Building a Better World
for All of Us®

September 20, 2019

RE: Centralized Water Treatment Proposal

Bruce Westby
City Engineer
7550 Sunwood Drive NW
Ramsey, MN 55303

Dear Mr. Westby and Members of the Selection Committee:

The City of Ramsey requires a qualified professional engineering firm to provide services for preparing a study, model and preliminary report for your centralized water treatment facility. Because this study will set the framework for the future of your facility, the City of Ramsey should select a consultant team who provides long-term solutions that are cost-effective, right-sized, flexible and meet your project schedule. In order to accomplish all of these requirements, Short Elliott Hendrickson Inc. (SEH®) can offer the City of Ramsey the following:

Water Industry Leaders. SEH is a regional leader in providing drinking water services. The individuals selected to lead this project have worked on numerous water treatment plant, water supply and water storage projects throughout Minnesota. Project Manager, Chris Larson, has worked on nearly 25 water treatment plant design and construction projects ranging in capacity from 0.25 to 30 MGD. Miles Jensen, who will provide QA/QC and project oversight, has worked on more than 85 water treatment plant projChris and Miles Jensen have worked together for more than 16 years completing the design and construction of more than 15 water treatment plants.

A Complete, Local SEH Team. SEH has assembled a team of technical experts who have worked successfully together on many water treatment plant projects throughout the region. The entire project team; from process engineers and architects, to electrical and mechanical engineers, are located in SEH's Minnesota offices. This not only provides us with an understanding of local issues and stakeholders, it also gives us the opportunity to provide quick response to your needs in a highly coordinated and cost effective manner.

Funding. A good idea, without the financial means to make it come to life, will remain just another good idea. But when it comes to community and economic development, SEH can turn your ideas into reality. Our experts work with communities across Minnesota to provide solutions for their projects. To do this, we access a variety of federal, state and local funding sources; including grants, low-interest loans, state bonding bills and tax incentives. Chris Larson recently completed a Drinking Water Revolving Fund Loan application for the Cloquet Water Treatment Plant No. 1 project.

Our financing staff has secured more than $100 million for communities in just the past 24 months. They apply knowledge of the funding agencies and their programs. Their experience includes securing state, federal and local funding for a variety of municipal projects from water and wastewater treatment plants, parks and trails, rehabilitating streets, industrial developments, to preserving historic buildings and structures.

We appreciate the opportunity to submit this proposal and are confident that we can provide the City of Ramsey with the results you are looking for. If you have any questions, please contact me at 651.765.2961 or clarson@sehinc.com.

Respectfully Submitted,

Chris Larson, PE
Project Manager
clarson@sehinc.com | 651.765.2961

Miles Jensen, PE
Principal-In-Charge
mjensen@sehinc.com | 651.490.2020

Table of Contents

**To simplify review, we have merged the Work Plan, Schedule and Fees into a single summary table. Based on our discussion with Bruce Westby, it is our understanding that this is an acceptable format.*

The specific licenses and credentials of the team members are described in the personnel and/or resume section of this document.

Project Understanding and Approach

PROJECT UNDERSTANDING

The City of Ramsey currently gets its drinking water from eight Tunnel City/ Wonewoc aquifer wells. This groundwater supply has historically provided the City's public drinking water system with an abundant source of quality water. In 2019, the Minnesota Department of Health informed the City that several of its wells contained manganese in excess of the health advisory standard. The City responded by taking five of the wells out of service and only pumping water from the three wells with the lowest manganese concentrations. Now the City has encountered elevated concentrations of iron in these wells too, resulting in increased customer complaints of rusty water.

In order to mitigate its iron and manganese problems, the City of Ramsey is considering constructing a water treatment facility. A new water treatment plant has been on the City's Capital Improvements Plan for several years, but given the current manganese levels, the City may be interested in advancing the scheduled timing of the facility's construction.

The City is proactively planning for a long-term solution to reduction of iron and manganese concentrations in its public water system by taking the first step – a feasibility study that identifies and evaluates options and alternatives for a centralized water treatment plant. To assist with this undertaking, the City is requesting proposals from qualified engineers to evaluate Ramsey's total water supply and treatment needs and provide alternate facility layouts for use in determining detailed estimates of project cost for a centralized treatment facility.

The scope of this feasibility study will be to assess sustainability of the City's current source water aquifer, create an updated computer model of its water system and prepare a detailed preliminary design report of the proposed centralized water treatment facility. As the project moves along, the selected engineering firm will engage the City's water system customers in a public information and education program.

Key Scope Issues

1. Assess sustainability of the City's current source water aquifer
2. Create an updated computer model of its water system
3. Prepare a detailed preliminary design report of the proposed centralized water treatment facility
4. Engage the City's water customers in a public information and education program

PROJECT TEAM APPROACH

A successful feasibility study is critical because it provides the basis for the design of your overall facility. If performed properly, it will result in a project that meets the City's goals in a cost-effective and operations-friendly manner. The SEH team and staff from Ramsey will unite to form a comprehensive project team. Starting with a thorough analysis of the City's source water aquifer, water demands and water distribution system, we will evaluate the basis and support for a centralized water treatment facility. The results of these efforts will provide an understanding of the source water and long-term capacity needs of the facility. With this information serving as a framework, the project team will determine the best course for the evaluation process by focusing on the layout features that City staff wants and the subsequent siting requirements that will support future capacity and treatment needs. Through eight proposed progress meetings (plus other meetings), the project team will share ideas and make decisions that customize the conceptual water treatment facility to meet Ramsey's long-term needs. The following are key elements of our teams' work and approach based on our understanding of the City's Request for Proposals.

> We find that the best way to deliver a project that meets the City's goals is through a collaborative City/SEH team.

1 Analyze Source Water

Analyze and report on the overall accessibility, capacity, chemistry and limitations of the Tunnel City/Wonewoc (TCW) aquifer. Melanie Niday, PG will lead the Source Water Analysis.

Analyze Aquifer Accessibility

Identify approximate useable boundaries of TCW aquifer (not limited to City limits).

The City of Ramsey is included in the greater Twin Cities metropolitan region. In identifying functional boundries we will make use of many available resources and publications including those from the Minnesota Geologic Survey the County Well Index (now known as the Minnesota Well Index) and the City of Ramsey's existing Wellhead Protection Plan Part I, that has been reviewed and approved by the Minnesota Department of Health. This groundwater management plan establishes water use from existing municipal wells over the course of 10 years. This plan includes a groundwater model that can be used to model additional scenarios relating to tasks in this proposal. SEH proposes utilizing this previously developed model along with a variety of sources to establish the usable boundaries of the TCW aquifer including the following:

- The City of Ramsey's most recent Wellhead Protection Plan.
- Mossler, John H. (1992). RI-40 Sedimentary Rocks of Dresbachian Age (Late Cambrian), Hollandale Embayment, Southeastern Minnesota. Minnesota Geological Survey. Retrieved from the University of Minnesota Digital Conservancy, http://hdl.handle.net/11299/60785.
- Mossler, John H.. (2013). M-194 Bedrock Geology of the Twin Cities Ten-County Metropolitan Area, Minnesota. Retrieved from the University of Minnesota Digital Conservancy, http://hdl.handle.net/11299/154925.
- Runkel, A.C.; Tipping, R.G.; Mossler, J.H.. (2003). Geology in Support of Groundwater Management for the Northwestern Twin Cities Metropolitan Area. University of Minnesota. Retrieved from the University of Minnesota Digital Conservancy, http://hdl.handle.net/11299/108353.
- Metropolitan Council. (2014). Twin Cities metropolitan area regional groundwater flow model, version 3.0. Prepared by Barr Engineering. Metropolitan Council, St. Paul, Minn.
- Minnesota Well Index created by the Minnesota Department of Health.

Identify Areas Where Additional Wells May Be Feasible

SEH will utilize a variety of information to determine future well locations that will be in the best interest for the City of Ramsey. The feasibility of a well location will be determined based on aquifer quality, aquifer capacity/supply and location cost and practicality.

1. SEH will review potential well locations based on proximity to existing water supply systems, jurisdictional boundaries including private and

public property boundaries, known and assumed water quality issues, assumed geologic sensitivity and vulnerability, the proposed source water aquifers protection from surface contaminants and information on water supply and quantity including predicted production rates from various aquifers.

2. Together with Melaine, Jeff Ledin, PE and Mark Wallis, PE will evaluate the most practical well locations first. Some locations may not be suitable due to proximity to the existing water supply lines or because they are owned or managed by entities that would be cost prohibitive or inaccessible to the City of Ramsey. Furthermore, priority may go to well locations in close proximity or located on City land as a cost saving measure to the City.

3. SEH will utilize GIS systems to compare well locations to existing water supply systems and jurisdictional boundaries, including City owned property, to cite well locations that are logistically feasible. We will also use GIS systems to map existing groundwater contaminants and aquifers vulnerability and sensitivity to determine the likelihood of contaminants reaching and traveling within the source water aquifer(s). (We detail this process in Section C, below).

4. SEH will also review geologic properties of the aquifers near the City of Ramsey. This includes locations within the currently utilized Tunnel City formation and other potential aquifers given the same parameters as listed above (We detail this process in Section D, below).

5. Lastly, SEH will review geologic information pertaining to well production and supply from proposed well locations.

Analyze Source Water Chemistry

Identify/inventory known primary contaminants, secondary contaminants and emerging contaminants (based on anticipated life of facility).

This analysis will begin with a determination and reporting of the US EPA's current primary and secondary water quality standards, followed by a determination of the US EPAs emerging contaminants list.

- SEH proposes utilizing multiple information sources to determine the existing and future quality of the City of Ramsey's water. The City recently conducted a two-part wellhead protection process. The Part I Wellhead Protection Plan determined the vulnerability of the City's aquifer based on the geologic sensitivity ratings of wells and their monitoring data. This helps to determine the rate at which surface water recharges source water aquifers utilized by the City of Ramsey's municipal wells. SEH will review similar properties for wells in the surrounding area along with any future proposed well citing locations.
- The City of Ramsey is in the process of, or has already completed their Part II Wellhead Protection Plan. This plan established a potential contaminant source inventory that the Environmental Protection Agency (EPA) and Minnesota Department of Health (MDH) has determined as potential point sources of contaminants given the established aquifer's vulnerability. We propose a review and, if necessary, an update to this potential contaminant source inventory. We will also review adjacent and nearby potential contaminant sources, nearby Department of Agriculture spill and cleanup sites, Minnesota Pollution Control Agency (MPCA) listings and contaminated or potentially contaminated sites, Minnesota Incident reports relating to Spills and information on regional landfills.
- Upon completion, SEH will prepare a memorandum that represents our best projection for the future chemistry and any potential treatment needed over the life of the City's proposed water treatment facility.

Analyze Aquifer Capacity/Limitations

Determine overall ability of the TCW to serve the City's future water supply needs.

SEH proposes three methods for determining the overall ability of the TCW to serve the City's future water supply needs.

1. Review the Aquifer Test Plan (DAP-ATP) that was approved during the development of the Wellhead Protection Plan Part I to determine if aquifer properties for the area around the City of Ramsey are adequate. If SEH determines that the DAP-ATP forms do not properly establish aquifer properties SEH proposes the following:

   – Conduct an aquifer test to determine aquifer properties of the TCW. SEH proposes a constant rate Aquifer pump test following Minnesota Administrative Rules outlined in 4720.5520 (https://www.revisor.mn.gov/rules/4720.5520/) to determine standard aquifer characteristics of the TCW. Better understanding of the aquifer properties can improve future predictions and groundwater models.

Additionally, the aquifer test will help determine specific capacity of the aquifer and any boundary conditions the aquifer may exhibit. This will provide information of well drawdown locally across the well fields and help make predictions for the wellfield given increased pumping rates and future aquifer drawdowns.

