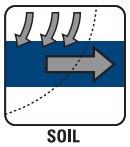
TENCATE Mirafi®


CONFINEMENT


SOIL REINFORCEMENT

Case Study

application	Temporary Basket Faced Walls	job owner	Metropolitan washington Airport Authority (MWAA)
location	Dulles Airport, Washington, DC	engineer	Foundation Engineering Science
product	Mirafi® HS400, Miragrid® GF-1, & Enkamat®	contractor	Atlantic Construction Materials

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

Undeveloped areas that had been delineated as "wetland areas" surround the southern perimeter of the Dulles International Airport. Rapid response roads that provide access to the airport runways to emergency vehicles and personnel from the south were planned and permitted to traverse the wetlands areas. Part of the construction permit required minimizing the footprint of the roadways through the wetlands, to include sections of the roadway crossing small streams and floodplains. In order to minimize the footprint of the elevated roadway in these areas, MSE walls needed to be designed for roadway elevations of up to 4 meters (13 ft) above existing site grades. In addition, the faces of the completed MSE walls needed to be grassed to blend-in with the surrounding wetlands.

THE DESIGN

The MSE walls were designed to utilize galvanized steel baskets as a facade for the temporary structures. Each subsequent lift of baskets was designed to incorporate a 3"H:18"V (9°) setback in order to minimize the lateral encroachment at the bases of the MSE walls into the adjacent wetland areas. Maximum wall heights of up to 4 meters (13 ft) were designed to support heavy truck traffic loads for a design life of 5 to 10 years. As a result of the traffic loads, Geolon® HS400 was chosen as the primary reinforcement for the MSE walls and Miragrid® GF-1 was chosen as the secondary reinforcement, or basket face-wrap. Due to potentially heavy rainfall and short-term high water levels in the vicinity of the MSE walls, an Enkamat® Composite, with its light weight nonwoven geotextile backing, was chosen as the erosion control mat (ECM) to aid in retention of the fine soil particles from the fill soils.

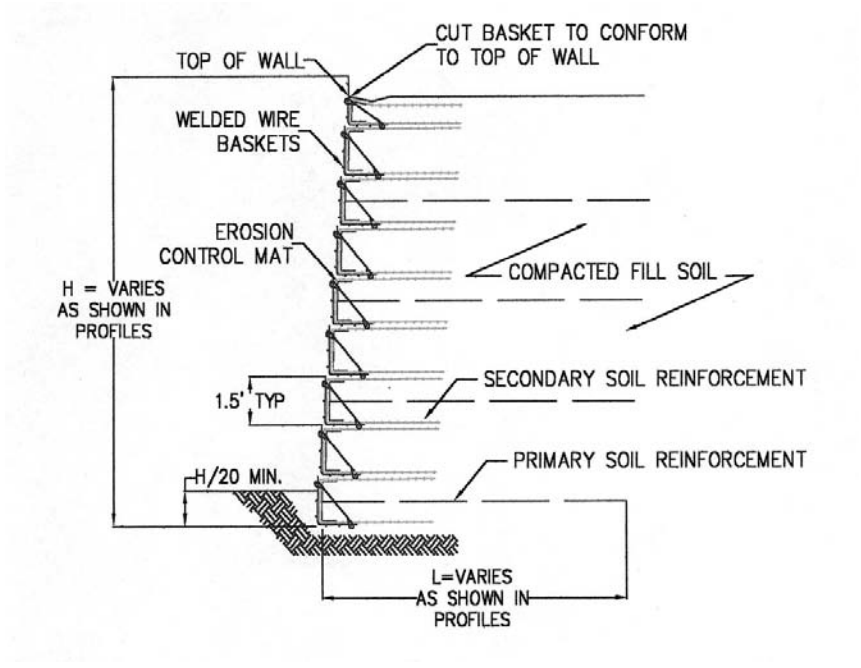
THE CONSTRUCTION

Construction of the MSE walls began in June 2000 with the placement of culverts, wingwalls and headwalls in the areas of the roadways traversing streams and small waterways. Once all of the drainage structures were in-place, construction of the MSE walls designed to support the roadways began. Construction of each wall was begun by excavating the existing soil or previously placed fill to the necessary elevation for placement of the first row of baskets. Once the first course of baskets were in-place, the secondary reinforcement and ECM were placed to the design lengths, along the backs of the row of baskets. Steel strut rods were then installed into the baskets at a lateral spacing of approximately 0.6 meters (2 ft) to aid in support of the basket faces during compaction of fill soil. Twenty-eight to thirty one centimeters (11-12 in) of loose fill soil was then laced behind the geosynthetics and compacted to the project specified percent compaction, and to an approximate thickness of 23 cm (9 in). Mirafi® HS400 primary reinforcement was then placed to the design reinforcement lengths extending from the inside of the

of the basket facing into the roadway section. The primary reinforcement was pulled taught and staked in place before placement of subsequent layers of fill soil. Placement of subsequent rows of basket facing and geosynthetic materials continued for each MSE wall until a wall's design height was reached. Once MSE wall construction was completed, the roadways were constructed to the grades and elevations specified in the project plans. After construction of the roadways was concluded, the faces of the MSE walls and any disturbed soils adjacent to the walls were hydro-seeded to promote the growth of vegetation.

THE PERFORMANCE

The use of MSE walls in this application minimized the potential disturbance of environmentally sensitive wetlands areas during roadway construction. The ability to vegetate the facing of the MSE walls aided in blending-in the wall systems to the surrounding wetlands. The flexible facing system of galvanized steel baskets, and geosynthetic secondary reinforcement and ECM, made construction of the MSE walls with a near vertical rise possible. The strength of Mirafi® HS400 made construction of the MSE walls feasible under the anticipated truck traffic loads. These factors helped to make MSE walls the best project solution for the Washington Dulles International Airport New ARFF Station Response Roads.



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