CRW ENGINEERING GROUP, LLC

CITY OF KOTZEBUE, ALASKA

RFQ# 19-01: Kotzebue Water Treatment Plant

October 9, 2018

CRW ENGINEERING GROUP, LLC

3940 Arctic Blvd., Suite 300 Anchorage, AK 99503
p (907)562.3252 | f (907)561.2273 | www.crweng.com

Contact
Jon Hermon, PE
jhermon@crweng.com

Acknowledgement of Addendum 1&2

City of Kotzebue
P.O. Box 46
258A Third Avenue
Kotzebue, Alaska 99752

October 9, 2018

Re: RFQ #19-01 – Professional Engineering Services for Kotzebue Water Treatment Plant

Members of the Review Committee:

The City of Kotzebue (City) is planning to design and build a new water treatment plant (WTP) and related improvements. The City is seeking a professional team that will work closely and collaboratively with them to deliver these key outcomes in parallel:

- Develop a robust, sustainable, and environmentally-friendly WTP that utilizes a cost-effective treatment process to meet the City's current and future water needs, including improvements to intake equipment at both water sources.
- Design a durable water main replacement for a failing section of distribution pipe.

CRW Engineering Group, LLC is the right firm to assist the City in accomplishing these outcomes. We have 37 years of experience planning and designing projects throughout the state of Alaska, with extensive cold regions water treatment and water facilities experience. We bring a number of strengths to this project:

- A **dedicated and experienced team**, led by **Rebecca Venot**, a proven Project Manager for the delivery of complex facilities. She will work closely with Jon Hermon, our Principal in Charge and Quality Review Manager, and the rest of our team.
- **CRW's long history of rural Alaska design and construction** offers a deep understanding and hands-on experience with a wide range of water treatment technologies, including those in sub-Arctic and Arctic environments. This background is enhanced by **industry-leading, water treatment process engineers** from our teaming partner, Jacobs Engineering Group.
- Our subconsultants, Golder Associates, Inc. (geotechnical) and Burkhart Croft Architects, LLC (architectural), bring **recent Kotzebue experience** to the team. These key disciplines will ensure the facility design integrates with the local environment.

We are **responsive, collaborative, and focused** on providing you with exceptional professional consulting and design services. CRW is ready to commit the necessary staff and resources to meet the City's goals for this project. We acknowledge the receipt of Addendum #1, dated September 17, 2018, and Addendum #2, dated October 4, 2018. As a Principal of CRW, I am authorized to bind the company in accordance with the requirements of this solicitation. If you have any questions or comments, please contact me at 562-3252 or at jhermon@crweng.com. Thank you for this opportunity.

Sincerely,

Jon Hermon, PE
Principal
CRW Engineering Group, LLC

TABLE OF CONTENTS

Project Understanding	1
Key Personnel	8
Firm Qualifications and Experience	11
Consultant Location	14
Project Management	14
Resumes	15

PROJECT UNDERSTANDING

UNDERSTANDING OF SCOPE OF WORK

The City of Kotzebue (City) has identified four objectives for this project:

- Evaluate previously completed, water treatment process analysis to determine the most robust, sustainable, and environmentally-friendly treatment facility to serve for the City for the next 30 years.
- Design and construct a new water treatment facility (WTP).
- Source Improvements: Assess the potential for a gravity supply of water from Vortac Lake and evaluate maintenance improvements to the Devil's Lake intake facility.
- Replace approximately 1,000 feet of water main that has experienced recurring failures in recent years.

Since the initial WTP Preliminary Engineering Report (PER) was completed, costs for some water treatment equipment have generally decreased, and more facilities using advanced processes have been commissioned. The City desires to explore these developments, confirm whether or not the PER recommendations from 2011 are currently valid, and determine a final treatment process approach.

Water Treatment Plant

The existing water treatment plant (WTP) was constructed in multiple phases over the last 40 years, and has reached the end of its useful life in relation to its building envelope and structure, ease of operation, and ability to produce high water quality. The water quality in Vortac Lake and Devil's Lake is challenging to treat due to cold temperatures, low turbidity, and very high levels of organics. The current water treatment process uses potassium permanganate, alum, and powder activated carbon (PAC) prior to flocculation and settling to oxidize and remove as much of the organic content as possible before filtration. Two polymers are used in the settling and filtration unit processes. Soda ash is added for pH adjustment to minimize corrosion in the distribution system. Chlorine, which is generated on site using the MIOX process, is added for disinfection and to maintain a disinfectant residual in the distribution system. As the plant has been modified over the years, additional processes have been added, chemical use has changed, and other modifications and improvements have been made to keep the process operational.

This approach has largely been successful due to the dedication of the Operations staff. During times of particularly poor raw water quality or other process upsets, the treated water does not meet current regulations, with high disinfection byproducts (DBPs) and occasional high levels of copper in the distribution system. Addressing these regulatory compliance issues is of the highest priority. The existing building is in poor condition with excessive energy use, possibly stemming from a failure of the building heat envelope, and rehabilitation of the structure is cost prohibitive. With a new plant and current technologies, the City plans to serve the community with high quality water for at least the next 30 years.

Water Treatment Process Considerations

CRW Engineering Group, LLC (CRW) is teamed with Jacobs Engineering Group (Jacobs) to combine a substantial history of cold regions sanitation design with industry-leading, water treatment expertise for this project. Our team has treated numerous water systems with high total organic carbon (TOC) levels similar to those found in Vortac and Devil's Lakes. When the concentration of natural organic matter in a source water is primarily dissolved and as high as 10-15 mg/L, additional treatment is usually required beyond the conventional approach of clarification and filtration, as evidenced in the City's existing process.

In response to the City's desire to confirm the treatment recommendations of the PER, we have briefly considered the following three treatment approaches. Our team has successfully executed these techniques on similar water quality projects elsewhere in North America:

- Conventional filtration with granular activated carbon (GAC) adsorption.
- Conventional filtration with anion exchange.
- Membrane microfiltration and nanofiltration.

A fourth option, ozone and biological filtration, has been successful in some locations to improve organics removal. However, this technique is not always reliable in sufficiently reducing TOC levels to achieve significant DBP mitigation. Further, it is not used extensively in cold climates, and therefore we did not evaluate it further.

The table on the following page summarizes the benefits, drawbacks, and relative capital and operating costs of the alternatives considered. We developed estimated costs using Jacobs' CH2M Hill Parametric Cost Estimating System (CPES) tool. CPES was created to analyze the capital and operating costs of different treatment alternatives for small and large scale projects, in order to rapidly screen alternatives and provide feedback on cost-reducing options. CPES was recently expanded to include an estimation of

greenhouse gas emissions, one of the measures used in this effort to evaluate sustainability of the considered processes.

	Conventional Filtration with GAC	Conventional Filtration with Anion Exchange	Membrane Microfiltration and Nanofiltration
Benefits	Very effective while GAC is fresh.	Easy to operate. Effective at removing dissolved organic carbon, reducing DBP's.	Fairly easy to operate and very effective.
Drawbacks	GAC will become exhausted and must be replaced. GAC replacement will impose recurring labor, material and shipping costs, which would be relatively high for Kotzebue.	Requires salt for regeneration, even with reuse. Regeneration will impose recurring shipping costs, which would be relatively high for Kotzebue.	Most difficult system to maintain. Manganese and organics will increase fouling on membranes; special cleaning techniques and chemicals will be required.
Relative Capital Cost	$	$$	$$$
Relative Operational Cost	$$	$	$$$
Relative Greenhouse Gas Emissions	Medium	Lowest	Highest

Our preliminary analysis indicates conventional filtration with anion exchange will meet the City's water treatment goals. This process has the flexibility to take the anion exchange component offline during periods of good water quality, thereby reducing operating costs. The overall pumping and energy requirements for this option are much less than microfiltration and nanofiltration, and more cost effective relative to the use of GAC. To confirm these findings and finalize the selection, a detailed evaluation of the alternatives by the City's consultant team is necessary. As described under Task 2 in our Detailed Work Plan, we will further evaluate the options and assist the City in selecting the most appropriate solution for Kotzebue.

Biomass and Energy Efficiency Considerations

Building and water heating typically account for more than 75% of energy use in arctic climates, which is consistent with the existing WTP's usage (approximately 3 times the energy of a similarly sized, modern building). The WTP applies waste heat provided by the Kotzebue Electric Association (KEA) to heat water for community distribution. This process is used to the least extent practical due to the high cost of the waste heat. The remainder of the energy inefficiency is the result of failing building envelope systems, including insulation.

Energy consumption in a new facility will be comparatively reduced by virtue of constructing within modern efficiency standards, and in the selection of construction materials, pumping systems, and simple solutions like LED lighting. Building heat loss can be improved with ventilation control, including heat recovery systems and mixing return air with outside air, building occupancy sensors to control fan operation, and employing thermostats with night setback capabilities to reduce energy demands during unoccupied periods. Energy consumption can also be mitigated by efficient use of the interior building volume, including placing the tallest process features beneath the highest ceiling levels to take advantage of air volume, and employing mezzanine space where practical.

Considering alternative fuels will offer even greater efficiencies. Low-mass, fuel-fired boilers quickly produce heat and feature an energy recovery cycle at the end of heating and hot water production. Renewable energy systems, such as wood chip or wood cord biomass boilers, can provide supplemental heat and reduce overall fuel consumption. Our team has used modular, wood boiler systems in high-cube "connex" containers that may be installed adjacent to the facility. This system can reduce the initial construction cost and improve the payback period.

Building Design Considerations

The building design will be developed with the City's review and inputs, and with due consideration given to mitigating operational, maintenance, and capital costs, which will likely be impacted by recent tariffs and high material demand for Interior Alaska (causing building materials prices to rise). We anticipate the new WTP structure will be an insulated, pre-engineered metal building (PEMB) featuring a concrete, slab-on-grade floor, and located adjacent to the existing facility on unconsolidated, silty soil having a moderate depth of thaw. For this configuration, a flat-loop, thermosyphon cooling system will be considered to address the potential of any degraded permafrost or other marginally frozen soil below the building. The use of pile support at each column of the building frame will be considered to counter any long-term creep under concentrated loading. A geotechnical investigation will be performed to confirm these design approaches.

The building design will be performed in accordance with the International Building Code, referenced standards, and any local amendments. For a PEMB, it appears that the building size reflected in the 2011 PER (7,200 square feet) will readily fit with the limitations of a two-story, Type II B (non-combustible) structure. The building calls for a logical and efficient layout, to optimize the floor space and interior volume with plant functions and unit processes. Due to occupancy and fire protection requirements, separate rooms should be provided for the boiler, electrical equipment, laboratory,

office and breakroom facilities, bathroom, chemical feed equipment, and chemical storage. To address code requirements relating to occupancy hazards and to protect essential WTP functions during community emergencies, we anticipate that interior building areas will be fully covered by a sprinkler system.

Process, heating, electrical, laboratory, chemical feed equipment, and chemical storage would be best located on the ground floor to facilitate operational and maintenance access and the movement of heavy materials. Office, breakroom and bathroom space, ventilation equipment, and miscellaneous storage could be located on a mezzanine level to make more efficient use of the building volume. If access to the facilities is required by the general public or personnel with disabilities, Federal accessibility guidelines will require its incorporation. An interior stairway should be provided for the mezzanine level in order to provide safe access not impacted by inclement weather (as would be the case if just an exterior stairway). Multiple building entrances and exits are necessary to meet emergency egress and equipment removal requirements, and would feature arctic design principles, such as canopy and entryway use, and considerations for mitigating snow drifting. Exterior margins of the building would feature LED lighting to illuminate pathways, parking areas, and working yard areas during the winter season.

Building Demolition Considerations

During the design, sampling for hazardous materials in the existing WTP will need to be completed to document the existing conditions and inform the demolition and disposal plans after the new WTP is online and started up.

Source Improvements

A water treatment facility is only as reliable as its water source. The City of Kotzebue is fortunate to have two, independent water sources, Devil's Lake and Vortac Lake. Vortac Lake is located approximately one mile east of town, and Devil's Lake is further east, about 2 miles from town and beyond an intervening hill. Pumping is required to convey water over this hill to the WTP. The water intake pumps and screens require annual maintenance and cleaning, an operations-intensive task that would benefit from a safer and more reliable process.

The surface of Vortac Lake is situated such that water could flow by gravity to the WTP, if the flow was started with a siphon or pipe run through the dam. However, the dam is understood to be comprised of mostly ice and silt, which is not conducive to drilling a pipe through or under the structure. Additionally, the lake side of the dam is sloughing during periods of high water. With Golder Associates (Golder), our geotechnical subconsultant, we reviewed geotechnical and civil engineering records for the Vortac Lake dam at the Alaska Department of Natural Resources (ADNR) Dam Safety Division. Based on our review of ADNR safety records and Golder's in-house geotechnical library, there appears to be sufficient, baseline technical data to develop a concept-level, engineering feasibility evaluation, coupled with an on-site visual evaluation by our engineering team to develop alternatives for gravity conveyance from Vortac Lake. Also, based on our safety data review, it appears the Vortac Lake dam is scheduled for a safety inspection. We are able to complete this required, periodic inspection as part of our feasibility evaluation to bring the dam structure into current compliance.

Water Main Replacement

Roughly 1,000 feet of buried, 6-inch-diameter, arctic, high-density polyethylene (HDPE) water line between Caribou Drive and Turf Street has been a continuous source of leaks. With HDPE piping, leaks are typically the result of substandard butt fusion or electrofusion techniques, or conditions present during initial construction. In the summer, as the water percolates into the surrounding soil, the impact of the leaks are negligible. In the winter, it is a significantly greater problem as the water surfaces and glaciates in front of the Housing Authority Building. City staff spends a substantial amount of time locating, excavating, and repairing leaks in this segment of piping.