2. SEH proposes to use the City of Ramsey groundwater model developed in the Part I Wellhead Protection Plan be utilized to model groundwater use and supply in the future.
   - We will use the groundwater model in order to model particle paths of water for times greater than the 10 years mapped in the Part I Wellhead Protection Plan. The current Wellhead Protection Plan is limited to looking at groundwater particle paths for the next 10 years using the existing municipal wells. SEH proposes looking at Particle paths beyond the 10-year period and update particle paths with any proposed well citing locations. We also propose reviewing how changes to the distribution system will affect the Drinking Water Supply Management area.
3. SEH proposes looking at future drawdown and water supply changes in the TCW aquifer by utilizing the existing groundwater model. Future drawdown in the aquifer can be modeled by comparing current drawdown within the TCW aquifer with predicted future pumping schemes (i.e. increased pumping rates in the existing well field or by adding well fields). This comparison of drawdown may be useful in long-term viability of water intervals, proximity and water supply of the TCW.

Analyze and provide recommendations on using alternative sources of water.

- If long-term aquifer limitations are established in the section above SEH will recommend steps Local and regional geology will be reviewed for potential aquifers other than the TCW such as the Mount Simon/Hinckley, or surface water.
- If long term aquifer limitations are established in the section above SEH will recommended steps
  - Review available geologic information established in section 1 for other potential aquifers.
  - Review location feasibility for other preferred aquifers.
  - Proposed test wells to be advanced to confirm geology.
  - Perform and analyses pump tests.
- The memorandum will also provide recommendations for the need and/or benefit of introducing a surface water supply both now and into the future. Information from the North3west Metro Regional Surface Water Supply Study will be incorporated into this portion of the water supply analysis.

Summarize Results

SEH will develop a report and figures with the above information.

2 Develop Water Model

The City has requested creation of a new water distribution system model. The goal of this effort is to use existing City GIS mapping and information as well as a copy of the City's existing model to create a new complete and functioning water system computer model. The construction of this model would include all of the major features of the existing Ramsey water system, with pipes, tanks, pumps and other water system components. We will calibrate the model with field data so that the operation of the model will reflect real world conditions of the water system. Upon completion of the model, the final product will be ready for use and reveal current operational capabilities, detect deficiencies and examine water system questions and concerns.

We will develop a new computer model of the water distribution system using WaterCAD v8i. SEH maintains software licensing for all industry leading water system modeling software and is available to transition between software platforms as needed. We will work with existing city GIS data to import water infrastructure information into the proposed water system model. We will constrict the model on the same coordinate system as existing GIS data allowing for seamless export of model result data in GIS format as needed. This will also allow for simple updates in the future as system components are added or replaced.

Additional capabilities of the completed model include but are not limited to:

- **Fire flow analysis:** ability to analyze fire flow and locate system deficiencies.
- **Planning:** ability to identify future system deficiencies and recommend system improvements.
- **Development assessment:** assess the impacts of system expansion and recommended water system improvements.
- **Operational management:** analyze overall system operation and overall impact on system operation.

The advancement of GIS mapping availability now provides for an efficient means to construct and utilize water system modeling technology. Seamless data import and export allow computer models to be easily constructed with available GIS data and then calibrated to industry standards. Once constructed and calibrated, the water system model will be a valuable tool for developing an understanding of existing water system operations, evaluation of deficiencies and analysis of potential improvements.

Data Collection and Model Assembly

A computer model of the water distribution system will be developed using WaterCAD modeling software. The current water distribution piping, elevated storage tanks, well pump curves, and operational data will be incorporated into the model.

Historical water system pumping data and usage data (from billing records) will be analyzed. This information can be extracted from monthly water billing summaries and assigned by address in the model. Furthermore, existing pumping records will be analyzed to develop an understanding of usage trends including Average day and Max day use. Additional water distribution system data (such as details related to facility operations) and mapping information will need to be collected and incorporated in the computer model as well. Elevations will be assigned to the model using contour and elevation data, which is readily available. Also, additional well, tower, pipe age, and pipe material information will be collected and reviewed for use in the model. Upon completion of this task, the complete water system will be constructed within the modeling software and ready to be modified and calibrated with field data.

Additional data incorporated into the model will include the current system operational data, and other system facility parameters necessary to provide for the construction of an accurate hydraulic model. Model demands will be assigned based on water pumping or billing records, as available, with peak demand factors being based on historical water use statistics for the City.

Calibration

Calibration testing will be conducted by SEH with assistance from City staff. Potential flow testing locations will be reviewed with City staff to ensure feasibility of the testing plan. City staff will operate all hydrant valves. SEH will provide testing equipment and collect pressure and flow data during hydrant operation. It is expected that this task will take up to two days. Because of the schedule for this project and the time of year, SEH will want to flow test the hydrants as soon as possible following the Notice to Proceed. SEH will want to be complete with flow testing before mid November 2019.

Calibration data will be utilized in a genetic algorithm calibration module to optimize model parameters for accuracy. The model will be calibrated to provide accuracy within 5% of field testing results, meeting industry standards for water distribution system computer Models. At the close of the project, SEH will turn the water model over to the City, for the City to use in the future. We will also be available to assist with operation of the model as requested by the City.

Water System Model Analysis and Verification

Upon calibration of the water model, an analysis will be performed to determine if there are any deficiencies in the existing system with respect to pressure and/or available fire flow. Average day demand, maximum day demand, peak hour demand, and EPS scenarios will be run for the existing distribution system. Current hydrant flow availability will also be analyzed. The initial system analysis will be used to verify that the model is producing appropriate results.

Future Water System Growth and Plant Siting Verification

Upon calibration of the model, we will develop scenarios within the model representing existing Average Day, Max Day and Peak Hour Conditions. Using future growth areas and population projections from the City's Comprehensive Plan, SEH will then develop a conceptual skeleton of trunk mains to support municipal water service.

This future plan will assist the Project Team in understanding the effect of plant siting on future growth of the community water system. A summary of the standard initial system analysis will be provided in memo form and SEH will provide the data files to the City for future modeling analyses.

3 Preliminary Design Report

For this phase of the project, SEH proposes to complete preparation of a report that brings all of the pieces together. As laid out in the City's Request for Proposals significant, but certainly not all, elements of the report will include the following:

Selection of Water Source(s)

SEH will utilize the results of our aquifer investigation and water system modeling efforts to identify the preferred source water to serve the Ramsey Water Treatment Plant. This work will include a meeting with the MDH, incorporation of findings from the Northwest Metro Regional Surface Water Supply study and discussions with neighboring communities to determine the feasibility of Mount Simon/Hinckley groundwater, surface water, or system interconnects as potential sources for Ramsey.

Water Treatment

Once a source water has been selected/confirmed, SEH will review the treatment goals and processes most commonly and cost-effectively used for used for municipal water treatment, This work will include an analysis of the municipal hardness removal including lime softening, reverse osmosis and ion exchange softening. In previous feasibility studies, SEH has included incremental costs of municipal water softening versus the cost of in-home softening. SEH will evaluate water treatment plant options including gravity and pressure filtration for iron and manganese removal. Pressure filtration is likely to have lower capital costs and could more easily incorporate the existing ground storage reservoir. However, gravity filtration offers operational advantages and may have lower life cycle costs. We will also share our positive experiences with designing and operating biologic filtration plants with the project team to show how this technology can be incorporated into your project,

After the treatment goals and treatment process options have been identified, the Project Team will sit down and discuss the advantages and disadvantages of each process. The Project Team will take tours of select water treatment plants across the region to help the Ramsey Staff get a better understanding of the various treatment processes. The Preliminary Design Report will document the discussions and observations made on the advantages and disadvantages of each process so that City staff can select the process that works best for your needs.

Plant Layout - Filter Size and Design Features

Selecting the proper filter size is critical for the facility to consistently meet its maximum design flows—without being over-designed. Our experience has shown that the best results come from considering filtration rate, solids loading, available head loss, and media size, layering and depth, and then modeling these parameters with our pilot plant. Using this information, we can design your filtration system(s) that allows your operators to push the plant(s) during maximum demand periods without undue stress or compromised water quality.

Plant Layout - Filter Backwash Water Handling and Disposal

Our engineers understand the relationship between filtration and filter backwash systems. While one system filters water, the other processes spent backwash water. When the next filter cell requires backwashing, the handling system must be ready to receive and process the spent water, or the plant's capacity will be diminished. Our experience has taught us how to make sure the systems work hand-in-hand for optimal capacity. We will work with City staff to review the levels of backwash water processing, from simple retention tanks to more efficient lamella plate settlers, to a complete zero-liquid-discharge (no sanitary sewer discharge of process water) facility similar to the one we designed for Wisconsin Rapids, Wisconsin.

Plant Layout - Clearwell and High Service Pump Analyses

Using the new Ramsey hydraulic model, SEH Water System Specialist Chad Katzenberger will simulate operations from the proposed treatment plant to establish potential clearwell and high service pump capacities. By varying the distribution system demands over time through computer simulation, our engineers will be able to predict the operation of the facility's high service pumps. Once the distribution system's response is determined, a potential clearwell can be sized to allow the high service pumps to operate to their fullest capacity without overrunning the combined capacity of the wells and clearwell (for gravity filter alternatives).

Plant Layout - Plant Design Versatility

In addition to the versatility in pumping discussed above, Ramsey's water treatment facility should be conceived and designed with the flexibility to add treatment processes, either upstream or downstream, of the proposed filtration process to accommodate future requirements, whether they be emerging contaminants or switching source waters to include a different groundwater aquifer or even surface water. SEH brings extensive experience designing facilities for arsenic, radium, radon, TTHM precursor removal, volatile organic compound (VOC) stripping, softening, surface water treatment, alternate disinfection, and corrosion control for lead and copper reduction that are inclusive of upstream and downstream designs.

Plant Layout - Electrical Power and SCADA Analyses

The feasibility study will address the major electrical issues including power distribution, stand-by generator power, and

other systems including fire alarm detection, security, telephone, and building access controls. In addition, upgrades to the City's existing SCADA system will be identified in a walk-through with Ramsey's water operators. SEH's electrical practice center leader, Chad Westbrook, PE, will lead these efforts.

Plant Layout - Architectural Elements

For the purposes of accurate cost estimation and presentations to the Council and public, SEH's Scott Blank, AIA, will work with City staff to develop the "look" of the water treatment plant to capture the architectural features and style of other City buildings, but also sensitive to the surrounding residential areas. This work is essential in order to determine an accurate cost estimate for the facility.

Plant Layout - Space Needs

SEH will work closely with the City to identify the spaces needed at the proposed facility for offices, work spaces and storage. This work will also examine relative locations of the chemical storage and feed rooms and how chemical deliveries are made to the site(s).

Plant Layout – Collective Assembly of the Features

The many topics discussed above are just some of the basics that goes into developing a suitable facility layout. SEH's design team is very experienced in laying out plants with good room and purpose organization/grouping that have good "process flow" both initially and with potential future plant/process additions. Once we have a plant layout assembled, we will meet with the Minnesota Department of Health (MDH) regulators to build understanding and consensus with an initial review of the proposed facility. This is standard protocol for SEH to get the MDH involved early as we have found this promotes quick project approvals down the road.

Site Layout – Blending Facility Configuration with Site Constraints

The size, relief, topography, location and roadway access are just some of the features that drive facility layout and then how that facility is placed upon the site. As ideas for Ramsey's water treatment facility are vetted, SEH's design team will work with the facility's shape to fit it upon the City's proposed site. The SEH/Ramsey project will spend time discussing how to make the best use of the site and how to best site the facility to be a good neighbor to those nearby, while at the same time offering good access for construction and plant operations. The Preliminary Design report will include the facility site & utility layout drawing.

