

Green Alternatives to Rip Rap for Streambank Protection Shoreline Stabilization

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Rip Rap Issues

- **Eliminates Vegetation**
- **Mineral Content**
- **Large Stone – Big Equipment**
- **Availability**
- **Installation**
- **Safety/Liability**
- **Cost**
- **Maintenance**
- **It's Just Plain Ugly**

RIPRAP FOR STREAMBANK PROTECTION

Produced by
Cumberland County SWCD
Knox-Lincoln SWCD
Maine Dept. of Environmental Protection
Maine Soil & Water Conservation Commission
Portland Water District
Time & Tide RC&D Area
US Environmental Protection Agency
USDA Soil Conservation Service

WHAT IS IT?

Riprap is a heavy stone facing (armor) on a shorebank used to protect it and the adjacent upland against wave scour. Riprap depends on the soil beneath it for support and should be built only on stable shores or bank slopes.

ENVIRONMENTAL CONSIDERATIONS

Stabilizing streambanks with shrub and tree vegetation provides excellent habitat for fish and wildlife species. Maine's fisheries rely on a combination of shading and leaf drop by the plants. Shading protects fish species from "thermal pollution" -- when the water heats up too much for fish to thrive. Leaf litter provides the first link in the food chain -- a food source for the insects that young fish feed on. Avoid at all costs using riprap if vegetation can solve your erosion problem. If riprap is unavoidable, use a combination of riprap and plantings to provide the vegetative cover needed.

WHAT IS RIPRAP COMPOSED OF?

Riprap is composed of three sections: the armor or stone layer, the filter layer, and the toe protection.

Typical armor is composed of rough, angular rock. The second component, the underlying filter layer, supports the stone against settlement, allows groundwater to drain through the structure, and prevents the solid beneath from being washed through the armor layer by waves or groundwater seepage. The toe protection prevents settlement or removal of the lower edge of the riprap.

In certain cases overtopping of the top of the riprap slope may be a factor which needs to be considered. The top of the slope can be protected by including a stone overtopping apron in the design.

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Green Alternatives



**VEGETATION IS YOUR
PERMANENT EROSION
PREVENTION**

Shear Stress Comparison

Material	Shear Stress (lbs/ft²)
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Most Grasses	~ 8
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4" Riprap	~1.5
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8" Riprap	~3
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12" Riprap	~8
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Coir