Use of repair clamps is a relatively economical method of fixing leaks for sufficiently restrained piping, but is subject to future leaking when the HPDE pipe section creeps, expands/contracts, or if the surrounding soils cause the joints to move on a seasonal basis. Repairing leaky joints by butt fusion or with electrofusion couplings provide permanent fixes, but are difficult and costly to perform if long segment lengths need excavation and/or removal to facilitate repairs. Cured-in-place sliplining might be considered if pitorifices were not used at service lines. Replacing the existing line with 6 or 8 inch line may be the most feasible approach to permanently fix the leaks. Along with the main distribution line, approximately 12 services in the area would need replacement (amounting to about 1,500 linear feet of piping). If desired by the City, a review of the specific project conditions and construction economics can be performed as part of the alternatives analysis effort to confirm that replacement is the best approach for resolving this problem.

The primary concern with longstanding leaks is the likelihood of thermal degradation of the permafrost below the water line. Further, saturated soils under heavy wheel

loading compromise the integrity of road embankments and pavements. We understand that the degree of thermal impact is believed to be minimal, as the existing road does not appear to heave or settle appreciably. A review of these conditions is nevertheless advisable, as described in our following Detailed Work Plan.

PROPOSED APPROACH

The success of this project will be facilitated by the timely evaluation and selection of a treatment process and the water source improvements, which will allow the design phase to begin as soon as possible and be completed in October 2019. On a parallel but accelerated timeline, the water main design can be completed by June 2019 for summer construction, as requested in the RFQ. Our team will work quickly and thoroughly in the planning process to develop a design approach that will meet the City's objectives.

Detailed Work Plan

Our detailed work plan to the right outlines how we will implement the project, provide high-value service to the City, and meet the scheduling objectives for both the water main and water treatment plant timelines. See *Figure 1. WP* to the right for our **proposed schedule**.

Task 1: Project Initiation and Chartering

Upon selection, we will negotiate a project scope and fee based on the approach and details outlined in this plan. After review of the existing project conditions and relevant documents, we will schedule a chartering meeting in Kotzebue to review the approach with all stakeholders (City staff, permitting representatives, and others) to confirm the success factors that will guide the execution and development of the project. We will present a preliminary evaluation of the treatment processes identified in past studies and recommend which options merit further evaluation. The meeting will also include a comprehensive tour of all existing facilities to gain a deeper understanding of the issues.

The desired outcome of this meeting will be to achieve consensus of the preliminary basis of design for the facility, including plant sizing and capacity needs for current and future demands, and treatment processes meriting further investigation.

Our team will be appropriately sized with members involved with the WTP, source improvements, and water main replacement components of the project. Having this staff overlap will provide cost-effective site visits and continuity between the components of the larger project.

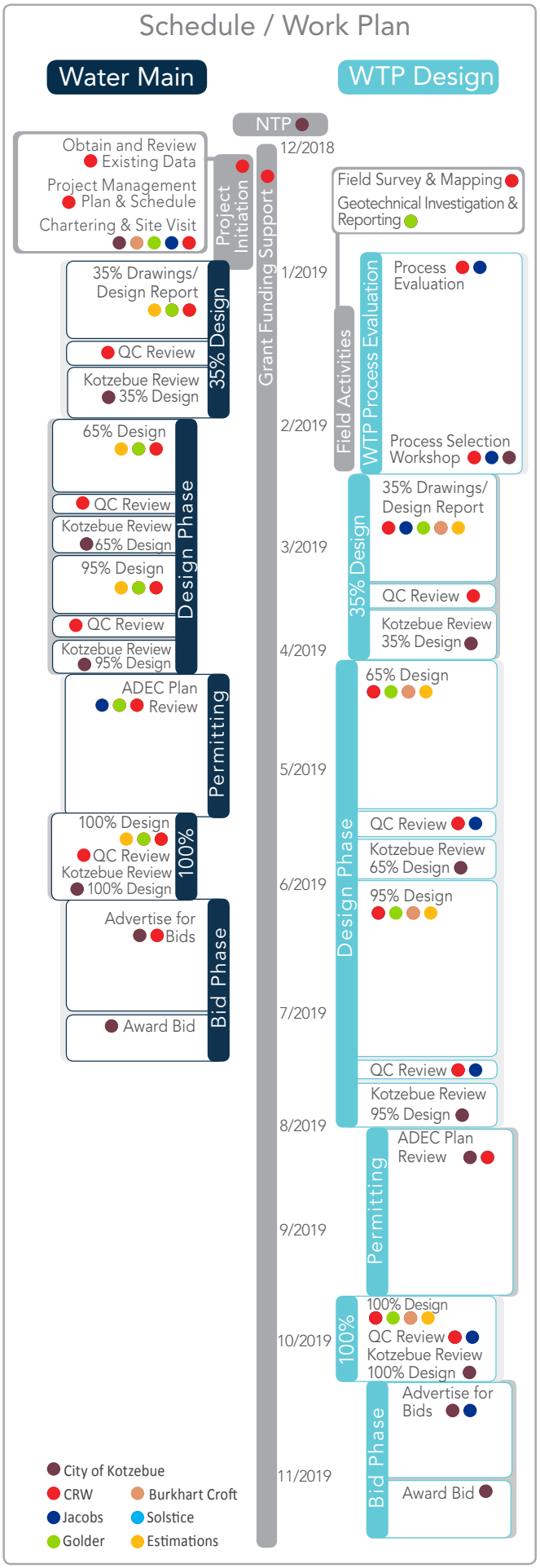


Figure 1. WP

Task 2: Process Evaluation and Selection

At the heart of the project is the evaluation and selection of the water treatment process. We will combine our cold regions water treatment background with the experience of our water treatment specialists from Jacobs, and collaborate with the City in developing processes that are appropriate for the environment and community. Jacobs will lead the process evaluation and selection, guided by their expertise in working with challenging water in cold weather regions throughout North America. The process evaluation will be as follows:

We will develop a treatability study plan that will identify benchtop and small scale pilot testing to inform the cost and desktop-based treatment analysis. Bench scale tests for membrane treatment and GAC performance will be performed on raw water from Kotzebue, after being shipped to TestAmerica's Treatability Study Laboratory in Corvallis, Oregon, a leading water quality and environmental testing firm. Membrane performance will be evaluated based on water quality impacts and a study of membrane fouling parameters. Rapid small scale column tests (RSSCT) of GAC will be conducted to determine how quickly the GAC's organics adsorption capacity is exhausted, a critical component of the operating cost. Ion exchange is not well-suited to benchtop scale testing, so a small scale pilot test will be performed at the existing WTP to confirm design and operating parameters.

During the treatability study, process sizing and other components will be estimated to develop a detailed capital and operating cost. Further advantages and disadvantages of the treatment alternatives will be discussed, as well as cost-reduction options. This work will be summarized in a draft alternatives analysis report for the City's review. It will include brief commentary on the evaluation of building systems, layout of facilities, and alternative energy technologies, including biomass boilers, low-mass boilers, and wind-to-heat systems.

A process selection workshop will be conducted in Kotzebue to discuss the details of the treatability study and evaluation of treatment process options. After the workshop and a consensus on a path forward is reached, the draft alternatives analysis report will be finalized and serve as the basis of design.

Task 3: Geotechnical Services

As a firm with extensive experience in the Kotzebue region and throughout Alaska dealing with frozen ground and difficult geotechnical considerations, Golder will lead the geotechnical investigation. After conducting the geotechnical explorations identified below, Golder will provide foundation recommendations for the new WTP, appropriate trench design for the water main replacement, and the evaluation of alternatives for Vortac Lake.

Water Treatment Plant: A site and project-specific, geotechnical investigation will be conducted to determine the current subsurface soil and ground thermal states. Forecasted climate impacts to foundation performance in marginally frozen to warm permafrost will be included with our design analysis. The geotechnical site characterization will also evaluate the potential for freezing point depression impacts that may be caused by elevated salts or other ions in the recovered permafrost soil samples. Due to the building size and expected foundation loads for a replacement WTP, it may be necessary to use specialized geotechnical exploration and soil sampling means and methods, which would warrant the services of a geotechnical drilling contractor with appropriate equipment.

Water Main Replacement: To determine the nature and extent of thermal degradation along the existing and planned replacement pipeline sections, we suggest conducting a geophysics assessment along the horizontal alignments. Ground-penetrating radar (GPR) and OhmMapper resistivity methods are recommended, coupled with localized, ground truth geotechnical borings. The combination of GPR and Ohm-resistance geophysical methods will provide a vertical profile of subsurface, ground thermal states, particularly if excessive ground ice is present. The geophysics methods will also provide as-built locations of known, buried utilities and an indication of unknown subsurface utilities or other improvements to reduce construction-phase risks. We anticipate using locally available exploration equipment, such as Drake Construction's drill rig, to complete the investigation for this location.

Vortac Lake Evaluation: A feasibility evaluation of dam modifications to allow for gravity flow from Vortac Lake will be conducted. As part of the field work for this evaluation, the required inspection to bring the dam into compliance with AADNR Dam Safety Division will be completed.

Task 4: Survey

Based on the 2011 PER, we assume the new WTP will be located adjacent to the existing facility, where the parts yard is currently located. Existing water distribution loops run across this area, so a detailed base map of the site will be required to locate the new facility relative to the distribution piping, and develop a plan to provide temporary water service during the WTP construction. A detailed

survey base map to locate the existing services requiring replacement will also be developed for the water main replacement component.

Task 5: Design Plans, Specifications, and Cost Estimates

The project team will be fully involved in the design process. CRW's senior, in-house civil, structural, electrical, mechanical, and controls system engineers will lead their respective disciplines. CRW will execute the process engineering design under the direction of Jacobs' Lead Process Engineer. This method provides continuity from the Process Evaluation and Selection phase, with cost-effective design delivered by Alaska staff. Burkhart Croft will lead the architectural design, and Golder will provide geotechnical guidance during the design phase. Estimations will develop cost estimates at the various phases of design.

Design of the water main replacement and the WTP and source improvements will follow the same robust design and quality assurance/quality control approach described in the Quality Control Plan section below. Both designs will have deliverable milestones at approximately the 35%, 65%, and 95% milestones, with the 100% design incorporating permitting review comments in addition to City and QA/QC comments. Developing the design through a stepwise progression maximizes quality and efficiency while minimizing changes. Specific phase details are outlined below:

- 35% Design: This phase maps the direction of the project for the subsequent design stages. Criteria for the water main replacement, architectural, structural, mechanical, electrical, and controls system design will be established. The WTP process design criteria and alternative energy analysis developed in Task 2 will be incorporated into the rest of the plant design. Preliminary drawings and a construction cost estimate will be developed. At this stage, design changes are typically straightforward and readily incorporated, with minimal cost changes.
- 65% Design: In this phase the preliminary design will be developed into detailed drawings and draft specifications, and with these documents, the construction cost estimate will be refined. Comments from the 35% design review will be incorporated, and further details added. After the 65% design is complete, changes in design scope and direction are more costly to integrate, and therefore the City's comprehensive review of these deliverables is critical.
- 95% Design/Agency Review: During this phase, the 65% drawings will be advanced to a final condition for submittal to permitting agencies, as described in Task 6. Any changes in the design at this point will have been the result of previous review meetings. The cost estimate will be updated to reflect changes to material pricing and the current bidding climate.

All deliverables include five paper copies and electronic (PDF) files. CAD files can be delivered as part of preliminary submittals as requested, but it is advisable to submit these files at the final design phase and/or after record drawings are complete. At each design milestone a review meeting between CRW and City staff will be conducted, consisting of a facilitated page-turning through the plans to identify key design features requiring the City's input for preferred standards. Key discussion items will focus on operator engagement with the new facility, system controls, access for maintenance, and general operational efficiency. Incorporating this level of review and discussion will engage Operations staff in the design process, which provides a foundational understanding of how and why a new facility will operate as designed. This focus will optimize the startup process and reduce upsets in the early operating period.

Throughout the design, our team will account for constructability, construction phasing, and the demolition of the WTP. Detailing the transition plan between the existing and new facilities will begin at the 65% level and refined in the 95% design phase. Based on preliminary conversations with the Alaska Department of Environmental Conservation (ADEC), this is a critical component of the plan review process, and care will be taken to develop this transition planning throughout the design.

Performance testing and startup are critical components of the success of a new WTP facility, and is a collaborative process between the engineers, construction contractor, and WTP staff. A smooth plant startup begins with clear specifications outlining the startup testing and commissioning components for each individual unit or building process, leading up to a facility-wide demonstration and challenge test, which is performed in conjunction with operator training. This experience aids the Operations staff in understanding how the new procedures will react to day-to-day changes and how to address unexpected process interruptions. Our team is proficient in starting up new facilities throughout Alaska, and well-versed in detailing the plans and specifications to facilitate this undertaking. Our project requirements will include rigorous plant testing and contractor-provided service support for the first year of operation.

Quality Control Plan

Delivery of well-examined work is critical to project success. Our quality control (QC) chartering session will include a team discussion of quality measures important to the City, which will then be monitored throughout the project. Our Principal in Charge, Jon Hermon, will also serve as Quality Control Manager. Jon will facilitate and coordinate the internal peer review of each project deliverable prior to distribution to the City. Review comment tracking logs will be used to document review comments and the designer's response. Internal review summaries and supporting documentation will be distributed to the City with each design deliverable to document the quality of the work. Our proposed project schedule allows adequate time to execute the Quality Control Plan for each deliverable. Our design team will engage and collaborate with senior reviewers throughout the project. This early and frequent coordination minimizes errors and edits following reviews.

