

Models 237 and 288 Helical Piles

Project: Barale Ranch Lodge Stabilization

Location: Colusa County, CA

Date: August 2013

Challenge:

The Barale Ranch duck hunting lodge experienced significant settlement up to nine inches over a period of several years. The large, elevated wood structure with the main floor level nearly two stories above grade was built along the bank of a natural creek. At the time of building construction, a wooden retaining wall up to five feet tall was built to retain a wedge of fill to create a level building pad. The lodge was then constructed on wood columns and shallow concrete footings. The settlement created an obvious lean to the building with sloped floor conditions across the width of the footprint. A geotechnical investigation included two exploratory borings, one at each end of the building. Boring 1 identified medium stiff to stiff silty clay fill to approximately seven feet, stiff to hard clayey silt to nine feet, and stiff silty clay to the bottom of the boring at 32.5 feet. Boring 2 encountered stiff silty clay fill to seven feet, medium stiff to stiff silty clay to 13.5 feet, stiff to very stiff silty clay to 17 feet, and medium dense to dense sand and gravel to the bottom of the boring at 31.5 feet. Deep foundations were required to support the building below the fill and weak native clay soils. The project required a five week foundation design/construction schedule to ensure that the lodge would be ready in time for the upcoming hunting season.

Solution:

The lodge would be supported on a completely new foundation consisting of grade beams, concrete piers/columns and steel braced frames. Eighty-eight (88) Model 288 (2.875-inch OD by 0.276-inch wall) hollow round shaft helical piles with an 8"-10"-12" triple-helix lead section were installed vertically and cast into the concrete columns to support design compression loads up to 24.5 kips. Seventeen (17) Model 288 helical piles with a 10"-12"-14" triple-helix lead section were installed at a 45-degree batter and cast into the grade beams to resist design lateral loads up to 20 kips. Thirty-two (32) Model 237 (2.375-inch OD by 0.154-inch wall) hollow round shaft helical piles with an 8"-10" double-helix lead section were installed vertically and cast into concrete columns to support design compression loads up to 8.7 kips for the surrounding wood deck. The Model 288 piles were installed with a tracked skid steer while the Model 237 deck piles were installed with hand-held equipment. All piles were installed to torque-correlated ultimate capacities of at least two times the design loads (FOS ≥ 2). With the variable soil profile and the range in required pile capacities, vertical and battered pile lengths ranged from 18.5 to 50 feet. Installation of the 137 helical piles was completed within the allotted time frame to keep the project on schedule to reopen the lodge. With the new foundation system in place, the building was disconnected from the existing columns in sections, leveled, and then resupported on the new foundation.

Project Summary

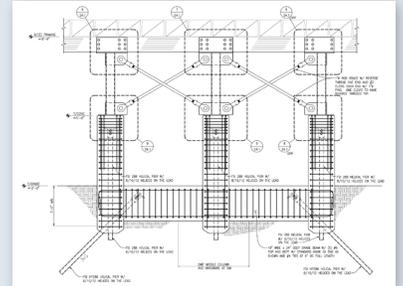
Project Engineer: SFA Design Group, LLC

Certified Pile Installer: Foundation Repair of California

Products Installed: (88) FSI HP288 Helical Piles, 8"-10"-12" Lead Section, Design Working Compression Loads up to 24.5 kips; (17) FSI HP288 Helical Piles Battered at 45 Degrees, 10"-12"-14" Lead Section, Design Working Lateral Loads up to 20 kips; (32) FSI HP237 Helical Piles, 8"-10" Lead Section, Design Working Compression Loads up to 8.7 kips; Helical Pile Installation Lengths of 18.5 to 50 feet.



Barale Ranch Lodge



Foundation detail



Predrilling at column locations prior to helical pile installation



Installing HP237 piles for deck support



Helical piles installed within grade beams at column locations