

# SHOREMAX® FLEXIBLE TRANSITION MAT

INSTALLATION GUIDE





## Introduction to the ShoreMax® Transition Mat

The North American Green® RevetMax™ System ShoreMax® Transition Mat is designed for protection of high scour and high velocity applications. The flexible transition mat can be used in varying applications and can replace hard-armor designs with “green” vegetated designs.

To create the maximum vegetated design, we suggest combining two high-performance North American Green Erosion Control Products (ECPs), the ShoreMax Mat and a VMax® Turf Reinforcement Mat (TRM). North American Green offers many different VMax TRMs that can be used with the ShoreMax Mat. The VMax TRM’s special structural design anchors and reinforces the roots and stems of vegetation for long-term stability, and helps create a shear plane that deflects the flowing water away from the soil surface. The ShoreMax Mat provides mechanical protection and ballasting to the protected area and increases the immediate permissible shear stress capabilities of the system.

Once installed, the ShoreMax Mat offers protection comparable to hard-armor products such as rock riprap and articulated concrete blocks in turbulent flow and wave attack applications. ShoreMax Mat can take your high flow projects to the maximum in green vegetated design with unvegetated shear performance up to 8.6 lbs/ft<sup>2</sup>

### FEATURES OF SHOREMAX TRANSITION MAT

ShoreMax Mat is the first flexible soft revetment scour protection system that easily installs over difficult soil topography, and does not require heavy equipment or expensive earth anchors to install. It’s also non-buoyant, so it won’t float or uplift in submerged and heavy flow conditions. ShoreMax Mat is designed with “spikes” that bite into the underlying mat, which prevents horizontal shifting of the mat.

### KEY APPLICATIONS

ShoreMax Transition Mat is designed for immediate to permanent protection for high scour applications such as head-to-tail protection of drainage channels, culvert and pipe outfalls, and steep chute and slope drains like those associated with parking lots, roadways, mines and landfills. The flexible transition mat can be used to create soft revetment systems. ShoreMax Mat can be utilized for shorelines, streambanks, and spillway applications where wave attack can reach the super critical stage.

SHOREMAX TRANSITION MAT DESIGN CRITERIA						
TRM Underlayment Type and Phase		Maximum Permissible Shear Stress	Maximum Flow Velocity	Maximum Wave Attack Applications		
SC250	Unvegetated	7.5 lb/ft <sup>2</sup>	18 ft/s	6 in. wave height, ≤4:1 slope	12 in. wave height, ≤5:1 slope	N/A
	Vegetated	10 lb/ft <sup>2</sup>	18 ft/s			
C350	Unvegetated	8.0 lb/ft <sup>2</sup>	19 ft/s	6 in. wave height, ≤3:1 slope	12 in. wave height, ≤4:1 slope	N/A
	Vegetated	12 lb/ft <sup>2</sup>	20 ft/s			
P550	Unvegetated	8.5 lb/ft <sup>2</sup>	19.5 ft/s	6 in. wave height, ≤2:1 slope	12 in. wave height, ≤3:1 slope	18 in. wave height, ≤5:1 slope
	Vegetated	14 lb/ft <sup>2</sup>	25 ft/s			

*The ShoreMax Transition Mat has been evaluated for its performance in conjunction with a VMax TRM in both channel and wave attack applications, resulting in these guidelines.*

MAXIMUM DESIGN CONDITIONS			Anchor Pattern
Shear Stress	Velocity	Wave Height	
≤6 lb/ft <sup>2</sup>	≤14 ft/s	6 in.	F
>6-8 lb/ft <sup>2</sup>	>14-18 ft/s	12 in.	G
>8 lb/ft <sup>2</sup>	>18 ft/s	18 in.	H