Task 6: Permitting

Permitting process success is facilitated by keeping permits off of the critical path and through early communication with agency reviewers, which begins at the 35% design level for our team. We will prepare and submit draft permit applications for the City to review prior to submitting documents to the permitting agency, and construction approval permitting documents at the 95% design phase to allow for review and approvals prior to finalizing bid documents. This method reduces the potential for permitting-driven addenda during the bid process. Solstice Alaska Consulting (Solstice) will lead the environmental permitting effort, with CRW will leading the ADEC and building official permitting components.

Our collaborative approach with all members of the team, including regulatory agencies, has helped lead projects through the permitting process. Several permit types will be required for this work:

- **ADEC Construction Approval.** Our recent experience with ADEC plan review has indicated that permitting review efforts have become very detailed, with protracted timeframes. While this situation is largely beyond our control, we can potentially mitigate delays by submitting preliminary information early in the design process, to help familiarize the permitting agency with the project and anticipate submittals so they can readily incorporate the work into their schedule.
- **Building/Fire Marshal.** This permit will involve submittal of design documents and response to any concerns from local building officials and the State Fire Marshal. In general, the Fire Marshal will focus on building-related fire protection concerns and rely on the local authority having jurisdiction for reviewing site-related components, such as firetruck access and hydrant locations.
- **Environmental Permitting.** The previous Environmental Report (ER) was comprehensive, but will need updating to reflect changes in the alternatives reviewed. The project scope reflected in the ER was found unlikely to impact wetlands, floodplains, cultural resources, or threatened and endangered species. Modifications to the dam at Vortac Lake would require additional environmental review. We do not propose to "re-create the wheel" by reinitiating consultations with resources agencies, unless site changes exist that were not previously considered. Instead, our team would use the previous ER as a starting point and revise as necessary to reflect new alternatives discussed in the PER and any new environmental conditions. In addition, the ER would need to reflect any changes in environmental laws, including removing references to the Alaska Coastal Management Plan. We would use our established relationship with the U.S. Department of Agriculture (USDA) to ascertain needed changes and make them only as appropriate. Environmental permits are not anticipated unless changes to the site or water intake facilities at Vortac and Devil's Lakes are proposed. If changes are needed, our team will work with the Alaska Department of Fish and Game, ADNR, and the U.S. Army Corps of Engineers to obtain the necessary permits.

Task 7: Grant Funding Support

Through the course of over 30 years serving rural Alaska communities, CRW has worked with numerous funding agencies, including USDA Rural Development, the Economic Development Administration, Environmental Protection Agency, Indian Health Service, Alaska Native Tribal Health Consortium (ANTHC), and Denali Commission. Our team is very familiar with the details of project funding, including the application process and incorporation of stipulation in the plans and specifications. Our experience will benefit the City when applying for grant funding for construction funds for this project and in maximizing the use of these funds.

Task 8: Bid Documents

The separate designs of the water main and WTP improvements will be advanced in parallel. Bid documents for each component will be completed after receipt of the ADEC Approval to Construct and Fire Marshal comments so the final bid package will reflect any changes from these reviews.

Five hard copies and electronic (CAD and PDF) files of final documents will be provided to the City for bidding, and will be comprised of plans, specifications, and Engineers Joint Contract Documents Committee (EJCDC) contract documents integrated into a single package.

Task 9: Bidding Support

The CRW team will provide assistance to the City during bidding including attendance at the pre-bid conference, responding to bidder questions, preparing clarifications, and assisting with addenda, as necessary. This effort will include updates to the cost estimate for any questions or clarifications that require a significant change to the design, or proposed alternatives or substitutions by contractors that may affect the bid price. After bidding is complete, a final conformed set of plans and specifications will be developed for use during construction.

Task 10: Project Closeout

Upon completion of the project, CRW will provide files of record documents to the City. This will include CAD files, design calculations and assumptions, alternatives analyzed, and all supporting documentation. CAD files will be provided in AutoCAD 2018 format, and geospatial data will conform to ESRI ArcGIS geodatabase NAD83 State plane Zone 4 Feet Projection. Other supporting documentation will be in Microsoft Office and PDF files.

Task 11: Additional Services

The CRW team is available to provide additional services requested by the City. Our team is primed to provide any level of construction support, including office-based engineering services, construction administration and management, materials procurement, and on-site inspections. We offer considerable expertise in these areas, enhanced by over 15 years of supporting rural Alaska communities build infrastructure via the force account method used by ANTHC and Village Safe Water (VSW). Our team includes a Certified Construction Manager (CCM), and his review will be included throughout the design to provide input on constructability considerations.

Both CRW and Jacobs are accustomed and prepared to provide operational technical support to the City, including operator training, performance testing, and continued support through the first year of operations.

Interaction and Coordination

Coordination, collaboration, and dialogue between the City and the CRW team is essential for a successful project. We will ensure that the City is a well-informed, active participant in the design process by implementing:

- Clear and frequent communication via phone, teleconferences, and email.
- Bi-weekly teleconferences to review project status and budget.
- Intermediate deliverables to summarize specific tasks and critical project decisions.
- Attendance by key project staff at major deliverable review meetings in Kotzebue.
- Monthly summary reports submitted with billing statements.

CRW Project Manager Rebecca Venot will be the primary point of contact for the City. Principal-in-Charge Jon Hermon will be our direct contact for contractual matters. Other team members will be readily available to the City throughout the project.

KEY PERSONNEL

We have assembled a dedicated team of qualified professionals to serve the City in the four primary aspects of this project:

- Water Main Replacement Design
- Water Treatment Process Selection & Planning
- Water Treatment Plant Design and Source Improvements
- Bidding and Construction Phase Services

To deliver these project elements, we have created a strong, in-house team, supplemented with drinking water treatment process engineers from Jacobs. As a full-service design firm, CRW offers discipline expertise in surveying and the process, civil, structural, mechanical and electrical design associated with this project. Our team includes Burkhart Croft and Golder for architecture and geotechnical services, respectively. Both of these firms bring significant experience in Kotzebue, northwest Alaska, and the North Slope, which will facilitate the design of structures that address the arctic climate and frozen, silty soils. Solstice will provide permitting support services. Our team is very familiar with arctic design and construction, water main replacements, and water treatment process selection and plant design. Our local staff and national experts will collaborate to deliver a plan that draws upon industry-wide best practices for treating water similar to Kotzebue's, while tailoring it to the City's unique goals and needs.

PROJECT TEAM ROLES & QUALIFICATIONS

Jon Hermon, PE, SE, VE, (CRW) will serve **as Principal-in-Charge** and **Quality Control Manager.** He is a lifelong Alaskan and Principal at CRW who has practiced civil and process engineering in communities throughout Alaska for 28 years. He has designed and managed numerous water

treatment projects including jar testing, pilot testing, desktop analyses, design, construction management, plant startup, and process optimization. Jon has served as Contract Manager (Principal-in-Charge) and Project Manager for projects involving multiple design disciplines, such as Bethel's two WTPs, WTP/washeteria projects for Napaskiak, Wales, Nunapitchuk, Gambell, and Deering. Jon recently managed a water treatment improvements project for the City and Borough of Wrangell, which involved jar testing, pilot testing, the writing of a PER, and design support to improve the existing water treatment process. He is currently leading the conceptual civil engineering design for the Kivalina K-12 Replacement School project site and utilities for the Northwest Arctic Borough School District. He offers a substantial understanding of water treatment chemistry and process design, as well as the challenges of design, construction, logistics, O&M, permitting, and site control issues faced in rural Alaskan communities. In addition to leading the technical design of projects, he has prepared scopes of services, fee proposals, negotiated additional work, and managed planning, design and construction assistance services. Contact: 3940 Arctic Blvd., Ste. 300, Anchorage, AK 99503; (907) 562-3252; jhermon@crweng.com.

Rebecca Venot, PE, (CRW) will serve as **Project/Technical Manager**. Rebecca has more than a decade of experience in the planning and design of water infrastructure projects throughout Alaska. She will be responsible for scope development, fee preparation, project team and City coordination, and the overall design effort. Rebecca's background and expertise is in water treatment process selection, design, and construction administration. She has delivered complete, new facility treatment plant designs ranging from small, 100 GPM facilities in Wales to significantly larger, 15 MGD facilities in Ketchikan. Previously employed by CH2M, Rebecca has worked closely with the Jacobs team members on multiple projects. Rebecca understands the complex coordination and requirements of delivering multiple projects simultaneously, and the details necessary to develop a well-coordinated set of plans and specifications to meet the City's goals. She will be fully engaged in helping the project progress smoothly through her proactive leadership. Contact: 3940 Arctic Blvd., Ste. 300, Anchorage, AK 99503; (907) 562-3252; rvenot@crweng.com.

Lee Odell, PE, (Subconsultant, Jacobs) will serve as our **Water Treatment Senior Technical Consultant.** Lee has a wide range of experience in water quality and treatment facility planning and design. One of the hallmarks of his career has been helping utilities find innovative and cost-effective ways to address their specific challenges. Lee has significant design experience in ion exchange for groundwater and surface water, as well as iron and manganese removal experience with high-rate pyrolusite filtration. Contact: 2020 SW Fourth Ave., Ste. 300, Portland, OR 97201; (503) 872-4750; lee.odell@jacobs.com.

Kim Ervin, PE, (Subconsultant, Jacobs) will serve as the **Lead Water Treatment Process Engineer**. Kim specializes in water quality and water treatment planning, alternatives evaluation, bench and pilot testing, design, and construction. She is involved in all areas of water system planning, including policy development, system analysis, treatment process evaluation, conservation planning, and implementation strategy development and prioritization. Kim has extensive experience working in Alaska with projects in Southeast Alaska and for the North Slope Borough. Contact: 1100 112th Ave. NE, Ste. 500, Bellevue, WA 98004; (425) 233-3536; kim.ervin@jacobs.com.

Jim Lozier, PE, (Subconsultant, Jacobs) will serve as **Membrane Senior Technical Consultant**. He is Jacobs' global technology leader for desalination and membrane treatment and an internationally-recognized expert on membrane treatment, desalination and advanced water reuse. Jim has worked with a variety or low pressure membrane (microfiltration and ultrafiltration) and nanofiltration technologies throughout North America and the world, including the design and commissioning of two the first, dual membrane (MF/NF), drinking water facilties in the world at Utqiaġvik, Alaska and Diego Garcia. Contact: 101 N. 1st Ave., Phoenix, AZ 85003; (602) 253-1200; jim.lozier@jacobs.com.

Steven Hebnes, PE, CCM, (CRW) will serve as **Lead Civil Engineer** and **Construction Contract Administrator**. Steven is a licensed Civil Engineer and a Certified Construction Manager with over 18 years of design and construction experience in rural Alaska, including site development and water and sewer facilities. He was the Lead Civil Design Engineer for the Wales WTP/Washeteria. He also leads construction administration services for design-bid-build projects and force account construction. Steven is currently providing construction administration and procurement services for the City of Emmonak Water and Sewer Project, Department of Military and Veterans Affairs, and multiple VSW projects. He has worked in over 35 Alaskan communities accessible only by plane or boat. His experience includes water and sewer systems, solid waste facilities, bulk fuel and

power system upgrades, and transportation improvement projects. Contact: 3940 Arctic Blvd., Ste. 300, Anchorage, AK 99503; (907) 562-3252; shebnes@crweng.com.

Rick Mitchells, PE, (Subconsultant, Golder Associates) will lead the **Geotechnical Investigation** and **Design**. Rick has 35 years of experience as an engineering geologist and geotechnical engineer on a variety of architectural, civil, mining, petroleum, and military projects across Alaska, with special knowledge of warming permafrost. He has conducted geotechnical explorations and developed geotechnical engineering recommendations for community infrastructure improvements throughout Alaska, with an emphasis on remote site projects. Typical remote site projects in warm and degrading permafrost include village schools and facilities, water and wastewater treatment system, potable water storage tanks, bulk fuel storage systems, and broadband communication systems. His experience in Kotzebue includes geotechnical services for the EWT Wind Towers, ATC Kotzebue Dormitory, Kotzebue Youth Center, Northwest Magnet School Foundation Installation Observation; Ted Stevens Way Upgrade; and Terra-NW GCI Communication Towers. Contact: 2121 Abbott Rd., Ste. 100, Anchorage, AK 99507; (907) 865-2537; rmitchells@golder.com.

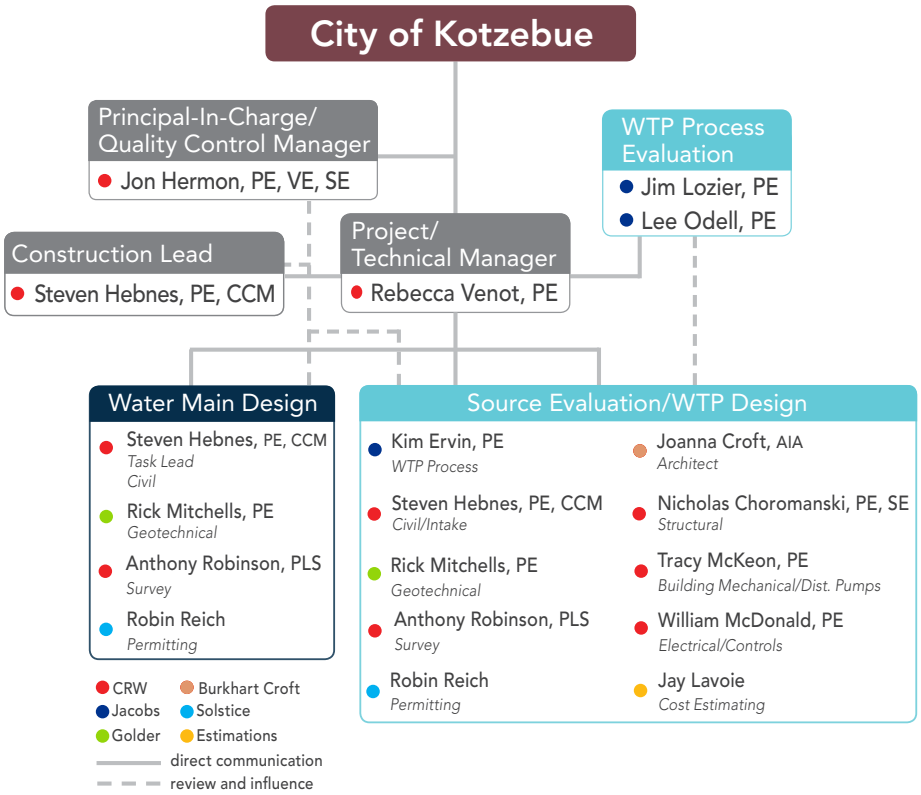
Joanna Croft, AIA, (Subconsultant, Burkhart Croft Architects) will serve as **Principal Architect**. With over 25 years of experience, Joanna has led complex facility design on projects across Alaska, with the majority in rural areas. She has completed projects in Kotzebue and many other Northwest Arctic Borough communities, including the Northwest Magnet School/Alaska Technical Center Renovation and Addition, which converted an outdated building into a modern facility with updated and new spaces; and the Magnet School Dorm, completed in 2014. She is currently working with CRW on the Master Plan and design of the Kivalina K-12 Replacement School. Contact: 880 N St., Ste. 302, Anchorage, AK 99501; (907) 929-9334; joanna@burkhart-croft.com.

