



Building Communities.
Improving Lives.

Pump Station Master Plan

PROPOSAL FOR

Professional Engineering Services

NOVEMBER 17, 2021



Highland



West Side



Hazel Park

Adam Salo, PE

Court International Building
2550 University Ave W
Suite 400N
St. Paul, MN 55114-2015

Direct 651.271.3439
asalo@hrgreen.com





▶ 2550 University Avenue West | Suite 400N
St. Paul, MN 55114
Main 651.644.4389 + **Fax** 713.965.0044
▶ HRGREEN.COM

November 17, 2021

St. Paul Regional Water Services
1900 Rice Street
St. Paul, MN 55113

RE: RFP – Professional Engineering Services for Pump Station Master Plan

Dear Selection Committee Members:

HR Green's St. Paul based Professional Engineering and Technical Team is pleased to respond to St. Paul Regional Water Services' (SPRWS) Request for Proposals for the Pump Station Master Plan. We also acknowledge the receipt of Addendum #1, dated November 10, 2021.

Over the past several years, SPRWS has been replacing equipment and making upgrades at many of their pumping stations. This has greatly improved the reliability and operability of these facilities. Hazel Park and West Side (the two largest stations downstream of the McCarrons WTP) had electrical and pumping upgrades designed by HR Green. During both of these projects, SPRWS and the HR Green design teams discussed approaching the upgrade projects from a higher-level perspective instead of focusing just on the electrical gear. At the West Side station, the design team did address transient pressures, pump efficiency, service voltage concerns. SPRWS elected to upgrade the pumps from the original 1961 units running on 2400V. The design included new 480V pumps with significantly lower horse powers that will maintain a similar flow rate.

This Pump Station Master Planning process will allow SPRWS to effectively evaluate all of their pumping stations' needs, not just electrical and pumping equipment that is beyond its useful design life. A holistic evaluation of building deficiencies, necessary site upgrades, piping and valve conditions, basic security concerns, electrical systems and pump efficiency/requirements will allow us to provide SPRWS with a capital improvement plan (CIP) that categorizes the most critical needs so they can be addressed first.

In order to achieve SPRWS' project goal, HR Green has assembled a Local Team of experienced technical staff who will exceed your expectations for the delivery of the project tasks. As such, we respectfully submit for your consideration the following highlights addressing your selection criteria, which will be presented in more detail in the our comprehensive professional services proposal.

- **Unsurpassed Local Team Experience and Qualifications** – HR Green proposes a similar project team that delivered the successful Hazel Park Pump Station upgrades and the current West Side Pump Station Project. We have strengthened our team with the addition of **Mark Hardie, P.E.** (with over 25 years of experience). Our seasoned Project Team are St. Paul based and include: **Adam Salo, P.E.** serving as our Project Manager with 20 years of experience, **Bob Thayer, P.E.**, with over 44 years of experience, **Verne Jacobsen** with over 60 years of experience (including 34 years with SPRWS), and **Dennis Neumann** with 39 years of experience. **Bob Russek** of IMO Consulting Group (an MBE/SBE subconsultant) will perform the architectural assessment and brings over 43 years of experience.
- **Uniquely Related Company Project Experience** – HR Green's Related Experience found in Section 3 is the collective experience of our proposed St. Paul Based Project Staff. Most notable are the West Side and Hazel Park Pump Stations electrical rehabilitation projects where we examined many similar issues to be addressed in this Master Plan. Our project experience demonstrates our ability to provide the local resources necessary to achieve the desired results. Many other projects, including the ones shown, exhibit HR Green's exceptional ability to develop master plans and CIPs for major drinking water facilities.

- **Detailed Explanation of Approach to Meet Project Goals of Request for Proposals** – HR Green fully understands the results SPRWS wants to achieve. We believe our Proposal is in full support of your requested Scope of Services and related tasks. The key to the success of this project will be HR Green’s partnering and close interaction with SPRWS’ stakeholders from project kick-off through development of the final CIP. Early in the project, consensus will be built regarding the project mission and critical success factors. Issues will be addressed and successfully resolved in a timely manner throughout the data gathering and plan development.
- **Most Appropriate Proposal Cost** – Our goal is to provide SPRWS with the best value which may not be the lowest engineering services fee but rather better value in terms of providing the most appropriate fee for the professional engineering services required to meet SPRWS’ project goal. We have provided SPRWS with a time and materials not-to-exceed cost, which includes all labor, charges and expenses related to the proposed Project Scope. This cost is in full support of SPRWS’ requested Scope of Services and Project Timeline, HR Green’s Proposed Project Approach and itemized staff hours of effort.

We look forward to working with your Team on this important project. Please do not hesitate to contact Adam Salo at (651) 659-7748 or Verne Jacobsen at (651) 659-7713, if you have any questions or require additional information.

Respectfully submitted,

HR GREEN, INC



Adam Salo, PE
Project Manager

Table of Contents

Overall Proposal Suitability	Tab 1
Cost (Submitted as a Separate File)	Tab 2
Previous Work and Organizational Experience.....	Tab 3

Tab 1 - Overall Proposal Suitability

PROJECT UNDERSTANDING

SPRWS has been methodically upgrading aging infrastructure at many of their facilities. HR Green has an intimate familiarity with some of these facilities from our recent experience at the **Hazel Park Pump Station Electrical** project and the **West Side Pump Station** project in addition to Verne Jacobsen's decades of experience both operating and working with SPRWS. Verne will be able to bring his grounded opinion to this Master Plan project and make valuable recommendations like he did during the West Side project. There, the design team worked with SPRWS to step back and consider changing the utility service voltage due to a combination of factors including 480V gear is more common, less expensive, and the pumps were decades old and not as efficient as new units.

This pump station master plan will be a comprehensive assessment that will not overlook critical operating and maintenance elements. An evaluation will be made of the existing infrastructure in SPRWS' pumping systems and utilize that information to develop replacement costs. These costs will be the basis for a 10-year capital improvement plan (CIP) so planning for large capital expenditures will be possible. This process will be very helpful in ensuring the highest priority needs are taken care of first and that money is used efficiently by avoiding multiple piecemeal projects.

PROJECT APPROACH

HR Green proposes to staff this project primarily with personnel located in our Saint Paul office, which will allow for easy communication between SPRWS staff and the design team. **Senior level staff with years of experience will perform the site visits and evaluations of the equipment, not junior level staff engineers.** HR Green's approach will focus on information gathering meetings/workshops with SPRWS project stakeholders and listening to your specific needs and thoughts concerning existing equipment and issues. We believe understanding the existing equipment and buildings are critical to the success of the project.

Bob Russek of IMO (an MBE/SBE subconsultant) will be responsible for reviewing the buildings. He has 43 years of experience designing water/wastewater buildings and has

recently completed a master planning evaluation of dozens of Metropolitan Council buildings.

As illustrated in the project examples, development of master plans by assessing process equipment and buildings happens with many of our clients that want to understand their future capital spending. The assembled team has experience not only with SPRWS but other large local clients. Our thorough understanding of water distribution systems combined with the strong relationship built with SPRWS over the past several years makes our team the best choice.

At key points in this project, HR Green will meet with SPRWS Staff, carefully listen to their concerns, and fully understand their priorities regarding the existing stations. SPRWS Staff has consistently indicated in previous projects that safety, reliability, redundancy, security, operability, maintainability, capital cost, operating cost, and automated standby generator operation are important priorities at their pump stations. HR Green will use information gathered to best address these priorities with the CIP. By following this approach, SPRWS staff will have available the information they need to plan for capital expenditures over the next decade and be able to update the overall distribution system by addressing priorities in a planned systematic fashion rather than on a reactionary basis.

