

# Johnstown, Colorado Water Treatment Plant Expansion Design

February 5, 2021





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February 5, 2021

Mr. Marco Carani, Director of Public Works  
Town of Johnstown  
450 South Parish  
Johnstown, CO 80534

[www.jvajva.com](http://www.jvajva.com)

RE: Proposal for the Professional Engineering Services for the Expansion of the Johnstown Water Treatment Plant

Dear Mr. Carani and Selection Committee Members:

JVA, Incorporated (JVA) appreciates the opportunity to provide our response to the Town of Johnstown (Town) Request for Proposal for the Expansion Design of the Johnstown Water Treatment Plant (JWTP) project. JVA has reviewed the RFP, addendums, and attended the preproposal meeting and site walk for this project. We have assembled a team of qualified and experienced engineers to assist the Town in meeting its goals and objectives for the expansion to 10 million gallons per day (MGD) firm capacity. JVA's key staff committed to the success of this project are primarily based in our Fort Collins and Denver offices. To provide the Town the most qualified services, JVA has teamed with Browns Hill Electrical & Controls, Inc. (BHEC) for the design expansion. Charles Page of BHEC is on the project team and is currently working with the Town on upgrading the SCADA system and very familiar with the JWTP electrical and control systems. In addition, JVA has teamed with Northern Colorado local firms for geotechnical engineering (Lithos) and survey (King Surveyors) who have experience working with both JVA and the Town.

Since this project will be accomplished within the tight confines of the existing treatment facility and there is much to know about site constraints and constructability issues, we believe this project is an excellent example of how the Construction Manager at Risk (CMAR) delivery process will benefit the Town. Having the contractor involved in the design from the 30 percent level through final design will help to confirm the assumptions we have made and give us all an accurate price confirmation including a Guaranteed Maximum Price (GMP) before the design is completed. This delivery method removes the bid day surprise, and develops a strong team of owner, engineer and contractor that will carry into the construction phase of the project. JVA is considered experts in the CMAR delivery method, and we are proud of the successes we have had in delivering these projects for many of our clients on similar water treatment plant expansions. Our expertise not only lies in our ability to provide solutions and work as a team, but in our skill to foresee and mitigate potential conflicts and challenges. The numerous CMAR projects we have completed to date has given us the experience and understanding of how to best implement this project delivery method to meet the Town's objectives.

The JVA team is very qualified for this project based on our past work experience with design upgrades and expansion to existing WTP filtration processes including mixed media and membranes (pressure and submerged). Over the last 5 years JVA has designed and upgraded several WTPs that required filter expansion / rehabilitation or conversion to membrane filtration throughout Colorado including projects for North Table Mountain W&SD, Town of Berthoud, Town of Crested Butte, Mount Crested Butte W&SD, City of Grand Junction, and Woodmoor W&SD to name a few and as described in our proposal to follow. John McGee will be the Principal-in-Charge for the project and located in the Fort Collins office within a 25-minute drive to Johnstown. Andrew Sparn will be the project manager who is just coming off the North Table Mountain Filter Expansion project and will be dedicated to your project. Melissa Rhodes will lead the process team for JWTP expansion and is very experienced with both mixed media and membrane filtration design. She will be assisted by Leah Opitz and Ryan



Wienphal as project and design engineers. Leah was project engineer for the \$20.3 million Mt. Crested Butte WTP which partly consisted of abandoning a mixed media direct filtration system with ultrafiltration membranes and brings her experience and expertise to your project. recently joined JVA as a design engineer and was formerly employed with Ramey Environmental Compliance as a Class A licensed Operator for water treatment operations.

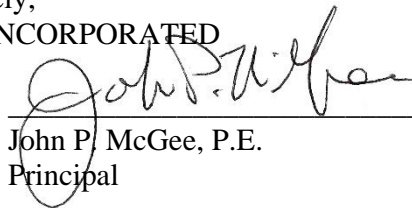
JVA has a very structured and detailed QA/ QC program to ensure that all deliverables are reviewed prior to submitting to the Town. Josh McGibbon will lead the QA/QC efforts for the project. Josh has been principal-in-charge or Technical Lead for the WTP filter expansion and rehabilitation projects referenced in our proposal. Adam Teunissen will be the lead structural engineer on the project who specializes in water and wastewater structural tank designs.

In addition to our design qualifications, JVA has extensive experience and skills to effectively coordinate the planning and permitting efforts with the Colorado Department of Public Health and Environment (CDPHE). Our staff has outstanding relationships with CDPHE personnel. JVA also has extensive experience and success in assisting municipalities with funding assistance, including both SRF and DOLA grants and loans.

Please review the attached proposal document and call any of the numerous references cited, and feel free to call me with any questions. In summary, we believe our team is uniquely qualified for completing the JWTP Expansion project to the Town's complete satisfaction. We are a local firm and are looking to build a long-term relationship with Johnstown. We take pride in our commitment to quality work, proactive communication, and highest levels of service and it would be our pleasure to work closely with Town staff for years to come.

Sincerely,  
JVA, INCORPORATED

By:



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John P. McGee, P.E.  
Principal

Attachments

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## Introduction

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JVA, Inc. (JVA) appreciates the opportunity to present our team and qualifications for the Town of Johnstown Water Treatment Plant Expansion project. This proposal is based on the requirements outlined in the RFP issued on December 30, 2020. Our project team members have extensive experience in master planning, particularly with Colorado communities similar to Johnstown. We have a strong presence in the region, working on critical wastewater and water projects for the Towns of Berthoud, Mead, Platteville and the City of Greeley. We look forward to assisting the Town in expanding your water treatment plant.

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## Section 1: Identification of Proposer

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JVA is a Civil, Environmental, and Structural consulting engineering firm headquartered in nearby Boulder, Colorado, with Front Range offices in Fort Collins and Denver, and

mountain offices in Winter Park and Glenwood Springs. JVA celebrates our 65<sup>th</sup> anniversary of engineering excellence, serving municipalities, special districts, and owners throughout Colorado. Our current staff size consists of 130 experienced engineers, designers, and administrative staff. We are committed to excellence in our service to all clients. As consulting engineers, we are dedicated to superior design, and understand the need to communicate, work as a team, and complete projects on time. JVA provides its clients with creative thinking, design sensitivity, and cost-effective engineering. We

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### Contact:

John P. McGee, P.E.  
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recognize that true service to the client is more than quality engineering. Efficient use of the Town's resources, meeting project deadlines, and being sensitive to your needs are our primary goals.

This project will primarily be run out of our Fort Collins office, with John McGee as the Principal-in-Charge. Our team and subconsultant information can be found in Section 4 of our Proposal.

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## Section 2: Project Overview and Approach

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### Project Approach

JVA attended the pre-proposal meeting, attended the Johnstown Water Treatment Plant (JWTP) walk through and have read the RFP and supporting documents to fully understand the goals and objectives for the JWTP expansion. The JWTP is rated for a firm capacity of 5 MGD limited by filtration with one filter out of service. The original filter plant was constructed in 1966 and has been maintained by the Town with improvements over the 50 years. The most significant improvement was the addition of a 10 MGD Dissolved Air Flotation (DAF) system for pretreatment that replaced outdoor aged flocculator / clarifiers that remain abandoned today. Based on recent peak demands, the JWTP is not capable of meeting the Town's potable water needs



without use of the emergency interconnects from Greeley, Little Thompson Water District (LTWD) and Central Weld County Water District (CWCWD). The Town completed a raw water master plan in 2005 that describes the Town's water rights portfolio which includes 4,757 acre-feet of Consolidated Home Supply Ditch and Reservoir Company and 360 acre-feet of Consolidated Hillsborough Ditch Company for a total of 5,117 acre-feet. The Town also owns some Colorado Big Thompson (CBT) shares that can be delivered upon request to the Town through the Home Supply system. The Town also has a substantial portfolio of water rights for non-potable irrigation including numerous shares in Farmers, Hill and Brush, Greeley-Loveland, and Highland Ditch companies. The Town's municipal and irrigation water rights portfolio are adequate to meet the current and 10-year demands for domestic and irrigation uses. The Town has been proactive with residential and commercial developments encouraging non-potable irrigation as well as water conservation practices to reduce or flatten the curve of peak day demands at the JWTP.

The primary raw water source for the JWTP is the Lone Tree Reservoir (LTR) located approximately 10 miles east of the plant. The secondary raw water source for the JWTP is the Johnstown Reservoir located approximately  $\frac{3}{4}$  mile east of the plant. Both raw water sources are pumped to the JWTP. Back in 2008, the Town constructed a new raw water pump station at the Johnstown Reservoir with a net pumping capacity of 6.7 MGD. The LTR pump station will not meet this next phased expansion of the JWTP and will need to be expanded to meet future demands. The existing 16-inch LTR raw water transmission line will need to be upgraded or another transmission line installed parallel to the existing 16-inch to meet future JWTP capacity needs. Over the last several years, the Town has implemented projects at both raw water pump stations and the JWTP to improve SCADA / HMI automation and communications of delivering raw water to the JWTP more reliably and less manual operation intervention. On-going improvements at these sites have also included replacing aged PLCs, raw water pump

VFDs, DAF saturator / compressor, and equipment repair and replacement (i.e. repair of LTR powered activated carbon (PAC) system, etc). On the finished water side, the Town has made numerous improvements to the Town's distribution system over recent years including upsizing, replacement and rehabilitation of watermains, installation of PRVs, water storage and booster station upgrades / expansions. The Town's intent is become less reliant on the emergency interconnects with Greeley, LTWD and CWCWD and continue to develop a more robust and reliable water distribution system throughout the year. Johnstown budget and prioritizes capital projects for the water distribution system every year for meeting current and future needs.

Based on JVA's understanding, review of the RFP documents (including addendums), and discussions with operation staff during the JWTP walk through, JVA has put together a task-by-task approach for this project. Each task outlined below will include a technical memorandum that will serve as the basis of design for the JWTP expansion.

- *Task 1* - 5 MGD to 10 / 12.4 MGD (one filter off-line / all in service) expansion of the existing JWTP with addition of a matching mixed-media filtration system or replacement of the mixed-media filtration system with an ultrafiltration membrane system.
- *Task 2* - Evaluate and expand (if necessary) the existing Clearwell to meet CT and compliance with DOVE (Policy 5)
- *Task 3* - Evaluate and expand (if necessary) the Finished Water Pumping system to meet new pumping demands
- *Task 4* - Design of a new building (if necessary) to house either the additional mixed media filters or membranes
- *Task 5* - HVAC and plumbing design for the existing filter building and any new buildings added for the expansion
- *Task 6* - Coordination with the Town's on-call system integrator (Browns Hill Engineering and Controls) for electrical, SCADA and controls

- *Task 7* - Design of a new raw water pipeline integrated with the existing LT Raw Water Pump Station from LT Reservoir to the JWTP
- *Task 8* - The JWTP Expansion shall include the design of safety devices required for staff to operate and maintain the treatment processes effectively and reliably
- *Task 9* – Value Added Ideas

## Task 1 – Filter Expansion

JVA has developed three- (3) alternatives for expanding or replacing the JWTP mixed media filtration system. The three alternatives include:

- ✓ Alternative 1: Expand the existing filtration process / building
- ✓ Alternative 2: Replace existing filtration process with Membrane Gravity Filters (MGF)
- ✓ Alternative 3: Replace existing filtration process with Conventional Submerged Membranes

### *Alternative 1: Expand Existing Filtration Process:*

This alternative will include expanding the existing filter building to the west to allow extension of the filter piping gallery and addition of the new filter boxes. A schematic of the filter building expansion is shown on Figure 1. The new filters will be the exact same size of the existing filters (12' x 18') to double the capacity of the existing plant. Some of the filter piping (i.e. filter effluent common header piping) will need to be expanded to handle the increased flow from each train. It is proposed to add the following improvements to the existing filters and to include the same for the new filters:

- Filter-to-waste piping and discharge
- Replace surface wash with air scour
- New Leopold underdrains and media
- PLC / SCADA / HMI integration for automated control

The challenges faced with this option will be maintaining treatment operations during construction of the new filters and rehabilitation of the existing. Sequencing construction with system demands will be a major challenge with this option. The Town has the option of utilizing their interconnects with Greeley, LTWD and NWCWD however, this is not a guaranteed reliance since the supply interconnect entities will serve their needs first prior to supply water to Johnstown. Historically the peak summer demand decline by late September / early October allowing an opportune time to begin the rehabilitation of the existing filters. The new filter building addition can be constructed throughout the year while the existing filters remain on-line to meet system demands. Once the new filters are constructed there will be a down time for each train when the new filter piping (backwash, filter effluent, drain, filter-to-waste) is integrated and upsized as necessary with the existing piping. A detailed structural analysis will be conducted of the southwest filter piping gallery wall to determine rehabilitation for cutting out a portion of the wall to extend the gallery and expose the influent piping from the DAF. Construction Manager at Risk (CMAR) delivery for expanding the existing filter process should be considered by the Town. Projects that involve major rehabilitation of existing water retaining structures, treatment processes, piping, and electrical / controls that require detailed scheduling, process shutdowns, operations coordination and contractor insight invites consideration of CMAR delivery.



Figure 1: Alt #1 - Expand Existing Filter 1

### Alternative 2: Replace Existing Filtration Process with MGFs

JVA reached out to ultrafiltration membrane manufacturers to determine what systems that would be most adaptable to the existing infrastructure for minimizing additional tankage and buildings. One such system is Membrane Gravity Filters (MGFs) that function like gravity flow mixed media filters. MGFs can be installed inside the existing filter boxes with modifications to the influent, backwash, drain, and filter effluent piping. Addition of air scour would be required for backwash and cleaning the membranes. The compressors for air scour could be located on the main process floor or down in the pipe gallery. The existing backwash supply could be integrated with the MGFs with minor piping modifications. Pumps would be necessary for wasting the backwash and to drain down the MGF boxes. Shown on Figure 2 is a schematic of the MGFs retrofitted into the four existing filter boxes. A total of four converted MGF trains each with four membrane chains would be capable of producing 3.33 MGD per train for a total of 13.33 MGD with all trains operating and 10 MGD firm capacity with one train out of service. During construction, one side of the existing filters can be operated while the other side is gutted (underdrains, media, gullet, and backwash troughs removed) and retrofitted with the MGFs. The influent piping from the DAF will have to be modified for distribution to each filter train as well as the permeate and backwash supply piping. Again, a CMAR delivery for this project is highly recommended due to the down time and operation coordination required between the contractor, Town, and engineer. Like Alternative 1, the filter rehabilitation work would need to be conducted during the non-peak season (October to May) to minimize the use of interconnects.



Figure 2: Alt #2 – Convert Existing Filters to MGFs

### Alternative 3: Construct New Membrane Filtration Facility – Abandoned Existing Filter Plant

This alternative would compare GSM (Alternative 2) retrofit with skid mounted membrane filtration (MF) facility. It is proposed that the new MF facility be constructed just west of the existing DAF building. The advantage of this alternative is that the existing filtration process can maintain treatment operations with very limited shutdowns and reliance on emergency interconnects during construction of the new MF facility. The existing filter building could be retrofitted for additional chlorine contact and / or finished water pumping improvements. The pipeline that exists between the DAF building and Filter building could be repurposed for conveyance between the two structures. The MF treatment process is a proven technology with many systems throughout Colorado. JVA has in-depth experience with MF design and retrofits of existing filter plants. The MF are slab skid mounted and arranged in multiple arrays and trains with dedicated influent pumps, clean-in-place (CIP), air scour and backwash processes. In contrast to GMFs, MFs required influent pumping to the membranes skids to pressurize the membranes for the filtration process. The primary disadvantages of this alternative compared to Alternatives 1 and 2 is the required pumping to feed the membranes and chemicals and storage needed for CIP.

*Included in Appendix B is an example drawing set for installing Gravity Membrane Filters (GMFs) within the mixed media filter basins. Included in Appendix C are Site Drawings for Alternatives 1, 2 and 3*



Figure 3: Alt #3 - Construct New Membrane Filtration System

### Task 1 Deliverable

JVA will prepare a technical memorandum (memo) for evaluating Alternatives 1 through 3 and based on selected criterion prepare a recommendation for preliminary design of the selected alternative. The memo will include a feasibility analysis, cost evaluation, design criteria and concept design. This memo will serve as a basis for subsequent design tasks. *To avoid redundancy of this approach section, a technical memo will be prepared for all the tasks below to set the design parameters, criteria, and concepts for preliminary and final design phases.*

### Task 2 - Evaluate Existing Clearwell and Chlorine Contact

For Alternative 1, the existing clearwell will need to be expanded for additional chlorine contact time (CT) to achieve adequate disinfection credit for viruses and giardia inactivation. For Alternatives 2 and 3, the existing clearwell may have enough volume for CT because membrane filtration has a pore size opening that prevents giardia from passing through which allows 3 log removal credit, thereby only needing to meet CT for virus inactivation. Existing filtered water quality data would have to be trended for pH, temperature, and chlorine residual to determine the required volume required to achieve adequate CT for virus inactivation at the new peak day design flow. It should be noted that assigned baffling factor will be an important design consideration for CT. JVA will discuss with the Town whether a Disinfection

Outreach and Verification Effort (DOVE) was conducted by CDPHE for the JWTP. If a DOVE was conducted, a baffling factor would have been assigned. If a DOVE was not conducted, JVA would calculate the baffling factor to determine CT required for giardia and virus inactivation. For any added clearwell volume, the tank would be baffled to achieve a minimum baffling factor of 0.7.

### Task 3 - Evaluate Finished Water Pumping

The existing finished water pumping system consists of three vertical turbine pumps that pump finished water to the Town distribution system.