Nicholas Choromanski, PE, SE, (CRW) will serve as **Lead Structural Engineer**. Nick is a licensed structural and civil engineer, and has more than 11 years of structural design experience leading teams on numerous projects throughout Alaska. He understands the unique challenges associated with construction in remote Alaskan regions, such as designs that can be built during a short construction season, selecting location-appropriate construction materials, and designing structures to withstand extreme weather conditions. Nick developed the structural designs for several water and wastewater treatment, and washeteria facilities across the state. Recent projects include WTPs for the City of Wales and the City of Arctic Village, and the structural evaluations of the existing wastewater treatment plant for the City of Sitka. Contact: 3940 Arctic Blvd., Ste. 300, Anchorage, AK 99503; (907) 562-3252; nchoromanski@crweng.com.

Tracy McKeon, PE, LEED AP ND+C, QCP, (CRW) will serve **as Lead Building Mechanical and Plumbing Engineer**. Tracy has over 19 years of experience in mechanical design. Her background provides an extensive working knowledge of the cold climate requirements of mechanical systems. Tracy worked for mechanical contractors for six years and has hands-on knowledge of plumbing, mechanical installations, and design. Her recent water treatment plant experience includes the Wales WTP/Washeteria, the Seldovia WTP, and the Deering WTP HVAC Upgrades. She is currently serving as Lead Mechanical Engineer on the AWWU Electrical-Mechanical Term Contract, the Emmonak Water and Sewer Vacuum Station Upgrades, and the Nunapitchuk WTP/Washeteria Design. Contact: 3940 Arctic Blvd., Ste. 300, Anchorage, AK 99503; (907) 562-3252; tmckeon@crweng.com.

Bill McDonald, PE, (CRW) will serve as **Lead Electrical Engineer/SCADA**. Bill has over 44 years of technical and 29 years of professional electrical experience in Alaska, and has designed controls for many wastewater and WTPs, including the Kotzebue, Wales, Bethel Heights, and Arctic Village WTPs. He is the Engineer of Record for electrical, and instrumentation and controls, on the Bethel Heights and Bethel City Subdivision greensand filtration project. As Electrical Engineering Manager for the AWWU Term Contract, Bill works closely with the IT Department on the design and upgrade for controls and instrumentation. He recently modified existing facilities and designed new controls, while coordinating with the existing SCADA, for the AWWU Septage Improvements. Bill's background includes final commissioning and troubleshooting controls and instrumentation at plant startup. On several recent designs, he was tasked with designing controls to interface with "packaged" water treatment systems. Bill's first job as a PHS electrician in 1976 was the ongoing Kotzebue Water Plant Upgrade Project. As Principle Engineer for EDC in the 1990s, he was Engineer of Record and Project Manager for the design and construction of power and controls for the Kotzebue distribution loop pressure system upgrade. Contact: 3940 Arctic Blvd., Ste. 300, Anchorage, AK 99503; (907) 562-3252; bmcdonald@crweng.com.

Anthony Robinson, PLS, (CRW) will serve as **Lead Surveyor**. Anthony's background includes over 20 years of survey experience working as a field surveyor, survey technician, and survey manager. He has extensive experience in remote Alaska performing design surveys, construction surveys, boundary surveys, BIA surveys, ROW mapping, subdivision platting, native allotment surveys, cadastral surveys, geodetic control, hydrographic surveys, and aerial photo control surveys. Anthony is currently the project land surveyor for the Emmonak Water and Sewer upgrades. He has served as project land surveyor for the Arctic Village WTP and River Intake, Atmautluak River Intake, and Tuntutuliak WTP Upgrades. Anthony is familiar with the requirements of rural Alaska, having worked in over 40 remote Alaskan villages. Contact: 3940 Arctic Blvd., Ste. 300, Anchorage, AK 99503; (907) 562-3252; arobinson@crweng.com.



Robin Reich (Subconsultant, Solstice Alaska Consulting) will serve as **Permitting Specialist**. She has more than 20 years of experience in environmental documentation/permitting and public relations. She grew up in Bethel, and understands the importance of protecting the land and local environmental and subsistence resources. Robin has worked on multiple past VSW projects, including the Tuntutuliak Water and Sewer Plumbing and Tanks, Emmonak Water and Sewer Improvements, Chefornak Wastewater System Improvements, and the Wrangell WTP Improvements Environmental Report. Robin will assist with needed permit determination and assistance with acquiring permits, as needed. Contact: 2607 Fairbanks St., B, Anchorage, AK 99503; (907) 929-5960; robin@solsticeak.com.

Jay Lavoie (Subconsultant, Estimations, Inc.) will serve **as Construction Cost Estimator**. For more than 35 years, Jay has provided consulting services in Alaska to design professionals, government agencies, and contractors on over 3,500 projects. This experience provides him with a thorough understanding of most cost estimating issues that may arise, and the skill to conceptualize the cost impacts at early levels of design. Since 2015, Jay and his staff have provided cost estimating services for more than 40, rural communities' sanitation projects, including the Wales WTP/Washeteria Improvements project for CRW. The majority have included PER estimates for the ANTHC Division of Environmental Health and Engineering (DEHE). Jay will provide focused and thorough efforts for cost control and budget maximization. Contact: 1225 E. International Airport Rd., Anchorage, AK 99518; (907) 561-0790; jay@estimations.com.

TEAM ORGANIZATION

Our project team is shown in the organization chart above, with lines of authority and discipline leads depicted:

FIRM QUALIFICATIONS AND EXPERIENCE

Established in 1981, CRW Engineering Group, LLC (CRW) is a multidiscipline engineering firm with a staff of over 70 professionals. CRW is entirely based in Alaska, with offices in Anchorage and Palmer. We are licensed in the State of Alaska to practice land surveying and engineering, and employ professionals in the civil, environmental, structural, electrical and controls, mechanical, and land surveying disciplines. CRW provides professional services to municipal, State, and private institutions throughout Alaska. We specialize in site development, transportation and traffic engineering, storm drainage systems, water treatment and distribution, sewer collection and treatment, pedestrian and bus amenities, platting, mapping and boundary surveys. CRW has served

communities all over the State of Alaska and particularly in the northwest region and other arctic climates. We enjoy a high rate of repeat work from our clients because we offer a substantial degree of expertise, responsiveness, and sense of ownership for every project in which we are involved. CRW is a medium-sized firm with a broad variety of services, which facilitates our ability to lead large projects and provides detailed focus on small projects. We are adequately insured to work on the anticipated size of this project.

The team of CRW, Jacobs, Golder, and Burkhart Croft was assembled to provide a resonant combination of remote, arctic engineering and understanding, technical acumen, and proven experience to serve the City of Kotzebue. Our team provides substantial, comprehensive experience and proficiency with process engineering, arctic facility planning and design, and rural Alaska construction support services. This group is enhanced by the addition of Solstice to provide environmental and permitting support, and Estimations for construction cost estimating.

Our subconsultants were selected based on the following:

- **Jacobs Engineering (formerly CH2M)** is an industry-leading water treatment design firm. Their state-of-the-art, planning and design experience helps clients worldwide deliver high-quality water to the communities they serve.
- **Golder Associates** provides geotechnical services for communities in Alaska, and specializes in supporting the engineering and construction of a wide variety of Arctic and sub-Arctic infrastructure projects, including geotechnical explorations and development of foundation recommendations.
- **Burkhart Croft Architects** is an architectural firm with a portfolio of diverse commercial and public projects, focused on design, production, and project management. They offer considerable experience in rural communities throughout Alaska, and more specifically in the North Slope and Northwest regions.
- **Solstice Alaska Consulting** provides environmental permitting services throughout the state, and specializes in completing SEPA/NEPA processes, including Environmental Assessments and Categorical Exclusion documentation.
- **Estimations, Inc.** provides cost estimating services throughout Alaska and has extensive experience in developing cost estimates for rural projects with challenging logistics.

An essential part of project success is collaboration and close, working relationships both within our team and with our clients. Nobody knows your water and water system better than you, and augmenting the experience of the City's staff with the technical expertise and skills of our team will create a successful outcome.

On the following page, *Figure 2* provides a snapshot of several key projects representative of our background dealing with water main replacements, challenging raw water quality, and cold-climate treatment design, which reveals how our experience can serve Kotzebue.

KEY PROJECT EXAMPLES

Seldovia WTP Design – CRW designed and provided force account construction management of a new, direct filtration water treatment facility utilizing three, eight-foot-diameter, pressure vessels for filtration of a mountain reservoir, surface water source. CRW performed jar testing and desktop studies to evaluate raw water quality and water treatment processes to manage high, raw water organics and associated disinfection byproducts. Direct filtration with corrosion control via polyphosphate injection was selected as the best treatment approach. The facility included a new building, treatment process, piping, and control system. CRW also provided commissioning and follow-up monitoring of the facility.

North Slope Borough Six WTP Designs – CH2M (Jacobs) completed process design for microfiltration followed by nanofiltration designs for the six, North Slope Borough villages. The raw water source for each community is a seasonally thawed tundra pond with high organics, high turbidity, and high iron. The process included raw water heating, particle straining, microfiltration, nanofiltration, and post-treatment chemical addition. The process includes several intermediate break tanks, required to manage the differing flow rates and pressure requirements of the microfiltration and nanofiltration processes. After the initial construction, the microfiltration membranes irreversibly fouled and were eventually replaced with a different technology and more robust cleaning procedure. Within the past 5 years, CH2M completed design of upgrades to the WTP in Wainwright.

Dublin Road WTP – The upgrade/expansion of this facility expanded the treatment capacity by 25 percent with an advanced treatment process. Treatment alternatives included GAC, biological filtration, and ion exchange. Jacobs performed extensive bench and pilot scale testing to size GAC contactors and test different configurations. Piloting of the ion exchange process focused on a variety of regeneration approaches and confirmed the effectiveness for seasonally high levels of nitrate, atrazine, and

Figure 2. Work Experience Matrix

The projects outlined by the orange box are described in detail.

