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Wastewater Pump Station Elimination

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Case Study

Wastewater pumping stations, also known as pump stations or lift stations, are facilities designed to move wastewater from lower to higher elevation through pipes. Key elements of lift stations include a wastewater receiving well (wet-well) sometimes equipped with screen or grinder to separate coarse material; pumps and piping with associated valves; motors; a power supply system; an equipment control and alarm system; a ventilation system; and sometimes including an odor control system.

Scarborough

By the Numbers



Population ~17,000
23 District Pump Stations
68+ miles of collection system
23.5 miles of force main
2.5 MGD Treatment Plant

The Scarborough Sanitary District manages wastewater collection and treatment for the town of Scarborough Maine, on the coast of southern Maine. The Sanitary District (<http://scarboroughsanitarydistrict.com/>) manages more than 68 miles of collection system piping (see sidebar), the majority of which is 8-12 inch PVC pipe ranging from less than 10 years old to over 40 years old. The system includes more than two dozen, District and privately owned, pump stations. The Scarborough Sanitary District, created in 1969, is a stand-alone organization with an elected seven-member Board of Trustees.

The original collection and treatment system was installed in 1963 to serve primarily the school department and town offices, discharging to the Nonesuch River. The treatment plant was

tucked between a rail line (now a rail trail) and a marsh near the Nonesuch River. This facility was upgraded to secondary treatment in 1969.

Between 1975 and 1980, the District formulated a town wide wastewater plan. This wastewater plan resulted in the construction of a new 1.8 million gallons (average) per day secondary treatment facility at a new location, near the ocean, with a new deep ocean outfall. To save money, the old treatment plant was converted to a pump station, PS-4, to pump the wastewater to PS-6 on its way to the new treatment plant near the coast.

Trouble Spot

Because it had been a treatment plant, the conversion to a pump station created problems due to the sizing of the facility, and odors were a common complaint at PS-4. Despite modification and rebuilds over the years, the pump station never performed satisfactorily.

The location of PS-4 was also within half a mile of another pump station, PS-11, serving a neighborhood on the other side of the marsh. PS-11 had been installed in 1984. It was a can style pump station and not an ideal working environment for



View between Pump Stations



Old PS 11

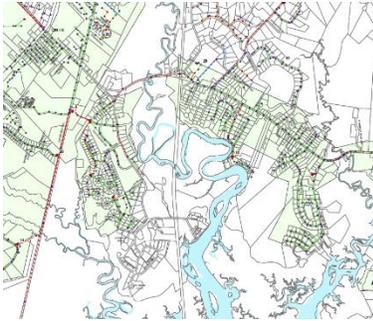
operators. It was also at the point of needing an upgrade. An evaluation was done which looked at replacing both pump stations at a cost of \$3.45 million.

The Fix

During the evaluation, the chief operator, who had been with the district when the old treatment plant was converted and the new treatment plant was built, noted that there was already a pipe under the marsh from PS-4 toward PS-11, which had been the outfall pipe for the original 1963 plant. Based on this knowledge, the evaluation was expanded to

consider eliminating one of the pump stations. An estimated \$0.75 million in construction costs could be saved by combining the two stations.

Combining these two pumping stations would both eliminate one problematic pump station and upgrade an older-style pump station. The re-routing of the flow would also eliminate ¾ mile of old force main, replaced with 1,000 feet of new force main and require pumps with 50 hp motors as compared to the original 200 hp motors at PS 4, adding to operational savings.



Map showing area of pump stations and collection system by Nonesuch River

The new station sits near the location of the old PS-11, but is a much improved pump station design, with sound proofing in the walls and an odor management system to protect the neighborhood.

"Institutional knowledge was a key factor in developing this solution. The chief operator, who had historical knowledge, recognized that the old outfall pipe could be used to connect the two stations."

***David Hughes,
Superintendent,
Scarborough Sanitary
District***

Added Benefits

The emergency generator at PS-4 had recently been replaced. With the combining of the these stations, the District was able to repurpose this generator and use it to replace the aging generator at the wastewater treatment facility.

The old railroad line had been turned into a rail trail, and the Scarborough Sanitary District offered the old PS-4/Original Treatment Plant site as a location for a town parking lot to allow better access to the rail trail.

Summary

Often, an emergency is needed to move a project to construction. That can be expensive. In other situations, as in this case, assessing the conditions of the system and the need for upgrades, and also involving staff that operate the system, can result in a better solution. The Scarborough Sanitary District addressed both the needed upgrades as well as the operational problems, resulting in cost savings for the District as well.



New Scarborough Sanitary District PS 11

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