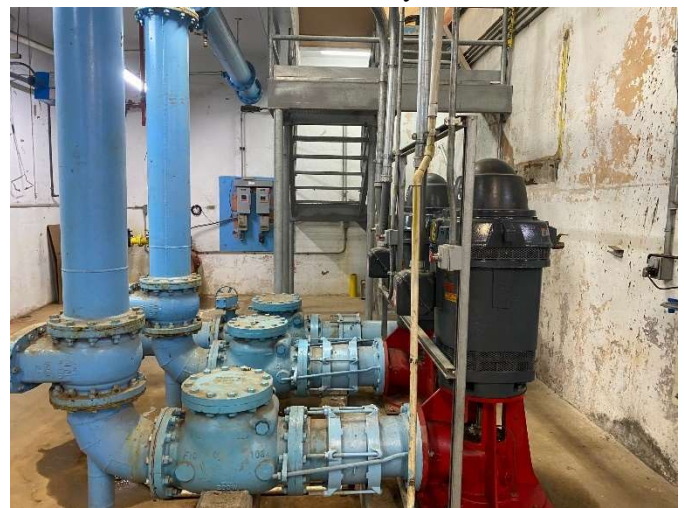


Photo: JWTP Finished Water Pumps

JVA will evaluate and prepare a condition assessment of the finished water pump system to determine what improvements and expansion would be required for meeting the new peak day demand of 12.4 MGD. If it is determined in Task 2 that more CT is required, it is proposed that additional clearwell volume is added, the new tankage would be connected to the existing pump station.

### Task 4 - New Filter Building Addition (if necessary)

For Filtration Alternatives #1 and #3, would require a new building to house the new mixed media filters (Alt #1) and new MF facility (Alt #3). For Alternative #2, a new building for housing additional filters would not be required since there is enough filter train volume for GMF to achieve a peak day flow of 12.4 MGD (10 MGD firm). If a new filter building is



added, the building would match the existing material (CMU) and architectural style of the existing Filter and DAF buildings.



*Photo: JWTP Existing Filter Pipe Gallery*

JVA has architectural and structural team members in house that will design the filter building addition if Alternative #1 or #3 is selected for the filter expansion.

### **Task 5 - HVAC and Plumbing for Existing and New Filter Addition**

The existing Filter building was constructed in 1966 and has aged HVAC and plumbing equipment that will need to be upgraded to improve heating, cooling and ventilation efficiency and reduce corrosion of piping and structures and extend the life of the Town's assets. For a new filter building addition, the HVAC and plumbing design will be prepared in accordance with the Town's adopted IBC code and NFPA code related to the selected processes and functionality of the building.

### **Task 6 – Electrical, Controls and SCADA Integration**

JVA will subcontract with Browns Hill Electrical and Controls (BHEC) to conduct a condition assessment of the existing electrical infrastructure and evaluate the electrical upgrades / improvements for each the filtration alternatives and associated process improvements. JVA will also work with BHEC for integrating controls and SCADA with the recommended filtration alternative. The Town is

currently working with Charles Page with BHEC for on-going SCADA integration and improvements for both the water and wastewater facilities.



*Photo: JWTP Filter / Clearwell SCADA Screen*

It is likely that electrical improvements will be required for the existing Filter building along with the new buildings and expansion. The extent of electrical upgrades will depend on the filter expansion alternative selected.

### **Task 7 - Design of a New Raw Water Pipeline from Lone Tree**

Based on Addendum #1 of the RFP, the Town decided to negotiate with the selected consultant the design of the new LTR raw water pipeline and associated improvements to the LTR pumping station. In preparation of the LTR pipeline design, JVA has teamed with Lithos and King Surveyor to conduct the survey, geotechnical testing and report, easement preparation and design of the trenchless crossings. Based on a preliminary alignment provided by Johnstown, we have identified at least five necessary tunnels (locations where third parties will not allow for open-cut construction) including Highway 287, Berthoud Parkway, I-25, State Highway 60, and the BNSF Railroad. Lithos has significant experience in designing geotechnical and tunnel specific components of pipeline projects.

To help manage construction risk for the proposed pipeline project, it is important Johnstown develop appropriate requirements and consider development of a Geotechnical Baseline Report (GBR). GBRs identify ground conditions to be encountered during tunnel construction, specify allowable tunnel means and methods for individual tunneled crossings, and

provide considerations for shaft and tunnel construction. A GBR is a unique geotechnical document that is directly incorporated into the contract for a project. We have extensive experience and understanding in available tunnel means and methods and how to couple these means and methods with ground conditions as identified through a prudent subsurface investigation. In addition, we have produced numerous multi-crossing GBRs for various project types. Appropriate specifications and tunnel detail drawings are an important consideration; our experience with tunnel construction have aided in the development of robust tunnel specifications and drawings.

A recent project, currently in design, where tunnel specific design documents were developed is the South Tank and Waterline Loop for Johnstown. This project will include roughly 10 tunneled crossings of county roads, irrigation ditches, the Little Thompson River, and railroad tracks. The project is currently in the final stages of design with anticipated bid in mid-2021. The Town’s understanding of the critical nature of tunnel crossings and the need for specific construction documents addressing these components of construction will lead to the selection of qualified contractor(s) and appropriate risk allocation for the project team.

Once the scope for the LTR pipeline design is negotiated with the Town, the JVA team will prepare the LTR plan and profile drawings and specifications including details for open cut and trenchless pipeline design. A minimum of Level B Subsurface Utility Engineering (SUE) will be prepared for the entire alignment of the LTR pipeline design with Level A SUE for each conflicting utility crossing or interference. Level A SUE includes potholing to confirm both horizontal and vertical alignment of the conflicting utility.

### Task 8 – Code Compliance for Reliable and Safe Operations

The filter expansion design will include compliance with all applicable codes, including the latest OSHA, NFPA, NEC and IBC requirements to provide safe

and reliable environment for the JWTP operation staff. Safety is of number one importance for treatment operations since operators are dealing with corrosive and hazardous chemicals, dust, and confined spaces. Proper ventilation and lighting in work areas is essential for safe access and to maintain and operate equipment or change out chemicals. All areas that contain chemicals will have spill protection and tempered emergency eye wash stations.

### Task 9 – Value Added Ideas

In addition to the eight tasks described above, JVA has come up with several ideas the Town may want to consider for this project.

*Repurposing of the Abandoned Clarifiers* - for DAF solids storage and thickening or backwash recycling and / or for Powered Activated Carbon (PAC) or Ozone contact basins to mitigate taste and odor compounds in the raw water. The JVA team has a



significant amount of experience with both ozone and PAC treatment for reducing taste and odor in drinking water. There have been significant advances in on-site generation of ozone for use as an oxidant and for controlling taste and odor in raw water.

*Converting existing Mixed Media Filters to GMFs* - As presented in Task 1, converting the existing mixed media filters to GMFs would save the Town a significant amount of money avoiding or delaying the construction of additional filter trains and a building while still meeting the Town’s objective for producing 12.4 MGD filtration capacity (10 MGD firm).



*The Construction Manager at Risk (CMAR) approach* - for project delivery has become much more popular over the last several years for the construction of water and wastewater treatment facilities. JVA recommends this approach for expansion of the LPWWTP. This approach includes a competitive process for selecting the CMAR which includes an RFP along with either 30 or 60 percent design documents. The selection process for the CMAR includes weighted qualitative and quantitative criteria evaluated by the Town and JVA to select the most qualified CMAR. For this project, JVA recommends preparing the CMAR RFP with 30 percent design documents for competitive selection. Post 30 percent design effort will include the CMAR with the design team to assist with constructability and valued savings for the project. The design team works together to produce construction documents and a guaranteed maximum price (GMP) for the project. The distinct advantages of the CMAR delivery versus the Design-Bid-Build delivery is that the Contractor has had time to provide input for constructability and sequencing to the work for the expansion and to reduce interruptions to operations during construction. The CMAR process has shown to be highly successful especially with rehabilitation of existing WWTPs that involve complex tie-ins, bypass pumping, shutdowns, and process improvements. Early involvement allows for the CMAR to plan and efficiently sequence the construction and methods employed and produce a high-quality product and Owner satisfaction.

*Project Funding* - JVA has a reputation for being creative when it comes to project funds. Often smaller communities do not have limitless, or even adequate, financial resources. JVA is well versed in the available State and Federal funding opportunities for infrastructure projects, and we will assist the Town in pursuing grant and/or loans to fund the necessary infrastructure improvements. We understand the importance of funding when working with small communities and do our best to even seek financing for the engineering services that we provide. The vast majority of our water projects involve State or Federal funding assistance. JVA generally takes the lead on the application process and meeting the

conditions of the grant/loan after the award. Listed below are some funding sources that JVA and our staff have assisted our municipal and Special District clients in obtaining for water infrastructure projects:

- ✓ ***DOLA Energy and Mineral Impact:*** With Johnstown located in Weld County, a County that has experienced significant impacts from the oil, gas and mineral development, the Town may qualify for the Energy and Mineral Impact Assistance Fund. This fund provides financial assistance for wastewater treatment and collection system projects. The assistance includes loans and/or grants for planning, design and construction. There are matching grants for projects between \$200,000 and \$2,000,000. Loans are also available, but other sources provide lower interest rates and have better terms. We have developed excellent relationships with DOLA staff. Contact Barry Cress at 303-866-2352 for a reference on JVA's level of service.
- ✓ ***CDPHE Planning Grants:*** JVA has recently been successful in assisting some communities in receiving planning grants for under \$50,000. These grants are obtained by writing a letter of request, and do not have a lengthy application process. The planning grants can be used for planning and preliminary design of infrastructure improvements.
- ✓ ***CDPHE State Revolving Fund:*** JVA has extensive experience assisting communities in obtaining State Revolving Fund (SRF) grants and loans. This funding source can be used for infrastructure planning, engineering and construction. Direct loans are available to the Town for up to \$2,500,000 and leveraged loans for larger amounts. Direct loans have an interest rate of 0.0 to 2.0 percent based on your MHI and a term of 20 years. JVA has worked extensively with CDPHE and the Colorado Water and Power Development Authority and will assist the Town with the application and loan processing.



## Section 3: Management Approach

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The JVA team will be managed to optimally balance quality, schedule, and costs on this project. Project management is a focus of our training at JVA. We utilize an outside consultant, Trever Renquist with Impact Management Systems, for individual trainings for key management staff. We also have a monthly in-house training program for all project engineers and managers. Here we focus on a variety of topics such as effective communications, delegation, time management and tools to make each of us more effective managers.

Managing the design and engineering process starts with the development of a detailed Work Plan. The Work Plan identifies the goals of the project, the team, roles, communication, deadlines, deliverables, and all other aspects of the project. The Work Plan will be shared with Town Staff and updated throughout the project. The Work Plan will also include a detailed workload breakdown including hours for each task and a schedule developed using Microsoft Project.

Our management team meets weekly where we discuss staffing needs, workload, and other department level topics. The JVA project managers also meet weekly to allocate staff, set deadlines, and assign projects. This is followed by a department level staff meeting where project tasks are assigned and coordinated, and deadlines are presented. Individual project team meetings occur as needed based on project size. We recommend weekly team meetings for this project. This level of internal communication is also promoted with our clients.

To manage cost, JVA incorporates cost reporting software into our project management, which allows us to monitor the project design budgets on a weekly basis or even daily if needed.

Our project success is a result of close coordination and communication with the owners, designers, contractors, and vendors, allowing us to serve you more effectively. Project progress is regularly

communicated through the design, review, construction, and inspection procedures on all projects. This careful attention to your needs creates projects that run smoothly and efficiently. Specifically, for the JWTP Expansion JVA proposes to provide a work plan that will provide milestone dates for work-in-process deliverables as outlined in the RFP. The deliverables will include the 30, 60 and 100 percent design documents for Town review followed up by design progress meetings for each deliverable to obtain input prior to finalizing. All deliverables and milestones will be agreed with the Town at the project kick-off meeting. At the 30 percent design deliverable, JVA proposes to assist the Town with the CMAR selection, value engineering and GMP proposal reviews.

The JVA team is committed to excellence in our service to our clients. The JVA team recognizes that true service to the client is more than quality engineering. Quality in JVA projects is maintained by several important factors:

- Our similar work on past projects of similar scope promotes efficiency
- Work is reviewed internally for quality, possible value engineering benefits, and engineering excellence
- Our firm excels in building state and local regulatory relationships, and public outreach.

"I had the privilege of working closely with several engineers and managers from JVA following the Sept. 2013 flood. I can highly recommend JVA and the team I worked with, namely Mark Van Nostrand, Andrew Sparn, and Josh McGibbon. They were thorough, professional, and committed to bringing Lyons' residents home as quickly and safely as possible. Thanks, JVA!"

—Sandy Banta, Former Board of Trustee  
Town of Lyons

## Section 4: Staff Qualifications

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**John McGee, P.E.**  
**Principal / Client Manager**

John has over 32 years of experience with water treatment related projects and will serve as the Principal-in-Charge for the CLFP South Plant project. John's primary role of the project will be weekly check-ins with JVA staff members on project status, budget and schedule. John will represent JVA as the contract signatory and licensed engineer for stamped reports and drawings. As principal-in-charge, John will correspond directly with Town staff on the execution of the Town/JVA agreement, negotiated scope and fees, and any value-added services that may arise during the project. John is familiar with the Johnstown WTP from previous discussions with plant staff and attendance at the pre-proposal meeting. John brings in-depth experience with the rehabilitation of mixed media filters and expansion as technical lead for the Berthoud WTP expansion, Pueblo West Metro District (PWMD) WTP expansion, City of Loveland WTP expansion and North Table Mountain WTP expansion. Prior to joining JVA, John was the Water Treatment Manager and Project Manager for the City of Loveland. During his tenure at the City, John managed and prepared in-house designs for the rehabilitation of 16 mixed media filters, addition of a 12 MGD flocculation / sedimentation using plate settlers, and rehabilitation of a 30-year old flocculation and sedimentation process with the replacement of baffle walls, flocculation paddles and drives and tube settlers. John brings this experience and expertise for the JWTP expansion project and will share his in-depth experience with project team members and Town staff throughout the evaluation, design and construction stages.



**Josh McGibbon, P.E.**  
**Technical Lead and Funding Expert**

Josh's role for this project will be the Technical Lead and Funding Expert. Josh will provide technical leadership to the team and draw on his past experience with similar projects to meet the Town's goals. Furthermore, Josh has spent the past 20 years working with the State's various funding agencies to make projects a reality by finding the necessary funding. Josh has significant amount of experience with both conventional filtration (mixed or dual media) and alternative filtration systems such as membranes. He will attend reviews and workshops with the client, commit project resources, and provide technical QA/QC to all design deliverables.



**Andrew Sparn, P.E.**  
**Project Manager**

Andrew will be the project manager for the JWTP Expansion project. He will be the primary contact and manage the design teams for this project. Andrew is currently wrapping up as the project manager for the 16 MGD North Table Mountain Water & Sanitation District (NTM) expansion project. The CMAR delivery is on schedule to be completed on time and within the \$13.6M guaranteed maximum price. This project is very similar in size and scope to the JWTP expansion project including an 8 MGD filter addition and pretreatment expansion. With the NTM project winding down, Andrew will be committed to this project as your project manager and will spend the time needed with the project team and Town staff to produce a high-quality product delivered on time and within budget. Prior to joining JVA, Andrew worked for Aslan Construction as a Superintendent is familiar with water treatment plant construction and large pipeline construction. Andrew is the On-Call Engineer for the City of Lamar and has successfully completed multiple recent projects involving replacing, rehabilitation and upsizing water distribution and transmission pipelines. Andrew is

skilled in all facets of design, permitting, and construction management of water treatment and pipeline projects. He has extensive knowledge and experience in grant/loan funding for water and wastewater treatment facilities and water quality projects. Andrew excels in communication and project management to ensure projects stay on schedule and budget. Andrew has been with JVA for 10 years and has coupled his construction experience with a strong design and project management experience which aligns him very well to serve as Project Manager for the JWTP Expansion project.

**Leah Opitz, P.E.  
Project Engineer**



Leah will be the project engineer for the JWTP Expansion project. Ms. Opitz is very familiar with mixed media filtration from past projects including Carter Lake Filter Plant

Filters #14 and #15, Filter Media replacement for the Soldier Canyon Filter Plant and North Table Mountain WTP expansion. Leah has also been the lead design engineer for numerous membrane filtration projects including Tod Creek Metro District WTP improvements, Mount Crested Butte WTP expansion, Lochbuie WTP expansion, and the Town of Crested Butte WTP expansion. For this project, she will assist / coordinate with Melissa, Ryan and sub-consultants during the concept design / evaluation phase, preliminary / final design phases, and Basis of

Design report for the JWTP expansion project.

**Ryan Wienpahl  
Design Engineer**



Ryan Wienpahl is a design engineer based in the Boulder JVA office. He has four years of experience in the

water and wastewater treatment field, including more than three years as a treatment plant operator. Through working for a contract operations company, Ryan had the opportunity to operate a wide variety of drinking water and wastewater treatment systems, allowing him to develop a strong foundation in water

treatment processes. He now brings this strength to bear in the design of new systems with JVA. Prior to turning his focus to water treatment, he worked for two years on water quality assessment projects with the U.S. Geological Survey, including the National Water Quality Assessment project. He has also volunteered for water-related non-profit organizations, including Water for People in the Denver area and El Porvenir in Nicaragua. Ryan received his M.S. degree in Civil Engineering from the University of Colorado at Boulder in 2016.

**Laurie Laos  
Raw Water Pipeline Design**



Laurie Laos will lead the Raw Water Pipeline Design for the JWTP Expansion project. Laurie is a senior project engineer and certified floodplain manager that has been

with JVA for 5 years, specializing in water distribution and conveyance. In addition to her work on infrastructure design and analysis projects and master planning, she assists the civil site teams on stormwater flood control and water quality design. Laurie is proficient in the preparation of utility design drawings and specifications. Laurie is well versed in modeling and design programs including the EPA Stormwater Management Model (SWMM), ArcGIS, WaterGEMS, and AutoCAD for developing base maps and drawings, and PCSWMM and Infoworks products.

