design and permitting suport for a new composting facility. Designed a 100 yr.stormwater retention pond and collection lagoon. Wrote the Storm Water Pollution Prevention Plan and Spill Prevention, Control and Countermeasure Plan.

Tarrant Regional Water District Integrated Pipeline (IPL) Project, Fort Worth, TX. *Sub-Consultant to SAIC - Project Manager.* Assisted the Tarrant Regional Water District (TRWD) with design operational reviews, operations design considerations, staff interviews, and ongoing SOP development for its Integrated Pipeline project. The pipeline will run from Lake Palestine to Lake Benbrook, with connections to Cedar Creek and Richland-Chambers Reservoirs. It will also integrate TRWD's existing pipelines to the Dallas system to provide up to an additional 350 million gallons per day (MGD) of raw water to North Central Texas. TRWD and Dallas Water Utilities currently serve over four million people in the DFW area. Once this vital project is completed, it will allow the agencies to serve an additional 1.5 million people and contribute to the continued economic growth of the region.

RHONDA E. HARRIS, P.Eng, PMP, F. WEF, MIAM

QUALIFICATIONS

M.B.A., Business Administration, Southern Methodist University, Dallas, Texas, 1989

B.S., Civil Engineering, University of Texas at Arlington, 1984

Diploma, Asset Management, IAM 2017

CAPABILITY SUMMARY

Rhonda has more than 40 years of experience in managing and administering a variety of facilities and programs in the water environment sector. Her experience includes developing and implementing training programs for public and private sector personnel, developing regulations for the U.S. Environmental Protection Agency (U.S. EPA), as well as knowledge management and management consulting, condition assessments, business practice evaluations, asset management and life cycle costing, engineering design, construction and O&M renewals and operations for facilities and systems. She is a certified Texas Water and Wastewater Operator and approved Operations Trainer, as well as a licensed Wastewater Operator in Ontario, Canada. She is also a registered Texas Professional Engineer in Texas, a P. Eng, in Ontario, Canada, a Certified Project Management Professional (PMP) and holds a Diploma in Asset Management from the Institute of Asset Management (IAM). Ms. Harris is a leader in asset management and O&M issues, working for change and improvement in the global environment.

RECENT & RELEVANT PROJECTS

Owner's Advisory Services - Operations and Maintenance Review for Design-Build-Operate Project - MHAFB Water Treatment Facilities for the State of Idaho IWRB

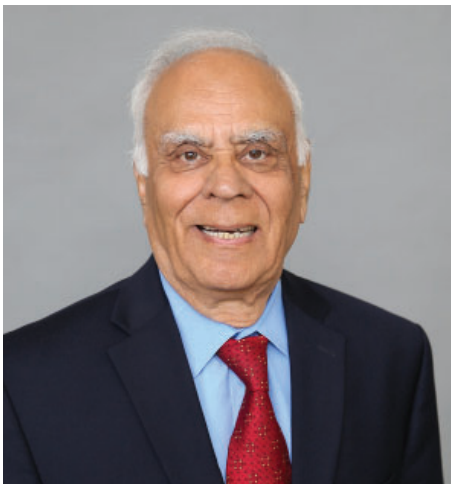
Rhonda provided owner's advisory services for review of the operations and maintenance component for a Design-Build-Operate (DBO) project for a new Water Treatment Pump Station, Pipeline and Treatment facility for the Mountain Home Air Force Base (MHAFB) located south of Boise, Idaho. The project was owned and coordinated by the Idaho Water Resources Board (IWRB) and included 15 miles of raw water transmission main connecting surface water from the Snake River via a Pump Station to new Water Treatment facilities located onsite at the MHAFB. This operations and maintenance review was critical to be sure that all proponents on the project had consistent, coherent, standardized information for their use in the bidding and construction of these assets.

Metro Vancouver Operations and Maintenance Training Assistance Project (TTAP) – The Greater Vancouver Regional District (Metro Vancouver) in Vancouver, British Columbia, Canada.

Rhonda was the Technical Lead for Operations and Quality Control for the $12 million Technical Training and Procedures Program - TTAP program. This ongoing program is a development, delivery and support program for Metro Vancouver, serving 22 municipalities and 1 district for provision of drinking water and treatment of wastewater. Responsibilities included management and development of a comprehensive Training Development Plan and Schedule, development and implementation of specific training curricula for each of the six division in the O&M Department – Maintenance, Water Treatment and Systems Control, Utility Systems, Wastewater Treatment, Quality Control and Watershed Management, ongoing QA/QC of the technical and management aspects of the program, development of a Train the Trainer process and ongoing support for the process.

NAEEM QURESHI

PE, Client Service Manager, Water



Mr. Qureshi is one of the most published authors in Minnesota having 25 articles in regional publications including the Journal AWWA, and Opflow AWWA publications. He has presented over 100 water topics in regional conferences including the AWWA.
Mr. Qureshi has over 50 years of experience in pilot studies, water treatment plant design, well, storage, booster station, water distribution analysis and design, water quality, and water rate studies. He has worked on over 200 projects in the water supply area. Projects include water quality, WTP design, water system analysis, operational review of water plants, storage, pumping stations, and well design.

YEARS

» 50 Years Industry Experience

EDUCATION

» Master of Science in Civil Engineering, University of Minnesota, 1985
» Bachelor of Science in Civil Engineering, 1966

LICENSURE

» Professional Engineer: MN, WI

PROFESSIONAL ORGANIZATIONS

» Member - American Water Works Association (AWWA)
» Past Member - Coagulation and Filtration Committee, AWWA, involved in publication of "Precoat Filtration" and "Operational Control of Coagulation and Filtration Process" Manuals
» Member - Program and Education Committee AWWA, MN Section

AWARDS

» L.N. Thompson Award, Minnesota Section AWWA, September 2008
» Gimmick and Gadget Award, Minnesota Section AWWA, 1996

PROJECT EXPERIENCE

Pilot Plant Studies

» City of Anoka, MN
» City of Blaine, MN - Plant 1, Plant 2, Plant 3
» City of Brooklyn Park, MN
» City of Champlin, MN
» City of Cloquet, MN
» City of Edina, MN
» City of Isanti, MN
» City of Lakeville, MN
» New Ulm Public Utilities, New Ulm, MN
» City of Robbinsdale, MN
» Upper Sioux Indian Reservation

Water Treatment Plant Design

» PFC Removal Plant - 2,100 gpm, Oakdale, MN
» WTP No. 4, 2,000 gpm, Anoka, MN
» WTP No. 6, 1,500 gpm, Anoka, MN
» WTP No. 1, 2,000 gpm, Blaine, MN
» WTP No. 2, 5,500 gpm, Blaine, MN
» WTP No. 3, 2,000 gpm, Blaine, MN
» WTP Expansion, 7,000 gpm, Brooklyn Park, MN
» Regent Ave. Plant Improvements, 7,000 gpm, Brooklyn Park, MN
» WTP, 1,500 gpm, Circle Pines, MN
» Reconstruction Filter, Columbia Heights, MN
» Wooddale WTP, 1,000 gpm, Edina, MN
» WTP No. 2, No. 3, and No. 4, 2,000 gpm each, Edina, MN
» Reconstruct Filters, Cost: $1.0 Million, 120 MGD, Fridley, MN
» Filtration Plant Improvements, Cost $0.2 Million, Fridley, MN
» WTP No. 1, 900 gpm, Goodview, MN
» WTP No. 2, 700 gpm, Goodview, MN
» Preliminary Design, CIP, Hopkins, MN
» WTP Design, 2,850 gpm, Isanti, MN
» WTP, 7,000 gpm, Lakeville, MN
» Lagoon Overflow Treatment, 1,200 gpm, Minneapolis, MN
» WTP No. 1, 700 gpm, Princeton, MN
» WTP No. 1 & No. 2, 2,000 gpm each, Robbinsdale, MN
» WTP No. 3, 1,000 gpm, Robbinsdale, MN
» Lime Softening Plant, 500 gpm, Staples, MN
» WTP No. 4 & Vinyl Chloride, St. Louis Park, MN
» WTP No. 8, St. Louis Park, MN
» WTP No. 16, 1,600 gpm, St. Louis Park, MN
» WTP at Federal Correctional Institution, 500 gpm, Sandstone, MN

Water Treatment Plant (WTP) Feasibility Studies

» City of Edina, MN
» City of Hermantown, MN
» City of Inver Grove Heights, MN
» City of Milaca, MN
» City of Redwood Falls, MN
» City of Staples, MN
» City of Winona, MN
» 3M Company, Cordova, IL

Sambatek

Experience Summary

Ms. Kennedy specializes in asset management services. She has assisted clients with the development of asset management programs that include initiatives such as service levels, performance management, business case evaluations, CMMS development, and maintenance management. Ms. Kennedy has been responsible for leading teams with developing and implementing best practices for inventory management.

Assignment

Asset Management

Education

B.S., Earth Science/Geoscience, Pennsylvania State University 1992

Experience

25 years

Joined Firm

2013

Licenses/Certifications

Professional Water Asset Manager (PWAM)

Associate Water Asset Manager (AWAM)

Training

Certified Training in Asset Management (CTAM 100-400)

Analysis and Design of Aquifer Tests Including Slug Tests and Fracture Flow

Relevant Expertise

- *Asset Management*
- *Performance Management*
- *Business Case Evaluation*
- *Hydrogeology*

Plant Asset Management Services, Metropolitan St. Louis Sewer District, St. Louis, Missouri

Project Manager responsible for completion of multi-phase project including evaluation of 6 WWTPs and 250 pump stations. Activities include multi-site evaluations; setting management expectations for the overall project and asset management strategy, plan, and program development. Project components include a gap analysis, asset management planning (both strategic and tactical), and standards development, assigning priority criteria to assets for CIP planning, development of maintenance strategies, and asset hierarchy review and alignment with the asset management program objectives.

Comprehensive Asset Management Plan, Greater Cincinnati Water Works, Ohio

Task Lead for developing consequence of failure (COF) approach for discrete assets. Led workshops to assist GCWW with defining asset COF and developed scoring methodology. Prepared overall asset management guidelines document and authored pilot condition assessment results technical memorandum.

Risk Based Asset Management Project, Green Bay MSD, Wisconsin

Task Lead for supporting an ongoing risk-based asset management gap analysis, strategy development, and implementation project for GBMSD. Direct responsibilities include facility condition and risk assessment, capital planning, CMMS/GIS and data enhancements, and service level development.

Collins Park WTP Facilities Assessment, City of Toledo, Ohio

Task Lead responsible for facilitating a workshop to establish physical and performance condition assessment and asset criticality criteria for the City's Collins Park WTP vertical assets. Presented the key asset management ideas to the client's staff, reviewed candidate asset condition and criticality criteria, established criticality scoring, and finalized the approach to be used across the asset base.

Asset Management Program, City of Columbus, Ohio

Local Task Lead as part of a consulting team providing support for a comprehensive asset management program for CDPUs water, wastewater, and electric utility assets. The project includes a comprehensive needs assessment, gap analysis, and strategy development. Other tasks include development of a capital project business case methodology incorporating triple bottom line analysis, staff training, and service level development.

Operations and Maintenance Asset Data Collection, Metropolitan Council Environmental Services, St. Paul, Minnesota

Technical Lead for developing an approach to collect asset data to update the CMMS and develop preventative maintenance work order templates for the MCES Blue Lake WWTP. The asset database had not been updated in several years following various CIP projects and work order management could not be effectively employed from the incomplete asset inventory. Developed field inventory plan for implementation and provided assistance throughout the development of the PM work orders.

Phil Caswell

PE

Structural Oversight

Education

- Bachelor of Civil Engineering, University of Minnesota, St. Paul, Minnesota, 1983

Registration

- Professional Engineer #19204, State of Minnesota

Phil joined Stantec in 1984 and currently serves as Structural Team Leader in our Minneapolis office. Phil's responsibilities include staff management, structural design, specification preparation, and quality assurance. His experience includes structural design and construction of a wide variety of project types, including dams, pumping stations, water and wastewater treatment facilities, flood control projects, new buildings, tanks and structures, structural condition assessments, building and tank repair, renovations and demolition. Phil also has extensive experience with civil and site-related projects such as retaining walls, hydraulic inlets and outlets, buried utility vaults and concrete pavements.

Relevant Experience

Water Treatment Facility No. 3, Wayzata, Minnesota
Phil assisted with the concept and detailed structural design, and provided quality control for the structural plans, specifications and construction phase services for this project. This project involved the design and construction of a new 3 MGD conventional gravity filter plant for iron and manganese removal.

Water Treatment Plant, Hastings, Minnesota
Phil assisted with the concept and detailed structural design, and provided quality control for the structural plans, specifications and construction phase services for this project. Stantec constructed a nitrate removal ion exchange facility directly adjacent to an existing well.

Water Treatment Plant Expansion, Eveleth, Minnesota
As structural engineer of record, Phil provided preliminary structural design, QA/QC review of structural plans and specifications, and construction services. The surface water treatment plant was renovated for turbidity and total organic carbons.

Water Treatment Plant Expansion, Inver Grove Heights, Minnesota
Phil designed both the original gravity filter water treatment plant and its recent expansion that doubled the facility's capacity. As structural engineer of record, Phil provided structural design, QA/QC review of structural plans and specifications and construction services. Stantec designed the original 6.02 MGD facility in 1999 to economically accommodate expansion that would double the plant's total capacity.

SW Water Treatment Plant, Sartell, Minnesota
Phil assisted with the concept and detailed structural design, and provided quality control for the structural plans, specifications and construction phase services for this project. This project involved the design and construction of a new 6 MGD conventional gravity filter plant for iron and manganese removal. The plant was designed to be easily expanded to 16 MGD.

Additional Water Treatment Plant Experience
- Chaska, Minnesota
- Virginia, Minnesota
- Eagan, Minnesota
- South Bend, Indiana
- Granite Falls, Minnesota
- Harris, Minnesota
- Marshfield, Wisconsin
- Medina, Minnesota
- Hector, Minnesota
- Plymouth, Minnesota

Daniel E. Poppler, P.E.

Associate

Buildings Consulting Group, Inc.

EDUCATION University of Minnesota, Bachelor of Civil Engineering

REGISTRATION Professional Engineer in Minnesota
Minnesota P.E. Registration: 41273

EXPERIENCE Dan is an Associate Principal with Buildings Consulting Group, Inc. with over 22 years of experience in condition study, forensic evaluation, structural and renovation design, and construction management.

PROFESSIONAL AFFILIATIONS American Concrete Institute MN Chapter

SELECTED PROJECT EXPERIENCE

WATER TREATMENT-WASTEWATER STRUCTURAL EVALUATIONS AND DESIGN

1. **Burnsville Water Treatment Reclaim Tank and Tunnel Evaluation,** Burnsville, Minnesota (2017)
   Serving as a structural engineering sub-consultant to Black and Veatch, Buildings Consulting Group, Inc. completed an evaluation of the concrete reclaim tank and tunnel systems. Our assessment consisted of performing a visual and sounding survey of the existing structural systems to identify locations of distress and recommendations for repairs. Dan served as the Project Structural Engineer for the review of the existing structural components and to determine improvement/repair needs. The evaluation was completed in 2017.

