

Fort Belvoir Community Hospital

Fort Belvoir, VA



Menard installed more than 4,900 CMCs for this high load bearing project.

Menard's design for Controlled Modulus Columns™ (CMCs) at Fort Belvoir played a major role in expediting the schedule for this fast-tracked project.

Client / Owner: US Government
General Contractor: Turner Gilbane J.V. (Joint Venture of Turner Construction and Gilbane Building Company)
Owner's Foundation Engineer: US Army Corp of Engineers – Baltimore District
Ground Improvement Contractor: Menard

Project Summary

The Fort Belvoir Community Hospital is part of an integrated health care network providing medical services to the nation's wounded soldiers and their families. The \$800 million, 1.3 million sq ft military construction project, managed by the Corps of Engineers, was fast-tracked as part of the 2005 Base Realignment and Closure program. The project required ground improvement to support the high-bearing load of the facility, which is a series of five, multi-story buildings connected to form one structure, plus two parking garages, one anchoring each end.

Due to the aggressive schedule, Menard proposed an alternative solution to rammed aggregate piers by specifying Controlled Modulus Columns™ (CMC), an economical technique for strengthening ground and increasing its load bearing capacity, while allowing for faster installation and improved sustainability via limited site import/export.

Ground Conditions

The hospital is located within three miles of the Fall Line, which is the boundary separating the Coastal Plain from the Piedmont Physiographic Province. The soils immediately below the surface and extending from 7-12 feet are stiff to hard low plastic and high plastic clays with varying amounts of sand. Below this layer are dense sands and gravels.

Ground Improvement Solution

The Corps had designed spread footings for the project with a specified bearing capacity varying between 7,000 and 8,000 psf depending on the structure. Since the buildings were built near existing grade or cut down in some locations, no significant settlement was expected below the slab-on-grade, so no ground improvement was required under the slabs. Menard went through a rigorous design process to demonstrate that the CMCs would work at the high-bearing pressure and still meet the performance criteria for settlement and bearing capacity. The design team ran a series of proprietary Menard footing settlement calculation models and confirmed the analysis with a third-party review using a 3D finite element model. Menard designed a dense array of CMC elements under each foundation support and installed more than 4,900 CMCs at a maximum depth of 29.5 feet for a total of 63,322 linear feet. A load transfer platform between CMCs and footings was designed to eliminate any physical connection between the ground improvement system and the structure.

Menard

275 Millers Run Road
Bridgeville, PA 15017
Tel 412.257.2750

www.menardusa.com