PROPOSED SCOPE OF SERVICES

The HR Green Project Team has developed the following Scope of Services which addresses SPRWS' requirements and incorporates elements into the three tasks that we believe are necessary to achieve the desired outcomes. In addition, we have taken the liberty to reference our applicable project experience in some of the Task Elements to demonstrate our competence to accomplish them.

Task 1 – Kick-Off Meeting, Site Visit and Data Collection



Meet with SPRWS Staff to kick off the project and visit pump stations.

The primary goals of this task are to:

- Meet with SPRWS Staff to kick off the project. Deliver meeting minutes.

- » Establish communication protocols, project update meetings and discuss HR Green/SPRWS Project Team staff availability.
- » Identify, categorize and prioritize SPRWS' issues and needs for each given project element.
- » Review proposed project timeline.
- Develop checklist for data gathering at each pump station. The **Appendix** contains a sample data recording log we have used on previous projects. HR Green will work with SPRWS staff to customize a similar log for this project.
- Visit each of the 11 pump stations to gather data on the existing equipment and structures. The following will be reviewed during a 2-day period:
 - » **Building Structure** (except at Highland No. 1) including siding/brick, doors, windows, louvers, weatherproofing, and roof (except at Fridley and West Side). HVAC will not be evaluated.
 - » **Electrical Systems** including a discussion of backup generator needs, transfer switches, utility voltages, and VFD's. SCADA and instrumentation and control will not be evaluated.
 - » **Pumps** including hydraulic and motor efficiency, age, and compatibility with drives (except at West Side as they are under construction with an HR Green project).
 - » **Pump Capacity** will be evaluated using historical records including average, minimum and maximum flows as well as anticipated growth in service areas.
 - » **Piping and Valves** including general age, coating condition, corrosion, and known issues.
 - » **Flow Metering** at Fridley including arrangement of the existing meter and recommendations for modifications or replacement to achieve accurate measurements.
- During site visit, identify code issues, as well as general safety and security concerns.
- Document existing conditions.

Task 2 – Professional and Technical Assessment



Document asset inventory, develop costs for recommended upgrades, and determine pumping efficiencies.

During this task, HR Green will document and develop the following for each of the 11 pump stations, the major equipment at each station will be included in an asset

inventory list:

▪ **Building Structures**

- » List any deficiencies in the building components by station based on the site visits. Components to be evaluated (except at Highland 1) are:
 - Siding and/or brick
 - Doors
 - Windows
 - Louvers
 - Weatherproofing
 - Roof (except at Fridley and West Side).
- » Develop repair or replacement costs for issues.

▪ **Electrical Systems**

- » Hazel Park, West Side, Beebe Road, West St. Paul, Highland 1 and Highland 2 will not be visited or evaluated for electrical needs since all have recent electrical upgrades.
- » Evaluate existing equipment drawings, models, and one-lines.
- » Assess existing physical equipment arrangement and clearances.
- » Consider the age, repair history, and availability of replacement components of the equipment.
- » Following discussion with SPRWS staff on backup generator needs, determine necessary transfer switches, transformers, docking stations, access, or permanent equipment placement.
- » SCADA improvements will not be detailed but basic costs will be included.
- » Develop costs by station for recommended upgrades.
- » Develop budgetary costs for upgraded security cameras.
 - Coordinate with SPRWS if there is a preferred security company
 - Use previous projects and vendor information to develop a schematic list of equipment (cameras, door/window alarms, motion sensors) for increased security at each pump station.
 - Recommend storage location for security video footage.

- **Pumping**
 - » Evaluate existing pump curves and contact manufacturers or vendors for original efficiency curves and motor data (if needed).
 - » Use flow and pressure monitoring data from SPRWS and existing pump curves to develop current system curves for each pump station.
 - » Compare typical pump run operation to system curve to determine existing pumping efficiency.
 - » Work with pump vendors to choose potential new pumps for each station.
 - » Calculate a theoretical cost savings for the average pumping rate.
 - » Compare the existing and projected pumping rates.
 - » Discuss whether VFD's provide a benefit with SPRWS staff for each station.
 - » Consider the age and repair history of the equipment.
 - » Assess pump motor protections for grounding and inverter duty.
 - » Evaluate overall floorplan for pumping equipment maintenance replacement clearances.
 - » Develop costs by station for recommended upgrades.
- **Piping and Valves**
 - » Assess operational concerns with SPRWS staff.
 - » Document valve failures per SPRWS staff input. HR Green will not operate valves.
 - » Evaluate straight sections of piping around flow meters and on pump intake/discharge.
 - » Document coating failures.
 - » Document corrosion on piping and valve systems.
 - » Assess age of equipment.
 - » Develop costs by station for recommended upgrades.
- **Flow Metering at Fridley**
 - » Evaluate existing plans and equipment data for concurrence on site.
 - » Assess meter location for adequate straight runs of pipe.
 - » Evaluate potential clogging in meter from river debris or zebra mussels.
 - » Determine if the existing system can be modified to

provide accurate flow measurement.

- » Make recommendation for modifications or replacement of meter with a different type.
- » HR Green has extensive experience specifying and designing high accuracy meters in pumping applications for both potable and sanitary systems.
- » Develop costs for recommended improvements.
- Develop and deliver the Professional and Technical Assessment that summarizes the analyses listed above with detailed improvement recommendations.
- Submit Professional and Technical Assessment Technical Memorandum to SPRWS Staff.
- Facilitate a workshop with SPRWS staff to discuss the Professional and Technical Assessment and recommended improvements to be developed into a CIP. Deliver meeting minutes.

Task 3 – Capital Improvement Plan Documents



Assemble 10-year CIP using the asset inventory developed in Task 2 along with SPRWS input.

During this task, HR Green will:

- Utilize input from SPRWS staff to understand the largest potential for significant operational difficulties.
- Compile costs for recommended improvements at each pump station using the asset inventory list.
- Lay out a 10-year plan (CIP) for executing design and construction at all 11 pump stations.
- Facilitate a workshop with SPRWS staff to discuss the CIP. Deliver meeting minutes.
- Provide a final CIP document signed by a Minnesota Professional Engineer.

SPRWS Responsibilities

As noted in the RFP, SPRWS understands there are certain tasks they can perform more efficiently to reduce the costs paid to a consultant. Following is the list we anticipate SPRWS staff will complete:

- For the project kick-off meeting, SPRWS will coordinate attendance of key SPRWS staff and stakeholders, and coordinate the location and time of the project kick-off meeting
- SPRWS will provide adequate access to facilities and

staff during the project. During the kick-off meeting, HR Green will work with SPRWS to establish site visits and a communication protocol.

- SPRWS Staff will work with the HR Green team to define the SPRWS' goals for the project so that HR Green can provide optimum recommendations.
- SPRWS will provide the existing building and system information to HR Green prior to beginning the field-based data collection.
- Provide input on known issues at each pump station.
- During the site visits, SPRWS will provide safe access for data collection. This includes confined space entry.
- SPRWS will work with HR Green to define all future expansions.
- SPRWS will provide operating flow and pressure information up and downstream of each station.
- SPRWS will provide historical flow data.
- Provide timely responses to HR Green questions regarding particularly challenging items that were observed during field data collection.
- Provide clarification of comments on draft deliverables as required, ensuring satisfactory final deliverables.
- For the standby power and utility service connection prioritization, SPRWS will provide HR Green with power outage history and most critical process operations.
- Provide timely responses for comments to the Professional and Technical Assessment, and Capital Improvements Plan.
- Attend meeting to provide input on the Professional and Technical Assessment.
- Attend meeting to provide input on the CIP.

