

Draft Scope - Fridley Pump Station Evaluations

Station Overview

SPRWS obtains most of its raw water supply from the Mississippi River. This water is taken in and pumped by the Fridley pump station. The station consists of two intake structures. Three pumps are housed within one of those structures. Supporting infrastructure (travelling screens, piping & valving, electrical gear, flow metering) is utilized to support the intake and pumping operation. Additionally, SPRWS feeds ferric chloride at the Fridley station to help begin the settling process for solids suspended in the water. Finally, there is a surge tower on site to accommodate pumping dynamics. Water pumped from the Fridley station flows through a chain of four lakes prior to reaching the McCarron's WTP. The four lakes provide raw water storage volume in addition to settling time. Because of these lakes, SPRWS can tolerate outages in the pumping infrastructure at the Fridley station for up to two weeks.

The Fridley pump station is aging and may need significant capital investment.

Project Goals

SPRWS's goals in investing in the station are as follows. These goals are roughly prioritized; however, the prioritization structure is flexible.

1. Reliability and Risk Reduction – The Fridley station plays a critical role in supplying water to 450,000 people. SPRWS is unable to tolerate long term outages, and the top project priority is to identify and address or mitigate any potential issues that could cause a long-term outage in pumping.
2. Structural integrity – Address any issues with structural integrity in the buildings/foundations that could become more expensive or challenging to mitigate in the future.
3. Safety Improvements – Identify any safety concerns that could place SPRWS or contractor workers in danger during certain maintenance or operation scenarios. Mitigate these safety concerns through engineered solutions.
4. Long term durability of infrastructure – SPRWS will seek to make improvements that could improve the lifespan of infrastructure at the stations. For example, the intake stations have been observed to be very hot and humid environments, which may be problematic for electrical and mechanical infrastructure. Improvements to remedy any such conditions that could shorten the lifespan of infrastructure are desirable.
5. Operational Improvements/Economic Improvements – Identify systems and infrastructure that are maintenance headaches or that are inefficient to operate. Replace these pieces of equipment to realize long-term savings or to operate more efficiently.
6. Auxiliary/Miscellaneous Improvements

Project Scope

SPRWS staff has collaborated to develop a list of known issues at the Fridley pump station. The station is also the subject of a handful of engineering reports. SPRWS desires to work with Black & Veatch (B&V) to move the project forward by fully defining project scope and determining how best to deliver the project. Further, SPRWS desires to work with B&V to address some questions about the infrastructure.

Task 1 – Electrical Evaluations

1. PM/Admin
 - a. Provide administration and management functions required to successfully complete the work including budget and schedule control, document control, coordination of activities, monthly invoicing, and project closeout. Maintain a change register of any scope changes affecting the project budget or schedule. Scope changes shall be discussed with SPRWS, and written approval will be received before proceeding.

A. Transformer Replacement

SPRWS owns a transformer near the pump station that reduces voltage from Xcel Energy so it can be utilized by the pump station. The transformer is visibly worn and has not been part of a preventative maintenance program. Testing of this transformer by RESA in Q1 2024 showed that although it is working well, parts are no longer available for maintenance.

Given the age, the criticality, the noted issues, the lack of replacement parts, and the long lead times on transformers, SPRWS would like B&V to develop procurement documents for a new transformer, as detailed below.

1. Site Visit
 - a. Visit the site to verify the current condition and layout of the transformer and how it interfaces with the pump station.
2. Procurement Evaluation
 - a. Advise SPRWS on the most appropriate procurement method for the transformer. Questions to address include:
 - i. Should SPRWS order the transformer directly, for installation by either SPRWS or others?
 - ii. Should SPRWS hire a contractor who will be responsible for both supplying and installing the transformer?
3. Transformer Procurement Design – This scope assumes SPRWS would procure the transformer directly and have it installed by themselves or others. If it is determined in Task 3 that an alternative approach would be more beneficial to SPRWS, additional services beyond this scope of work will be negotiated.
 - a. Develop procurement Front Ends
 - b. Develop Transformer Technical Specification
 - i. Design an appropriate replacement for the transformer with input from SPRWS staff. Develop procurement front end documents and a transformer specification that are sufficiently detailed for SPRWS to be able to procure the transformer from a reliable vendor.
 - c. Drawing Development – No drawings are anticipated.
 - d. Respond to manufacturer questions during the procurement process.
 - e. Conduct Shop Drawing Review – Review transformer shop drawing.
4. Existing Transformer Plan
 - a. Support SPRWS in developing a plan for what to do with the existing transformer on site. Options include:
 - i. Rehabilitate existing transformer and keep as a “shelf” spare.

- ii. Rehabilitate existing transformer and install in parallel to a replacement transformer.
- iii. Provide a replacement transformer and demolish the existing transformer or determine if there is a market which would support a sale in its existing condition.

B. Medium Voltage Switchgear and Starter

The pump station includes a medium voltage switchgear lineup with fused switches used to protect the pump station electrical system from short circuit and ground faults. The switchgear also contains three synchronous motor starters for the pumps. The switchgear and starters are critical to the operation of the pump station and will be evaluated for reliability and vulnerability.

1. Site visit
 - a. Visit the site to verify the current condition, switchgear, and configuration of the motor starters.
 - b. Investigate available space for replacement of switchgear, if required.
2. Switchgear Evaluation
 - a. Assess switchgear for vulnerabilities, reliability, and redundancy.
 - i. Conduct visible inspection of switchgear and starters.
 - ii. Review exiting pump station design drawings.
 - iii. Review existing test reports.
 - b. Assessment will consider appropriate redundancy and reliability for operation of the pump station for the next 20-30 years.
3. Documentation
 - a. Provide recommendations for switchgear and starters.
 - b. Provide a high-level constructability plan including staging and schedule.
 - c. Prepare technical memorandum with a preliminary one-line diagram and opinion of probable cost for potential recommended improvements.

Task 2 - Project Priority and Delivery Plan

1. PM/Admin
 - a. Provide administration and management functions required to successfully complete the work including budget and schedule control, document control, coordination of activities, monthly invoicing, and project closeout. Maintain a change register of any scope changes affecting the project budget or schedule. Scope changes shall be discussed with SPRWS, and written approval will be received before proceeding.
2. Documentation Review
 - a. Review the Issues Log and the associated engineering reports, provided by SPRWS.
3. Site Visit
 - a. Visit the site to assess review the assessments made in the reports and confirm that no infrastructure has deteriorated since the date of the last report.
4. Condition Assessment Allowance
 - a. This task includes an allowance for condition assessment activities if deemed necessary by the project team. Activities may include site visits, testing, analysis, etc.

- b. If condition assessment activities take place, findings will be summarized in a condition assessment report.
- 5. Prioritization
 - a. Develop a list of potential investments/projects. Prioritize these investments by assigning values for likelihood of failure and consequence of failure, in collaboration with SPRWS, based on the goals stated above. Evaluate budgetary capacity with SPRWS staff and determine which projects should be funded based on the prioritization.
- 6. Delivery Plan
 - a. Once the project scope has been developed, support SPRWS in developing a delivery plan for the project scope.
 - i. Determine contracting method to be utilized. Should all work be housed under a single general contractor? Or should separate contracts (ex: mechanical, electrical, structural) be obtained?
 - ii. Evaluate alternative delivery options (i.e. CMAR) for the project?
 - iii. Develop a construction sequencing plan to maximize efficiency and minimize disruption to operations.