

## On trac

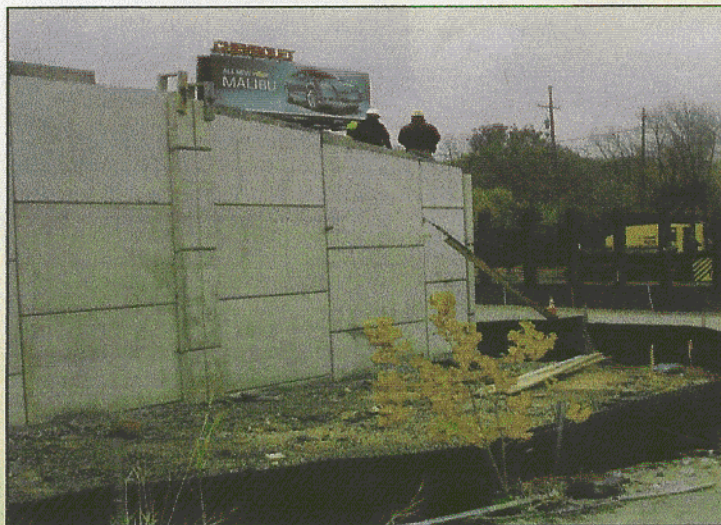
*New MSE design, soil reinforcement make for a 100-year bridge*

**With proper maintenance, the 200-ft-long bridge can have an indefinite life span.**

Will transportation systems in the 22nd century make today's bridges obsolete? It's hard to predict that far ahead, but when that time comes and the new bridge on North-South Blvd. in Greenbelt, Md., is reaching the end of its life span, it will have been the conduit for untold trips that created significant economic value and added to the quality of life for generations.

The truth is that with proper maintenance, the 200-ft-long bridge can have an indefinite lifespan, partly because of a unique system of a pile-supported superstructure, the embankments supported by mechanically stabilized earth (MSE) walls and the embankments reinforced by the Rammed Aggregate Pier (RAP) systems.

The bridge is the gateway to Greenbelt Station, a 240-acre, mixed-use site under development and adjacent to the Metrorail and MARC commuter train stations. The bridge design called for MSE headwalls and 26-ft wing walls, which can be a tricky installation with so many angles and piles. In this case the EarthTrac HATM system was used for the MSE wall because its galvanized, ribbed-steel soil reinforcement strips can be slightly skewed around the support piles and sleeves, and then bolted to precast concrete facing panels. EarthTrac HA is the only approved product on the Maryland State High-



way Administration's list for walls up to 50 ft high.

While EarthTrac HA solved the bridge support problem, embankment support was still an issue because ground investigations indicated an unacceptably high risk of settlement in the undocumented/uncontrolled foundation soils supporting the MSE bridge abutments. This was partly due to the weight of the MSE structure, and from the expected traffic load on the bridge itself. Faced with the traditional and costly solution of over-excavation and replacement of the soil with suitable granular fill, general contractor Concrete General adopted the Geopier soil reinforcement system using RAP elements as an alternative to support the walls and minimize the settlement.

RAP elements are created by drilling 30-in.-diam. holes and ramming well-graded aggregate into 1-ft layers to reinforce the surrounding fill soils. Under the direction of the engineering

team, 150 RAP elements were installed 20 ft deep and provided 4,000 psf of bearing capacity. Calculations showed that the particular layout created an additional 25% of allowable bearing pressure than the original estimate predicted. Combined with the time saved in construction and the cost savings of MSE backfill that would have been required if the soft fill had to be excavated and replaced, the Geopier system brought a level of straightforwardness to a complex project.

Engineered solutions such as the bridge at North-South Boulevard are a good example of why traditional or off-the-shelf solutions, while comfortable for many contractors, are not always the best solution. These relatively new construction technologies can meet grade-separation and bearing-pressure challenges effectively and at lower costs. It is good to see that we are starting to get comfortable with them.