Additional Services Available

While not requested in the original RFP, SPRWS staff may choose to include the following additional services which are available at their request:

- **Transient Analysis.** This project will discuss any known issues with transient pressures, we would propose developing a transient model and performing a full analysis of systems suspected of trouble spots similar to how HR Green worked with SPRWS at the West Side station.
- **Fridley Standpipe.** This project will address the condition of the standpipe from a high level. If concerns are noted with the condition, a higher level full inspection of coatings and structural integrity would be recommended. HR Green has a teaming relationship with a water tower consultant that we would be able to work with to perform a full, detailed inspection.
- **Instrumentation and Controls.** HR Green has worked closely with Larry Larsen and other SPRWS staff on the current West Side Improvements project. The West Side will have a current and upgraded SCADA panel and controls following construction. Using that recent experience, HR Green could efficiently evaluate the remaining pump station's SCADA components and include them in the overall CIP.
- **Mechanical/HVAC.** Temperatures inside the pump stations are well regulated by the constant flow of groundwater through the piping systems. However, during certain times of the year, ventilation or dehumidification may be necessary. In addition, VFD drives expel a significant amount of heat when added to a building. HR Green's seasoned mechanical staff would be able to add an analysis of minor equipment at each building to include it as part of the overall CIP.

PROJECT SCHEDULE

HR Green is well known for its ability to maintain project schedules and uses sophisticated software to manage our talent and resources. In developing this proposal, a project outline and project timeline with delegation of HR Green and SPRWS project staff tasks was completed. HR Green selected our project team for the SPRWS Pump Station Master Plan based on individual staff members specific expertise, as well as their availability. Company-wide resources are reviewed frequently to make certain that project schedules are being met and the necessary staff are assigned to meet them. Our software monitors individuals assigned to specific projects and compares that to time actually spent. Adam Salo, our assigned Project Manager, can see in real time who is busy and who is not and what resources can be allocated to meet schedules.

HR Green acknowledges SPRWS' Tentative Project Timeline and certifies that our assigned Project Team along with project support staff, have adequate availability to meet the May 1, 2022 deadline to the Master Plan and CIP.

Pictured to below is our proposed Project Timeline.



Key Considerations



* HR Green recently provided electrical upgrades to these Pump Stations.

Fridley

- Flow Metering Accuracy
- Standpipe Coating Condition
- Zebra Mussels
- No Standby Power

Highland No. 1

- In Historic Building with Recent Rehabilitation
- New Electrical Gear Under Design

Highland No. 2

- New Electrical Gear Under Design

Hayden Heights

- Potential for Decommissioning
- Electrical System is Original

St. Anthony

- Electrical System is Original with Upgrades in 1976
- Pair of Newer pumps Installed in 2004

Hazel Park*

- Recently Replaced Electrical Gear
- Pump Motors are Original and not Inverter Duty Rated but Running with VFD's

West Side*

- Electrical Gear and Pumps to be Replaced in 2022 as a HR Green Design

West St. Paul

- Recently Replaced Electrical Gear

Beebe Road

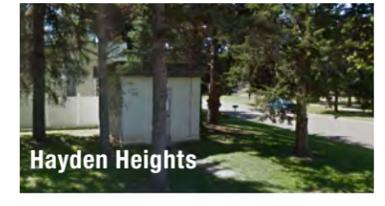
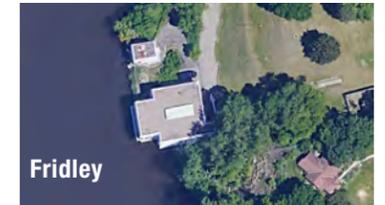
- Upgraded Pump and VFD in 2005, Others are Original 1979
- Potential Pressure Concerns

Roselawn

- Electrical System and Pumps are Original from 1979

Mailand Road

- Electrical System and Pumps are Original from 1979



Tab 2 - Cost (Submitted as a Separate File)

Tab 3 - Previous Work and Organizational Experience

HR Green takes pride in our St. Paul based and company-wide technical expertise and our ability to provide St. Paul Regional Water Services (SPRWS) with the demonstrated responsiveness and reliability that you expect and deserve.

Our Team’s locally recognized expertise and broad range of services, along with our commitment to providing them to our hometown community, will facilitate a successful project.

We offer SPRWS:

- The unique expertise of our local team with numerous water/wastewater/stormwater pumping facilities.
- Unparalleled qualifications, experience and past performance on similar projects for various clients.
- A locally based responsive team of individuals committed to SPRWS through all project phases.
- A team of Minnesota Registered Electrical Engineers that capitalize on their first-hand experience with retrofitting existing facility electrical systems.

▶ POTABLE WATER PUMP STATION EXPERIENCE MATRIX

HR GREEN - POTABLE WATER PUMP STATION EXPERIENCE MATRIX																															
Client / Project	TYPE OF STATION				PROJECT PHASE								TYPE OF PROJECT						DESIGN			ANCILLARY FACILITIES									
	Raw Water / Low Service	Process Waster/ Residuals	High Service	In-Line Booster	Study/Facility Plan	Preliminary Design	Detailed Design	Construction Phase Services	P.S. Only	Treatment System w/ P.S.	GST w/ P.S.	EST w/ P.S.	Water Main w/ P.S.	New	Rehab	Below-Grade / Vault	Above-Grade	Pre-Manufactured	Architectural Design	Structural Design	Controls/SCADA	Suction/Discharge Piping	Backup Power Generator	VFDs	Flow Metering	HVAC	Control Valves	Transients / Surge Control	Site Design		
Amana Colonies, IA																															
Anamosa, IA - High Pressure Zone Improvements																															
Cedar Rapids, IA - J Ave Water Treatment Plant																															
Cleveland, TX (WTP)																															
Coming, IA																															
Fort Madison, IA - RO Water Treatment Plant																															
Fort Madison, IA - Booster Station																															
Greenfield Municipal Utilities (Greenfield, IA)																															
Huron, SD (DP Booster Sta)																															
Huron, SD (WTP)																															
Iowa City, IA																															
Johnston, IA - 66th Ave Pump Station																															
Johnston, IA - 86th Street Pump Station																															
McHenry, IL (WTP)																															
Milford Municipal Utilities (Milford, IA)																															
Nevada, IA - Water Treatment Plant																															
Oceola Water Works (Osceola, IA) - WTP																															
Ottumwa Water & Hydro (Ottumwa, IA)																															
Palo, IA																															
Regional Water (Avoca, IA)																															
Rock Valley, IA																															
Sioux Falls, SD (South Reservoir)																															
Spirit Lake, IA																															
Wahpeton, IA																															
West Des Moines Water Works (West Des Moines, IA)																															
Des Moines Water Works, IA																															
Wentzville, MO																															
Pasadena, TX - Crenshaw Water Plant																															
Pasadena, TX - Wafer Water Plant																															
Xenia Rural Water District - Woodward WTP																															

Following is our Project Experience and Key Personnel summary of the project staffs’ background, qualifications and project roles and responsibilities. We have also provided resumes of the HR Green Team. This information identifies our Project Manager and Key Members of the Team. We provide their General Background, Roles and Responsibilities for the project as well as Experience with Similar Projects.



Water System Asset Evaluation

Pasadena, Texas

The City of Pasadena intends to upkeep and maintain their water facility infrastructure and has the need to perform an extensive evaluation of their facilities. The objective of this asset evaluation was to develop an inventory of key equipment and necessary improvements at each of the City's water plants. The City retained HR Green to complete an asset evaluation for 21 water facilities (18 water plants and 3 metering stations) within the City's distribution system.

