Elkhorn Valley Ethanol

Norfolk, Nebraska

Keller provided a cost-effective vibro concrete columns design to overcome constructability concerns (necking) within the soft soils.

The project

Elkhorn Valley Ethanol, LLC planned to construct a new renewable fuel production facility with the capacity to produce 45 million gallons of ethanol annually. The soil profile at the site consisted of 10 to 15 ft of competent surficial soils overlying soft silts and clays including a 3-ft-thick layer of water-laden, very soft material at a depth of 15 to 18 ft below grade. Dense sands were present at about 40 ft below grade.

The challenge

Given the subsurface conditions, deep foundations were required to bypass the poor soils and mitigate the potential for unacceptable differential settlement of the concrete mats on grade that would support several large storage and processing tanks. However, the designers were concerned over the possibility of necking of the originally proposed auger cast piles during construction.

The solution

Keller offered an alternative vibro concrete column design that would overcome necking concerns. Engineers evaluated the axial and lateral capacities of the vibro concrete columns for the site soil conditions. Keller utilized a concentric ring pattern with spacing developed from individual tank loading details provided by the general contractor. Almost 600 reinforced, 200-kip capacity vibro concrete columns were installed for the project. The vibro concrete columns were terminated at the interface of the soft silts and clays and the dense sands for a shorter pile length than the original auger cast design.

Project facts

Owner(s)
Elkhorn Valley Ethanol LLC

Keller business unit(s)
Keller

Main contractor(s)
Fagen Engineering LLC

Engineer(s)
Terracon Consultants, Inc.

Solutions
Deep foundations

Markets
Oil, gas and chemical
Tanks

Techniques
Vibro concrete columns

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