

## Submerged...in Flood Control Projects

In Summer 2008, the Midwest experienced major flooding events due to several months of heavy precipitation followed by significant rainfall events in June. Several counties and municipalities in the WHKS service area experienced impacts from the aftermath of the 2008 flooding.

In Cerro Gordo County and Greene County, Iowa, WHKS inspected selected bridges for flood damage, checked for scour by probing, and submitted reports on findings with repair recommendations to each County. Scour is the erosion or removal of streambed or bank material due to flowing water. Although scour can occur at any time, it is especially strong during flooding events.

WHKS also assisted the north Iowa Cities of Mason City, Charles City, and Waverly, Iowa by inspecting bridges and retaining walls for flood damage, checking for scour by probing around the substructures in the water, and submitting reports on findings with cost estimates for repairs. WHKS personnel had to access the affected areas by boat to conduct the scour investigations in Charles City and Waverly. In Waverly, WHKS teamed with Lambourne Environmental Diving Service, LLC to assist with the underwater inspection. WHKS also assisted the City of Waverly in assessing flood damages to its wastewater treatment facility and collection system.



*Undermining of the sidewalk at the south end of the bridge location at 1<sup>st</sup> Street at Willow Creek Bridge in Mason City, Iowa.*



*Devastation to the Charles City, Iowa Pedestrian Bridge.*

Charles City experienced flood elevations over 20 feet higher than the normal water level of the Cedar River within a 5-day period in June, with the highest crest recorded at 25.6 feet. The flooding destroyed the 102-year-old Charles City Pedestrian Suspension Bridge, named a National Historic Structure in 1989. WHKS was retained by the City of Charles City to evaluate the condition of the remaining portion of the bridge and investigate design requirements and preservation of the historical status of the structure. WHKS performed a feasibility study with replacement options for the structure.

In Mason City, the Winnebago River rose to a record 18.57 feet—more than 11 feet above the flood elevation for the river and almost 3 feet higher than the previous record flooding from 1993. The floodwater overtopped levees in the City, and the Water Treatment Plant was shut down due to floodwaters and the Water Reclamation Facility (WRF) was operating at maximum capacity. City residents were instructed to conserve water and avoid flushing toilets for several days.

WHKS assisted the City of Mason City in assessing the flood damage at the WRF. As a result of the flooding, several items will be added to the current upgrades being constructed at the WRF in 2008 and 2009. These items include the rehabilitation of the influent bar screens that were damaged by flood debris, as well as raising electrical distribution equipment and the WRF's emergency generator to be one foot above the June 2008 flood levels.

WHKS is still working with several communities in Southeast Minnesota on projects related to flood damage repairs from the flooding in Fall 2007.

## Grand Avenue and 13<sup>th</sup> Street Improvement in Ames, Iowa

The WHKS team was selected by the City of Ames, Iowa to provide design services for the reconstruction at the intersection of 13<sup>th</sup> Street and Grand Avenue. The primary objective was to develop concepts for improvements to the intersection to meet current and future traffic needs, improve traffic safety and operations and meet City of Ames and Iowa DOT Design Standards.

WHKS has previously completed four alternative geometry concepts for the intersection improvements. A preliminary traffic analysis was performed to assist in developing concepts that would meet the study objectives. The analysis was based on current signal operation, historic traffic counts, additional traffic counts completed by the City, accident data, the current Transportation Master Plan and traffic modeling. The analysis produced year 2025 traffic projections and provided proposed lane configuration and turn lane needs to accommodate year 2025 traffic. The team also reviewed an additional concept for widening 13<sup>th</sup> Street only using Year 2030 projected traffic volumes for an intersection configuration on Grand Avenue.

Several concepts were developed for improvements to the intersection, including a multi-lane roundabout. The concepts were evaluated based on economics, impacts to adjacent properties, total property acquisitions, impact to the traveling public, possible utility relocations, and public input. The analysis utilized a matrix that showed the assets and liabilities for each concept.

Services provided by the WHKS team include site survey, preliminary roadway design, right of way design, right of way acquisition, traffic signal system design and funding application assistance. WHKS also provided extensive public involvement services, including participation in public meetings and City Council workshops.

Currently, WHKS is designing traffic signal improvements at the intersection to update the aged traffic signals.



Traffic signal improvements were involved in the work.

## Overcoming Challenges to Complete Warren Avenue Reconstruction in Zumbrota, Minnesota



The completed Warren Avenue Reconstruction project.

The City of Zumbrota, Minnesota obtained the services of WHKS to provide engineering design and construction services for the reconstruction of Warren Avenue between 8th Street and 5th Street. This area had a history of watermain breaks and the existing pavement was in poor condition.

New watermain was installed along the project route, increasing in size from 6" to 8" DIP watermain. 250 feet of clay sanitary sewer was replaced with PVC and increased in size to meet standards. Approximately one city block north of 6th Street was a surface reconstruction of the bituminous pavement and did not include any underground utilities.

This project presented design challenges because the elevation of the boulevards on either side of the street varied by over two feet, which required a varying roadway cross section with an offset crown to match. Planning was also required to tie into existing utilities and provide homeowners with temporary water service during construction. Utility easements were obtained from adjacent property owners to utilize open space and save existing trees.

