



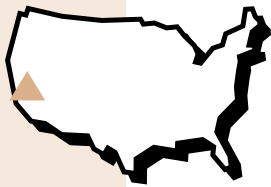
▶ CASE STUDY: FLOOD APPLICATION

Keystone Stands Up to El Niño's Rage!

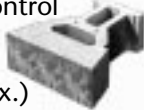
Just the mention of el Niño these days strikes fear in those living close to coastal waters. In southern California, where it rains hard for short periods of time, big, wide flood control channels are built to retain the flow of rivers and surface runoff to make room for property development.

Peter's Canyon Wash is a flood control channel that has been enlarged to increase its capacity. It is located in Irvine, California, approximately halfway between Los Angeles and San Diego. Before developing the adjacent property, its owner, The Irvine Company, had to widen the channel because development of the property would increase discharge into the channel. The Irvine Company, a major developer in Orange County, worked with the county and the city of Irvine to select a suitable product.

The channel walls would need to withstand complete saturation of the backfill and supercritical water velocities. The search for new, cost-effective alternative to concrete-lined or rip-rap channels led to Keystone. Orange County Flood control was so impressed with Keystone's testing in water applications that requests for alternative products



- ▶ **PROJECT:** Peter's Canyon Wash
- LOCATION:** Irvine, California
- PRODUCT:** Keystone Standard Units Modified for flood control channel revetment
- SQUARE FOOTAGE:** 32,000 sq. ft. (approx.)
- GENERAL CONTRACTOR:** Griffith Co. Santa Ana, California
- ENGINEERING CONSULTANT:** John M. Tettermer & Assoc.
- KEYSTONE REPRESENTATIVE:** Stable Earth Systems, Inc. Santa Ana, California



Phase I of Peter's Canyon Wash is complete.

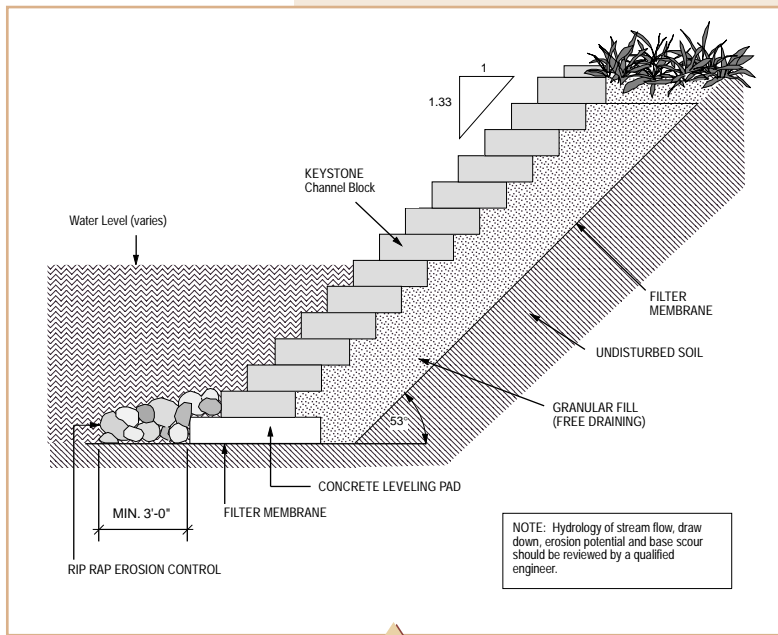


were denied. No products could match Keystone's level of testing in critical water applications.

In addition to proven reliability, Keystone brought other benefits to the project: an attractive and cost-effective alternative to rip-rap or cast-in-place concrete; a surface that is less prone to graffiti than smooth concrete; and the ability to build more steeply than 2:1 (horizontal:vertical). The new channel walls, built at .75:1 (h:v) to avoid the disruption of an existing high pressure water line, also left more land for development.

The installation of the three required walls was a joint venture between Keywest Retaining Systems of Portland, Oregon, and Geogrid Retaining Systems of San Diego, California. 32,000 square feet of Keystone Standard units, modified for flood control channel revetment, were installed - rapidly. The installers, racing to beat the onslaught of El Niño, built an average of 1,000 square feet of wall a day, including backfill.

In early December, several weeks after completion, the walls weathered their first major rainstorm - a 200 year



Typical cross section.

storm event. Fueled by El Niño, 7 inches of rain fell in less than 24 hours. The channel, 100 feet wide at the top and 70 feet wide at the bottom, was filled to within 3 feet of the top. The water flowing at super-critical speeds, ie., velocities greater than 16 feet per second. As the rushing water filled the channel, the walls performed as anticipated. Receding waters revealed the walls had successfully weathered the first critical test. Phase II is gearing up to add on to this successful section of a storm water channel.



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