	Project Name and Location	Size (gpm or pipe size)	Planning/ Study	Design	CA/CM	Arctic Environment	Rural Design/ Construction	Project Details	
WTP Projects	VSW - Seldovia WTP, Seldovia, AK	285	■	■	■		■	Direct filtration facility for a high-organics source water using pressure vessels.	●
	North Slope Borough - North Slope Borough WTP Design, 6 NSB Villages	700	■	■	■	■	■	Six microfiltration/nanofiltration plants for high turbidity, iron, and organics surface water sources.	●
	City of Columbus - Dublin Road WTP, Columbus, OH	56,000	■	■	■			Piloting and process design for GAC and ion exchange.	●
	City of Winnipeg, Winnipeg WTP Upgrades, Winnipeg, MB	150,000	■	■	■			Extensive piloting and process evaluation to treat high TOC water.	●
	VSW - Unalakleet WTP, Unalakleet, AK	90	■	■	■		■	Evaluation of direct, two-stage, and GAC treatment processes through benchtop and pilot scale testing for a high organic raw water struggling to comply with DBP regulations. Selected process included direct filtration, with pH adjustment for corrosion control.	● ●
	Englishman River Water Services - Parksville, BC	2,800	■	■	■			Coagulation and membrane filtration process with extensive treatability study.	●
	VSW - Deering WTP Upgrades, Deering AK	25	■	■		■	■	Filtration and disinfection improvements to water treatment process to bring City's system into compliance with drinking water regulations. *Not yet constructed.*	●
	VSW - Wales WTP/W Improvements, Wales, AK	100	■	■		■	■	New infiltration gallery and WTP to treat surface water with relatively low turbidity and microbial contamination, but high levels of uranium and fluoride. *Not yet constructed.*	● ● ●
	Lower Kuskokwim School District - Dis-trictwide Water System Improvements Program, Multiple Villages	300	■	■				Upgrade of water treatment facilities for five village school sites in southwest Alaska faced with brackish source water and high organics using microfiltration and nanofiltration.	●
	Two Bethel WTP Improvements, Bethel, AK	400	■	■	■		■	Raw groundwater had high levels of organically bound iron and manganese, organics, and ammonia. Pilot testing indicated direct greensand filtration was the best process to address all water quality issues.	● ● ●
	City and Borough of Sitka - Indian River Sitka Temporary Filtration Project, Sitka, AK	3,200	■	■	■		■	Process evaluation, design, construction, and operational support for a temporary microfiltration membrane facility to serve a secondary water supply during a primary water source outage.	●
	NW Arctic Borough School District - Kivalina Replacement School, Kivalina, AK	25	■			■	■	Concept design review of overall infrastructure for new school which included siting a water source in Wulik River and pumping to school tanks for subsequent treatment. School would be using a fill-and-draw system.	● ● ●
	VSW - Nunapitchuk WTP, Nunapitchuk, AK	40	■	■	■		■	Extensive pilot testing and PER; added coagulation, new upflow/clarifier greensand filtration, chloramination and corrosion inhibitor for groundwater with high Fe, Mn, As, ammonia and organics. *Not yet constructed.*	● ●
	VSW - Arctic Village WTP/Washeteria, Arctic Village, AK	20	■	■	■	■	■	Conventional filtration package plant with high and highly variable turbidity levels.	● ●
	City & Borough of Wrangell - Water Treatment Pilot Study, Wrangell, AK	1,800	■					Extensive evaluation of technologies for improving treatment process and capacity of City's surface water supply, including desktop assessment, pilot testing, PER and working with operators to improve existing treatment process. DAF and multimedia filtration process selected for design.	● ●
	City and Borough of Sitka - Critical Secondary Water Source Project, Sitka, AK	3,200	■					Evaluation of filtration options for development of a new source. Support through funding process, and eventual design and construction administration.	●
	VSW - Gambell WTP, Gambell, AK	40	■	■	■	■	■	Added granular filtration and disinfection improvements to the City's surface water treatment process to meet drinking water regulations. Iron bacteria, turbidity and Pb/Cu were primary contaminants targeted by new process.	● ●
Water Main Replacement Projects	ANTHC - Kiana Water & Sewer Upgrades - Kiana, AK	6-inch	■	■	■	■	■	2,500 feet of new water main, 2,000 feet of new gravity main, and 1,500 feet of force main with water and sewer service to 7 homes.	●
	City of Valdez - Middle School Water Main, Valdez, AK	8-inch	■	■	■			1,920 feet of 8" and 10" ductile iron pipe installed to serve middle school and replace a section of existing transmission main.	●
	City of Bethel - City Subdivision W&S, Bethel, AK	6-inch	■	■	■		■	12,000 feet of new circulated water main, with 46 residential services for Bethel's City Subdivision.	● ●
	City of Bethel - Bethel Heights Piped W&S Improvements, Bethel, AK	6-inch	■	■	■		■	Replacement of 2,600 feet of recirculating water mains at numerous road crossings within Bethel Heights subdivision.	● ●
	VSW - Quinhagak Water and Sewer Projects, Quinhagk, AK	6-inch	■	■	■		■	More than a decade of support to the City to install more than 5 miles of above-ground water and sewer piping, with 160 services.	● ●
	City of Dillingham - Dillingham Water System Improvements, Dillingham AK	8-inch		■	■		■	Design of 5,700 feet of new mains to eliminate dead ends and replacement of 3,000 feet of existing asbestos cement with ductile iron pipe	●
	VSW - Water and Sewer Improvements, Seldovia, AK	10-inch	■	■	■		■	Replaced 3,140 feet of buried leaking thin-wall steel pipe with ductile iron and HDPE water mains	●
	AWWU - Sullivan Arena/Ben Boeke Water Upgrade, Anchorage, AK	10-inch	■	■	■			Replaced 3,200 feet of failing buried water main with 10" HDPE piping.	●
	City of Emmonak, Water and Sewer Improvements, Emmonak, AK	6-inch	■	■	■		■	Replacement of two loops of high/low pressure system with fully circulating system.	● ●
	Native Village of Tanacross - Sewer Improvements, Tanacross, AK	4-inch	■	■	■	■	■	1,850 feet of buried arctic pipe force main between new lift station and septic system	●

● CRW ● Burkhart Croft ● Jacobs ● Solstice ● Golder ● Estimations

TOC. The pilot study allowed the City of Columbus, Ohio, to make an informed decision on a new treatment process that saved over $100 million of capital cost compared to previously identified membrane treatment solutions.

Unalakleet WTP Upgrades – CRW performed the design and force account construction of upgrades to the Unalakleet WTP to address elevated levels of disinfection byproducts in the finished water. The project included on-site pilot testing, design, and construction management. The process evaluation compared direct filtration to two-stage filtration and GAC treatment. Improvements included replacing old sand filters with mixed-media pressure filters with backwash and air-scour systems, constructing a dedicated chemical storage room, and installing a new, coagulant batching and dosing system.

Winnipeg WTP – Long term planning for Winnipeg, Manitoba's 2040 water system included a multi-year pilot program to identify and evaluate WTP processes. Pilot processes included direct filtration with/without pre-ozonation and media filtration; conventional treatment with dissolved air flotation, with/without intermediate ozonation; shallow and deep-bed filtration; and biologically active GAC filtration. In parallel with the pilot plant, a number of off-line tests were carried out to determine GAC bedlife, simulated distribution system disinfection by-products, algal toxins, organics reduction, disinfectant demand and decay, and taste and odor control.

Englishman River Water Service & WTP – During the predesign phase for this project in British Columbia, Jacobs performed extensive treatability testing to determine the best approach to provide filtration (membrane or conventional filtration), remove color and disinfection byproduct precursors (ion exchange, ozone/BAC, nanofiltration, coagulation), and manage residuals (enhanced wetlands, 2nd stage membranes). The design criteria developed during treatability testing was used to develop layout, cost estimates, and technical assessments of each alternatives. Based on the criteria developed jointly with the client and operations staff, membrane filtration and coagulation were selected as the best-value treatment process. Subsequent to membrane procurement, the performance and design criteria of the coagulation/membrane process was confirmed during a 5-month pilot study.

Water Main Replacement, Statewide – CRW has designed thousands of feet of water and sewer main extensions and replacements throughout Alaska, including Bethel, Emmonak, Quinhagak, Valdez, Kiana, Tanacross, Anchorage, and Seldovia. We have experience with all styles of recirculating, high-low pressure, and conventional distribution systems for buried and above grade systems using HDPE piping. We have extensive knowledge of arctic pipe construction and offer a library of standard pipe details that can be readily adapted to the needs of a project, as well as standard trench details customizable to the unique geotechnical details of an individual project. Our team can design around complex utility easements and conflicts to replace the failing water main in Kotzebue. We are also well-versed in modeling and designing pumping systems and associated controls that serve both conventional and recirculating distribution systems.

CONSULTANT LOCATION

CRW's Midtown Anchorage is conveniently located near the airport and midtown hotels, facilitating ease of meeting with City staff visiting Anchorage and our subconsultants. Our team has the ability to meet anytime, using screen-sharing and video conferencing services to bridge the distance between Anchorage and Kotzebue, allowing our team to function as though they are in a single office. Additionally, many CRW engineers travel through Kotzebue as part of the firm's work in the region, and site visits or meetings can be arranged in conjunction with other travel. Golder and Burkhart Croft are also located in Anchorage. Jacobs team members are based in Washington and Oregon, and also have an Anchorage office.

PROJECT MANAGEMENT

Successful project management requires proactive communication and coordination with the City, permitting and regulatory agencies, and the project team. Our Project Manager, Rebecca Venot, will be a responsive and dedicated point of contact for City staff in managing the scope, schedule, and budget. Rebecca will take responsibility for achieving a successful outcome for the City of Kotzebue, and she is exceptionally proficient at leading teams to high-quality work products though documentation and project reporting.

Rebecca will provide bi-weekly progress updates to the City via email or a phone call. The updates will include an action item and decision log, changes and modifications to the scope, schedule, and budget, and other project coordination details. At the time of submittals, she will distribute a review comment tracking form to document all comments and provide a coordinated response to City staff. Rebecca will distribute meeting agendas and minutes for all meetings and workshops held over the course of the project.

Our Detailed Work Plan and Schedule is included in the Proposed Approach Section, on page 4.

Thank you for your time and consideration.

JON HERMON, PE, SE, VE

Principal/Civil Engineer

Jon Hermon is a lifelong Alaskan and a Principal at CRW Engineering Group, LLC. He has practiced in the areas of civil, process, and structural design for 28 years in communities throughout Alaska. His diverse design and project management experience includes water, sanitary sewer, and Arctic utility systems; water and wastewater treatment, roadways, and site development. Jon uses a "hands-on" management style that keeps him involved in the design process; he actively designs in many of the projects under his leadership. He has provided process and structural design for most of his water and wastewater facility projects. Jon has been with CRW since 1996.

EDUCATION

BS, Civil Engineering
Oregon State University
(1985)

REGISTRATION

Professional Civil Engineer, Alaska
(CE 8229)

Professional Environmental Engineer, Alaska (EV 14139)

Professional Structural Engineer, Alaska
(ET 14161)

RESIDENCY

Alaska

PROFESSIONAL AFFILIATIONS

American Water Works Association (AWWA)

REFERENCES

Lynn Marino, PE
State of Alaska
Village Safe Water
Project Manager (Retired)
(907) 279-3593

Donna Lee, PE
State of Alaska
Village Safe Water
Project Manager
(907) 269-7611

Amber Al-Haddad
City and Borough of Wrangell
Department of Public Works Director
(907) 874-3904

PROJECT EXPERIENCE

Wales Water Treatment Facility and Washeteria Improvements – Wales

Jon served as Contract and Project Manager for this Village Safe Water project, which involved the study and design of a new, modular water treatment plant/washeteria facility, and permitting a new, surface water source. Jon led a design team comprised of multiple disciplines through a complex archaeological, geotechnical, and site control planning process. Throughout the duration of the work, Jon was closely involved in all aspects of numerous studies, design development, public involvement, and permitting.

Water Treatment Plant Improvements – Gambell

Jon served as Project Manager for the water treatment analysis and design of improvements made to the City of Gambell's existing water treatment plant. Jon oversaw on-site jar testing and a treatment study, and was directly involved in the planning and concept design of the water treatment process, which included oxidation, coagulation, filtration, and disinfection system improvements. The project also included the design and construction of a new, 1.3-million-gallon, water storage tank.

Bethel Heights and City Subdivision Water Treatment Plants – Bethel

As Project Engineer, Jon designed two water treatment facilities for the City of Bethel to remove iron, manganese, and organics. Facility design for each plant included 400 GPM greensand filtration systems; water truck filling stations; 500,000-gallon, water storage tanks; and pumping facilities for circulating water distribution systems. He supervised jar and pilot testing, and was actively involved in helping plant operators optimize water treatment performance in advance of new drinking water regulations.

Drinking Water Pilot Testing and Various Design Improvements – Wrangell

Jon served as Contract and Project Manager for this project, which involved the evaluation of water treatment improvements for the City and Borough of Wrangell (CBW), which operates a 1.3 MGD, pre-ozonation/slow sand filtration plant that struggled to meet summer water demands. The project included a desktop evaluation to assess various water treatment options, with dissolved air flotation selected for pilot testing. CRW helped CBW pursue project funding for these improvements, included the writing of a PER and ER, which were successfully used to secure USDA Rural Development funding. CRW also assisted CBW in the evaluation and design of various other process improvements to the existing facility.

REBECCA VENOT, PE

Civil Engineer

Rebecca Venot is a skilled Project Manager and Water Treatment Engineer specializing in water treatment planning, design, and optimization. She has led multi-discipline design teams delivering complex new and retrofit treatment plant improvements throughout Alaska. She has served as an on-site engineer during construction of several treatment plants, and thrives on coordinating and leading challenging plant start-ups. Rebecca joined CRW in March 2017.

EDUCATION

MS, Civil & Environmental Engineering, Colorado State University, Fort Collins (2007)

BS, Mechanical Engineering University of Colorado, Boulder (2005)

REGISTRATION

Professional Civil Engineer, Alaska (CE 12905)

Professional Civil Engineer, Washington (CE 47744)

RESIDENCY

Alaska

PROFESSIONAL AFFILIATIONS

American Waterworks Association
M37: Operational Control of Coagulation and Filtration Processes Rewrite Subcommittee

Alaska Water/Wastewater Management Association Membership Committee Chair & Board Member

REFERENCES

Shilo Williams
City and Borough of Sitka
Environmental Superintendent
(907) 474-4071

Oscar Menendez, PE
State of Alaska
Village Safe Water
Project Manager
(907) 269-7606

Elizabeth Merrill, PE
Alaska Native Tribal Health Consortium
Project Manager
(907) 729-4022

PROJECT EXPERIENCE

VSW Wales Water Treatment Plant and Washeteria Improvements – Wales

Rebecca was the Project Manager and Process Engineer for the design of a new water treatment plant and washeteria (WTP/W) for the City of Wales. The project included a new river intake, modular WTP/W building on a new site with a thermosyphon cooling system, potable water distribution pumping, waste heat recovery, and an on-site septic system and drain field. Construction of the WTP and washeteria modules is expected in 2019, with installation and start up scheduled for 2020.

VSW Deering WTP Improvements – Deering

Rebecca was the Lead Process Engineer for the design of improvements to the Deering Water Treatment Plant, including a two-phased approach to bring the WTP into compliance with current drinking water regulations. The upgrades include direct filtration with pressurized filtration vessels, GAC filtration, UV disinfection, and fluoride and chlorine injection. Construction is underway, with start-up in late 2018.

Critical Secondary Water Supply Project – Sitka

Rebecca is the Project Manager and Lead Process Engineer for the evaluation of filtration alternatives for the City and Borough of Sitka, to develop a secondary water supply. The filtration evaluation considered granular and membrane filtration of two water sources, and developed conceptual plans and capital and operational cost estimates for each alternative. Once funding is secured, Rebecca will lead the final process selection, design, and construction administration of this project.

