GEOPIER®

Geopier Rammed Aggregate Pier® Elements Used to Support Wind Farm in New Madrid Seismic Zone

CLIENT'S CHALLENGE

Geopier® designed and installed Rammed Aggregate Pier ground improvement for support of forty (40) wind turbines at the Delta Wind project in Tunica, MS. The overall design accounted for several challenging site conditions including: 1. Soft/loose subsurface conditions, 2. High groundwater levels, 3. Normal and extreme loading conditions, and 4. Seismic loading and liquefaction associated with the nearby New Madrid fault (Mw = 7.5 and PGA up to 0.44g). The design was vetted by several internal and external reviewers to verify the stringent design criteria for the project were met.

SUBSURFACE CONDITIONS

The subsurface conditions at the various wind turbine sites generally consist of 20 to 30 feet of soft to stiff silt and clay alluvial deposits underlain by medium dense to dense sand and gravel. Groundwater was encountered at variable depths but typically near the ground surface. Of particular importance on this project is the presence of liquefiable soils at depth.

GEOPIER® SOLUTION

Geopier used a combination of both drilled and displacement solutions to improve the bearing soils and meet the design criteria for the project. The Geopier solution was designed to control settlement (total and differential), improve dynamic stiffness, and provide an adequate factor of safety against bearing failure under both static and seismic loading conditions. Meeting the design criteria was challenging given the heavy static and wind loads and the seismic loading conditions (Mw = 7.5 and PGA up to 0.44g). Geopier installed between 48 and 234 piers per site to depths ranging between 25 and 45 feet depending on subsurface and loading conditions. Our design was vetted and approved by internal and external reviewers and the performance of our design was field verified with a post-installation testing program consisting of pier modulus testing and CPT soundings. The Geopier design provided significant cost and schedule savings to the project team versus the deep foundation alternatives.

Delta Wind Project

Tunica County, Mississippi

AES
Owner

Wanzek Construction, Inc.
General Contractor

Barr Engineering Co.
Geotechnical & Structural Engineer

Peterson Contractors, Inc.
Geopier Installer

GEOPIER IS GROUND IMPROVEMENT®
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