**Adam Teunissen, P.E.  
Structural and Architectural Lead**



Adam will be leading the structural design for this project. Adam has specialized in structural engineering and design for water and wastewater

treatment facilities and pump stations for the last 17 years. His experience includes cast in place concrete basin and wet well designs as well as treatment buildings of several different building materials including masonry, precast concrete, steel, and wood. Adam has also performed several designs which

utilize pre-engineered metal building systems for water, wastewater, and commercial applications. Adam works extensively on just water and wastewater applications that involve structural engineering and is very familiar with all applicable ACI codes for water retaining structures. Adam has completed and actively involved with most the CMAR water and wastewater infrastructure projects with JVA, including North Table Mountain WTP, Mount Crested Butte WTP, Idaho Springs WWTP, Nederland WWTP, Crested Butte WTP to name a few.

### Subconsultants

We supplemented our design team with subconsultants who have expertise in geotechnical engineering, survey, and mechanical. JVA has worked extensively with these team members. We know and trust them to provide the best possible service to the Town.



#### Browns Hill Electrical and Controls (BHEC)

BHEC is currently performing work for the Town at the JWTP including upgrading the SCADA system and is familiar with the existing electrical and control systems. JVA will team with BHEC staff Ted Willie, PE and Charles Page for the electrical and controls design of the JWTP Expansion. Both Charles and Ted will attend the kick-off meeting and conduct a thorough electrical and controls condition assessment to determine limiting factors of the JWTP. The limiting factors along with the selected filtration expansion alternative will set the stage for the electrical and controls design upgrades and improvements.

Established in April of 2000, Browns Hill Engineering and Controls LLC (BHEC) is an Electrical Engineering consulting firm located in Littleton, Colorado. Browns Hill and JVA have a relationship going back to 2000 and have worked together on numerous water and wastewater projects.



#### Lithos – Geotechnical

Lithos Engineering (Lithos) specializes in geotechnical evaluations for utility and water and wastewater plant construction and the evaluation and design of trenchless techniques such as pipe bursting, horizontal directional drilling (HDD), sliplining, and cured-in-place-pipe (CIPP).

For this project, Lithos will conduct the Geotechnical Investigation which will include the soil borings located at the proposed WTP site structures and pipelines, groundwater depth determination and soil testing. From the results of the investigation, Lithos will prepare the Geotechnical Investigation Report which will provide recommendations for foundation construction and compaction. As discussed earlier, Lithos will provide the geotechnical engineering and trenchless design for the LTR raw water pipeline and construction.

Lithos will be lead by **Lance Heyer, P.E.** and **Steven Kuehr, P.E.** Lance is is an associate and geotechnical engineer with Lithos Engineering and has 11 years of experience in the engineering industry. Mr. Heyer has over 7 years of specific experience designing and observing construction for water treatment plant related infrastructure. Steven a Senior Consultant at Lithos Engineering. Mr. Kuehr specializes in geotechnical and tunnel engineering as it relates to water supply, sewerage, water resources, aggregate mining, roadway and bridge projects.



#### King Surveyors – Survey

King Surveyors (King) has been serving municipalities in northern Colorado for over 30 years. Based in Windsor, CO, King is near Johnstown and

has provided survey services in the Johnstown area for many years.

King will prepare Design Topographic Exhibits, establish a job site benchmark tied to the Town GIS vertical datum, and data collect topographic site features, trees, surface evidence of utilities and type (including physical characteristics such as inverts or top of pipe), curbs, access and design features noting the ROW or property lines of each site. In addition to the visible location of the utilities, they will show the location of the utilities as they are noted on the maps from local municipalities and utility companies, and any utility flagging or paint markings existing at the time of fieldwork. King will include underground utility locator services with 811 call in to meet requirements of Senate Bill 18-167. To confirm the elevation and location of critical utility crossings for the sewer alignment, potholing services will be used in conjunction with survey. A potholing firm will be selected during pre-design based on potholing firm availability. Potholing will be performed in conjunction with survey to achieve quality level B design drawings.

**Vladislav Skrejev, PLS** will be the project manager for this project and will schedule the survey crew for

the work. Chad will also be reviewing all deliverables and will be the Professional Licensed Surveyor for the project.

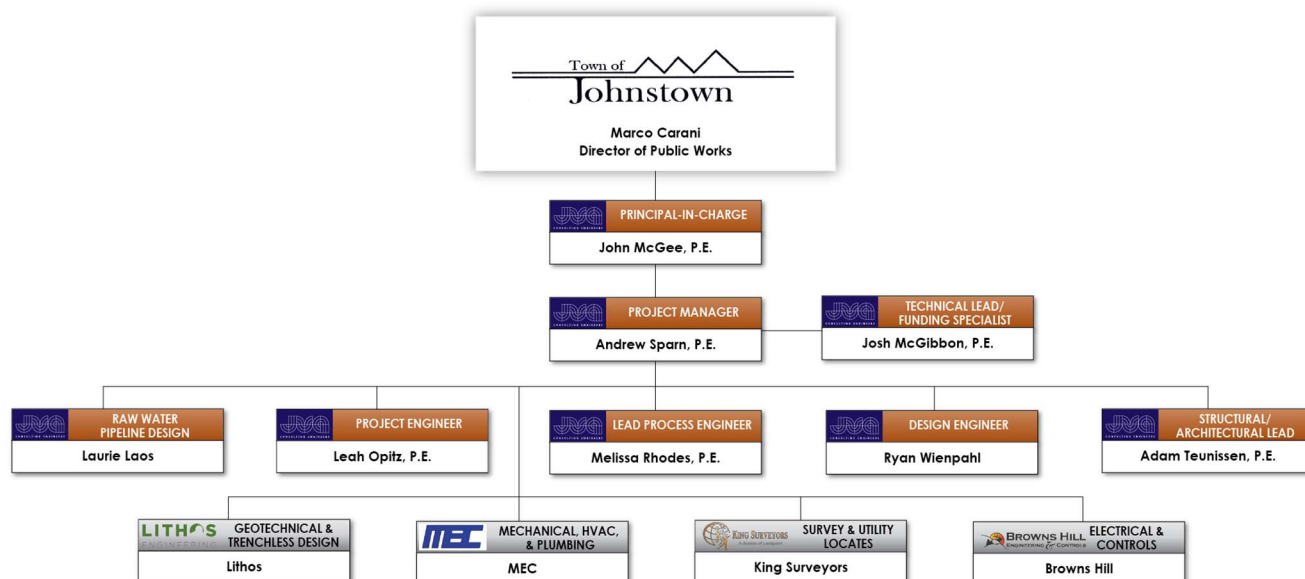


### MEC – Mechanical Engineering

Based on Westminster, CO Moen Engineering Consultants, Inc (MEC) has been providing mechanical engineering services throughout Colorado and other states for over 16 years.

**Bryan Moen, P.E.** will be the lead mechanical engineer for the lift station design. Bryan has worked with JVA on several water treatment, wastewater treatment and lift station projects and have established a trustworthy and quality relationship. JVA and MEC brings this experience to this project. Bryan is very familiar with the applicable NFPA and mechanical building codes that will be required for this project. For the existing filter building and proposed building additions HVAC design critical for proper ventilation, energy efficiency and dust control.

## Water Treatment Plant Expansion Design Organizational Chart





## Section 5: Related Project Experience

Woodmoor WSD Water Treatment & Raw Water Pumping & Transmission Monument, CO	
	<b>Reference:</b> Woodmoor Water and Sanitation District Jessie Shaffer, District Manager JessieS@WoodmoorWater.com 719-488-2525

JVA has been serving as the District’s On-Call Engineer since 2018 after delivering the design of the Well 21 project. We have implemented all water and wastewater capital improvement projects in the last two years. JVA has developed a close relationship with District staff, working weekly with staff engineers, management, and operators. We regularly attend Board meetings and assist in planning and annual budgets.

### Well 21

JVA completed the design, permitting, and construction administration for the Well 21 project. The project included the drilling of a new 2,100 ft deep groundwater well, equipping the well with a pump, motor, pipe, and pitless adaptor. JVA permitted and designed a well house with air relief valve, sample station, flushing valve, VFD, pump controls, and instrumentation. JVA provided AutoCAD training and worked closely with the District Engineer to develop construction documents for the 5,300 ft raw water transmission line to tie the new well into the Central Water Treatment Plant.

### Scrub Oaks Water Line Replacement

JVA designed the 2,000 LF Scrub Oaks water line replacement. The existing water line was experiencing frequent breaks and leaks. The design took into consideration maintaining service to numerous customers while replacing the waterline. The waterline was relocated within the County right-of-way to maintain separation from the existing sanitary sewer main. JVA received utility permits

from El Paso County. The project was bid with a pipe bursting alternative, allowing the District to compare costs for open trench versus pipe bursting and budget for future capital projects. The project was delivered under budget and within the desired schedule.

### South Water Treatment Plant Improvements

JVA is designing the improvements to the SWTP which include replacing the on-site sodium hypochlorite generations system, relining an existing FRP tank, improving ventilation in the mechanical room, complying with CDPHE’s Disinfection Outreach Verification Effort (DOVE), improving chemical feed systems, and modifying the raw water feed system to alleviate pressure surges and metering issues.

### Central Water Treatment Plant Improvements

JVA is designing and permitting the improvements required to convert the CWTP from a groundwater treatment facility to a surface water treatment facility. This project includes replacing the clarifier and filter media; replacing the underdrains; adding air scour; recoating the filter units; adding filter-to-waste; complying with DOVE; optimizing pretreatment for iron, manganese, and radium; adding a raw water blending tank; and replacing instrumentation and controls. JVA is advising the District on complying with the draft TENORM regulation due to elevated levels of radionuclides in the raw water sources. JVA is performing a demonstration scale study in compliance with CDPHE for radium removal.

### Lake pump Station

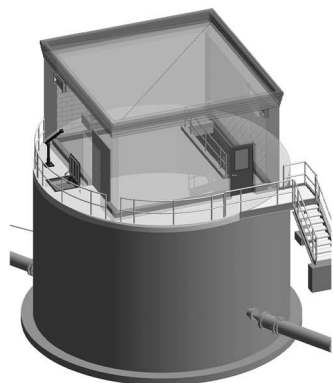
JVA is designing and permitting a new raw water pump station at Lake Woodmoor to feed the CWTP. The new pump station will be designed with redundant reservoir feed lines to draw water off the deepest levels of the reservoir. The pump station will also have the ability to pump to both the SWTP and the CWTP. The pump station alternatives and effects to the dam are being evaluated thru a Semi-Quantitative Risk Analysis (SQRA). The project includes 3,000 ft of new raw water transmission line to tie the pump station into the CWTP.

## Evergreen WTP Improvements Evergreen, CO



**Reference:**  
Evergreen Metro District  
Dave Lighthart, General Manager  
dlighthart@evergreenmetro.org  
303.674.4112

JVA was hired by Evergreen Metro District (District) in early 2019 to make improvements to the high service pump station (HSPS), site piping, membrane reject waste and recovery system, and chlorine contact basin. The project also included demolition of existing structures, drainage improvements, new automated security gate and entrance, and electrical and control upgrades. JVA prepared the Project Needs Assessment for the District to apply for State Revolving Fund (SRF) program and obtain low interest loans for construction of the project. The WTP processes include flocculation and sedimentation followed by submerged membrane filtration, and chlorine disinfection. The major focus of the design was replacing and aged high service pump station with a new HSPS which was designed within a repurposed abandoned clarifier and included a new HSPS building on top of the HSPS.



*New High Service Pump Station*

The WTP site was very constrained with limited room for expansion with an abundance of active and abandoned underground utilities. The District elected to utilize the CMAR delivery to construct the project. JVA assisted with the District with CMAR selection process at the 60 percent design document phase and

was awarded to Stanek Constructors. The construction documents and GMP was finalized in December 2020 and notice to proceed for construction January 2021. JVA has been retained by the District to begin water system modeling and master planning for 2021 and will be providing construction administration services for the WTP improvements.

**Project Size:** 4.5 MGD Capacity  
**Design Contract Amount:** \$280,000  
**Construction Administration:** \$120,000 million  
**Guaranteed Maximum Price:** \$2.77 million  
**Project Completion:** May 2022

## Water Treatment Plant Filter Upgrades Grand Junction, CO



**Reference:**  
John Eklund, Utility Engineer  
City of Grand Junction  
970.244.1558  
Approximate Total Project Cost:  
\$1,200,000  
Cost of JVA Services:  
\$143,000

JVA designed and permitted filter upgrades to the City of Grand Junction 16.0 MGD Water Treatment Plant. The project included replacing the existing filter underdrains and media as well as the addition of new blowers and air scour. The project was a fast track design with only 60 days to complete and submit to CDPHE. The design included converting the existing filters from surface wash to air scour. JVA working extensively with Leopold to pre-purchase the equipment to meet the aggressive schedule. The project was constructed by Moltz Construction on schedule and below budget.

**Project Size:** 16 MGD Capacity  
**Design Contract Amount:** \$114,000  
**Construction Administration:** \$29,000  
**Construction Price:** \$900,000  
**Project Completion:** June 2017

“JVA has been excellent. Their expertise has made our WTP Filter Retrofit project seem almost effortless. A few things stand out:

JVA makes sure our plans are going to work – Updating an old treatment plant to current standards is no small feat. JVA coordinated local and state design standards (including getting exemptions approved), equipment suppliers, and sub-consultants seamlessly to create a comprehensive project plan set in a mere 62 days.

JVA never seems busy (even though I know they are) – They always seem pleased to investigate the best solution or answer questions when I call. I never feel rushed or put off, and responses are always prompt and well thought out.

JVA has a full range of services at their fingertips – Whether structural, environmental or other, they can provide services and answers from within their company. Also, they provided structural inspection of our facility which has kept the contractor moving. It is much simpler than dealing with multiple subs, whether in design or construction. This is incredibly important when our project schedule is so short.

JVA is enjoyable to work with – Their resume speaks for itself. Their professionalism is paramount. However, the fact they are friendly and fun to be around is the icing on the cake.”

City of Grand Junction

## Mt. Crested Butte Water & Sanitation District WTP Expansion

Mt. Crested Butte, CO



**Reference:**  
Mike Fabbre, District Manager  
Mt. Crested Butte Water &  
Sanitation District  
970.349.7575  
mfabbre@mcbwsd.com

JVA designed and permitted the Mt. Crested Butte Water and Sanitation District (District) Water Treatment Plant (WTP) Expansion. The District’s WTP is a 1 MGD direct filtration water treatment

facility consisting of flocculation, sedimentation and filtration in packaged unit followed by chlorine disinfection. The WTP treats water from the East River, Malensik Ditch, and four springs. The project includes capacity expansion to 1.5 MGD firm capacity and changing to membrane filtration for the new water treatment plant and construction of a new East River raw water pump station. These improvements will provide adequate system redundancy during peak demands. The project also includes a new redundant raw waterline connecting the pump station to the water treatment plant. In addition to process improvements, the project includes repurposing the existing water treatment plant building and a new administration building with a water quality laboratory, operations room, kitchen, locker rooms, and operations offices. As part of the permitting process, JVA prepared a comprehensive Basis of Design Report (BDR) which analyzed current and projected full buildout peak demands to comply with CDPHE design criteria for potable water systems. The project is utilizing the Construction Manager and Risk (CMAR) project delivery method and will be funded by the State Revolving Fund. JVA is in the process of developing 90% construction drawings and specifications for the CMAR contractor to prepare their Guaranteed Maximum Price.

JVA has worked on numerous water and wastewater projects for the District and currently serves as their on-call engineer. Projects have included a new Disinfection Building, Process Building Improvements, Paradise Lift Station building, development review and construction observation services.

**Project Size:** 1.5 MGD Capacity

**Design Contract Amount:** \$1.2 million

**Construction Administration:** \$1.2 million

**Guaranteed Maximum Price:** \$20.3 million

**Project Completion:** March 2022

## Town of Berthoud Water Treatment Plant Expansion, Berthoud, CO



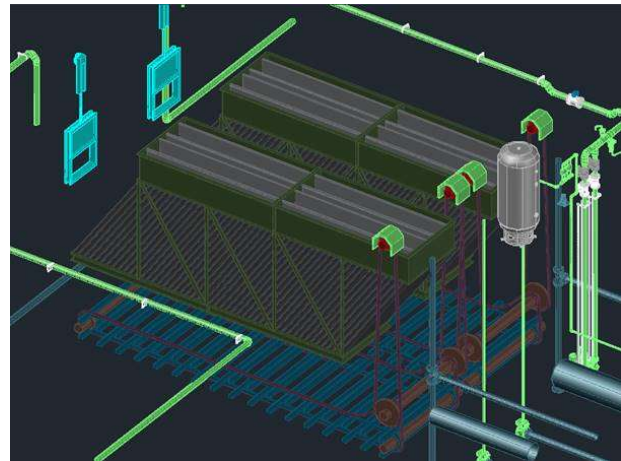
### Reference:

Stephanie Brothers, P.E. Public Works Director  
Town of Berthoud  
970.532.2643  
sbrothers@berthoud.org

JVA completed a water system Master Plan for the Town of Berthoud in 2011 and updated the Master Plan in 2017. A detailed Capital Improvement Plan for the WTP was developed based on findings during a Comprehensive Plant Evaluation (CPE) in the 2011 Master Plan. The improvements included a 2017 WTP expansion project to increase capacity from 2.2 MGD to 4.2 MGD. Other successful projects that have been completed as part of the Master Plan include distribution mains for new developments, storage mixing, a booster pump station for a new pressure zone, and distribution system interconnects with the Little Thompson Water District.