***Temporary Filtration/Indian River Project – Sitka**

Rebecca evaluated alternatives for the location and type of treatment for Sitka's potable water supply during a multi-month outage to facilitate a dam raising project. Rebecca led the design and construction administration of a temporary direct microfiltration membrane filtration system with raw and finished water pumping, chlorine dosing, backwash handling, and chlorine contact storage tanks was selected.

***Water Treatment Plant Upgrades – Wainwright**

Rebecca was the lead process engineer for renovations to the existing microfiltration/nanofiltration plant built in the mid-1990s. She was responsible for coordination of construction phasing and sequencing to keep the plant operational during the brief summer treatment season.

**Indicates projects with a previous employer*

Jim Lozier, PE

Global Technology Leader for Desalination and Membrane Treatment

Jim Lozier is Jacobs' Global Technology Leader for Desalination and Membrane Treatment and is an internationally recognized expert on membrane treatment, desalination, and advanced water reuse. Jim has worked with a variety or low pressure membrane (microfiltration and ultrafiltration) and nanofiltration technologies throughout North America and the world, including the design and commissioning of two of the first dual membrane (MF/NF) drinking water facilties in the world at Utqiaġvik Alaska, and Diego Garcia. Jim brings vast experience in evaluating, designing, and implementing the full range of membrane treatment processes including RO, NF, UF, MF, and ED.

Jim's experience relevant to the Kotzebue project includes his involvement with bench/pilot testing, plus full-scale plant design and post-commissioning optimization of MF/NF plants for the Barrow Utilities Electric Cooperative, Inc. (BUECI) and the North Slope Borough.

Education

M.S., Civil Engineering, University of Arizona
B.A., Biology, State University of New York

Professional Registrations

Professional Engineer: Arizona (2010, No. 46341)
Professional Engineer: Florida (1993, No. 46999)

Project Experience

Senior Consultant on the design of three, small-capacity, integrated membrane treatment plants for the Lower Kuskokwim School District in southwest Alaska. The plants will utilize Memcor microfiltration, ***nanofiltration,*** and disinfection with free chlorine to produce drinking water that meets all current and anticipated drinking water regulations, and in particular, the ESWTR and D/DBP Rule. The raw water sources are both fresh and brackish, and contain high levels of TOC (6 to 25 mg/L), and low levels of hardness and alkalinity. These sources are also a high risk for Giardia and Cryptosporidium contamination. Responsibilities include assistance in preparation and review of design specifications and drawings, and assistance during construction and startup.

Senior Process Engineer on the design of a 72,000-gpd, dual-membrane demonstration for the Barrow Utilities Electric Cooperative, Incorporated (BUECI) in Barrow, Alaska. The demonstration treats an impounded surface water containing moderate turbidity, high total organic carbon (TOC), and Giardia and Cryptosporidium by using two membrane processes: microfiltration (MF) and nanofiltration (NF). The plant, placed into operation in August 1995, has operated continuously and provided a treated water that meets all current and anticipated future drinking water regulations and is currently being expanded in capacity. The system consists of one 50-gpm MF unit and two parallel 20-gpm NF units. Prepared specifications and drawings for the dual-membrane plant, reviewed and approved vendor submittals during construction, and assisted in plant operations for purposes of troubleshooting membrane fouling problems and training of operators in enhanced membrane cleaning operations.

Principal Investigator for the American Water Works Research Foundation project Microbial Removal and Integrity Monitoring of High-Pressure Membranes Used in Water Treatment. This research focused on quantification of viral and protozoa pathogen removal by ***nanofiltration*** and reverse osmosis and methods for monitoring the integrity of such membranes for pathogen removal. Responsible for overall project management; preparation of experimental protocol; oversight of bench testing by University of Illinois and pilot testing at City of Chesapeake, VA, and Orange County Water District, CA.; conducting project advisory committee briefings; data review and analysis; and preparation of periodic and final reports. The project was co-funded by the U.S. Bureau of Reclamation.

Dual membrane treatment for precursor removal. Senior Consultant on a 6-month pilot study for the New Jersey American Water Company. The study, conducted to satisfy the requirements of the U.S. EPA's Information Collection Rule, used the combination of Memcor microfiltration (MF) and ***nanofiltration (NF)*** to treat waters derived from the Passaic River. The study included bench-scale comparison of the performance of four NF membranes to selecting the most appropriate for pilot testing. Responsibilities included interfacing with EPA's ICR technical representative, selection of membranes for bench testing, assistance in development of test protocol and equipment design, data/results review, participation in weekly conference calls and project meetings with NJAWC, and development and review of final project report.

NOM and precursor removal. Lead Process Engineer for a membrane pilot study conducted for the City of Chesapeake, Virginia, to obtain criteria for the design of a 10-mgd water treatment plant (WTP) to process water high in color and dissolved organic matter from the Great Dismal Swamp. Pilot testing was conducted on a variety of nanofiltration membranes receiving surface water processed by alum coagulation, sedimentation, and filtration. Responsible for plant design; construction oversight and plant operator training.

Lee Odell, PE

Global Technologist for Drinking Water Reuse

Lee has a wide range of experience managing projects in water resources, water quality and treatment, water reuse design, and facilities planning. One of the hallmarks of his career has been helping utilities find innovative and unique ways of addressing their specific problems. Mr. Odell has 29 years of experience as an Engineering Consultant and 4 years of experience as a Water Treatment Plant Operator and Operations Supervisor.

Since 1996, Mr. Odell has helped find an innovative, cost-saving method for removing iron and manganese from drinking water supplies. Using pyrolusite, a manganese dioxide-based ore, Mr. Odell has helped develop a process for iron and manganese removal that can run at loading rates as high as 10 to 15 gpm per square foot. The consequences of this high loading rate application means that filters can be smaller and facility costs can be lower while maintaining better iron and manganese removal than many of the traditional methods. Mr. Odell has conducted pilot testing, demonstration testing, design and has overseen installation of pyrolusite filtration systems that have saved clients 50 to 75 percent over traditional iron and manganese treatment technologies.

Lee has designed several ion exchange treatment facilities for surface water and groundwater systems ranging from 30 gpm to 82 mgd in capacity.

Education

M.S., Environmental Engineering, University of Iowa
B.S., Civil Engineering, University of Iowa

Professional Registrations

Professional Engineer: Professional Engineer: Washington, 2/1993; Oregon; Illinois, South Carolina, New Mexico

Relevant Experience

Ion Exchange for Surface Water Facility, Process Lead, Dublin Road Water Purification Plant Columbus, Ohio.

Led the process design for the nitrate removal facilities for nitrate removal at the Dublin Road Water treatment plant. The work included developing design criteria evaluating alternatives, selecting ion exchange technologies, NPDES permit negotiations, preliminary and final design of a 200 MLD capacity nitrate removal facility. Developed an operating model and led pilot testing to evaluate alternative regeneration strategies.

Ion Exchange for blended groundwater and surface water Facility, Lead Process Designer, Zone 4 Groundwater Facility, City of Glendale, Arizona.

Lee served as Lead Process Designer for the City of Glendale's 40 MLD Zone 4 Groundwater Supply and Treatment Facility. The project included design of four new groundwater wells, conveyance to a central treatment facility and construction of an ion exchange system that minimized regeneration waste for the City of Glendale's Zone 4 groundwater supply. The project was completed as a GC/CM project with CH2M HILL as the designer and Sundt Construction as the GC/CM.

Ion Exchange For Surface Water Facility, Lead Process Designer, Fleur Drive WTP, Des Moines Water Works.

Lee is currently serving as the Lead Process Designer for an 80 MLD nitrate removal ion exchange facility for the Des Moines Water Works' Fleur Drive WTP. This anion exchange facility will allow the Fleur WTP to continue to meet regulatory levels, during seasonal elevated nitrate conditions in the two rivers that serve the WTP: the Des Moines and the Raccoon.

Ion Exchange for Groundwater Facility, Lead Modeler, Hanford West Groundwater Remediation, U.S. Department of Energy.

Lee developed a uranium adsorption model and prepared laboratory tests to calibrate and support the model in preparation of ion exchange treatment to remove uranium for the Hanford Nuclear Reservation's 200 West Groundwater Treatment Plant.

Kimberly K Ervin, PE

West Region Service Leader, Drinking Water, Senior Technologist

Ms. Ervin is Jacobs' West Region Service Leader for Drinking Water, responsible for technology development, monitoring industry drivers, and linking technologists to projects. She is also a Project Manager with Jacobs' Water Business Group in Seattle, Washington. She specializes in water quality and water treatment planning, alternatives evaluation, bench and pilot testing, design, and construction. She is an accomplished project manager on small to large, multi-discipline projects including planning, design, and construction. She is involved in all areas of water system planning, including policy development, system analysis, treatment process evaluation, conservation planning, and implementation strategy development and prioritization. She is an ultraviolet (UV) and ozone system designer (all phases) for Cedar Water Treatment Facility, as well as UV system specialist for UV feasibility studies for Northwest utilities.

Education

M.S., Civil Engineering, Stanford University, 1994
B.S., Civil Engineering, University of Washington, 1993

Professional Registrations

Professional Civil Engineer: Washington, 1998 (No. 34797)
Professional Civil Engineer: Alaska, 2007 (No. 11697)

Water Treatment Facilities

Regional Business Manager; Cedar Water Treatment Facility Operations; Seattle Public Utilities; Washington; 2013.
Business Manager for operations of a 180-mgd water treatment plant. Responsible for regulatory and contract compliance, staffing, financial management, safety, and sustainability.

Engineering Manager; Watershed Microbial Source Tracking; Ketchikan Public Utilities; Ketchikan, Alaska; 2013.
Program to evaluate and identify sources of recent increases in fecal and total coliform in the source water for this unfiltered water treatment plant. Project used state-of-the art, microbial "finger printing" to identify the sources of contamination.

Design Manager; Camas Slow Sand Treatment Plant; Camas, Washington; 2012 to 2013.
Design Manager for design and construction of slow sand facilities to replace pressure filter system. Facilities included upflow roughing filters, slow sand filters in earthen basins, on-site generation of hypochlorite and space for future pH adjustment.

Design Manager; Wainwright Water Treatment Plant Upgrade; Wainwright, Alaska; North Slope Borough; 2012 to 2013.
Design Manager for demolition and replacement of existing membrane and reverse osmosis water treatment plant on the North Slope of Alaska. Project challenges included project planning and scheduling for the one available barge during the construction season, and maintaining plant operations during construction.

Project Manager; Sitka Temporary Filtration Facilities; Sitka, Alaska; 2012 to 2014.
Managing evaluation, design, and construction of temporary treatment facilities. The City's water supply was out of service during the summer of 2014 for work on the existing dam. During this time, the city used an alternate water source that required full surface water treatment. The temporary facilities included membrane filtration, chlorination, chlorine contact storage, chlorine feed facilities, and raw and finished water pumping.

Project Manager; Raymond Water Treatment Plant Upgrade; Raymond, Washington; 2011 to 2013.
Upgrade of the 1970's water treatment plant for compliance with Long Term 2 Disinfection Byproducts Rule. Early phases of the project included bench testing to evaluate treatment alternatives leading to design and construction of packaged flocculation and plate sedimentation treatment units, improved rapid mix system, and chemical coagulant modifications for improved removal of DBP precursors.

Project Manager; Sitka UV Facility; Sitka, Alaska; 2010 to 2014.
Managing design and construction of treatment facilities for compliance with the Long Term 2 Enhanced Surface Water Treatment Rule. Facilities included UV disinfection with space for future on-site hypochlorite generation and sodium fluoride for fluoridation.

Senior Consultant and Design Manager; UV Disinfection Facility; City of Kodiak; Kodiak, Alaska; 2004 to 2012.
Senior Consultant for evaluation of the feasibility and design for UV on the city of Kodiak's unfiltered source under the Long Term 2 Enhanced Surface Water Treatment Rule. The evaluation included a year-long water quality monitoring program, regulatory evaluation, comparison of regulatory compliance alternatives, and UV facility conceptual plans. Final facilities included UV disinfection and flow control incorporated into the existing on-site hypochlorite generation system and soda ash for pH adjustment. Led commissioning of the new water treatment plant in 2012.

Senior Consultant and Design Manager; Ultraviolet (UV) Feasibility and Disinfection Byproduct (DBP) Control; Ketchikan Public Utilities; Ketchikan, Alaska; 2004 to 2008.
Senior Consultant for evaluation and design of UV disinfection and chloramine to halt the formation of disinfection by-products for this unfiltered source. The evaluation included a year-long water quality monitoring program, regulatory evaluation, comparison of regulatory compliance alternatives, and facility recommendations. Final facilities included UV disinfection and conversion to chloramination.

STEVEN T. HEBNES, PE, CCM

Civil Engineer and Certified Construction Manager

Steven is a lifelong Alaskan with a strong background in rural civil and sanitary design, soil and site investigations, cold regions engineering, and construction management. With over 18 years of experience, including four years working as an owner and contractor quality control representative, he has hands-on experience in construction, design, project and construction management, and regulatory compliance. Steven has an extensive knowledge of Arctic civil engineering design considerations and solutions. He is responsible for detailed designs, calculations, CAD drawings, and general engineering support. Steven joined CRW in 2007.

EDUCATION

BS, Civil Engineering
Montana State University, (2005)

REGISTRATION

Professional Civil Engineer, Alaska (CE12462)

Certified Construction Manager, CMAA (#10642)

RESIDENCY

Alaska

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers

REFERENCES

Oscar Menendez, PE
State of Alaska
Village Safe Water
Project Manager
(907) 269-7606

Tiffany Tritt-Yatlin
Arctic Village Council
Tribal Administrator
(907) 388-6309

Cassidi Cameron
City of Seldovia
City Manager
(907) 234-7643

PROJECT EXPERIENCE

Wales Water Treatment Plant/Washeteria – Wales

Steven was the Lead Civil Engineer for development of a site for a new water treatment plant (WTP) and washeteria. The work included evaluating project sites based on land ownership (multiple landowners/heirs), historical cultural resources, and hazardous waste contamination. The design consisted of a new, 1,904-square-foot, modular WTP and washeteria building. Project tasks included permitting and design of a building pad, a riverbed infiltration gallery, a wastewater drain field, and water and sewer piping utilities.

