

DBP Compliance

EPA Quarterly Update



Quarter 2 Update: July – September, 2022

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The Springfield Water and Sewer Commission (Commission) is embarking on large-scale upgrades to replace 50- to 100-year-old drinking water infrastructure and to achieve compliance with regulatory limits for disinfection by-products (DBPs). This is a quarterly update on projects related to DBP compliance and water supply capacity.

The following projects to reduce Disinfection By-Products in the Commission's drinking water and maintain a consistent supply of safe drinking water have progressed over the last quarter:

- **Clearwell & Backwash Pump Station project** - CH Nickerson completed construction of the clearwell structure, hydraulic control structure, and inlet meter vault and began backfilling activities. A shutdown of our rapid sand filters and existing clearwell is scheduled for November, to allow for the contractor to tie into our existing 48-inch rapid sand filter effluent line.
- **Rapid Sand Filter #6 Underdrain – COMPLETE** – The replacement of the of Rapid Sand Filter #6 underdrain was completed. RH White replaced the underdrain that failed in January with a new underdrain system and the filter was returned to service in August.
- **New Water Treatment Plant Design** – Hazen completed an alternatives analysis and draft Basis of Design Report. The report includes preliminary evaluations of all major components of the new water treatment plant, including layout, capacity, residuals handling options, process design criteria, raw water conveyance, permitting, and design parameters for the electrical, HVAC, structural, and civil components of the project.
- **42-inch Raw Water Transmission Main** – We evaluated alternatives and selected the option to repair the existing pipeline and install a new energy dissipating valve and structure at the outlet at the Sedimentation Basin. AECOM is progressing with the final design and bid documents for this project.
- **Aluminum Chlorohydrate (ACH) Bulk Chemical Storage/Chlorination System Improvements** - RH White completed the replacement of components of the gaseous chlorine system. The gaseous chlorine system was placed back in service in August. RH White is approaching completion of the new ACH bulk storage tank system which is needed to replace the totes currently used.
- **Cobble Mountain Hydroelectric Station Improvements for Primary Raw Water Conveyance** - Stantec and Kleinfelder completed field inspections of the facility and submitted a condition assessment report for the facility over the last quarter. They are currently working on an alternatives analysis for upgrades to the hydropower station.

We have included additional information for each project on the following project update pages.

Please contact us if you would like more information about these projects. More information is also available at <https://waterandsewer.org/projects/>.

Clearwell & Backwash Pump Station

- Project Purpose:** This facility will replace the existing clearwell and backwash, domestic, and process water pumps. The existing clearwell is a 1920's slow sand filter that was retrofitted for use as a clearwell and backwash water storage tank for the direct filtration plant in the 1970's. The structural integrity of the clearwell is uncertain and the roof is leaky, allowing rainwater to infiltrate into the filtered water. The clearwell cannot be taken offline for maintenance, presenting a single point of failure for the direct filtration plant. The existing backwash, domestic, and process water pumps are original to the plant and are regularly breaking down and in need of repair. This project will provide the reliability and redundancy needed to maintain existing operations and will also function as the first component of the new water treatment plant.
- Delivery Approach:** Design-Build with AECOM (OPM), Tighe & Bond (Engineer), and CH Nickerson (GC). Funded by SRF.
- Design Progress:** Tighe & Bond submitted the 100% design in late June. AECOM sent comments back in July, and Tighe & Bond is currently working on finalizing the design.
- Const. Progress:** CH Nickerson completed the concrete work associated with the clearwell structure, hydraulic control structure, and inlet meter vault and began backfilling around the structures.
- Supply Chain:** Pricing for large diameter ductile iron pipe has been impacted by pandemic supply chain issues and the Ukraine/Russia conflict. Delivery dates have also been uncertain and have caused a slight delay in the substantial completion date, although some delivery lead times and anticipated cost increases have recently been reduced. The main supply issue driving schedule seems to be related to electrical system components.
- Project Delays:** Changes in design scope as requested by the Commission and AECOM during the 60% design review, along with pipe delivery delays, have resulted in a four-month delay in project completion.
- Operational Issues:** No significant operational issues occurred in Quarter 3. A shutdown of the rapid sand filters and existing clearwell is scheduled for November to facilitate a connection into the 48-inch effluent line that delivers filtered water into the existing clearwell. This will require careful shutdown of the rapid sand filters and reliance on the slow sand filters along with temporary feed systems. A permit application for the shutdown and temporary chemical feed systems was submitted to MassDEP and is pending approval.
- Schedule:** Project scheduled to be substantially completed in June 2023 (delayed from February 2023) but is currently projected to be delayed to August 2023 due to pipe and equipment lead times.