TABLE 1: Minimum anchor pattern

MINIMUM ANCHOR TYPE BASED ON SOIL TYPE	
Soil Type	Anchor Type
Clay - Clay Loam	10 in. Wire Staple or 12 in. ShoreMax Stake
Silt Loam - Loam	10 in. Wire Staple or 12 in. ShoreMax Stake
Sandy Loam	12 in. Wire Staple or 12 in. ShoreMax Stake
Sand/Muck ≤6 in.	12 in. Rebar Staple
Sand/Muck 6-12 in.	18 in. Rebar Staple
Sand/Muck 12-18 in.	Earth Anchor 400 + 12 in. Rebar Staple
Sand/Muck >18 in.	Earth Anchor 680 + 18 in. Rebar Staple

TABLE 2: Minimum anchor type

## Anchoring and Guidelines

Installation of the ShoreMax Mat can be done simply and without the need for expensive equipment. The ShoreMax Mat and TRM underlayment are simply installed over a prepared seeded soil and fastened into place with anchors. Special percussion earth anchors are typically not required.

The ShoreMax Mat's flexibility allows it to be easily installed using a variety of fasteners such as the ShoreMax Stake, wire staples, rebar staples and percussion earth anchors. Because it easily self-conforms to the underlying terrain, fasteners are not required to force conformance with the underlayment material - they only serve to hold the panels in place. The type and size of fastener used is simply dependent upon the underlying soil and degree of compaction.

Anchoring patterns for the ShoreMax Mat vary depending on the project applications with increased anchoring patterns required for higher flow or scour applications. Please refer to the tables and figures on this page to determine the appropriate anchor type and anchor pattern. For site-specific recommendations use the Erosion Control Materials Design Software® (ECMDS) for help in selecting a ShoreMax Mat and fastening details. Visit [www.ECMDS.com](http://www.ECMDS.com) for more information.

### ANCHORING GUIDE

1. When installing the ShoreMax Mat, the anchor pattern (Figures 1 or 2) should be selected based on the expected maximum design conditions (shear stress, velocity or wave impact) (Table 1).
2. Anchor type selection should be based on the soil type and pull-out strength required (Table 2). In soft, highly erodible soils percussion earth anchors may be necessary. Earth anchors can be installed in conjunction with staples (Figure 2).
3. When using percussion earth anchors, position anchors in each corner and the center of the panel. Place staples in the appropriate pattern through remainder of mat. Staples can be shared between two adjacent panels.

