

Building a Bypass with Meticulous and Multiple Back-up Precautions to Ensure 100 Percent Uptime

The Xylem team came up with comprehensive rental solution capable of standing up to a 100-year storm

Lancaster, Pennsylvania, like hundreds of other cities across the nation, is tackling the challenges of upgrading its water and sewage system as efficiently and cost-effectively as possible. A key part of the city's endeavor is the upgrade of four pumping stations along the Conestoga River to reroute more stormwater to the City's Advanced Wastewater Treatment Plant (AWWTP), versus draining it into the river.

One of the four upgrade projects involved expansion of the Lancaster North Sewage Pumping Station. The job required a temporary bypass to circumvent the station during the upgrade.

"This wasn't a straightforward construction job, so it was important to have a good team of experienced professionals in place," says Jeff Laney, Project Manager for Wickersham Construction & Engineering, a Lancaster firm with more than 100 years of experience in commercial, industrial, environmental and wastewater projects.

The City hired CDM Smith as consulting engineers to design the project. Wickersham won the bid for the construction work, and Xylem was hired to design and implement the bypass.

Solution

The North Sewage Pumping Station receives influent from three different lines - a 120-inch combined sewer and storm water line from the city, plus one 30-inch and another 24-inch sewer line coming from different municipal areas.

The average daily flow into the pumping station is roughly 9 to 12 million gallons-per-day (MGD), with capacity for twice that flow in a storm event. As a precautionary measure, the Xylem team designed a bypass that could handle upwards of 24 MGD, enough to stand up to a 100-year storm. Meticulous and multiple back-up precautions were taken to ensure 100 percent uptime and optimum efficiency, and to eliminate the risk of a sanitary sewer overflows (SSOs) caused by a failed pump or power failure.



The rental pumps and piping were an ideal temporary solution that provided the integrity and performance of a permanent system.

CUSTOMER: Wickersham Construction & Engineering and City of Lancaster, Pennsylvania

CHALLENGE: Provide a bypass during the Lancaster North Sewage Pumping Station expansion project that could handle upwards of 24 MGD - enough for a 100-year storm - and ensure 100 percent uptime and optimum efficiency.

PRODUCTS:

- 6 Godwin HL250 pump-sets with 12-inch discharge flanges (4 electric, 2 diesel), with level transducers, high-level floats and auto-dialers
- 6 Variable Frequency Drive (VFD) units
- 2 Back-up Generators
- HDPE piping equipped with flow meters

RESULT: The local Xylem team, working together with the City of Lancaster, CDM Smith engineers, and Wickersham Construction, provided a comprehensive bypass and backup solution during a three- to six-month expansion of the North Lancaster Pumping Station. Xylem's Godwin pump-sets provided steadfast service while providing the municipality with significant cost savings on their rented equipment.

“We needed a solution that would be in place for three to six months and wouldn’t falter” says Laney. “Knowing that the bypass was in good hands with Xylem allowed our Wickersham team to focus on the construction component, and that was key.”

To move the maximum amount of wastewater, Xylem recommended that Wickersham rent six Godwin HL250 pump-sets with 12-inch discharge flanges. Four of the six units were electric pumps, and they were established as the primary pumps for the project, running from a temporary power line. Each pump was installed with a Variable Frequency Drive (VFD) unit in order to control pump speed and enhance power usage and efficiency.

For additional energy savings, each pump was equipped with a level transducer pre-set to turn the pumps on/off depending on fluid level in the wet well. A back-up generator was installed to ensure the electric pumps would work in case of a power outage and two diesel-driven pumps served as redundant back-up pumps if any of the four primary pumps failed.

The bypass included twin discharge lines of 24-inch high-density polyethylene (HDPE) pipe, each fed by two pumps and equipped with flow meters that fed data into a PLC controller and the plant SCADA system. This alerted plant operators about the flow amounts coming their way from the bypass, and allowed the facility to adjust their influent flow rates in case of spikes or drops.

Xylem also installed high-level floats that monitored flow rates and would assure operators that the bypass was working and handling the flow. The floats were equipped with auto-dialers to alert Wickersham personnel and the project foreman when the back-up pumps kicked on - saving the city money compared to personnel for 24/7 pump watch duty.

Results

When the Xylem team activated the large-scale bypass, the expansion construction began.

For the duration of the project, Wickersham rented the pumping equipment, piping and accessories from the local Xylem branch. This meant Wickersham wouldn’t have to worry about long-term maintenance and upkeep of the equipment. They could also focus on their core business and their primary focus of the project - the pump station upgrade and expansion. “To be able to have this type of comprehensive solution, with the ability to rent whatever was necessary for the bypass project, was a tremendous cost savings to Lancaster and made our bid very competitive,” says Laney.



The Godwin HL250 pumps and piping were moved into place by crane.



Four of the Godwin rental pumps used for the bypass.