UNIVERSITY OF VERMONT MEDICAL CENTER

Project Type: Education
Service: Deep Foundations/Piles
Techniques: Drilled Micropiles

HELICAL

GEOTECHNICAL CHALLENGES

- Compression Load Resistance
- Difficult Access
- Settlement Control
- Unsuitable Soil Conditions
- Low Vibration
- Work Adjacent to Exisiting Structure

INTRODUCTION

Construction of the new Robert E. and Holly D. Miller Building is improving inpatient care facilities at the University of Vermont (UVM) Medical Center in Burlington. The new facility consists of a 7-story, 180,000 SF building that will include greater single occupancy inpatient facilities. The building is located on the west side of the medical campus with portions immediately adjacent to existing West Pavilion facilities.

GEOTECHNICAL CHALLENGES

Soil conditions at the site consisted of a thin fill layer (in locations) underlain by natural, very dense sand and silt (Glacial Till) which were favorable for support of shallow foundations. However, portions of the new building were immediately adjacent to existing buildings resulting in the need for deep foundations to support the new loads and reduce impacts on the existing foundations. The combination of the very dense conditions and working against existing structures created construction challenges.

DESIGN AND CONSTRUCTION SOLUTION

To solve the challenges, the project design team specified the use of drilled micropiles (DMPs) in specific areas near existing foundations to allow work within the tight access environment while limiting vibrations and disturbance to surrounding ground. The DMPs were specified with a design (working) capacity of 100 kips in compression. HELICAL designed the small diameter piles with 5.5-inch diameter N80 (Fy = 80 ksi) casing extending at least 10 feet through the fill soils followed by a #14 (Grade 75) center bar within a 6-inch diameter bond zone for 23 feet beyond the casing. The piles were drilled through the very dense glacial till with internal flush to avoid disturbing the surrounding soils and reducing impacts on adjacent medical rooms kept in operation. In addition, HELICAL utilized a machine with the latest technology in exhaust control to minimize the environmental impact on the existing hospital's nearby air intake vents. A total of 60 drilled micropiles were installed at the site in about 20 days.

Prior to installing production DMPs, a full-scale load test was completed on a non-production pile. The test was performed in tension as a cost and schedule savings measure compared with a compression test setup. The test results indicated less than a ½-inch of deflection at 100% design load and confirmed that the DMPs would perform as designed.

PROJECT DETAILS
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