**\*NOTE:** Number of staples used per panel can be reduced by 30-40 percent when sharing staples between panels.

☐ - Staple/Stake    ⊕ - Percussion Earth Anchor

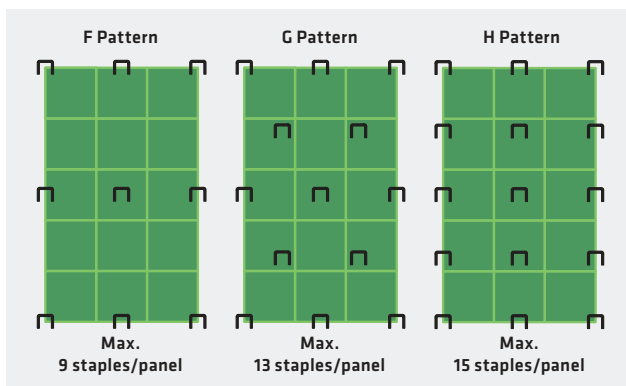


FIGURE 1: Anchor Patterns for use with staples/stakes

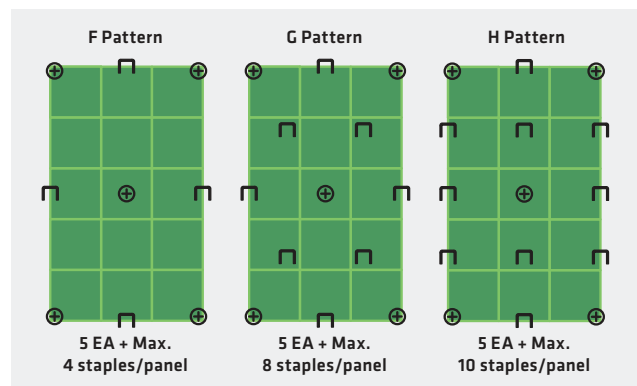
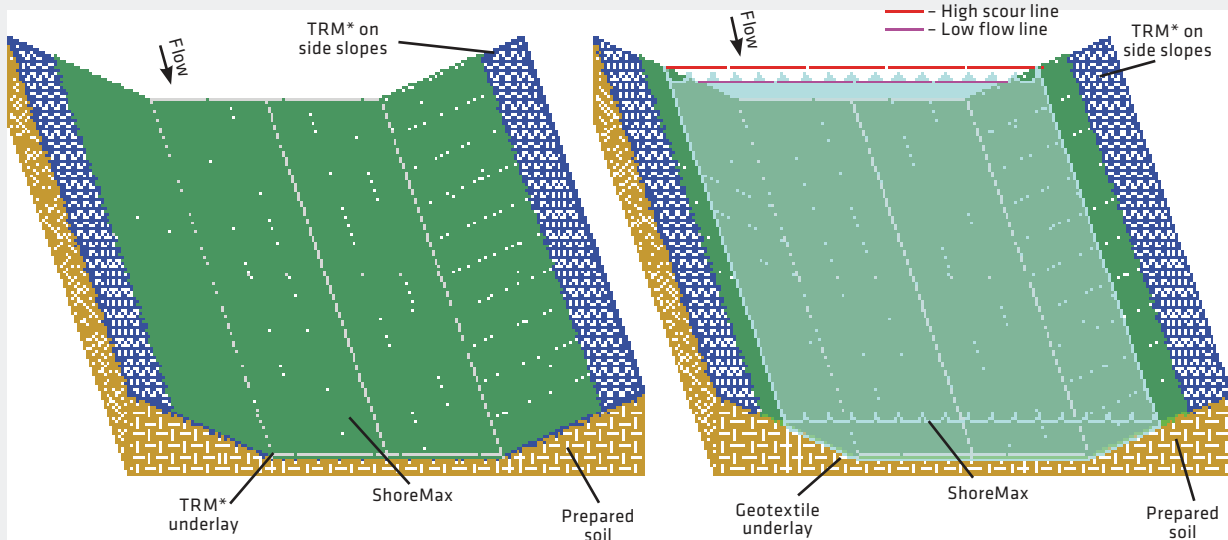


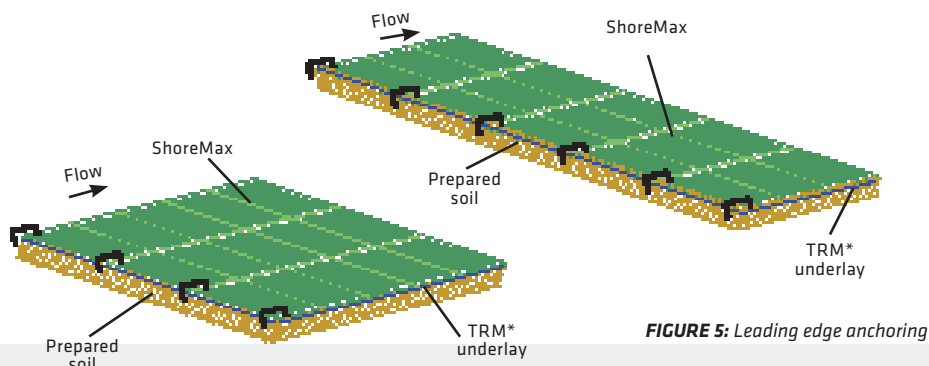
FIGURE 2: Anchor Patterns for use with a combination of earth anchors and staples

# Channel Design Guideline



**FIGURE 3:** Steep channel

**FIGURE 4:** Continuous flow channel



**FIGURE 5:** Leading edge anchoring

## STEEP CHANNEL/CHUTE SPILLWAY DETAIL

\*ShoreMax® Mats can be installed over a variety of underlayments including: sod, TRMs, geotextiles, and in some cases Erosion Control Blankets (ECBs).