In 2017, JVA completed the planning, permitting and design of the Berthoud WTP Expansion and Improvements. The design included the demolition of the existing single basin flocculator / clarifier and conversion to a two-train pretreatment plate settler system and hoseless sludge vacuum track removal doubling the capacity within the same footprint along with the addition of a third flocculation stage. The pretreatment upgrade allows for the Town to take one basin off at a time without the need of shutting down

the entire plant for maintenance of the pretreatment process.



*Plant 3D Modeling for Plate Settler System*

The design also included doubling the capacity of the dual media filtration system, backwash waste basin improvements, new electrical service and standby generator, demolition of the old filter building, addition of a powder activated carbon (PAC) system, plant drain pump station upgrade, corrosion control improvements, and new clearwell overflow.



*Photo: Construction of the New Filter Trains #3 and #4*

JVA prepared the Basis of Design Report at the 60 percent design and submitted to CDPHE for approval. The Town elected to use the CMAR project delivery to construct the project. JVA prepared the RFP for the CMAR review and selection. Moltz Construction was awarded the CMAR design / constructability review contract and construction contract with a GMP of

\$3.44 million. The construction began late August 2017 and completed by August 2018.

JVA also performs on-call engineering services for the Town of Berthoud including WTP permitting, compliance and water quality assessments, hydraulic modeling, and development utility reviews.

**Project Size:** 4.2 MGD

**Design Contract Amount:** \$175,900

**Construction Administration / Observation:** \$134,100

**Construction GMP:** \$3.44 million

**Construction Completion Date:** August 2018

North Table Mountain WSD Water Treatment Plant Expansion, Golden, CO	
	<p><b>Reference:</b>            North Table Mountain WSD            Bart Sperry, PE, District Manager            303.279.2854 ext. 305  <a href="mailto:bart@ntmwater.org">bart@ntmwater.org</a></p>

JVA was retained from the conceptual design phase of the project to begin the preliminary and final design and permitting phases for the North Table Mountain Water and Sanitation District (NTM) Water Treatment Plant (WTP) Expansion. The NTM WTP is an 11 MGD conventional water treatment facility consisting of ballasted flocculation / sedimentation, filtration, and chlorine disinfection. The project includes capacity expansion to 16 MGD capacity, while providing adequate treatment redundancy during peak summer demand. Water treatment improvements included the upgrade and replacement of the first generation Actiflo™ ballasted flocculation / sedimentation with the latest generation ballasted floc / sed system (Actiflo Turbo). The ballasted floc / sed upgrade increased the pretreatment capacity from 11 MGD to 16 MGD within the existing basins with minimal structural improvements. The design also included multi-media filter expansion, baffling the chlorine contact basin to increase the baffling factor from 0.1 to 0.5 and achieve DOVE compliance, housewater pumping improvements, and complete revamping of the primary and electrical service, ATS and standby generator, and SCADA / HMI / controls.

In addition to process improvements, the project includes a chemical storage / feed facility and an administration building with a water quality laboratory, operations laboratory, training center, kitchen, locker rooms, and operations offices. JVA prepared the 30 percent, 60 percent, and 100 percent design phases along with an opinion of construction cost for each phase. There was a significant amount of collaboration and workshop sessions with the District to refine the design and specifications. At the 60 percent design phase, the Basis of Design Report (BDR) was submitted to CDPHE for review and was approved within two months. In addition, JVA prepared the RFP with the 60 percent design documents to solicit qualified contractors for review and selection of a Construction Manager at Risk (CMAR) project delivery. The successful CMAR was Aslan Construction from Berthoud, Colorado. Aslan was on the project team during the final design phases and assisted with constructability, creativity and cost savings to meet the construction budget. This collaborative effort resulted in a successful Guaranteed Maximum Price (GMP) for the project. JVA also assisted the District in the preparation of a Department of Local Affairs (DOLA) Energy Impact Assistance Grant (EAIG) application. The District was awarded a grant of \$1,000,000 partly due to an innovative hydrothermal HVAC heat pump design to reduce carbon fuels required to heat and cool the administrative / lab building (Green Energy). The project construction kicked off in March of 2020 and is anticipated to be substantially completed by August of 2021. JVA has been retained by the District for construction observation and construction administrative services. A summary of project costs for the engineering design and construction services and construction cost is provided below.

**Project Size:** 16 MGD Capacity

**Design Contract Amount:** \$644,000 (no change orders)

**Construction Administration and Observation**

**Engineering Services Contract Amount:** \$426,000

**CMAR Guaranteed Maximum Price:** \$12,800,000 (includes the \$1 million DOLA grant)

**Date of Project Completion:** August 2021

### Town of Crested Butte Water Treatment Plant Improvement Project, Crested Butte, CO



**Reference:**  
 Town of Crested Butte  
 David Jelinek, Water System Manager  
 970.349.0885  
 DJelinek@crestedbutte-co.gov

JVA was hired by the Town of Crested Butte (Town) in 2018 to conduct a Project Needs Assessment in accordance with the State Revolving Fund (SRF) program to obtain low interest loan for expanding the Town’s WTP. In 2018, the WTP had experienced peak day demand approaching the plant capacity of 1.25 MGD. The Town and JVA were successful in obtaining the loan along with a DOLA grant for expanding the WTP to 1.66 MGD sufficient for project demands for the next 10 years. The Town’s WTP is an ultrafiltration membrane filtration water treatment plant. The expansion project featured an increase in the system capacity from 1.25 MGD to 1.66 MGD, redesigned chemical pretreatment system to optimize treatment efficiency and improve system hydraulics, and a building expansion to improve operability and access to process equipment. As part of this effort, funding from DOLA and SRF was facilitated to finance the construction. The project was designed on an expedited schedule and went from the planning stages of a comprehensive performance evaluation to 100% design and permitting in under one year.

- Project Size:** 1.66 MGD Capacity
- Design Contract Amount:** \$139,000
- Construction Administration:** \$139,000
- Guaranteed Maximum Price:** \$2.3 million
- Project Completion:** December 2019

### Northglenn Water Treatment Plant Master Plan Northglenn, CO



**Reference:**  
 Mike Roman, Civil Engineer II  
 303.450.4079  
 mroman@northglenn.org

The City of Northglenn (City) operates a conventional water treatment facility (WTF) consisting of chemical addition, rapid mix, flocculation, sedimentation and mixed media filtration. Serving a population of about 40,000 people, the 14 million gallon per day (MGD) facility operates at about 60 percent capacity in the peak summer months. Build-out maximum day demands were projected at about 10 MGD. As part of the Water Treatment Plant Master Plan Update the treatment capacity, facility performance, and operations were evaluated and performance limiting factors (PLFs) were identified. Recommendations were made for treatment process improvements to address the identified PLFs. The highest prioritized recommendation was water treatment residual solids handling improvements. The current solids handling system consists of two recycle basins and a pump station. Filter backwash, clarifier blow-down and plant drains all feed the recycle basins and the combined product is pumped to the sanitary sewer without recycle to the front end of the WTF. Staff indicated that about 60 million gallons of water per year are wasted to the sewer that could be recycled.

JVA document potential comprehensive solutions to improve the residual solids handling process. The primary objectives for the improvements include backwash water recycling and solids dewatering. Several passive dewatering options were explored, however, due to property constraints, mechanical dewatering was preferred and documented in the Master Plan Update. It was recommended to replace the liner and solids removal system for the backwash recovery ponds with a new recycle pump station. The combined solids loading (backwash waste and clarifier blow-down) was projected at about 2,300 lbs/day, including the soon to be added filter to waste. A detailed description and cost estimate for the solids



handling and mechanical dewatering facility was provided in the Master Plan Update, including backwash recovery pond and recycle pump station improvements, solids handling basin, decant system, equalization and thickening, process building and plan for potential beneficial reuse. The Master Plan is

complete, and the City is using the document to develop a long-term CIP.

**Project Size:** 14 MGD Capacity  
**Design Contract Amount:** \$64,300  
**Project Completion:** April 2020

## Section 6: Project Schedule

Project Milestones	2021										2022			
	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Project Initiation and Site Investigations	B		C											
Concept Design Phase	B			C										
Concept Design Phase Workshops			X											
30 Percent Preliminary Design Phase			B			C								
Preliminary Design Phase Workshops					X									
60 Percent Design Phase and BDR / CMAR Selection						B			C					
60 Percent Design Workshops								X						
CDPHE BDR Approval											X			
Construction Documents and GMP Phase										B		C		
Construction Documents Workshops											X			
Notice to Proceed Construction												B		
Construction Administration Phase												B		

*B = Begin*

*C = Complete*

### Project Initiation and Site Investigation Phase

As shown in the Project Schedule, JVA will schedule a kick-off meeting and JWTP field visit with the Town and Operation staff. It is anticipated that the project will begin in the middle to late March 2021. All key team project team members including subs, will attend the kickoff meeting. Following the meeting, the project team will tour the JWTP and interview operation staff regarding plant operations and design features. JVA will prepare meeting / plant tour notes and distribute to the Town.

The geotechnical investigation and topographic survey and utility locates would be launched following the kickoff meeting. Lithos will conduct the Geotech investigation and develop a geotechnical

report for recommendations for structure foundation support and dewatering. The survey will include topo for the entire site along with critical tie in elevations and hydraulic elevations of existing piping and processes. The Project Initiation and Site Investigations will be completed by May 2021.

### Concept Design Phase

The intent of this phase is to evaluate and prepare the design concept for each design task presented in the *Approach Section* of this proposal. JVA will prepare a technical memo for each design task that will set the design parameters for treatment processes and equipment, hydraulics, mechanical (i.e. HVAC), electrical and controls. JVA will schedule a half-day workshop review session with the Town and



operation staff to discuss the technical memos and respond to comments. It is anticipated that the Concept Design Phase will be completed by June 2021.

### **30 Percent Preliminary Design Phase**

Once the concept design for the filter expansion is completed and agreed upon with the Town, JVA will kick into the 30 percent design phase. At this phase, the filtration alternative has been selected which will allow for an efficient schedule to complete the 30 percent design documents. The 30 percent design will include site plans, site piping plan, hydraulic profile, process & instrumentation diagrams, process plans and sections, and electrical one-lines drawings. JVA will prepare an opinion of cost (OPC) for the construction. During the final stages of the 30 percent design a half day workshop session will be Town to obtain feedback prior to finalizing the 30 percent design documents. It is anticipated that the 30 percent design documents will be completed by August 2021.

### **60 Percent Design Phase**

JVA will produce 60 percent design documents which will include drawings and technical specifications (Divisions 1 through 16). JVA will prepare the Basis of Design Report (BDR) in accordance with CDPHE guidelines for submittal. The drawings will include general, civil, process, architectural, structural and electrical drawings. For specifications, the Construction Specification Institute (CSI) 5-digit Master Format will be used to create the technical specifications. JVA will communicate closely with the Town on specified process equipment, instruments, piping, valves, and building materials to ensure that these products meet the Town's standards and are compatible with existing equipment, instruments, and materials. JVA will prepare an RFP and draft contract documents to solicit qualified contractors for delivering the project using the Construction Management at Risk (CMAR) method. Once the CMAR proposals are received, JVA will assist the Town with review of the proposals and recommendation of Award. Once selected, the CMAR will be on board with the project team to

complete the final design phases of the project. Typically, the CMAR will have a separate contract with the Town for pre-construction design tasks. JVA will schedule with the Town and CMAR for review and schedule a half-day workshop to review the design and respond to comments and input from the Town and CMAR. It is anticipated that the 60 Percent Design Documents and CMAR selection will be completed by November 2021. It is anticipated that the BDR submittal to CDPHE will be completed by November 2021. From JVA's experience, CDPHE will take two to three months to review the BDR for approval.

### **Construction Documents and Guaranteed Maximum Price (GMP)**

JVA will advance the design details and technical specifications to produce construction documents (CDs). During development of the construction documents, JVA will be working with the Town and CMAR to obtain review comments on constructability and design details. The advantage of having a CMAR on board allows for efficiency during the design process which includes input from the contractor throughout.

The documents will include the executed CMAR contract documents and final GMP. The final GMP is a result of a collaborative effort between the Town, JVA and Contractor during the design reviews and coordination with sub-contractors, suppliers, and equipment sales representatives to arrive at the most competitive contract price. JVA will submit the 100 percent design documents to the Town for review and schedule a half-day workshop to review the design and respond to comments and input from the Town. It is anticipated that the CDs, GMP, and execution of the CMAR contract will be by February 2022.

### **Construction Administration Phase**

Based on the project schedule shown above, the notice to proceed (NTP) for the CMAR will be March 2022. JVA will assist the Town with providing in-office and field construction administration services. We have estimated for a project of this size (not including the LTR pipeline construction) a





construction timeline of 18 months. JVA will provide the following construction administration services:

- Attend pre-construction meeting – prepare meeting minutes
- Review of pay applications, shop drawing submittals, O&M manuals, Request for Information (RFIs), and Work Change Directives (WCDs)
- Attend weekly construction progress meetings
- Provide part-time onsite inspection and prepare observation reports (we have assumed weekly 4-hour visits for a duration of 18-months)
- Prepare record drawings (CAD and PDF)

## **Section 7: Work Breakdown Schedule and Estimated Fee**

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Please see the sealed envelope attached for a detailed work breakdown structure (WBS) for this project with hourly rates and a total estimated fee for JVA’s design and bidding services for the Johnstown Water Treatment Plant Expansion Project. Our estimated fees are based on an estimated total construction cost of \$8 million. There will be opportunities to reduce costs through the CMAR process and the collaborative approach presented in this proposal.

“You and your team have delivered every bit of what you said you would and more. We are very pleased to have gone with JVA for this project.”

—Brian G. Prunty, Public Works Director  
City of Rifle

# RESUMES

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## Laurie A. Laos

Senior Project Engineer, Environmental and Civil Engineering

### Education

M.S. Civil Engineering,  
Colorado State University, 2014

B.S. Environmental  
Engineering, University of  
Wisconsin-Platteville, 2008

### Registrations

Certified Floodplain Manager

### Professional Organizations

AWWA



### Project Experience

Design and Project Engineer for the following projects:

#### **Town of Berthoud I-25 Water Distribution and Wastewater Collection Systems, Berthoud, CO.**

Design Engineer for design and construction of 4,250 linear feet of a 16-inch PVC water transmission main and 8,000 linear feet of 15-inch and 12-inch PVC sanitary sewer main with connection to the Berthoud Regional Wastewater Treatment Facility (WWTF). Project included coordination and dual design of the water and sanitary sewer. Design included three crossing of I-25 via a boring. An interconnect with Little Thompson Water district required detailed understanding of their system and design standards for the connection to occur. Project included open cut river crossings which required floodplain and wetland analyses and an Army Corp permit.

#### **Town of Windsor Water Transmission Main Rehabilitation, Windsor, CO.**

Provided design and GIS support for the analysis and rehabilitation recommendation for 2,800 linear feet of an existing 16-inch diameter pipe. Completed an alternative analysis on the appropriate repair option of slip-lining or replacement using available information including working with Town staff to understand the current system condition and determined that the best course of action for the project was a waterline replacement. Design Engineer for the design and construction of the water main replacement.

#### **Prospect Mountain Water Distribution System Improvements, Town of Estes Park, CO.**

Senior Project Engineer responsible for the design of water main distribution system replacement for the Prospect Mountain service area in the Town of Estes Park. Responsible for organizing and directing four design engineers used to complete the design of 30,000 LF of water distribution mains. Worked with available existing Town GIS data to develop preliminary design of the waterline and finalizing the design with the topographic survey. Developed easement figures for the legal descriptions. Coordinated with Town Staff for the preferred alignments and discussed best options for the alignment of the new waterline to provide service to all customers while considering all design constraints that are inherent with installation of a new waterline in an area that is already built out.

#### **Hidden Valley Water District Connection to Evergreen Metropolitan District, Evergreen CO.**

Senior Project Engineer responsible for the design of a new water main distribution system to connect the Hidden Valley Water District (HVWD) to Evergreen Metropolitan District (EMD). Design included 2,325 LF of 6-inch DIP with a flow meter vault, a backflow preventor vault, and an altitude valve vault. The connection required a bore under Highway 74 with several utilities, private owner concerns, and elevation difference that challenged the design and construction. The EMD waterline could not be shut down for the connection and required a wet tap of the 14-inch line. The project also included the replacement of 1,780 LF of the existing 2-inch and 4-inch water service line parallel to the 6-inch distribution line and the reconnection of 13 services.

#### **Woodmoor Water Sanitation District Scrub Oaks Waterline Replacement, El Paso County, CO.**

Project and design engineer for the design of the replacement of 980 LF of 6-inch DIP waterline that is located between two blocks in a residential subdivision. Initial design considerations included slip-lining of the existing waterline, but further analysis of the existing utility locations and available space determined that realigning the waterline was a better option. The design was completed in a condensed schedule due to construction timing and funding.

#### **Town of Wellington Storm Sewer Design and Water Line Replacement, Wellington CO.**

Design Engineer for the drainage analysis of 1,500 linear feet of 36 and 42-inch RCP storm sewer pipe within a residential roadway. The analysis included delineating storm runoff basins, creating a Stormwater Management Model (SWMM), designing the storm sewer system including a railroad crossing. In conjunction with the storm sewer design, design was completed for the replacement of the existing 8" AC water line that parallels the designed storm system and installing two new sanitary sewer manholes. Worked with Town staff to determine the location of the pipe and precautions to be taken while working with the AC pipe.



