

Squamscott River Sewer Siphons Project

The Squamscott River Sewer Siphons project has encountered several obstacles, both delaying the project, and changing its scope. Below is a community project update that explains the project's purpose, scope, and timeline as well as addresses what the Town is doing to move forward. We are confident that the staff has utilized Town resources to the fullest extent by working with third-party experts, requesting alternatives, and analyzing physical and financial risks at each step of the way.

Project purpose and Scope

In FY 2020, a Town Warrant for \$1.6 million dollars was approved to design and construct a new siphon to expand capacity, and included money (\$200,000) towards a design to upgrade Webster Ave Pump Station. The existing two 8-inch sewer siphon pipes that were installed in the 1960s were slated to be cleaned and inspected. An inspection of the pipes revealed holes in the pipes allowing river water to infiltrate. The project focus shifted to include maintaining existing sewer flows in addition to increasing capacity. After additional evaluation of options, the decision was made to install three new siphon barrels as the existing siphons were too badly deteriorated to work on without the threat of failure.

As the Town moved forward with the design and engineering of the new three-barrel system, various geotechnical boring data was utilized. New borings at the entry pits on both sides of the river were completed. Previous boring data from the Main pump station project, data from the Phillips Exeter boat house project, and data from the original construction of the siphons were all examined. This existing data allowed Town staff and the consultants to feel confident as to their understanding of the river bed substrates. No ledge was anticipated at the proposed project design depth. The siphons project budget was revised to \$2.6 million by adding Congressional Direct Spending (\$600,000), and state/local ARPA funds (\$600,000) to the original budget. Construction bids for the three barrel system were opened in 2022 and a bid award was made in the amount of \$1,627,750 by the Select Board.

Construction Summary To Date

In early December 2022, the contractor and subcontractor mobilized and pipes were fused and laid out in Swasey Parkway. A drill rig was set up on the Mill side of the river with drilling expected to last five days to install one barrel.

Drilling began from the Mill side of the river. The first attempt hit ledge at approximately 80 feet and a second attempt at 100 feet. Rock drilling equipment was required to continue. Subsequently, a letter of differing conditions was given to the contractor allowing them to mobilize additional equipment necessary for a rock drill. The Town and the contractor agreed that the project would be re-evaluated after completing a single barrel to understand the potential cost of a three barrel system.

The contractor and subcontractor mobilized new equipment to the site to begin rock drilling of a pilot hole and proceeded through the ledge. They met challenges, including limited ability to

steer the new heavier rock drill bit/heads and issues with the drill bit/head wearing out due to the hard ledge. On the fifth attempt to complete the pilot hole, drilling slowed dramatically, which increased the project's cost. On February 16, 2023, the contractors completed the 6-inch pilot hole to the Mill side of the river. The work plan was to begin reaming, expanding the hole first using a 12-inch reamer and then an 18-inch reamer and finally, pulling the 12-inch siphon pipe through the drill hole. During reaming, the project experienced a second fluid release of bentonite clay. NH DES was notified, and an additive was pumped to seal off the fluid release. On February 20, a seismic graphing contractor attempted to map the location of the ledge. The goal was to map the contours of any ledge along the proposed drill paths and give the Town and contractors more information, as well as look for alternative locations for barrels two and three if the Town was able to move forward. Unfortunately, due to bubbles/gas in the sediment, the seismic graphing contractor did not produce usable data.

At this point, various options and ideas were considered, such as enlarging one hole to fit 2 or 3 pipes. This idea was not recommended by the drill team because of the potential for another fluid release. The team also discussed completing a single siphon across the river and then repairing the two existing siphons. This would protect Jady Hill by acting as a bypass in the event of a collapse. After discussions with the consultants, this method was not recommended as it was considered too risky. The lengthy and costly drill process continued to be under regular review by the Town Manager, Town staff, engineers, and consultants.

On February 23 the shaft on the drill rig pushing the 12-inch reamer from the Swasey Parkway side broke, with the reamer halfway through the river at approximately 400 feet. Drilling was halted and the Town was given three options by the drill teams. Option one was to weld a casing pipe over the drill shaft and push it into the drill hole from the Mill's side and attempt to push the stuck equipment back to the Swasey side for extraction. The contractor and subcontractor felt this option did not have a high potential for success and the estimated cost was \$400,000. Option two was to find the location of the break and determine whether excavation to fix it. Option three was to vacate the current drill location and start a new hole at a different location. On March 23, the contractor, subcontractor, engineering teams, third-party experts, and Town staff watched as the broken rod was removed from the hole. The break occurred at 103 feet from the drill rig and was approximately 35-40 feet below the surface of Swasey Park. The cost estimate to excavate down to the break and reconnect the broken rod is \$750,000.

How do we move forward?

The Town has an updated contingency plan in the event the existing siphons fail which includes implementing a bypass pumping system. Sewer flows would be collected upstream of the existing siphons and pumped across String Bridge and tied into a Water Street manhole. The plan could be implemented quickly, The project is stalled as the Town determines how to proceed, identifying any potential risks and investigating all alternatives. The Town requested that the consultants formulate the hydraulic calculations for (2) 12-inch barrels instead of the three-barrel system proposed as well as potential new routes around the ledge.

If the Town moves forward with a new hole, the contractor has recommended more substantial rock drilling equipment and they have provided a new daily cost estimate for this increase. The use of a conductor barrel to ensure any drill holes are not lost would be in place if another attempt moves forward.

Although the project methods have changed, the project goals have not. The Town needs to replace the existing deteriorated sewer siphons, and increase sewer capacity for future Town growth. The challenging riverbed conditions have forced the Town to review all alternatives. We are working diligently with the engineering team, contractors, and legal counsel to understand all potential financial implications and determine a path forward.

At this time, we can only speculate on the project's cost however, we do expect changes will result in a cost increase. The increase will not be the estimated \$3.5 million for a single sewer siphon times three. The reason is the \$3.5 million estimate includes more than just the directional drilling, as it includes other components of the project such as sewer main reconstruction, inlet & outlet structures, the contractor's cost to change equipment, the plan for the change in conditions, and drilling through 800 ft of rock. The increased costs would not be the same for barrels two and three because we now have more accurate data on what the drill team will be drilling through to complete the project. Various options are being vetted, such as reducing the project to a two-barrel system, or drilling a hole large enough to support two siphons in a single drill hole. Any change in the system design will need to be approved by the NH Department of Environmental Services, as they regulate sewer capacity regulations. There is an urgency to repair the existing sewer siphons due to their condition and the potential for failure. The project may have to be phased in to meet our final goals.

This project is challenging, and options, costs, and timelines are unknown at this time. The project is more complicated than initially expected; however, not unattainable. The siphon project requires more planning, research, and thinking outside the box to deal with the change in conditions. Town staff, consultants, and the Select Board remain committed to determine the most effective and responsible path forward for this project. As soon as more information is available, the team will give a report to the Select Board. If residents want to stay updated on the project, please join our Select Board meetings or go to the DPW website for more information. Please direct any questions you may have to the Town Manager's office.