HR Green performed site inventory, inspections, and asset evaluation for 21 total facilities. City Operations staff accompanied HR Green to the site visits to provide information on current operations and recent maintenance needs. Improvement recommendations to the water system are based on the condition of the asset and discussions with the City. The assessment included general overview of the site equipment, drainage, security, tank coatings, mechanical/electrical/structural deficiencies, and compliance with local regulations. These findings were documented in an evaluation report. The assessment categorized each facility into major process areas including tanks, booster pumps, well, structures/buildings, site/grounds, and generators. Condition assessment was performed based on inspection and remaining useful life. HR Green recommended three priorities of improvement for each facility based on their evaluation: immediate (0-2 years), short-term (2-5 years), long-term (>5 years) based on the condition of the assets. HR Green also provided the cost estimate associated with each recommended improvement and was documented in the final evaluation report.

The evaluation can be used to support the City with capital improvement planning for the water system facilities. This report is provided as a guidance document for system improvements and to assist with future Capital Improvement Plans (CIP) for the water facilities and metering stations. The evaluation will help the City manage their water facilities and budget funds to improve the water quality for their customers.

REFERENCE

Terry Bowman
Assistant Superintendent
Water Production
City of Pasadena
P: 713-475-4936
E: tbowman@pasadenatx.gov

KEY TAKEAWAYS

- Large water district with multiple treatment and pumping facilities.
- Development of CIP for client to prioritize projects.



Water Treatment Plant Facility Plan

Aberdeen, South Dakota

Due to steady residential and industrial growth, the City of Aberdeen anticipated the need to expand their water system to meet future demands. Keeping in mind the age and reliability of the existing infrastructure, the City wanted to take a holistic view of the treatment system and obtain cost effective solutions to meet the current and future needs of their customers.

The City operates a 12 MGD surface water treatment plant that utilizes soda ash softening, chloramines, and dual media filters. The plant meets current demand, but does not have redundant systems to provide firm capacity to meet peak flows. To ensure reliable operation of the WTP in the short-term and provide a roadmap for long-term capacity expansions, the City hired HR Green to prepare a Facility Plan.

Following an on-site inspection by process, electrical, and structural engineers, a condition assessment was completed that evaluated the condition of the treatment basins, related equipment, and efficiency of operation. In addition, the condition of the building structure and electrical components were summarized and included a list of prioritized improvements. This included electrical elements such as age, condition, maintainability, available capacity and code compliance of the electrical power distribution system.

Equipment rehabilitation was recommended to complete lifecycle replacement of existing equipment and increase reliability in the short-term. Alternatives were also provided to increase capacity to meet long-term needs. Specifically, the recommendations included the following -

Short-term Recommendations:

- New potassium permanganate feed system to allow batch mixing and eliminate dry feed system.
- Soda ash feed system improvements. Additional silo capacity was added as well as a water softening system for the dilution water system to prevent scale buildup.
- Sodium hypochlorite feed system. On-site generation system replaced gas chlorine system to provide greater operator safety and replace gas system that had reached the end of its design life.
- New Reclaim Basin sludge collection system. Existing basin was difficult to clean and must be taken off-line for cleaning. Existing rake system is broken, requiring labor-intensive cleaning.
- CO2 feed system to provide additional redundancy.
- Liquid Fluoride feed system to replace dry chemical feeders.

Long-term Recommendations:

- Additional clearwell for additional capacity and redundancy.
- New treatment train of Actiflo pretreatment, solids contact units, and filtration to provide a 6 MGD capacity expansion.
- Ozone and granular activated carbon for taste and odor removal.

REFERENCE

Bob Braun
Water Treatment Plant
Superintendent
P: 605.626.7074
E: bob.braun@aberdeen.
sd.us

KEY TAKEAWAYS

- Resiliency and Redundancy
- Taste and Odor
- Chemical Feed Systems
- Capacity Upgrades
- Operational Efficiencies

KEY TEAM MEMBERS

Mark Hardie

Bob Thayer



Water and Wastewater Master Plan

Wilmington, Illinois

The City of Wilmington was in a unique situation. Just as the City had begun to expand the capacity of their water and sanitary sewer systems, they were struck with downturn in the economy. The majority of the planned future development never occurred. Consequently, the City had no revenue streams to pay for loans that were used to implement the expansions of their systems. After dipping into the City's reserve funds to cover the loan payments, they were also discovering that their sewer and water rates were not able to cover the debt service let alone the operations and maintenance of the system. HR Green has partnered with the City to help alleviate this issue. This first step was to perform a water and sewer rate analysis that was based on a Cost of Service analysis. The City of Wilmington has a diverse pool of users including a large industrial section that creates different demands on the system. As the new rate structure needed to cover the O&M expenses, the Capital Expenditures and the Debt service, the cost of service analysis provided a true cost of providing the different types of users with service. This way, the lighter users are not required to bear the burden the large users create on the system.

Along with the Rate Study, HR Green analyzed the condition of the current system taking into account the life of service on the existing equipment and the demands that would be placed on the system in the future. A condition and operational assessment was performed on key infrastructure including water and wastewater treatment plants, lift stations, and booster pump stations. This helped to identify Capital projects that would allow the system to handle all current and future demands. HR Green also evaluated the operation of each system and was able to identify some areas when a change in operations provided the City with efficiencies resulting in operations cost savings.

Once the final numbers were developed, HR Green did a brief survey of different funding mechanisms that were available for the City to utilize and helped the City to develop a Capital Improvement Plan that identifies projects and potential funding sources.

Throughout the process, HR Green worked closely with the City staff to keep the public not only informed of the decisions being made but also involved in the process. When the stakeholder are informed and have input, they have a greater buy into the system.

REFERENCE

Ryan Foster
Water Department
Lead Operator
P: 815.476.6732

KEY TAKEAWAYS

- Water and Sewer Rate Study
- Asset Evaluation
- Operations Evaluation
- Capital Improvement Planning
- Funding Mechanisms Review
- Enhanced Public Involvement

KEY TEAM MEMBERS

Mark Hardie



Hazel Park Pump Station Electrical Improvements

St. Paul, Minnesota

SPRWS commissioned a Master Plan which was completed in 2014. The Plan identified Capital Improvement Projects required over the next 40 years. One of the highest priorities identified in the Master Plan is to replace aging electrical infrastructure at the Hazel Park Pump Station. The goals of this project were to improve long-term reliability, improve maintainability, reduce operating expenses, improve safety, and provide for future pump station loads. All improvements were designed to maximize availability of the pump station operations during construction. At the end of the project, HR Green delivered Construction Documents which satisfied SPRWS Staff requirements.

HR Green understood the importance of continuous pumping capability at the Hazel Park Pump Station, especially during summer months. To minimize the impact on operations, HR Green recommended scheduling electrical equipment replacement during winter months when water demand was significantly lower. Replacement of the existing electrical equipment was complicated by these concerns:

- Conduits from the motor control center to three of the four pumps pass through the bottom of the motor control center and under the floor.
- Conduits from the motor control center to the metering current transformer enclosure pass through the north wall above the motor control center.
- Conduits from the motor control center to the generator connection cabinet pass through the north wall behind the motor control center.

HR Green developed a cutover plan that addressed those concerns and provided temporary power to some of the pumps. The cutover plan ensured that the existing motor control center could be safely removed and Pump Station operations would continue (at reduced rates).

HR Green's experience on this pump station rehabilitation will provide continuity and familiarity for the Highland PS 1 and 2 project. The same team that worked on this project is proposed for the Highland improvements, providing a seamless transition and understating of the goals and expected I&C updates.

