Rip Rap Alternatives

Source: Flexamat

BENEFITS

	L	M	H
Flow Control	■		
Erosion Control	■	■	■
Sediment Control			
Runoff Reduction			
Flow Diversion			

Description: As described within this section, rip rap alternatives encompass a variety of products that can be used in situations and locations where rip rap has traditionally been used or in locations where rip rap alone may not be sufficient.

Typical Uses: Used to dissipate energy at culvert outlets, provide wave protection at shorelines, stabilize streambanks, and prevent scour at the transition from highly concentrated flow outlets to channel flow.

Advantages:
- Some products can be vegetated, providing a “softer” appearance than traditional rip rap.
- Some installations can be mowed with conventional equipment.
- Some products may provide a greater level of protection than rip rap.
- Some products can be driven over, allowing access for maintenance vehicles

Limitations:
- Continuous flow channels may not support vegetation.

Longevity: Permanent

SUDAS Specifications: Refer to Section 9040, 2.19 and 3.25 for HDPE transition mats.

A. Description/Uses

This section describes a variety of manufactured products intended to be used in place of riprap for stabilization or scour protection.

1. **Transition Mat:** Flexible, UV-stabilized HDPE panels with multiple voids to allow vegetation to grow through and provide energy dissipation and scour protection. The panels are typically installed at pipe outlets. The mat protects the area at pipe outlets from scour until the water spreading out in the channel diminishes the turbulent forces. The channel downstream of the outlet, where the flow becomes uniform, must still be evaluated to ensure that the channel lining can withstand the anticipated shear stress. Transition mats can typically be vegetated or installed over sod which will grow up through the mat, obscuring the visibility of the mat and enhancing the erosion protection of the system.

2. **Grid-Tied Concrete Block Mat:** Manufactured from individual concrete blocks tied together with high-strength geogrid. Each block is tapered on all four sides, forming a pyramid shape. This product has a wide range of uses, including outlet protection, channel lining, shoreline protection, scour protection, streambank stabilization, slope protection, spillways and overflows, low water crossings, and boat ramps. Grid-tied concrete block mats provide enough space between the blocks to allow vegetation to grow up through the block, obscuring the visibility of the mat and enhancing the erosion protection of the system.

3. **Articulated Concrete Mat:** Consists of individual concrete blocks connected with cables to develop a mattress of interconnected concrete blocks. Articulated concrete mats provide a high level of resistance to scour and shear stress and can be used for outlet protection, channel lining, shoreline protection, scour protection, slope protection, spillways and overflows, low water crossings, and boat ramps. The blocks can be provided with either an open-cell or closed-cell configuration allowing the system to be backfilled with soil and vegetated if desired.

B. Design Considerations

Manufacturers of rip rap alternative products typically provide guidelines, design information, product specifications, and installation instructions for their products. It is recommended that designers contact the product representative to assist with the design and specification of these products.

A common cause of failure for some rip rap alternatives is the failure to properly anchor the product to the ground. Ensure the installation utilizes the type and quantity of anchors recommended by the manufacturer.

C. Application

Rip rap alternative products are intended to be used where traditional rip rap will not provide the desired appearance or performance.

D. Maintenance

While rip rap alternative products are intended for permanent installations, maintenance and replacement may be required. They should be inspected regularly to determine if there are performing adequately and for damage after large storms or overtopping events.