WHKS provided construction staking and observation services for the project. Due to the constraints of reconstruction projects, coordination with residents and maintaining access throughout construction were the most challenging aspects of construction. By working closely with City staff and the low bidder, Schumacher Excavating of Zumbrota, the utility installation and pavement base course were completed successfully.

WHKS is celebrating **60 years** of service in 2008. The firm was started in 1948 in Mason City, Iowa and has since grown to over 70 employees in multiple office locations in the Midwest.

## Emergency Bridge Repair in Fremont County, Iowa

An Iowa DOT bridge inspection revealed severe deterioration of the bridge deck on the structure on Highway 2 over the overflow of the West Branch of the Nishnabotna River in Fremont County, Iowa. The Iowa DOT retained WHKS to provide emergency bridge repair plans for the structure, which is located approximately 1.5 miles east of Sidney. Because of the poor condition of the bridge deck, WHKS was required to provide rapid turn-around on the bridge improvement plans.

WHKS prepared plans to replace the existing bridge deck and reconstruct with a wider 28-foot roadway. In addition to the deck reconstruction, barrier rails were replaced, abutments were reconstructed, new joints were installed, bearings were reset, and areas of the beams were repainted. The project will be complete in Fall 2008.

WHKS has performed bridge design services at numerous bridge locations over the past twelve years as part of our ongoing General Services Agreements with Iowa DOT. The bridge related projects as part of this arrangement have included bridge repairs, bridge deck overlay, and bridge barrier rail retrofit projects.

## William Angerman, P.E. Promoted to Vice President



The WHKS Board of Directors is pleased to announce that William K. Angerman, P.E., Rochester Office Manager and Director of Water and Wastewater Engineering Services, has been elected to the WHKS Board of Directors and has been promoted to Vice President.

Bill manages and directs all water and wastewater engineering projects for the firm and is the Consulting City Engineer for several communities in Minnesota and Iowa. He joined WHKS in 1994 after receiving his B.S. Degree in Civil Engineering from Michigan Technological University.

## WHKS Conducts Bridge Capacity Analysis for Spaulding Dam in Springfield

WHKS recently provided structural engineering services to J.F. Brennan Co., Inc. to assist with the replacement of the Tainter gates on the Spaulding Dam for Lake Springfield in Springfield, Illinois. The Spaulding Dam, initially constructed around 1934, was not only originally designed to retain and control water depths, but also as an integral bridge that previously carried vehicular traffic across the dam. Because of the deteriorated condition of the existing bridge, a new bridge was constructed immediately north of the Spaulding Dam in 1992, diverting vehicular traffic off of the dam.

As part of the project, J.F. Brennan was faced with the task of developing a procedure to lower the new gates in place. WHKS conducted a structural analysis of the existing bridge to evaluate its structural capacity to support a 100,000-pound crane and a 60,000-pound tractor-trailer, which were necessary to facilitate installation of the new gates. A field inspection of the structure was conducted to determine the extent of existing deterioration and a reduced load capacity was established. Based on this analysis, it was determined that the existing structure was not adequate for the proposed loads.

WHKS worked closely with J.F. Brennan to establish two alternate methods for lowering the new gates in place. One alternate required placement of the same crane and tractor-trailer on the new structure and temporarily closing the road to traffic. The second alternate required coordination between J.F. Brennan and the crane supplier to devise a method to drive the crane out on to the dam spillway and pick the gate off the tractor-trailer while positioned on the existing bridge. WHKS provided the supporting analysis and calculations illustrating the structural adequacy of the new bridge for the proposed loads, as well as for the existing bridge for the tractor-trailer and gate load. In addition, WHKS completed the analysis under an expedited schedule due to an upcoming holiday that would have restricted delivery of the crane and delayed the initial target installation date for the first gate.



*Delivery and installation of the first of five gates for the dam.*

# What's Happening at WHKS

## **Representative projects currently underway:**

### **Mason City, Iowa**

2008/2009 Street Resurfacing and Overlay Project

*Client: City of Clear Lake, Iowa*

DD 47 Storm Sewer Improvement Project

*Client: City of Lake Mills, Iowa*

### **Ames, Iowa**

TIF 3<sup>rd</sup> Addition Subdivision, Ames, Iowa

*Client: Dayton Park, LLC*

Stanton & Chamberlain Drainage Improvements, Final Design

*Client: City of Ames, Iowa*

### **Dubuque, Iowa/East Dubuque, Illinois**

### **Rochester, Minnesota**

Sanitary Sewer & Water Main Extension to serve Lenwood Heights

*Client: City of Rochester, Minnesota*

Tower Ridge Road Slope Stabilization Construction Services

*Client: City of Rushford Village, Minnesota*

### **Springfield, Illinois**

IL 100/106 over the Illinois River at Florence - Lift Span Truss Rehabilitation

*Client: Illinois Department of Transportation, Bureau of Bridges and Structures*

International Brotherhood of Electrical Workers New Union Hall - Site Development and Structural Building Plans

*Client: Prather-Tucker Associates, Inc.*

***For additional information on any WHKS projects, please contact our offices.***



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