



Box Culvert/Embankment Support

Neola, Iowa

The GP3® System was utilized to control total and differential settlement of a large box culvert over highly compressible soils to within stringent project criteria.

Description: The Iowa Department of Transportation proposed construction of a 157-foot long box culvert beneath an existing highway overpass along Route 191 near Neola, Iowa. In addition to the box culvert construction, the proposed final grade of the construction area beneath the overpass was to be raised by as much as 26 feet using flowable fill.

Subsurface Conditions: Approximately 32 feet of compressible silty clay overlying a thin layer of stiff glacial till and subsequently very stiff weathered shale. With moisture contents on the order of 35 percent, the silty clay was highly compressible as evidenced by oedometer and numerous in-situ tests.

Geopier Solution: Concerned with excessive settlement resulting from the construction of the culvert and subsequent area filling operations at the site, Iowa DOT officials selected Geopier soil reinforcement to control total and differential settlements as well as to reduce downdrag forces along existing piles supporting the adjacent bridge supports. A total of 276 Geopier soil reinforcement elements installed in a triangular grid spaced at 5 ft



on-center. The Geopier design consisted of four different sections with elements of varying shaft lengths of 6.5, 14, 19, and 22 feet, corresponding to changes in fill height along the length of the culvert. Total and differential settlements were substantially reduced to within stringent project criteria.

PROJECT TEAM

Owner:

Iowa Department of Transportation

Geopier Installer:

Peterson Contractors, Inc.

Geopier Designer:

GFC-Midwest