REFERENCE

Kou Vang
Engineering Division
1900 Rice Street
St. Paul, MN 55113
P: 657.266.6350

KEY TAKEAWAYS

- SPRWS Pump Station
- MCC Replacement
- Temporary Power to Existing Facility
- Familiar Project Team
- Similar Project Goals to Update 480V Electrical Gear
- Similar I&C Updates

KEY TEAM MEMBERS

Adam Salo

Bob Thayer





West Side Pump Station Electrical Rehabilitation

St. Paul Regional Water - St. Paul, Minnesota

SPRWS identified the replacement of aging electrical equipment throughout their system as a priority during a master planning effort in 2014. The West Side Pump Station is their second largest booster station and much of the equipment was decades old and in need of repair. In addition to full replacement of the electrical switchgear, starters, addition of an automatic transfer switch and upgrades to their PLC, HR Green addressed transient concerns and pump efficiency as part of the design. Originally the West Side Pump Station operated at 2400V with an existing 480V on site genset. The design included replacement of 4 pumps up to 350HP and as old as 1962. The utility feed was also changed to 480V and VFDs added to improve operational flexibility and address the majority of transient concerns.

HR Green's experience on this pump station rehabilitation will provide continuity and familiarity for the Highland PS 1 and 2 project. The same team that worked on this project is proposed for the Highland improvements, providing a seamless transition and understating of the goals and expected I&C updates.

REFERENCE

Kou Vang
Engineering Division
1900 Rice Street
St. Paul, MN 55113
P: 657.266.6350

KEY TAKEAWAYS

- SPRWS Pump Station
- MCC Replacement
- Temporary Power to Existing Facility
- Familiar Project Team
- Similar Project Goals
- Similar I&C Updates

KEY TEAM MEMBERS

Adam Salo
Bob Thayer
Chris Harrington
Verne Jacobsen



Sanitary Lift Stations, Storm Pump Stations, and SCADA System Upgrades

Minneapolis, Minnesota

HR Green worked with the City of Minneapolis on rehabilitation and standardization of 9 sanitary lift stations and 23 stormwater pump stations.

The rehabilitation and standardization process started with separate engineering studies of the existing sanitary lift stations and existing stormwater pump stations. The studies focused on establishing reliability and standardization needs at each of the existing 32 stations, including estimated construction costs, for budgeting purposes.

Following study completion, sanitary lift stations and stormwater pump stations were designed by HR Green, and multiple projects were bid for improvements to all 32 stations.

Following bidding, HR Green provided engineering construction services to verify that construction was completed according to design intent. HR Green provided in-house engineering services in addition to on-site construction observation.

At this time, construction of all 9 sanitary lift stations has been completed, and the stations have been operating successfully for approximately 5 years. Construction of the 23 stormwater pump stations was recently completed. Several of the initial stormwater pump stations rehabilitated have been operating successfully for over 2 years.

HR Green is currently in the construction phase of a cellular based SCADA system designed by HR Green to observe, and eventually operate, all 32 stations. Construction of the new SCADA system was completed in 2020.

REFERENCE

Sean Oberg
Supervisor, Sewer
Maintenance
City of Minneapolis
P: 612.673.5632

KEY TAKEAWAYS

- Rehabilitation of Aging Stations
- Control Panel Upgrades
- Proximity to Water Bodies
- Simultaneous Construction at Multiple Locations

KEY TEAM MEMBERS

Adam Salo

Bob Thayer

Dennis Neumann

Chris Harrington



Local Architectural Experience

Metro Transit is involved in a master planning process to improve their bus service. IMO recently participated in two projects: the Sun Ray Bus Shelter in St. Paul and the Bloomington Bus Turn-Around improvements.

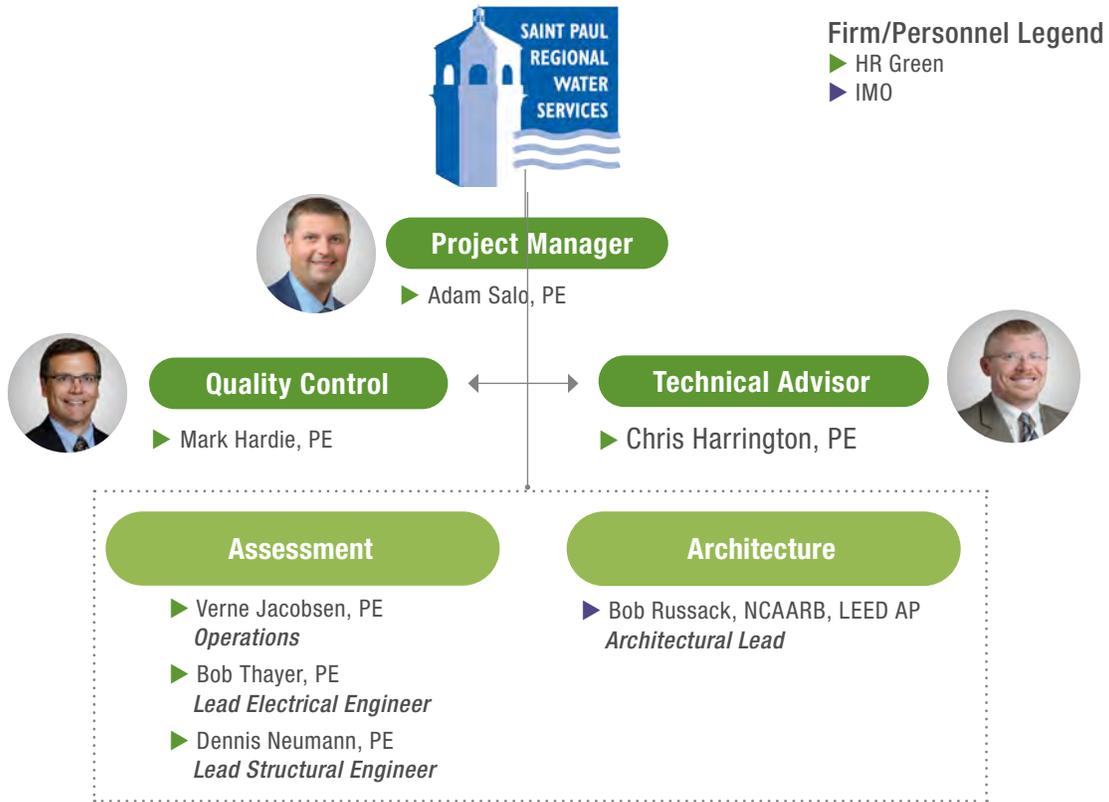
At **Sun Ray shopping** center we added a bus shelter across from an existing bus stop. This project required extensive revisions to the existing sidewalks to ensure HC accessibility. It also involved directional drilling to run power lines to the new bus stop. This project is currently in the Metro Transit 'pipeline'. Bidding is expected later this year. IMO provided architectural, structural and civil engineering services.

The **Bloomington Project** made revisions to an existing turn-around at 80th Street. Some concrete 'islands' were removed and others re-configured to improve turning radii. We also made a study of lighting. Some existing fixtures were relocated to ensure safe levels of illumination. IMO checked all of the existing sidewalks to ensure HC accessibility. We again provided architectural and engineering services. The successful bid was under budget. Construction is currently under way.

In both cases we followed a systematic design process. IMO started by surveying the existing conditions and making a list of Metro Transit standards and design criteria. We always try to compare at least two alternate solutions to ensure a comprehensive approach. Solutions were developed in cooperation with the Metro Transit staff. We will be involved during construction on an 'as-needed' basis.