Clearwell structure – concrete work completed

Rapid Sand Filter #6 Underdrain Repairs - **COMPLETE**

Project Purpose: This project replaced the Rapid Sand Filter #6A underdrain system after it failed in January. The rapid sand filters were constructed in the 1970's as part of the direct filtration plant, and the clay tile underdrain systems are original to the plant. The plastic nozzles were previously replaced between 6 to 12 years ago. The nozzles in Filter #6 were the oldest nozzles in the plant and were last replaced 12 years ago.

The clay tile underdrain structurally failed during a routine backwash, most likely due to an air blockage. This project replaced the entire underdrain system with a new Leopold Block-style system that reduces the risk of air blockages and restore use of the filter until the new plant is online. The Commission is installing air vents and air release valves on all six filters in conjunction with this project to reduce the risk of an underdrain failure in the remaining filters.

Delivery Approach: Design-Bid-Build with AECOM (Engineer) and RH White (Contractor).
Funded by cash reserves.

Progress: RH White installed the new Leopold Block-style underdrain system and the filter was restored to service in August.

Supply Chain: No issues at this time.

Project Delays: The Leopold Block-style underdrain system selected for this project included a custom fabricated steel air header pipe. The delivery of this pipe was delayed due to schedule miscommunications and fabrication schedule limitations, delaying project completion by six weeks. Demolition work was delayed when asbestos containing materials was found and required remediation and coordination with MassDEP.

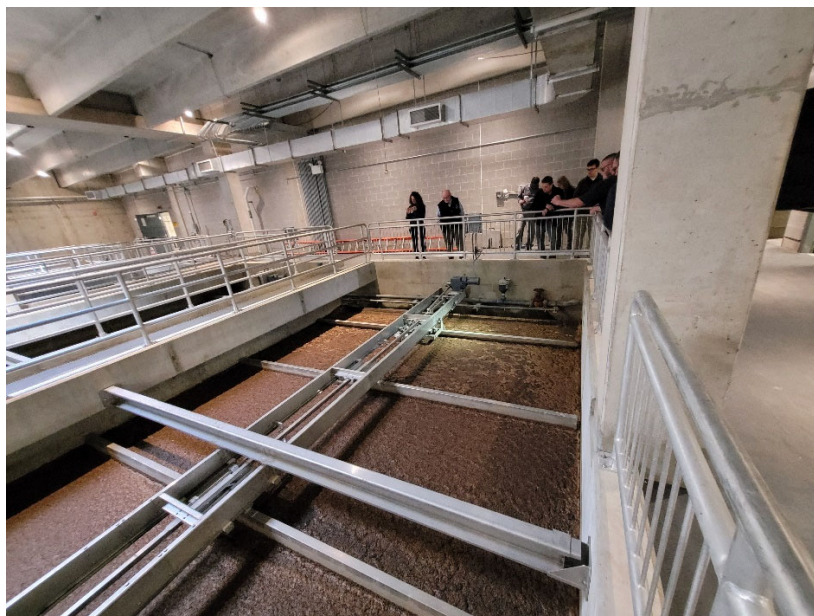
Schedule: Project completed in August 2022 (originally July 2022).



Installation of the new Leopold block-style underdrain system

New Water Treatment Plant Design

- Project Purpose:** This project is for design and construction of a new water treatment facility to meet the system demand while providing a higher level of treatment to achieve long-term, consistent compliance with the Disinfection By-Product (DBP) Rule. The new WTP will replace the existing direct filtration and slow sand filtration plants, which were not designed to remove adequate dissolved NOM to meet current regulatory limits for HAA5s and THMs.
- The Commission has frequently been in non-compliance for HAA5s since 2018. To address this issue, after completing several studies, the Commission identified that modifications to the existing plant processes would not be sufficient to achieve compliance, and that the addition of clarification was needed to reliably remove NOM and maintain compliance. Dissolved Air Flotation (DAF) with a polyaluminum chloride coagulant was selected as the clarification process for the new conventional plant.
- Delivery Approach:** Design-Bid-Build with Hazen (Engineer). Planned financing by WIFIA and SRF.
- Progress:** Hazen completed an alternatives analysis and draft Basis of Design Report in Quarter 3. The report includes preliminary evaluations of all major components of the new water treatment plant, including layout, capacity, residuals handling options, process design criteria, raw water conveyance, permitting, and design parameters for the electrical, HVAC, structural, and civil components of the project.
- Supply Chain:** Supply chain impacts on this project are currently unknown, but are a considerable possibility and concern. Hazen is considering early works packages to possibly facilitate the early procurement of long lead time materials to avoid lengthy delays.
- Project Delays:** None at this time.
- Schedule:** This project is scheduled to be completed end of 2027, as required by the terms of the WIFIA Loan. To meet this aggressive deadline, early works and demolition packages will be executed to prepare the site prior to the completion of the treatment plant design as well as procure key long lead time items.