Biodegradable ECB's













AUG 30 2006



DANGER
KEEP OFF
EROSION AREA















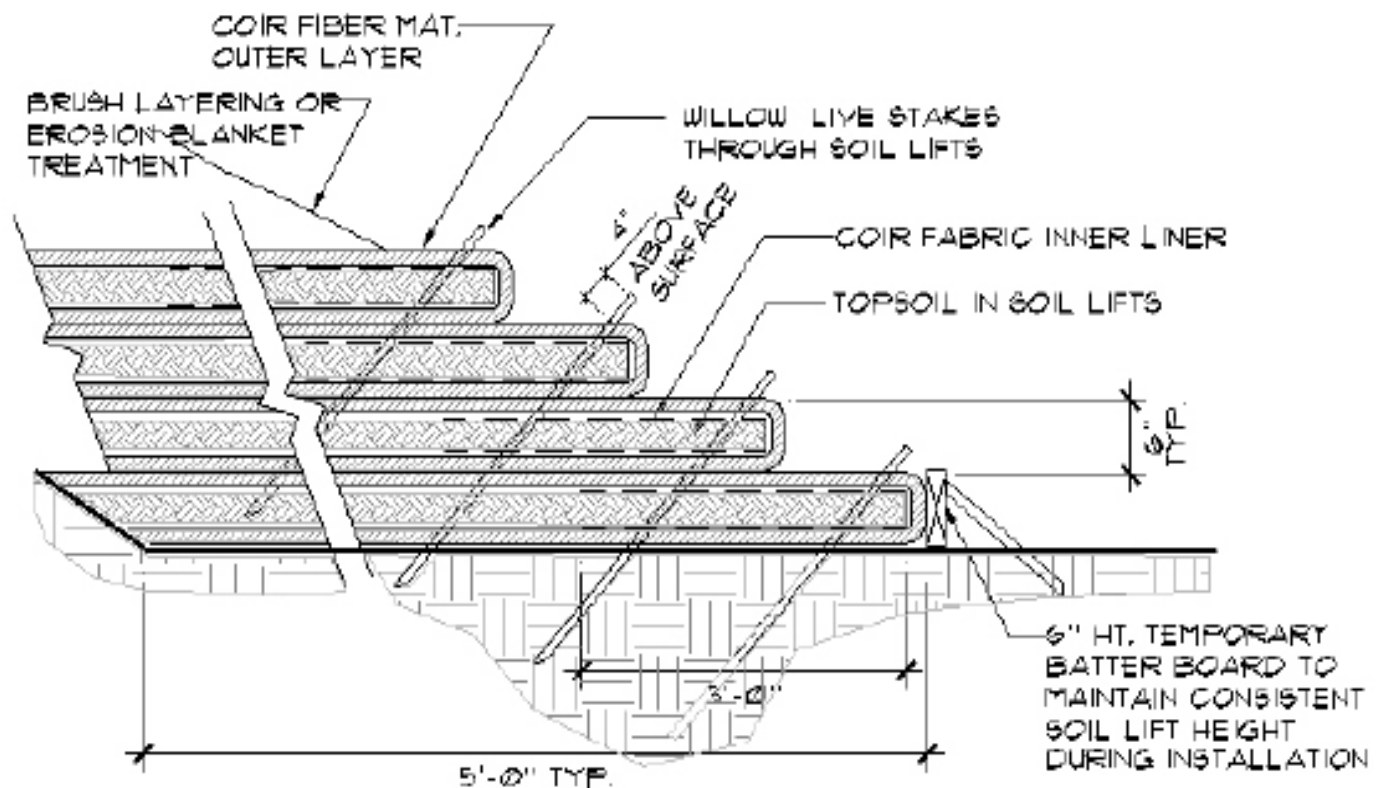












WRAPPED SOIL LIFT DETAIL

NTS















COIR LOGS

- **Density**
 - **5 / 7 / 9 lbs.**