# John P. McGee

Principal, Environmental Engineering

## Education

M.S., Civil/Environmental Engineering, West Virginia University, 1988

B.S., Civil Engineering, West Virginia University, 1986

## Registration

Professional Engineer:  
Maryland, Indiana, Colorado

## Professional Organizations

Water Environment Federation (WEF)

American Water Works Association (AWWA)



## Instructor/Trainer

**Colorado State University** – Part Time Instructor for teaching the Spring Semester, 3 credit hour class CIVE 437 – Wastewater Treatment Process Design

## Water Projects

Principal, Project Manager, Technical Advisor or Engineer of Record for the following Facilities:

**14 MGD Northglenn, CO Water Treatment Master Plan Update** – Principal in Charge for the Northglenn water treatment master plan update. The project included a comprehensive performance and capacity evaluation of the treatment and solids processes and identification of performance limiting factors (PLFs). To address the PLFs, recommendations were included along with a 10-year capital improvement plan with opinions of probable costs. The master plan update was completed in May 2020 and the City will begin implementing recommended capital improvements later 2020.

**45 MGD Soldier Canyon Filter Plant, Fort Collins, CO** – Project Manager for the design to improve the backwash recycle and supply pumping improvements at the SCFP. The project began in July 2015 and was completed in December 2016. The project involved replacing and 20-year old pumps with a larger and more efficient pumps to provide a higher level of service and redundancy during peak filter backwash demands and increase recycle flows.

**16 MGD North Table Mountain Water & Sanitation District WTP Improvements, Golden, CO** – Project Manager for the Preliminary Design Improvements to the District's WTP. The Preliminary Design included a new administration / laboratory building, addition of new filters and building, addition of a second 8 MGD Actiflo Pretreatment process and building, disinfection improvements, backwash pond recovery improvements, demolition of the old filter / administration building, raw water valve vault improvements, and associated electrical, mechanical and plant process control upgrades

**50 MGD Carter Lake Filter Plant, Berthoud, CO** – Project Manager for the evaluation, development and permitting of a beneficial use plan to apply water treatment residuals on land areas for reclamation. The project also involved the permitting of the discharge of backwash water to surface water.

**4.2 MGD WTP, Town of Berthoud, CO** – Project Manager for the master planning, preliminary design and final design of 2.0 MGD expansion project to the Town of Berthoud water treatment facility. The project involved rehabilitation of existing clarifiers using plate settlers, addition of new filters new backwash waste pump station, future sludge drying area for clarifier sludge, corrosion control improvements, backwash recycle, new standby generator, and plant drain pump station.

**38 MGD WTP, City of Loveland, CO** – Project Manager with JVA for completing water treatment projects for transitioning the new water treatment manager that took the position that Mr. McGee held previous. The projects included final design review of the 38 MGD Water Treatment Plant Expansion, floc / sed rehabilitation / expansion with tube settlers and plate settlers, backwash and sludge ponds expansion / improvements, beneficial reuse of treatment residuals permitting on the grounds of the WTP, on-going Glade Reservoir and Big Thompson River water quality monitoring program.

**2 MGD Water Treatment Plant, Mount Crested Butte Water and Sanitation District, CO** – Technical Lead for the planning, design and permitting for a new membrane ultrafiltration plant replacing a 30 year old direct filtration plant. The project began construction in June 2020 and is being constructed adjacent to the existing WTP. The existing WTP will be repurposed for vehicle storage, backwash recovery and recycle (converting chlorine contact tank), and fuel storage. The project also includes construction of a new raw water pump station and intake structure for pumping raw water from East River to the pre-sedimentation basin.

**City of Loveland, CO** – Water Treatment Manager overseeing all personnel for water treatment operations, water quality and industrial pretreatment. In addition, functioned as project manager for all minor and major capital projects for the Loveland WWTP and WTP. John was involved with the preparation and implementation annual, 5- and 10-year CIP budgets and operation and maintenance budgets. John managed in-house designs and approval for the rehabilitation of sixteen (16) 2 MGD high-rate filters with new underdrains, air scour and media



## Josh J. McGibbon

### Vice President, Environmental Engineering

#### Education

B.S. Montana State University,  
Civil Engineering, 2000

#### Registration

Professional Engineer:  
Colorado, 2006

#### Professional Organizations

Water Environment Federation

Rocky Mountain Water  
Environment Association –  
Executive Committee

American Water Works  
Association



#### Project Experience

Principal, Project Manager or Engineer of Record for the following Facilities:

**North Table Mountain Water and Sanitation District Water Treatment Plant Expansion, Arvada, CO**  
Principal-in-Charge for the design of a water treatment plant expansion. The project included preliminary design, followed by a 60 percent design package and assistance with the Construction Manager at Risk (CMAR) procurement for the expansion. The project includes a new administrative building, metering vault improvements, expansion of the ballasted flocculation pretreatment process, new conventional filters, chemical system improvements, clearwell baffling, a new valve vault, backwash automation, new onsite wastewater treatment system (OWTS), heating ventilation and cooling (HVAC) upgrades, and electrical and controls upgrades.

**Town of Erie Water Treatment Plant Solids Handling Facility, Erie, CO.** Principal-in-Charge for the Design Build of the Town of Erie WTP Solids Handling Project. Performed pretreatment optimization of plate settler system. The WTP site has space constraints so mechanical dewatering will be utilized. The project includes solids storage tanks, dewatering equipment, PAC relocation and the addition of sodium permanganate as a preoxidant. The new equipment will be housed in a new building over the old WTP tanks that will be reconfigured for solids storage. The solids handling facility will be designed to handle the current 10 MGD capacity with expansion to 17 MGD.

**Woodmoor Water and Sanitation District 2021 Water Capital Improvement Projects, Monument CO.**  
Principal-in-Charge for the design of the improvements to South Water Treatment Plant (SWTP), Central Water Treatment Plant (CWTP) expansion, and new Lake Pump Station, and new Well No. 21. The SWTP and CWTP are designed with oxidation and filtration for iron and manganese and both surface water and groundwater compliance. Each plant is designed to be converted seasonally from groundwater only to surface water. The projects included a new well and building, pretreatment building, filter replacement, chemical feed modifications and a new pump station.

**Parker Water and Sanitation District Rueter-Hess Water Purification Facility Residuals Ponds Expansion, Parker CO.** Principal-in-Charge for the water treatment residuals project. Project included the preparation of a technical residuals analysis for the treatment system including ballasted flocculation pretreatment and ceramic membrane filtration. Quantified the solids quantity and types to size the pond expansion project. Prepared design drawings and CDPHE and BDR.

**Berthoud Water Treatment Plant Expansion, Berthoud, CO.** Engineer of Record for the design and permitting of a 2.0 MGD expansion of the water treatment facility to 4.2 MGD firm capacity. Process upgrades include coagulation (chemical feed/dispersion), decreasing gradation of flocculation, two-train inclined plate settlers, two dual media filters with air scour, high service pump, and caustic corrosion control treatment prior to distribution. Improvements to the solids handling and backwash recovery system includes retrofitting an existing clarifier to a gravity thickener and upgrading a backwash holding basin to a residuals drying bed.

**Pueblo West Metropolitan District Water Treatment Plant Expansion, Pueblo West, CO.** Engineer of Record for the design of a 5.0 MGD expansion of the water treatment facility which will assure the District will have additional water supply capacity for current peak water demands. The water treatment expansion includes upgrades to filtration, disinfection, chemical feed, backwash basins, and backwash solids drying beds. The new facility will have a total capacity of 21 MGD.

**Grand Junction Water Treatment Plant Improvements, Grand Junction, CO.** Engineer of Record for the design and permitting of a filter upgrade to 16 MGD water treatment plant. The project includes replacement of existing filter underdrains and media as well as the addition of new blowers and air scour.

**City of Idaho Springs Water Treatment Plant Improvements, Idaho Springs, CO.** Principal-in-Charge for design and construction administration of numerous improvements to the existing 2.0 MGD microfiltration water plant. Project included improvements to the Clean in Place (CIP) system such as chemical dosing, piping, and automation and dedicated sewer system. Chlorine gas disinfection system was replaced with sodium hypochlorite feed and remote fill system. Automated coagulant dosing system for TOC reduction was installed.

**Town of Crested Butte Water Treatment Plant Improvement Project, Crested Butte, CO** QA/QC Manager for the design of a treatment plant expansion project for the Town's existing membrane filtration water treatment plant. The expansion project featured an increase in the system capacity from 1.25 MGD to 1.66 MGD, redesigned chemical pretreatment system to optimize treatment efficiency and improve system hydraulics, and a building expansion to improve operability and access to process equipment. As part of this effort, funding from DOLA and SRF was facilitated to finance the construction. The project was designed on an expedited schedule and went from the planning stages of a comprehensive performance evaluation to 100% design and permitting in under one year.



## Leah C. Opitz, P.E.

Project Engineer, Environmental Engineering

### Education

B.S. Colorado State University,  
Civil and Environmental  
Engineering course work,  
2014-2016

B.S. University of Maryland,  
Microbiology, 2009

### Registration

Professional Engineer  
Colorado, 2020



### Project Experience

Project Engineer for the following Facilities and Utilities:

**Carter Lake Filtration Plant, Berthoud, CO** – Design Engineer for the Carter Lake Filter (CLFP) Backwash Irrigation Beneficial Use Plan (BUP) Project. The CLFP consists of two plants with a combined capacity of 50 MGD. The CLFP has historically stockpiled WTP residuals on-site. Leah prepared a beneficial use plan (BUP) and permit for the use of CLFP water treatment residuals as well as use of the filter backwash water for irrigation. The BUP was prepared in accordance with CDPHE criteria and the permit for use was recently approved by the CDPHE. As a result, the residuals can be used for land reclamation and construction fill at designated areas. In addition, the CLFP has minimized discharges to surface water from their backwash water ponds.

**North Table Mountain Water and Sanitation District Water Treatment Plant Expansion, Arvada, CO** –Design Engineer for the design of a water treatment plant expansion. The project included preliminary design, followed by a 60 percent design package and assistance with the Construction Manager at Risk (CMAR) procurement for the expansion. The project includes a new administrative building, metering vault improvements, expansion of the ballasted flocculation pretreatment process, new conventional filters, chemical system improvements, clearwell baffling, a new valve vault, backwash automation, new onsite wastewater treatment system (OWTS), heating ventilation and cooling (HVAC) upgrades, electrical and controls upgrades, and an evaluation of their sludge drying beds and residuals handling practices..

**Water Treatment Plant Master Plan, City of Northglenn, CO** – Project Engineer for the water treatment plant master plan for the City of Northglenn. The master plan included an evaluation of water quality and raw water resources and evaluation of existing infrastructure, which included analysis of treatment capacities for pretreatment, filtration, disinfection, chlorine contact, chemical systems and pumping systems. Improvements and operational modifications were estimated and cost estimates were developed for each capital improvement project for the next 10 years.

**Soldier Canyon Filtration Plant, Fort Collins, CO** – JVA was hired by SCFP to evaluate backwash supply (BWS) pumping to provide a higher level of service and redundancy during the peak water production periods. Currently the SCFP operates two (2) BWS pumps; the larger of the pumps used primarily during higher production periods and the smaller pump during lower production periods. During the peak production periods there is no backwash pump supply redundancy in a situation when the larger pump fails. The smaller BWS pump is unable to keep up with the backwashing demands required by the filters. JVA was tasked with designing a redundant pump that would replace the smaller pump to meet peak BWS demands and minimize electric demand charges of BWS pumping during the lower production periods. JVA conducted a detailed site visit to collect data for the existing process equipment and electrical service and controls. Following this phase, JVA prepared a hydraulic model based on the current peak day.

**Solids Handling Facility, Town of Erie, CO** – Design Engineer for a new solids thickening and dewatering process at the Town's microfiltration water treatment plant. The process is designed for ultimate WTP buildout of 16.65 MGD and an estimated 4,600 pounds of solids per day. The existing solids settling and pretreatment sedimentation processes were evaluated and improvements recommended to improve the concentration and consistency of solids from the vacuum systems. Design included a new gravity thickener, yard piping and vaults, 60,000 pound powder activated carbon silo and feed system, sodium permanganate system, centrifuge, site improvements, and a new building. The project was a Design/Build alternative delivery.

**Berthoud Estates Wastewater Treatment Facility, Berthoud, Colorado** – JVA completed a preliminary engineering report, site application, and wastewater utility plan based on ammonia discharge limits for an existing lagoon wastewater treatment plant. Alternatives evaluated included lagoon improvements, a new mechanical wastewater treatment plant, and several options for connecting to the Town of Berthoud sanitary sewer collection system. The recommended alternative was to construct a new mechanical facility, and Berthoud Estates has secured State Revolving Fund (SRF) to commence design. The design phase will include a hydraulic profile of the WWTF that will remain within the existing constraints from the stationary collection system and discharge location elevations.



## Melissa L. Rhodes

Senior Engineer, Environmental Engineering

### Education

M.S. Colorado School of Mines,  
Environmental Science and  
Engineering, 2010

B.S. Colorado School of Mines,  
Environmental Engineering,  
2010

### Registration

Professional Engineer:  
Colorado, 2015

### Professional Organizations

RMWEA Industrial Pretreatment  
Committee

Water Environment Federation  
(WEF)



### Project Experience

Senior Engineer for the following Facilities:

**Town of Crested Butte Water Treatment Plant Improvement Project, Crested Butte, CO** – Project engineer for the design of a treatment plant expansion project for the Town's existing membrane filtration water treatment plant. The expansion project featured an increase in the system capacity from 1.25 MGD to 1.66 MGD, redesigned chemical pretreatment system to optimize treatment efficiency and improve system hydraulics, and a building expansion to improve operability and access to process equipment. As part of this effort, funding from DOLA and SRF was facilitated to finance the construction. The project was designed on an expedited schedule and went from the planning stages of a comprehensive performance evaluation to 100% design and permitting in under one year.

**North Table Mountain Water and Sanitation District Water Treatment Plant Expansion, Arvada, CO** – Project engineer for the design and construction of a water treatment plant expansion. The project included preliminary design, followed by a 60 percent design package and assistance with the Construction Manager at Risk (CMAR) procurement for the expansion. The project includes a new administrative building, metering vault improvements, expansion of the ballasted flocculation pretreatment process, new conventional filters, chemical system improvements, clearwell baffling, a new valve vault, backwash automation, new onsite wastewater treatment system (OWTS), heating ventilation and cooling (HVAC) upgrades, and electrical and controls upgrades.

**Berthoud Water Treatment Plant Expansion, Berthoud, CO** – Project engineer for the design and permitting of a 2.0 MGD expansion of the water treatment facility to 4.2 MGD firm capacity. Process upgrades include coagulation (chemical feed/dispersion), decreasing gradation of flocculation, two-train inclined plate sedimentation, two dual media filters with air scour, high service pump, and caustic corrosion control treatment prior to distribution. Improvements to the solids handling and backwash recovery system includes retrofitting an existing clarifier to a gravity thickener and upgrading a backwash holding basin to a residuals drying bed. Personal responsibility also included corrosion control analysis of the finished water quality and mitigation recommendations by utilizing bench-scale testing and water chemistry modeling.

**Town of Crested Butte Water Treatment Plant OCCTR Project, Crested Butte, CO** – Project engineer for the design and permitting of an optimal corrosion control treatment evaluation. Project included water chemistry modeling to determine the best corrosion control approach.

**Town of Erie Water Treatment Plant Solids Handling Facility, Erie, CO** – Project engineer for the Design Build of the Town of Erie WTP Solids Handling Project. The Town of Erie has historically discharged WTP solids to the sanitary sewer system which caused issues with the biosolids handling at the WWTP due to PAC and other chemicals found in the residuals. The WTP site has space constraints so mechanical dewatering will be utilized. The project includes solids storage tanks, dewatering equipment, PAC relocation and the addition of sodium permanganate as a preoxidant. The new equipment will be housed in a new building over the old WTP tanks that will be reconfigured for solids storage. The solids handling facility will be designed to handle the current 10 MGD capacity with expansion to 17 MGD.

**Confidential Client, Idaho** – Project/process engineer for evaluation of alternatives, bench testing, and basic engineering for a mine site in Idaho undergoing remediation under CERCLA. An alternatives analysis was done to select between ballasted sand flocculation, the high density sludge (HDS) process, and microfiltration. Alternatives were developed for flows up to 2,900 gpm for the removal of arsenic, copper and cobalt. After the alternatives analysis was completed a Basic Engineering Report and  $\pm 20\%$  cost estimate was provided.



## Andrew C. Sparn

Project Manager, Environmental Engineering

### Education

B.S. Civil Engineering,  
Columbia University, School of  
Engineering and Applied  
Science, New York, NY, 2008

B.S. Physics, University of  
Puget Sound, Tacoma, WA,  
2006

### Registration

Professional Engineer  
Colorado (2015)

### Professional Organizations

American Water Works  
Association (AWWA)

Water Environment Federation  
(WEF)



### Project Experience

**North Table Mountain Water Treatment Plant Expansion, Golden, CO** Project Manager responsible for design, permitting, and construction administration of the NTM WTP expansion project. The existing 11 MGD WTP was designed and permitted for a capacity of 16 MGD. Water treatment improvements included the upgrade and replacement of the first generation Actiflo™ ballasted flocculation / sedimentation with the latest generation ballasted floc / sed system (Actiflo Turbo). The design also included multi-media filter expansion, baffling the chlorine contact basin to increase the baffling factor from 0.1 to 0.7 and achieve DOVE compliance, backwash recycle pumping improvements, and complete revamping of the primary and electrical service, ATS and standby generator, and SCADA / HMI / controls. In addition to process improvements, the project includes a chemical storage facility and an administration building with state certified water quality laboratory, operations laboratory, training center, kitchen, locker rooms, and operations offices. In addition, JVA prepared the RFP along at the 60 percent design documents to solicit qualified contractors for review and selection of a Construction Manager at Risk (CMAR) project delivery. JVA also assisted NTM in the preparation of a Department of Local Affairs (DOLA) Energy Impact Assistance Grant (EAIG) application. The District was awarded a grant of \$1,000,000 partly due to an innovative hydrothermal HVAC heat pump design to reduce carbon fuels required to heat and cool the administrative / lab building (Green Energy).