Cost Estimation

SEH's extensive experience with water treatment plants and water contractors allows us to prepare accurate cost estimates based on similar projects and the current market prices for equipment and materials. As part of this project, we will prepare construction estimates and 50-year, present-worth, life-cycle cost estimates for each alternative. This will allow the City to have accurate cost information for the various facility layouts and select water treatment solutions that best serves the needs of the City.

Rate Assessment

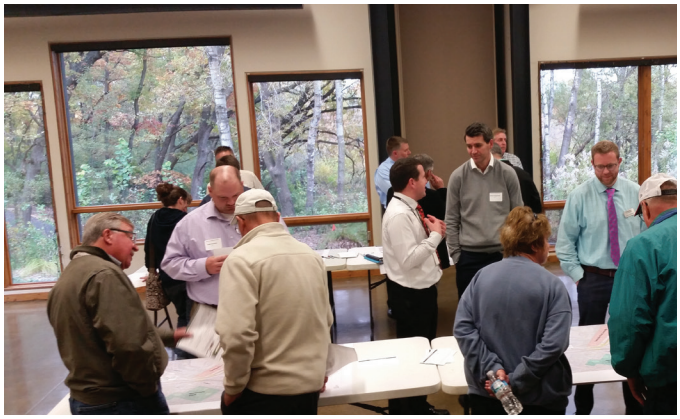
With the cost estimation work completed, SEH will then have the information to review the City's existing water rates and recommend changes as necessary to cover the capital and O&M costs associated with a new water treatment plant.

Funding

A good idea, without the financial means to make it come to life, will remain just another good idea. But when it comes to community and economic development, SEH can turn your ideas into reality. Our experts work with communities across Minnesota to provide solutions for their projects. To do this, we access a variety of federal, state, and local funding sources; including grants, low-interest loans, state bonding bills, and tax incentives.

Our financing staff is knowledgeable of the funding agencies and their programs. Their experience includes securing state, federal and local funding for a variety of municipal projects from parks and trails, rehabilitating streets, industrial developments, to preserving historic buildings and structures. In fact, we've secured more than $100 million in just the past 24 months. Some of the drinking water projects that our team secured financing for include:

- City of Pelican Rapids - Water Treatment Improvements; $600,000 low interest loan (Drinking Water Revolving Fund)/$250,000 grant (Business Development Public Infrastructure)
- City of Akeley - Water Treatment Improvements; $600,000 low interest loan (Drinking Water Revolving Fund)/$300,000 (Small Cities Development Program)
- City of Belgrade - Water Treatment/Supply Improvements; $600,000 low interest loan (Drinking Water Revolving Fund)/$400,000 (Small Cities Development Program)
- City of Minnetrista – Water Treatment Plants; $10 million low interest load (Drinking Water Revolving Fund)
- City of Gibbon – Water Treatment Improvements; $2.2 million low interest loan (Drinking Water Revolving Fund)



Public involvement meeting.

Projects come to life when the community emerges to share their voices.

4 Public Involvement

For our clients, the public involvement process incorporates citizens and stakeholders in the early stages of the planning process and encourages their participation throughout a project's lifecycle. Collaborating with the public allows policy makers to foster a shared project vision and enjoy a higher level of acceptance among planners, citizens, and other project stakeholders.

SEH has found Public Informational Meetings (PIMs) to be a very effective approach for public education. In an informal setting, with scheduled presentations, residents can attend to learn about the project. Led by our SEH's Public Engagement Specialist, Kristin Petersen, our project team members experienced in managing the PIM and outreach efforts. What's more? We can tap into SEH's Corporate Communications team of 14 creative digital and content specialists to aid in tailoring the right tools and message to help tell the project story efficiently.

Projects come to life when the community emerges to share their voices. We also recognize there is no single technique that works for all situations. As a result, for this feasibility study, the SEH team proposes to use the following methodologies as a guide for the Ramsey Water Treatment Facility planning phase the public involvement process:

- Begin in late March-early April 2020, with two months of informational mailers in customers' water bills and postings to the City's website and other social media avenues the City normally uses regarding issues of water quality, water demands and FAQs on water treatment and treatment facility function.
- Then follow these postings with a survey that asks customers to weigh in on issues like softening verses simple iron and manganese removal and comparative cost of treatment on a 1,000 gallon basis.
- Along about the beginning of May 2020, initiate an open house to discuss the survey results and share more information as the Preliminary Design Report draft nears production.
- Review the information with City staff at a meeting and consensually agree on incorporating customer feedback into the final Preliminary Design Report drawings and text.
- Then go back to the website and social media to demonstrate we heard, understood and value the ideas, concerns and goals of all people and thank everyone for their interest and input on water treatment in Ramsey.

Project Personnel

The organizational chart below highlights the team we have assembled for the City of Ramsey's Water Treatment Plant. Over the years, this core team of professionals has developed a solid working relationship with each other and a growing number of satisfied drinking water clients. We have included biographical sketches of our proposed project team, demonstrating their extensive experience delivering successful water treatment studies, planning, design, permitting and construction projects. Resumes for key team members are also included in the Appendix

City of Ramsey
BRUCE WESTBY, PE – CITY ENGINEER

Chris Larson PE
PROJECT MANAGER

Miles Jensen PE
PRINCIPAL-IN-CHARGE & QA/QC

SOURCE WATER ANALYSIS

Melanie Niday PG
HYDROGEOLOGIST

Jeff Ledin PE
WATER ENGINEER

Mark Wallis PE, CCS, CCCA, CDT
WATER ENGINEER

WATER TREATMENT OPERATIONS

John Thom
WATER OPERATIONS SPECIALIST

Kevin Young PE
WATER OPERATIONS SPECIALIST

PUBLIC ENGAGEMENT

Kristin Petersen AICP, NCI, LEED AP®
PUBLIC ENGAGEMENT SPECIALIST

DISTRIBUTION SYSTEM MODELING

Chad Katzenberger PE
HYDRAULIC MODELING ENGINEER

M/E ENGINEERING

Chad Westbrook PE
ELECTRICAL ENGINEER

Nick Brula PE
MECHANICAL ENGINEER

PROJECT PERSONNEL // ROLES AND BIOS

Chris Larson, PE

Project Manager

24+ years of experience

Chris's experience covers all aspects of water treatment including pilot studies and testing, preliminary engineering studies, design, construction administration, project management, and startup and training for water treatment and supply projects. ***As project manager, Chris will be responsible for scope, schedule, budget, deliverables, communications, meetings, engineering resources, staff supervision and project direction.***

Miles Jensen, PE

Principal-In-Charge / Quality Assurance

35+ years of experience

Miles brings more than 35 years of engineering experience specializing in the design and construction of water treatment plants; specifically advanced water treatment facility process design. ***He will oversee the QA/QC plan for your project, schedule reviews, and monitor staff to ensure a high-quality final product is delivered to your complete satisfaction.***

Melanie Niday, PG

Hydrogeologist / Source Water Analysis

31+ years of experience

Melanie is a hydrogeologist with extensive experience in solid waste permitting, hydrogeological and remedial investigations, ground water monitoring, data reduction and analysis and report preparation. ***Melanie will lead the aquifer assessment task.***

Jeff Ledin, PE

Senior Water Engineer

27+ years of experience

Jeff is a water engineer with extensive experience, especially in the area of public water systems engineering. ***With Jeff's long history will well siting, design and construction, he will assist Melanie in the assessment of sustainable groundwater for Ramsey.***

Mark Wallis, PE, CCS, CCCA, CDT

Civil Engineer / Source Water Analysis

34+ years of experience

Mark has extensive experience working with a wide variety of multidiscipline water projects, including water system supply and distribution plans, wells, water booster stations, water towers and water conservation, and emergency preparedness plans. ***With Mark's past experience of designing and developing wellfields in such communities as Sartell and other Minnesota cities, Mark will assist Melanine and Jeff in the analysis and planning of Ramsey's future well field growth and development.***

Chad Katzenberger, PE

Lead Hydraulic Modeling Engineer

15+ years of experience

Chad brings extensive water master planning and hydraulic modeling experience to the project. ***His responsibilities for this project will include calibration and update of the water model, water modeling analysis and system planning.***

John Thom, PE

Water Operations Specialist

54+ years of experience

John is a water and wastewater operations specialist with extensive experience in the management of water and wastewater utilities, plant studies, plant start-up, O&M, operator training and is the pilot plant designer and operator. ***John will provide operations review of the water treatment plant and site layout. John will also provide review and input on the proposed water treatment processes.***

Kevin Young, PE

Project Engineer

8+ years of experience

Kevin has served as a water treatment plant operator, engineer and supervisor at a 10 mgd lime softening facility for Moorhead Public Service (MPS). His operations experience also includes ozone disinfection, biological filtration, chlorination and high service pumping. ***Kevin will provide the day to day process engineering for layout of the plant and site. Like John, Kevin holds a Minnesota Class A water operator's license in addition to his Bachelor's and Master's degrees in Civil Engineering.***

Kristin Petersen, AICP, NCI, LEED AP®

Public Engagement Specialist

13+ years of experience

Kristin is an AICP certified planner and is the senior design engagement lead at SEH. Her background is focused on identifying and managing community concerns and conflicts and documenting, writing and providing graphic design for the preparation of project planning reports. ***Kristin will organize and lead the Public Outreach program with Chris Larson.***

Chad Westbrook, PE

Electrical Engineer

23+ years of experience

Chad is an electrical engineer with technical experience that includes facility power distribution and generation systems; fire alarm detection and notification; communication systems; and security systems. ***Chad will lead the electrical and control system design. For the Preliminary Design Study, this work will be important for appropriate sizing of the electrical and control spaces and developing an accurate cost estimate of the planned facility.***

Nick Brula, PE

Mechanical Engineer

15+ years of experience

Nick has extensive experience in energy analysis/modeling and ASHRAE 90.1 appendix G. He is experienced in every phase of HVAC project development, including initial cost estimation, facility analysis, system design and construction administration. ***Nick will be responsible for the mechanical system layout and space needs assessment for the mechanical and HVAC systsms. Like Chad, Nick's early input during the Preliminary Design Report will assure that the mechanical spaces are sized correctly and the facility cost estimate is accurate.***