1. Prepare soil before installing erosion control products, including any necessary application of lime, fertilizer and seed (when installing TRM or ECB underlayment).
2. Install TRM over prepared soils according to manufacturer's recommendations.
3. Place the ShoreMax Mat in the bottom of the channel over the installed TRM (Figure 3). The ShoreMax Mat should be installed up to the appropriate elevation on the side slope as determined by the engineer. The ShoreMax Mat can be laid in either direction.
4. For channels carrying continuous water flows, an appropriate geotextile should be placed under the ShoreMax Mat for submerged applications (Figure 4).
5. Place staples/anchors in the appropriate pattern. Perimeter staples can be shared between two adjacent panels. In soft or highly erodible soils, percussion earth anchors may be required. Please see page 3 for additional details on anchoring.
6. At the beginning of channels and other areas where significant concentrated flows are directed onto the ShoreMax Mat, place one staple/pin per linear foot along the leading edge of the ShoreMax Mat, resulting in one staple/pin on each corner and gridline (Figure 5).



### OUTLET/CULVERT PROTECTION DETAIL

\* ShoreMax® Mats can be installed over a variety of underlayments including: sod, TRMs, geotextiles, and in some cases ECBs.

1. Prepare soil before installing erosion control products, including any necessary application of lime, fertilizer, and seed (when installing with a TRM or ECB).
2. Install TRM over prepared soils according to manufacturer's recommendations.
3. Place the ShoreMax Mat over the installed TRM (Figure 6). The ShoreMax Mat can be laid in either direction.
4. For culvert and outfall applications, the ShoreMax Transition Mat should extend a minimum width of 3-4 times the pipe diameter and a minimum length of 4-5 times the pipe diameter (Figure 6). With steeper channel gradients, the length of the ShoreMax Mat may need to be extended.
5. Place staples/anchors in the appropriate pattern. Perimeter staples can be shared between two adjacent panels. In soft or highly erodible soils, percussion earth anchors may be required. Please see page 3 for additional details on anchoring.
6. Place one staple/pin per linear foot along the leading edge of the ShoreMax Mat, resulting in one staple/pin on each corner and gridline (Figure 5).

