

CASE STUDY / **COWSKIN CREEK WATER QUALITY RECLAMATION FACILITY**

RESTORING WATER QUALITY THROUGH DESIGN-BUILD

In a mutual effort to mitigate extreme functional issues, the Cowskin Creek Water Quality Reclamation Facility was served with a consent order that mandated the rehabilitation of its headworks and solids treatment systems. To comply with strict regulations, the progressive design-build approach addressed immediate and challenging issues without taking the current plant offline.



PULLING TOGETHER THE RIGHT TEAM RESULTED IN CLEAN WATER, IN AND OUT.

Through immense collaboration, this project, showcasing multiple complex technical solutions, fulfilled consent order mandates within a tight timeline and budgetary constraints.

PROJECT STATS

CLIENT

City of Wichita, Kansas

LOCATION

Wichita, Kansas

TOTAL PROJECT COST

\$2.9 million

COMPLETION DATE

Phase 1: December 2015

Phase 2: June 2016

9

MONTHS TO
PROJECT COMPLETION

12

WEEKS AHEAD OF
SCHEDULE FOR GRIT
REMOVAL UNIT INSTALLATION

0

CHANGE ORDERS

CHALLENGE

Owned by the City of Wichita Public Works and Utilities Department, the Cowskin Creek Water Quality Reclamation Facility, a 2 million-gallons-per-day (MGD) biological nutrient removal (BNR) plant, has served the sanitary sewer district of northwest Wichita since 2003.

Referred to as Plant 3, its purpose is to provide treatment through screening, grit removal, biological treatment, clarification and open channel ultraviolet light disinfection. But while it looked good in its appealing stone façade, the plant was functionally failing. In early 2015, the Kansas Department of Health and Environment (KDHE) stepped in, imposing a consent order and required updates by June 30, 2016.

Building off our established relationship, the city called us in. In collaboration with CAS Constructors, our pre-construction condition assessments showed deteriorated influent screen channels and grit removal equipment, compacted biofilter media and corroded effluent reuse pumps. The aerated holding basin suffered from clogged and damaged aeration headers and diffusers and an outdated and inoperable instruments automation. With a hard and fast deadline looming and strict budgetary constraints,

construction had to be completed quickly and without disrupting the plant's current operations.

SOLUTION

Utilizing a progressive design-build delivery method, our team approached this project in two phases. The first included the preparation of the design to 30-percent completion, also providing the owners with a guaranteed maximum price proposal. Once approved, phase two took off. During those next six months, we completed the design, construction and post-construction tasks, including performance testing, startup and commissioning, and operator training and support. Providing a single point of responsibility, our joint venture team kept city officials informed on a regular basis throughout the entire design-build process.

In working closely with the Grit King manufacturer, our construction partner and the city, we made decisions — in a timely fashion — that improved treatment and functionality well within the accelerated time frame.

After procuring the grit removal equipment, our team worked to improve the solids treatment and reconfigure the biosolids digestion and dewatering process. We also rehabbed influent screening channels in a manner that eliminated the need



for an elaborate flow bypassing scheme. This creative reconfiguration saved tens of thousands of dollars on labor and equipment while also keeping the plant operational during construction.

Because of increased commercial development in the service area, the solids handling system was ill-equipped to address the variable influent wastewater loading. By including medium bubble diffusers in the aerated holding basin (to convert it into a digester) and adjusting operational protocols, treatment efficiency was provided and capacity added at no additional cost.

Fulfilling other operational mandate requirements, we replaced the corroded effluent reuse pumps and reconfigured the pumping control system.

Outside, however, was the issue of odor control. Located near the front of the facility — within view of walking, running and fishing grounds for the public — the compacted biofilter media wasn't doing its odor control job, resulting in increased pressure drop through the blower discharge piping. To filter hydrogen sulfide odors, our team installed a new Bohn biofilter system, with future plans to improve its appearance by planting colorful annuals.

Despite strict budget parameters, the project came in under budget, allowing the facility to purchase another item on its list: a centrifuge for solids processing.

RESULTS

Because of the swift, quality work by our joint team, the Cowskin Creek Water Quality Reclamation Facility — and its surrounding environment — has been cleaned up, addressing mandates listed in the consent order and restoring overall functionality.

The design-build approach streamlined processes and procedures, exceeding the compliance schedule, as well as providing operational improvements to the facility through savvy solutions, collaboration and construction sequencing.

Choosing an efficient project delivery method allowed for performance-based decision-making and open communication between team members, providing city officials and facility staff the opportunity to weigh in on plant improvements. Transparency and collaboration from the group influenced design direction, resulting in a high-quality project that kept money in the bank. With such quality, functional (and shiny) updates, the newly revamped interior now rivals its impressive exterior in look and feel.

SPECIALIZED SERVICES

- Preliminary studies
- Field investigations
- Conceptual design
- Process improvement
- GMP development
- Final design
- Construction
- Startup and commissioning
- Operator training

AWARDS

- **Award of Excellence**
Kan-Struct, 2017 Building Awards Division III
- **Award of Excellence**
Associate General Contractors of Kansas, 29th Annual State Building Awards (2017) General Contractor Awards, Design-Build
- **Merit Award**
Category: Civil Infrastructure Municipal Water/Wastewater DBIA Mid-America Region Design-Build Awards Competition (2016)



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