SEH's Pilot Study Trailer

Summary of Proposed Work Plan, Schedule and Fees

CENTRALIZED WATER TREATMENT FACILITY	***SEH Staff Hours***	***Labor Costs***	***Expenses***	***Total***
TASK 1 - PROJECT INITIATION (Week of October 28, 2019)				
Kickoff Meeting (Meeting No. 1)	16	$1,947	$204	$2,150
Data Collection	10	$1,332	$0	$1,332
Project Initiation Subtotal	**26**	**$3,279**	**$204**	**$3,483**
TASK 2 - ANALYZE SOURCE WATER (November 2019 to Mid-January 2020)				
Analyze Aquifer Accessibility	19	$2,021	$0	$2,021
Analyze Aquifer Capacity	19	$2,021	$0	$2,021
Analyze Source Water Chemistry	12	$1,464	$0	$1,464
Analyze Aquifer Limitations	11	$1,248	$0	$1,248
Summarize Results	20	$2,237	$0	$2,237
Meet with City Staff (Meeting No. 2)	4	$748	$82	$830
Analyze Source Water Services Subtotal	**85**	**$9,738**	**$82**	**$9,820**
TASK 3 - DEVELOP WATER MODEL (November 2019 to January 2020)				
Demand Analysis				
Data Collection (GIS, Mapping, Demand Data, Facility Data)	5	$590	$0	$590
General Project Management & Coordination	3	$421	$0	$421
Historical Demand Analysis	2	$169	$0	$169
Review current and future service area population forecasts and update water demand projections over the planning period.	4	$449	$0	$449
Collect available current demographic data and planning forecasts for the identified service area based on the City's Comprehensive Plan.	2	$169	$0	$169
Collect and review water demand data information including billing (AMI), SCADA pumping records, DNR annual reports, other historical data sources, and other available planning and engineering reports	3	$253	$0	$253
Demand Analysis: Develop unit demands (gallons/day/unit) to be used for projecting future water requirements.	2	$169	$0	$169
Develop peaking factors for maximum day (MD), maximum hour (MH), average day (AD), average summer day (ASD), and average winter day (AWD).	2	$169	$0	$169
Forecast future average day demand in 5-year increments starting with year 2020 and going through year 2040.	2	$169	$0	$169
Develop 10 max day (MD10) use patterns for modeling purposes.	2	$169	$0	$169
Meet with City Staff (Meeting No. 3)	4	$713	$153	$866
Evaluation				
Model Construction from GIS	3	$239	$0	$239
Elevation Update to water model	1	$84	$0	$84
Model Facility Update(Wells, Tanks)	3	$239	$0	$239
Historical DemandReview	1	$84	$0	$84
Water System Demand Allocation & Distribution	2	$169	$0	$169
Desktop preliminary Calibration, Project Setup	3	$309	$0	$309
ArcMap Online Setup (Field Data Collection)	3	$365	$0	$365
Deploy & Retrieve Telogs (2 weeks of data collection)	4	$562	$0	$562
Field Flow Testing (One Day)	8	$674	$173	$847
Pump Capacity Analysis - Field Testing/Review	3	$239	$0	$239
Facility Review (Collect SCADA Data, field test, 2 weeks)	1	$70	$0	$70
Micro and Macro Field Testing Data Compilation	2	$155	$0	$155

CENTRALIZED WATER TREATMENT FACILITY	SEH Staff Hours	Labor Costs	Expenses	Total
Develop water system diurnal demand curves	2	$155	$0	$155
Develop and Incorporate water model controls	3	$239	$0	$239
Calibration of Model w/ field data	13	$1,082	$0	$1,082
Calibration Results Summary	3	$239	$0	$239
Conduct a Supply Capacity Analysis	3	$239	$0	$239
Conduct a Storage Volume Capacity Analysis	3	$309	$0	$309
Conduct a Pumping Capacity Analysis	3	$309	$0	$309
Fire Flow Capacity Analysis	3	$309	$0	$309
Emergency Operations Analysis	4	$323	$0	$323
(90% Draft) Develop Hydraulic Analysis Report	7	$758	$0	$758
Identify and Classify System Deficiencies (Hydraulic Capacity, Fire Flow, Storage, Growth, Water Quality, Pipeline repair, upgrade or replacement, admin and support, other)	5	$590	$0	$590
Final Hydraulic Analysis Report				
Prepare Final Hydraulic Analysis Report	21	$2,126	$0	$2,126
Meet with City Staff (Meeting No. 4)	4	$713	$153	$866
Develop Water Model Services Subtotal	**134**	**$14,016**	**$478**	**$14,495**
PREPARE PRELIMINARY DESIGN REPORT (December 2019 to April 2020)				
Select a Water Source	10	$1,211	$0	$1,211
Develop Treatment Goals	11	$1,440	$0	$1,440
Explore Available Treatment Options	11	$1,440	$0	$1,440
Summarize Advantages/Disadvantages of Each Option	6	$822	$0	$822
Select Preferred Treatment Option	5	$606	$0	$606
Develop Preliminary Centrailzed Treatment Facility Layout	51	$6,048	$0	$6,048
Select Preferred Site	12	$1,464	$0	$1,464
Meet with City Staff (Meeting No. 4)	4	$627	$31	$658
Calculate Estimated Construction and Operational Costs	6	$835	$0	$835
Review Existing Water Rate Structure and Recommend Revisions	6	$822	$0	$822
Explore Alternative External Funding Sources	3	$411	$0	$411
Prepare Draft Report	31	$3,616	$0	$3,616
Meet with City Staff (Meeting No. 6)	4	$627	$31	$658
Prepare Final Report	8	$1,006	$0	$1,006
Attend City Council Meeting to Present Final Report with City Staff (Meeting No. 8)	2	$432	$31	$463
Preliminary Design Report Services Subtotal	**170**	**$21,406**	**$93**	**$21,499**
PUBLIC EDUCATION/ENGAGEMENT PLAN (April 2020 to May 2020)				
Web-Based Communications	3	$411	$0	$411
Develop FAQs for uploading	7	$800	$0	$800
Attend Open House (Meeting No. 7)	4	$627	$31	$658
Prepare and upload responses to Customer Fedback	5	$606	$0	$606
Public Education/Engagement Plan Services Subtotal	**19**	**$2,444**	**$31**	**$2,475**
Estimated Project Totals	**434**	**$50,883**	**$888**	**$51,771**

Refer to the attached full Labor Hours & Expenses sheet for complete details

Firm Qualifications and Relevant Experience



FIRM BACKGROUND

Short Elliott Hendrickson Inc.® (SEH) is a 100% employee-owned company providing engineering, architectural, planning and environmental services to public and private clients throughout the country. Our more than 800 employee-owners deliver valuable solutions in the buildings, energy, environmental, infrastructure, transportation and water markets. Our collective purpose and body of work is focused on Building a Better World for All of Us®. "Building a better world" embodies our commitment to improving quality of life through safer roads, bridges, parks and trails; renewable energy and sustainable design; and cleaner air, drinking water, rivers and lakes. Together with our clients, we are designing customized solutions that impact the residents and businesses in the communities we serve, employees in the companies we serve and citizens of the world. You will find our clients across the United States, with evidence of our work in 42 states.

Water Treatment Capabilities

From pilot testing and treatment evaluations, through design and start-up of new water treatment facilities, SEH water treatment specialists find valuable solutions for communities and businesses. We've designed more than 60 drinking water treatment facilities in the past 10 years. Whether it is a 20 million gallon per day (mgd) surface water treatment facility or a 100 gallon per minute (gpm) well, our engineers design ways to address the challenges of each. Our water treatment services include:

- Arsenic removal
- Corrosion control
- Iron and manganese removal
- Lime and ion exchange softening
- Membrane filtration
- Nitrate removal
- Pilot studies
- Plant start-up and troubleshooting
- Plant assessments/capital improvements planning
- Radionuclide removal
- Surface water treatment
- Turbidity removal
- Ultraviolet (UV) disinfection
- Ozonation
- Volatile organic compound (VOC) removal and air stripping

Short Elliott Hendrickson Inc. (SEH®)

PROJECT MANAGER
Chris Larson, PE
651.765.2961
rsanford@sehinc.com

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3535 Vadnais Center Drive
St. Paul, MN 55110-3507
651.490.2000 | 888.908.8166 fax

sehinc.com

Short Elliott Hendrickson Inc.
Founded **1927**

Has grown to **32** locations

Simplifying complex challenges through **4** market areas: mobility, better places, clean water and renewing infrastructure

Employing **800+** engineers, architects, planners, scientists and talented professionals

An impressive **80%** of our clients are repeat customers

LEADERS IN DRINKING WATER

Clean, clear, reliable drinking water is one of the essential components to a healthy and enjoyable community.

Increasing customer demands, tougher regulations, vulnerability, maintenance, budget constraints and funding are continuing issues of concern. We can help address each one by providing a broad range of support for your water supply needs.

Experience in Design of Water Treatment Facilities

From comprehensive planning and treatment evaluations through design and start-up of new water facilities, our specialists customize solutions to your community's water needs. Our water treatment experience includes:

- Master planning and feasibility studies
- Pilot studies
- Computer modeling
- Wellhead and source water protection
- Water treatment
- Pumping stations
- Water storage
- Transmission and distribution
- Field investigations and testing
- Rate studies
- Financial/funding assistance
- SCADA systems

Financial Capabilities

Financial objectives in the drinking water industry are always changing, which makes successful planning more difficult and more important than ever. Today's water utilities need to consider the financial impacts of:

- Escalating costs of operational and infrastructure improvements
- Expanding regulatory and environmental forces from government and public interest groups
- Public demand for clean and affordable water

SEH can help water utilities stay financially viable by developing comprehensive capital improvements plan (CIP), cost of service analyses and cost-based rates structures. Financial management, capital finance planning, and rate setting have become critical tasks that demand tried and true financial skills. SEH water rate experts can help identify a utility's cost of providing utility service. This information allows you to determine equitable rates to be charged for water services, and allow a system to adequately recover costs associated with providing services in a reliable and effective manner.

SEH Pilot Filters – Biological Ammonia Removal

Funding Assistance

Water treatment facilities are highly intensive capital projects, often requiring communities to seek alternative means to finance much of the cost of the construction. Several funding mechanisms may be potentially available to the Sanitary District for financing some or all of the project. SEH's benefit to the District is that we know the funding programs and the staff that reviews the funding proposals. We understand the written and "unwritten" requirements. SEH will not waste the District's time or resources on non-productive opportunities. We have the capability to research many less well-known funding options, to maximize your project funding potential.

The SEH water team holds a high regard for the important decisions that federal, state and local funding agencies make every year.

We have a proven track record in successful grant writing and administration with Minnesota communities. Because of our specialization in grant writing, we work with all agencies and dozens of grant programs and can identify the most appropriate option for the City to pursue in financing needed public improvements.

RELEVANT EXPERIENCE // IRON AND MANGANESE TREATMENT

SEH has vast experience with iron and manganese treatment throughout many Minnesota and Wisconsin groundwater supplies . Our water treatment professionals have worked for many years under a strict QA/QC process that provides utilities with accurate assessment information and reliable solutions. SEH's hands on approach to water treatment is unique to the industry. We own and operate a pilot plant trailer that allows our water team to efficiently provide cost effective water treatment solutions. On the pages that follow, we have provided examples of similar projects for SEH team members who are earmarked for your water systems improvement projects.