2. **McCarrons Water Treatment Plant,** St. Paul, Minnesota(2016 to 2017)
   Serving as a structural engineering sub-consultant to Black and Veatch, Buildings Consulting Group, Inc. completed the design of the structural systems in support of electrical and switchgear improvements. Dan served as the Project Structural Engineer for the structural design of the cast-in-place vaults, foundations, and masonry openings.

3. **Victoria/St. Bonifacious Lift Station/Interceptor Improvements,** Victoria and St. Bonifacious, Minnesota – (2007 to 2012)
   Buildings Consulting Group, Inc. served as a structural engineering sub-consultant to Brown and Caldwell. The Victoria and St. Bonifacious interceptor improvement project included installing a new forcemain extension, lift stations, and odor control buildings. The Smithtown improvement project included designing new transition structures, culverts, and retaining walls supported on piling. Dan served as the Project Structural Engineer for the structural design of the project.

4. **Powerhouse Building Tunnel and Foundation Wall Rehabilitation** – St. Paul, Minnesota (2013)
   Serving as the prime consultant for the State of Minnesota, Buildings Consulting Group, Inc. completed a review and analysis of the existing brick tunnel and stone foundation wall. Our review included performing site observations, structural design of tunnel replacement slab sections, and waterproofing design of tunnel and foundation wall systems. Dan served as the Project Engineer.

5. **MCES L-34 Lift Station Evaluation and Design,** Coon Rapids, Minnesota – (2015-Present)
   Buildings Consulting Group, Inc. served as a structural engineering sub-consultant to Foth. The MCES L-34 Lift Station is an active lift station with dry and wet wells. Buildings Consulting Group, Inc. performed a structural review and evaluation of the existing structural components including concrete structural systems, masonry systems, and metal stair systems to determine repairs that were required. Our review and observations were compiled in a facility condition assessment report. Dan served as the Project Structural Engineer for the structural portion of the project.

Mark Rolfs

PE

Hydraulics Oversight

Education

- Bachelor of Science, Civil Engineering, Iowa State University, Ames, Iowa, 1980

Registration

- Professional Engineer #16722, State of Minnesota

With 38 years of experience at Stantec, Mark is a leader in Stantec's water/wastewater group in Minneapolis. Mark's primary responsibilities include engineering for both water and wastewater. For water systems, he is proficient in hydraulic modeling analysis, well pumphouses, water booster pumping stations, water storage reservoirs, and water treatment plant high service pump design. He is skilled at using multiple software's to perform computer hydraulic analyses for water distribution systems, water treatment plants, and pumphouse designs. For wastewater, his primary focus is on the hydraulic performance of sanitary sewer lift stations and wastewater plant pump flows.

Relevant Experience

Water Supply and Distribution Plan, Chaska, Minnesota
Mark has been the primary modeler for the City of Chaska's water system model for the past 23 years. He has used his modeling expertise on many occasions to analyze changes to the distribution system. Most recently, the routing of the new Highway 212 section through Chaska caused significant alterations to Chaska's trunk water system.

Pump Station No. 4, Minneapolis, Minnesota
Mark was responsible for the hydraulic and mechanical design for all of the new pumps in this facility. The project involved renovating a 100-year-old, 70 mgd, 6,500 horsepower facility. Due to its age, numerous building and infrastructure conditions were disclosed that required re-engineering to sustain long-term remedies for the client.

Water Supply and Distribution Plan, Carver, Minnesota
Mark was project manager. He managed the hydraulic analysis and reports, and was responsible for the final review. Carver has experienced rapid growth and water needs will continue to increase as the City builds to an estimated 19,560 by 2030. This report designed a water system capable of serving the growing population. The major challenge was to lay out a system that could accommodate the projected 2030 maximum day water demand of 7.45 MGD.

Comprehensive Water Plans, General
Mark's career has included water system modeling and planning for many communities around the metro area. He is very familiar with the specifics of the metro area in terms of supply, storage and distribution system requirements. During the 1980's and 1990's Mark completed comprehensive water system modeling for many of the fastest growing metro area communities including Eagan, Apple Valley, Woodbury, Cottage Grove, Maple Grove and Plymouth. His involvement with these rapidly expanding systems gave him unique insights into the growth challenges for these communities from a water system standpoint.

Water Treatment Facilities – Hydraulics and High Service Pumping Design
One of the most experienced water system engineers in Minnesota, Mark has assisted with WTP designs in many metro area communities in the role of Hydraulic expertise. In order to fully understand the interaction of the WTP with the distribution system it is necessary to combine a detailed model of the high service pump system with the distribution system model for the entire community. Mark has specialized this process in the High Service Pump design for several communities in the metro area including Eagan, Apple Valley, Plymouth, Maple Grove, Carver, and Chaska. The combination of the two models has resulted in the successful hydraulic design of these WTPs.

Chuck Oehrlein

Electrical Oversight

Education

- Associate Degree, Electrical, Dunwoody College, Minneapolis, Minnesota, 1986
- Associate Degree, Computer Information Systems, Dunwoody College, Minneapolis, Minnesota, 1984

Registrations

- Certified Engineering Technologist / Technician, National Institute for Certification in Engineering Technologies

Chuck has been with Stantec since 1987 serving as an Electrical Engineering Technician, Project Manager, and leader of the Minneapolis Building Services Team. His primary responsibilities include project management, electrical and control design, writing specifications, and electrical construction administration. Primarily Chuck designs electrical and control systems for water and wastewater facilities and related generator design, and Supervisory Control and Data Acquisition (SCADA) Systems. Chuck also has over 30 years of experience with lighting design, conducting energy audits, and designing security card access, CCTV systems and fire protection systems.

Relevant Experience

Southwest Water Treatment Plant and Generator Design, Sartell, Minnesota
As project manager, Chuck was responsible for the design and electrical construction engineering services of the power distribution, SCADA (including radio telemetry to remote sites), standby generator, lighting, fire alarm, and security systems. Chuck also designed a portable generator set and "generator ready connections" for the City's pump houses, lift stations, and East Water Treatment Facility.

Lime Softening Water Treatment Projects, Richfield, Minnesota
Chuck was responsible for electrical and control portions of multiple projects for the lime softening at water treatment facility and related wells, towers, and lift stations to remove existing controls, filter equipment, chemical feed equipment, lighting, security systems, CCTV systems, and electrical equipment and replace with new. The demolition of the existing systems and installation of the new system occurred while all facilities were in use.

Lime Softening Water Treatment Plant Upgrade(s), Wisconsin Rapids, Wisconsin
Chuck was responsible for the electrical and control portions of multiple projects for the lime softening at the water treatment facility and related wells and towers. The projects involved complete new water plant controls, modifications of existing telemetry systems to the wells and water towers, a new standby diesel engine generator, and a complete lighting retrofit for the water plant.

Lime Softening Water Treatment Plant Upgrade(s), Little Falls, Minnesota
Chuck was responsible for electrical and control portions of multiple projects for the lime softening at water treatment facility and related wells and towers. The projects replaced all chemical feed equipment including all equipment related to lime handling and feeding. The water plant control system was upgraded from an antiquated analog control system to an upto-date digital SCADA system. In addition to controls upgrades, Chuck was also responsible for the design of a new standby diesel engine generator and a complete lighting retrofit.

Lime Softening Water Treatment Plant, Granite Falls, Minnesota
Chuck performed the electrical portions of the preliminary design study and assisted in the electrical and control design for this 1.0MGD lime softening water treatment facility. Chuck was also responsible for the construction engineering services related to electrical and controls.

Water Treatment Plant No. 3, Wayzata, Minnesota
As project manager, Chuck was responsible for the design and electrical construction engineering services of the power distribution, SCADA (including radio telemetry to remote sites), standby generator, lighting, fire alarm, and security systems for this new water treatment facility.

Water Treatment Facility Expansion/Garage/Vehicle Wash Bay–Apple Valley, Minnesota
Chuck was responsible for the electrical and control design and construction engineering for this 6.5 million gallon per day expansion of the existing treatment facility. The project also included a 12,000 square foot garage / shop expansion to the water plant and a vehicle wash bay addition to the adjacent Central Maintenance Facility. The electrical design included a new 2500 amp electric service, renovation and relocation of the existing 1250 KW generator, all new 480 volt power distribution, interior and exterior lighting, and card access, fire alarm, and security systems. The design also included a complete new water plant control system.

Water Treatment Plant, Stacy, Minnesota
As project manager, Chuck was responsible for the design and electrical construction engineering services of the power distribution, SCADA (including radio telemetry to remote sites), standby generator, lighting, fire alarm, and security systems for this new water treatment facility.

Ronald C. Armstrong, PE

Experience Summary

Ron Armstrong brings more than 29 years of experience as a lead or design electrical engineer on a variety of projects at water treatment, wastewater treatment, power generation, industrial, and utility facilities. His responsibilities have included design of low and medium voltage power distribution systems, and specification of motor drives and controllers, diesel generators, transformers, paralleling switchgear, and electrical materials. Ron has also designed protective and control schemes for substations, performed arc flash analysis, protective device coordination and short circuit studies; designed underground electrical distribution systems; designed process control systems; and written process control narratives.

Assignment

Electrical and I&C

Education

Bachelor of Science, Electrical Engineering, Clarkson University, 1988

Registration

Minnesota, No. 26973 (1999)

Experience

29 years

Joined Firm

2007

Baldwin Residuals & Fairmount Reservoir Decommissioning, Baldwin WTP, City of Cleveland Division of Water, Ohio

Lead Electrical Engineer. Responsibilities include designing modifications to existing motor control centers at pump stations, designing motor control schematics, and coordinating electrical equipment with the instrumentation and control systems. Equipment specified for this project included variable frequency drives, motor control centers and medium voltage transformers. CWD's standard specifications were used. Provided construction services including submittal review and responses to RFIs. Provided oversight and review of arc flash study performed by this firm.

American Cyanamid Superfund Site Groundwater Treatment Facility and Conveyance System Design, Pfizer, Bridgewater, New Jersey

Electrical Design Lead. Electrical design for the groundwater extraction, conveyance, and discharge system as well as the site-wide groundwater treatment facility (GWTF). Design included standby generators for GWTF and EQ Basin; electrical distribution to multiple extraction wells, equipment platforms and valve/meter enclosures; coordination with control systems including adding a site wide fiber optic network; and interfacing with existing plant electrical distribution system. The conveyance system was designed to minimize disruptions to electrical and control systems located in a 500-year flood plain. Project is currently under construction.

Chaska L-71 Lift Station Replacement, Metropolitan Council Environmental Services, St. Paul, Minnesota

Electrical Design Lead. The replacement of a 13 MGD lift station, which included a new facility containing six constant speed pumps, grinders, an odor control system, a chemical feed system, and ancillary equipment. Design included a standby diesel generator, reduced voltage motor starting and provisions for future upgrades to facility.

Oakwood Beach WWTP, New York City Department of Environmental Protection, New York

Electrical Engineer. Wrote technical memo for replacement of six 200 HP main sewage pumps, motors and controls. Evaluated technologies for pump speed control and made recommendations for Headworks improvement project.

Woodbury L73 Lift Station Access Improvements, Metropolitan Council Environmental Services, St. Paul, Minnesota

Electrical Design Lead. The project included the design of electrical and control systems for new structures and stairwells for improved access to the MCES L73 Lift Station. Electrical design included lighting controls for hazardous classified areas with interfacing with HVAC controls. Project is currently in construction at a value of $3 million.

John Abrera, PE, ENV SP

Experience Summary

John has 34 years of experience specializing in the application of Information Technology (IT) for utilities and local governments. He is currently supporting IT projects utilizing new technologies in data platform, predictive analytics, machine-to-machine (M2M), and internet-of-things (IoT) and their application to utilities and local governments. John works in BC's Utility Performance Group as the Smart Utility Application Leader, where his focus is on the application of smart sensor and data platforms to solve specific problems for utilities. He has worked on vital operation systems for water utilities, including LIMS, GIS, Customer Billing Systems, IVR, SCADA, FIS, HRIS, ERP, and EAM systems.

Assignment

I&C Integration

Education

B.S., Biomedical Engineering, University of Southern California, 1984

Registration

Professional Engineer 0039707, Georgia, 2018

Professional Engineer 040698, Colorado, 2019

Certified Maintenance Reliability Professional

Instatute for Sustainable Infrastructure, ENV SP

Water Treatment Operator, Grade 3, CA

Collection System Operator, Grade 2, CA

Environmental Compliance inspector, Grade 3, CA

Experience

34 years

Joined Firm

2018

Relevant Expertise

- *Utility IT and Asset Management*
- *SCADA Management*
- *ERP selection and deployment*
- *Enterprise asset management (EAM/CMMS) system architecture and implementation*
- *Utility Operations*
- *Data Management platforms*
- *Water/Wastewater Quality/Compliance Systems*

Maximo Upgrade Project Phase 1, Department of Watershed Management, City of Atlanta, Georgia

Task Manager. John was the task manager for the Maximo system upgrade projects including mobile solutions. The project involved the consolidation of three instances of Maximo (6.2.1, 6.2.3 and 7.1) used at six treatment facilities, into a single instance of Maximo (7.1.1.3). The primary area of focus was overall project guidance, server, and network. The project also increased integrity of the water distribution system data. This data is being used for required criticality and hydraulic modeling for development of the Capital Improvement Plan.

Water Distribution Network Data Validation, Department of Watershed Management, City of Atlanta, Georgia

Project Manager. This project included deployment of Predictive Analytics Data Platform with dashboards in sewer flow and level, spills and project data (Phase 1 – completed) and CIP project tracking, customer service, Water Distribution and Sewer Capacity Certification (Phase 2 – completed). Phase 3 of real-time predictive data platforms have been done in conjunction with the City and are ARC GIS-based. As project manager, John was responsible for the validation of water distribution network pipe attributes and the addition of missing pipe attribute information.

Smart Sensor Monitoring, City of Memphis, Industrial Monitoring and Pretreatment Program, Tennessee

Project Manager. Project included specification, configuration and deployment of smart sensors for in-sewer monitoring of pH and level for five industrial dischargers. This project includes the development of a dashboard to allow for this remote monitoring and reporting.

Asset Management Projects, Department of Watershed Management, City of Atlanta, Georgia

Project Manager. Linear Asset Inventory and Workflows project, increasing integrity of the water distribution system data. This data is being used for required criticality and hydraulic modeling for development of the Capital Improvement Plan. In addition, Project Manager for Maximo system upgrade projects including mobile solutions.

