

Enkamat® R²M**DIVISION 2
Site Construction****Stormwater Channel****Owner / Developer:**

C.C. Myers
Rancho Cordova, CA

Winchester Country Club

Meadow Vista, CA

Engineer:

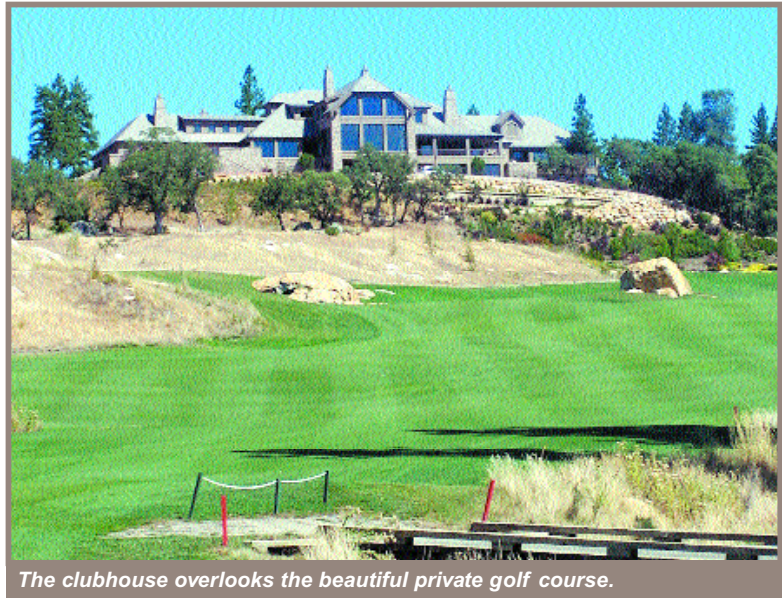
King Engineering
Grass Valley, CA

Contractor:

Roger Cook International
Roseville, CA

Distributor:

California Paving Fabric Co.
Anderson, CA



The clubhouse overlooks the beautiful private golf course.

Enkamat Used in Sensitive Eco-Habitat

Nestled in the Sierra foothills with a breathtaking view of the snow capped Sierra Mountains is Winchester Country Club, an exclusive residential community designed to coexist within its picturesque natural setting. The 1100 acre development scheduled for completion in 2005 includes an 18-hole championship golf course designed by Robert Trent Jones Sr. and Jr. surrounded by 400 custom built homes on 3-5 acre sites, equestrian and walking trails, and a wildlife habitat for a variety of native animals and plants.

Just 40 minutes from downtown Sacramento yet a million miles from city life, it seemed that nature hadn't been disturbed in this pristine location since pre-gold rush times. Keeping this natural setting with minimal disturbance to the forest and wildlife while developing the finest private golf course community in Northern California was the vision of developer C.C. Myers and the Winchester Country Club project team.

While the rolling hills provided a beautiful setting for the residents and golfers, they posed a special challenge to King Engineering who had to design adequate drainage swales within the elevation changes of 1600 msl to 2100 msl and street gradient changes from 5 - 10% throughout the community. The average annual rainfall for this area in the wet season is 18" and mother nature commonly dumps up to 2" of rain within an hour or two.

Cascading down the foothills, this stormwater can create a raging river in a very short amount of time.

The drainage patterns were sculpted to fit within the existing grade contours and to intercept sheet flow from the rolling hills and residential lots. The drainage channels carry the stormwater down to collection points that drain into the wetland preserves located throughout the community. Design team members from King Engineering, Winchester Country Club, and Placer County Planning Department developed the criteria that had to be met for the finished drainage channels:

- handle the shear and flow capacity during peak rainfall
- had to blend into the existing scenery so residents and golfers would not notice them
- minimize disturbance to the wildlife habitat by reducing erosion and sediment transport into the wetland areas.

The design team reviewed many alternatives for constructing the drainage channels. Different options included concrete, rip-rap, articulate block, asphalt, and turf reinforcement mats (TRMs.) The only product which met the criteria for the project was the TRM.

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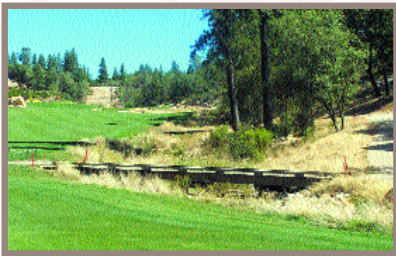
Enka-Engineered

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PRODUCTS

Eco-Channel

The team researched the choices of TRMs on the market and considered using a biaxial netting filled with fiber and stitched together, a combined long-term biodegradable mat with a permanent structure, and Enkamat, a monolithic, three-dimensional nylon matrix. Issues such as ease of installation, long-term maintenance, and product integrity were discussed and considered. Some of the products under consideration could unravel during installation which would send synthetic fibers floating into the wetland area, some could create a problem when mowing over them as the stitched area would come apart, and some could float away during high velocity rainfall.

Enkamat R²M Root Reinforcement Matrix was chosen because it met or exceeded all of the design criteria. The product features that impressed the design team were:



- Enkamat can withstand shear forces of 10 psf — 4 times the amount of shear forces typical for this area — and has no buoyancy factor (it will not float away.)
- The material is lightweight, easy to install, and will not get caught in maintenance equipment after vegetation is established.
- Enkamat is a 95% open structure that has a superior holding capacity for soil, root mass, and vegetation.

- Enkamat will not unravel and disturb ecological habitats or wildlife downstream.
- Enkamat allows native plants / grasses to grow through the matrix in dry or wet climates.

California Paving Fabrics Company oversaw the installation of Enkamat and provided details and troubleshooting support for inlets, outlets, and other structures within the drainage swales. All aspects of potential failure sites were addressed prior to the installation. Once the 2' to 4' deep, V-shaped, 5% -13% gradient drainage channels were cut to grade, the Enkamat installation began.

The Enkamat was rolled out into the channels and conformed easily to the terrain surface. Instead of using the typical U-shaped pins to anchor the mat, 12" pins with washers were used to fasten the mat because of the extremely hard ground. Seeding took place before and after the deployment of the Enkamat. The seed mixture consisted of prairie grasses and wildflower plants indigenous to the area. The Enkamat was not soil filled because the design allowed the Enkamat to collect any potential sediment within the runoff water prior to the water reaching the wetland preserves.

The development of Winchester Country Club has been gradual with minimal disturbance to its natural surroundings. Since the first Enkamat installation in this community in 1999, the drainage swales that contour the walking paths, streets, and equestrian trails have been aesthetically pleasing, easy to maintain, and extremely effective at handling the stormwater flow during the wet season.

The design team at Winchester Country Club is pleased with the performance of Enkamat and the success in meeting the project objectives. Everyday the residents, golfers, and employees of this incredible, multi-million dollar community are reminded of the vision of C.C. Myers to develop an ecologically sensitive environment where humans and mother nature coexist.

For more information about Enkamat R²M and other quality products manufactured and marketed by Colbond Inc. please call our toll free number or visit our website.



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