## 24<sup>th</sup> & Crossgates/Harvard & Wakarusa Sanitary Sewer Improvements (PROJ.# CS04-08,CS04-09)

## FINAL REPORT

This report provides information on the recently completed Capital Improvement Project # CS04-05,06, also known as the 24<sup>th</sup> & Crossgates/Harvard & Wakarusa Sanitary Sewer Improvements. A map of the 24<sup>th</sup> & Crossgates project area is shown below.



## General Project Information

The 2003 Wastewater Master Plan included Capital Improvement Projects (CIP) for sewer collection improvements in various parts of the City of Lawrence. City projects CS04-08 and CS04-09 in the Wakarusa River Basin 2 (WR-2) were driven by the need to



verify recommendations of the Master Plan, and to identify problems, specific locations and line segments that require relief and/or replacement. The 2003 Master Plan, in a broad overview of the wastewater collection system, initially recommended relief sewers in the area of 24<sup>th</sup> and Crossgates at an estimated cost of \$490,000 and relief sewers in the area of Harvard and Wakarusa at an estimated cost of \$449,000.

City staff performed flow monitoring and rainfall monitoring in the basin. The City then entered into a contract with two engineering firms who used the data to develop a statistically accurate hydraulic model to evaluate the behavior of the system

Final Report – 24<sup>th</sup> & Crossgates/Harvard & Wakarusa Sanitary Sewer Improvements Page 1 of 4 under varying rainfall and groundwater conditions, and to evaluate the impact of full build-out in the service area of basin WR-2.

Modeling results indicated no existing, dry-weather condition or capacity problems in the collection system studied. The model did indicate that capacity problems developed when wet weather flow from inflow and infiltration (I&I) was added in to the base flow, and that future growth would exacerbate the capacity problems under those conditions.

The consultants used cost-effective analysis to determine the least-cost improvement plan to reduce excessive I&I and effectively manage the remaining wet weather peak wastewater flows by increasing the capacity of the collection system in basin WR-2.

Based on this cost-effective analysis, the consultants recommended the replacement of a segment of gravity sewer in the area of Harvard and Wakarusa, and increasing the capacity of 1,754 feet of 21" gravity sewer in the area of 24<sup>th</sup> and Crossgates by the cured-in-place-pipe (CIPP) process.

A map of the gravity sewer replacement location is shown below.



Table 1 presents information related to the schedule of the project.

Engineering Contract Awarded (study)	06/07/04
Engineering Contract Awarded (design)	03/15/05
Construction Bid Awarded	02/20/07
Working Days Allotted	60
Working Days Used	47
Notice to Proceed Given	05/15/07
Final Completion Date	07/22/07

Table 1

**Delich Roth & Goodwillie**, **P.A. (DRG)** was selected as the consultant for the project. DRG partnered with **Wade & Associates**, **Inc.** for the study portion of the project. Ace Pipe Cleaning Inc. was the low bidder on the project and was awarded the construction contract. They subcontracted with **I-Con Underground. LLC** for the cured-in-place-pipe portion of the project and **R.D. Johnson Excavating Company** for the open cut portion of the project.

Graph 1 provides information on the engineering and construction costs of the project. Graph 2 compares costs of the different methods used on the project.



Table 2 presents information regarding cost of the project

Engineer's Estimate of Construction Cost	\$191,380
Construction Costs (actual)	\$120,398
Easement Costs	\$0
Engineering Costs	\$40,552
Change Orders	0
Change Order Amounts (+/-)	\$0.0
Total Cost of Project	\$160,950
2003 Master Plan Projected Cost	\$939,000
Table 2	

Summary: A major challenge for this project was interpreting the flow data, flow models and pipeline condition information to arrive at a rehabilitation/replacement plan that would provide capacity and service at the desired level both in the present and future when the service area is fully built out. The trenchless method used in the 24<sup>th</sup> and Crossgates area eliminated the need to disrupt a large apartment complex with excavation activity in parking lots and access roads. Encumbered funds for the project that were not consumed can now be applied to other projects. **Photographs** of this project are on the following page.

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## Project Photographs





Installing pipe around other utilities

By-pass equipment next to apartments



Cured-in-place-pipe installation

Cured-in-place-pipe installation