Commission staff overlook a DAF tank on a site visit to a local water treatment plant.

42-inch Raw Water Transmission Main

Project Purpose: This project is for the repair of the 42-inch bypass raw water conveyance PCCP pipeline, which was damaged when a new energy dissipating valve failed in 2019. The 42-inch bypass provides an important route for raw water to bypass the Cobble Mountain Hydroelectric Station (CMHS), the Intake Reservoir, and the 72-inch Intake Tunnel. Returning this route to service will allow the Commission to take the CMHS and 72-inch Intake Tunnel offline for maintenance when needed.

With the 42-inch raw water transmission main out of service, the Commission currently relies on the Diversion Gates (the low-level dam outlet) to release water from the Cobble Mountain Reservoir when the CMHS is routinely offline for maintenance. This outlet was not designed to operate as a regular intake and is not operable remotely, requiring staff to regularly perform a complicated confined space entry that, in an emergency, would require assistance from a technical rescue team. With the 42-inch bypass out of service, there is currently no bypass for the 72-inch Tunnel.

Delivery Approach: Design-Bid-Build with AECOM (Engineer).

Progress: Over the last quarter, the Commission considered alternatives to restore this important raw water conveyance route. Alternatives considered included lining, spot repairs, and full replacement with a new steel main. The Commission selected the option to repair the existing pipe and construct a new energy dissipating valve and structure at the outfall.

AECOM is working on the preliminary design.

Supply Chain: Supply chain impact on this project is uncertain. Current lead times on materials indicate that this may be less of a concern than some of our other projects, but possible long lead time items include the energy dissipating valves (EDVs).

Project Delays: None at this time.

Schedule: Project anticipated to be completed end of 2024.



Outlet of the 42-inch bypass water supply main at the Sedimentation Basin

ACH Bulk Chemical Storage/Chlorination System Improvements

Project Purpose: This project will provide a bulk storage tank and piping for Aluminum Chlorohydrate (ACH), one of the coagulants used at the plant. ACH has been used since 2016 but has been stored in totes in a temporary configuration.

The project also includes replacing components of the gaseous chlorine system that are due for routine replacement, including the chlorine tank scales and all chlorine piping. This work will allow the gaseous chlorine system to continue to operate reliably until the new plant is online.

This project will allow the existing Direct Filtration Plant and chlorine system to continue to operate reliably until the new plant is online.

Delivery Approach: Design-Bid-Build with Tighe & Bond (Engineer) and RH White (Contractor).

Progress: RH White completed the replacement of components of the gaseous chlorine system. The gaseous chlorine system was placed back in service in August. RH White is approaching completion of the new ACH bulk storage tank system.

Supply Chain: None at this time.

Project Delays: The project has been delayed by two months due to delays in completing the electrical work associated with the ACH bulk storage tanks.

Schedule: Project scheduled to be substantially completed August 2022 but now projected to be completed in October 2022.



New bulk storage pads and secondary containment in the new ACH storage room.

Cobble Mountain Hydroelectric Station Improvements for Primary Raw Water Conveyance

Project Purpose: The Cobble Mountain Hydroelectric Station (CMHS) is an essential component of the Commission's raw water conveyance system. As part of the primary raw water conveyance route, the CMHS delivers water from the Broome Gate Intake down to the Intake Reservoir while generating power by using the 450-foot elevation difference between the two reservoirs. This project will identify alternatives for conveyance and hydropower generation in response to failing infrastructure at the facility. The existing turbines have reached the end of their operational lives, and only one out of the original three turbines is currently operational on a restricted schedule to reduce additional wear.

When the CMHS is offline for maintenance, the remaining routes for raw water conveyance are the 42-inch bypass (currently out of service) and the low-level Diversion Gates, which are not designed for regular operation. Restoring the CMHS conveyance route is vital to establishing reliable raw water conveyance for the Commission.

Delivery Approach: To be determined.

Progress: Stantec and Kleinfelder completed the first comprehensive field inspections of the facility and submitted a condition assessment report for the facility over the last quarter. They are currently working on an alternatives analysis for the hydropower station.

Supply Chain: None at this time.

Project Delays: None at this time.

Schedule: Project schedule has not yet been established.



Cobble Mountain Hydroelectric Station



Engineering Capital Projects Schedule

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