SEH Iron and Manganese Removal Projects Completed Within Last 6 Years

Client	Year Complete	Treatment Capacity (mgd)
Thorp, WI	Ongoing	0.15
Cloquet, MN	Ongoing	1.4
Sussex, WI*	Ongoing	5.1
Hudson, WI	Ongoing	1.0
St. Joseph, MN	2018	1.0
Madison, WI	2017	3.6
Eau Claire, WI	2017	24
Gilbert, MN	2017	1.0
Savage, MN	2016	4.3

Client	Year Complete	Treatment Capacity (mgd)
Minnetrista, MN (North)*	2016	0.7
Minnetrista, MN (South)*	2016	1.4
Apple Valley, MN	2015	17.5
St. Louis Park, MN	2015	3.0
Wisconsin Rapids, WI	2014	3.0
MCF Stillwater, MN	2014	1.0
South Bend, IN	2014	10
Brooklyn Center, MN	2014	26
South Rivanna WTP, VA	2013	12

**Radium removal*

SEH Water Treatment Plant and Piloting Experience Projects

Wisconsin

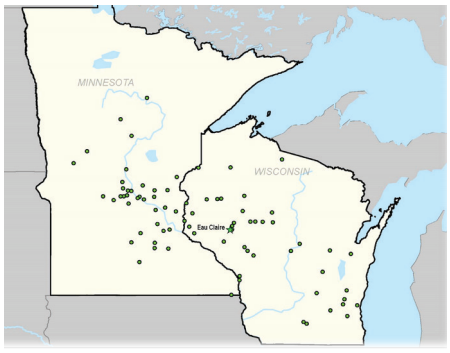
- Abbotsford (2.5 mgd)
- Chippewa Falls (3 mgd)
- Cornell (0.4 mgd)
- Eau Claire (24 mgd)
- Hartford (3 mgd)
- Hudson (1 mgd)
- Madison (3.6 mgd)
- Marshfield Utilities (3.3 mgd)
- North Shore Water Commission Port Washington (4 mgd)
- Superior Water (6 mgd)
- Sussex (5.1 mgd)
- Thorp (0.15 mgd)
- Whitehall (1.7 mgd)
- Wisconsin Rapids (7 mgd) Improvements Program

Minnesota

- Albany (4 mgd)
- Apple Valley (17.5 mgd)
- Brooklyn Center (26 mgd)
- Camp Ripley (2.5 mgd)
- Champlin (7 mgd)
- Chaska (2.6 mgd)
- Chaska (12.6 mgd)
- Cloquet (1.4 mgd)
- Eagan – Cliff Road (16.3 mgd)
- Eagan – Coachman Road (12 mgd)
- Fridley – Commons Park (10 mgd)
- Inver Grove Heights (6 mgd)
- Inver Grove Heights (6 mgd) Expansion
- Inver Grove Heights Rehabilitation
- Maple Grove (15 mgd)
- MCF Stillwater (1 mgd)
- Minnetrista North (0.7)
- Minnetrista South (1.4)
- North Branch (1.2 mgd)
- Plymouth (13 mgd)
- Plymouth (7 mgd)
- Richfield (14 mgd)
- Sartell North Plant (4 mgd)
- Sartell Southwest Plant (6 mgd)
- Savage (7.9 mgd)
- Savage (4.3 mgd)
- Spring Lake Park (2.9 mgd)
- St. Louis Park (3 mgd)
- St. Paul Regional Water Services (145 mgd) Program Management
- Virginia DPU (5 mgd) Renovation
- Waite Park (5.8 mgd) Improvement
- White Bear Lake (7.2 mgd) Lime Solids Handling Study
- Winona - Johnson Street Renovation (6 mgd)

Pilot Studies

- Anoka
- Apple Valley
- Aurora
- Blaine
- Brooklyn Park
- Cornell
- Easton
- Eau Claire
- Foley
- Gilbert
- Hackensack
- Lafayette
- La Crosse
- Ladysmith
- Madison
- Melrose
- North Branch
- Onalaska
- Onamia
- Ortonville
- Osseo
- Pelican Rapids
- Rib Mountain (San. Dist. No. 1)
- Richfield
- Savage
- Shoreview
- Slinger
- Stevens Point
- Sussex
- Waupun
- Whitehall
- Wisconsin Rapids



SEH Water Treatment Plant Planning and Implementation Work in Wisconsin and Minnesota

Water Treatment Plant

APPLE VALLEY, MN

Over the past 27 years, SEH team members have worked with the City of Apple Valley on their water treatment facility needs. Beginning in 1988, Miles Jensen delivered design and construction engineering services for the 12 mgd iron and manganese removal water treatment plant. In 1998, Miles served as project manager for an automated filter bypass that extended capacity of the facility to 17.5 mgd with blending. He also worked with the City on several miscellaneous projects and investigations related to their water treatment plant since its construction.

Currently, Miles is the program manager and Chris Larson the design engineer providing planning, design and construction services required to expand this iron and manganese removal plant to 24 mgd. Improvements include the addition of four concrete gravity filter with 6.5 mgd filtration capacity, two additional backwash tanks, upgrades to the existing filters and inlet distributors, adding a 15,000 square foot utility garage and shop and a municipal car wash. Remodeling and upgrades to the existing water treatment plant and offices were also included.

REFERENCE	Carol Blommel Johnson Utilities Superintendent 952.953.2441
SEH TEAM	Miles Jensen | Project Manager Chris Larson | Sr. Project Engineer

Faribault Water Treatment Plant

FARIBAULT, WI

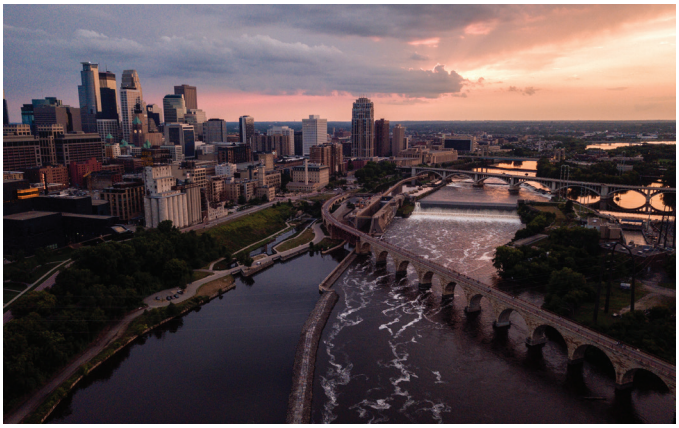
The City of Faribault has five water supply wells with elevated concentrations of iron. The City of Faribault recently had to replace all of its residential flow meters due to iron buildup. In addition to water quality concerns, some of Faribault's water infrastructure is old and in need of replacement including a 2 MG concrete reservoir constructed in the 1920s and a pumping station constructed in the 1930s.

In 2015, to assess the existing infrastructure and to evaluate options for removing iron from their drinking water, the City of Faribault hired SEH to prepare a water treatment plant feasibility report. The feasibility report identified that a pressure filter treatment plant would be a better option for Faribault due to high groundwater at the site and cost considerations. In 2018, SEH performed the detailed design of the water treatment plant. The project included design of a cost effective 8 MGD horizontal pressure filter treatment plant. The design includes demolishing the existing 2 MG reservoir and increasing the pressures of the 5 existing wells. This design provides a more efficient and operator friendly process. The water treatment plant is currently under construction.

REFERENCE	Travis Block Public Works Director 507.333.0365
SEH TEAM	Chris Larson | Project Manager Nick Brula | Mechanical Engineer Chad Westbrook | Electrical Engineer

Northwest Metro Water Study

METROPOLITAN COUNCIL ENVIRONMENTAL SERVICES (MCES) | ST. PAUL, MN



The capacity and future of existing groundwater supplies in the Northwest Metro may not be sufficient to meet future demands. To evaluate the feasibility of a joint surface water or groundwater drinking water system, the communities of Corcoran, Dayton, Ramsey, and Rogers decided to collaborate with MCES.

MCES retained SEH to complete a technical assessment of the capital and operational costs, as well as the potential benefits, of the following options:

- A joint surface water treatment plant taking water from the Mississippi River
- A joint groundwater treatment plant
- Governance and cost sharing options

The approaches ultimately evaluated in the study will not be prescriptive, but will serve as examples to stimulate future planning that could involve a hybrid of alternatives identified in the study, or in combination with water conservation measures and other sustainability approaches.

REFERENCE	Ali Elhassen, PE, PhD Metropolitan Council 651.602.1066
SEH TEAM	Chris Larson | Project Manager

Water Treatment Plant No. 1

CITY OF CLOQUET, MN

The City of Cloquet has manganese in its Well 8 that exceeds the Minnesota Department of Health's (MDH) recommendations. The City also utilizes a natural spring for a portion of its drinking water. The spring is currently classified as groundwater, but if it is determined that the spring is under the influence of surface water, Cloquet would need to treat this water or quit using it.

The City of Cloquet hired SEH to design a water treatment plant to remove the manganese from Well 8. The schedule for the project was extremely tight due to funding deadlines. In three months, SEH needed to prepare a feasibility study to determine the correct solutions and then do a full design of a water treatment plant. SEH investigated three water treatment plant sites and two treatment options (steel gravity and concrete gravity). The solution selected was a 1,000 gallon per minute concrete gravity filter treatment plant at Cloquet's Public Works site.

The water treatment plant processes include detention, dual media filtration, chemical feeds, a concrete clearwell and high service pumping. The water treatment plant also includes surface water treatment features, including filter to waste piping and valves, if it becomes necessary to treat water from the Spring Lake Reservoir.

REFERENCE	Caleb Peterson, PE Public Works Director – City of Cloquet 218.879.6758
SEH TEAM	Chris Larson | Project Manager Miles Jensen | Sr. Project Engineer Jeff Ledin | Sr. Project Engineer Chad Katzenberger | Hydraulic Modeling Engineer Nick Brula | Mechanical Engineer Chad Westbrook | Electrical Engineer

Water Treatment Plant No. 7

ELK RIVER MUNICIPAL UTILITIES
| ELK RIVER, MN

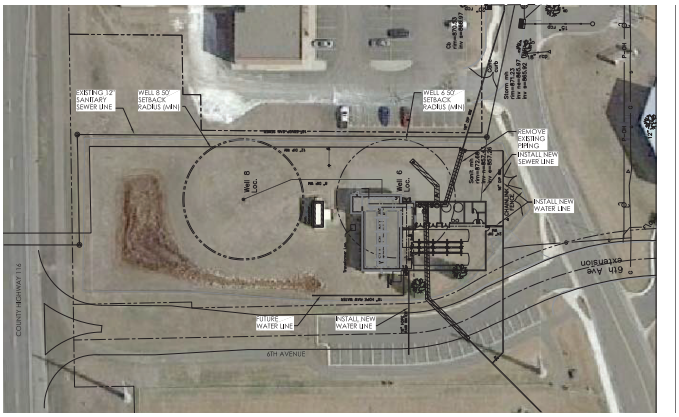
Water Treatment Plant No. 7 is a 1,000 gallon per minute steel pressure filter water treatment plant originally constructed in 2004. In 2006 modifications were made to the plant to allow for the treatment of an additional well. The current capacity of the treatment plant is not adequate for the concurrent treatment of both wells. Additionally, the water quality difference between the two wells is significant enough to prevent easily alternating the wells. To ensure the Utility is optimizing its water supply system, SEH was contracted to design an expansion that allowed for the treatment of both wells.

The expansion project included a 1,600-sq. ft. building addition, installation of 1,000 gpm pressure filter, fire suppression, chemical feed system upgrades, SCADA upgrades, and the associated electrical and mechanical work. The completed expansion will allow for the Utility to individually treat water from each well through a dedicated pressure filter.

REFERENCE	Erik Volk Utility Superintendent – New Brighton, MN 651.638.2119
SEH TEAM	Miles Jensen | Project Manager John Thom | Project Design Leader Nick Brula | Mechanical Engineer

Well No. 6 & 8 WTP Expansion

CITY OF ANOKA, MN



Anoka's Well 6/8 Water Treatment Plant is a 3,000 gpm (4.33 MGD) two-pressure vessel facility design for iron, manganese and radium removal. Due to increasing water demands and an apparent regulatory removal of Wells 1 & 2 from the City's production potential, the City of Anoka is faced with having to expand its Well 6/8 WTP to include proposed Wells 9 & 10. Before drilling the wells, the City decided to expand the WTP. The City contracted with SEH to complete a preliminary design study that laid out the scope of the facility expansion.

Currently, Miles serves as Project Manager on the design phase which will add two additional pressure filter vessels and increase the plant capacity to 6,000 gpm (8.6 MGD). The plant expansion will include all new chemical rooms, a laboratory and control and a new electrical room. The design phase is expected to be complete in February 2020.

REFERENCE	Pete Klingenberg Water & Sewer Supervisor 763.576.2923
SEH TEAM	Mark Wallis | Project Manager Chad Katzenberger | Water Modeling Engineer John Thom | Water Operations Specialist Kevin Young | Project Engineer Nick Brula | Mechanical Engineer Jeff Ledin | Water Engineer Melanie Niday | Project Scientist

Observatory WTP and South Rivanna WTP Improvements

RIVANNA WATER & SEWER AUTHORITY (RWSA) | CHARLOTTESVILLE, VA

Miles served as Project Manager for the Preliminary Engineering Report and Chris now serves as the Project Manager for the design project for improving two separate surface water treatment plants under one construction contract.

