

Almost Schooled by the Florida Pan Handle Soils



Protected bank today after the erosion control blankets have completed their job of controlling erosion until vegetation has become established.

RiverCamps on Crooked Creek is a 1,500 acre unique product by The St. Joe Company that was created with the vision of providing its owners the ability to enjoy and discover West Bay. The residential development is located in Northwest Florida's Emerald Coast in Panama City Beach. The JOE community is carefully nestled in a secluded woodland preserve along the sparkling waters of Crooked Creek and the spectacular 18,000 acre expanse of West Bay. Nearly two thirds of RiverCamps has been set aside for conservation. The development consists of 408

lots that range from three quarters of an acre to over six acres in size. There are approximately six miles of trails and boardwalks spread throughout the project.

Original Problem

The project team recognized difficulties with establishing vegetation so they consulted a soil scientist regarding their vegetation concerns. American Excelsior Company was contacted regarding their concerns with erosion and concentrated flow conditions through the drainage ditches. Lack of vegetation was caus-

ing continuous erosion, which resulted in sediment loading into the canals. Concentrated flows were causing the banks of the channels to slump into the storm drainage ditches that were being constructed. The site's inability to retain soil on the slopes and establish vegetation were the two primary reasons for requesting consultation on this unique project. Originally, poor establishment of desired species such as Brown Top Millet (*Panicum ramosum*) and Annual Rye Grass (*Lolium multiflorum Lam.*) was experienced, while Crabgrass (*Digitaria sanguinalis*) dominated the site.

Soil Analysis

Vegetation establishment is a key ingredient required for successful temporary erosion control Best Management Practices (BMPs). Extensive soil analyses were conducted on the site. Based upon the initial review of the site conditions, soil profiles were analyzed in shallow pits along with three inch auger examinations. Soil samples were obtained from selected soil horizons and sent to the University of Florida Soil Testing Laboratory. Each sample location was examined for surface characteristics including existing vegetation, debris, degree of erosion, coarse fragments (gravel), bulk density (degree of compaction), and unusual characteristics. Each location and fill site was examined with a soil sampling spade to a depth of approximately 20 inches and some areas were excavated with the three inch auger to a depth of 40 inches or more. The morphology of each horizon within the excavation was described by utilizing the Munsell soil color chart, USDA soil textural classifications, and pH by the Helige-Truog field method. The Helige-Truog field analysis method has a lower threshold of four and some of the samples obtained around the pond areas and drainage channels yielded pH values less than four.

Field Observations

Poor vegetation establishment was observed across most of the site. Bare areas were often covered with a microbiotic crust that naturally forms on soil surfaces in the region. The crust reduces seed germination. Many areas of the road shoulders had visible tire tracks, which caused higher soil compaction on the shoulders as compared to natural soils. Topsoil and woody debris were found in some areas of the road shoulders. Vegetation was found to be healthier in areas that contained topsoil. A rust colored soil and water combination was present in many areas, which suggested a problem with acidity levels. Many areas were seeded several times in an attempt to establish vegetation. The transitional areas above the channel and the slopes inside the drainage channels were all lacking minimum vegetation conditions needed to provide effective erosion control. Average storm events for the region were creating above normal erosion and sediment control maintenance. Project advancement was delayed after each storm event because ei-



Vegetated erosion control blankets protecting bank a few weeks after installation (left side of photo).

ther sediment had to be removed from the drainage channels or the channels had to be completely reconstructed before development could advance. The cumbersome and expensive maintenance was educational in the fact that current practices simply would not stabilize the site. The BMP toolbox needed to be reopened to find the right product for the right application.

Actions Taken: Erosion And Sediment Controls

Hydraulically applied mulch and seed were previously applied to the site, but erosion washed the material away and continually filled the canals with sediment. Thus, the first action was to pull back and clear the channels of sediment. Coastal Plains sediments may contain materials that exhibit high contents of unoxidized iron sulfides, and have a rust colored look and smell when dredged from the waterways and canal. Near the coast, these sediments may be present and stable at shallow depths as long as they remain submerged in the permanent water table. These sediments begin to oxidize and form sulfuric acid when exposed to air. Depending on the amount of iron sulfides present in the sediments, the pH of the soil can drop to two or lower. Few plants can survive these ultra acidic conditions. Over time the pH will rise as the soils age; however, this can take several years depending on many different factors. Topsoil and compost can be added to sediments to help improve the quality of the material.