Project Team

We have assembled an experienced team in the evaluation and analysis of lift stations. All team members have years of evaluating, designing and constructing large and critical pumping, electrical and structural components within lift stations for clients like SPRWS. Below is an org chart of our team for the proposed project.





Adam Salo, PE

Project Manager

Adam's 20 years of diverse professional experience has ranged from wastewater and drinking water treatment, collection and conveyance projects to municipal street, flood control and recreational facilities. He has worked on all phases of project development, from preliminary planning through construction observation. His design work included layouts, equipment selection and review, as well as hydraulic and process analysis. He has provided construction inspection and coordination on projects ranging in size from \$10,000 to \$20 million.

EXPERIENCE

20 Years

YEARS WITH HR GREEN

13 Years

EDUCATION

BS, Civil engineering,
University of Minnesota

REGISTRATION / LICENSE

Professional Engineer, MN,
45107

As Project Manager, Adam will be responsible for scope, schedule, budget, deliverables, communications, meetings, engineering resources, staff supervision and project direction.

He has 20 years of experience assisting clients with design and construction projects including numerous pump station projects.

SELECTED PROJECT EXPERIENCE

▶ Hazel Park Pump Station Electrical - St. Paul Regional Water | Project Manager

SPRWS commissioned a Master Plan which was completed in 2014. The Plan identified Capital Improvement Projects required over the next 40 years. One of the highest priorities identified in the Master Plan was to replace aging electrical infrastructure at the Hazel Park Pump Station. The goals of the project were to improve long-term reliability, improve maintainability, reduce operating expenses, improve safety, and provide for future pump station loads. HR Green provided Engineering Design and Construction Administration Services. Improvements were designed to minimize the impact upon pump station operations during construction. The new electrical equipment has been operating satisfactorily for approximately three years.

Adam was the project manager for this project.

▶ West Side Pump Station Electrical Rehabilitation - St. Paul Regional Water | Project Manager

The West Side Pump Station is SPRWS' second largest booster station and much of the equipment was decades old and in need of repair. In addition to full replacement of the electrical switchgear, starters, addition of an automatic transfer switch and upgrades to their PLC, HR Green addressed transient concerns and pump efficiency as part of the design.

Adam was the project manager for this project.

▶ Sanitary Lift Station Rehabilitation - City of Minneapolis, MN / Project Engineer

HR Green has provided the City of Minneapolis with a comprehensive asset assessment of ten sanitary lift stations. The assessment of each lift station included a structural condition analysis as well as evaluations of control systems, and backup power systems. These assessments were used in conjunction with an economic analysis to develop recommendations for repair, rehabilitation or replacement of each lift station.

Adam provided design specifications and coordination of bidding documents with the owner for all of the lift stations.

▶ 2nd Street NW Lift Stations Improvements - Chisholm, MN | Project Engineer

HR Green was hired to design improvements to the Chisholm 2nd Street L.S. The design included replacement of the existing pumps, piping, valves, electrical systems, lighting, HVAC, receptacles, switches, etc. with equipment rated for explosion proof service. Due to hazardous area classification inside the building, the main electrical gear and motor controllers were moved to outdoor enclosures. Provisions were made for a future mechanically cleaned screen, and associated modifications to the structure and roof.

Adam provided planning and final design for the lift station renovation. This included pump selection, piping layout, occupancy classification, screen design, and general layout.



Mark Hardie, PE

QA/QC

Mark's experience encompasses project management, design and construction administration. Mark specializes in the analytical evaluation of existing water and wastewater facilities to determine viable methods of correcting system deficiencies and meeting applicable requirements. Mark has considerable experience with water studies which has included water supply, treatment, and distribution systems. He has been involved in all phases from early concept alternative evaluation all the way through construction. He is committed to client involvement in the project development process, always seeking his clients' satisfaction with improvements to their facilities.

EXPERIENCE

27 Years

YEARS WITH HR GREEN

22 Years

EDUCATION

MS, Civil

Engineering, SDSU - 1993

BS, Civil Engineering,
SDSU - 1991

REGISTRATION / LICENSE

PE, MN, 26665

Also licensed in SD, IA, IL

Mark will complete all QA/QC activities for this project. He will complete a detailed QA/QC for all deliverables.

Mark brings over 25 years of experience working on major pump stations including managing pump, electrical and structural upgrades around the region.

SELECTED PROJECT EXPERIENCE

► Wells, Wellhouses, Reservoirs, Booster Stations, Pumping Stations and Storage

- » New Well Selection and Design - Sioux Falls, SD / Project Manager
- » East Reservoir Improvements - Sioux Falls, SD / Project Manager
- » West Reservoir Entrance Improvements - Sioux Falls, SD / Project Manager
- » Big Sioux Aquifer Expansion, Collector Well 71 - Sioux Falls, SD / Project Manager
- » Collector Well 69 - Sioux Falls, SD / Project Manager
- » Collector Well 62 - Sioux Falls, SD / Project Manager
- » Riverside Collector Well and Transmission Main - Sioux City, IA / Project Manager
- » Water System Improvements – Cleveland, TX / Lead Process Design
- » Prairie Ridge Water System Improvements - Prairie Ridge Association – Crystal Lake, IL / Project Manager
- » Water System and Well Field Improvements – Huron, SD / Project Manager
- » Elevated Water Storage Tank – Huron, SD / Project Manager

► Water Treatment Facilities

- » Water Treatment Plant Improvements – Elk Point, SD / Project Manager
- » Water System Improvements – Spirit Lake, IA (2002) / Project Manager
- » WTP Facility Plan - Aberdeen, SD / Project Manager
- » Soda Ash System Improvements - Aberdeen, SD / Project Manager
- » WTP Dome Cover Replacement - Aberdeen, SD / Project Manager
- » WPP Filter Upgrade and Backwash Basin – Sioux Falls, SD / Project Manager
- » Spirit Lake Fish Hatchery Water Treatment System Design - Iowa Department of Natural Resources / Project Manager
- » Water Treatment Plant Expansion – Spirit Lake, IA (2008) / Project Manager
- » Water Treatment Plant Rehabilitation - Wahpeton, IA / Project Manager
- » Water Treatment Plant #2 Improvements – McHenry, IL / Project Manager

► Water Needs

- » Water System Needs Analysis – LaSalle, IL / Project Manager
- » Water and Sewer Asset Management Study - Wilmington, IL / Project Manager
- » Water System Needs Analysis - Lemont, IL / Project Manager
- » Water Model & Water System Master Plan Report – Mundelein, IL / Project Manager
- » Lake Michigan Water Supply Alternative Evaluation – Antioch, IL / Project Manager
- » Water System Needs Analysis – Marengo, IL / Project Manager



Chris Harrington, PE

Technical Advisor

Chris has served as a technical lead and project manager during planning, design, construction, and troubleshooting of more than a dozen wastewater and stormwater pump station projects for wastewater conveyance, flood protection, stream augmentation, irrigation & combined sewer separation. Chris has performed hydraulic transient analysis for multiple wastewater pump stations and a chemical transport pump station and has led the equipment selection to protect against the destructive pressures that can occur in the pipelines. He has led and partnered with sub-consultants to perform design and administer construction of trenchless pipe installation methods for force main and gravity pipes that are part of the overall pumping system for those projects.

EXPERIENCE

16 Years

EDUCATION

MS, Civil Engineering,
University of Minnesota,
Twin Cities

BCE, Civil Engineering,
University of Minnesota,
Twin Cities

REGISTRATION / LICENSE

Professional Engineer -
Civil, MN, 49831

Chris has served as a technical lead and project manager on more than a dozen pump station projects. He will provide his expertise on transient data review.

