



# LANDLOK<sup>®</sup> REPORT

An Erosion Control Case Study From Synthetic Industries

## Landlok<sup>®</sup> TRM 1061B Proves Ideal For Water Reservoir Slope Stabilization

### Background

As in many parts of the southwestern United States, the water used or consumed by the general public is obtained from surface water such as rivers and streams. In those areas, local water management districts channel the water from the rivers, transporting it through canals or pipes to holding ponds or reservoirs. With increased loads on the water treatment plants, and because the plants operate more efficiently under a constant head, the need for additional, secondary reservoirs to feed the treatment plants is increasing.

Along the Gulf Coast of Texas, the winds are quite strong and continuous. These winds can present a challenge to engineers to find creative methods of economically stabilizing the banks of the reservoirs. When a southern Texas community a few miles off the coast was awarded a grant to construct a new secondary reservoir, the engineering consultant (Mejia and Rose, Inc., Brownsville, Texas) was faced with protecting the embankments of a 750 by 550 foot new reservoir adjacent to the existing one. Additionally, the project was to be performed under limited budgetary constraints.

### The Challenge

In addition to providing more storage, the primary function of the new reservoir was to feed water to the existing reservoir, maintaining a constant head, thus allowing the treatment plant to operate more efficiently. This meant the water depth in the new reservoir could fluctuate over a 10 foot vertical water depth. With 3:1 slopes on the embankment, and the possible fluctuation in depth, more than 30 feet of embankment needed protection from the wind-wave erosion potential. A lack of rock deposits in the area made the customary combination of rock rip-rap over a geotextile fabric extremely expensive. Rock had to be transported almost 200 miles, increasing labor costs as well.

### The Solution

Given these parameters, the engineers selected a unique Turf Reinforcement Mat (TRM) designed to help establish vegetation, enhance long-term performance through reinforcement of its root structure, and prevent embankment soils from washing through the mat. After careful analysis, the engineers selected a TRM commercially known as Landlok<sup>®</sup> TRM 1061B.



*Installation of Landlok<sup>®</sup> TRM 1061B*

Landlok TRM 1061B, manufactured by Synthetic Industries, is a turf reinforcement matting backed with a lightweight, nonwoven geotextile fabric that is an ideal alternative to hard armor protection. It is specially designed for turf reinforcement, providing protection from minor wave action and minimizing the potential movement of soil particles during rapid draw down periods.



*Vegetation Beginning to Flourish.*



*Vegetation after three months.*

## **Benefits of Landlok® TRM 1061B Over Hard Armor Systems:**

- ▶ Provides a more aesthetically pleasing alternative
- ▶ Allows vegetative establishment
- ▶ Extends performance limits of natural vegetation
- ▶ Reduces water velocities and captures sediment
- ▶ Promotes infiltration/groundwater recharge
- ▶ Reduces sediment transport
- ▶ Flexibility conforms to uneven subgrades
- ▶ Resistant to thermal expansion and contraction
- ▶ Easy to install
- ▶ Offers significant cost savings
- ▶ Promotes water quality

## **Construction**

The Contractor began construction in May 1996. After preparation of the subgrade, the TRM was installed on the slopes with the necessary pinned and trenched tucks at top and bottom. The mat was also pinned in accordance with the recommended schedule for 3:1 slopes. After installation, the mats were seeded with a localized seed mix and soil filled. The contractor installed a temporary watering system for the necessary water required for germination.

## **Results**

The use of Landlok TRM 1061B in lieu of traditional hard armor protection proved quite cost-effective. Bid prices for the TRM installed were approximately one-half of the estimated cost of using rock rip-rap which allowed the local water district to build more reservoir storage capacity for the same dollar. Nearly two years later, the project site was inspected by the design engineer. There were no signs of erosion on any of the embankments and healthy vegetation existed through the matting above the water line. It was also noted that maintenance, should any be required, would be easy to perform as compared to hard armor rock and fabric.



*Slope fully vegetated after one year.*



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