**NTM Water Treatment Plant Evaluation and Capital Improvement Plan, Golden, CO** Project Manager for a comprehensive performance evaluation and design to expand the District's WTP to a firm 16 MGD capacity. The CPE included assessing the condition and performance of each process, including raw water supply, pretreatment, chemicals, conventional filtration, clearwell/disinfection, and high service pumping. Capital improvements were identified and prioritized into a phased plan. The selected improvements include expanding the existing pretreatment process, constructing four new dual media filters, constructing a new chemical system building, baffling the clearwell, a new gravity to distribution option, and a new administration building with a state certified water quality control laboratory, operations lab, kitchen, offices and locker room.

**Berthoud Water Treatment Plant Expansion, Berthoud, CO** Project Manager responsible for the design and permitting of a 2.0 MGD expansion of the water treatment facility to 4.2 MGD firm capacity. Project work includes preliminary design and final design with bidding and construction anticipated for 2016 and 2017. Process equipment addition includes coagulation (chemical feed/dispersion), decreasing gradation of flocculation, two-train inclined plate sedimentation, two dual media filters with air scour, high service pump, and caustic corrosion control treatment prior to distribution. Improvements to the solids handling and backwash recovery system includes retrofitting an existing clarifier to a gravity thickener and upgrading a backwash holding basin to a residuals drying bed.

**City of Lamar Main Street Potable Water Distribution, Lamar CO** Project Manager for the design and construction administration for replacement of the potable water distribution system within the Main Street Corridor. The project included approximately 12,000 ft of 6", 8", and 12" PVC C900 distribution piping. Work also includes replacing the existing lead services with HDPE services to the businesses and residents along Main Street as well as transmission isolation valves, fire hydrants, and ground hydrants to facilitate the watering of the flower pots bordering Main Street. Main Street is also CO Highway 287 and the project was delivered in partnership with the City and CDOT. Project funding included a DWRP loan and DOLA EIAF grant. Phase 1 and Phase 2 were recently completed, and Phase 3 is anticipated to commence construction in Spring of 2021.

**Pueblo West Metropolitan District Water Treatment Plant Expansion, Pueblo West, CO** Project Engineer responsible for the design and construction administration of a 5.0 MGD expansion of the water treatment facility. Project work includes preliminary design, final design, and construction administration services. Process equipment includes prepackaged treatment units, a vertical turbine high service pump, surge anticipator valve, primary and secondary polymer chemical feed systems, chlorine gas disinfection system. The water treatment facility expansion incorporated modifications to the of the facility's filtration, chlorine gas, polymer chemical feeds, backwash waste handling process, and high service pump station expansion to meet future peak water demand of the District.



**Zone 2 PRV Replacement Project, Westminster, CO** Project Manager for the design of improvements to 11 existing pressure reducing valve vaults along 5 pressure zones. The project included abandoning or replacing potable water pipelines up to 30-inches diameter with pressures up to 165 psi. Pipeline materials included steel, ductile iron, PVC, and asbestos cement. Generated construction documents to demo four existing pressure reducing valve vaults, install two new pressure reducing valve and one air/vac release combination valve vaults, retrofit one pressure reducing valve vault, several direct bury valves, and ancillary potable water distribution pipeline improvements. Ancillary concrete flat work and asphalt was necessary.

**Town of Lochbuie Water Treatment Plant Expansion, Lochbuie CO** Project Manager responsible for master planning, permitting, and design for the Lochbuie water treatment facility. Project included expansion to 2.47 MGD peak capacity. The expansion includes two new RO skids and associated chemical feed systems, corrosion control caustic system, new chemical storage building for bulk storage and delivery of chlorine and caustic, new building exterior walls and roof to match the recently constructed Town Hall. The project is currently being solicited for CMAR delivery to qualified contractors.

**City of Lamar Raw Water Transmission Line, Lamar, CO** Project Manager for the design of 35,000 ft of 12" C-900 and 16" C-905 PVC raw water transmission line. Responsible for hydraulic calculations, pipeline alignment, tie-in details, and construction documents. Performed construction administration for the duration of the project, reviewing submittals, field engineering for below grade unforeseen conditions, and weekly construction meetings. Provided oversight for final commissioning, including tie-in and switchover, flushing, pressure testing and disinfection.

**Todd Creek Metropolitan District Water Treatment Plant Expansion, Brighton, CO** Project Manager for permitting, design, and preparation of construction documents for the expansion of the water treatment facility to 0.85 MGD. This project is ongoing and includes addition of a low pressure ultrafiltration and large capacity RO skid. Additional considerations include RO brine discharge permit, disinfection capacity evaluation and expansion, corrosion control, and potassium permanganate pre-treatment system. Andrew also managed the CMAR project delivery with the District and Contractor. Alternative delivery was needed to accelerate schedule and conform to a tight budget.

**Idaho Springs Water Treatment Plant Upgrades, Idaho Springs, CO** Project Engineer responsible for design and submittal of a Drinking Water Engineering Report for municipal drinking water treatment facility upgrades focused on increased membrane performance and compliance with disinfection byproduct regulations.

**Rocky Ford Water Treatment Plant, City of Rocky Ford, CO.** Project Superintendent for the Rocky Ford WTP funded by USDA Rural Development. Responsible for project submittals, scheduling, and day-to-day operations to complete the WTP within budget and on-time. Project included demolition of the piping, filters, and associated processes for the existing WTP. Construction of a new masonry building to house the two UV vessels capable of disinfecting 3.0 MGD. Constructed new multimedia filters, including filter underdrain blocks, air scour blower and appurtenances, control valves, filter media, FRP wash water troughs, filter controls and field instrumentation. Installed 10 stainless steel inclined plate settlers and collection troughs and supports. Installed a filter-to-waste pump, sampling system, chemical feed system and associated piping, electrical instrumentation and controls. Rehabilitated flash mix system, clarifiers and baffling system in the clear well.



# Adam J. Teunissen, PE

## Senior Project Manager, Structural Engineering

### Education

B.S. Civil Engineering,  
University of Wisconsin -  
Platteville, 2003

### Registrations

Professional Engineer:  
Colorado  
Wisconsin  
Minnesota  
Indiana

### Professional Organizations

Structural Engineers  
Association of Colorado  
American Concrete Institute  
Committee 350 Member

### Awards

2011 ACEC Minnesota  
Engineering Excellence Honor  
Award, Structural Engineer:  
New Wastewater Treatment  
Facility at Willmar, Minnesota



### Project Experience

Project Manager or Engineer of Record for the following representative projects:

**North Table Mountain Water Treatment Facility, Golden , Colorado.** Project Manager for the structural design of an expansion to the existing water treatment facility. Additions include the design of new administration space, new filter tanks, chemical and electrical building additions, and expansion to the secondary treatment process.

**Idaho Springs Water Resource Reclamation Facility Design, Idaho Springs, Colorado.** Project Manager for a new facility consisting of two 41 foot by 50 foot digester tanks and attached two story building for the headworks and dewatering processes. The first floor of the building is constructed of concrete walls and a concrete structural slab above supporting the 22 foot by 80 foot pre-engineered metal building on the second story.

**Town of Milliken Water Treatment Building, Milliken, Colorado.** Project Manager for the Structural design of a 62 foot by 58 foot treatment building and 18 foot by 21 foot by 13 foot deep concrete tank. The treatment building design consisted of a pre-engineered metal building over shallow concrete foundations. The tank is a cast-in-place concrete design covered with fiberglass plank grating supported by fiberglass beams.

**Pueblo West States Avenue Lift Station (LS3), Pueblo West, Colorado.** Lead structural engineer for the design of a 20 foot by 30 foot lift station and building. The structure consists of a 8 foot diameter precast concrete wet well, cast in place concrete foundations supported on drilled piers and a pre-engineered metal building.

**Lochbuie Water Treatment Plant, Lochbuie, Colorado.** Lead Structural Engineer for a small addition to the water treatment plant. The 13 foot by 20 addition expanded the existing pre-engineered metal building and was designed for chemical storage.

**Hayden Water Treatment Plant, Hayden, Colorado.** Lead Structural Engineer for a retrofit for new filters into an existing clarifier structure.

**Berthoud Water Treatment Facility, Berthoud, Colorado.** Lead Structural Engineer for an addition and remodel at the facility. Remodel work included the construction of new settling basins and flocculation tanks within the footprint of an existing clarifier. A 15 foot by 30 foot addition was added to the existing filter building to provide 2 additional filter tanks and associated pipe gallery.

**Erie Water Treatment Plant, Erie, Colorado.** Lead Structural Engineer for solids handling project. The project included the reuse of an existing concrete building foundation to support a new pre-engineered metal building. The completed building measured approximately 31 feet by 98 feet. Several structural modifications were made to the existing structure to accommodate the pre-engineered metal building and its new purpose. In addition to the new building a 30-0" diameter cast-in-place concrete gravity thickener tank was designed. JVA teamed with Fischer Construction for this design build project.

**Water Treatment Plant Improvements, Town of Rye, Colorado.** Lead Structural Engineer for a small addition to an existing treatment building. The new addition (16 feet by 12 feet) was constructed of single wythe masonry walls and prefabricated roof trusses to match existing building construction.

**Mt Crested Butte Wastewater Treatment Facility, Mt Crested Butte, Colorado.** Lead structural engineer for addition of a new pre-engineered metal building (43 feet by 29 feet) over an existing UV treatment process. New cast-in-place foundations were designed to work with existing pipes and other existing interferences.



## Ryan P. Wienpahl

Design Engineer, Environmental Engineering

### Education

B.A. Anthropology/Spanish  
University of New Mexico  
Albuquerque, NM  
2011

M.S. Civil Engineering  
University of Colorado  
Boulder, CO  
2016

### Registrations

Colorado CWP:  
Class A Wastewater Operator  
Class A Water Operator  
Class A Ind. WW Operator  
Class 3 Collect. Sys. Operator  
Class 3 Dist. Sys. Operator

### Professional Organizations

Rocky Mountain Water  
Environment Association



### Project Experience

Design Engineer for the following projects/facilities:

**DoubleRL Ranch Water Treatment Systems Improvements, Ridgway, CO** – Design Engineer for the design of a new water treatment system for a private ranch designed to meet a specific finished water quality profile. Responsible for process design, defining design criteria, equipment selection, project manual development, and drafting coordination. Also assisted in construction administration of the project, including facilitating the bidding process, coordinating with the contractor and equipment supplier, observing construction progress, and reviewing submittals.

**Pueblo West Metro District Wastewater Treatment Plant Improvements, Pueblo West, CO** – Assisted with construction administration for a project that involved installing a not-potable water reuse system in the PWMD wastewater treatment facility.

**Town of Mead Wastewater Treatment Facility Improvements, Mead, CO** – Design Engineer for the replacement of the existing grit pump and aerobic digester aeration grid. Responsible for equipment selection and design for replacement of the existing vertical, vacuum-primed grit pump with a horizontal, self-priming pump and for the replacement of the digester aeration grid.

**Town of Winter Park LIFT Public Transit Operations Facility, Winter Park, CO** – The Town of Winter Park is installing a new transit operations facility that will include a bus washing system for the public transportation buses of Fraser county. The installation will include the development of a new drinking water well and the inclusion of an Onsite Wastewater Treatment System. Design Engineer for the design of the water treatment system for the facility. Responsible for drafting the Basis of Design Report and the Technical, Managerial, and Financial Capacity Assessment, and other CDPHE permitting requirements for public water systems.

**Idaho Springs WWTP Expansion, Idaho Springs, CO** – Design Engineer assisting with construction administration of phase 2 of the project. The project involves retrofitting the existing two-tank Sequencing Batch Reactor with an AquaNereda Aerated Granular Sludge bioreactor from Aqua Aerobics. Responsibilities included site observations, payment application reviews, contractor coordination, and operator training.

**Rifle Utility Maintenance, Capital, and Rate Study, Rifle, CO** – Participated the development of a water and wastewater master plan and rate study. Specifically, assisted with the existing facilities evaluations, TDS mitigation research, and identification of priority projects for the Capital Improvement Plan.

**Camp IdRaHaJe Preliminary Engineering Report, Baily, CO** – Evaluated the existing utilities and helped prepare a Preliminary Engineering Report to communicate recommendations for wastewater treatment system improvements. The improvements were intended to address past CDPHE compliance excursions and more stringent impending permit limitations. Responsible for assessing potential treatment processes associated with CDPHE groundwater discharge permits to be recommended as alternatives for meeting compliance limitations.

**Next Big Crop Greenhouse Modifications, Boulder County, CO** – Design Engineer for the design of a greenhouse floor drain and drain water storage tank. The new design includes hauling offsite for disposal. Responsible for system design and coordinating sampling for use in identifying a hauler and wastewater treatment facility to receive the captured water from the greenhouse operation.

**Pueblo West Metro District Platteville Boulevard Waterline Design, Pueblo West, CO** – Design Engineer for the design and construction administration of a roughly 4,500-foot-long water distribution alignment along a section of Platteville Boulevard between N. Iliff Dr. and N. Canvas Dr. in Pueblo West. The project included hydrants, tie-ins, and appurtenances. Responsibilities included system design, site visits, coordination with other water districts and the Bureau of Reclamation for the crossing of sensitive utilities, submittal reviews, and payment application reviews.

**Mt. Crested Butte Water and Sanitation District Hunter Ridge Annexation, Crested Butte, CO** – Assisted with EPA Storm Water Management Model to develop design basis for re-routing segments of the Mt. Crested Butte sewer system away from a snow accumulation area so that year-round access to the manholes can be maintained.



**Years of Experience: 11**

#### **Education**

M.S., Colorado State University, 2012  
Civil Engineering

B.S. Colorado State University, 2009

Major: Civil Engineering  
Minor: Business Administration

#### **Professional Registration**

Professional Engineer, CO (#49500)  
Professional Engineer, WY (#15481)  
Professional Engineer, TX (#132228)

#### **Professional Societies**

American Society of Civil Engineers (ASCE)

Colorado Association of Geotechnical Engineers

North American Society of Trenchless Technologies

#### **Certifications**

OSHA 40-hr Health & Safety Training

MSHA 20-hr New Miner Training

Nuclear Density Gauge Certification

Lance Heyer is an associate and geotechnical engineer with Lithos Engineering and has 11 years of experience in the engineering industry. Mr. Heyer has over 7 years of specific experience designing and observing construction for water treatment plant related infrastructure.

## **PROJECT EXPERIENCE**

### **Soldier Canyon Treatment Plant Expansion (Fort Collins, Colorado)**

The Soldier Canyon Treatment Plant completed an approximately \$30M expansion throughout 2019 and 2020 to provide increased capacity up to 50 MGD. The expansion included the following specific infrastructure: flocculation and sedimentation building, chlorine contact tank building, soda ash silo and building, and associated piping. Lithos Engineering provided a geotechnical investigation and recommendations for the project. The treatment plant is located immediately west of Horsetooth Reservoir and extends onto the hillside or hogback geologic feature. The location of the plant creates unique geologic conditions where shallow bedrock consists of interbedded hard sandstones to softer, expansive claystones. Behavior of soil and bedrock conditions after completion of the improvements were considered in recommending foundation approaches for the various infrastructure. Mr Heyer served as the project manager for the project and was the geotechnical engineer of record.

### **Chlorine Contact Basin (Fort Collins, Colorado)**

In the fall of 2017, the City of Fort Collins completed construction of a new chlorine contact basin (CCB) at the water treatment facility. The basin was originally situated in a location requiring excavating an existing hogback, part of which was found to contain expansive bedrock. Lithos helped the City identify an alternative location that required little excavation and limited the risk of differential movement due to expansive bedrock substantially. In addition, the foundation for the CCB at the selected location was nontraditional and utilized an existing unreinforced concrete slab and approximately 3 feet of imported structural fill to provide adequate separation from expansive bedrock. Lithos' efforts in identifying the alternative site and considering various foundation alternatives saved the City approximately one million dollars on the approximately eight-million-dollar project. Mr Heyer functioned as the project manager and engineer.

### **UV Building at the Drake Water Reclamation Facility (Fort Collins, Colorado)**

The City of Fort Collins has decided to begin treating wastewater with UV light as opposed to chlorine due to recent difficulties in chlorine transportation. As part of the treatment upgrade, a UV building will be constructed partially over the existing Chlorine Contact Basin (CCB) at the Drake Water Reclamation Facility. For the project, Lithos provided a subsurface investigation and a geotechnical engineering report. Foundation recommendations considered the portion of the building situated over the existing foundation of the CCB and the need to extend the UV building outside of the existing CCB footprint. Although outdated by the current standard of practice, Lithos recommended the extensions of the building match the existing CCB foundation: drilled shafts extending a minimum of 5 feet into unweathered, expansive bedrock.

### **Aeration Basin at Drake Water Reclamation Facility (Fort Collins, Colorado)**

Due to more stringent water treatment standards set by the state of Colorado, Fort Collins utilities decided to construct new a new aeration basin to exceed the current requirements. The project included demolishing two existing but unused clarifiers and extending two aeration basins further to the

north. Mr Heyer was the project manager for the project with tasks including direct communication with the client, overseeing and coordinating the subsurface investigation, providing a geotechnical engineering report for subsequent structural design, and attending project design and construction meetings. In addition, due to the proximity of expansive bedrock to the base of the proposed basin and the integral nature of the basins southern wall to existing infrastructure, a deep foundation drilled shaft a structural floor approach was selected. Mr. Heyer provided geotechnical recommendations for drilled shaft design, and managed the geotechnical construction oversight program during drilled shaft installation.

