

## GILBOA DAM

Gilboa, NY



**T**he Gilboa Dam, located in New York's Catskill Mountains, impounds the Schoharie Reservoir and holds approximately 18 billion gallons of water. The Schoharie Reservoir is one of 20 upstate lakes and reservoirs that provide drinking water to approximately eight million of New York City's residents and visitors.

Built in 1927, the dam stands 180-feet high and consists of a 700-foot-long earth embankment and a 1,324-foot-long cyclopean concrete spillway.

In October, 2005, it was determined that the then 79-year-old Gilboa Dam was not in compliance with current engineering standards for safety. A study concluded that the dam was in danger of failure during periods of extreme high water.

### PROJECT BACKGROUND

The dam's potential failure would have far-reaching impacts, with billions of gallons of water flooding the nearby valley. It was estimated that the damage could reach as far as the town of Schenectady, which was 20 miles away.

**Owner:**  
New York City Department of Environmental Protection

**General Contractor:**  
Nicholson Construction Company

**Technique(s):**  
High-Capacity Dam Anchors

**Subsurface Conditions:**  
Sedimentary rock consisting of shale and silt stone

**Approximate Key Quantities:**  
High-Capacity Dam Anchors 79



Overview of drill platform and work area (left); Drilling vertical tie-downs (top right); Rigs drilling incline anchors through the dam (bottom right)

In 2006, the New York City Department of Environmental Protection launched an emergency dam rehabilitation program to stabilize the dam through the installation of high-capacity rock anchors.

Because there were considerable concerns around the long-term performance of the anchors, a comprehensive design and testing program was created to ensure their performance capabilities.



## THE WORK

Nicholson was awarded the emergency contract to install the dam's stabilizing anchors.

Five drilling rigs were used to install the 79 high-capacity rock anchors in the dam crest and downstream face to improve the overall stability of the dam. Forty-seven of the anchors were drilled vertically through the dam crest and 32 inclined anchors were installed through the dam face from a temporary work platform, which was also designed and constructed by Nicholson. The anchors ranged in

length from 107 to 237 feet and had loads of 1,370 to 2,040 kips. The largest anchors had 58 strands.

Nicholson's contract also included the installation of four pre-production test anchors, a dam instrumentation system (including two extensometers and a data acquisition system,) 15 subsurface investigation borings, and the design and the installation of a temporary debris fall protection system.

A project of this magnitude required a comprehensive safety and quality control plan and staff to perform the work. In addition to a full-time member of Nicholson's staff overseeing on-site safety and quality procedures, Nicholson hired independent project quality and safety consultants to monitor quality and safety during all phases of construction operations.

## THE RESULT

The \$24 million Gilboa Dam stabilization project was completed within a span of nine months. The 79 anchoring cables installed by Nicholson made the dam compliant with the state's guidelines for dam stability and ensured the safety of those living close to the Gilboa Dam.

The project was completed ahead of the contract's scheduled milestone dates and well within the Owner's budget. It was also recognized as the McGraw-Hill Construction Best 2007 Public Works project in New York Construction.

In 2011, the dam weathered the heavy waters of Tropical Storm Irene and remained safe and structurally sound.