The capacity of the 5 mgd **Observatory WTP** is to be expanded to 10 mgd and include a new pretreatment chemical storage and feed building, renovation of the sedimentation basins considering lamella plate settlers, reconstruction of the 1953 filters and expansion of the intermediate pumping system, and the addition of 4.0 MGD of granular activated carbon (GAC) contactors and chlorine contact (CT) tank.

The 12 mgd **South Rivanna WTP** improvements will include the addition of two new 3 mgd filter cells, a new administration building, and miscellaneous treatment process and electrical power and SCADA improvements. The estimate cost of this combined improvements project is $35M.

REFERENCE	Dave Tungate Water Manager – RWSA 434.977.2970 x 155
SEH TEAM	Chris Larson | Project Manager Kevin Young | Project Engineer John Thom | Water Operations Specialist

Reverse Osmosis Softening Pilot Study

CITY OF LAKEFIELD, MN

SEH teamed with a reverse osmosis (RO) equipment manufacturer to conduct a 146 day pilot study to evaluate RO as a centralized water softening process. Centralized softening is being implemented in order to remove Point of Entry (POE) ion exchange water softeners that introduce chloride to the water during regeneration cycles. The primary driver for the project is a chloride limit in the wastewater treatment facility's NPDES/SDS permit. SEH completed the design for the RO system and pretreatment improvements to the existing WTP and the project is currently entering the bidding phase. Mass balance calculations show that a 99.8% reduction in chloride concentration will be achieved after ion exchange water softeners are removed within the City.

REFERENCE	Kelly Rasche Clerk 507.662.5457
SEH TEAM	John Thom | Water Operations Specialist Nick Brula | Mechanical Engineer Kevin Young | Project Engineer Chad Westbrook | Electrical Engineer

Biological Iron, Manganese and Ammonia Removal Pilot Study

CITY OF ONAMIA, MN

The City of Onamia obtains its water supply from two groundwater wells, which are both high in iron and manganese. The wells each have iron more than three times higher and manganese two times higher than the United States Environmental Protection Agency (US EPA) Secondary Standards. Additionally, the concentrations of ammonia in Well Nos. 3 and 4 are 2.7 mg/L and 7.2 mg/L, respectively. For comparison, past data collected by Minnesota Department of Health (MDH) suggests that more than 86% of Minnesota wells have ammonia concentrations less than 1.1 mg/L. The abnormally high levels of ammonia are of concern to both the City and MDH due to the higher risk of nitrification in the distribution system and difficulties maintaining a disinfectant residual. SEH was hired by the City to conduct a biological treatment pilot study to remove the ammonia, iron and manganese from their water. City staff is operating the pilot equipment. Recently, the pilot system was able to remove 10 mg/L of ammonia, nearly 50% of the raw water manganese, and iron to well below the 0.3 mg/L secondary standard.

REFERENCE	Josh True Water System Operator 320.630.6217
SEH TEAM	Jeff Ledin | Project Manager Kevin Young | Project Engineer John Thom | Water Operations Specialist

Water Treatment Plant

CITY OF GIBBON, MN

Poor water quality, an aging facility and limited space for expansion resulted in the City of Gibbon opting to design a new water treatment plant (WTP). The City's original WTP was an iron and manganese removal plant with aeration and gravity filtration. The water treatment equipment was housed within the City's jail, which was constructed in the early 1900s. Both the structure and the treatment equipment were in need of significant repairs, with the last major renovation – the rehabilitation of the steel gravity filters – completed more than 20 years prior.

SEH team members were involved in the planning design and construction services for a cost-effective concrete gravity filter plant to replace the existing WTP and enhance iron and manganese removal. The plants processes include aeration, concrete gravity filters, sodium hypochlorite feed, potassium permanganate feed, fluoride feed, a clearwell, and high service pumps. The project also included a complete upgrade of the plants SCADA system. Further adding to the complexity of the project, it was necessary for the WTP to fit on an existing single home lot adjacent to the existing water tower to minimize costs and reuse as much existing underground infrastructure as possible.

REFERENCE	Dana Lietzau City Administrator –City of Gibbon 507.834.6566
SEH TEAM	Chris Larson | Project Manager Chad Katzenberger | Project Engineer John Thom | Water Operations Specialist

On-Site Sodium Hypochlorite Generation System

CITY OF NEW ULM, MN

In 2017, SEH began working with New Ulm Public Utilities on a Preliminary Engineering Report to install an On-Site Sodium Hypochlorite Generation System at the WTP to replace an existing gaseous chlorine feed system. Design of the system began in 2018 and it went online in late 2018. The system was designed to utilize existing chemical containment bunkers within the WTP's chemical feed room for the salt brine tank and sodium hypochlorite storage tanks. The sodium hypochlorite generation and feed equipment was installed between the bunkers.

Through past experience, plant operators have found that chlorine cannot be added to the water until after it is pumped out of the clearwell on its way to the distribution system. They have found that the chlorine present in the backwash water damages the "bugs" in the filter, which is detrimental to their treatment of iron, manganese, and ammonia.

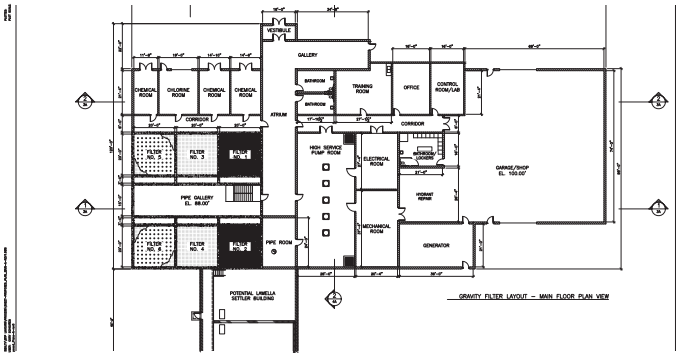
SEH paid particular attention to the sodium hypochlorite feed locations for the project. In order to provide operational flexibility, two (2) post-aeration chlorine feed points were installed in case a decision is made to abandon biological treatment. However, the primary chlorine feed point is into the high service pump discharge header. Since water is pumped out of the clearwell into the distribution system at approximately 65 psi, high pressure peristaltic hose pumps were required to pump the sodium hypochlorite into the pipeline. The hose pumps have been operating since early 2019, and have required little maintenance after the initial start-up.

REFERENCE
George Brown
Water/District Energy Dept. Supervisor
507.233.2132

SEH TEAM
Jeff Ledin | Project Manager
Kevin Young | Project Engineer
Chad Katzenberger | Project Engineer

Water Treatment Plant Feasibility Study

CITY OF BROOKLYN CENTER, MN



The City of Brooklyn Center has nine water supply wells with concentrations of manganese ranging from 0.23 milligrams per liter (mg/L) to 0.59 mg/L. In addition to causing aesthetic problems, the Minnesota Department of Health has issued health guidance values for manganese of 0.1 mg/L for bottle fed infants and 0.3 mg/L for children and adults.

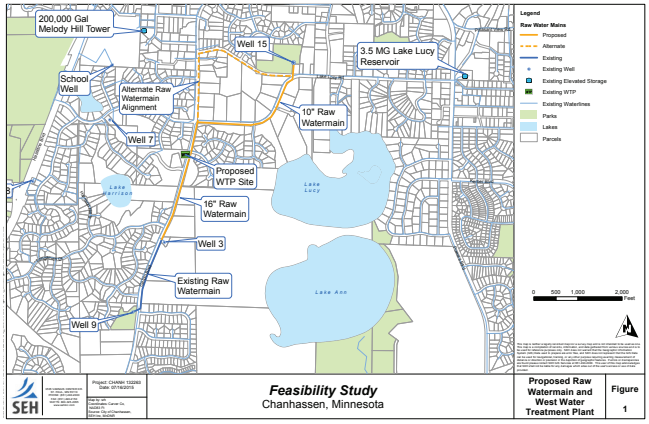
To evaluate options for removing manganese from their drinking water, the City of Brooklyn Center hired SEH to prepare a water treatment plant feasibility report.The team worked closely with City staff to prepare treatment plant design layouts that met the City's needs and provided an operator friendly and efficient layout. In addition, SEH conducted a pilot study on the City's water to verify the optimal treatment process. The feasibility report identified treatment options and backwash water processing options. The report provided building layouts, site layouts, raw water main routing, and renderings of the alternatives. The report evaluated the alternatives based on advantages/disadvantages, construction costs, and life cycle costs. The final report allowed the City to make informed decisions on their water treatment options based on a thorough evaluation of the alternatives.

REFERENCE
Mark Hatfield
Public Utilities Supervisor
763.585.7103

SEH TEAM
Miles Jensen | Project Manager
Chris Larson | Senior Project Engineer

West Water Treatment Plant Feasibility Study

CITY OF CHANHASSEN, MN



In 2015, the City of Chanhassen contracted with SEH to prepare a feasibility study for their proposed West Water Treatment plant. Miles served as project manager where the basis of design for the facility was iron and manganese removal. The capacity of the facility is 6,000 gpm (8.6 MGD). Siting of the facility was selected to allow dual-zone pumping into the City's high pressure Western zone as well as its low pressure East Zone.

The project also included water system modeling by Chad to identify pumping heads for each pressure zone from the selected site. The estimated cost of the proposed WTP construction project was $13.8M and 20-year and 50-year present worth analyses were performed to assist the City with capital cost recovery through bonding and O&M costs through water rate adjustments.

REFERENCE	Paul Oehme Lakeville Director of Public Works 952.985.2701
SEH TEAM	Chad Katzenberger | Water Modeling Engineer

Personnel Qualifications and Relevant Experience

Chris Larson PE

PROJECT MANGER

Chris is a civil and environmental project manager/engineer with extensive experience in development, design, construction and management of a wide variety of projects. His experience covers pilot studies and testing, preliminary engineering studies, design, construction administration, project management and startup and training for water treatment and supply projects. Chris has also provided facility planning, design and construction administration of major sanitary sewer interceptors. He serves as the engineer for the Joint Powers Water Board of St. Michael, Albertville and Hanover, overseeing all of the engineering aspects of a water utility.

- Water Treatment Plant Expansion – City of Apple Valley, MN
- Water Treatment Plant – City of Faribault, MN
- Water Treatment Plants – City of Minnetrista, MN
- Water Treatment Plant No. 1 – City of Cloquet, MN
- NW Metro Water Study (Metropolitan Council Environmental Services) – St. Paul, MN
- Gibbon Water Treatment Facility – City of Gibbon, MN
- Observatory Water Treatment Plant Improvements (Rivanna Water & Sewer Authority) – Charlottesville, VA

EDUCATION

Master of Science
Environmental Engineering
University of Minnesota-Minneapolis

Bachelor of Science
Environmental Engineering
Michigan Technological University-Houghton

REGISTRATIONS

Professional Engineer in Minnesota

24+

years of experience

Miles Jensen PE

PRINCIPAL, QA/QC

Miles is a water treatment expert with 35 years of engineering experience as a project manager, client service manager and water discipline leader. Miles specifically specializes in advanced water treatment facility process design, construction management and plant start-up. Miles' experience includes master planning for ground and surface water systems, including enhanced coagulation, lime softening and ion exchange processes for iron, manganese, arsenic, radium, volatile organic compound (VOC) removal and DBP control.