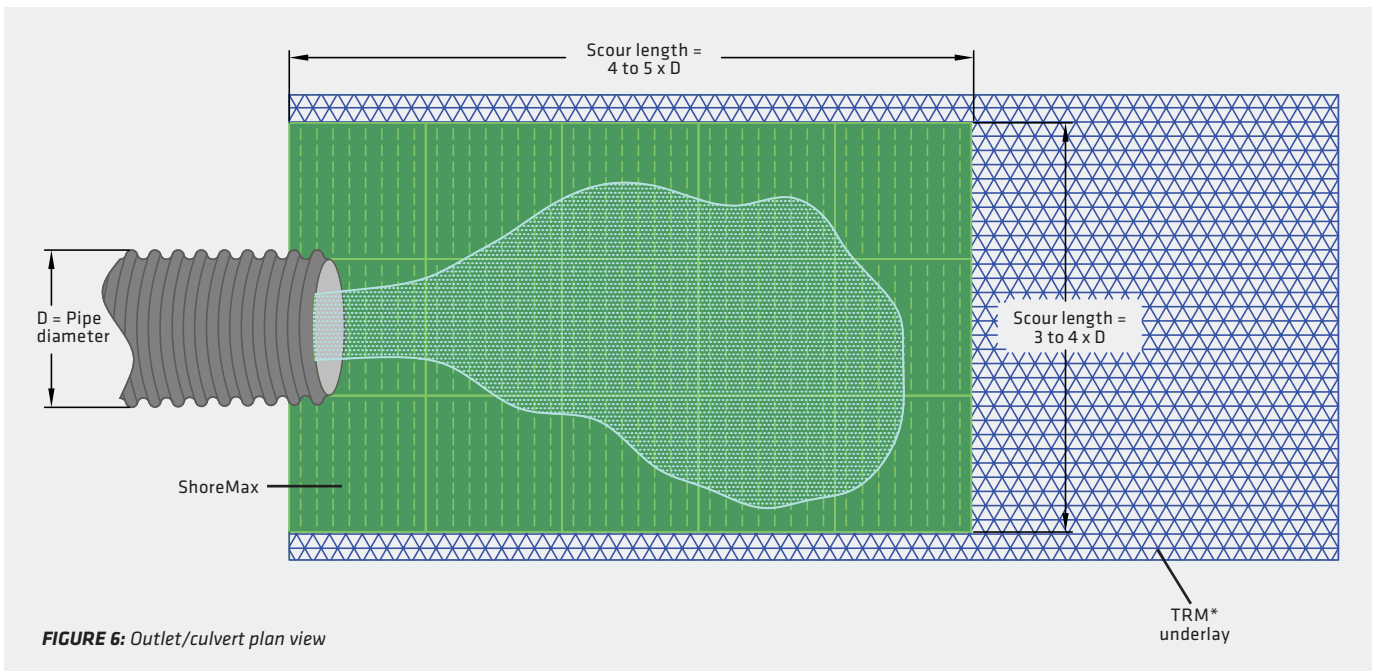
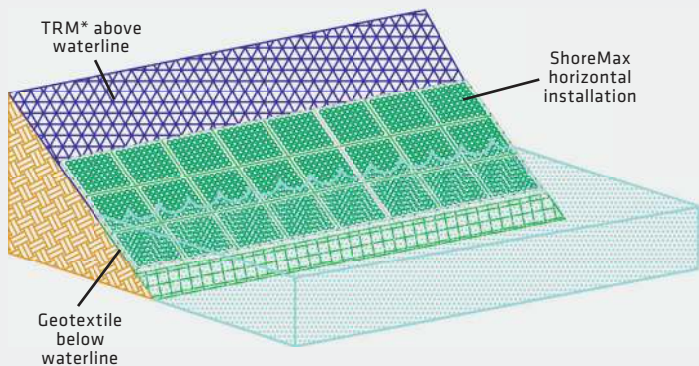
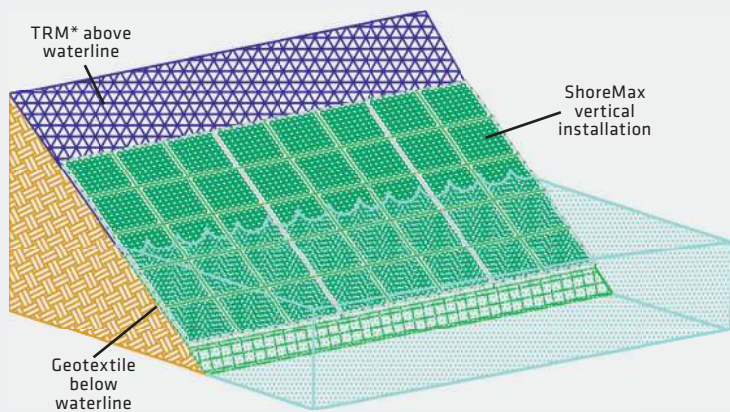
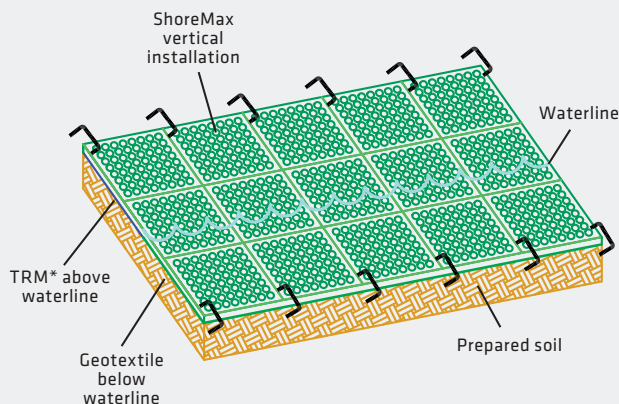
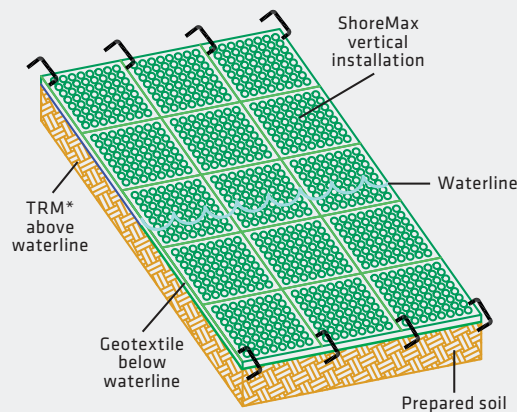


