

SECTION 1 – GENERAL

PRODUCT MANUFACTURER

ShoreFlex®

By Shoretec, LLC

SUMMARY

- A. This section shall consist of the all the required work, material, and activities to ensure that the improvements are both working properly and following the intent of its original design.

1.1 PRICE AND PAYMENT PROCEDURES

- A. Measurement and payment
 - 1. ShoreFlex® an erosion control mat is an alternative option to the Articulating Concrete Block Revetment System, and shall be considered in situations where a lesser degree of erosion control is required. The designing engineer shall determine the appropriate situational usage for this item.
 - 2. This item shall be measured by the square foot as shown on the plans also taking in to account the toe-in square footage. Total project square footage can be confirmed by the manufacturer with accompanied layout drawings.
 - 3. The materials furnished for the installation of this item shall be paid for at the quoted unit price from manufacturer. The price is full compensation for the assembly and loading of the product for shipment to jobsite or otherwise specified assembly area. Price does not include: transporting, equipment, materials, labor, and incidentals associated with placing ShoreFlex®.

1.2 SUBMITTALS

- A. Manufacturers Data
 - 1. Manufacturer will submit the performance testing and calculations in support of the ShoreFlex® erosion control system.
- B. Shop Drawings
 - 1. Drawings will be submitted with each project depicting; mat placement method, size and location of mats, proper toe-in depths and anchoring, appropriate mat to mat connection techniques.

1.3 DELIVERY, HANDLING, and STORAGE

- A. ShoreFlex® will be rolled and or in mat form packaged with lifting straps and an optional roll core for ease of handling and installation on site. Spreader bar may be obtained from supplier if needed.

- B. Upon delivery, rolls or mats should be inspected to ensure that all of the units are free of defects that may hinder either performance or installation of ShoreFlex®. Delivered rolls or mats should not be left exposed for more than 30 days to ensure protection from UV light.
- C. Missing concrete due to chipping or cracking shall not exceed 15% of the average concrete unit weight. If the threshold of 15% is surpassed the material may be rejected by the engineer. Repair, patch, or replacement of the affected area should be done per the manufacturer's recommendation.

SECTION 2- PRODUCTS

2.1 MANUFACTURERS

- A. The manufacturer must be able to demonstrate a minimum of 25 years in manufacturing of hard armoring erosion control systems. Manufacturer will also demonstrate no less than 10 million square feet (detailed project list) of successfully installed flexible hard armor erosion control mats with substantial vegetation growth. Proposed equals must be approved by the engineer a minimum of thirty (30) days prior to bid date. The owner or his engineer reserves the right to accept or reject any proposed equal cellular concrete mattress system for reasons including but not limited to previous performance record, appropriate and applicable testing, hydraulic performance characteristics, and qualified technical support. Shoretec, LLC is an approved manufacturer and can be reached at (225) 408-1444.

2.2 MATERIALS

A. Tied Concrete Block Erosion Control Mat

ShoreFlex® is manufactured from individual concrete blocks that are tied together to form an erosion control mat. Each concrete block within the mat will be tapered, uniform, and interlocked. Block interlocking will occur with the use of a high strength geogrid to ensure that no longitudinal or lateral movement of blocks occur during lifting or installation.

1. The concrete blocks will meet a minimum compressive strength of 5,000 psi at 28 days as per ASTM standards. The concrete blocks will be spaced no further than 1.5 in. apart creating an average minimum mat weight of 10.5 lb. per square foot.
2. Standard mat panels will come in 8 ft. by 32 ft. lengths unless otherwise specified by the plans or contractor. Custom mat dimensions available upon request.
3. The geogrid connection system is an open knitted fabric composed of high tenacity, multifilament polyester yarns knitted and coated in tension to form a stable grid structure. The geogrid is securely cast into and embedded within each concrete block to provide the connection strength. The geogrid will meet the requirements shown in Table1:

Table1: Polyester geogrid system for interlocking concrete blocks.