CIS, FIS, and HRIS System Replacement, Sweetwater Authority, Chula Vista, California

Project Director. Selection, procurement support, and project management services for the replacement of CIS, FIS, and HRIS systems for this water utility. Responsible for generation of requirements, generation of RFQ, RFQ evaluation and short-list, generation of RFP, selection evaluation/methodology/ranking, system demos, procurement support and oversight of Project Manager.

Jason Bordewyk

PE

Construction Services

Education

- Bachelor of Science, Environmental Engineering, Michigan Technological University, Houghton, Michigan, 2001

Registration

- Professional Engineer #38753-6, State of Wisconsin
- Professional Engineer #46972, State of Minnesota

Jason has more than 17 years of experience with water system planning, construction engineering, and design of water and wastewater related projects. His design and construction experience include varying project types across the region including: wells, water treatment, water towers, water distribution, sewer interceptors, and lift stations. Jason has experience in all phases of water treatment implementation including preparation of Construction Documents, conducting construction site inspection and providing Contract Administration services. He is familiar with State and MDH requirements. Jason recently completed resident construction services for a radium removal treatment plant and assisted with construction oversight of the fast-track installation of a treatment plant for Cottage Grove MN to address PFAS contamination. Jason's water system planning includes extensive hydraulic modeling and comprehensive planning experience as well as wellhead protection planning, DNR water supply plans, water vulnerability assessment, asset replacement analysis, unaccounted for water evaluations, and emergency response planning.

Relevant Experience

Water Treatment Plant, Stacy, Minnesota
Jason worked as resident engineer for construction of a new concrete gravity water treatment facility for the removal of iron, manganese and radium from the groundwater supply. Work included grading, excavation, backfilling, concrete, masonry, paving, process equipment, interior and underground piping, painting, HVAC, plumbing, electrical, and correlated items. A new groundwater well was also constructed.

Water Supply Planning and Construction due to PFC Contamination, Cottage Grove, Minnesota
Jason worked with the City to develop a response to the new PFC health indices set by the State. Jason developed a Water System Operations Plan which the City adapted and provided to MDH for an explanation of compliance with the new standards. Jason assisted with the design and construction for GAC water treatment at two locations to treat existing groundwater with high health indices.

Lift Station L13 Improvements, Metropolitan Council Environmental Services (MCES)
Jason served as Resident Engineer for a 24 MGD lift station rehabilitation including installation of parallel 24 inch force mains out from the station, wet well rehabilitation, and complete replacement of all pumping and electrical equipment in the station. Three new 8,500 gpm pumps, electrical and controls, and new interior piping was installed while the lift station remained fully operational.

Lift Station L30 Improvements, Metropolitan Council Environmental Services (MCES)
Jason provided Resident Engineer services for construction including extensive rehabilitation of the 5.6 MGD sanitary lift station during temporary bypass pumping operations. All new process, electrical, mechanical, building, and site improvements were completed during temporary station shutdown.

Well 4 Pumping Facility, Carver, Minnesota
Jason was responsible for construction documents, project engineering, and construction inspection for construction of a new well house and water blending facility. This project involved the design and construction of a pumping facility for a new well to serve the northwest service area. A new building was constructed to house water piping and water treatment chemical storage.

0.5 MG Water Tower, Marshfield, Wisconsin
Jason managed design and construction of a new water tower. The 500,000 gallon water tower serves the Utility's main pressure zone, providing a complementary water tower to the existing Grant Park Tower. The new water tower increases the system's operational flexibility and provides needed storage for system growth.

0.75 MG NW Area Water Tower, Carver, Minnesota
Jason completed project engineering and construction inspection of a new composite water tower. The 750,000 gallon water tower will serve the City's northwest growth area, which has historically been served by a pumped-only system.

NE Green Campus Storm Water Reclamation Improvements, Minneapolis Public Schools
Jason oversaw construction services for Installation of stormwater collection from the existing building roofs, athletic field, and new community plaza and storm water pumping to the irrigation system. The reclamation system included an underground CMP tank, 22 manholes and associated pipes up to 21 inch, and a new pumping station.

Section 3

Related Project Experience

Successful progressive design-build (PDB) projects require a comprehensive understanding of how design-build works. To achieve this, public agencies turn to BC as Owner's Representative (sometimes referred to as owner's advisor) to help them execute these projects. Our team understands the key to project delivery success using design-build methods is collaboration. We will help SPRWS and its design-builder work together to achieve your desired goals. We will also work to provide sufficient owner input into the design process and achieve maximum construction cost certainty. Most importantly, as the Owner's Representative we will also work closely with SPRWS to ensure minimal disruption to the day-to-day operation of the McCarron's WTP throughout design, construction, and implementation.

Our team members have served as owner's representatives on more than 35 design-build projects—many of which were first-time "pilot projects" for the owner. We have helped owners develop business processes to determine where design-build is and is not appropriate, as well as implementation strategies tailored to specific project needs. This unmatched, hands-on experience provides you with exclusive insights and knowledge of lessons learned necessary to make this effort a success.

The following pages include detailed descriptions for some of our most relevant progressive design-build and water treatment projects. The matrix on the following page provides a sampling of our most recent projects, relevant to your scope of work.

The BC team's technical expertise and Owner's Representative (OR) experience will help SPRWS select the right progressive design-builder, minimize risks, and achieve greater cost certainty.

Brown and Caldwell is providing owner's representative services to the Soquel Creek Water District for their Pure Water Soquel Program. The projects in this program include the design and construction of facilities that will be capable of producing approximately 1.3 million gallons per day (mgd) of purified water, which is the estimated volume required to offset the cumulative groundwater overdraft attributable to District groundwater pumping.

These Relevant Projects Demonstrate Our Ability to Respond to SPRWS's Scope of Work

		PROJECT DELIVERY METHOD	FIRM	PILOT STUDIES/BENCH TESTING	LIME SOFTENING	OZONATION	RECARBONATION	PROCUREMENT DOCUMENTS	MAINTENANCE OF OPERATION	DESIGN & CONSTRUCTION PHASE OVERSIGHT	TRAINING & O&M ASSISTANCE
FEATURED PROJECTS	**Mountain Home Air Force Base Water Supply, ID**	DBO	BC	●				●		●	
	Soquel Creek PURE Water, Soquel Creek Water District, CA	PDB	BC	●				●	●	●	●
	Front of Plant OA Services, Silicon Valley Clean Water, CA	PDB	BC					●	●	●	
	Pure Water Program, San Diego, CA	PM	BC/S	●		●		●			
	Green River Filtration Facility Expansion Project, Ravensdale, WA	CMAR	S	●		●	●	●		●	●
	Hap Cremean Water Plant Rehabilitation and Upgrades, Columbus, OH	DBB	S	●	●	●	●	●	●	●	●
	Dewatering Facility, City of San Jose, CA	PDB	BC	●				●	●	●	
	Pump Station Improvement Project, Silicon Valley Clean Water, CA	PDB	BC						●	●	
	Jefferson and Hood Street Interceptor, City of Tacoma, WA	PDB	BC	●				●		●	
	Central Treatment Plant, City of Tacoma, WA	DB	BC	●				●	●	●	●
	JBLM WWTP Upgrade, Joint Base Lewls-McChord	DB	BC	●				●	●	●	
	LT2 Project, City of Walla Walla, WA	CMAR	BC					●	●		
	Southwestern Parkway CSO Basin, Louisville, KY	PDB	BC					●		●	
	River Renew Program, Alexandria, VA	FPDB	BC	●				●	●	●	●
	DC Tillman Pilot, City of Los Angeles, CA	PDB	BC	●		●	●				
	Sustainable Water Infrastructure, Santa Monica, CA	PDB	S	●				●		●	●
	Lake Oswego Water Treatment Plant Upgrades, OR	DBB	BC/S	●		●		●	●	●	●
	Collins Park WTP Improvements, Toledo, OH	PM	S		●		●		●	●	●
	Dublin Road WTP Treatment Capacity Increase, Columbus, OH	DBB	S		●		●	●	●	●	●
	West Palm Beach WTP Improvements, FL	PM	S	●	●		●	●	●	●	●
	Fenton Water Treatment Plant, MI	DBB	S		●		●	●	●	●	●
	Wahpeton WTP, ND	DBB	S		●		●	●			

BC: Brown and Caldwell | S: Stantec

CMAR: Construction Manager at Risk | DB: Design-Builder | DBB: Design-Bid-Build | DBO: Design-Build-Operate | FPDB: Fixed-Price Design-Build | PDB: Progressive Design-Build | PM: Program Management

PROGRESSIVE DESIGN-BUILD

Pure Water Soquel Program Management

Soquel Creek Water District, California

BC is providing Owner's Advisor (OA) services to the Soquel Creek Water District (District) for their Pure Water Soquel (PWS) Program. The purpose of the program is to create a supplemental water supply to restore groundwater levels basin-wide as more water has been extracted from the aquifers than is replenished from the natural rate of recharge from rainfall. This will aid the District in meeting the mandates of the Sustainable Groundwater Management Act that basin groundwater use be sustainable by 2040. The projects in this program include the design and construction of facilities that will be capable of producing approximately 1.3 million gallons per day (mgd) of purified water, which is the estimated volume required to offset the cumulative groundwater overdraft attributable to District groundwater pumping. The conveyance infrastructure, however, would be sized to accommodate the potential for future expansion of the project's treatment system to convey a total of up to roughly 2.7 mgd of purified water. The primary components of the PWS Program include the following:

- Tertiary treatment facility and advanced water purification facility (AWPF)
- Pump stations and pipelines for the conveyance of source water, purified water, and RO concentrate (brine)
- Groundwater recharge and monitoring wells

As Owner's Advisor, BC is assisting Soquel Creek Water District in setting priorities and implementing a decision process that aligns the scopes and delivery methods of the projects in the program with the District's objectives.

BC's OA team has provided engineering and technical expertise to define the projects. The team has also assisted the District in understanding the various delivery methods that can be considered for the program's various components, including design-bid-build (DBB) and design-build (DB). DB methods include progressive design-build (PDB) and fixed-price design-build (FPDB).

As OA, BC has conducted outreach to the water and wastewater treatment industry (engineers, contractors, operators) that included an open house where participants were surveyed to gain valuable input from the market on the delivery models for each of the program's projects. This outreach was also an effective method for increasing competitive interest in the project. Based on the findings, BC evaluated the various delivery strategies and presented the findings to the Soquel Water District Board with recommendations for next steps in the program decision process. The results of BC's OA support to date has been instrumental in securing the Soquel Water District Board's final approval to move forward with the projects in the program.

Lead Owner's Representative

Leofwin Clark

Total Project Cost

$2.3 million

Client Contact

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SPRWS Team Members Involved

- Leofwin Clark
- Pat Tangora
- Jon Johnson
- Patrick Weber

Relevance to SPRWS

- Progressive design-build
- Advanced water treatment
- Market sounding and outreach
- Objectives-focused procurement

BC's OA team is now implementing market sounding, a process that invites interested design, construction, and operations firms to participate in calls that seek industry input on a defined set of topics as well as other input. Typically, up to 20 firms may participate in these calls. The answers to the OA's questions and other information provided during the calls is aggregated and presented in the form of a report and presentation to the District. This next step in the process further informs the client and is a valuable tool for the final determination of the best delivery method and procurement process for design and construction of the various facilities as well as procurement of an operator for the AWT under a separate long-term contract. The market sounding also further increases competitive interest in the projects.

Based on the work of BC's OA team with the District to date, the progressive design-build delivery method has been chosen for the tertiary treatment facility and the AWPF. The conveyance system will also be delivered using a progressive design-build delivery method. A two-step, best value procurement process will be used to select the progressive design-build contractors for these projects. The groundwater recharge and monitoring wells will be delivered using the design-bid-build method. BC will provide the design for the wells and a two-step, best value procurement process will be used to select the contractor.

BC's OA team has worked closely with the District to provide engineering and technical support to define the performance standards for the facilities, engineering support to advance permitting, site investigations, and cost estimates.

As part of the BC OA team scope, the team is developing Requests for Qualifications (RFQs) and Requests for Proposals (RFPs) for the procurement of all the treatment and conveyance facilities. The BC OA team is also developing the RFQ that will pre-qualify operators who will engage with the proposing design-build contractor respondents for the treatment facilities during the procurement of the progressive design-build contractor. After commissioning of the facility by the DB contractor, the AWT facility will be handed over to the selected operator under a negotiated at-risk, long-term contract.

DESIGN-BUILD OPERATE

Mountain Home Air Force Base Water Supply

Department of Water Resources, Idaho

BC served as the Owners Advisor to the State of Idaho for the high profile Mountain Home Air Force Base water supply project, which is intended to reduce reliance on declining aquifers by providing a new source of supply from the Snake River. The infrastructure project was envisioned to include a new 6 MGD water treatment facility, raw water pump station, intake structure, and 14-mile transmission pipeline.

Owners Advisor Services. BC helped to balance prescriptive and performance based requirements in the Design-Build-Operate (DBO) contract as the project required an aggressive focus on schedule to secure beneficial water rights in 2021. The selected procurement process involved a two-step procurement with a Request for Qualifications (RFQ) and Request for Proposal (RFP). Each step in the process balances the technical needs of the State and collaboratively reduces risk to the DBO entity thereby improving the price of the project. BC completed a market analysis to engage prospective firms; drafted and issued the SOQ, supported the State's selection of shortlisted qualified entities, facilitated risk transfer and scope refinements and began preparation of an RFP.

The SOQ provided specific requirements for the DBO entity to meet to qualify for the shortlist. This screening allowed the State to establish important criteria for DBO entity's past history, liquidity, insurance, and expertise in drinking water design and construction fields. Following shortlisting, each entity was invited to participate in one-on-one confidential meetings with the State. These meetings provided insight into the specific project risks that were of most concern to each entity and allowed the State to proactively address risk through data collection. For example, each entity was asked to provide suggested boring locations for geotechnical explorations, which the State used to adjust the geotechnical boring plan and avoid future risk.

The outcome of this collaborative effort will yield a stronger project that meets the desired outcomes of the State in terms of project cost, schedule, quality and risk while allowing the DBO entity the confidence to provide the services required without unnecessary risk that would impact objectives.

The project is currently on-hold while the State determines revenue options with the U.S. Air Force. Our team, led by team members Pat Tangora and Leofwin Clark is prepared to complete the RFP stages of the projects including conceptual documents, supporting DBO Entity review, interviews, selection, contract negotiations and award.