SELECTED PROJECT EXPERIENCE

▷ West Side Pump Station Electrical Rehabilitation - St. Paul Regional Water - Technical Advisor

The West Side Pump Station is SPRWS' second largest booster station and much of the equipment was decades old and in need of repair. In addition to full replacement of the electrical switchgear, starters, addition of an automatic transfer switch and upgrades to their PLC, HR Green addressed transient concerns and pump efficiency as part of the design.

Chris is advising SPRWS on the interpretation of the hydraulic transient measurements they are taking at multiple points in their distribution system. He is also providing design recommendations for the valve actuator used on the controlled ball check valves.

▷ SPRWS - Booster Pump Transient Analysis - St. Paul, MN - Project Manager

For this project we evaluated the efficacy of a detail that SPRWS requires developers to follow when they install booster stations for their development projects. SPRWS was interested in having a solid defense of the requirement to include surge tanks in the detail. We performed a hydraulic transient analysis that identified the primary causes of added risk of hydraulic transients which included surge tank size, surge tank location, system flow rate, total dynamic head of the system, and the size of the City main feeding the development. Based on our assessment we recommended that SPRWS update the detail to include a surge tank on both sides of booster stations since that arrangement provided the lowest risk to the City piping as well as the piping in the development. We also identified that the current rule of thumb for sizing the surge tanks provides a significant factor of safety to protect against low pressures on both sides of the station.

▷ SCADA Upgrades for Wastewater Lift Stations, Booster Station, & Water Towers – Arden Hills, MN

Chris was the project manager for this project and coordinated the activities of the City, the HR Green controls engineer, the path study team, and the systems integrator who completed the upgrades. For this project we designed improvements to, and performed construction administration services for upgrades to the City's Supervisory Control & Data Acquisition (SCADA) system. HR Green reviewed the existing infrastructure and designed a single monitoring system for all wastewater lift stations, two potable water towers, and one potable water booster station that allows future expansion.



Verne Jacobsen, PE

Operations

Verne has a wealth of water infrastructure experience. He spent 25 years helping water utility clients plan, improve, develop, construct and operate municipal water systems, Prior to this, he spent 34 years with Saint Paul Water Utilities, engineering distribution water system operation, and administering all utility operating divisions. His work included major water system improvements for Mankato, Maple Grove, Eden Prairie, Loretto, Luverne, South Saint Paul, Saint Paul Regional Water, Rochester Public Utilities, and the Stillwater Board of Water Commissioners.

EXPERIENCE

60+ Years

EDUCATION

BS, Civil Engineering,
Indiana Institute of
Technology - 1957

REGISTRATION / LICENSE

Professional Engineer, MN,
6988, 1962

Having witnessed and contributed to ongoing evolution in water system design over the last half century, Verne brings unparalleled expertise in water system design and operations, effective energy utilization, water metering systems, water rates, and financing improvements.

SELECTED PROJECT EXPERIENCE

▶ **New Pumps of Fridley and McCarrons Pump Stations - Saint Paul Regional Water Services - St. Paul, MN / Project Manager:**

Verne provided design and construction services for the purchase and installation of a 1,250hp pump at the Fridley River Station and a 1,000hp pump at the McCarrons Pump Station. The project also included replacement of the existing electrical switch gear at the Fridley Station. The purchase of the pumping units was unique, as we developed specifications and worked with the central purchasing agent to allow the purchase and payment for the pumps to be based upon the efficiency of pumping units offered.

▶ **Minneapolis Water Works Energy Retrofit - Minneapolis, MN / Project Manager**

Project included design and construction services for the purchase and installation of three 1,000hp pumps, four pumps ranging in size from 75hp to 600hp, six adjustable speed drives and new lighting fixtures. The new pumps and related equipment were installed in pump station No's. 4, 5 and 6 at the Fridley water complex. The retrofit improvements were installed to lower the energy costs associated with the Minneapolis water pumping operations.

▶ **St. Louis Park Energy Improvements-St. Louis Park, MN / Project Manager**

Design and installation of energy saving improvements including four VFD's on existing pumps, three new pumps, and motors with VFD's, SCADA KW demand control and constant control monitoring of the entire water system operation.

▶ **Reservoir and Rehabilitation of Existing Booster Station - Victoria, MN / Project Manager**

Verne developed a preliminary design report for a water storage reservoir and booster station. The project includes a 0.75M gallon buried water reservoir, reuse/rehabilitation of the existing booster station, the addition of an emergency generator and related water infrastructure improvements required for operation of reservoir and booster station.

▶ **Storage Reservoir and Booster Station - Loretto, MN / Project Manager**

Provided design and construction related services for their new ground storage reservoir, booster station, and related well improvements. The Project allowed the City to meet current water regulations by supplying water from their best well, increasing fire flow and improving water system pressure.



Bob Thayer, PE

Lead Electrical Engineer

Bob brings extensive electrical engineering experience to every project. He has guided numerous power generation, large industrial, and water/wastewater treatment facilities through design, construction and startup. Bob has designed controls, lighting and power distribution systems, more than 70 of which included on-site power generation for emergency backup and/or power peak shaving. He has also designed the utility interconnections for more than 50 landfill gas-to-energy power plants across the United States.

EXPERIENCE

44 Years

YEARS WITH HR GREEN

19 Years

EDUCATION

BS, Electrical Engineering,
University of Minnesota

REGISTRATION / LICENSE

Professional Engineer -
Electrical, MN, 16272

Also registered in CA, CO,
IA, IL, MO, SD, and WI

Class "A" Master
Electrician License, MN,
AM07226

Bob has 44 years of experience completing the analysis, design and construction services on electrical projects throughout Minnesota, including similar pump station projects for SPRWS.

SELECTED PROJECT EXPERIENCE

▶ Hazel Park Pump Station Electrical Improvements - City of St. Paul, MN / Lead Electrical Engineer

SPRWS commissioned a Master Plan which was completed in 2014. The Plan identified Capital Improvement Projects required over the next 40 years. One of the highest priorities identified in the Master Plan was to replace aging electrical infrastructure at the Hazel Park Pump Station. The goals of the project were to improve long-term reliability, improve maintainability, reduce operating expenses, improve safety, and provide for future pump station loads. HR Green provided Engineering Design and Construction Administration Services. Improvements were designed to minimize the impact upon pump station operations during construction. The new electrical equipment has been operating satisfactorily for approximately three years.

▶ West Side Pump Station Electrical Rehabilitation - St. Paul Regional Water | Electrical Engineer

The West Side Pump Station is SPRWS' second largest booster station and much of the equipment was decades old and in need of repair. In addition to full replacement of the electrical switchgear, starters, addition of an automatic transfer switch and upgrades to their PLC, HR Green addressed transient concerns and pump efficiency as part of the design.

Bob was responsible for leading the design of the electrical gear, coordination of I&C design and development of construction plans and specs.

▶ Sanitary and Storm Pump Station Rehabilitation Project - City of Minneapolis, MN - Electrical Engineer

HR Green worked with the City of Minneapolis on rehabilitation and standardization of 9 sanitary lift stations and 23 stormwater pump stations. The rehabilitation and standardization process started with separate engineering studies of the existing sanitary lift stations and existing stormwater pump stations. The studies focused on establishing reliability and standardization needs at each of the existing 32 stations, including estimated construction costs, for budgeting purposes.

Bob provided electrical services for these projects.



Dennis Neumann, PE

Lead Structural Engineer

Dennis provides key insights for structural analysis and design of municipal, commercial and industrial facilities. His projects have included water and wastewater treatment facilities, water resources structures, solid waste transfer stations, power generating stations, manufacturing plants and power transmission and distribution infrastructure. Dennis also does field work, including on-site inspection and assessment of existing structures as well as on-site observation of new construction.

