

Model 287 Helical Piles

Project: Environmental Treatment Plant
Location: West Elizabeth, PA
Date: November 2014

Challenge:

A proposed environmental treatment plant would include two main structures with building footprints of 1,980 and 3,200 square feet. The buildings would be located downslope from an abandon coal mine where site preparation would involve cutting into the slope of the steep hillside. The slab-on-grade structures were originally designed with shallow foundations; however, a geotechnical investigation identified varying depths of coal waste fill in the upper soil profile, prompting the need for deep foundations.

Solution:

Helical piles were chosen as the ideal deep foundation solution given the identified soil profile and the relatively light foundation loads. Helical piles can also be installed quickly without generating spoils. The helical pile configuration consisted of Model 287 (2.875-inch OD by 0.203-inch wall) round shaft with an 8"-10"-12" triple-helix plate lead section. The piles were advanced to depths up to 23 feet below finish floor elevation to bear below the coal waste fill and to achieve torque-correlated ultimate capacities of at least twice the specified design working compression load of 20 kips (FOS ≥ 2.0). The piles were fitted with standard new construction brackets to be cast into structural slabs as well as grade beams and pile caps to support the building foundations. The helical pile components were hot-dip galvanized for corrosion protection.

Prior to installing the production piles, a full-scale load test was performed on a sacrificial pile to verify helical pile capacity and the deflection-to-load response, per the project specifications. The measured total deflection at design working load was 0.207 inch, resulting in a calculated net deflection of only 0.086 inch.

Heavy rains during construction created difficult working conditions and caused the site to be closed several times due to cut-slope failures. A total of 235 helical piles were installed to support the treatment plant structures.



Compression load test



Installing helical pile



Site overview



Installed piles

Project Summary

Architect: Century Engineering, Inc.
Structural Engineer: EA Engineering, P.C.
Geotechnical Engineer: AWK Consulting Engineers, Inc.
General Contractor: Clean Harbors Environmental Services
Certified Pile Installer: Baker's Waterproofing & Foundation Repair
Products Installed: (235) Foundation Supportworks® HP287 Helical Piles, 8"-10"-12" Lead Section, Installed Depths Up to 23 feet, Design Working Compression Load of 20 kips