Description	Minimum requirement	Testing Method
UV Stabilization	25	years
Ultimate Tensile Strength (MD and CMD)	30 kN/m (2,055 lb./ft.)	ASTM D 6637
Elongation at Break	6%	ASTM D 6637
Tensile Strength @ 2%	12 kN/m (822 lb./ft.)	ASTM D 6637
Tensile Strength @ 5%	24 kN/m (1,646 lb./ft.)	ASTM D 6637
Tensile Modulus @ 2%	600 kN/m (41,000 lb./ft.)	ASTM D 6637
Tensile Modulus @ 5%	480 kN/m (32,900 lb./ft.)	ASTM D 6637
Grid aperture size (MD and CMD)	.6 inch	Length

- The use of a soil retention blanket as a backing material will be specified on a job by job basis. The selection of a particular retention blanket should be done by the design engineer or purchasing party. All soil retention blankets will be attached to the geogrid along the outside of the mat via hog rings to ensure proper function of the underlying soil retention blanket.

B. Lifting/Anchoring Loops.

- Anchoring of the mats will be done via the embedded lifting/anchoring loops. The concrete embedded lifting/anchoring loops will be made from a 3/8 in. Polypropylene rope with a 480 lb. (2.13 kN) tensile strength, allowing for ease of mat maneuvering during installation and anchoring once mat is placed. The lifting/anchoring loops will be placed along the front and back edge through every block and along the sides every 5 blocks. Anchoring systems can be recommended by the manufacturer or engineer for specific site conditions.

2.3 PERFORMANCE TESTING

- ShoreFlex® will resist erosion and scour due to hydraulic forces. ShoreFlex® will meet the requirements listed in Table 2 when tested with a backing material on a non-vegetated surface.

Table 2: Limiting shear stress testing, ASTM D 6460

Test	Tested value	Bed Slope	Limiting Value
ASTM 6460	Shear Stress	10% & 20%	18 lb./ft. ²
ASTM 6460	Velocity	10% & 20%	30 ft./sec

SECTION 3- EXECUTION

3.1 INSTALLATION

- ShoreFlex® installation will be done by a manufacturer approved installer. All equipment, materials, labor, and incidentals associated with placing ShoreFlex® are to be covered by the approved installer.

1. Subgrade prep should follow the construction plans submitted either by the engineer or manufacturer. The subgrade should be smooth, firm, unyielding, and free from all debris including sticks, rocks, roots, and other protrusions that would inhibit intimate contact with the subgrade. No individual block should be raised more than $\frac{3}{4}$ in. above the immediately adjacent block to ensure proper hydraulic performance.
2. Top soil and seed can be applied directly to prepped subgrade prior to the placement of the Mats to obtain desired expedited vegetation growth.
3. Mats should be installed according to the line and grade shown in the plans that have been provided by the engineer or the manufacturer. Technical assistance will be available from the manufacturer during installation if needed.
4. Installation of adjacent mat seams perpendicular to the flow should be done with a shingle installation method. The downstream mat should be placed a minimum of 18 in. underneath the upstream adjoining mat and can be fastened together as per the engineer or manufacturer's recommendation.
5. Installation of adjacent mat seams parallel to the direction of flow should meet in the middle of the channel and should have a 2 ft. erosion control blanket placed equally under both mats and both mats shall be fastened together using the engineer or manufacturers recommendation.
6. A minimum toe trench of 18 in. should be dug for the leading edge of the concrete mat that is perpendicular to channelized flow. All exterior edges of the concrete mat not exposed to channelized flow should be trenched in a minimum of 3". The leading edge and sides of the mat will be placed in the trenches and backfilled with a non-erodible soil or site specific soil.
7. Additional anchoring can be achieved by using the lifting/anchoring loops that are embedded into the concrete blocks at the edges of each mat. Each loop can be used to adjust mats during installation as well as be used for attaching earth anchors to permanently hold the concrete mats in place.