The second action was to learn more about the soil moisture required for vegetation establishment. During some periods sufficient rainfall was not received so seeds and plantings needed to be irrigated, which was easily accomplished using a watering truck. Care had to be taken to apply the water so it did not cause erosion. Road shoulders tend to have dry soil conditions, high soil temperatures, compacted soil surfaces, lack of appropriate topsoil, and inappropriate vegetation species selection. Reduction of existing soil compaction was accomplished by aerating the bed and then hand raking the shoulders in a pattern that was parallel to the road. This was a performance factor that reduced soil rilling. Every effort was taken to keep vehicles from driving on the shoulders, as this will kill young plants and inhibit germination.

This project reinforced the fact that there are appropriate species for most seeding applications. Annual Rye Grass (*Lolium multiflorum Lam*) is ideal for quickly establishing a green border; however, it will not thrive until the soil and air temperatures decrease (August 15 - October 15 in the Florida Pan Handle). Brown Top Millet (*Panicum ramosum*) germinates easily when soil temperatures are high (April 1 - August 15); however, it is generally an unattractive plant and short lived. Bahia (*Paspalum notatum*) and/or Bermuda (*Cynodon dactylon*) might germinate quickly, but they will also likely out compete native grasses and wildflowers that could otherwise be established on site. Sufficient na-

tive topsoil, at least four inches in depth, should be applied to areas that will require vegetation. Applications of native seeds should be used and broadcast by hand, not in a hydro-mulch application. Direct seed to soil contact is best. After broadcasting, lightly rake the seed into the soil. Seed needs to be bedded in the soil to germinate quickly and uniformly. Plugs of native grasses and herbaceous materials planted should be staggered to help intercept rainfall and surface water movement. Other Sandy soil stabilizing plants are Switchgrass (*Panicum virgatum*) and Elliott's Lovegrass (*Eragrostis elliottii*). Several seed companies offer custom blends that help reduce the guess work associated with plant selection. Proper seed mixtures are one step to help control erosion and establish a durable native stand on site.

The Third action was the use of erosion control blankets (ECBs) to prevent soil erosion and hasten vegetation efforts by protecting the seed bed. A single strip of Curlex® II excelsior matting, as provided by American Excelsior Company, Arlington, Texas, was installed along the road curb to prevent erosion along the shoulders. Sod strips were not used as an alternative

along the curb because sod may compete with adjacent native plantings if it becomes established. This matting was selected because of its performance capabilities and extended functional longevity as compared to other erosion control product options. It was also installed along areas where concentrated flow conditions were anticipated or areas that were deemed highly erodible. These areas included the drainage channels and slopes. Curlex ECBs were chosen for these applications because of the “Velcro-like” connection they make with soil. As rain hits the excelsior ECBs the soil beneath is protected and held in place by the wood fiber matrix within the blanket. Rain water is absorbed by the matrix, which aids in vegetation establishment especially during droughty conditions. Moisture is released back to the seedbed from the Curlex fibers as the soil begins to dry. The engineered fibers curl, expand, and interlock with each other when wetted. The engineered denier and curl of the fibers produce a product that intimately intermingles with soil for a period of time that provides a superior performance-based cover factor to prevent erosion and provide beneficial seed bed conditions. In addition, these products

are backed by complete ASTM large-scale performance testing that helps quantify the protection of native and permanent seed investments.

Conclusions

The consultative advice from soil scientists and certified professionals provided the guidance to a successful solution to the challenges created by the unique soils of the Florida Pan Handle. A lesson learned was to select the right product for the right application at the onset of the project. Sometimes alternative BMPs sound good to start with, but going with a proven, performance-based backed product is more than piece of mind when project fiscal and environmental responsibilities are riding on your shoulders. **L&W**

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