EXPERIENCE

39 Years

YEARS WITH HR GREEN

19 Years

EDUCATION

BS, Civil Engineering,
Valparaiso University

REGISTRATION / LICENSE

Professional Engineer -
Civil, MN, 19807

Also licensed in IA, SD, IL

Dennis provides key insights for structural analysis and design of pump stations. He has experience with a wide range of structural materials including reinforced concrete, steel, masonry, aluminum, fiberglass, wood and stainless steel. Dennis also does field work, including on-site inspection and assessment of existing structures.

SELECTED PROJECT EXPERIENCE

▷ Sanitary and Storm Pump Station Rehabilitation Project - City of Minneapolis, MN - Structural Engineer

HR Green worked with the City of Minneapolis on rehabilitation and standardization of 9 sanitary lift stations and 23 stormwater pump stations. The rehabilitation and standardization process started with separate engineering studies of the existing sanitary lift stations and existing stormwater pump stations. The studies focused on establishing reliability and standardization needs at each of the existing 32 stations, including estimated construction costs, for budgeting purposes.

Dennis was the lead structural engineer on this project, including submittal review and site visits to inspect construction.

▷ West Side Pump Station Electrical Rehabilitation - St. Paul Regional Water | Project Manager

The West Side Pump Station is SPRWS' second largest booster station and much of the equipment was decades old and in need of repair. In addition to full replacement of the electrical switchgear, starters, addition of an automatic transfer switch and upgrades to their PLC, HR Green addressed transient concerns and pump efficiency as part of the design.

Dennis provided structural services on this project.

▷ 2022 Miscellaneous Pump Station Improvements - Preliminary Design - City of Sioux Falls, SD - Structural Engineer

The City's Collection System Master Plan had identified and prioritized pump stations throughout the City for rehabilitation and estimated a cost. With around \$2,150,000 available for funding, the City moved forward to contract for design services. HR Green visited the high priority sites with City staff and met for a scoping meeting. Several codes have changed since the stations were put in service, and HR Green identified a few things to help provide a safe access and environment. Based on recent experience, HR Green identified that the budget was not sufficient to complete all 7 pump station rehabs. HR Green recommended that the City first contract for preliminary design and cost estimating, so the City could prioritize which stations were critical with the budget available.

Dennis was a Structural Engineer on this project.

Education

*B.S. Architecture,
University of Minnesota
(1972)*

*M.S Architecture
University of Minnesota
(1978)*

**Professional
Registration**

*Registered Architect
Minnesota # 17388
NCARB #50419
LEED AP*



IMO

Mr. Russek is a Senior Architect with extensive experience with water treatment plants, wastewater treatment plants, lift stations and pumphouses. He has completed over two dozen such facilities in his career. Besides architectural design, Mr. Russek was responsible for construction documents, construction administration, specification writing, client representation, feasibility studies and architectural illustration. His work includes both remodeling and renovations. He previously taught architecture part-time at the University of Minnesota and full-time at a technical college. Mr. Russek continues to teach architectural history classes at middle and high schools through the AIA. His lengthy career includes many building types. However, municipal buildings, recreation buildings and industrial buildings dominate his portfolio. Besides being LEED Certified and Certified by the National Council of Architectural Registration Boards (NCARB), he is also a Minnesota-State Certified Energy Auditor and a member of the Society of Architectural Historians and the Institute of Classical Architecture.

Projects:

St Paul, Minnesota Wastewater Plant – Filtration and Incineration Building 1: Mr. Russek led the architectural work as a sub-contractor to TKDA. He designed a new electrical building to match the style of the upcoming headquarters facility. To meet building code, he also added an egress building. It extended a stairway from the on-site tunnel system up to grade. Other work was added in increments over time. The scheduling basis was 'as needed'. An example is a roof patch for vacated duct work at the FLT Building. These projects have all been successfully completed.

Ashland, Wisconsin Wastewater Plant - A remodeling of a failing building envelope. Corrected masonry details, replaced defective masonry, added new entries and installed a new roof.

Lake City, Minnesota Wastewater Treatment Plant - A modest building designed out of decorative concrete block to match the style of an adjacent building. Earth tones dominate with some colored accents to create a positive image. The building envelope requires no future maintenance.

Apple Valley, Minnesota Water Plant - Mr. Russek designed this building to match the adjacent public works building. It contains a sophisticated computer system that adjusts operation to meet demand.

St. Paul, Minnesota Water Plant Rapid-Mix Building - Part of a substantial upgrade to the St Paul Water Plant. Accommodates chemical mixing equipment. Designed to blend architecturally with the adjacent circa – 1920 water plant.

St. Paul, Minnesota Water Plant Chlorine/Ammonia Building - Part of the St Paul water plant upgrade. Poured-concrete construction maximizes the safety of a hazardous occupancy. Mr. Russek's design connects this new building to the style of the original plant. This facility was also designed to handle off-loading of potentially dangerous chemicals.

Examples of Lift Stations, Pump Houses Projects and Related:

- Rockford, MN – Lift Station
- Plymouth, MN – Lift Station
- Howard Lake, MN – Water Treatment Plant
- Lake City, MN – Wastewater Treatment Plant
- Dayton, MN – Pumphouse
- Winona, MN – Backwash Building
- Plymouth, MN – Pumphouse
- Minneapolis, MN – Pumphouse #9

APPENDIX

Project	
HR Green Project #	
Date	
DESCRIPTION AND AGE	
Equipment Type	
Unit Number or Identification	
Manufacturer	
Manufacturer's Model Name or Number	
Year of Installation	
Years in Service	
Material of Construction	
Components Replaced and Year :	
DESIGN CRITERIA	
Flow Capacity (gpm or mgd)	
Pressure Rating or TDH (psi or feet)	
Mass Capacity (lbs/hr, lbs/d, tons/d etc.)	
Volume (gallons)	
Surface Area (sq. ft.)	
Detention Time, theoretical maximum (minutes)	
Surface Overflow Rate or Loading (gpm/sq. ft.)	
Other Design Criteria :	
PROCESS INFORMATION	
Operational Summary :	
Control Methods :	
Monitoring Methods :	
Redundancy Summary :	
Operational Flexibility Options :	
Level of Criticality to Producing Water (Lag time from shut down to production difficulty) :	
OPERATORS ASSESSMENTS	
Overall Effectiveness :	

Level of Effort needed for preventative maintenance :	
Frequency of repair in last 2 to 5 years :	
O & M manual usefulness :	
MOTOR EFFICIENCY	
Nameplate HP	
Electrical Power (VAC/Ph/Hz)	
Starting Device/Type of Drive	
CONDITION ASSESSMENT - MOVING PARTS	
Typical Equipment Life - Moving Parts	
Owner/Operator Comments :	
Owner's Machinist Foreman Comments :	
Engineer assessment of condition with reasons :	
CONDITION ASSESSMENT - NON MOVING PARTS	
Typical Equipment Life - Non - moving parts	
Owner/Operator Comments :	
Engineer assessment of condition with reasons :	
Engineer assessment of pipe and supports near equipment :	

CONDITION ASSESSMENT - INSTRUMENTATION AND CONTROL	
Year of Installation	
Typical Equipment Life	
Owner/Operator Comments	
Owner's Electrical Foreman Comments	
Engineer assessment of condition with reasons :	



HRGreen®

TRANSPORTATION
+
WATER
+
GOVERNMENTAL SERVICES
+
LAND DEVELOPMENT
+
ENVIRONMENTAL
+
CONSTRUCTION

▷ HRGREEN.COM