



Washington State Liquor Warehouse Addition

Seattle, Washington

The Geopier Impact® system proved to be a comprehensive solution for both superior foundation and slab support and site liquefaction mitigation

Description: Construction of a 64,000 sq. ft., high-bay warehouse addition to the existing Washington State Liquor Control Board warehouse facility, to be used for storage and an automated racking system. Column loads were up to 250 kips, floor loads up to 1,000 psf, and wall loads up to 5 klf. In addition to foundation support, site liquefaction mitigation was a priority as a nearby Duwamish Channel created lateral spread potential.

Subsurface Conditions: Subsurface conditions consist of 10 to 12 feet of existing sand fill over soft clay and silt that extends to approximately 30 feet. The soft clay is underlain by loose sands to the maximum explored depth of 60 feet. Groundwater was encountered at a depth of approximately 5 feet.

Geopier Solution: Aside from the heavy floor slab loads that the foundation needed to support, this project required a reliable and effective means of mitigating the potential for site liquefaction. Deep piles with earthquake drains were considered, but the Geotechnical Engineer recommended the Impact® system as a comprehensive and more cost-effective solution. Allowable total and differential settlements of less than one inch and 1/2 inch, respectively, and the need to minimize site vibration and impact on adjacent structures were additional motivators for



choosing the Impact system. Modulus test results showed about 0.21 inches of movement at top-of-pier stress level of 18,350 psf.

PROJECT TEAM

Owner:

Sunrise Assisted Living

Geotechnical Engineer:

GTA, Inc.

Structural Engineer:

Ehlert Bryan Inc.

General Contractor:

Glen Construction Company, Inc.

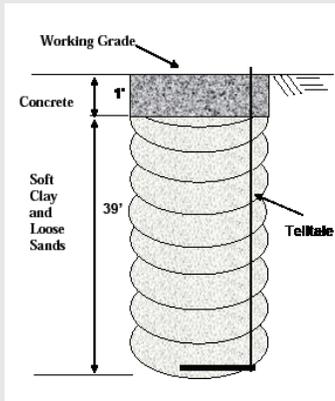
Geopier Installer:

GeoConstructors, Inc.

Geopier Designer:

GeoStructures, Inc.

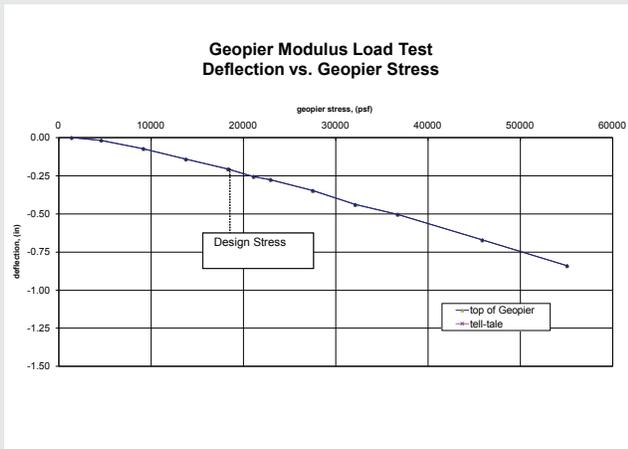
MODULUS TEST PIER SETUP



The non-production Rammed Aggregate Pier (RAP) elements extended through the sand, fill and clay to a depth of 40 feet below grade. Following RAP installation, a 20-inch diameter, one-foot thick concrete cap was placed over the RAP. Deflection measurements were taken on cap during modulus test performance.

The modulus test showed approximately 0.21 inches of movement at top-of-pier stress level of 18,350 psf.

MODULUS TEST RESULTS



During the modulus test, the top of the Impact pier deflected approximately 0.21 inches at a stress of 18,350 psf (100% of design top-of-pier stress), indicating an Impact pier modulus of 619 pci. The site-specific test value exceeded the design Impact pier modulus of 180 pci, confirming the superior performance of the Impact system solution.