- Chanhassen, MN West WTP Feasibility Study (8.6 MGD)*
- Brooklyn Center, MN WTP Feasibility Study (10 MGD)*
- Elk River, MN Well 7 Filter Addition (2.0 MGD)P*
- Anoka, MN Wells 6/8 WTP Expansion (5.6 MGD)P*
- Fridley - Locke Park WTP Renovation and Backwash Tank addition(2.0 MGD)P
- Savage, MN WTP #2 Renovation and Addition (4.3 MGD)*
- Eau Claire, WI WTP Filter Renovation and Pretreatment Expansion (30 MGD)*
- Sussex, WI Well 4 (1 MGD) P* WTP
- Sussex, WI Well 5 (1 MGD) P* WTP
- Sussex, WI Well 8 (2 MGD) P* WTP
- South Bend, IN - Pinhook WTP Renovation (10 MGD)*

EDUCATION

Bachelor of Science
Civil Engineering
University of Minnesota-Minneapolis

REGISTRATIONS

Professional Engineer in Minnesota, Wisconsin, Michigan, Indiana, Illinois, Iowa, Nebraska, North Dakota, South Dakota, Colorado, and Virginia

35+

years of experience

Jeff Ledin PE

CIVIL ENGINEER/SOURCE WATER ANALYSIS

Jeff is a professional engineer with extensive experience, especially in the area of public water systems engineering. Jeff brings a strong technical background including many years in highway/heavy construction supervision experience. He has worked on all phases of municipal engineering projects throughout Minnesota. The scopes of his work have included project development, preliminary design, client contact, permitting, design and construction. He has served as client contact for several communities with good success due to verbal and written communication skills.

- Well 9 and Water Treatment Plant 6/8 – City of Anoka, MN
- Water System Plan and Pilot Testing – City of Foley, MN
- Locke Park Water Treatment Plant Improvements – City of Fridley, MN
- Water Treatment Plant Filter Rehabilitation – City of Lafayette, MN
- Water Treatment Plant Improvements – Town of Lowell, MN
- Ammonia, Iron and Manganese Removal Pilot Study – City of Onamia, MN
- Water Treatment Plant Expansion – City of Apple Valley, MN
- Water Treatment Plant Rehabilitation – City of Pelican Rapids, MN

EDUCATION

Bachelor of Science
Civil Engineering
University of Colorado - Denver

REGISTRATIONS

Professional Engineer in Minnesota, Colorado, North Dakota, South Dakota, Missouri, Iowa, Wisconsin, Indiana, Nevada, Arizona, Wyoming

22+

years of experience

Mark Wallis PE, CCS, CCCA, CDT

CIVIL ENGINEER/SOURCE WATER ANALYSIS

Mark is a senior professional engineer with extensive experience working with a wide variety of multidiscipline water projects, including water system master planning, wells, water treatment, water booster stations and water towers. Mark's specialty is providing long-range planning for communities to help them prioritize and phase system improvements. A passionate listener and communicator, Mark's goal on each project is to understand the specific needs and desires of the client, effectively communicate alternatives, and develop solutions that meet their needs and budgets. I

- Lakewood Water Treatment Plant Control Filter – City of Duluth, MN
- Water Treatment Plants 1/2 and 6/8/9 Renovations – City of Anoka, MN
- Operational Evaluation Water Treatment Facility (Tower-Breitung Wastewater Board) – Tower, MN
- East Mesabi Joint Water System Preliminary Engineering Report – City of Biwabik, MN
- Water System Model – City of Moose Lake, MN
- Well No. 12 and Pump Building Construction – City of Cottage Grove, MN
- Surface Water Treatment Pilot Study – City of Aurora, MN

EDUCATION

Bachelor of Science
Civil Engineering
University of Wisconsin - Platteville

REGISTRATIONS

Professional Engineer in Minnesota and Wisconsin

Construction Documents Technology (CDT) (1994),

Certified Construction Contract Administrator (CCCA)

Certified Construction Specifier (CCS)

All through the Construction Specifications Institute

Melanie Niday PE

ENVIRONMENTAL ENGINEER/SOURCE WATER ANALYSIS

Melanie is a project manager and hydrogeologist with extensive experience in permitting, hydrogeological investigations, and groundwater monitoring. Her experience includes aquifer studies, solid waste permitting, environmental assessment worksheets (EAW), and environmental impact statements (EIS), as well as wetland assessments, remedial investigations, and remedial action plans.

- Surface Water Treatment Pilot Study – City of Gilbert, MN
- Aquifer Study – City of Little Falls, MN
- Wellhead Protection Plan – City of Vadnais Heights, MN
- Hydro Services for Design and Implementation of Groundwater Monitoring – Rock County, MN
- Aquifer Study – City of Cold Springs, MN
- North Post Wells (US Army - Fort McCoy) – Fort McCoy, WI
- Wellfield Assessment (City of New Ulm) – New Ulm, MN
- Remedial Services – Minn-Dak Farmers Cooperative, Wahpeton, ND
- Aquifer Study – Minnesota Energy, Buffalo Lake, MN
- Aquifer Study – Great River Energy, South Heart, ND

EDUCATION

Bachelor of Science
Geology
North Dakota State University-Fargo

REGISTRATIONS

Professional Geologist in Minnesota and Wisconsin

31+

years of experience

Chad Katzenberger PE

MODELING ENGINEER

Chad is a lead process engineer with 14 years of process piping design, water hydraulics, water treatment and construction experience. Chad's responsibilities include leading a multidisciplined group of civil, mechanical and electrical engineers as well as architects and landscape designers. Chad's most recent work included the Unit Well 31 Facility Design and Unit Well 12 where he led the water treatment plant process design, report preparations, REVIT modeling and quality control of hydraulics and SCADA.

- Water Model Construction and Analysis – City of Gaylord, MN
- Feasibility Study for Water Quality and Water Supply – City of Gilbert, MN
- Well 4 and Well 5 Water Treatment Plants – Village of Sussex, WI
- Water Treatment Facility Renovation – City Savage, MN
- Well 31 Facility Design (Madison Water Utility) – Madison, WI
- Unit Well 12 Upgrade and Conversion to a Two Zone Well (Madison Water Utility) – Madison, WI
- Pinhook Water Treatment Plant Rehabilitation (South Bend Water Works) – South Bend, IN

EDUCATION

Bachelor of Science
Civil Engineering
University of Minnesota-Minneapolis

REGISTRATIONS

Professional Engineer in Minnesota

15+

years of experience

John Thom

WATER OPERATIONS SPECIALIST

John is a water and wastewater operations specialist with extensive experience in project management, plant studies, plant start-up, maintenance manuals, operation procedures manuals, water and wastewater operator training. He is also the wastewater and water treatment pilot plant designer and operator. His many years of treatment experience with iron and manganese as well as his first-hand knowledge starting up over 20 similar facilities will be critical to the City of Ramsey's water quality and pilot study report review. John has been recognized for outstanding performance in the water and wastewater industry by numerous professional organizations. Prior to joining SEH, John was the Public Works Superintendent for the City of Pelican Rapids, a Vocational Instructor for the state of Minnesota and a Utility Coordinator for the City of Richfield.

- Pilot Study and Alternatives Analysis (Rib Mountain Sanitary District No. 1) – Town of Rib Mountain, WI
- Feasibility Study for Water Quality and Water Supply – City of Gilbert, MN
- Well 4 and Well 5 Water Treatment Plants – Village of Sussex, WI
- Water Treatment Facility Needs Assessments – City of Eau Claire, WI
- Well 31 Facility Construction (City of Madison Water Utility) – Madison, WI

EDUCATION

Certificate Technical Teaching
University of Minnesota-Minneapolis

REGISTRATIONS

Water Operator, Class A, Minnesota Department of Health

54+

years of experience

Kevin Young PE

PROCESS ENGINEER

Kevin's unique perspective as both an operations specialist and a professional engineer mean that he knows what does and doesn't work in the real world and also the constructability review process to develop integrated solutions that reduce project risks and achieve project goals. He served as a WTP operator, engineer and supervisor at a 10 mgd lime softening facility for Moorhead Public Service. His operations experience also includes ozone disinfection, biological filtration, chlorination and high service pumping. He is passionate about the environment and our responsibility to provide clean water to everyone. He is experienced with Supervisory Control and Data Acquisition (SCADA) operation, ArcGIS, with basic knowledge of InfoWater and AutoCAD.

- Water Treatment Plant No. 1 – City of Cloquet, MN
- WTP No. 1 Rehabilitation and Biological Treatment Optimization – City of St. Joseph, MN
- Iron and Manganese Removal Pilot Study – City of Gilbert, MN
- Ammonia, Iron and Manganese Removal Pilot Study – City of Onamia, MN
- Reverse Osmosis Softening Pilot Study – City of Lakefield, MN
- North Rivanna Water Treatment Plant - HSP Replacement (Rivanna Water & Sewer Authority) – Charlottesville, VA

EDUCATION

Master of Science
Civil Engineering
North Dakota State University-Fargo

Bachelor of Science
Civil Engineering
North Dakota State University-Fargo

REGISTRATIONS

Professional Engineer in Minnesota

Water Supply System Operator, Class A (MN)

8+

years of experience

Chad Westbrook PE

ELECTRICAL ENGINEER

Chad is an electrical engineer with experience that includes preparation of studies, construction drawings and construction administration. He is also an experienced project manager who has been responsible for project budget, scope and schedule for many of these projects. Chad has prepared construction drawings and specifications and provided construction administration through all project phases. The types of projects he has worked on include boiler and chiller facilities, higher education facilities, industrial facilities, water and wastewater treatment facilities, SCADA and public works buildings. Chad's technical experience includes facility power distribution and generation systems; facility and outdoor lighting; fire alarm detection and notification; communication systems; and security systems.

- Water Treatment Plant No. 1 – City of Cloquet, MN
- Crozet Water Treatment Plant Improvements (Rivanna Water & Sewer Authority) – Charlottesville, VA
- Water Treatment Plant – City of Faribault, MN
- North Rivanna Water Treatment Plant - HSP Replacement (Rivanna Water & Sewer Authority) – Charlottesville, VA
- Water Treatment Plant Phase II Improvements – City of Eau Claire, WI
- Reverse Osmosis Softening Pilot Study – City of Lakefield, MN
- Water Treatment Plant – City of Gibbon, MN

EDUCATION

Bachelor of Science
Electrical Engineering
Michigan Technological University

REGISTRATIONS

Professional Engineer in Alabama, Kentucky, Minnesota, North Dakota, Oklahoma, South Dakota, Texas, Virginia and Wisconsin

23+

years of experience

Nick Brula PE

MECHANICAL ENGINEER

Nick has extensive experience in the mechanical and construction engineering field. Nick has worked with energy analysis/modeling and ASHRAE 90.1 appendix G. He is experienced in every phase of HVAC project development, including initial cost estimation, facility analysis, system design and construction administration. Nick has helped design and oversee the construction of several industrial HVAC projects, including chiller replacements, boiler upgrade and replacements, constant volume and VAV systems, variable refrigerant flow systems, water and wastewater treatment facilities and plumbing upgrades. He is proficient in load calculation and modeling programs such as Carrier HAP and Trane Trace 700 as well as AutoCAD and Revit MEP.

