2005

Repairing Midwest Storm Sewers

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Honorable Mention

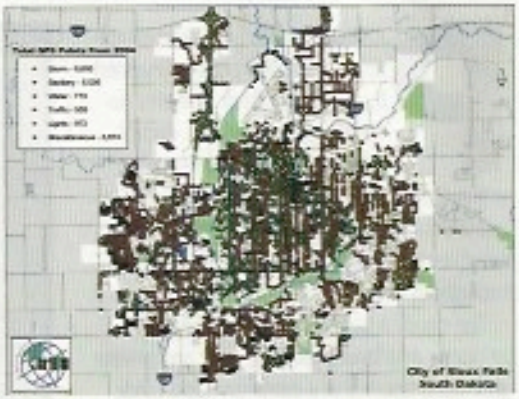
Repairing Midwest Storm Sewers

On May 29, 2004, more than six inches of rain fell in less than two hours in the City of Sioux Falls, South Dakota. Eighteen days later, another storm dumped eight more inches of rain on the midwestern city, resulting in flooded basements, streets, and yards, many of which had already been adversely affected by the previous storm.

Both storms lasted less than 24 hours but drenched the city with more than 250 percent of the normal rainfall for that time period. Combined, the two storms left more than 200 homes with flooded basements and/or sanitary-sewer backups. As city crews surveyed the affected areas, they became well aware that the storm-drainage system in older parts of the city needed to be reassessed.

City engineers suspected that they needed to update some of the storm-drainage data in the city's GIS, as much of the data for older neighborhoods were digitized from 30-plus-year-old plan sets. To assess the condition of the city's storm-drainage system as quickly as possible — and update the city's GIS — two crews mapped all of the storm-drainage structures in the 5,000 acres at the center of the city. Each team took to the streets of Sioux Falls with a handheld rugged GPS receiver running software for Pocket PCs and loaded with mobile GIS and field-mapping software.

During the course of 29 days, the field teams mapped more than 4,700 storm-drainage structures, including inlets, junction boxes, manholes, and pipes. City workers mapped more than 100 linear miles of pipes, or 30 percent of the city's entire storm-drainage system. By comparison, Sioux Falls has approximately 700 linear miles of street centerline.



For maximum efficiency, the city's GIS team created customized drop-down menus in the mobile GIS software, making it easy to log such attributes as the type, size, depth, and condition of each structure.

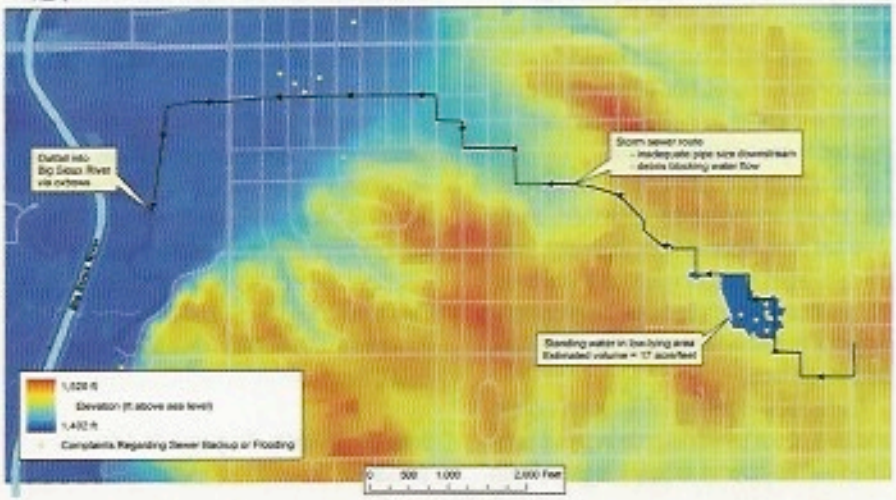
Each day, field teams uploaded their data into the city's GIS and mapped their findings. Once data collection was complete, the Sioux Falls Public Works Department prepared an assessment report including suggested improvements to the storm-drainage system.

Findings were presented to the Sioux Falls City Council, and in January 2005, the city secured $24.7 million dollars in State Revolving Fund loans to cover the cost of the improvements. Eight different basins in the core area of Sioux Falls experienced flooding, and to expedite the design process and address the severity of the situation, the city hired separate consulting firms to analyze, model, and design improvements for each basin. Construction of the recommended improvements will begin in the summer of 2005 and completion is expected within 18 months.

The city estimates it would have taken normal field survey crews more than 50 percent longer to acquire the same number of data points collected by the handheld GPS units, and cost savings are estimated at more than $130,000, primarily recouped in time savings and usability of the handheld units.

Current storm drainage–system information benefits other city departments as well. City water-reclamation crews can now upload maintenance data, repair schedules, and cleaning timetables directly to their tablet PCs, and an accurate and up-to-date GIS of utility data loaded into the handheld is extremely helpful for field crews who take the information with them into the field each day.

Using GIS to help understand the June 16, 2004 flash flood event
13th Street & Kiwanis Avenue Area - Sioux Falls, SD



Field crews took to the streets of Sioux Falls with a **Trimble** GeoXT handheld rugged GPS receiver running **Microsoft** Windows Mobile 2003 software for Pocket PCs and loaded with **ESRI**'s ArcPad GIS and field mapping software. The city's GIS team created customized drop-down menus in ArcPad.

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