

PROJECT BRIEF

# Willow Island Hydroelectric Structural Monitoring

## PROJECT PROFILE

**CLIENT:**  
American Municipal Power

**LOCATION:**  
Pleasants County, WV

**VALUE:**

- Real-time performance monitoring provides essential data for warning or deformation/movement

### SERVICES PROVIDED:

- Real-time automated data monitoring with Geocomp's *iSiteCentral*® data management system
- Direct shear tests on rock samples
- Evaluated stability of rock cuts under a range of piezometric conditions associated with flooding of the Ohio River
- Performed block analysis to assess the stability of a large, potentially unstable rock block formed by the intersection of a fault and the excavation
- Used 2D and 3D finite element analyses to determine design loads for stabilizing rock anchors

“Real-time web-based monitoring and warning was used during excavation for measurement of settlement, horizontal displacement, pore pressures, and tilt of the existing piers and the planned construction.”



## REAL-TIME MONITORING & DATA MANAGEMENT COLLECTION

Geocomp provided real-time monitoring and warning system for construction of a water retention cofferdam structure and deep excavation. The construction of the hydroelectric project was conducted in two phases: construction of the cofferdam to encircle the project site, and construction of the powerhouse. The cofferdam consists of multiple, interconnected cells of backfilled steel sheeting on the river side and a soil-bentonite slurry cut-off wall on the landward side. The cofferdam extends to the top of rock to provide a cut-off for infiltrating water into the planned excavation for the powerhouse. Geocomp provided engineering services during design and construction of the 2,400-ft-long cofferdam and 100-ft-deep excavation for future construction of a new hydroelectric powerhouse. Real-time web-based monitoring and warning was used during excavation for measurement of settlement, horizontal displacement, pore pressures, and tilt of the existing piers and the planned construction. The geotechnical instrumentation program was critical to monitoring the behavior of the soil slopes and the rock cut during excavation for the powerhouse. This provided confidence in our engineering predictions of slope movements, stability, and warning of unanticipated movements.



## BACKGROUND

Willow Island Lock and Dam was constructed in the 1970's as part of a series of lock/dams along the Ohio River. The site has been considered a prime location for a hydroelectric plant for the last two decades. American Municipal Power Inc., as part of four separate hydro projects, is constructing the 35- MW Willow Island Hydroelectric Project. The project will divert water from locks and dam through two horizontal 22-MW bulb turbines to generate power.