

Underpinning Prairie: Micropiles Support Prairie Du Sac Dam

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In its heyday, Prairie Du Sac Hydroelectric Facility was the largest capacity hydroelectric generation facility of its kind west of Niagara Falls. The original facility was completed in 1914 after four grueling years of construction at a cost of \$1-million. It was the vision of Norwegian immigrant, engineer, financier and investor Magnus Swenson who knew, after the successful completion and operation of the Niagara Falls Hydroelectric Facility in 1896, that harnessing the Wisconsin River's energy would provide the same results. And he was right. Located a little over 1.5-miles due North of Prairie Du Sac, WI which is approximately 23-miles NW of Madison, WI in South Central Wisconsin, the Prairie du Sac Hydroelectric Facility is made up of two main components. The facility includes Prairie Du Sac Dam ("The Dam"), which impounds the Wisconsin River creating the 9,000-acre Lake Wisconsin, and a powerhouse that contributes 31-MW of power to Wisconsin Power & Light's (Owner), an Alliant Energy company, customer base of 470,000 people in Southern and Central Wisconsin. The dam's spillway, one of the few hollow gravity structures in the United States, is approximately 1,188-LF in length and contains 41 gates that are approximately 40-feet in height and 20-feet in width. The dam sits entirely upon a vast network of over 12,000 steam-driven timber piles. The original timber piles have proven to be extremely durable in their 105-years of service. However, with historic tailwater recession and subsequent wetting and drying of the timber piles, some of the piles began to deteriorate as they were exposed to open air. The Owner proactively initiated a program to investigate the severity of the situation and ultimately develop a plan to remediate the foundation system supporting the dam to maintain its integrity. After a thorough vetting process, micropiles were ultimately chosen as the means to support the century old dam. The Nicholson Construction/GEI Consultants team was chosen as the Design/Build Contractor to perform the pre-production test program and production installation. This case study will discuss the project highlighting the analysis period through production work.