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# RICHMOND TAKES A BIG STEP FOR THE FUTURE

by Ron Brohammer

*Wastewater treatment is one of the single most important services a city provides its residents. The city of Richmond operated two treatment plants for more than 30 years, but growth and much-needed repairs presented a challenge that would take teamwork for success.*

## GROWING PAINS

In 2009, the city of Richmond was faced with a serious dilemma. Since the early 70s, the City of approximately 6,000 residents operated two wastewater treatment plants. In 1972, the city of Henrietta was connected to Richmond's wastewater treatment system. Since Henrietta is south of Richmond, it made sense to operate a south wastewater treatment plant and a north treatment plant. The majority of the

City's activity and commerce, however, was toward the north - the larger treatment plant. Over the years, both plants have undergone numerous changes and upgrades. In the 90s, the north plant was converted from drying beds to an oxidation ditch. About the same time, a second oxidation ditch was added to the south plant.

As time passed, growth in Richmond increased significantly and the south plant capacity was approached. Compounding this situation, the second oxidation ditch began to shift and significant earthwork was required to prevent it from failing. Ultimately, cracks did occur in the walls that while temporarily sealed, were edging toward ultimate failure of the system. Finally, by 2006, the Missouri Department of



**The operations of the Richmond sewer plant are consolidated at one location, including the control center, lab, maintenance area and storage.**

Natural Resources (MDNR) notified the City that no additional customers could be connected to the south plant. It had reached its capacity. Meanwhile, due to revised rules from the National Pollutant Discharge Elimination System (NPDES), the City was notified that some sort of discharge disinfection would have to be added to the north wastewater treatment plant. By 2009, the City was facing a near crisis in one of its most important services, and future growth, was stymied.

Many options were explored, seemingly each one more expensive than the last. After review, the City selected an option that would address the disinfection treatment at the north plant and address the issues at the south plant by building a new oxidation ditch.

The proposal included \$5.1 million in bonds and approximately \$4.7 million in grants through the United States Department of Agriculture and the Community Development Block Grant Program. The issue was presented to Richmond voters in 2010; they approved a \$5.1 million bond issue for plant upgrades in April 2010. Unfortunately, due to federal funding issues, \$4 million in grants fell through. This left the City short of the funds needed to complete the required work, estimated at \$9.8 million.

Shortly after the loss of the grant opportunities, it was suggested that operations of the sewer plant be consolidated at one location with sewage pumped from one location to the other. For years, city leaders had been told a single plant would not work; however, this was erroneous. It was very possible and had originally been proposed in 1999. At that time, however, there was no great impetus to complete major changes at the plants.

## EXPLORING OPTIONS

Faced with a clear dilemma, the City decided to explore new options. Olsson Associates of Kansas City concurred that a single plant would

work and should be located at the south facility, as the north plant was too marshy and the amount of piping already in the ground would make it a difficult site for development.

Engineering work began. The City reapplied for loans and grants and went back to the voters with more information and a new proposal to pass an additional bond issue. A public hearing was held, informational brochures were distributed and briefings were provided to various groups throughout the community. In essence, the City informed as many people as possible by briefing various groups about the new plant and advising them that if the project was to be accomplished, voters would have to approve another \$4.7 million bond issue. This totaled \$9.8 million in bonds that voters faced in two consecutive years with no work other than preliminary designs completed. The City would also seek nearly \$1.9 million in grants and low-interest loans through USDA and CDBG. Voters were informed that the base charge for sewer rates would be nearly \$20 per connection, plus user fees.

## BUILDING BEGINS

The new plant called for a pump station to be built at the north plant site, and a completely new plant to be built at the south plant site to include a five-million-gallon equalization basin to handle storm surge. The initial cost estimate was \$10.8 million. Initial planning called for all wastewater to be processed at the south plant using an oxidation ditch system. City staff began working on funding issues, while engineers developed plans for the new plant. The first steps involved establishing a bond rating for the City that consisted of Standard & Poor's reviewing all city finances and interviewing city staff. The City had no established bond rating. After a thorough review, the City's first bond rating in 2011 was an A- for general obligation bonds. Subsequently, revenue bonds received an A rating in 2013 and 2014. This was especially significant at a time when many cities were facing hard financial times and some were near bankrupt. The city staff, as well as City Council, were all very pleased with the bond ratings.

## SEQUENCING BATCH REACTOR

It was not all smooth sailing when the engineering estimate for construction came in more than \$2 million over budget. It was quickly determined that no one had an appetite to go back to the voters a third time. As the City was scrambling for a way forward, engineers offered a new proposal for wastewater treatment; a sequencing batch reactor (SBR). SBRs represented a significant savings in construction costs due to ease of construction, fewer moving parts, and less equipment. Initially, city staff was reluctant to accept this type of system. Concerns were allayed, however, after engineers took staff members to visit several very successful SBR operations. Another novel approach to the new plant would be a belt filter press (a dewatering system) that would allow the City to save about 90 percent of costs to dispose of the treatment plant residue.

In the meantime, the City qualified to receive a \$968,000 low-interest loan, a \$416,100 grant from USDA, and a \$500,000 grant through CDBG.



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The effluent (water) that leaves the treatment passes over several banks of ultraviolet lights, in order to kill any remaining bacteria that have not been removed through the processing by the plant's sequencing batch reactor.



This project was a major success because everyone involved – citizens, council, staff, engineers, contractors, suppliers, MDNR and funding agencies worked as a total team.

The two grants provided an extra \$916,100 when coupled with the \$9.8 million bond authority. This resulted in slightly under the \$10.8 million estimate (\$10,716,100); the City was also able to commit up to \$600,000 out of reserves, if needed. Contracts were awarded to Ross Construction for the plant itself and to KAT Construction for the 3.1-mile pipeline and a new 5,000,000-gallon detention basin. The combination of financing methods made the project possible.

Contractor, engineer, and staff met prior to project initiation. Everyone clearly understood the cost constraints and were ready to move forward. Formal groundbreaking was held on Aug. 28, 2013, and construction was underway. It had been more than four years since the initial decision was made to move forward, and work progressed steadily. Engineers, contractors, subcontractors, suppliers, and staff all worked exceptionally well together. Reports to USDA and CDBG were timely, and other than

a few weather delays, absolutely no work stoppages or problems arose. In the course of the construction, only three minor change orders requiring additional funding were required. The plant was completed in November 2014, with a final cost of \$11.275 million. It is working superbly – meeting and far exceeding all MDNR requirements. The City recently received a series of exceptionally heavy rains; the plant processed five million gallons per day and operated well within MDNR limits for treated sewage.

This project was a major success because everyone involved – citizens, council, staff, engineers, contractors, suppliers, MDNR, and funding agencies worked as a total team. It was a textbook project.

**BRIGHT FUTURE**

Richmond has a wastewater treatment plant that will function for decades to come and is designed for expansion, if required. The new

plant has allowed several projects in Richmond to move forward. The keys to this entire project were information, understanding, cooperation, and an unsurpassable spirit of team effort. □

**Ron Brohammer** is the city administrator for the city of Richmond. He also serves in the capacity of the public works director. Brohammer has served in these roles for the past five years. Visit the City's website at [www.cityofrichmondmo.org](http://www.cityofrichmondmo.org).

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