FOUNDATION SUPPORTWORKS

CASE STUDY Commercial

New Construction Helical Piles

Project: Maryhill Manor Additions
Location: Enderlin, ND

Challenge:

Maryhill Manor is a long-term care facility that provides 24-hour nursing and personal care services. The project included two major building additions to the north and east of the existing single-story, slab-on-grade structure. The geotechnical exploration included nine test borings completed to depths up to 51 feet. The soils within the upper approximate 14 feet of the profile were described as sandy and clayey fill, very loose to loose sand, soft to medium stiff clay and topsoil/swamp organic deposits. Medium dense sand and gravel was encountered between about 14 feet and 21 feet over very stiff to hard sandy lean clay (glacial till) to the bottoms of the test borings. Groundwater was observed at depths ranging from six to eight feet.

Support of the additions on shallow spread footings was considered, but then dismissed due to the presence of the highly variable, undocumented fill soils and the weak native soils. In order to minimize anticipated structural settlements, the foundations and floor slabs of the additions were planned with support on deep piles penetrating these upper soils.

Solution:

Designs for the foundations and structural slabs included a total of 80 Model 288 (2.875-inch OD by 0.276-inch wall) and Model 349 (3.5-inch OD by 0.300-inch wall) hollow round shaft helical piles. With design working loads ranging from 10 kips to 45 kips, helix plate configurations varied from double 8”-10” lead sections to triple 10”-12”-14” leads followed by a single 14” plate on the first extension. Model 288 helical piles were utilized to support design working loads up to 35 kips and the Model 349 helical piles were utilized to support the design working loads of 40 and 45 kips. Two pile load tests were completed, one in each area of the two major additions. In each area, the HP349 shaft with the quad-helix plate configuration was tested. Net deflections, total head movement minus elastic compression, of the test piles were 0.06-inch and 0.38-inch at the design working load of 45 kips. These measured deflections were less than the specified maximum net deflection of 0.5-inch. The test piles and the production piles were advanced to depths of 18 to 29 feet below the proposed finish floor elevations to bear within the medium dense sand and gravel or the very stiff to hard glacial till. The helical piles were installed to torque-correlated ultimate capacities of at least twice the design working loads (FOS ≥ 2). Load testing and production pile installation were completed in two phases, but were finished within a total of only eight days.

Load frame centered over helical pile

Load test equipment

Piles installed with tracked skid-steer

Completed pile installation

Completed pile installation

Project Summary

Certified Pile Installer: Innovative Foundation Supportworks
Products Installed: (80) Foundation Supportworks® Model 288 and Model 349 Helical Piles, Multiple Helix Plate Configurations, Installed to Depths of 18 to 29 feet Below Finish Floor Elevation, Design Working Loads of 10 to 45 kips