

## **FAQs for Marine Contractors**

### **What are the costs associated with properly installing a living shoreline project?**

The costs associated with properly installing a living shoreline project include design and construction. The design portion involves labor and material for the production of plans and specifications which includes obtaining Federal and Local permits and approvals as well as a State wetlands license. The construction portion involves labor and material for the installation of the project in accordance with the approved plans specifications, Federal permits, State wetlands license, Local permits and Local approvals.

### **Is there annual maintenance required for the vitality of a living shoreline project?**

Annual maintenance, including debris cleanup, replanting as needed, trimming tree branches, and removing any invasive species, is critical for the vitality of a living shoreline project.

### **What is the vulnerability of a living shoreline sill project to ice?**

The vulnerability of a living shoreline sill project to ice can occur during the interchange of the tide cycles when ice can stack and build up, potentially lifting and displacing armor stones at the base of the stone sill, and shearing plant material. However, this ice effect occurs mostly on sills where the stones are undersized. Using larger stones will decrease the likelihood of displaced stones.

### **What is the contractor's liability associated with the failure of a State-mandated living shoreline project?**

The contractor's liability associated with the failure of a State-mandated living shoreline project is part of the production of the design specifications general conditions section and wetlands vegetation section. These sections provide for a period during which the contractor is bound to replace work in addition to being liable for failure to perform the contract in accordance with its terms. The contractor is responsible for a two year workmanship warrantee and a one year warrantee on all plant material.

### **When doing a living shoreline project with the State, how are invoices handled?**

When doing a living shoreline project with the State, invoices are handled for completed design deliverables and/or completed construction portions of work only. Upon acceptance of the design deliverables and/or completed construction portions of work, an invoice is attached to a loan draft request for review and acceptance for payment to the owners to pay their contractors. Once a complete invoice is received, payment will be made no later than 30 days from the time of acceptance.

## **How do I learn about potential living shoreline projects and are there any certifications necessary to collaborate on State projects?**

Anyone can learn about potential living shoreline projects through our website or by using our DNR Mobile Restoration App and/or website (<http://www.mappler.net/mddnr/>).

Certifications are necessary to collaborate on any potential living shoreline projects in accordance with Chapter 286 of the 2010 Laws of the State of Maryland required being a Registered Marine Contractor with the Maryland Department of the Environment.

## **What determines the use of stone sill protection?**

There are many factors that need to be considered in order to have a successful project. They including degree of erosion, historic rate of erosion, navigation, width of the waterway, shoreline orientation, fetch, depth of the water, bottom material, height and regularity of tides, critical area buffer, and adequate sunlight exposure.

## **Where are sand containment structures most effective?**

Sand containment structures are most effective in low fetch areas with shallow water, a northwestern and/or southeastern shoreline orientation, and adequate sunlight exposure. The choice of project technique depends on experience, wave climate, bathymetry, and cost consideration.

## **How do you determine the height of a living shoreline protective device?**

The height of a living shoreline protective device is determined by many factors including the historic rate of erosion, fetch, depth of the water, findings based on wave run-up formulas and design parameters (i.e. storm event data).

### General wave run-up equations

$$\delta_o = \tan \beta (H_o/L_o)^{-0.5}$$

$$L_o = gT^2/2\pi$$

### Definition of variables

$\beta$  = angle of beach slope

$\tan \beta$  = beach slope

$d_s$  = depth fronting slope

$d_{sw}$  = median grain size in mm of sediment in swash zone

$d_{sr}$  = median grain size in mm of sediment in swash zone

$g$  = gravitational acceleration

$H$  = wave height

$H_o$  = deep water wave height

$H_{orms}$  = root mean square deep water wave height

$H_{so}$  = significant deep water wave height

$L$  = wavelength

$L_o$  = deep water wavelength

$L_{zwm}$  = vertical scale for Rayleigh distributed wave runup values (Nielsen and Hanslow, 1991)

$N_o$  = surf zone fall velocity parameter

$R$  = mean runup for irregular waves or runup for regular waves

$R_{2\%}$  = two percent wave runup

$T$  = wave period

$w_{sr}$  = fall velocity of median size sediment in surf zone

$\delta_o$  = Iribarren nu

### **What range of stone sizes should be used on projects?**

The range of stone sizes used on projects varies based on many factors including the historic rate of erosion, fetch, depth of the water, and height of the structure. Individual stones are approximately rectangular in cross section and free from thin slabby pieces having a maximum dimension more than three and one-half times the least dimension. The armor stone should have a minimum unit weight of 160 lbs. per cubic foot. Stones generally range from 200 to 900 lbs.

### **What is the minimum specification for clean sand fill?**

The minimum specification for clean sand fill is: Sand material shall contain less than 10% passing the number 100 sieve, not more than 10% by weight retained on a number 4 sieve, with no stone having a diameter greater than one-half inch. The material shall consist of rounded or semi-rounded grains with a median diameter of 0.6mm (+/- 0.25mm). No frozen material, trash, roots or other organic material will be permitted in the fill.

### **What are the general specifications for marsh grass planting?**

The choice of plants must mimic what naturally exists on site. The general specification for marsh grass planting is: *Spartina patens* shall be installed from the Mean High Water (MHW) elevation and upland to the limit of wetlands planting as detailed on the Contract Drawings. Rows shall be 18" o.c. staggered, and plants shall be 18" o.c. in the rows. *Spartina alterniflora* shall be installed from mid-tide elevation to the MHW elevation. Rows shall be 18" o.c. staggered, and plants shall be 18" o.c. in the rows.

For saline site conditions the following species are recommended: *Spartina alterniflora* (smooth cordgrass), *Spartina patens* (saltmarsh hay), *Panicum virgatum* (switchgrass), and *Salicornia virginica* (pickleweed).

For freshwater site conditions the following species are recommended:  
*Schoenoplectus tabernaemontani* (bulrush), *Schoenoplectus pungens* (three square),  
*Typha latifolia* (cattails).

**Can you provide me a list of unit prices?**

List of unit prices is relative to the recently awarded construction contracts.

**How far channelward of the existing Mean High Water elevation does a living shoreline project normally extend?**

It depends on the living shoreline technique adopted, some (or most) living shoreline projects extend channelward of the existing Mean High Water (MHW) elevation approximately 30-35 feet.

**Are living shoreline projects accessed for construction primarily from the waterside?**

Not always. Living shoreline projects are accessed for construction primarily from the landside depending on site conditions, availability of an access road, depth of the channel, etc. However, if it is more economic, living shoreline projects can be accessed by water (via barge).

**What is required for proper maintenance by the owners upon completion of the living shoreline projects?**

For proper maintenance by the owners upon completion of the living shoreline projects, consistent removal of leaves and/or debris (driftwood, plastic debris, wracklines, etc.) and periodic pruning of shoreline overhanging branches may be necessary with County Critical Area approval to maintain sunlight transmission to the marsh grasses.