CASE STUDY

PS42 Turf Reinforcement Mat

Win-Win: Permanent Erosion Control Technology Assists in Overcoming Regulatory Challenges & Increase Project Benefits

ABOVE - previous attempts at erosion control using unreinforced vegetation and rock riprap.

BELOW - exceptional vegetation establishment occurred three weeks after installation of the PS42.

Location:

Reserves at Chesterfield Village a Residential Development in Chesterfield, Missouri.

Project Details:

The Reserves at Chesterfield Village is an upscale residential development bordering perennial Chesterfield Creek.

Issues:

Chesterfield Creek and its wooded buffer are protected by the U.S. Army Corps of Engineers (CE) as environmental mitigation area. Special permission from the CE was required to discharge stormwater into the creek through the mitigation area. Authorization from the CE hinged on two key aspects. First, that disturbance be limited to only two areas. Secondly, that the discharge areas be restored to near-natural conditions. Preliminary engineering plans specified six stormwater discharges to the creek. Concentrating stormwater into only two discharges increased the potential for stormwater erosion. The steep slopes above the creek would be prone to runoff and thus erosion following disturbance.

Solution:

A creative mix of erosion control (EC) technologies were employed to meet the conditions set by the CE for minimizing disturbance and restoring the site. These included widespread use of the ErosionControl-Blanket PS42 composite-turf reinforcement mats (CTRM)s, contour wattling, native vegetation, and tree preservation and replanting. Instead of piping, an existing 400-ft. natural swale was modified to conduct 16 cubic feet per second of stormwater. Modifications include PS42 CTRM, velocity checks, and laminar flow converters. The CTRM provided effective immediate erosion control and exceptional mulching characteristics through it combination of straw and poly fibers. After straw degradation, the permanent randomly oriented poly fibers are still present to assist the vegetation in providing cover. The poly-fiber also affords a permanent 3-D reinforcement structure to increase the permissible shear stress of the vegetation. The installation of the PS42 was also found to provide an economical advantage by not requiring soil filling of the mat. The PS42 is simply applied and stapled into place after final grading, amendment application, and seeding. Anchor trenches were used at the beginning of the channel, along the side slope edges, and at the terminal end. In addition, because the PS42 comes in wider rolls (up to 16 feet) really made for quick installation, while significantly decreasing the number of overlap seams which can present concern as possible weak spots in the overall installation.

Results:

Construction was completed in fall of 2007. The project area has since experienced record precipitation. Both discharge areas have functioned exceptionally under very extreme conditions with no erosion and exceptional vegetation establishment. Without the employment of the PS42, the battering by spring rains and design-event flows would

ABOVE - erosion control and seed protection is achieved immediately after PS42 installation.

BELOW - the erosion control performance of the PS42 improves as vegetation continues to establish.

likely have resulted in significant erosion of slopes and discharge points. However, the project successfully met the regulatory mandates for protecting and restoring the mitigation area. Moreover, the natural appearance of the vegetated discharge areas adds to the pastoral setting promoted by the developer. And best of all, the “green” SEC methods that were used saved substantial costs over conventional piping or concrete swale designs. The PS42 reinforced vegetation will continue to develop and provide even greater levels of erosion control for this project.

Product Details:

The PS42 composite turf reinforcement mat is made of 67% polypropylene fiber and 33% agricultural straw fiber designed for critical slope and channel applications requiring permanent erosion control and turf reinforcement. The matting is sewn together on 1.5 inch (38.1 mm) centers. And meets requirements established in the FHWA FP-03 as a Type 5 A, and B turf reinforcement matting.

PS = 67% polypropylene fiber and 33% agricultural straw fiber matrix

4 = polypropylene/straw fiber matrix applied at a rate of 0.75 lbs/yd^2 (400 g/m^2)

2 = top permanent UV stabilized black net with a mesh size of 0.53 x 0.5 in (1.34 x 1.27 cm) and a bottom permanent UV stabilized black net with a mesh size of 0.626 x 0.626 in (1.59 x 1.59 cm)

The PS42 is mechanically bonded with UV stabilized black thread.

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