Lead Owner's Representative

Leofwin Clark

Total Project Cost

$63 million

Client Contact

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SPRWS Team Members Involved

- Leofwin Clark
- Pat Tangora
- Rhonda Harris

Relevance to SPRWS

- Pilot Testing
- Water Treatment
- Owner's first design-build project

Pilot Water Treatment Studies. BC conducted two separate water treatment pilot studies to support the technical recommendations of the RFP and complete State regulatory requirements. The first study, conducted during the summer of 2017, evaluated conventional water treatment techniques using an Intuitech pilot unit containing sedimentation, flocculation and filtration processes. BC operated the pilot unit from June 2017 through October 2017 and tested various operating scenarios and chemical additions. The intent of the pilot was to determine key design criteria for the DBO entity and meet State environmental requirements. Through this pilot study, BC identified high than anticipated algae concentrations that led to challenges operating the pilot unit. These challenges were an important finding that influenced the needs for additional piloting and more advanced water treatment techniques.

BC conducted a second pilot study during the summer of 2018 in collaboration with Xylem to evaluate the effectiveness of dissolved air floatation (DAF) and ozone treatment on the raw water. This study was focused on demonstrating a reduction in algae concentrations and showing a feasible treatment alterative for DBO entities and the State. While lower algae concentrations were experienced during this study than the previous study, the process showed an effective means of reducing algae concentrations and impact to filtration.

BC conducted the procurement of pilot study equipment, set up, operation and removal of the Intuitech pilot unit, collected samples for lab analysis, coordinated with Idaho Department of Environmental Quality, and prepare findings reports that were approved by the State.

PROGRESSIVE DESIGN-BUILD

Front-of-Plant Owner's Advisor Services

Silicon Valley Clean Water, Redwood City, California

Silicon Valley Clean Water (SVCW), a wastewater treatment agency in California, is implementing a $400M+ Regional Environmental Sewer Conveyance Upgrade (RESCU) program to replace its aging conveyance system. The Front of Plant (FoP) project was one of the three major projects included in the program and involves design and construction of a new deep influent lift station (approximately 90-feet deep, 80 mgd capacity), headworks treatment (screening and grit removal), odor control, and connection piping. The construction cost is estimated at $115M.

As Owner's Advisor, BC has been guiding SVCW to successfully deliver the FoP project using a collaborative progressive design-build (PDB) process. BC developed the initial conceptual design for the FoP project when SVCW had planned to use conventional design-bid-build delivery. However, due to SVCW's desire to maximize project value for the available budget while allowing for a high-degree of collaboration during design and construction, SVCW ultimately selected PDB delivery. BC was able to continue supporting the City even with this change in delivery method, by bringing our Owner's Representative expertise to the project team.

BC subsequently worked side-by-side with SVCW to develop an overall procurement strategy; prepare procurement documents (including minimum technical requirements, scope of preconstruction services, and coordination with SVCW's PDB contract); evaluate and select a design-builder; and negotiate the PDB contract.

Because the FoP project was one of the first two PDB projects implemented by SVCW, BC conducted two in-depth workshops with SVCW staff on the basics of PDB delivery and how to apply it to the FoP project. Key topics covered during these workshops included:

- Tailoring the procurement process given Project objectives and constraints, including budget, schedule and environmental,
- Key risks and how to best allocate them between SVCW and the selected design-builder to help manage costs,
- Procurement schedule and approach, including how best to obtain market input, and
- Approach to evaluating SOQs and proposals including composition of the evaluation committee, approach to selecting and weighting criteria, and use of confidential meetings and interviews.

Lead Owner's Representative

Pat Tangora (Procurement Lead/OA Expert)

Total Project Cost

$122 million

Client Contact

Bill Bryan, Senior Capital Improvements Program Manager

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Relevance to SPRWS

- Progressive Design-Build
- Maintenance of Plant Operation

BC continues to provide SVCW support during construction of the a new deep influent lift station.

The selected procurement strategy involved a two-step (RFQ/RFP) procurement with market outreach, confidential meetings with short-listed firms, submittal of target pricing as part of proposals, and a strong emphasis on the proposer team's ability to successfully collaborate based on in-depth reference checking, reference facility site visits and interviews.

Following procurement, BC worked closely with SVCW and the design-build team during Stage 1 (preconstruction) by participating during the design-builder's evaluation of project alternatives, design concepts, and revisions to design criteria and standards; reviewing key construction plans including proposals for early works packages; helping foster O&M staff participation through use of virtual reality tools; performing independent cost validation; and assisting with schedule and payment reviews. BC assisted SVCW during the negotiation of three early works packages and during negotiation of the guaranteed maximum price (GMP) for the majority of construction. These negotiations resulted in design-build contract costs within the City's budget.

The project is now under construction with BC providing support including review of final designs, review of key construction submittals on behalf of SVCW, reviewing pay requests, providing input on contract compliance issues, and participation in coordination meetings for the overall RESCU program. BC may also participate in factory witness testing of major equipment and provide field inspection support.

SVCW subsequently selected BC as its Owner's Advisor for the Pump Station Improvements (PSI) Project – the final major project in the RESCU program. The PSI project involves rehabilitating three existing SVCW conveyance pumping stations and portions of existing force mains

WATER TREATMENT PROCESS

Hap Cremean Water Plant Rehabilitation and Upgrades

City of Columbus, OH

Based on a mandate from the Ohio EPA for a more stringent disinfection byproduct control program at the Hap Cremean Water Plant and a growing concern about disinfection limitations at the plant, the Columbus Division of Water created the Hap Cremean Water Plant Disinfection By-Products Plant Master Plan in late 2009 under the direction of Stantec. Stantec was selected again to undertake several projects outlined in the Master Plant to upgrade the Plant's processes.

Stantec designed the intermediate-ozonation biologically-active filtration (Ozone/BAF) upgrade of the 100-MGD Water Plant to provide an additional 25-MGD average flow capacity to the Plant. The new treatment system is also being designed with a UV system to further inactivate cryptosporidium and giardia levels within the Plant's surface-water sources. This project marks several firsts for the region. At 125-MGD and using intermediate-ozonation and biologically-active filtration, the Hap Cremean Water Plant will be the biggest water treatment project in the Midwest. It is also the first major use of ozone/BAF treatment technology in Ohio, and the first project of its size and kind approved by Ohio EPA.

During the master planning phase, Stantec provided a source water evaluation and bench- and pilot-scale studies to determine the best treatment process and chemical optimization methods. The recommended design of an ozonation system with biologically active filtration was selected with several treatment alternatives developed and evaluated utilizing a Criterium Decision Plus methodology. Stantec also provided value engineering services and was able to save $75M for the City of Columbus by gaining approval for up-rating the Hap Cremean Plant to 125 MGD without the need for any capital investment on the City's part.

Stantec worked with plant staff to upgrade the existing lime softening processes with new state-of-the art carbon dioxide dissolution facilities, freeing up an existing recarbonation basin for repurposing as a new ozone contractor, and utilizing a set of existing filter galleries for the site of the new UV systems, thereby shaving several million dollars off the final construction cost.

Person Responsible for Successful Delivery

Charlie Bromley, Project Manager (Stantec)

Total Project Cost

$85 million

Client Contact

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SPRWS Team Members Involved

- Charles Bromley
- Michael McWhirter
- Tim Wolfe

Relevance to SPRWS

- Ozone/BAF treatment upgrades
- Extensive pilot testing
- Lime softening/recarbonation upgrades
- Maintenance of plant operations

Stantec coordinated closely with DOW staff to determine the final type and extent of Hap Cremean's improvements along with the necessary permitting and updates to the Ohio regulatory board for Environmental Protection. Stantec also provided construction administration services for the treatment expansion. All major work was conducted at the Hap Cremean Water Plant while it was still in operation. Stantec worked closely with the plant operations staff to design construction staging strategies, which involved carefully phased demolition and replacement of the Plant's basins, and detailed plans for tie-ins and connections to allow maintenance of plant operations throughout the extensive work process.

DESIGN-BUILD |
WATER TREATMENT PROCESS

Green River Filtration Facility Expansion

Tacoma Public Utilities, WA

Tacoma Water needed to improve their treated water quality and increase the reliability of their water supply. We helped them achieve this by providing a conceptual study, pre-design, final design, and construction engineering of the new Green River Filtration Facility. This innovative hybrid facility has a capacity of 90 MGD when it is operating in conventional treatment mode, and a full capacity of up to 168 MGD when it is operating in direct filtration mode.

The new Green River Filtration Facility is a hybrid direct-conventional filtration facility constructed on the site of the existing plant, using a CMAR delivery method with Stantec as lead designer. The new filtration plant added flocculation, sedimentation, filtration as well as new finished water storage and pumping, chemical systems, solids handling, commercial power and backup power.

The new plant is designed to take advantage of superior water quality in the summer months, employing direct filtration for up to 168 MGD and bypassing of the sedimentation process. Direct filtration minimizes chemical use, overall operating cost, and production of residuals. During winter months, when demand is lower, but river water quality can be degraded, the plant utilizes sedimentation for turbidity and sediment removal and to optimize filter performance. The new plant is capable of producing 90 MGD in the winter. As a result of this strategy, Tacoma Water is able to comfortably and reliably meet customer demand while minimizing overall project capital and operating cost.

Project design began in 2010 and was completed in 2012. Construction was initiated in July 2012 using the Construction Manager at Risk (CMAR) method of delivery. Stantec worked closely with Tacoma Water and the selected CM contractor to tailor plant design to match contractor recommendations, resulting in significant cost savings and contributing to final bids approximately 15% less than project budget. Substantial Completion of the new system was achieved on schedule in December 2014 (total completion in 2015) and the project overall came in more than $30 million below budget. Commissioning and startup were also successfully completed as scheduled. The project achieved all goals and is operating as originally planned.

In 2015 this project was recognized by the American Society of Civil Engineers (ASCE) for Outstanding Civil Engineering Achievement in Water Resources Engineering. In 2018 the design was recognized for three years of exceptional performance, the ultimate test of any design.

Person Responsible for Successful Delivery

Charles Bromley, PE (Stantec)

Total Project Cost

$184 million

Client Contact

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SPRWS Team Members Involved

- Charles Bromley
- Mike McWhirter

Relevance to SPRWS

- Design-build
- Collaborative delivery using CMAR model
- Innovative hybrid seasonal treatment approach
- Ozonation system
- Maintenance of plant operations

Section 4

Detailed Project Approach

Design-build insight and technical expertise for an outcome-focused procurement

The BC/Stantec team's approach to the Owner's Representative role is to define and then focus on the desired outcomes of the project as a whole. With these objectives clearly defined, we apply industry best procurement practices and the right level of technical insight and guidance to successfully select a design-builder. Then, it is the Owner's Representative's role to facilitate a collaborative team environment to enable the design-builder's delivery of the project, using the previously defined outcomes as a measure of our collective success.

Throughout the procurement phase, technical definition and oversight, and collaborative design-build delivery processes, it is our responsibility in the Owner's Representative's role to protect Saint Paul Regional Water Services' (SPRWS) interests in a fair and non-adversarial manner—and to support its mission to provide reliable, quality water and services at a reasonable cost. As such, the Owner's Representative is part of a team, focused on providing:

- **Leadership** and facilitation to bring design-build best practices to SPRWS and to adapt proven approaches to reflect SPRWS priorities and this project's unique requirements and objectives;
- **Expertise and advice** covering the full spectrum of requirements – technical, operations, procurement, construction, and commercial terms – to optimize lifecycle value, public health protection, and innovation; and
- **Validation and confirmation** to support the selection of the most qualified design-builder, confirm the robustness of its technical solutions and design, validate its construction costs, and hold it accountable for performance.

It is common for the design-build Owner's Representative role to take on a preliminary design function, augmented by a solicitation package development task, all aimed at hiring a design-builder to continue the progression of a preferred design concept. In contrast, we believe the most successful progressive design-build projects rely on an owner and its representative defining priorities and performance parameters – and then selecting and working collaboratively with a design-builder to develop a preferred design solution that optimizes performance requirements against scope, cost, and risk considerations.

With this approach, the owner and its representative define the parameters of success and the design-builder is held accountable for the design and construction of a project that meets those requirements. Therefore, the Owner's Representative's role is to facilitate and maintain a clear focus on the project's ultimate success, recognizing that the procurement and preconstruction process is a means to this end. We summarize this approach as Outcome-Focused Procurement and Delivery.

VENDOR OPPORTUNITY PROGRAM

Brown and Caldwell has a well-established history of collaborating with MBE/WBE/SBE firms as valued partners. We view these partnerships as opportunities to mentor other firms, enabling them to develop and expand their professional capabilities. Our efforts to align meaningful and challenging assignments with the skills and the true potential of our team members allows them to grow their businesses while bringing value to BC and our clients.

For this project, we are partnering with Sambatek (SBE), Buildings Consulting Group (MBE), and Pro-Ops, Inc. (WBE) bringing water treatment and Minnesota Department of Health (MDH) coordination experience, operator training experience and structural design experience, respectively. These assignments will provide SPRWS with specific areas of expertise unique to this project while enabling BC to further strengthen these firms' design-build credentials resulting in a winning formula for everyone involved.

Our detailed approach to an outcome-focused procurement and delivery is described in the following sections:

PHASE 1. Procurement and Preconstruction Services

The project starts with a facilitated definition of project objectives, confirming SPRWS' goals and desired outcomes. We establish priorities based on these outcomes, and then tackle technical requirements and adapt and tailor proven solicitation approaches to the project's specific goals. We also initiate permitting coordination and our understanding of current plant operations.

Phase 1 Outcomes

- Clear metrics for project success
- Selection of a design-builder that is most capable of meeting those metrics
- A definition of technical and performance requirements to which the Firm will be held accountable

PHASE 2. Pilot Plant and Preliminary Design

With the design-build firm (the Firm) selected, we enter the progressive scope and estimate development cycle. The art of success in this phase is to apply the right level of technical oversight and validation while allowing the Firm to implement their own design and take accountability for its performance. The Firm's implementation of the pilot test during this phase not only support regulatory requirements, but provides the basis for risk transfer and the setting of performance parameters.

Phase 2 Outcomes

- Pilot test result that supports permitting and definition of performance parameters
- A design that aligns to SPRWS's budget, as validated by a transparent construction cost that translates to a guaranteed price; a construction procurement packaging plan which will allow minority business goals to be met while providing competitive pricing and control of construction quality
- An optimized balance of performance and construction risk reflected by the right level of contingency
- The Firm's commitment to meet schedule and performance objectives

PHASE 3. Final Design and Construction

With a guaranteed price and a well-advanced design, focus shifts to continuous compliance validation process. During construction, the Owner's Representative role is to validate costs incurred and conformance with contract requirements for deliverables and progress. Also, as the design is completed, there is additional compliance review to document conformance with requirements defined in Phase 2. The Owner's Representative can also act as the operations staff's champion and ensure that their training and ability to operate the plant remains in the forefront of the Firm's priorities during construction and startup. On occasion, there will be the need to facilitate and adjudicate delivery issues and contract interpretations, being fair, but thorough in representing SPRWS' interests: trusting, but verifying.