Emmonak Water and Sewer Upgrades – Emmonak

Steven was the Project Engineer involved with the civil-structural design of new, above-grade utilidor water and sewer service boxes; pipe supports; and a mezzanine structure within the existing WTP. The project included three bid projects over multiple years. He currently provides construction administration services and is responsible for reviewing construction submittals, pay applications, design clarifications, change order requests, and site inspections. He is the main point of contract between the Owner, Contractor, and Grant Agency.

Seldovia Water Treatment Plant – Seldovia

Steven was the Project Manager for the construction of a WTP in the community of Seldovia. The new facility is a 2,079-square-foot, pre-engineered metal building that utilizes three, eight-foot diameter media filters capable of treating water at a rate between 80 and 285 GPM. He was responsible for providing construction management services which included overseeing force account employees, material procurement, design clarifications, and tracking the cost, schedule, and construction progress.

Napaskiak Replacement School K-12 – Napaskiak

This project involved developing a new school location, building access boardwalks, utilities, water storage tanks, and a new sewage lagoon. Steven was the Project Engineer responsible for all site development tasks, the design of a boardwalk/elevated truck crossing, permitting, and coordination with other disciplines. He also provide construction administration services.

GOLDER

RICHARD MITCHELLS

Education

BS, Geology, Youngstown State University, Ohio, 1979

MS, Geological Engineering, University of Alaska, Fairbanks, 1991

MS, Engineering Science Management, University of Alaska, Anchorage, 2001

MBA, University of Alaska, Anchorage, 2004

Certifications

Professional Engineer, Alaska (CE 8594)

Principal and Senior Geotechnical Engineer

Richard Mitchells has over 35 years of experience as an engineering geologist and geotechnical engineer on a variety of projects in Alaska. He has special training and experience in arctic engineering, engineering geology, and earthquake engineering. Mr. Mitchells has provided geotechnical engineering services on architectural, civil, mining, petroleum, and military projects across Alaska, with special attention on projects with warming permafrost. His background includes considerable work with the design of foundations for wind towers and similar structures in remote parts of the state, where he has developed new applications and unique foundation systems.

RELEVANT EXPERIENCE

Schools: Kotzebue, Naknek, Utqiagvik, Chefornak, Emmonak, Bethel, Wainwright, Point Lay, Nuiqsut, Anaktuvik Pass, Atqasuk, Kaktovik, Kalskag, and St. Marys, Alaska

Lead Geotechnical Engineer for site investigation and foundation design for rural school projects. Unique foundation design constraints included ice-rich, saline permafrost warranting passively cooled, adfreeze piling and the first use of large diameter helical piles in unfrozen soil for the Kalskag school project. The large diameter helical piles provided a significant cost savings relative to a drive pile and eliminated concerns with potential frost heave for an unheated (over-winter), shallow foundation system.

Public Buildings: Naknek, Utqiagvik, Bethel, Scammon Bay, St. Marys, Alatna, Deadhorse, Hopper Bay, and Tuntatuliak, Alaska

Lead Geotechnical Engineer for site investigation and foundation design for rural public buildings.

Communication Towers: Kotzebue, Naknek, Shishmaref, Delta Net - YK Region, St. Marys, Kodiak, and Utqiagvik, Alaska

Geotechnical Engineer of Record for twenty-eight, lattice-type, microwave towers installed in the Yukon-Kuskokwim region (Delta Net) to support telecommunication between the region's village and the IHS hospital in Bethel. Unique project requirements included grouted anchor tower foundations for leg loads in excess of 500-kips, severe wind/ice loading conditions, and remote site logistics to meet a three-year design and construction schedule.

Potable Water Tanks: Pt. Lay, Wainwright, Gambell, Kipnuk, Diomede, Deadhorse, and Kongiganak, Alaska

Geologist and geotechnical engineering for new potable water storage projects.

Water, Sewer and Solid Waste: Naknek, Shishmaref, Utqiagvik, Emmonak, Wainwright, Point Lay, Nuiqsut, Shageluk, Bethel, Nunapitchuk, Tuntululiak, Nightmute, Quinhagak, St. Marys, and Mekoryuk, Alaska

Geotechnical Engineer for site assessments and foundation design for water and sewer extensions.

Bulk Fuel Storage Facilities: Shishmaref, Utqiagvik, Emmonak, Wainwright, Point Lay, Atqasuk, Kipnuk, Deadhorse, Chefornak, Cape Newenham, Indian Mountain, Sparrevohn, and Kaktovik, Alaska

Geotechnical Engineer for site assessments and foundation design for bulk fuel storage facilities in western and North Slope Alaskan villages. Foundation systems include refrigerated fill pads and adfreeze pile foundation systems. Unique project requirements included large creep-potential saline soils and massive ground ice under large, sustained loads.

Wind Turbine Projects: Kotzebue, Nome, Quinhagak, Unalakleet, Kwigillingok, and Tuntutulaik, Alaska

Lead Geotechnical Engineer for site investigation and foundation design for wind turbines installed in Nome, Unalakleet, and Quinhagak, Alaska. Project work included conducting site explorations and foundation designs for reinforced concrete mat, adfreeze pile, and tensioned rock anchor foundations.

Joanna Croft, AIA NCARB
Burkhart Croft Architects, LLC
Principal Architect

Project Role
Principal Architect

Registration
Professional Architect
Alaska #A-9431

Education
BA, Economics & Political Science
Stanford University
MA, International Policy Studies
Stanford University
Master of Architecture
University of California at Berkeley
Arctic Engineering, UAA

Professional Affiliations
American Institute of Architects (AIA)
Association for Learning Environments

***State of Residency**: Alaska*

Joanna Croft is a founding Principal at Burkhart Croft Architects and will serve as Principal Architect for the Kotzebue Water Treatment Plant. With over 25 years of experience, Joanna has led complex facility design on projects across Alaska, with most of her work in rural areas of the state. Joanna excels in space program development and integrating initial project goals and themes into concrete design solutions.

Joanna has completed projects in Kotzebue and many other Northwest Arctic Borough communities. Currently she is working with CRW to master plan and design the new **Kivalina K-12 Replacement School**, which will be located at the end of the new evacuation road. Joanna led the design for the **Northwest Magnet School/Alaska Technical Center Renovation & Addition** in Kotzebue. Completed in 2013, this project converted the outdated vocational education building into a 21st Century facility with updates to the woodworking and metalworking shops, nursing and accounting class rooms; and new spaces for new voc-ed programs including a culinary arts kitchen and heavy equipment simulator room. The project included a 7,000 sf shop addition and separate mechanical module to support the full facility.

Joanna also designed the associated **Magnet School Dorm** in Kotzebue, completed in 2014 and located across the street from the ATC. Originally the dorm was planned to be located across the street from the NWABSD headquarters, immediately adjacent to the site of the currently planned, new **Kotzebue Water Treatment Plant.**

Joanna's rural design experience includes projects in Barrow, Kaktovik, Point Lay, Point Hope, Koyuk, Golovin, Shishmaref, Huslia, Minto, Bethel, Kalskag, Chefornak, Dillingham, Manokotak, Metlakatla and Kodiak.

Joanna has also been involved in the design of industrial facilities since working on the **Kodiak Fishmeal Plant** in 1993. More recently, she worked on a complex of six new pre-engineered metal buildings for the **ML&P Power Plant** in Anchorage. BCA has designed numerous support buildings for Petro Star, including the **Petro Star Water Treatment Building** in Valdez.

Northwest Magnet School/ ATC Addition & Renovation and Magnet School Dorm
Kotzebue

Proposed Staff

BCA Northwest Arctic Borough Experience

- Northwest Magnet School/ Alaska Technical Center
- Magnet School Dorm
- Kivalina K-12 School
- Napaaqtugmiut K-12 Replacement School, Noatak
- Kobuk K-12 School Renovation & Addition
- Shungnak K-12 Renovation,
- Selawik K-12 Reno & Addn

BCA Industrial Experience

- ML&P Power Plant: *Pump House, GIS, Ammonia Storage, Gas Compressor, Warm Storage & Cold Storage Buildings*
- Petro Star North Pole: *Maint, Admin & Control Buildings*
- Petro Star Valdez: *Maintenance, Admin & Control Buildings*
- Petro Star Fairbanks: *Warm Storage Building*
- Petro Star North Pole: *Switchgear PEMB*
- Port of Anchorage: *Marine Storage Building*
- Municipality of Anchorage: *Sullivan Arena Storage Building*
- A1: *Sand Storage Building*
- *Nelson Lagoon Fish Handling Facility*
- *St. George Fish Processing Facility*
- Westward Seafoods: *Smoking Shelter*
- GCI: *North Pole Hub Building*
- GCI: *Anchorage Hub Building*

Burkhart Croft
ARCHITECTS

NICHOLAS CHOROMANSKI, PE, SE

Structural Engineer

Nick is a licensed structural and civil engineer, and has more than 11 years of structural design experience leading design teams on numerous projects throughout Alaska. He holds a B.S. and a M.S. in Civil Engineering from UAA. Nick has developed a team of structural engineers who are familiar with rural Alaska and arctic region construction, having designed facilities in locations including Wales, Arctic Village, Prudhoe Bay, and Unalaska. He understands the unique challenges associated with constructing projects in remote Alaskan regions, such as modular and panelized construction, selecting location-appropriate construction materials, designing structures for drifting snow loads, and designing foundation systems on permafrost. He has worked on several water and wastewater treatment plants throughout the state, including for the City of Wales, the City of Arctic Village, and the structural evaluation of the existing wastewater treatment plant for the City of Sitka. Nick joined CRW in 2017.

PROJECT EXPERIENCE

Wales Water Treatment Plant and Washeteria – Wales

Nick led the structural design for this project, which included a new, raw water pump station, a 2,000-square-foot water treatment plant and washeteria, improvements to the existing distribution pumping system, and a septic system and drain field. Modularized wood construction was selected for the structure, to reduce the amount of field construction and for improved quality. Several foundation and structural systems were evaluated for the facility, with the final design consisting of treated timber foundations (to keep construction costs down given the remote location). To protect the facility against melting the permafrost located on the site, it was constructed over a built-up, insulated gravel pad with passive refrigeration.

***Arctic Village Water Treatment Plant and Washeteria – Arctic Village**

Nick, as the Senior Structural Engineer, completed the design for a new, 2,250-square-foot water treatment facility and washeteria. This facility was a single-story, wood framed building with panelized construction, including structural insulated panel (SIPs) walls and roof. The building site exhibited poor soils conditions, so the structure was elevated on a custom, adjustable steel post foundation system, so that the building foundation could be adjusted as the soil conditions heave and settle.

***Tununak School Major Maintenance Project – Tununak**

A major maintenance endeavor for the Lower Kuskokwim School District, this project made renovations and repairs to the existing 20,000-square-foot school. It also constructed a new, 900-square-foot water treatment facility, a 1,400-square-foot wastewater treatment facility, and other outbuildings. Nick led the structural design for all of the new buildings. He conducted site visits to evaluate the current facility and determine the adequacy of the existing structure, identify deteriorated structural members, and design repairs as required.

** Indicates project with a previous employer*

EDUCATION

MS, Civil Engineering, University of Alaska Anchorage (2010)

BS, Civil Engineering, University of Alaska Anchorage (2007)

REGISTRATION

Professional Civil Engineer, Alaska (CE 13083)

Professional Structural Engineering, Alaska (SE 14180)

Professional Civil Engineer, California (C77871)

RESIDENCY

Alaska

PROFESSIONAL AFFILIATIONS

Officer, Structural Engineers Association of Alaska (SEAAK)

International Code Council (ICC)

REFERENCES

Howard Morse
University of Alaska, Anchorage - Planning and Construction
Project Manager
(907) 786-4900

Jesse Campbell
DOT&PF
Project Manager
(907) 266-2723

Jed Shandy
Davis Constructors & Engineers
Project Manager
(907) 562-2336

TRACY MCKEON, PE, LEED AP BD+C, QCP

Mechanical Engineer

Tracy is a Mechanical Engineer and Project Leader with over 19 years of experience in construction and project management, and mechanical design. Her time working throughout Alaska has given her an extensive working knowledge of the cold climate requirements of mechanical systems. She has worked on various projects for private and government entities. Tracy's six years of experience as a mechanical contractor provided her with hands-on knowledge of plumbing, heating, ventilation, mechanical installations, and design. She excels at system conception, layout, code compliance, design analysis, cost estimating, and sustainable design. Tracy is a certified Energy Management Professional. She has the technical, managerial, financial, and communication background to plan and implement energy management programs for facilities. She is Qualified Commissioning Process provider with experience in existing building commissioning. Tracy has maintained her LEED AP certification since 2008.

PROJECT EXPERIENCE

Nunapitchuk Water Treatment Plant and Washeteria Design – Nunapitchuk

Tracy was the Lead Mechanical Engineer for this project to design a new water treatment plant (WTP) and washeteria in Nunapitchuk. The mechanical design included facility heating, plumbing, and ventilation.

Wales Water Treatment Plant/Washeteria – Wales

Tracy was responsible for third party review and quality control/assurance review for this City of Wales modular design project. The design included a new, 1,904-square-foot WTP and washeteria building with a heat recovery system.

Seldovia Water Treatment Plant – Seldovia

Tracy designed the dehumidification and heating upgrades in the facility to mitigate corrosion and humidity concerns. The existing system consisted of three, greensand filters in conjunction with uninsulated ductile iron piping and open water sources in the facility, producing high humidity, and heating and condensation issues.