FIGURE 6: Outlet/culvert plan view



**FIGURE 7:** Shoreline/streambank plan view  
*\*ShoreMax Mats can be placed on slope in either direction.*



**FIGURE 8:** Edge of mat anchoring

### SHORELINE/STREAMBANK/LEVEE DETAIL

*\* ShoreMax® Mats can be installed over a variety of underlayments including: sod, TRMs, geotextiles, and in some cases ECBs.*

1. Prepare soil before installing erosion control products, including any necessary application of lime, fertilizer and seed (when installing TRMs or ECBs underlayment).
2. Install TRM above the waterline following manufacturer's recommendations.
3. In areas below the normal water elevation, an appropriate geotextile should be installed beneath the ShoreMax Mat.
4. Place the ShoreMax Mat over the installed TRM or geotextile (Figure 7). The ShoreMax Mat can be laid in either direction (Figures 7 and 8).

5. Extend the ShoreMax Mat to cover the transitional range where scour is predicted based on typical water level fluctuations and wave lap.
6. Place staples/anchors in the appropriate pattern. Perimeter staples can be shared between two adjacent panels. In soft or highly erodible soils, percussion earth anchors may be required. Please see page 3 for additional details on anchoring.
7. Place one staple/pin per linear foot along the top and bottom edges of the ShoreMax System, placing one on each corner and gridline (Figure 8).

**NOTE:** A bottom anchor trench is not required when using ShoreMax Mat in conjunction with a TRM or geotextile.



### EXPERIENCE YOU CAN RELY ON

North American Green is the industry leader in providing comprehensive erosion and sediment control and turf reinforcement solutions. Our integrated systems and products were developed to ensure absolute customer satisfaction. Our products are backed by the most thorough quality assurance practices in the industry. And, we provide comprehensive design assistance for all of our systems.

For more information about North American Green Erosion Control Systems, visit [www.nagreen.com](http://www.nagreen.com), e-mail [info@nagreen.com](mailto:info@nagreen.com) or call **800-772-2040**. We are happy to assist you in developing solutions for all of your erosion and sediment control and turf reinforcement projects.



*ShoreMax® Transition Mat facilitates vegetation growth through voids in the mat.*



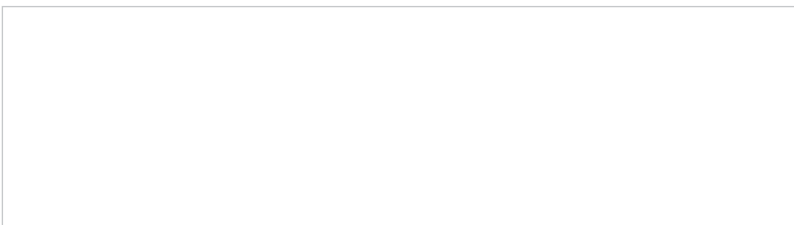
*The RevetMax™ System ShoreMax Transition Mat is a smart option to replace rock in high scour areas such as pipe outlets.*



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