Phase 3 Outcomes

- A completed design
- The safe construction of the project, supported by the right level of oversight and interaction to validate cost and progress
- Maintenance of operations and 100% regulatory compliance throughout the project
- Verification of performance and ultimate acceptance that the completed facility meets contract requirements

Warranty Phase and Beyond

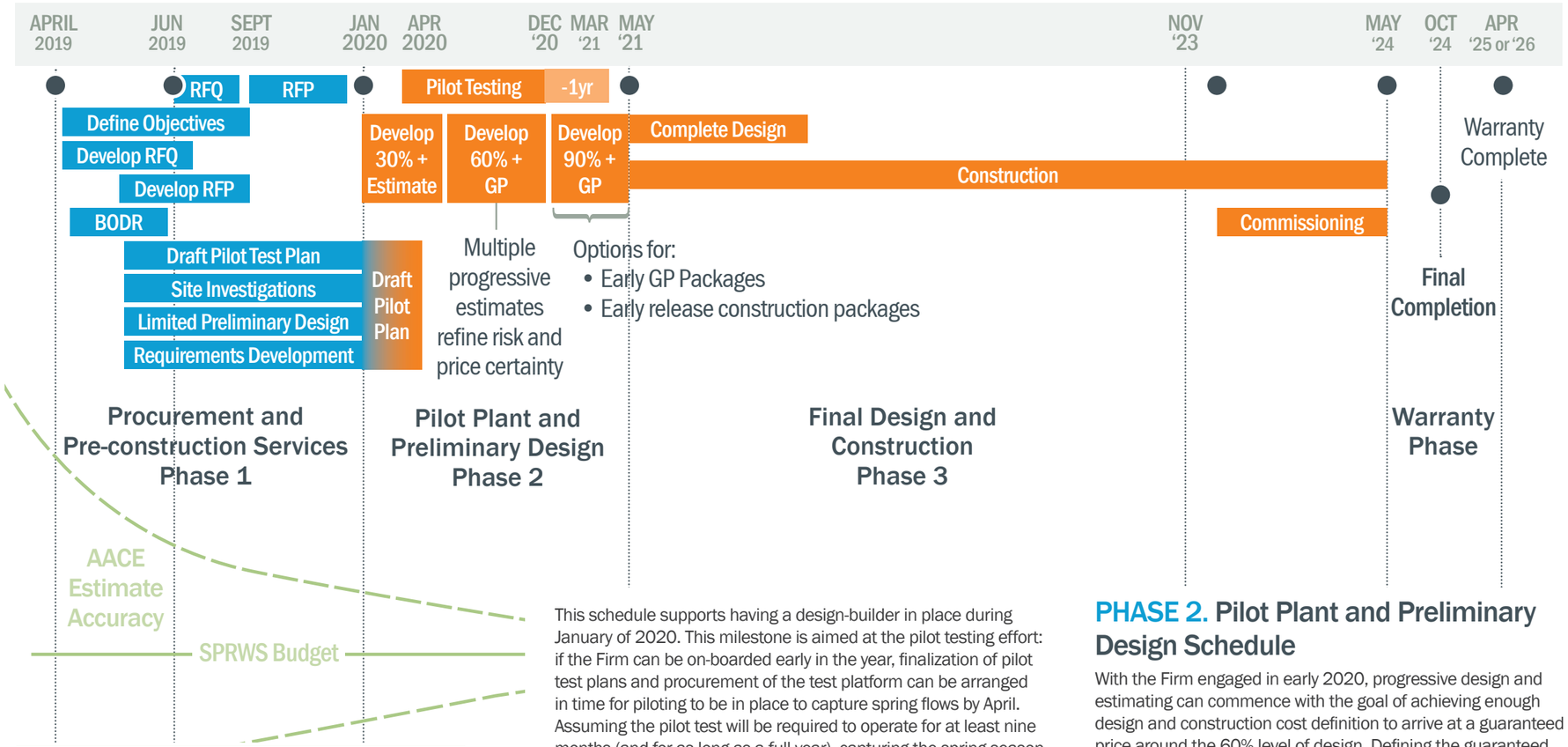
In addition to the phases identified in the Owner's Representative RFP, it is important to include recognition of the warranty period after substantial completion and acceptance. While the Owner's Representative's scope may be wound down at this point, the Firm's accountability will remain in place for at least a year (perhaps two) for warranty responsibilities. A successful design-build project relies on a continued local commitment to support warranty coverage and process performance troubleshooting.

Warranty Phase Outcomes

- A project that continues to perform, with inevitable adjustments and repairs handled in an accountable manner
- Long-term relationships that support future follow-up and availability among the project team
- A positive SPRWS experience that can be added to the library of best practices for future use at other utilities

These phases are summarized in Figure 4-1, which illustrates our proposed approach to completion from start to finish. The figure also summarizes an initial take at a project schedule, including an understanding of how the pilot testing task can be scheduled to avoid future delays:

FIGURE 4-1.
SPRWS McCarrons Water Treatment Plant Process Improvement Project from Start to Finish



PROJECT SCHEDULE

PHASE 1. Procurement and Preconstruction Services Schedule

Assuming that the Owner's Representative scope is initiated in April of this year, it will be critical to define overall project objectives and outcomes in the phase's first three to four months. This definition effort will support initiating a solicitation process for the Firm that results in an early 2020 start for the design-builder. For a two-step solicitation, the Request for Qualifications (RFQ) can be developed relatively quickly and released by June to support a short-listing and release of a Request for Proposals (RFP) in September. The total solicitation process should take about seven months, allowing for evaluation periods after each step and accounting for negotiation and approvals time after selection of a preferred Firm.

This schedule supports having a design-builder in place during January of 2020. This milestone is aimed at the pilot testing effort: if the Firm can be on-boarded early in the year, finalization of pilot test plans and procurement of the test platform can be arranged in time for piloting to be in place to capture spring flows by April. Assuming the pilot test will be required to operate for at least nine months (and for as long as a full year), capturing the spring season first will be of significant advantage in advancing the treatment process basis of design by obtaining high flow, low temperature results early. If this initial season were to be missed by as much as a month at the front end of the pilot testing plan, it could result in several months delay for extending testing to capture a full's season's worth of data later—and the delay impact would be even greater if nine months of testing inclusive of the spring season would otherwise ultimately be sufficient.

In parallel with the solicitation effort, the Owner's Representative team would be developing the basis of design and conducting site investigations (as discussed in the Phase 1 scope summary below). In addition, we recommend developing an initial pilot test plan, validating it with the short-listed design-build respondents during the RFP period, and having it largely ready to go when the Firm is selected. The Firm would then adopt the plan, revise and complete it as required, and be able to quickly engage with vendors to get the pilot test in place for the spring season.

PHASE 2. Pilot Plant and Preliminary Design Schedule

With the Firm engaged in early 2020, progressive design and estimating can commence with the goal of achieving enough design and construction cost definition to arrive at a guaranteed price around the 60% level of design. Defining the guaranteed prices at around the 60% level of design is consistent with typical industry practice, although some owners are comfortable with an earlier price agreement (with greater contingency), while others prefer a bit more definition or need additional design and estimating effort to refine the scope and achieve target budgets.

However, for this project, the pilot test requirement will likely drive the end date requirement for this phase to be relatively late in the design process, especially if a full year of pilot testing is required. Even with a nine-month pilot test, it is likely that the design may be advanced well beyond 60% by the time the piloting is complete. Given this timing, the start of design could be delayed or, more realistically, design would commence in early 2020 and associated construction cost estimate will be based on up to a 90% design by the time the pilot testing is scheduled to be complete. This schedule will result in reduced contingency and a well-defined scope and cost estimate, but at the cost of potential delay in getting to construction in the field. If the pilot test's impact on the critical path is of concern to SPRWS, the start of construction can be accelerated, either by releasing early design packages and associated pricing (for scope not otherwise impacted by the pilot test results) or by making informed design-decisions prior to completion of pilot testing and proceeding with conservative design parameters that are not likely to be impacted by the as-of-yet uncompleted pilot test results. In some cases, final adjustments can be made to the design and operational parameters based on final piloting results.

Depending on SPRWS' need and comfort level for an earlier construction start, Phase 2 could be complete as early as the end of 2020 or, if the construction start is tied to a full year of pilot testing, as late as May 2021.

PHASE 3. Final Design and Construction Schedule

The optimal choice for initiation of Phase 3 construction may lie somewhere between the late 2020 and May 2021 start dates. By accommodating some early site work, demolition, and relocations, major construction activities can be staged after the winter weather clears in early 2021—all with the goal of leveraging the summer months of 2021 for peak construction activity.

Assuming two to two-and-a-half years of construction is required to close in facilities and get them operational for unit and system-level testing, the facility will be ready for commissioning toward the end of 2023. Given the need for maintaining the operations of the existing treatment process and the potential complexity of tie-ins and limited shut down periods, start-up and commissioning can be expected to take six months, from late 2023 into the early spring of 2024. This schedule puts Acceptance Testing in the March and April timeframe of 2024.

Warranty Phase Schedule

The warranty period should start upon acceptance of the facility, corresponding to when beneficial use of the equipment operating as a full system has begun. One-year warranties are most common, but many owners opt for the benefits of a two-year warranty program on design-build projects, albeit at increased cost. In the absence of a strong preference either way by SPRWS, we often ask design-builders about preferred warranty approaches as part of the solicitation process and evaluation. This allows a particular focus on how warranty start dates are managed, given when equipment will be put into service at varying start dates over at least a six-month period during commissioning.

DETAILED PROJECT APPROACH

PHASE 1. Procurement and Preconstruction Services

The first several months of Phase 1 are focused on defining the project and initiating a chartering process that defines team member roles (both firms and people) to establish a foundation for developing solicitation documents and technical criteria. The overall outcome of this phase is the solicitation and engagement of the best available qualified design-build firm to build and construct the project and to be accountable for its performance.

Scope Summary

Whereas we believe the tasks in the RFP scope of services establish a clear path for successful implementation of the project, there may be opportunities to adjust the sequence of the tasks to improve overall efficiency and effectiveness. Specifically, we recommend the following:

1. Initiating contact with the Minnesota Department of Health (MDH) during Phase 1 rather than waiting until Phase 2 when the Firm is selected, will provide the opportunity to clarify expectations both in terms of pilot plant results and final plant performance. Being clear on these objectives during Phase 1, will enhance the quality of the solicitation package.
2. Initiating limited site investigations during Phase 1 will produce a more informed solicitation package. The Firm will still be expected to complete a rigorous site investigation and accept responsibility for interpretation of results, but having a better understanding of geotechnical conditions and existing structural conditions during preparation of the solicitation package will enable the proposing firms to more completely address know conditions in their proposals.
3. Initiating the pilot program prior to the spring thaw of 2020 will be essential if completion of design is to occur before the summer of 2021. To this end, we recommend pilot pre-planning in Phase 1 with the possibility of pre-purchasing long lead components. Within the proposals and during the selection process, we will learn a great deal about the proposed pilot plants and may be able to leverage that information to initiate early procurement of select items.

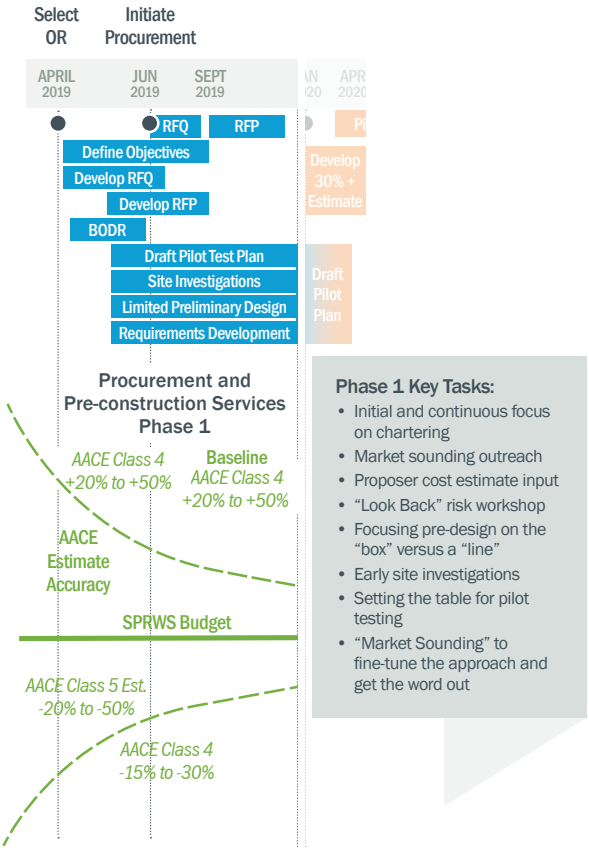


FIGURE 4-2.
Procurement and Preconstruction Services: Defining the project. Phase 1 is all about defining the project by setting desired outcomes. The solicitation documents and technical scope are then derived from those objectives.

PHASE 1 ESTIMATE AND SCOPE DEFINITION PROGRESS

At the outset of Phase 1, the Owner's Representative will review any existing SPRWS project cost estimates. We will revise (or create) a work breakdown structure consistent with previous progressive design-build procurements where a high level of cost transparency will be desired to validate the design-builder's construction costs. We will use our own design-build delivery team for this deliverable, including conforming it initially to AACE Class 5 standards (+30 to +100% and -20 to -50%). Depending on the existing level of definition, we can, at SPRWS' option, advance the estimate to AACE Class 4 (+20 to +50% to -14 to -30%), preferably based on input from design-build teams during the procurement process (one of our best practices is to publish the Class 5 estimate with the RFQ or RFP and invite review as part of the solicitation process, compiling comments and revisions from multiple potential proposers to reflect the state of the market). The Class 4 estimate will serve as the starting point for the selected Firm in Phase 2.

As part of this scope of work we will:

Clearly Define Objectives and Desired Outcomes. A primary advantage of the progressive design-build (PDB) delivery method is the potential to provide added value to SPRWS by capturing ideas, innovation, and best practices from all parties engaged in the project execution. These "actors" include the SPRWS staff, plant operators, design engineers, equipment vendors, general contractors, local sub trades and others providing services.

To start, we will conduct a series of interviews and small group workshops to understand SPRWS project drivers, technical concerns, and definition of project success. Discussions focus on key stakeholder groups and the "actors" noted above: utility leadership, operators, procurement and legal departments; and external stakeholders such as regulators at SPRWS's option.

The outcome of these discussions, which are generally informal, but facilitated to cover a broad range of known design-build topics and lessons-learned, is a concise set of three to five key issues and associated objectives that will be used to guide our approach for the remainder of the project. These outcomes are validated using a team chartering format so that each party is clear on the overall objectives and can work collaboratively to achieve them.

Charter the Team. With a draft set of goals in hand, a chartering session is held to formally bring together SPRWS leadership, plant staff, operators and the Owner's Representative team to validate and refine the identified drivers and key outcomes. This workshop, facilitated by the Owner's Representative, is focused on creating dialogue and free discussion to "brainstorm" a variety of input from participants. Following discussion, it is typical that the project objectives are refined and prioritized. These project objectives and outcomes then form the basis for the minimum project criteria developed which are defined in the RFP. Often, there is an associated list of specific constraints or concerns to supplement the bigger-picture issues that are also used for guidance in the development of solicitations documents and technical requirements.

