

# Carilion Riverwalk Parking Garage

Roanoke, VA



**Project Description:** The subsurface profile at the site of a new 5 level parking deck consisted of rubble/debris fill and loose alluvial soils to a depth of approximately 20 feet, underlain by 3 to 5 feet of very dense alluvial soils with cobbles and boulders extending to limestone bedrock. Because of difficult and costly foundation construction on other projects near the project site, the Owner directed the geotechnical engineer to consider all foundation options. Deep foundation systems considered for the project included driven piles and caissons. However, they were determined not to be cost effective since any deep foundation system would require extending through the alluvial layer of cobbles and boulders and penetrating the karst limestone bedrock. This substantially increased risk for drilling overruns due to the tough drilling and varying depth to competent limestone. Geopier elements supporting spread footings designed for an allowable bearing pressure of 6 ksf was found to be the most cost effective foundation system. The Geopier elements were designed to support column loads up to 1330 kips and provide the necessary settlement control. Geopier element lengths of 13 to 24 feet were provided in the fill and loose alluvium but could be terminated at the top of the very dense alluvial layer if encountered at shallower depths. This minimized risk and saved time and money.

## THE GEOPIER ADVANTAGE

- Geopier elements permitted spread footings to be designed for an allowable bearing pressure of 6 ksf for support of the parking garage.
- Geopier Foundations saved time and money compared to the other deep foundation alternates.
- Geopier Foundations eliminated the need to penetrate a very dense cobble/boulder alluvial layer and bear on the underlying limestone bedrock.

**Owner:** Carilion Health System, Roanoke, VA

**General Contractor:** Beers Skanska, Inc., Winston-Salem, NC

**Structural Engineer:** Carl Walker Parking Consultants, Atlanta, GA

**Geotechnical Engineer:** Froehling & Robertson, Inc., Roanoke, VA