

FHSU Art & Design Building



Ground improvement with cost-saving vibro sand columns on college campus

The Art & Design building at Fort Hays State University required [aggregate pier ground improvement](#) in order to reach a design bearing pressure of 5,000 pounds per square foot (psf) under the isolated footings. The existing site soils consisted of 1 to 7 feet of fill material (predominantly silty clay) which had a [standard penetration testing](#) range of 6 to 13. The natural soils on the site consisted mostly of soft to medium stiff silty clay down to greater than 40 feet, although a layer of sand of varying thickness was shown in the borings between the depths of 13 and 25 feet below ground surface. Shale was encountered at depths of 42 feet and greater.

Although aggregate piers / [stone columns](#) were required for [ground improvement](#) to support the structure, Subsurface Constructors proposed using sand in lieu of stone (the typical choice for aggregate piers). Crushed stone is less available and therefore more expensive in Central and Western Kansas, so the decision to install vibro sand columns provided cost savings. Subsurface designed and installed 320 vibro sand columns to achieve bearing pressures ranging from 3,000 to 5,000psf on this project.

Project details:

Owner: FHSU

Geotechnical Engineer: Terracon

General Contractor: Paul-Wertenberger Construction, Inc.

Structural Engineer: BDC Engineers

Location: Hays, Kansas