#### **Cogeneration Building at Drake Water Reclamation Facility (Fort Collins, Colorado)**

In 2020, the City of Fort Collins completed construction of a Cogeneration Plant, a power generation system converting waste gas from the DWRf digesters into electricity. The main component of the plant was constructed as a slab-on-grade with a footprint of approximately 60- by 30-feet. A series of four generators located directly west of the plant required four separate slabs-on-grade with footprints of approximately 18- by 12-feet. Lithos Engineering provided a geotechnical investigation and design and construction recommendations for the project. Mr Heyer was the project manager for the project.

#### **Pleasant Valley Forebay Sedimentation Facility (Larimer Country, Colorado)**

The High Park Fire devastated the foothills immediately west of Fort Collins, CO. In order to limit suspended solids to acceptable levels, the City of Fort Collins Utilities and Northern Water proposed a sedimentation basin near eastern boundary of the Cache la Poudre River canyon. The basin is approximately 300 by 80 ft by 12 ft deep, includes a 36-in. high knee wall connected to a slab on grade system, a diversion structure, a baffle wall used to separate high- and low-sediment water, and a 40-mil thick geomembrane placed over a sloped (2H:1V) embankment. The basin will be emptied as needed to collect and dispose of deposited sediment. Mr. Heyer worked as a geotechnical engineer for the project, providing a design report and recommendations for geotechnical slope stability and seepage and for structural infrastructure and earthen embankment side slopes. The entire project, from planning through final construction, was completed in less than 5 months.

#### **Boyd Water Treatment Plant Crane Pick Analysis (Loveland, Colorado)**

During renovations for Loveland's Boyd Water Treatment Plant, the general contractor utilized a crane to lift various demolished aeration basin pieces. The crane was situated near the top of the existing below-grade basin walls. The basin was to be updated and as part of the larger renovations therefore basin wall integrity was to be maintained during and post construction. Mr Heyer worked with the general contractor to provide outrigger offsets and maximum pick weights to maintain existing basin wall stability.

#### **Water Quality Lab (Loveland, Colorado)**

Lithos Engineering provided a geotechnical investigation and geotechnical design and construction recommendations for an approximately 100' x 50' water quality lab at the Boyd Water Treatment Plant. The investigation included two test pits and two geotechnical borings. The foundation for the structure was designed and constructed as spread footings with an interior slab on grade. During construction, extensive fill with deleterious material was discovered immediately under the foundation footprint. Mr Heyer directed the removal of fill and recompaction of suitable material beneath foundations. Mr Heyer was the project manager for the project.

#### **Storage Building (Loveland, Colorado)**

Lithos Engineering provided geotechnical and structural engineering design services for a storage building at Loveland's water treatment plant. The storage building will be used to house equipment and contain a lab testing area. The geotechnical investigation provided information for the foundation conditions and utility trenches. Lithos engineering designed a foundation system consisting of shallow drilled piers and an internal building slab for the future pole barn structure. Mr Heyer was the project manager and engineer of record for the geotechnical and foundation components of the project.



Years of Experience: 40

#### **Education**

MS, Civil Engineering, Purdue University, 1985  
BS, Civil Engineering, Purdue University, 1980

#### **Professional Registration**

Professional Engineer:  
CO (0024369) & CA

#### **Professional Societies**

American Water Works Association  
American Society of Civil Engineers  
Colorado Association of Geotechnical Engineers  
Rocky Mountain Water and Environment Association  
Colorado Stone, Sand and Gravel Association

Mr. Kuehr is a Senior Consultant at Lithos Engineering. Mr. Kuehr specializes in geotechnical and tunnel engineering as it relates to water supply, sewerage, water resources, aggregate mining, roadway and bridge projects. He has technical expertise in tunnel engineering, foundation engineering, slope stability, expansive soils, ground modification, retaining walls, landslide evaluation and repair, embankment dam design and groundwater collection trenches and cutoffs constructed by the slurry trench method. He has 40 years of progressive engineering experience. He has performed and managed geotechnical engineering investigations for storm drain outfall projects, treatment plants, interceptor sewers, water transmission pipelines, water storage reservoirs, intake structures and pump stations.

### **RELEVANT PROJECTS**

#### **Griswold WPF Raw Water Structure – Phase 2, Aurora, Colorado**

Principal-in-Charge and Project Manager for the new raw water vault at the Griswold Water Purification Facility. The subsurface conditions consist of eolian deposits and claystone/siltstone bedrock. Due to the presence of swelling claystone, a minimum 5 feet deep overexcavation with select fill backfill was recommended for the lower portions of the vault. There was a 72-inch raw water line adjacent to the vault. Provided geotechnical consultation including specification language and instrumentation recommendations regarding this issue. Reviewed Contractor's submittals for shoring and instrumentation.

#### **Wemlinger WPF Sediment Drying Beds, Aurora, CO**

Served as Principal-in-Charge and Project Manager. This project involved replacing the existing sediment drying beds with new, engineered sediment drying beds. The new concrete lagoons were constructed within the same footprint of the existing earthen lagoons. Provided recommendations for a permanent dewatering system which will operate as the water levels in nearby Quincy Reservoir approach the high-water level. Also provided foundation design recommendations for various structures and considerations for a tunneled waterline crossing beneath Quincy Avenue.

#### **Colorado Springs Utilities SDS Water Treatment Plant, Colorado Springs, CO**

Principal-In-Charge for Colorado Springs Utilities (CSU) Southern Delivery System's (SDS) 50 mgd water treatment plant and finished water pump station. The surface geology in the project area consists primarily of eolian soils extending to depths as much of 60-ft below existing ground surface. The eolian soils are hydro-collapsible and exhibit a collapse potential up to 6.3 percent. Design, construction and operation measures were necessary to mitigate the potential for water to collect below grade or to pond above grade. To mitigate the collapsible soils, the design-build team implemented Deep Dynamic Compaction techniques for ground improvement.

#### **East Cherry Creek Valley Water & Sanitation District (ECCVWSD) Northern Water Supply Project, Reverse Osmosis Treatment Plant and Booster Pump Stations, Adams, Denver and Arapahoe Counties, CO**

The ECCV Northern Supply Project includes a Reverse Osmosis Treatment Plant, High Service Pump Station, and North and South Booster Pump Stations and a 35-mile transmission line. The treatment plant, which includes a water storage tank, is located in the Beebe Draw geographic

*Steven Kuehr*

*Senior Consultant*

*Page 2 of 2*

area which contains thick and soft clayey soils; a condition that is unusual for the Denver area. Consolidation testing and settlement analyses indicated that approximately six inches of settlement could occur beneath the heavily loaded storage tank. Designed a temporary site surcharge to preload the tank area; this will preconsolidate the site such that settlement under the plant will be minimal. The surcharge consisted of compacted soil constructed to a height of 20-ft and included settlement monitoring platforms. Settlement monitoring indicates that settlement is occurring. The surcharge will be removed when settlement is complete so that the tank can be constructed.

**Bellvue Water Treatment Plant Residuals Handling Facility, Bellvue, CO**

Lithos staff performed subsurface geotechnical investigations and provided design recommendations for this project, which involved rehabilitation of existing sedimentation basins, construction of a thickening tank, a new pump station, and a new flow-equalization basin. Site conditions consisted of saturated fine- and coarse-grained alluvium overlying siltstone and sandstone bedrock. Mr. Kuehr served as Project Manager for this project.

**Public Wholesale Water Supply Project Water Treatment Plant and Pipeline, Ellis and Russell Counties, KS**

Performed geotechnical investigations and provided design recommendations for construction of a new water treatment facility in Russell County, Kansas. The proposed facility consisted of tanks and structures for administration, treatment, and pump housing, and residuals handling ponds. Mr. Kuehr evaluated the potential for collapse or dissolution within soils with high calcium carbonate content. He also provided recommendations for the residuals handling pond liners and for the on-site proposed pavements. Evaluated subsurface conditions and identified potential high groundwater and soft soils along the proposed pipeline alignment. Mr. Kuehr provided recommendations for trenchless and open cut crossings of streams and local drainages, paved county roads, highways, and existing active railroad. He also performed in-situ resistivity testing during site investigation to provide the corrosion engineer with design parameters.

**87th Avenue and Wadsworth Boulevard Lift Station, Westminster, CO**

Provided geotechnical engineering recommendations for a lift station, overflow storage tank and for several trenchless roadway crossings. The lift station required a deep excavation in a congested urban environment. Recommendations included over-excavation and replacement of expansive bedrock. Trenchless engineering recommendations were provided for the roadway crossings.

**WWTP Headworks Improvements, Longmont, CO**

The plant improvements included a new headworks building, a dry well pump station and grit chamber, a new influent flume with bottom, a new influent pumping station, a new Splitter Box and Control Valves structure and a new biofilter. The Firm performed three geotechnical borings and conducted geotechnical laboratory testing to supplement previous investigations at the site. We also performed field and laboratory corrosivity tests. Although some of the deeper structures were founded within claystone bedrock, we were able to demonstrate with appropriate laboratory testing that the bedrock had a low swell potential and that standard shallow foundations could be utilized.

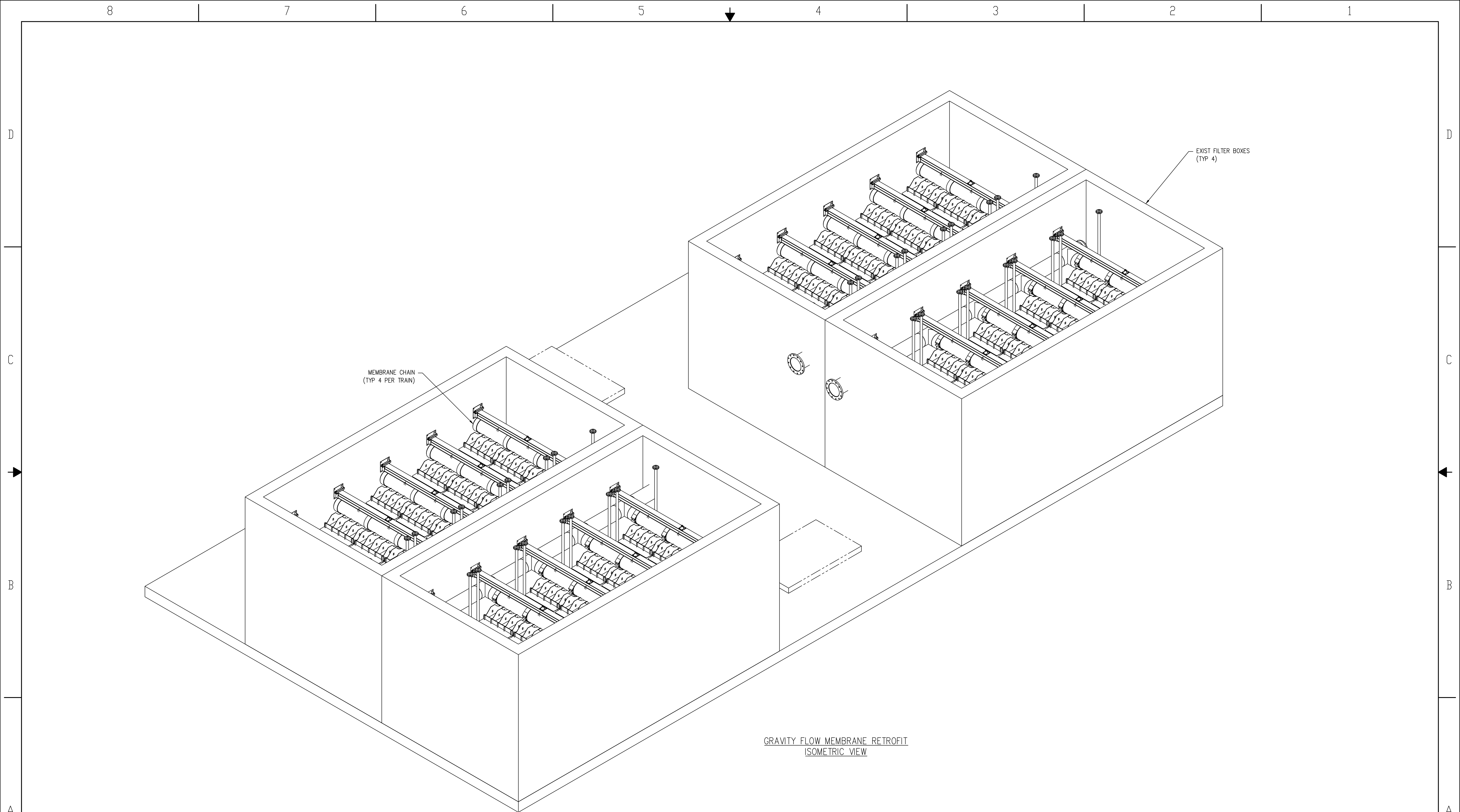
**Wemlinger Water Treatment Plant, Aurora, CO**

Served as Principal-in-Charge and Project Manager. This project involved replacing the existing sediment drying beds with new engineered sediment drying beds. The new concrete lagoons will be constructed within the same footprint of the existing earthen lagoons. Provided recommendations for a permanent dewatering system which will operate as the water levels in nearby Quincy Reservoir approach the high water level. Also provided foundation design recommendations and considerations for a tunneled waterline crossing beneath Quincy Avenue.

# **EXAMPLE DRAWING SET: GRAVITY FLOW MEMBRANES**

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GRAVITY FLOW MEMBRANE RETROFIT  
ISOMETRIC VIEW

REV	DESCRIPTION	ECD	DWN	APPR	APPR	DATE
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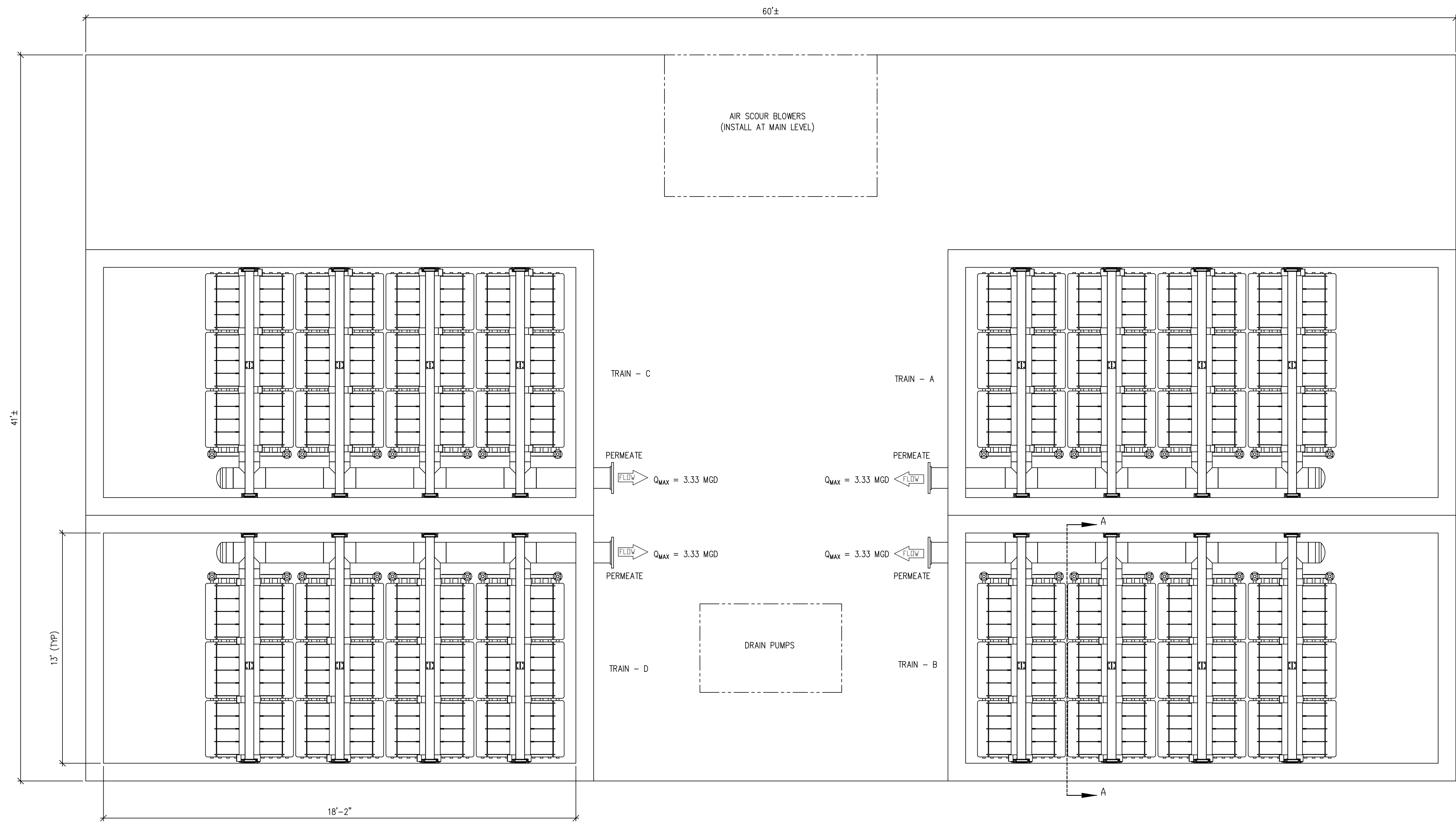
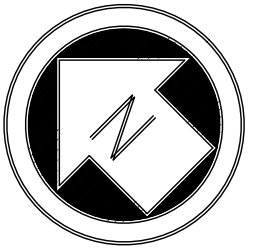
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DECIMALS	ANGLES
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.XX	FRACTION
.XXX	+/- 1/2"



CUSTOMER INFORMATION  
JOHNSTOWN WATER FILTER  
RETROFIT


GENERAL ARRANGEMENT  
LAYOUT

DRAWING NUMBER				REVISION	
441632-AG-01				A	
REF.:	PROJECT NO.	PART/MATERIAL NO.	SCALE	SIZE	SHEET
	441632		1:40	D	1 OF 3



GRAVITY FLOW MEMBRANE RETROFIT  
PLAN VIEW

NOTE:  
ALL DIMENSIONS ARE IN FEET AND INCHES.