The Water Design Build Council has found through recent surveys that one overriding criterion for success of a design-build project is having an engaged and active champion within the Owner's management. Our team understands that change is not always easy and will be ready and willing to support the SPRWS staff as they embark of this journey. Through our recent project experience, we can share examples of transitions conducted at other utilities leading from initial hesitation and wariness to acceptance and endorsement. The value of progressive design-build is to drive collaboration between the parties, and we strive to encourage maximum participation of key SPRWS staff in this process. However, we recognize the many competing interests and commitments on your staff's time, so ultimately our Owner's Representative team resources are available to augment SPRWS resources.

Pure Water Program, City of San Diego, CA

"The coordination and collaboration between BC and Stantec has been exceptional during the past four-plus years. The consultant teams have worked seamlessly with each other and alongside the City's Pure Water Staff. In my opinion, this is one of the most effective teams to partner with the City staff in my 28 year career history. I would hire this team again without any hesitation."

— John Helminski, Assistant Director

Note that the chartering and endorsement process is not intended to be a one-time event in Phase 1. Our experience in facilitating collaborative delivery is that the best outcomes are achieved when the principles of chartering are carried forth on a continuous basis, including the Firm, in follow-on sessions once it is selected to confirm, expand, and, where appropriate, adjust goals as the project evolves.

A key challenge in meeting the promise of PDB is to steer the project through the initial phase so that each party is clear on the overall objectives and can work collaboratively to achieve these. We have extensive experience in steering these aspects of PDB project development and find that the best outcome is achieved in a two-stage approach with the Owner participating in an Initial Chartering Session to develop the primary objectives for the RFP, followed by a follow-on session with the selected Firm to confirm, expand and, where appropriate, adjust these goals.

Understanding and Allocating Risk. We will develop a risk register template as a basis for understanding SPRWS' desired risk allocation. To develop an understanding of the appropriate risk allocation for this project, we often conduct a higher-level risk workshop (we call it a "Look Back" workshop) that focuses on future potential failure points, walking them back in time to identify potential root causes – and by understanding potential causes of future failure risks, we can assign responsibility now for the party best able to manage those risks.

The initial outcome of the risk analysis process is the high-level assign of risks in a table or "term-sheet" format. This summary is used to communicated with and receive feedback from the market early and to provide to SPRWS' legal resources for integration into design-build contract documents.

The risk allocation table is also used to guide the technical team in focusing their preliminary work around defining performance requirements and required supporting data or specifications for the design-builder. These work products inform the technical scope of work ahead of selecting the Firm, particularly the required data collection and site investigations.

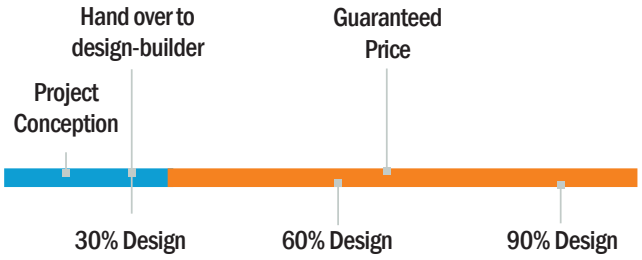
Ultimately the high-level risk allocation is transformed into specific risks documented in the risk register, initially managed by the Owner's Representative and then transferred to the design-builder as part of its cost development process. These risks for the foundation of documenting and negotiating contingency is in the cost estimate.

Developing the Contract. In addition to the risk allocation, there are numerous potential project-specific modifications to discuss with SPRWS and your legal resources. There are a number of standard form contracts available for progressive design-build projects, including those prepared by DBIA and Engineers Joint Contract Documents Committee (EJCDC). BC has direct experience on projects using all of these forms of contract. We will work closely with SPRWS legal resources to select the appropriate form of contract and to develop modifications that best fits your project, and your selected risk allocation. Because design-build contracting is fairly specialized, we can also assist with the selection of outside legal counsel when needed to supplement existing resources. Most recently, we assisted Soquel Creek Water District to identify outside legal counsel by preparing a description of the type of legal services typically needed for progressive DB projects.

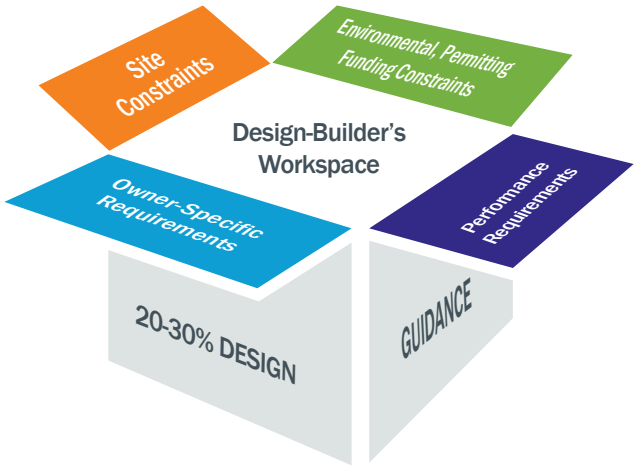
Defining the Right Technical Scope. Refining the technical scope to reflect the progressive design-build process requires a fundamental understanding that the Firm will be the designer of record and that the Owner Representative's technical role in these early stages is about project definition and developing an understanding of desired performance requirements. To avoid over-designing or delving into technical details that are more appropriate to shift to the design-builder, we often organize workshops with our own design-build delivery teams to calibrate this scope through the lens and expectations of a design-builder.

This approach is a reflection of our team's extensive in-house technical expertise required for this project, combined with an understanding of how to apply that expertise in a way that is most likely to achieve your objectives without unduly constraining the selected Firm. Often, Owner's Representatives approach conceptual design for a design-build project as if they were designing a conventional design-bid-build project, advancing the design to 20 or 30 percent. To provide proposers with the ability to innovate while making sure they do not stray too far afield, we find that it is useful to establish the playing field for the design-builders' proposed technical solutions rather than going too far down the road with one specific design concept. In practice, this means that certain aspects of a project (i.e., the requirements for process controls and communications) maybe more defined than the would typically be at a 20 or 30 percent design, while other aspects, such as a very specific facility layout or technology selection, are less defined.

This approach also allows SPRWS to reinforce its preferred risk allocation: for example, by providing geotechnical data, but not interpretation, we can move the schedule forward without inadvertently retaining more subsurface conditions risk than is desirable. As shown in Figure 4-2 on the following page, by allowing proposers and the selected Firm to innovate with a defined set of parameters ("within the box") we will maximize value and reduce cost while facilitating a project that meets SPRWS' needs and objectives.



A linear approach assumes that an Owner's Representative starts the design and a design-builder finishes it...



...for "in the box" approach, the Owner's Representative defines requirements, otherwise leaving the design-builder free to innovate with its own design.

FIGURE 4-2
The "Line and the Box". Owner's Representatives often approach design-build pre-design as a linear process, completing a 20-30 percent design that will be handed-off in a "line" to a design-builder to then advance to 60- and 100 percent. In contrast, our approach is to treat the pre-design deliverable as a set of rules – a broadly defined "box" in which the design-builder is free to innovate.

Advancing Piloting. Our technical team assembled for this project knows water treatment from start to finish. Our team members have led master plans, developed and conducted bench and pilot-scale testing programs, executed all phases of design, supervised construction, commissioned new plants, and optimized existing plants. We selected senior staff that have seen enough to know what is important in the project definition phase of a project, are technically strong enough to know which unproven assumptions or forgotten details will cause problems during construction or commissioning, and are mature enough to work collaboratively with the Firm while protecting the interests of the SPRWS.

Our team includes professionals with bench- and pilot-scale treatability experience with all the technologies proposed for this project – softening, coagulation for organics removal, clarifiers, ozone and advanced oxidation, BAC filtration, residuals management, and distribution system corrosion control.

As mentioned in the RFP, this project will require a well thought out bench and pilot-scale testing program. The testing program should achieve the following main objectives:

- Satisfy SPRWS and the Minnesota Department of Health (MDH) that the overall process configuration and proposed treatment technologies will meet the treatment goals and protect public health
- Validate the unit process loading rates, chemical doses, and other design parameters proposed by the Firm
- Provide an opportunity for SPRWS staff to understand the operational requirements of the proposed treatment equipment

To ensure that the overall WTP meets treatment goals after upgrading, a combination of bench-and pilot scale tests will be required, and our team understands which approach is best for each unit process under consideration. For example, the performance of a lime softening clarifier-thickener is very difficult to simulate at bench-scale and requires pilot testing to accurately account for the effects of sludge recycle, coagulant mixing and flocculation, and the thickening of precipitated solids. Furthermore, testing a pilot-scale clarifier on its own is insufficient; filters must be piloted as well, so that the subtle effects of the particle size distribution leaving the softener and the effects of the coagulation chemicals can be evaluated as to their effects on the filter effluent turbidity, the unit filter run volume, and the need for a filter aid.

Other parameters, such as ozone demand-decay data (which is critical for the sizing of ozone generation equipment) and the ability of ozone to remove trace contaminants such as taste and odor compounds and algal toxins, can most accurately and economically be determined at bench-scale. Both field samples and known standard compounds (algal toxins and other microconstituents) can be tested in the lab, with subsequent pilot-scale verification. This approach allows for the evaluation of ozone for algal toxin oxidation even if an algae bloom does not occur during the scheduled pilot window. Our team's extensive experience in treatability studies will allow us to advise SPRWS on the most appropriate test program for this project, define both the broad parameters and minimum requirements for this program, and then evaluate the Firm's proposed plan for compliance to these minimum requirements.

For any WTP design, capital cost is directly proportional to the design loading rates for the unit processes. This is especially true for large, concrete-intensive unit processes such as clarifier-thickeners. However, pushing the loading rate for one individual process may have adverse effects on other unit processes. For example, specifying a high loading rate for the softening clarifier may reduce clarifier costs, but may result in filter loading rates being reduced or filter backwash frequencies increased to compensate. Alternatively, an undersized clarifier may be difficult to control during certain water quality conditions, may require excessive coagulant and/or polymer doses, or have insufficient capacity for sludge thickening.

Based on this experience and insight, we propose to advance the schedule by developing the pilot testing program requirements and a draft pilot test approach in parallel with the design-build solicitation process. The requirements and draft plan can be provided to the short-list for review and comments as part of their response to the RFP, providing an opportunity to evaluate each design-builder's approach as part of the selection process.

As a result, the Firm's pilot test plan will be fairly well advanced when selected, allowing final discussion and approval of the plan in time to put pilot testing in place prior to the spring thaw. As noted earlier, this approach will support earlier construction given the 9 to 12 month duration of the piloting, once in place, the Owner's Representative role is to critically review pilot data, and to develop appropriate performance criteria to ensure that the desired OPEX/CAPEX balance is reached.

A well-designed pilot program provides SPRWS staff an opportunity to understand the operational requirements of the treatment equipment that the Firm is proposing. Once basic unit process sizing data is collected, we recommend that sub-optimal challenge tests be conducted so that SPRWS staff, as the future operators, will know how to respond and what to watch for in the event that coagulant is under-dosed or the ozone generator is out of service. **In addition, we recommend looking at the advantages of retaining all or portions of the pilot plant on site for future optimization and operator training exercises.**

Site Investigations. As noted above in the proposed Phase 1 scope adjustments, we recommend shifting site investigations and condition assessment to this phase of the Owner's Representative scope. Completing geotechnical investigations (without conducting associated analyses); documenting as-built conditions and utility locations; and defining connection points and site access prior to engaging the Firm is a worthy use of resources and generally always worth an early investment. Design-builders will always make use of this data and the more that is made available, the more realistic will be the costs.

In scoping site investigations, we recommend providing the drilling locations and type of investigations to prospective design-builders for their input. Collecting their aggregate comments prior to conducting these investigations will reduce added scope later in Phase 2.

Cedar River Water Treatment Facility Design-Build-Operate, Seattle Public Utilities, WA

Approximately two thirds of the drinking water for over 1.25 million people in the Seattle area is supplied by SPU's Cedar River source. Working with a multidisciplinary team of senior consultants, BC's Pat Tangora helped SPU develop an overall development strategy that involved using DBO contracting for the treatment facility, phased development of the facility and CMAR contracting for fish passage and dam improvements at Landsburg where SPU diverts water from the Cedar River. The project used lime for corrosion control and was one of the first major water treatment projects in the U.S. to use ozone.

Market Sounding. Once we've formed an initial vision of the project and a schedule and a structure of the procurement, we advocate reaching out to the market for their impressions, much like SPRWS did in regard for the Request for Information on the Owner's Representative RFP. This approach to a "Market Sounding" has been most useful on recent Owner Representative projects to gauge (and create) market interest and to fine-tune the solicitation package. We have used on-line submittals and surveys as well as pre-solicitation conference calls to gain input form the market—with the added benefit of alerting the market in advance of the solicitation to encourage teams to form.

Selecting the Firm. Because progressive design-build is a highly collaborative delivery method, success often hinges on selecting a design-builder that you can effectively work with. We develop solicitation documents that are clear, scaled to the size and scope of the project, and that reflect the goals and priorities identified and chartered by the project team. For efficiency, we use previously developed templates and combine elements as appropriate from the Water Design-Build Council. However, we pay specific attention to tailoring submittal requirements, pricing forms, and evaluation methodologies to specific project issues and desired outcomes, customizing the solicitation for the project.

The qualifications step of the solicitation process will focus on the key attributes of potential Firms' capabilities, particularly their safety records, references for similar projects, and financial capacities. In addition, we also use this phase of the solicitation to dive deeper. For example, we will ask for an approach to safety versus for this project in lie of just providing safety statistics and we will ask where have the Firms provide collaborative delivery in lieu of the traditional delivery of similar facilities.

We will expand this process with the second solicitation phase after a short-listing process to get a better, in-depth understanding of potential Firms' approach specific elements of the project. For example, we will focus response sections on pilot testing approaches, development of performance requirements, and specifics around schedule and the project's critical path.

In-depth reference checking, confidential pre-proposal meetings with individual proposer teams, and proposer interviews can all help an owner gauge this somewhat intangible, but critical, characteristic of a proposer team. We find that reference checking is most beneficial when conducted by one or two individuals representing the owner – BC's Owner's Representative team includes individuals who are adept at developing questions and conducting reference checking to help reveal if a proposer team has successfully collaborated with owner's in the past especially where project challenges need to be managed and overcome.

Confidential pre-proposal meetings are typically conducted to help ensure that proposers understand an owner's issues, objectives, and requirements for a project. But they also offer a window into how the team works together and how they will engage you in problem solving. Finally, interviews also offer the opportunity to test how a proposer team will work together and with you. One technique we have successfully used on other projects is to include a team exercise as part of the interview, where a proposer team must work together to develop a response and then present that response to the owner.

