

## Back River project overhauls sewage infrastructure

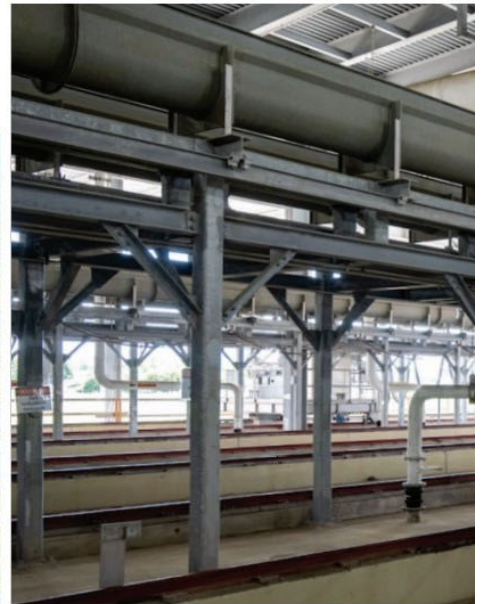
Some construction projects can only be described as massive.

The Back River Wastewater Treatment Plant Headworks and Wet Weather Equalization Facility project required crews to rapidly and precisely construct an influent pumping station (IPS), fine screen facility (FSF) and grit removal facility (GRF) and two 18-million gallon equalization tanks to create a facility capable of treating up to 750 million gallons of sewage daily.

As the second contractor to start work on site, **Clark Concrete** dug into the project's enormous cast-in-place concrete requirements. For the GRF, Clark poured 19,750 cubic yards of concrete to create eight channels rimmed by walls that were 23 feet high and 120 feet long. At the IPS, it created two 50-foot-deep wells, four 30-foot-deep channels and two 16-foot-tall ogee ramps.

The facilities would have to be water-bearing and, in some locations, withstand 40 feet of head pressure. Consequently, the concrete construction required specialized mix designs for walls thicker than three feet, meticulous timing and temperature-control measures for pours, exhaustive quality control measures, "miles and miles of waterstop" and BIM modeling that mapped out pour joints to minimize the possibility of leaks, said Nathan Scalla, Project Executive at **Clark Construction**, which served as the general contractor along with **Ulman Schutte**.

Ultimately, the facilities also had to pass a water-tightness test. Project specifications stated the IPS could only lose 0.5 percent of its fill volume in a 24-hour



*Members of the project team say it's the prettiest waste water treatment plant they have ever seen. Building the new Back River Wastewater Treatment Plant Headworks and Wet Weather Equalization Facility, however, challenged crews to do much, much more than create an attractive structure. Working under a tight and unmovable deadline, they had to create infrastructure that could treat up to 750 million gallons of sewage daily.*

period. Testers filled the building with 2.7 million gallons of water and determined the surface level could fall no more than one-seventh of an inch in a day. The IPS passed, losing only one-sixteenth of an inch of water.

Structural requirements and design tolerances had to meet not only the massive size and water pressures of the facilities, but also support masses of heavy equipment that would operate inside.

“The grit facility is not only a water-bearing structure. It also has train rails that run on top of the walls so the tolerances were very tight,” Scalla said.

The team from Ulliman Schutte tackled the enormous and exacting task of installing equipment and mechanical systems, including multiple lines of 64-inch steel pipe, 20-ton valves, 1500 HP pumps and wastewater screens that extended 20 feet above and 35 feet below the finished floor. In total, crews installed more than two miles of piping that

required welding, fusing, bolting, clamping and gluing, and ultimately pass a leak test. Simply getting some equipment in place required both Herculean efforts and creative solutions.

“Some equipment was so large that it had to be installed before the superstructure of the building went up,” Scalla said. “The screens went into two facilities ahead of the superstructure. The pumps were installed early summer 2019 and we built around them for a year and a half.”

However, installing the eight large pumps prior to superstructure construction wasn't a simple act of craning them into place. Crews used a gantry crane to lift the pumps which weighed up to 34,000 pounds apiece, to a central position on the pump floor. Crews then shuffled and lifted the pumps across the floor — over suction piping, pedestals and other protrusions — to set them in place.

Masons on the project faced their own daunting task of installing over 190,000 square feet of concrete masonry units on walls that included a mix of brick and ground-face patterns, varying load-bearing requirements, heights that sometimes exceeded 50 feet and some complex combinations of masonry, precast and steel.

“I'm not biased or anything, but I think it is one of the best looking wastewater treatment plants from an architectural perspective,” Scalla said. “We did a tremendous amount of work in a short period of time and had everything operational by the deadline of December 31, 2020. The team delivered a great facility to benefit the residents of Baltimore City and Baltimore County, and to protect the Chesapeake Bay.” X



*Statistics from the Back River project provide a glimpse into the magnitude of the project. Working included 19,750 cubic yards of poured concrete, 190,000 square feet of concrete masonry units, multiple lines of 64-inch steel pipe, wastewater screens that extended 20 feet above and 35 feet below the finished floor, and pumps weighing up to 34,000 pounds that had to be shuffled and lifted across the floor.*