- **Life Cycle**
- **Netting**
 - **Poly**
 - **Biodegradable**
 - **Possible metal thread in machine made netting**

























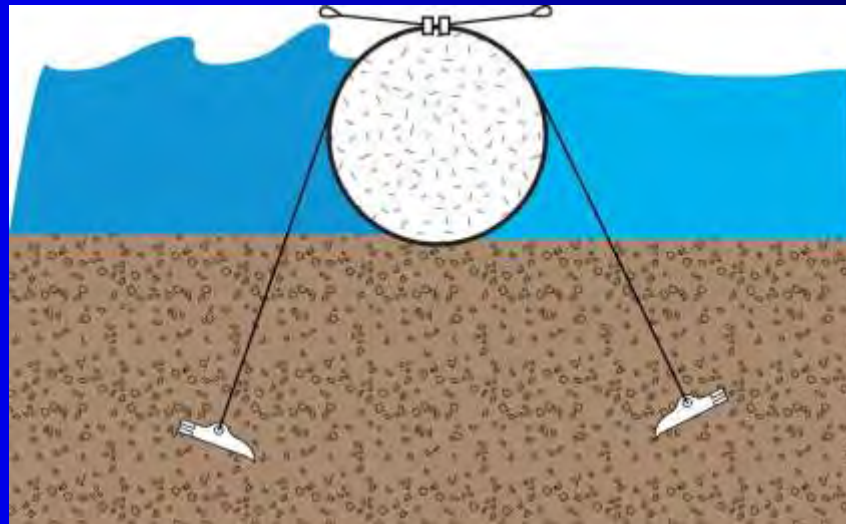
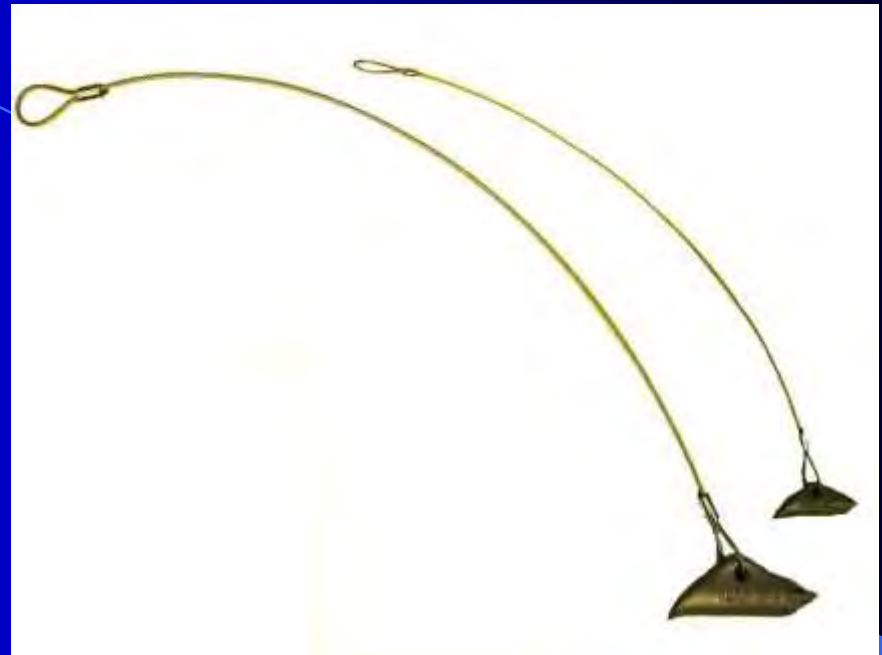