PHASE 2. Pilot Plant and Preliminary Design

The first several months of Phase 1 are focused on defining the project and initiating a chartering process that defines team member roles (both firms and people) to establish a foundation for developing solicitation documents and technical criteria. The overall outcome of this phase is the solicitation and engagement of the best available qualified design-build firm to build and construct the project and to be accountable for its performance.

Scope Summary

As with Phase 1, we believe that Phase 2 provides opportunities for adjusting task sequences to improve overall efficiency and effectiveness of the project delivery process.

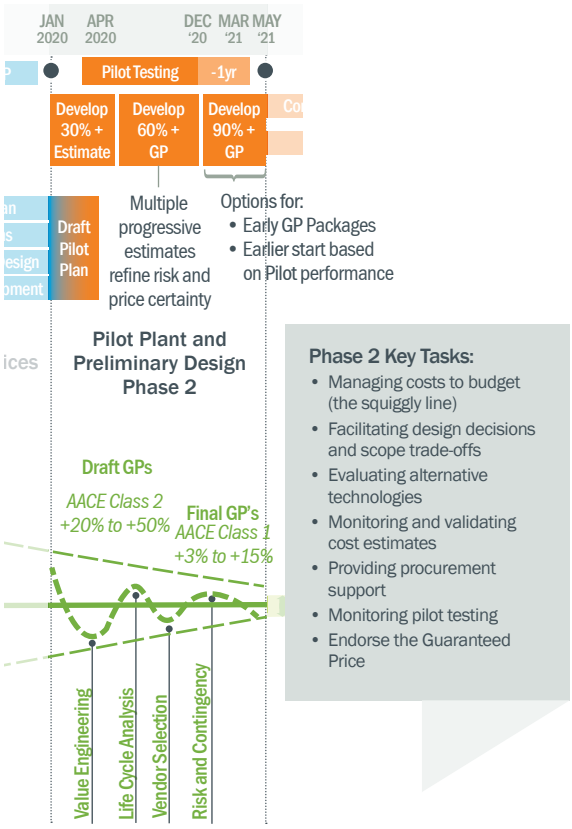
The chartering task sets the direction for the program, establishing it as one of the first key steps in the project delivery process. However, the charter is a dynamic document that should be updated and used as a constant guide. As such, the Firm should be brought into the chartering process during Phase 2 to help foster a cohesive team with a common objective.

Finally, we recommend negotiation of the guaranteed maximum price in Phase 2, rather than Phase 3. At the conclusion of Phase 2 the pilot testing results, the development of a process treatment scheme and the creation of a site layout, will provide sufficient information to initiate the guaranteed maximum price (GMP) negotiations.

Once the Firm is selected, we enter the progressive scope and estimate development cycle. Key to this phase is convert the Owner's Representative estimate to the design-builder purview, establishing a baseline estimate as early as feasible. The baseline estimate forms the comparator to all subsequent revisions as the design evolves and the costs are

FIGURE 4-3.

Pilot Plant and Preliminary Design: Design to Budget.
Phase 2 is all about refining the project scope and cost to meet requirements and SPRWS' budget. The outcome is a guaranteed price for well-defined, permittable design and agreed-upon performance criteria—all with just enough contingency to manage reasonable expectations for the unknown going forward.



PHASE 2 PILOT PLANT AND PRELIMINARY DESIGN PHASE 2

Starting with the Class 4 AACE estimate, the Firm will adopt the work breakdown structure and begin revision of the estimate on an iterative basis in parallel with design development. A new baseline estimate using the Firm's own cost model and expectations for self-performance should be expected with in the first two months of the start of Phase 2. This "baseline estimate," which should be approaching an AACE Class 3 level of definition (+10 to +30% and -10 to -20%) will represent the scope and cost against which each of the subsequent estimate iterations can be measured.

As the design evolves, additional SPRWS scope or other requirements will likely drive the estimate up. Value Engineering and scope-related trade-offs will drive the cost down. Costs will also be continuously updated based on increasing firm vendor and subcontractor quotations. An AACE Class 2 Estimate (+5 to +20% and -4 to -15%) is often sufficient to support a guaranteed price in conjunction with a design approaching 60% level of detail – and owner's working with a schedule consideration often agree to guaranteed pricing at this level with an understanding that the higher level of shared contingency will be returned under a guaranteed maximum price model. Should the need for pilot testing and additional design refinement require a longer Phase 2 schedule, it's likely the cost model can evolve to an AACE Class 1 level of accuracy (+3 to +15% and -3 to -10%). With the level of design somewhere between 60 and 90 percent complete at this point, costs are almost certainly well enough defined for a guaranteed price agreement, either on a guaranteed maximum price or a lump sum basis.

refined in parallel. As the design evolves, the associated cost estimate will go up and down, with the overall objective being to progressively refine the scope to meet the SPRWS budget (or to recognize the need for added scope and adjust the budget accordingly).

For this project, much of this ongoing design and cost iteration (the "squiggly line" in Figure 4-3) will be informed by regulatory requirements and pilot test results in conjunction with operator input and design detail and sequencing associated with maintaining plant operations and accommodating commissioning. This ongoing design and cost refinement is driven by the Firm and supported by the Owner Representative's technical, construction, estimating, and procurement resources who will facilitate, review, and validate the design and cost development cycle as it evolves.

The other primary role of the Owner's Representative in this phase is to provide technical insight and advice to SPRWS around technology, performance criteria, redundancy, operational requirements, and lifecycle costs. It is likely that the Firm will depend on timely decision making to progress the design and cost estimating effort—and to apply the pilot test results to an acceptable performance criteria definition.

As part of this scope of work we will:

Continue the Chartering Process. When the Firm starts, the first order of business is to integrate their team into the collaborative process. This effort entails updating and repeating the initial Chartering with two distinct areas of focus:

- First, Chartering must address roles and responsibilities, decision making process, and expectations for responsiveness and accountability. It is especially important to validate the Owner Representative's role as facilitator, recognizing that the Firm is the ultimate owner of performance accountability.
- Second, a detail review of the project's technical requirements, design and permitting efforts to date, and key requirements going forward. For this session, it is especially important to define the "box" in which the Firm has design flexibility—and to define SPRWS' prescriptive requirements.

As the project progresses, chartering refreshes will be required. Sometimes these will be scaled as small, short check-ins to confirm objectives and roles. At other times, a full team session may be required to address significant issues.

Validate Cost Estimates and Monitor Procurement. As the Firm takes over the WBS and construction cost estimate from the Owner's Representative, it will start populating actual costs based on the use of its own self perform resources, subcontractor quotes, and pricing form vendors. As the design advances, the scope will become increasing defined and an increasing number of subcontractors and purchase orders will be put out for bid.

It is the Owner Representative's role to monitor the Firm's procurement process and to validate that it is transparent, fair, and competitive. For directly purchased materials and equipment, validation is fairly straightforward effort of tracking requirements and price quotations against the construction cost estimate. For subcontracted scope, additional due diligence is required to attract adequate competition and to make sure as-bid scopes are equivalent. When appropriate, subcontractor selection can be made on a best value basis rather than purely on price, and it will be expected that SPRWS and the Owner's Representative have input to the award decisions, including veto capacity for undesired subcontractors or vendors.

For self-performed scope, including the Firm's General Conditions costs, cost validation requires the Owner's Representative to conduct a detailed review of the estimated scope, production assumptions, and embedded rates and costs. This effort requires an independent, but fully capable, estimating team—and our approach is to bring our own design-build estimating group to the project as a resource.

In some cases, it may be desired (or required) to put self-perform scope out for bids as a means to demonstrate competitiveness or to evaluate other delivery options that may have more available resources or that may cost less. For these procurements, the Firm will be conflicted, requiring the Owner's Representative to step in and manage the procurement process and evaluation. Again, this service can be provided by our own in-house design-build capacity.

As the cost estimate is developed, contingency will be another element for Owner Representative evaluation, aligning the risk register to actual potential costs and their probabilities and negotiating a reasonable level of coverage with Firm.

When all of the costs are assembled, the Owner Representative's role is to provide endorsement to SPRWS, validating the reasonableness, transparency, and completeness of the potential Guaranteed Price from the Firm.

Note that the reference to agreeing on a "Guaranteed Price" does not assume a preference for a Guaranteed Maximum Price, or GMP, which is most typical of progressive design-build delivery. The alternative is a fixed price, lump-sum approach. Both approaches have merit, depending on the level of design and contingency at the given point in time—and we suggest making an informative recommendation regarding the pros and cons of advancing to the Final Design and Construction Phase 3 under a guaranteed maximum price or on a lump sum basis based on the status of the cost estimate at the time. Normally, a GMP approach is accompanied by a potential shared savings clause that returns a portion, if not most, of any unspent costs to the owner. This is particularly attractive if the owner assesses that the contingency may be high and is likely to go unspent. In contrast, if contingency is low and the likelihood of there being any unspent construction costs left over at the end of the project is low, a lump sum model can be much less administratively intensive by avoiding continuous cost auditing through the construction phase.

Facilitate the Collaborative Design Process. There are many ways to design and construct a large water treatment plant upgrade and one of the key responsibilities of the Owner's Representative is to ensure that the work being done by the Firm will result in a final product that will meet SPRWS's requirements in a timely and economic manner. Firms can sometimes get complacent, and just rely on doing the same thing repeatedly. This can be advantageous in some situations, especially when an owner does not desire to be the "trial run" for a new technology. In other cases, the opportunity to employ a newer technology that has been successfully used elsewhere can be of significant benefit, particularly if its use is accompanied by a performance guarantee.

Our technical resources bring water treatment plant design experience from all corners of North America, as well as from the United Kingdom and Australia/New Zealand. This allows us to bring forward innovative approaches to this project that the Firm may not be familiar with—or to review and endorse innovations that a design-builder may bring to the Project's attention. For example, the Stantec UK offices have worked with several of their clients to replace powdered lime products with liquid lime systems at certain WTPs. Liquid lime is supplied as a ready-made suspension of calcium hydroxide in water. The production process allows the manufacturer to tightly control the particle size distribution, settling rate, and flow characteristics to enable it to be handled as a liquid. The easy storage and handling properties make it ideal for automated systems and where the availability of O&M personnel is limited. If there are potential advantages of using this approach at the McCarrons WTP, by leveraging our UK personnel who have done this before, we can provide a realistic evaluation of the option without discounting it as "too experimental." We can also leverage our internal technical experts to quickly provide "second opinions" and "gut checks" of project costs and approaches based on similar projects we have recently executed. If discrepancies exist, we can dive in deeper with more detailed estimates.

Central WWTP Expansion Owner's Representative, City of Tacoma, WA

Pat Tangora led the Owner's Representative team, including BC, for the City of Tacoma's first environmental design-build project. The $70M upgrade and expansion of Tacoma's main WWTP involved new processes as well as modifications to several existing processes and facilities. Working closely with City staff to change their perspective from hard bid to design-build delivery and maintaining plant operations during construction were critical elements of this project's success.

We also have the experience to know when treatment processes are not the right answer. Sometimes the answer to a problem is not obvious to those who are immersed too far in the details. The Firm will have a strong focus on delivering their proposed approach and we will provide an independent, unbiased viewpoint. For example, on a recent WTP assignment, a client had issued an RFP for the expansion of the clarifiers and filters at its WTP as maximum plant production was being reached during the hot summer months. A step-back from the terms of reference identified that the key infrastructure requirements were a lack of clearwell storage and a disinfection shortfall. The construction of a larger finished water reservoir with an integrated UV disinfection system allowed this owner to defer the full WTP expansion for 10 years.

Provide Pilot Testing Oversight. In support of design definition and permitting requirements, pilot testing will be conducted by the Firm. The Owner Representative's role will be to monitor the piloting against the requirements of the pilot testing plan and to provide an independent review of the results and the conclusions those results will have on the treatment process sizing and design.

As the duration of the required pilot testing is finalized, it will set the date at which a guaranteed price can be achieved, assuming that the pilot testing results will drive design modifications that result in changes to the project cost. However, in case of an extended (e.g, year long) pilot testing requirement for regularity purposes, there may be an advantage to settling on an design prior to its completion. In this case, the design may be defined somewhat conservatively to allow for some variation in the as-of-yet uncompleted piloting or there may be willingness to settle on a design knowing that there is some risk that future pilot results might impact the otherwise completed design. Balancing these risks on behalf of SPRWS and the Firm may result in an approach that allows for a guaranteed price and the start of construction prior to the completion of pilot testing.

PHASE 3. Final Design and Construction

The Owner's Representative is the key liaison in establishing a shut-down or bypass approval process that provides adequate lead time and alternative plans—and then for monitoring these activities on behalf of SPRWS to make sure the Firm is complying with the plan.

If the project is being built on a guaranteed maximum price basis, it is also the Owner Representative's role to monitor actual costs and to validate progress and invoicing.

Scope Summary

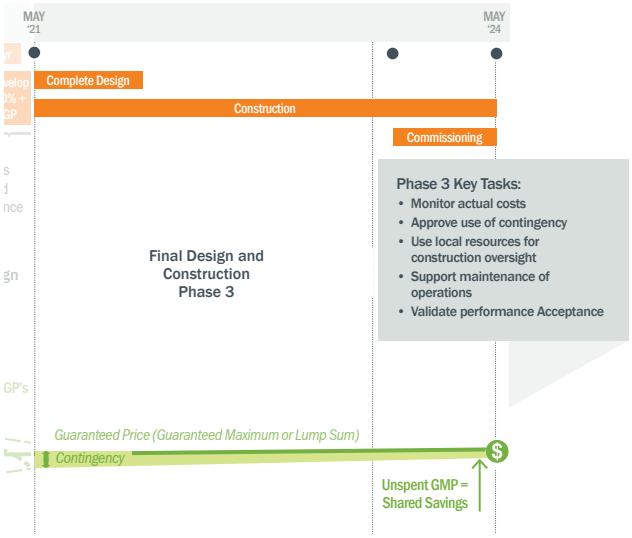
The scope for Phase 3 defined in the RFP is consistent with progressive-design-build practice. However, by the time of the Firm's substantial completion, we expect SPRWS' expectations for the Owner's Representative during this phase may evolve. As such, we scoped this phase consistent with the RFP, subject to SPRWS future modifications. We also recommend that community outreach be initiated earlier as part of Phase 1 or 2.

As part of this scope of work we will:

Final Design Support. After the Preliminary Design is finalized and the treatment processes nailed down, the project moves to Phase 3. This requires detailed and coordinated input from a full range of disciplines including process mechanical, site civil, structural, building mechanical, electrical, instrumentation and controls. The Firm will provide the necessary design professionals to lead this detailed design and maintain responsibility as Engineer of Record (EOR). Our team will provide senior staff within each of these disciplines locally to "shadow" the effort of the design team and conduct necessary reviews and quality assurances. Our staff understand their role to be the eyes and ears of SPRWS and confirm that design progresses according to the agreed plan.