- Water Treatment Plant – City of Faribault, MN
- Water Treatment Plant Filter Rehabilitation and Two New Production Wells – City of Eau Claire, WI
- Water Treatment Plant No. 10 – City of Hudson, WI
- Water Treatment Plant No. 1 – City of Cloquet, MN
- Reverse Osmosis Softening Pilot Study – City of Lakefield, MN
- Observatory Water Treatment Plant Improvements (Rivanna Water & Sewer Authority) – Charlottesville, VA
- Water Treatment Plants – City of Minnetrista, MN
- Wells 4, 5 and 8 Water Treatment Plants – Village of Sussex, WI

EDUCATION

Bachelor of Arts
Physics
St. John's University - Collegeville, MN

Bachelor of Mechanical Engineering
University of Minnesota-Minneapolis

REGISTRATIONS

Professional Engineer in Wisconsin, Colorado, Iowa, Indiana, Minnesota, North Carolina, New Jersey, South Dakota and Virginia

15+

years of experience

Kristin Peterson AICP, NCI, LEED AP®

PUBLIC INCOLVEMENT SPECIALIST

Kristin holds a Masters degree in Architecture, is an AICP certified planner, and is certified by the National Charrette Institute. She has a broad range of experience in community and transportation planning. Kristin's extensive public involvement experience includes creating design workshop tools, facilitating public meetings, preparing online and community preference surveys, holding design charrettes and conducting workshops for clients and project stakeholders. She brings a background focused on identifying and managing community concerns and conflicts, and documenting, writing and providing graphic design for the preparation of project planning reports. Her design work includes development of hands-on site models, 3D printed prototypes, and physical demonstration models to convey technically rich information in a format that is accessible to all ages, abilities, and communication styles.

Kristin has more than 13 years of experience developing and implementing stakeholder communications and outreach strategies on the following projects:

- TH 53 and Garfield Layouts for Twin Ports Interchange (Minnesota Department of Transportation District 1) – Duluth, MN
- Comprehensive Parks System Master Plan – Little Canada, MN
- South Hennepin, Franklin to Lake Streets – Minneapolis, MN
- US 63 Mississippi River Bridge Visual Quality – Red Wing, MN
- St. Anthony Parkway Bridge – Minneapolis, MN
- West Lake Multimodal Station – Minneapolis, MN
- Numerous infrastructure projects throughout the state

EDUCATION

Master of Architecture
Architecture
Pratt Institute - Brooklyn, NY

Bachelor of Arts
Philosophy
Creighton University - Omaha, NE

REGISTRATIONS

AICP (2015), American Institute of Certified Planners

Charrette System Certified (2014), National Charrette Institute

LEED AP (2009), U.S. Green Building Council

13+

years of experience

Task Hour Budget

TASK	DESCRIPTION OF TASK	SEH Labor Hours Total	SEH Labor Task Fees Total	SEH ODC Task Fees Total	Subs Task Fees Total	Task Fees Total	LARSON (Project Manager)	MARTIN (Process Project Engineer)	KARNS (Process Lead Tech)	KATZENBERGER (Process Hydraulics Engineer)	YELLE (Process Hydraulics Engineer)	HANSON KOONTZ (Process Tech)	JENSEN (SR. Process Engineer - QC)	NIDAY (Sr Scientist - Geology)	SHERRILL (Scientist - Geology)	BERGERSON (Civil Project Engineer)	FRICK (Project Architect)	EXPENSES			
																		Mileage Auto			
																		Unit	Total	Printing, Postage, etc…	Total
1	**PROJECT INITIATION**																				
	Kickoff Meeting (Meeting No. 1)	16	$1,947	$204	$0	$2,150	2	2		2	2	6		2				354	$204		203.55
	Data Collection	10	$1,332	$0	$0	$1,332	2	6						2					$0		-
	Project Initiation Subtotal	**26**	**$3,279**	**$204**	**$0**	**$3,483**	**4**	**8**	**0**	**2**	**2**	**6**	**0**	**4**	**0**	**0**	**0**			**$0.00**	**$203.55**
2	**ANALYZE SOURCE WATER**																				
	Analyze Aquifer Accessibility	19	$2,021	$0	$0	$2,021								3	16				$0		-
	Analyze Aquifer Capacity	19	$2,021	$0	$0	$2,021								3	16				$0		-
	Analyze Source Water Chemistry	12	$1,464	$0	$0	$1,464	1							3	8				$0		-
	Analyze Aquifer Limitations	11	$1,248	$0	$0	$1,248								3	8				$0		-
	Summarize Results	20	$2,237	$0	$0	$2,237	1							3	16				$0		-
	Meet with City Staff (Meeting No. 2)	4	$748	$82	$0	$830	2							2				142	$82		81.65
	Analyze Source Water Services Subtotal	**85**	**$9,738**	**$82**	**$0**	**$9,820**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**64**	**0**	**0**			**$0.00**	**$81.65**
3	**DEVELOP WATER MODEL**																				
	Demand Analysis																				
	Data Collection (GIS, Mapping, Demand Data, Facility Data)	5	$590	$0	$0	$590				3	2								$0		-
	General Project Management & Coordination	3	$421	$0	$0	$421				3									$0		-
	Historical Demand Analysis	2	$169	$0	$0	$169					2								$0		-
	Review current and future service area population forecasts and update water demand projections over the planning period.	4	$449	$0	$0	$449				2	2								$0		-
	Collect available current demographic data and planning forecasts for the identified service area based on the City's Comprehensive Plan.	2	$169	$0	$0	$169					2								$0		-
	Collect and review water demand data information including billing (AMI), SCADA pumping records, DNR annual reports, other historical data sources, and other available planning and engineering reports	3	$253	$0	$0	$253					3								$0		-
	Demand Analysis: Develop unit demands (gallons/day/unit) to be used for projecting future water requirements.□	2	$169	$0	$0	$169					2								$0		-
	Develop peaking factors for maximum day (MD), maximum hour (MH), average day (AD), average summer day (ASD), and average winter day (AWD).□	2	$169	$0	$0	$169					2								$0		-
	Forecast future average day demand in 5-year increments starting with year 2020 and going through year 2040.	2	$169	$0	$0	$169					2								$0		-
	Develop 10 max day (MD10) use patterns for modeling purposes.	2	$169	$0	$0	$169					2								$0		-
	Meet with City Staff (Meeting No. 3)	4	$713	$153	$0	$866	2			2								266	$153		152.95
	Evaluation																				
	Model Construction from GIS	3	$239	$0	$0	$239				0.5	2								$0		-
	Elevation Update to water model	1	$84	$0	$0	$84					1								$0		-
	Model Facility Update(Wells, Tanks)	3	$239	$0	$0	$239				0.5	2								$0		-
	Historical DemandReview	1	$84	$0	$0	$84					1								$0		-
	Water System Demand Allocation & Distribution	2	$169	$0	$0	$169					2								$0		-
	Desktop preliminary Calibration, Project Setup	3	$309	$0	$0	$309				1	2								$0		-
	ArcMap Online Setup (Field Data Collection)	3	$365	$0	$0	$365				2	1								$0		-
	Deploy & Retrieve Telogs (2 weeks of data collection)	4	$562	$0	$0	$562				4									$0		-
	Field Flow Testing (One Day)	8	$674	$173	$0	$847					8							300	$173		172.50
	Pump Capacity Analysis - Field Testing/Review	3	$239	$0	$0	$239				0.5	2								$0		-
	Facility Review (Collect SCADA Data, field test, 2 weeks)	1	$70	$0	$0	$70				0.5									$0		-
	Micro and Macro Field Testing Data Compilation	2	$155	$0	$0	$155				0.5	1								$0		-
	Develop water system diurnal demand curves	2	$155	$0	$0	$155				0.5	1								$0		-
	Develop and Incorporate water model controls	3	$239	$0	$0	$239				0.5	2								$0		-
	Calibration of Model w/ field data	13	$1,082	$0	$0	$1,082				0.5	12								$0		-
	Calibration Results Summary	3	$239	$0	$0	$239				0.5	2								$0		-
	Conduct a Supply Capacity Analysis	3	$239	$0	$0	$239				0.5	2								$0		-
	Conduct a Storage Volume Capacity Analysis	3	$309	$0	$0	$309				1	2								$0		-
	Conduct a Pumping Capacity Analysis	3	$309	$0	$0	$309				1	2								$0		-
	Fire Flow Capacity Analysis	3	$309	$0	$0	$309				1	2								$0		-
	Emergency Operations Analysis	4	$323	$0	$0	$323				0.5	3								$0		-
	(90% Draft) Develop Hydraulic Analysis Report	7	$758	$0	$0	$758				3	4								$0		-
	Identify and Classify System Deficiencies (Hydraulic Capacity, Fire Flow, Storage, Growth, Water Quality, Pipeline repair, upgrade or replacement, admin and support, other)	5	$590	$0	$0	$590				3	2								$0		-
	Final Hydraulic Analysis Report																				
	Prepare Final Hydraulic Analysis Report	21	$2,126	$0	$0	$2,126	1			4	16								$0		-
	Meet with City Staff (Meeting No. 4)	4	$713	$153	$0	$866	2			2								266	$153		152.95
	Develop Water Model Services Subtotal	**134**	**$14,016**	**$478**	**$0**	**$14,495**	**5**	**0**	**0**	**37.5**	**91**	**0**	**0**	**0**	**0**	**0**	**0**			**$0.00**	**$478.40**
4	**PREPARE PRELIMINARY DESIGN REPORT**																				
	Select a Water Source	10	$1,211	$0	$0	$1,211	2	8											$0		-
	Develop Treatment Goals	11	$1,440	$0	$0	$1,440	2	8					1						$0		-
	Explore Available Treatment Options	11	$1,440	$0	$0	$1,440	2	8					1						$0		-
	Summarize Advantages/Disadvantages of Each Option	6	$822	$0	$0	$822	2	4											$0		-
	Select Preferred Treatment Option	5	$606	$0	$0	$606	1	4											$0		-
	Develop Preliminary Centrailzed Treatment Facility Layout	51	$6,048	$0	$0	$6,048	2	16	24				1				8		$0		-
	Select Preferred Site	12	$1,464	$0	$0	$1,464	2	2								8			$0		-
	Meet with City Staff (Meeting No. 4)	4	$627	$31	$0	$658	2	2										54	$31		31.05
	Calculate Estimated Construction and Operational Costs	6	$835	$0	$0	$835	1	4					1						$0		-
	Review Existing Water Rate Structure and Recommend Revisions	6	$822	$0	$0	$822	2	4											$0		-
	Explore Alternative External Funding Sources	3	$411	$0	$0	$411	1	2											$0		-
	Prepare Draft Report	31	$3,616	$0	$0	$3,616	4	24				2	1						$0		-
	Meet with City Staff (Meeting No. 6)	4	$627	$31	$0	$658	2	2										54	$31		31.05
	Prepare Final Report	8	$1,006	$0	$0	$1,006	2	4				2							$0		-
	Attend City Council Meeting to Present Final Report with City Staff (Meeting No. 8)	2	$432	$31	$0	$463	2											54	$31		31.05
	Preliminary Design Report Services Subtotal	**170**	**$21,406**	**$93**	**$0**	**$21,499**	**29**	**92**	**24**	**0**	**0**	**4**	**5**	**0**	**0**	**8**	**8**			**$0.00**	**$93.15**
5	**PUBLIC EDUCATION/ENGAGEMENT PLAN**																				
	Web-Based Communications	3	$411	$0	$0	$411	1	2											$0		-
	Develop FAQs for uploading	7	$800	$0	$0	$800	1	6											$0		-
	Attend Open House (Meeting No. 7)	4	$627	$31	$0	$658	2	2										54	$31		31.05
	Prepare and upload responses to Customer Fedback	5	$606	$0	$0	$606	1	4											$0		-
		0	$0	$0	$0	$0													$0		-
		0	$0	$0	$0	$0													$0		-
		0	$0	$0	$0	$0													$0		-
		0	$0	$0	$0	$0													$0		-
		0	$0	$0	$0	$0													$0		-
	Public Education/Engagement Plan Services Subtotal	**19**	**$2,444**	**$31**	**$0**	**$2,475**	**5**	**14**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**			**$0.00**	**$31.05**
	GrandTotal:	**434**	**$50,883**	**$888**	**$0**	**$51,771**	**47**	**114**	**24**	**39.5**	**93**	**10**	**5**	**21**	**64**	**8**	**8**	**327.5**	**$188**	**$0.00**	**$887.80**