NAME:
Southside Wastewater Treatment Facility

LOCATION:
St. Cloud, Fla.

PLANT SIZE:
6 mgd

INFRASTRUCTURE:
Headworks with screening and grit separation; odor control system; two parallel biological treatment trains; three clarifiers; four cloth media disc filters; high-rate chlorine contact basins and extensive reuse storage.

The city of St. Cloud once operated two WWTFs. Today it treats all wastewater at the recently expanded Southside WWTF.

First-year performance records indicate that the 6-mgd facility may be operating at approximately 8 to 9 mgd.

Southside WWTF is designed to accommodate additional treatment infrastructure should service demand increase.

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SizedUp

Sound infrastructure and manpower bolster a strategic WWTF expansion

By Caitlin Cunningham

Situated less than 30 miles outside of Orlando, the city of St. Cloud, Fla., takes pride in its small-town feel, ample parks and 2.5 miles of scenic lakefront. Recently, the growing community added to its marina and constructed a new city hall and senior center facilities. It also completed a major wastewater treatment facility (WWTF) expansion that allowed for the decommissioning of a second WWTF, thus concentrating operations in one location.

Prior to the conclusion of this project, St. Cloud operated the two facilities—Southside WWTF and Lakeshore WWTF—at a combined capacity of 4 million gal per day (mgd). Having concluded its expansion of Southside WWTF, the city now treats wastewater at this single, 6-mgd facility. No longer in service, Lakeshore WWTF will be demolished and the land turned over to the Parks and Recreation Department for use in future lakefront park expansion.

Planning Phase

"In 2004, it became clear that the vast quantities of undeveloped land within the St. Cloud service area would lead to a service demand well beyond the combined ratings of the city's Lakeshore and Southside WWTFs," said Todd Swingle, environmental utilities director for the city of St. Cloud. "Additionally, growth patterns in the service area were resulting in the Southside WWTF racing toward capacity limitations while additional capacity remained at the Lakeshore WWTF."

To address these balance issues, accommodate future growth and reduce operating costs, the city developed plans to expand Southside WWTF, originally constructed in 2001. Officials opted to focus wastewater treatment at this facility because Lakeshore WWTF, an aging steel facility, needed significant repairs.

Expansion Elements

While the newly expanded Southside WWTF is currently permitted at 6 mgd, first-year performance records suggest that current operations may warrant rerating in the range of 8 to 9 mgd.

The facility's treatment process begins with headworks featuring screening and grit separation. An odor control system draws a vacuum on all headworks structures, injecting an air/sulfide mixture into the aerobic portion of the process; this adsorbs odor and offsets oxygen demand and downstream power requirements.

Two parallel biological treatment trains follow, arranged with a common wall construction to promote cost-efficiency and maintenance flexibility. Each train has a Modified Lutzack-Ettinger process configuration—two anoxic basins in series then two aeration basins in series, any of which can be removed from service without affecting the overall process. High-efficiency fine-bubble membrane diffusers minimize aeration costs within the aeration basins, and internal nitrate recycle is pumped from the end of the second aeration basin to the first anoxic basin for denitrification. Multistage centrifugal blowers provide air.

The original Southside WWTF used two 0.8-mgd-rated DAVCO ring steel plants that were converted to aerobic digesters during the expansion. Designed to operate in series, the digesters employ cyclic aeration, ultimately reducing the nitrogen recycle load back to the headworks. A screw press dewaters sludge to about 20% dry solids; the dewatered sludge is sent to a landfill, and leachate from the landfill is treated at Southside WWTF.

Additional facility infrastructure components include three clarifiers, four cloth media disc filters, high-rate chlorine basins and a 90-million-gal reclaim water storage pond. A 60-in.-diameter intake pipe connects a 20-mgd pump station to the pond, making all of the facility's reclaimed water available for unrestricted public reuse, particularly in irrigation applications.

Designed with expansion in mind, the new Southside WWTF is configured to readily accommodate an additional treatment train with anoxic and aeration basins; a fourth clarifier; two additional cloth media disc filters; and a third chlorine contact basin. The city anticipates that the next phase of expansion will boost the facility's rating to as great as 12 mgd.

"The preplanning of these expansion activities has the city well positioned to provide the expansion in a quick turnaround so that the facility is not overbuilt too far in advance of the actual need," Swingle said.

Automation & Manpower

Southside WWTF is highly automated via its comprehensive SCADA system, but the city relies on qualified manpower for housekeeping, experience and safety purposes. Pairs of operational staff members are present 16 hours daily, and three maintenance personnel work weekday shifts; an onsite superintendant oversees both groups.

"By evaluating operator duties versus time, we have been able to determine the minimum staffing needed to achieve operational goals," said Chris Fasnacht, environmental utilities operations manager for the city of St. Cloud. "During tough times, staffing reductions are often considered to reduce operating costs, but the loss of maintenance and housekeeping may prove more costly in the end." WWD

Editor's note: *In conjunction with WEFTEC.09, St. Cloud's Southside WWTF will host a tour the afternoon of Oct. 12.*

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