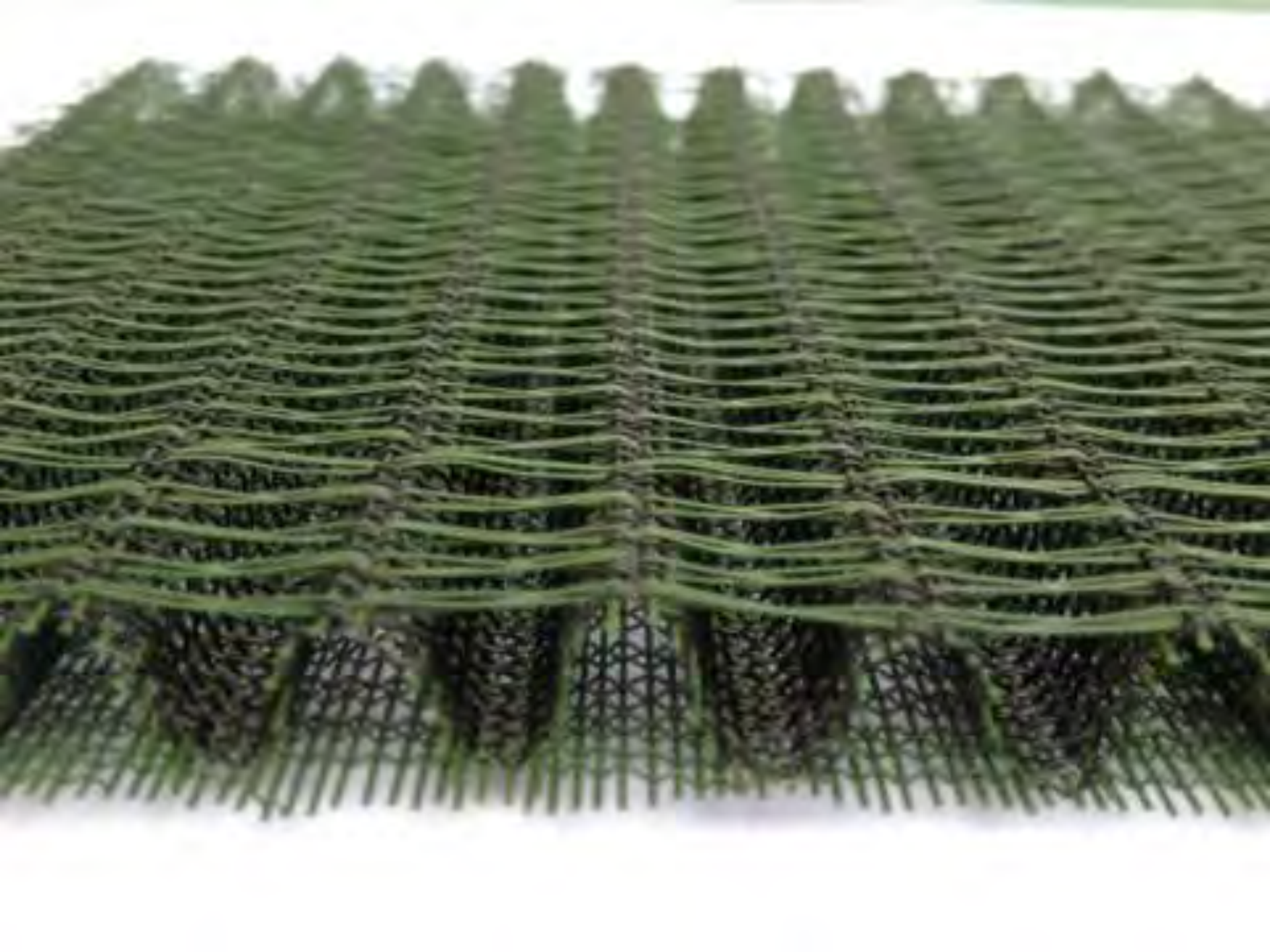


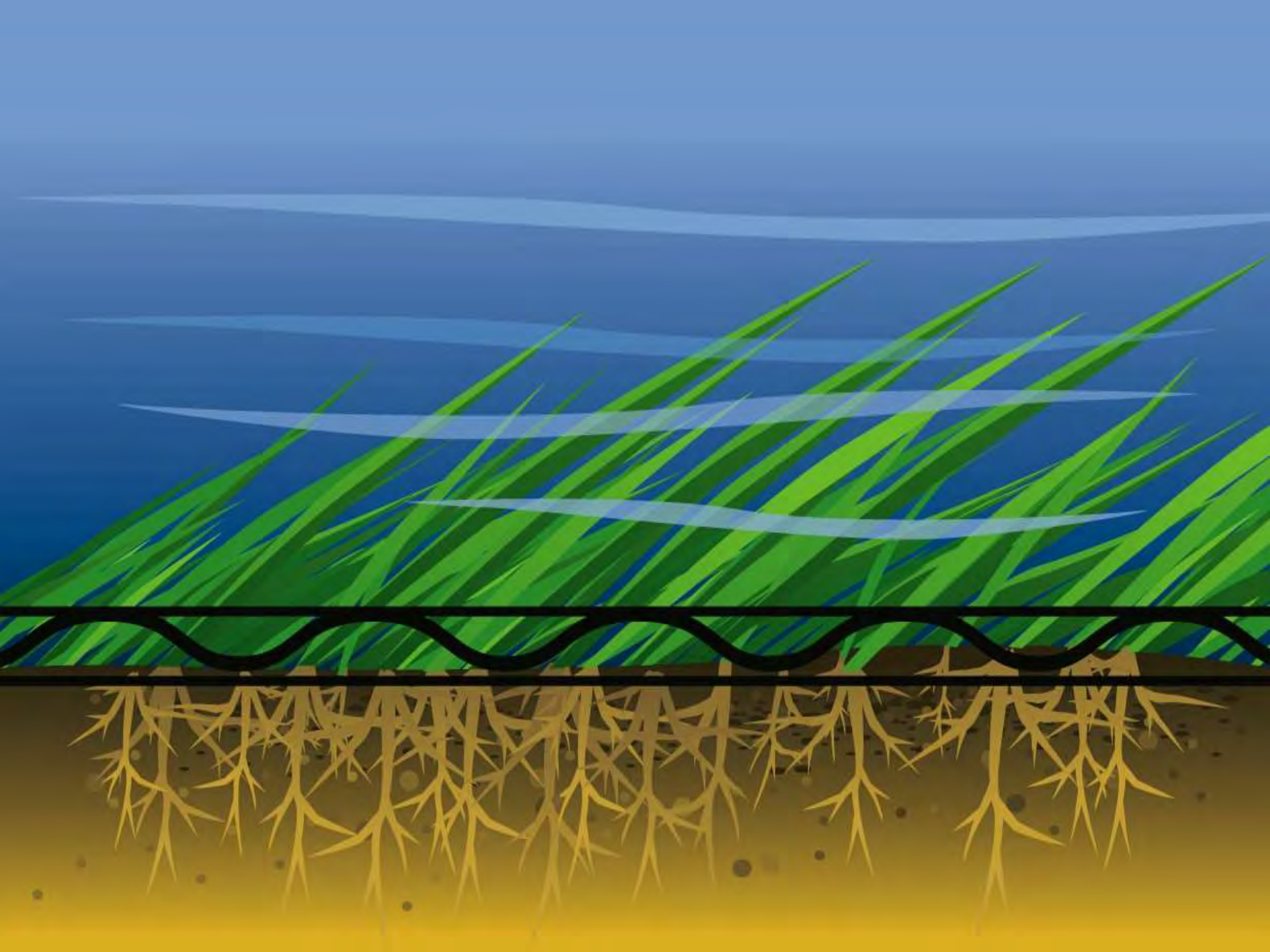




The background is a solid dark blue. A thin, light blue curved line starts from the left edge and arcs downwards towards the center. A larger, lighter blue triangular shape is positioned in the lower right quadrant, with its hypotenuse facing towards the center of the image.

Turf Reinforcement Mats

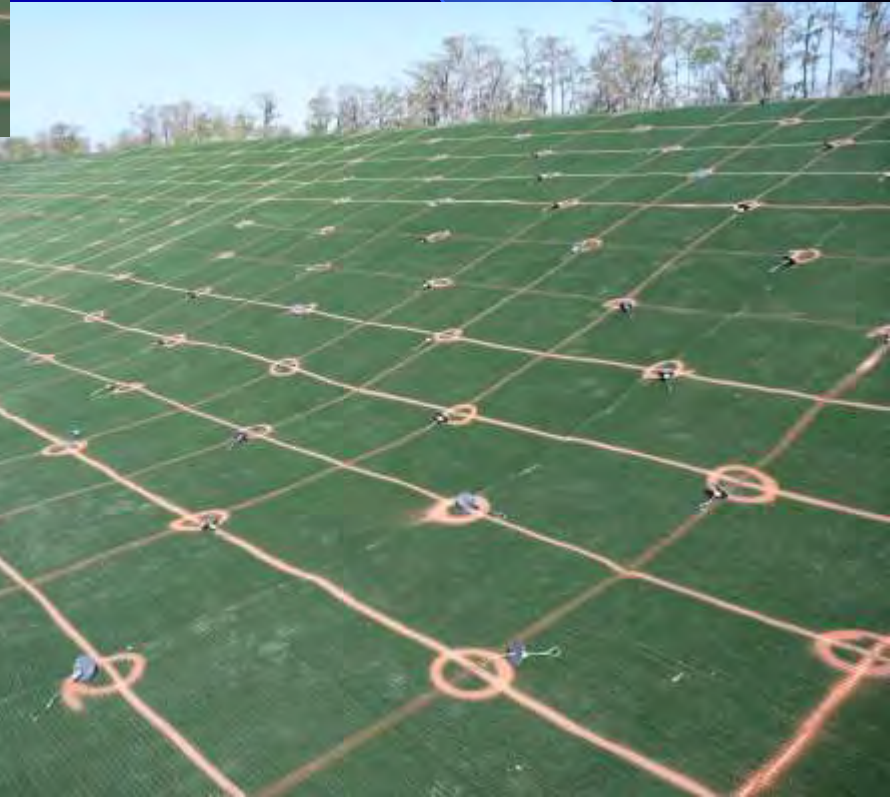




TRM's

- **Max Velocity**
 - **25 ft./sec.**
- **Max Permissible Shear Stress**
 - **16 lbs./ft.²**
 - **40" rock riprap**
- **Tensile Strength**
 - **3800 x 5000**























Maplecrest Left Spillway - after storm





The background is a gradient of blue, transitioning from a lighter blue on the left to a darker blue on the right. A thin, light blue curved line starts from the top left and curves downwards towards the center. A spotlight effect, represented by a semi-transparent blue cone, originates from the word 'Vanes' and points towards the bottom right corner.