 **REFERENCE ONLY  
DO NOT USE FOR  
CONSTRUCTION**

REV	DESCRIPTION	ECO	DWN	APPR	APPR	DATE
A	INITIAL RELEASE		VM	KK		27 JAN 21

TOLERANCES UNLESS NOTED

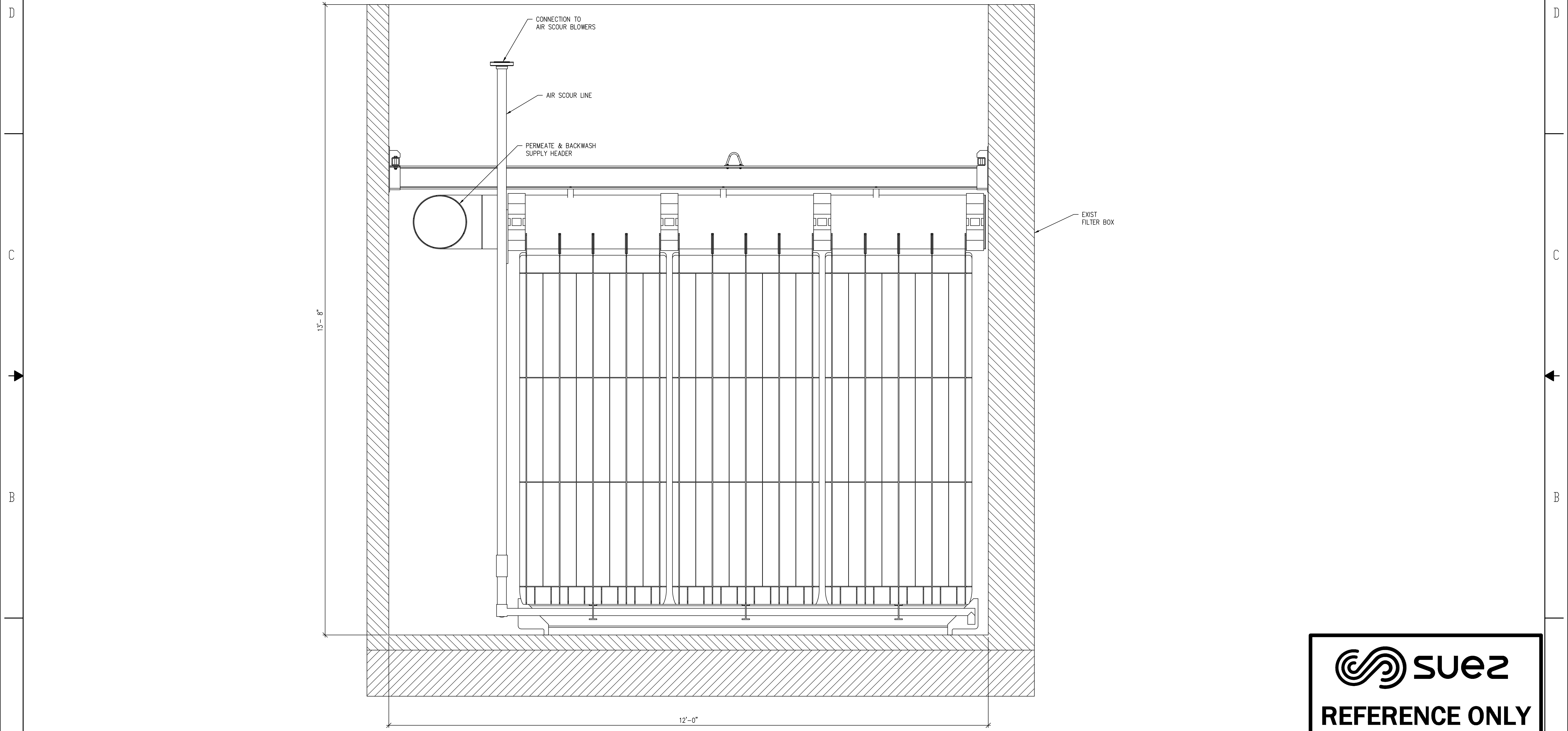
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XXX +/- 1/2	



CUSTOMER INFORMATION  
JOHNSTOWN WATER FILTER  
RETROFIT

GENERAL ARRANGEMENT  
LAYOUT

DRAWING NUMBER 441632-AG-01		REVISION A	
PROJECT NO. 441632	PART/MATERIAL NO.	SCALE 1:40	SHEET 2 OF 3



13'-8"

12'-0"

NOTE:  
ALL DIMENSIONS ARE IN FEET AND INCHES.

GRAVITY FLOW MEMBRANE RETROFIT  
SECTION A-A



**REFERENCE ONLY  
DO NOT USE FOR  
CONSTRUCTION**

REV	DESCRIPTION	ECD	DWN	APP	DATE
A	INITIAL RELEASE		VM	KK	27 JAN 21

TOLERANCES UNLESS NOTED

DECIMALS	ANGLES
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.XX	FRACTION
.XXX	±/-.1/2



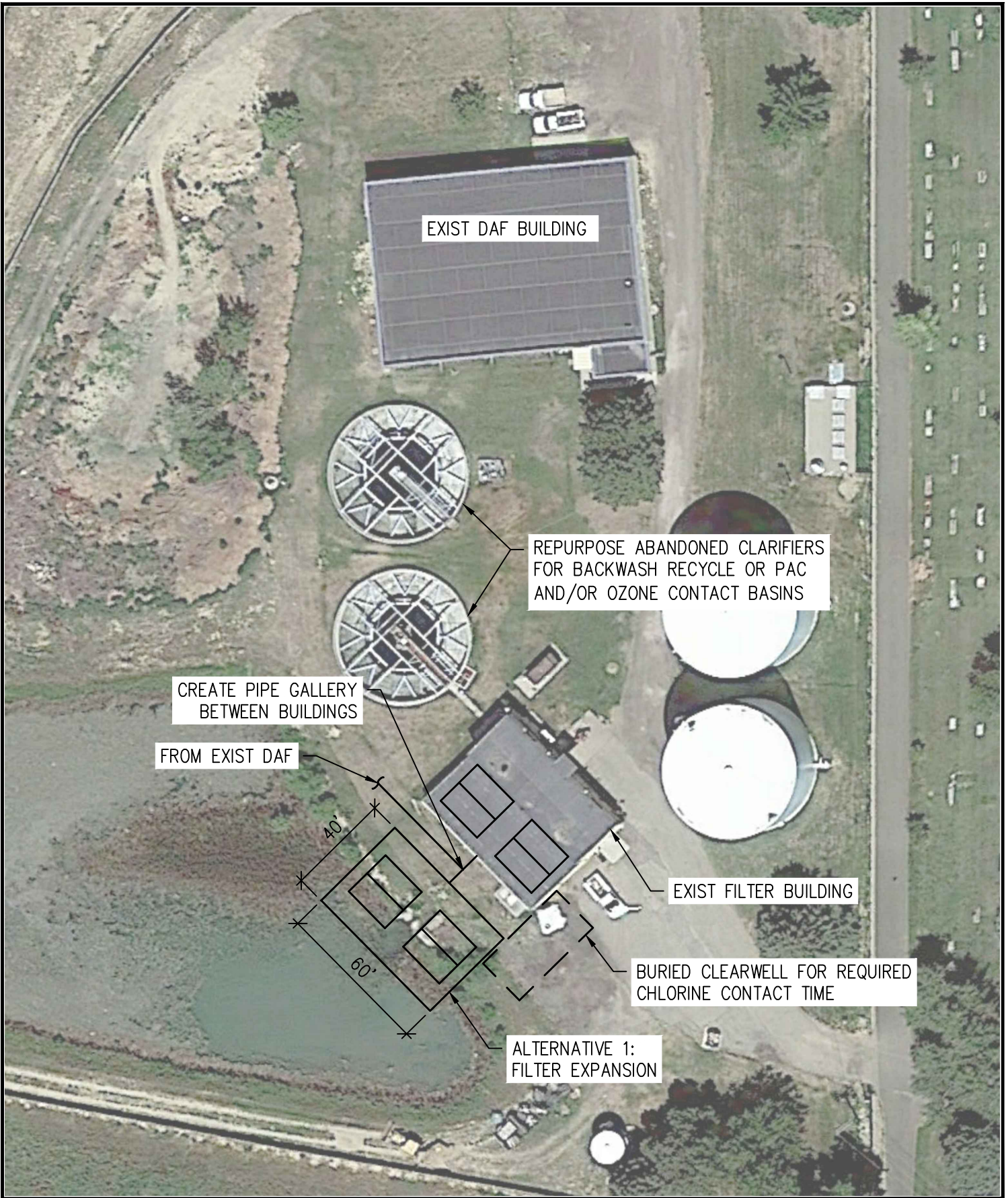
CUSTOMER INFORMATION  
JOHNSTOWN WATER FILTER  
RETROFIT

GENERAL ARRANGEMENT  
LAYOUT

DRAWING NUMBER 441632-AG-01		REVISION A	
PROJECT NO. 441632	PART/MATERIAL NO.	SCALE 1:40	SHEET 3 OF 3

# **SITE LAYOUTS FOR FILTER ALTERNATIVES 1, 2, AND 3**

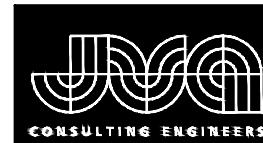
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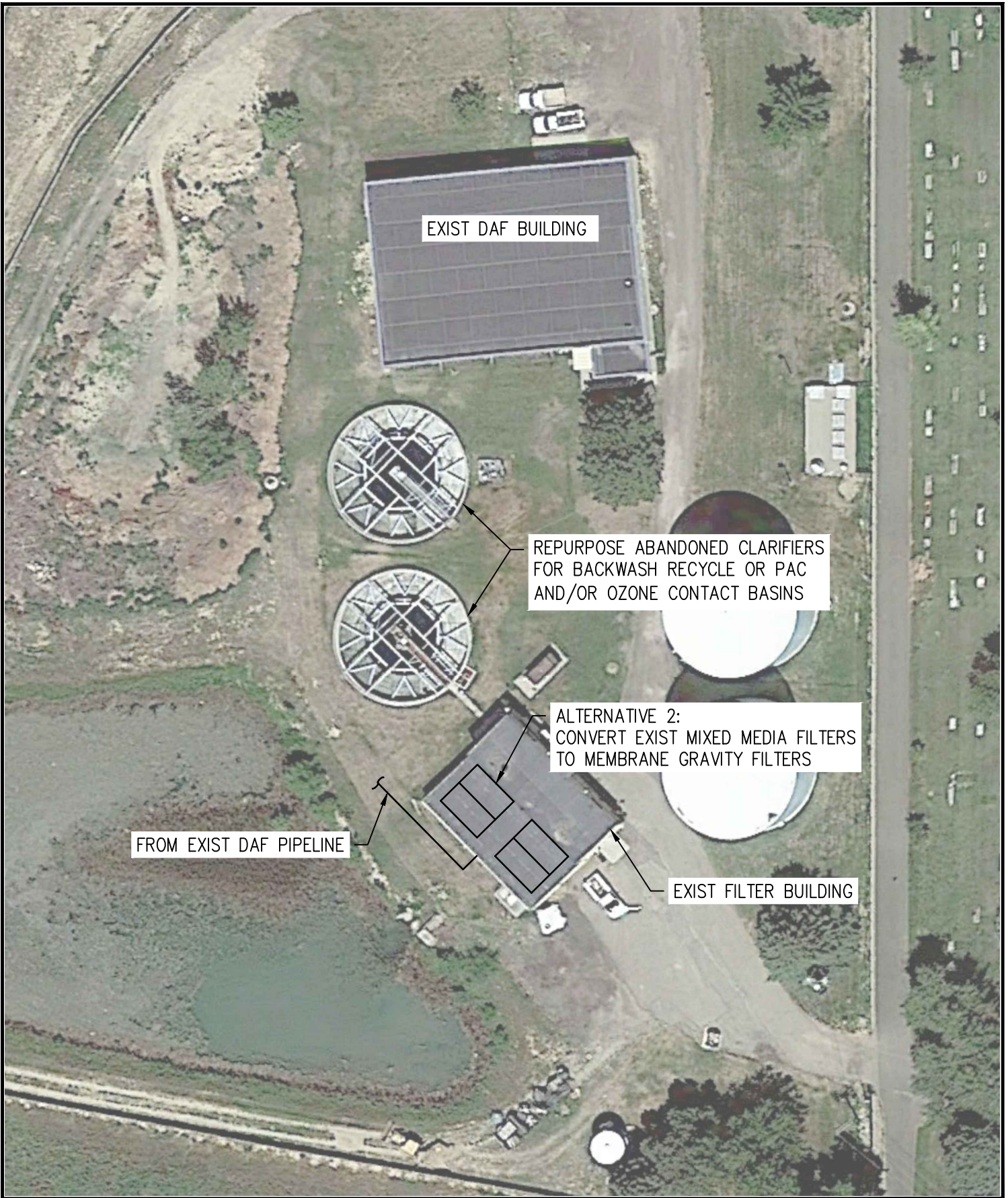
# ALTERNATIVE 1

## JOHNSTOWN WTP

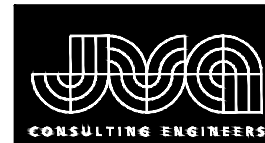
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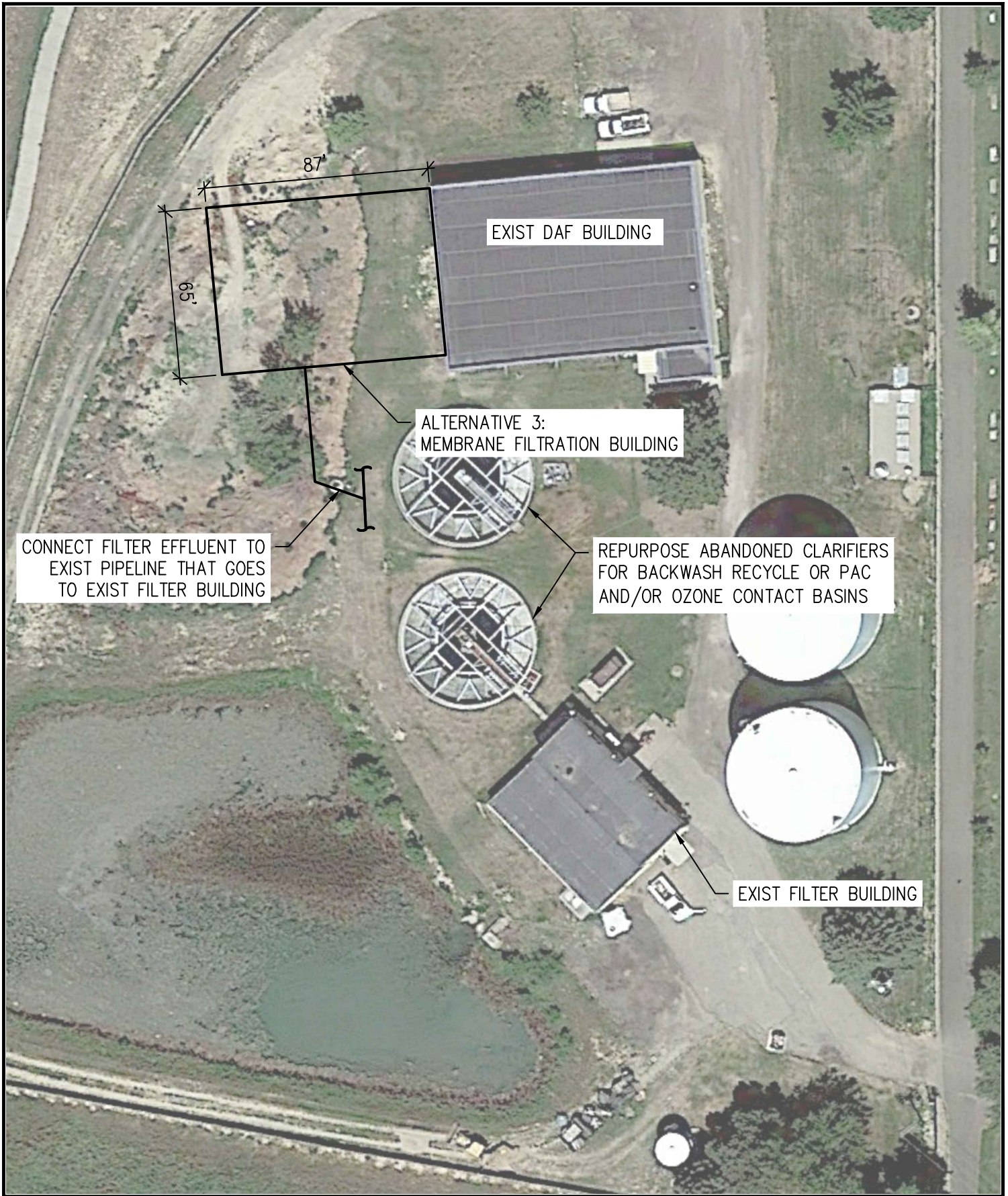
JVA, Inc.  
1319 Spruce Street  
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Boulder • Fort Collins • Winter Park  
Glenwood Springs • Denver



**ALTERNATIVE 2**  
**JOHNSTOWN WTP**  
**FEB 2021**



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**ALTERNATIVE 3**  
**JOHNSTOWN WTP**  
**FEB 2021**



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