FIGURE 4-4

Final Design and Construction: Maintaining Operations while Building the Project. Phase 3 is all about building the project safely while maintaining existing operations. The design will also be completed during this phase. The primary focus for a successful project at an existing facility is well-planned and sequenced construction that is continuously coordinated with on-site O&M staff.



PHASE 3 FINAL DESIGN AND CONSTRUCTION

For a guaranteed maximum price delivery (most common for progressive design-build projects) costs will be monitored on an open book basis as the Firm constructs the project. When the need for contingency arises, the Owner's Representative will validate the request. Unused funds will normally accrue to the Owner or be shared with the Firm at a pre-agreed ratio. Overruns on construction cost are at the risk of the Firm.

In some cases, it will make sense to convert the guaranteed prices to a lump sum and allow construction to proceed without monitoring actual costs – a significant reduction and elimination of administrative overhead for SPRWS. In this case, the use of contingency will be at the Firms' discretion and any over- or underrun will accrue to the design-builder.

Provide Field Oversight. The same senior local professional staff who complete the design reviews will remain engaged throughout the construction stage of the project. This allows for continuity of their design reviews and efficient oversight. Again, their role is as observer and reviewer rather than Engineer-of-Record (EOR). We expect that evaluation of shop drawings and vendor submittals will be the responsibility of the Firm's design team according to the agreed protocols. We will conduct QA of these completed activities and confirm that the necessary engineering judgement is being exercised. We anticipate that occasional site visits will be conducted by our team's discipline leads in order to review progress of work according to plans. Subject to confirmation with SPRWS, it is anticipated that the primary effort for site inspection and quality control testing will be under the scope of the Firm. However, our local team can provide staff for site inspection and QC tasks if that approach is preferable to SPRWS.

During the construction phase, our team will assist SPRWS in conventional contract administration activities including convening progress meetings, managing progress draws, maintaining RFI logs, dealing with changes and dispute resolution. Giving the collaborative nature of progressive design-build delivery, most of the information requests, conflicts, changes, and disputes tend to be minor in nature and can be resolved between the Firm and Owner's Representative. There are however occasionally issues that require elevating to the Owner. We have established protocols for handling these disputes and will review appropriate and acceptable procedures with SPRWS prior to commencement and confirm these with the Firm at or around the Chartering Session.

Procedures and Training Support. We will review the current practices associated with O&M training within SPRWS. Discussions with Operation and Maintenance staff will assist us in developing the detail necessary to integrate Standard Operating Procedures (SOPs) and Original Equipment Manufacturer (OEM) requirements into a comprehensive training program that will ultimately be developed by the Firm. We will recommend any upgrades and/or changes to the existing training delivery system be reviewed and approved by the personnel who will ultimately be responsible for the operation of the plant. Our experience in operations, training and commissioning will be a valuable resource to the overall team.

Jefferson and Hood Street Surface Water Interceptor Progressive Design-Build, City of Tacoma, WA

Pat Tangora is leading the BC team that worked with the City to procure a progressive DB contractor for the design and construction of a major stormwater interceptor through downtown Tacoma. Because of these challenges and the need for close collaboration, the City elected to deliver the project using Progressive DB and implemented a procurement strategy that emphasized the importance of trenchless construction experience. The City has completed procurement and is now working collaboratively with the selected design-builder to advance the design and address permitting and construction risk issues in advance of negotiating the GMP.

For example, the development of an electronic learning (e-learning) training program can potentially add value to SPRWS beyond this project. E-learning modules best serve as a tool to provide basic information for operators prior to more specific system training. Development and implementation of an electronic training program could be concurrent with the design and construction of the facilities. Successful completion of an E-learning training program may be recognized by local licensing officials for contact hour recognition.

Maintenance of Plant Operations (MOPO). In a complex upgrade such as this, where water production must continue as the plant is under construction, we are collaborators. Our project delivery approach is set up with the client as the key stakeholder and decision-maker. While the Firm focuses on the design and construction phases of the project, we know that operation and maintenance is ultimately the most time-consuming aspect to get right. As such, we put a great deal of effort to confirm that the plant personnel are involved with all key aspects of the design to ensure long term sustainability considerations are incorporated into the project. We do this through holding workshops at all critical milestones with the Firm and client stakeholders.

We Plan Ahead. Successful project outcomes don't just happen by accident. Successful projects are the outcome of detailed planning by experienced teams, anticipating potential problems and challenges and developing effective solutions to deal with them. By considering the big picture early in the project, we can better collaborate with SPRWS and the Firm to mitigate and properly address changes as they happen.

We know how to get WTPs built and we know to operate WTPs. The senior process engineers on this team have significant construction experience and significant hands-on operational experience; we are not "on-paper designers." We have operated WTPs during the commissioning of our own designs or by providing operational troubleshooting to our clients. This experience makes us very well suited to review and advise on the design, construction, and commissioning approach proposed by the Firm. We bring deep experience in retrofit construction to operating facilities, so our team can identify risk elements before they result in a cost or schedule impact. For smaller modular WTPs the maintenance of operations is relatively straight forward – basically isolating construction areas from operations. However at larger facilities that are undergoing process upgrades (rather than just expansion with new parallel trains) it is a very complex undertaking.

For instance at the Hap Cremean WTP in Columbus OH, the project required simultaneous process upgrades for multiple process units. Adding to complexity, different design teams were responsible for each of the separate elements such as recarbonation basins, ozone generators, filter upgrades, and UV disinfection. With this range of complexity, we had to develop detailed staging work plans that supported the operators while still remaining economical with capital dollars. The result was an elegant reuse of older basins, re-purposed for new uses, and an advanced treatment plant with modern operator-friendly equipment.

We are confident that we can employ this same thoughtful approach on your project and assist the Firm to complete the major retrofits during live operations without impact to continuous operations.

Validate Acceptance Testing, Commissioning and Longer-Term Assurances. One advantage of design-build projects is that they offer the opportunity to go beyond simply designing a project, and constructing what has been designed. This is typically done by including performance standards as part of the contract requirements as well as a formal acceptance test to demonstrate that the project is meeting those standards. If the Firm fails to pass the Acceptance Test, the contract typically includes provisions for retesting, for requiring operational and capital improvements until the acceptance test is passed, and for liquidated damages for failure to pass the acceptance test by a specified date. On progressive design-build projects, the draft DB contract included with the RFP typically includes the framework for setting the performance test standards and the acceptance test plan, while the detailed acceptance test planning is typically a collaborative effort between the owner and design-builder.

Warranty Phase and Beyond

Following acceptance, some owners want ongoing assurance of performance from the design-builder. This can be achieved through an extended design-build warranty with performance provisions, typically extending 1 to 2 years beyond the more standard 1-year DB warranty. However, because long-term performance is affected by operations and maintenances practices, a contract for some level of ongoing O&M support (observation, on-going training) from the design-builder is typically coupled with such an extended warranty.

The successful completion and acceptance of the upgrades is at the core of our definition of project success. The Owner's Representative approach will be considered successful when we can look back and:

- Acknowledge a facility that is demonstrated to perform as desired
- Confirm there was minimal impact to ongoing plant operations while it was built
- Know your operators and maintenance staff like the results
- Prove we all met your schedule expectations
- Prove that we all met your budget limitations
- Recognize that issues were handled the right way, and problems became solutions

And, in the end, SPRWS will use this delivery model and approach again for its next project.

Section 5

Proposal Cost

Table 5-1 provides a summary of the BC team's proposed level of effort for the project. The information includes the total estimated hours per personnel title, summarized by phase. Our complete cost proposal, the Scope of Work, and the Vendor Outreach Program Ordinance Questionnaire are provided as a separate file.

TABLE 5-1. BC/Stantec Team Estimated Hours

Personnel Titles	Phase 1 Hours	Phase 2 Hours	Phase 3 Hours
Project Manager	212	216	180
Owner's Representative	336	72	168
OR - Procurement	414	232	376
OR - Market Specialist/Estimating	360	40	24
OR - Contract Specialist	416	320	388
OR - Bid Evaluation	232	104	0
Expert Engineer	176	280	216
Principal Engineer	112	312	372
Senior Engineer	40	584	739
Engineer	84	344	1,188
Staff Engineer	40	0	96
Junior Engineer	24	0	100
Designer	40	0	0
Communication/Funding Specialist	60	0	80
Administrative Support	80	100	144
Total Hours	2,626	2,604	4,071
Total Project hours		**9,301**	

Scope of Work

Phase 1. Procurement and Preconstruction Services

Objectives

1. Define and determine SPRWS project goals and needs.
2. Prepare a solicitation package for selecting a Firm with the capability to design, construct and integrate these treatment processes into the existing treatment plant.
3. Select the Firm

Owner's Representative Responsibilities

Task 101. Development and preparation of the solicitation package including specifications and plans to select the appropriate Firm

Task 102. Assist SPRWS in defining objectives, priorities, constraints and the creation of evaluation criteria.

Task 103. Confirm what is allowed under statute and/or other applicable policies

Task 104. Assist SPRWS with the procurement process and Design Build Firm selection process.

Task 105. Coordinate and Conduct meetings with SPRWS as needed.

Task 106. Review and become familiar with the site, review record drawings, and data collection.

Task 107. Develop requirements and/or criteria for design standards, construction performance, and treatment process performance; and develop and implement a process for compliance with these requirements.

Task 108. Assist and provide SPRWS with a detailed Project scope for the loan application to the Minnesota Public Facilities Authority.

Task 109. Provide contract negotiation support to optimize opportunity for the SPRWS to select the best form of contract, and the Firm with the best proposal that is within budget.

Task 110. Develop Project organizational structure that define the roles of the City, SPRWS, Owners Representative, and the Firm.

Phase 2. Pilot Plant and Preliminary Design Phase

Objective

Assist SPRWS and the Firm in developing a treatment process scheme that will best meet SPRWS treatment process goals and that can be incorporated into the existing treatment plant while maintaining the plant in operations.

Owner's Representative Responsibilities

Task 201. Attend progress meetings

Task 202. Coordinate and Conduct additional meetings with SPRWS as needed.

Task 203. Coordinate and attend meetings with MDH and the Firm as needed.

Task 204. Provide technical review of materials submitted by the Firm.

Task 205. Review and evaluate pilot testing protocols as submitted by the Firm to confirm the best use of proven treatment technologies in the market and prepare review summary report.

Task 206. Provide resources to manage schedule and budget compliance of the Pilot Plant and Preliminary Design Phase.

Task 207. Develop performance requirements and assist SPRWS to negotiate performance guarantees.

Task 208. Coordinate any required permit applications that may be needed during this phase with the Firm to obtain permit approval in a timely manner.

Phase 3. Final Design and Construction

Objective

Apply best practices in the industry to successfully manage the Project during the final design, construction and commissioning of the Project.

Owner's Representative Responsibilities

Task 301. Attend progress meetings.

Task 302. Coordinate and conduct additional meetings with SPRWS as needed

Task 303. Coordinate and attend meetings with any regulatory agencies and the Firm as needed.

Task 304. Coordinate with the Firm on any required permit application that may be needed during this phase for timely granting of permit approval.

Task 305. Coordinate with the Firm any public outreach as required for the permitting process.

Task 306. Develop and facilitate a process to assist SPRWS in obtaining a Guaranteed Maximum Price ("GMP") for the construction of the Project at the earliest point feasible.

Task 307. Review and provide evaluate/analysis the operational impacts to the existing plant operations throughout the design, construction, and commissioning process.

Task 308. Lead and assist SPRWS with evaluation of different design options and risk.

Task 309. Provide technical review and response to materials submitted by the F8irm and prepare review summary report. Technical review shall also include dispute resolution and change orders.

Task 310. Perform Project design review, construction oversight, cost/schedule control, quality and compliance control, and review quality assurance efforts by the Firm as to complete the Project on schedule and on or below budget.

Task 311. Manage cost negotiations. Cost negotiations shall include providing independent engineering Project cost estimates, evaluate and validate design-build cost proposals, and assist SPRWS in the negotiations of the GMP.

Task 312. Review and comment on the commissioning plan, assist SPRWS during the acceptance testing activities, and provide monitoring for the acceptance testing activities.

Task 313. Evaluate integration/commissioning phase sequencing during integration/commissioning of new treatment process facilities into existing treatment process facilities to avoid impacts to the overall finished water quality leaving the treatment plant and minimal impact to plant operations.

Task 314. Assist in Developing the best operational practices for the new facilities based on pilot studies, design, and construction.

Task 315. Assist and participate in pre-startup training, post startup training, onsite operations, and scheduled maintenance program.

Task 316. Participate in project final inspection to verify that construction is in conformance with design and provide recommendations to SPRWS.

Task 317. Provide memorandum on satisfaction of required conditions for acceptance

Project Understanding

1. Attendance at progress meetings will be for the purpose general coordination and representing SPRWS' interests. The Firm will be responsible for facilitating the meetings, issuing agendas, preparing meeting minutes, and maintaining action item lists.
2. Coordination with the Firm on any required permit applications to verify that necessary permits have been identified and are being acquired in a timely manner. All application materials permit acquisition and permit compliance shall be the responsibility of the Firm.
3. Coordination of public outreach with the Firm will be for the purposes of providing input on overall messaging and representing the best interests of SPRWS. We will provide input on content and delivery of outreach information, but it will be the Firm's responsibility to prepare all communications and execute all public outreach actions.
4. Maintenance of plant operations during piloting, design and construction shall be the responsibility of the firm. BC will review and comment on the Firm's maintenance of plant operations plan for compliance with this requirement.
5. Project design reviews will be conducted to confirming overall compliance with SPRWS objectives. The Firm will be responsible for the final quality and content of all design documents.
6. Construction oversight will consist of monitoring the Firm's compliance with their required quality assurance plan. Full time construction observation shall be the responsibility of the Firm,
7. The Firm will be responsible for developing and implementing a commissioning plan and all acceptance testing activities. BC will review the commissioning plan and monitor implementation of the plan and associated acceptance testing for overall compliance.

8. Integration of new treatment processes into existing processes and finished water quality shall be the responsibility of the Firm. BC will evaluate the Firm's commissioning plan for compliance with this requirement.
9. Development of best operational practices will consist of identifying required standard operating procedures (SOPs). It will be the responsibility of the Firm to prepare and implement required SOPs.
10. It will be the responsibility of the Firm to develop and implement pre-startup training, post start up training and related operations and maintenance programs. BC will assist in the identification of training requirements, monitoring of program execution and compliance with the training plan.
11. The Firm will have primary responsibility for conducting and documenting inspections, including the final inspection. BC will provide the necessary design disciplines to participate in the final inspection to observe overall compliance with the design documents.

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