Vanes



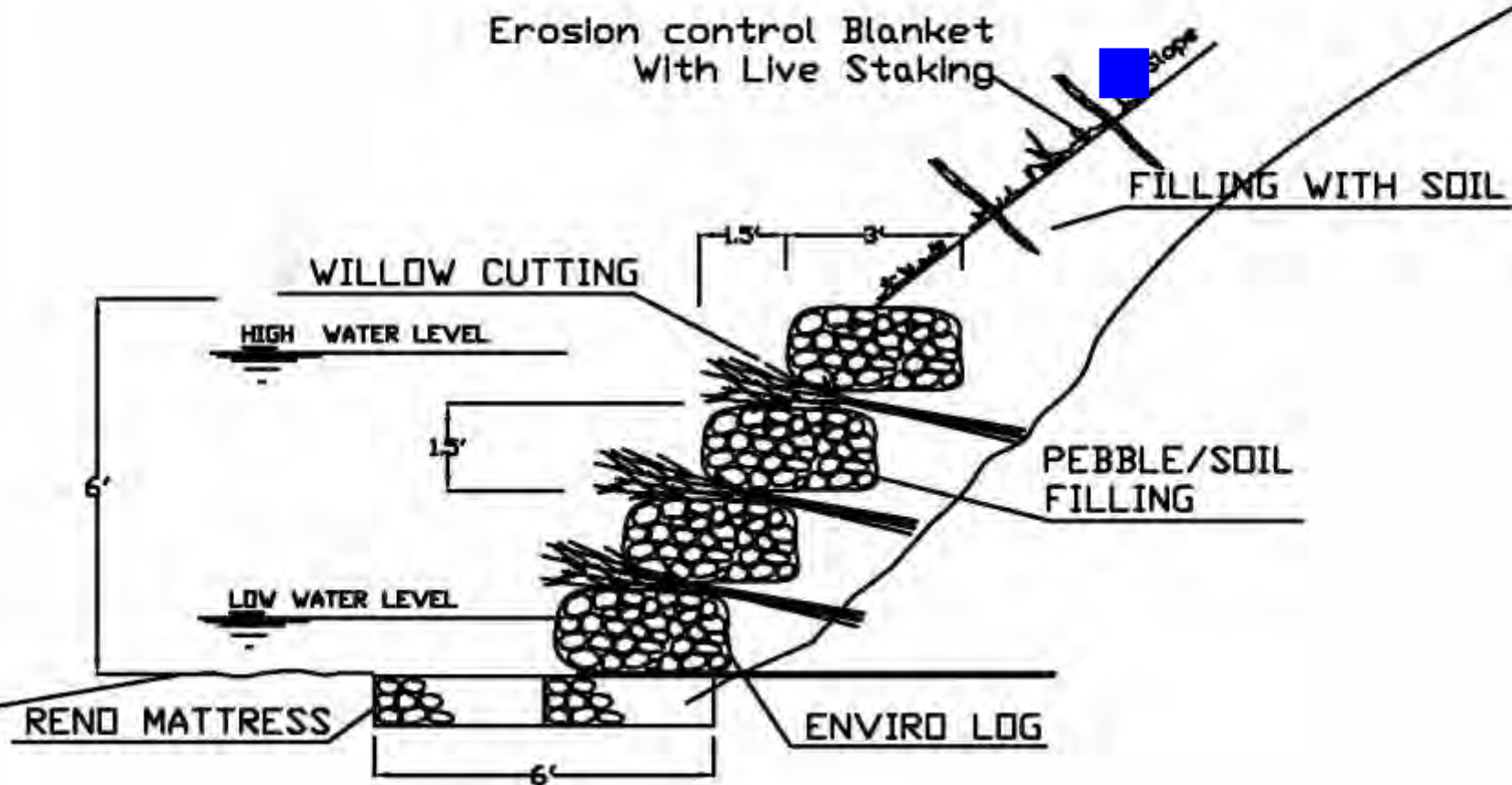




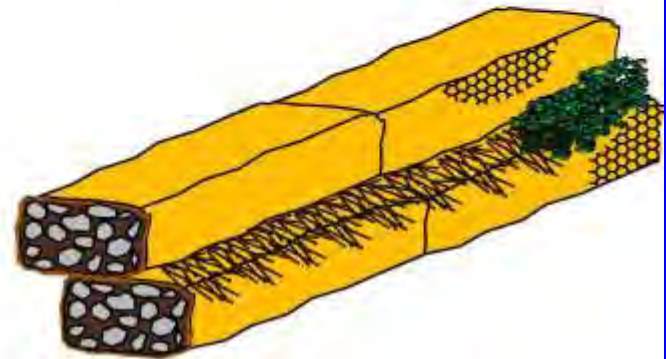
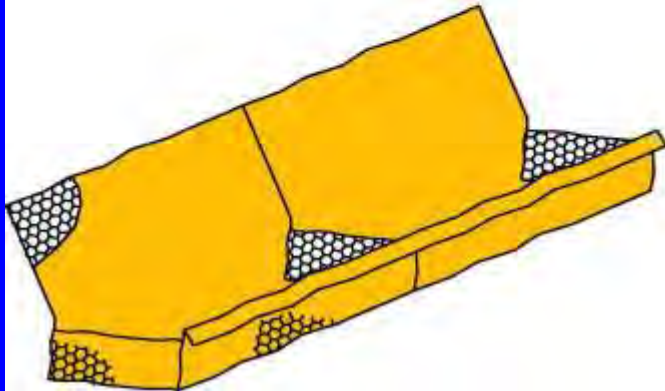
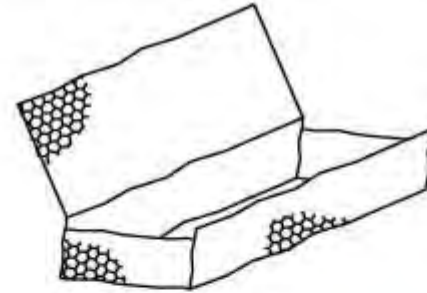
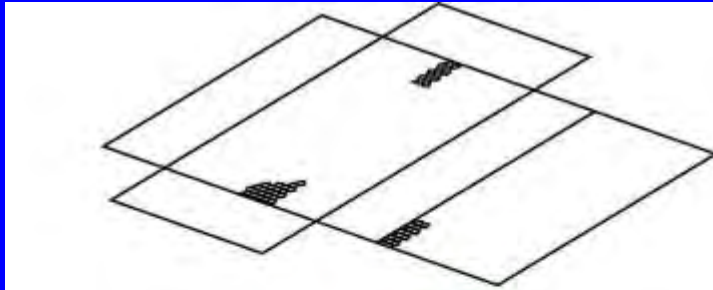


The background is a dark blue gradient. A thin, light blue curved line starts from the left edge and curves downwards towards the bottom right. A larger, semi-transparent blue shape, resembling a sector of a circle or a stylized wave, is positioned in the lower right quadrant, partially overlapping the text.

Envirologs / Biologs



TYPICAL CROSS SECTION



















06/23/2011









Marine / Reno Mattresses





















Soft Revetment Protection Mats













05.10.2012



05.21.2012



05.30.2012





Bank erosion pins



QUESTIONS?



"This really is an innovative approach, but I'm afraid we can't consider it. It's never been done before."



The background is a solid blue gradient. A thin, light blue curved line starts from the left edge and arcs downwards towards the bottom right. A larger, semi-transparent blue shape, resembling a spotlight beam or a stylized 'C', originates from the same area and extends towards the bottom right corner, creating a sense of depth and focus.

THANK YOU