Buildings

Grand Valley State - L. William Seidman Center

UNITED STATES

Grand Rapids, MI

Owner
Seidman College of Business at Grand Valley State

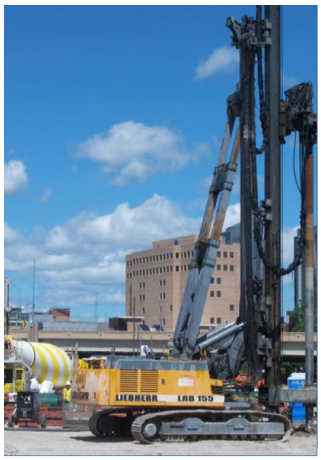
Engineer
JDH Structural Engineering

General contractor
Pioneer Construction

Dates of work
2011/08 2011/09

Main figures

Controlled Modulus Columns CMC™
1100 EA.



Description

The construction of the 40,000-sq-ft Seidman College of Business at Grand Valley State University included a four-story academic center with exterior courtyards and planters. Support was required for all floor slabs, footings and exterior planters. The original design called for augercast piles or micropiles with a structural slab, pile cap and grade beam foundation system.

Menard and Nicholson Construction Company (NCC), an affiliate company of Menard, worked together using a unique combination of techniques to provide a more economical design.

Ground conditions

The project site consisted primarily of variable sand fill to a depth of 10 to 30 ft with areas of soft silt and clay layers. In addition, a large portion of the site contained woodchips at depths ranging from 5 to 25 ft. Below the existing fill and an underlying dense sand layer, were alternating layers of weathered shale and gypsum.

Preliminary rock probing indicated the presence of voids, ranging in thickness from 2 to 14 ins. The excessive settlement of nearby structures had been attributed to similar voids, so the mitigation of this concern was critical to the project.

Solution

NCC was initially contacted to provide a design for micropiles underneath the building footings and grade beams. This system would require that all micropiles be drilled into bedrock in order to grout any voids encountered. In an effort to provide cost savings to the client, NCC teamed with Menard to provide an alternative scheme.

NCC performed Low Mobility Grouting (LMG) to fill voids at select locations across the site within the weathered bedrock. This technique is proven to prevent further void development and settlement in the Grand Rapids area. Menard installed Controlled Modulus Column (CMC)™ rigid inclusions that terminated in the dense sand layer that was present above the weathered bedrock.

This combined design of CMC rigid inclusions and LMG was not only more economical than a deep foundation system that would have extended into the bedrock, but also offered substantial savings in the foundation itself by allowing the client to eliminate grade beams pile caps, structural slabs and utilize shallow foundations

In summary, a combined design by Menard and Nicholson Construction Company using CMC rigid inclusions and Low-Mobility Grouting provided a more economical solution than a traditional deep foundation system.