Deering Water Treatment Plant Improvements – Deering

Tracy is the Lead Mechanical Engineer for this ongoing project to design HVAC improvements to the Deering Water Treatment Plant.

Ambler Water Treatment Plant – Ambler

The Lead Mechanical Engineer for this project, Tracy provided design and construction services for the new, 1,728-square-foot WTP. The mechanical design included facility heating, plumbing, and ventilation.

ANTHC Biomass Boiler Design – Huslia

Tracy was the Lead Mechanical Engineer and Project Manager for this project. The scope included design of a biomass boiler system housed in a prefabricated metal building. The project included the installation of 3 Garn 2000 cord wood boilers to transfer heat to the school, water treatment plant, and clinic. The project required coordination with ANTHC, the City of Huslia, and Tanana Chiefs Conference.

EDUCATION

BS, Mechanical Engineering
University of Alaska,
Fairbanks (1997)

REGISTRATION

Professional Engineer,
Alaska (ME11388)

RESIDENCY

Alaska

PROFESSIONAL AFFILIATIONS

American Society of Heating, Refrigeration, and Air Conditioning Engineers (Currently serving on the Board of Governors and President- Elect for State Chapter)

Society of Women Engineers (Member)

National Fire Protection Association (Member)

Association for Learning Environments (Member)

REFERENCES

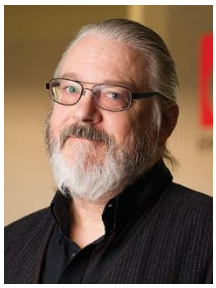
Tashina Duttle
ANTHC
Rural Energy Initiative
Program Manager
(907) 729-3509

Jeff Walden
Matanuska-Susitna Borough
Lead Project Manager
(907) 861-7710

Keith Stephens
Alaska Department of
Health and Social Services
Facilities Manager
(907) 465-1872

WILLIAM M. MCDONALD, PE

Senior Electrical Engineer



Bill McDonald is a Senior Electrical and Controls Systems Engineer, and has been Lead Engineer for CRW's Electrical group since 2005. His 44 years of electrical and technical experience includes 29 years as a Professional Electrical Engineer in Alaska. He has also served as a Radio Technician (USAF – Kotzebue AFS) and as a Journeyman Electrician (US Public Health - Statewide). His work experience includes the planning, design, and troubleshooting of power, lighting and control systems for rural and municipal water/wastewater treatment facilities, schools, office complexes, health clinics, commercial facilities, retail sales, office building tenant improvements, washeterias, and tank farms. Bill's background also encompasses construction management services, consisting of submittal reviews, inspections, and the startup and commissioning of new facilities.

EDUCATION

Graduate Studies,
Arctic Engineering,
University of Alaska,
Anchorage

BS, Mathematics
University of Alaska,
Anchorage (1984)

REGISTRATION

Professional Electrical Engineer, Alaska (E 7879)

Professional Controls Systems Engineer, Alaska (O 14316)

RESIDENCY

Alaska

PROFESSIONAL AFFILIATIONS

Institute of Electronic and Electrical Engineers (IEEE)
Life Member

Illumination Engineering Society (IES)

REFERENCES

Reese Cheney
AWWU
IT Projects Manager
(907) 365-2309

Kathleen Bourque-Parker
MOA PM&E
Supervisor
(907) 343-8242

Douglas Poage
ANTHC
Project Manager
(907) 729-3662

PROJECT EXPERIENCE

Arctic Village Water Treatment Plant Improvements – Arctic Village

Bill was the Lead Electrical Engineer for the most recent (2012) upgrades at the water treatment plant (WTP), which included new filters, coagulation and chemical feed systems, and backwash and air scour systems. He designed all of the electrical, which involved new building service and power distribution panels, flow meters, a streaming current detector, a data collection system, and process controls/control panels and related systems. As System Integrator for a packaged, process plant system, Bill provided the instrumentation and control infrastructure required by the skid-mounted system. He was also the Commissioning Agent and assisted in plant startup.

Quinhagak Sanitation Improvements – Quinhagak

An ongoing, multiphase project, Quinhagak's water treatment and distribution system has been gradually expanded and improved. The upgrades combine an existing water source (vertical, dual pump infiltration gallery/well) with three, individual, slant well infiltration galleries. All wells are controlled via a local control panel, which relays status signals to the main panel at the WTP. Due to limited power supply at the well sites, Bill devised controls to engage heat tape on the treated water main, which spanned the length of the village to the main storage tank. This reduced electrical costs while protecting the water line during low temperature periods.

Seldovia Water Treatment Plant – Seldovia

Bill was responsible for the power, lighting, and controls design for a new facility currently under construction. The system consists of three, independently-monitored greensand filters operating in parallel. The design required a significant line extension for power, and Bill developed a medium-voltage feeder to minimize utility costs and constraints. The power distribution included a standby generator and automatic transfer switch. The process controls include manual backwash, system performance and water quality monitoring, and recording for Agency reporting. Bill served as Commissioning Agent and startup integrator for the plant.

ANTHONY J. ROBINSON, PLS

Surveyor

Anthony (Tony) Robinson, a Senior Land Surveyor, has led field surveys, GPS data collection, mapping for design, right-of-way, land/site development, and construction projects for CRW since 2008. He has 22 years of experience, serving as both a field and office survey technician, crew chief, and survey manager. During his college years, he worked summers for the Bureau of Land Management on remote surveys throughout Alaska. After receiving his PLS registration, Tony became a partner in a land surveying firm in Ohio, performed and managed survey crews throughout the Eastern United States, and became licensed in eight states. His surveying experience includes GPS processing and creating custom coordinate systems, design and boundary surveys, ALTA land title, geodetic control, and construction surveying. He is CRW's Chief Drone Officer, responsible for our UAV aerial survey and mapping projects.

EDUCATION

Michigan Technological University
BS in Land Surveying
Associate of Applied Science in Civil Engineering (1997)

REGISTRATION

PLS Alaska #12316
PLS Ohio #8120
PLS Michigan #4001050448
Certified Federal Surveyor #1547

Certified FAA UAS Remote Pilot #3948420

RESIDENCY

Alaska

PROFESSIONAL AFFILIATIONS

Alaska Society of Professional Land Surveyors (ASPLS): Member (2009-Present)

REFERENCES

Steve Schmitt PLS
Municipality of Anchorage
Municipal Surveyor
(907) 343-8366

Marty Williams PLS
Bureau of Land Management and Indian Affairs (BIA)
(907) 271-1612

Mike Spangler PLS
Ted Stevens Anchorage International Airport,
Airport Surveyor
(907) 266-2480

PROJECT EXPERIENCE

Emmonak Water and Sewer Improvements – Emmonak

Tony served as Project Surveyor for GPS control and RTK surveys, boundary, topographic, and utility survey for upgrades to the City of Emmonak's existing arctic pipe water and sewer system and water treatment plant (WTP). He was responsible for all project meetings, land record research, and planning remote travel, lodging, and local transportation. He served as crew leader for the field survey, field computation, and the establishment of a custom, low-distortion, projection grid coordinate system. Tony also oversaw the preparation of utility easement documents for BIA restrictive and unrestricted lots, and prepared the topographic and right-of-way project basemap. Project funding came from USDA - Rural Development and the State of Alaska's Village Safe Water Program. Improvements included rehabilitating and expanding the water and sewer systems, retrofitting and replacing water service connections, upgrading the WTP, and repairing flood-damaged system components.

ANTHC Shageluk Sewage Lagoon and Lift Station – Shageluk

CRW provided design, surveying, and environmental permitting for the Shageluk sewage lagoon and lift station. Tony provided survey control and topographic data and developed the survey base map.

Arctic Village Water System Improvements – Arctic Village

Tony was Project Surveyor for the boundary, topographic, and utility survey for the Arctic Village Water Systems upgrade. He was responsible for all project meetings, land record research, and planning remote travel, lodging, and local transportation. Tony performed all survey field work solo, including the topographic survey of existing facilities and proposed project area, and the survey profile of the Chandalar River for the water intake site. He prepared the survey topographic and right-of-way base mapping drawings for design. After the design was complete, Tony was responsible for all construction layout staking for the new WTP/Washeteria facility, utilities, and site grading.

ROBIN REICH, PRESIDENT, SOLSTICE ALASKA CONSULTING, INC.

EDUCATION

M.S. studies, University of Alaska, Biology
B.S., Humboldt State University, Marine Biology, 1992

PROFESSIONAL AFFILIATIONS

Alaska Association of Environmental Professionals
American Association of Environmental Professionals

EXPERIENCE

Ms. Reich, who founded Solstice Alaska Consulting, Inc., has more than 20 years of experience in environmental documentation and permitting. Robin has led multiple National Environmental Policy Act documents in accordance with NEPA and various federal agencies' guidance. Robin has experience with authorizations and consultations under the Clean Water Act, Endangered Species Act, National Historic Preservation Act, Migratory Bird Protection Act, Marine Mammal Protection Act, Federal executive orders, and other state and local environmental laws. She has prepared Biological Assessments and Incidental Harassment Authorization applications. She knows how to effectively manage environmental documents involving multiple disciplines, stakeholders, and issues. Robin has experience wetlands, water quality, and fisheries field studies in Alaska, and she grew up in Bethel.

SAMPLE PROJECTS

- Wrangell Water Treatment Pilot Study USDA Rural Development Environmental Report for City of Wrangell
- Emmonak Water Treatment Plant and Water Storage Upgrades USDA RD Environmental Report for City of Emmonak
- Tuntutuliak Water and Sewer Plumbing and Tanks Indian Health Service Environmental Assessment for Village Safe Water
- Coffman Cove Luck Point Sewer Improvements USDA RD Environmental Report for City for Coffman Cove
- Emmonak Water and Sewer Improvements IHS Environmental Assessment for VSW
- Chefornak Wastewater Improvements IHS Environmental Assessment and permitting for VSW
- Atka Sanitation Plan Update revisions to a community sanitation plan for VSW
- Point Baker Wastewater Improvements Alaska Department of Environmental Conservation Alaska Clean Water/Drinking Water Fund Loan Program environmental checklist for VSW
- Pelican Water and Wastewater Improvements environmental permitting for VSW
- Ambler Water and Sewer Improvements environmental checklist for Alaska Native Tribal Health Consortium
- Galena Water and Sewer Improvements environmental checklist for ANTHC
- Quinhagak Water and Sewer Improvements environmental checklist for ANTHC
- Takotna Water and Sewer Improvements environmental checklist for ANTHC
- Akiak Water and Sewer Improvements environmental checklist for ANTHC
- Napaskiak Water and Sewer Improvements environmental checklist for ANTHC
- Nightmute Water and Sewer Improvements environmental checklist for ANTHC
- Noorvik Water and Sewer Improvements environmental checklist for ANTHC
- King Cove Landfill USDA RUS Environmental Report for the City of King Cove
- Homer Shellfish Water Main permitting for City of Homer
- Kenai Reservoir permitting for the City of Kenai
- Homestead Road Water and Sewer Environmental Protection Agency Environmental Assessment for City of Valdez

ESTIMATIONS

JAY N. LAVOIE
Senior Construction Cost Estimator

Jay began providing cost estimating services to the Alaska design and construction community in 1983. The City of Kotzebue benefits from his decades of estimating experience in Alaska on over 3,500 projects. These projects, each with their own unique needs and requirements, have involved various disciplines and have been used for planning and budgeting, as well as full design and construction. He develops spreadsheets and databases to reflect the customer's individual coding and reporting requirements.

Projects such as this require more than just good communications with the designers. It requires an experienced estimator that can anticipate beyond the information available. Jay has earned widespread recognition as a professional construction cost estimator. He has developed modeling methods to assist in early cost development and producing engineering rule-based approximations to the specific demands of a facility or engineering system. In addition, he utilizes historical data for comparative pricing and quality control benchmarks in the estimating of a project.

To support the project, Jay brings to the team experience in cost estimating new, improvement, and renovation projects for infrastructure and systems throughout Alaska.

Jay is an expert in construction costs, value engineering cost impacts, general contractor bid reconciliation, and LCCA. He understands construction costs and specifically, Alaska's construction costs.

PROJECT EXPERIENCE
Chenega Bay Water Treatment Plant
Chignik Bay WTP Improvements
City of Gambell Sanitation Improvements
City of Thorne Bay Utility Improvements Study
Eklutna Water Treatment Facility
Emmonak Water Treatment Plant Upgrades
Fort Yukon Water Treatment Plant
Kake Water & Sewer System Upgrades
Kongiganak Water Project
Kotlik East Island & West Peninsula Water & Sewer Project
North Pole Water Main Extension
North Pole Wastewater Treatment Plant Rehabilitation
Pitka's Point Water Treatment Plant, Washeteria, Storage Tank & Well
Prudhoe Bay Water & Waste Water Treatment Plant
Shishmaref Washeteria/WTP Addition & Demo Pump House Bldg
Sitka WTTP Rehabilitation
Thorne Bay Water Treatment Plant Improvements
Tuluksak Washeteria & WTP Improvements PER
Wales Water Treatment Plant Improvements

YEARS EXPERIENCE IN ALASKA
35

YEARS WITH ESTIMATIONS
24

EDUCATION
University of Alaska Fairbanks
Education: Bachelor of Science, Civil Engineering

PROFESSIONAL AFFILIATIONS
Association for Advancement of Cost Engineering

REFERENCES
Glen Kravitz
ARCADIS U.S.
(907) 374.6938
glen.kravitz@arcadis-us.com

Bill Jones
ANTHC, DEHE
(907) 729.3801
wejones@anthc.org

Steve Fishback
STEVE FISHBACK ARCHITECT
(907) 375.5584
steve@fishbackak.com