BURNS McDONNELL

CASE STUDY / **EMPORIA WASTEWATER TREATMENT PLANT UPGRADES**

# WASTEWATER TREATMENT PLANT IS GIVEN NEW LIFE

With new strict water requirements looming over the City of Emporia, the race was on to upgrade its wastewater treatment plant to meet the impending regulations. Using an innovative technology process, the first of its kind in the state of Kansas, the city was able to reduce costs while complying with upcoming permit rules.

# INNOVATIVE SOLUTIONS LEAD TO COST-EFFECTIVE RESULTS

Due to financial limitations, a comprehensive wastewater treatment plant rehabilitation was provided, reusing as much existing infrastructure as possible.

## PROJECT STATS

**CLIENT**
City of Emporia

**LOCATION**
Emporia, Kansas

**COMPLETION DATE**
June 2019

**$1M**
**COST SAVINGS**

**1ST**
**IFAS PROJECT IN KANSAS**

## CHALLENGE

When regulators notified the City of Emporia that more stringent treatment requirements would be included in the city's next permit revision, officials knew they would need to make a change to their aging wastewater treatment plant. To address both the aging infrastructure and the need to provide additional capacity, a significant capital investment would be required.

## SOLUTION

With financial limitations prohibiting the creation of a new facility, a design-build delivery approach and alternative technology would allow Emporia to reuse as much of the existing infrastructure as possible. This approach was chosen because it provided a single point of accountability, allowed collaboration with the city, and reduced overall project cost and delivery time. In addition, the city was provided financial guidance as well as assistance in obtaining funding via the Kansas State Revolving Loan Fund (SRF).

The design-build team of Burns & McDonnell and CAS Constructors worked collaboratively to provide improvements to meet the impending discharge permit requirements, including those for effluent nitrogen (10 mg/L) and phosphorus (1.0 mg/L). The innovative technology utilized is based on an Integrated Fixed-Film Activated Sludge (IFAS) process. It's the first of its kind in Kansas, but one of more than six similar installations that Burns & McDonnell has implemented

across the nation for biological nutrient removal (BNR). The approach was selected to ease installation in the existing aeration basin, effectively eliminating the need to build separate anaerobic/anoxic basins for nutrient reduction.

In addition to meeting the nutrient reduction objectives, facility improvements also include the treatment of wet weather flow up to 11 million gallons per day (MGD), streamlined operations and solids handling, and reduced energy costs in conjunction with a reliable supply of power, and a new laboratory, office and administrative space.

The project was designed and constructed using two phases. Phase one included the preparation of the design to 30% completion and preparation of the lump sum price proposal. Phase two involved preparation of the complete design, construction and post-construction tasks, including performance testing, startup and commissioning, and operator training and support.

## RESULTS

Improvements to the wastewater treatment plant were completed on time, allowing the City of Emporia to meet its new permit obligations. Based on the IFAS technology process that was implemented, the city was able to save over $1 million in project costs. In addition, plant operators have an updated control system and better tools for process optimization.

## PROJECT FEATURES

- Conversion of aeration basins to IFAS BNR
- New 2,000-square-foot lab and office space
- New aerobic digester and WAS solids thickening processes
- New headworks fine screening, washer-compactor and grit removal system
- New large bubble mixing and high-speed turbo blower systems
- Rehabilitation of final clarifiers
- Rehabilitation of the UV disinfection system
- Replacement of influent pumps and controls

## WHAT IS IFAS?

**The Integrated Fixed-Film Activated Sludge (IFAS) process enables activated sludge systems to achieve dramatic gains in volumetric productivity without increasing mixed liquor suspended solids levels in the process. By doing so, IFAS systems deliver improved performance while reducing the solids impact on clarification processes. IFAS upgrades offer an extremely cost-effective solution for municipal wastewater plant expansion, taking full advantage of existing systems, equipment, process knowledge, training and operator skills.**

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