

Case Study

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| application | Segmental Retaining Wall | job owner | Pacific Life Insurance Company |
| location | Orange County, CA | engineer | NMG Geotechnical, Canyon Consulting |
| product | Miragrid® 24XT & 10XT with SRS Verdura Wall | contractor | Soil Retention Systems, Snyder Langston |

TenCate develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

When it comes to land development and maximizing the useable land in hilly terrain, there is no place like Southern California. This was the case for Pacific Life Insurance Company when choosing to locate their Life Insurance Division of 1000 employees to a new location in Aliso Viejo. The location provides traffic free access to the 73 toll road in Orange County, a midpoint between Los Angeles and San Diego. The 9 story glass building adjacent to the Lennar Homes building has high visibility along the freeway. Given the site constraints, adequate parking could only be achieved with a 5 story parking structure. However, due to the site terrain, a 60 to 70 ft high grade separation exists between the nine story high-rise and the base of the parking structure. During preliminary design, the grade separation line on the civil drawings was noted as 50 ft high MSE wall (SRW).

THE DESIGN

The general contractor, Snyder Langston and the geotechnical engineer, NMG Geotechnical were left to complete the design and selection of the SRW. The wall design challenges were:

- Wall geometry with curves as tight as 10 ft radius, drastic height changes along the wall length, and both 90 degree inside and outside corners (see wall photos).
- Critical structure with wall heights approaching 40 ft with 2:1 slopes above in a seismically active region.
- Portion of the wall facing the 73 toll road

to be constructed as plantable wall to maximize visual aesthetics.

- Design to accommodate pedestrian and vehicular bridge from the wall area through drilled pier foundation.

The selection was the Soil Retention Systems (SRS) Verdura retaining wall system (ICC Report ER5515), a geogrid reinforced SRW with a plantable and non-plantable face. SRS is a complete design–manufacturer–build contractor. The principal of SRS, Jan Erik Jansson says, “SRS has at its goal the perfection of SRW systems, producing the blocks that go into the system and installing the blocks to create grade–transitioning structures.” Since the 1980’s, SRS has provided plantable SRW’s to support the development of large residential and commercial properties in Southern California.

THE CONSTRUCTION

In construction of the Verdura Wall, heavy earthmoving scrapers were used for wall backfill placement. The block facing in the lower portion of the wall is the Verdura 60 wall block.



Placing the Miragrid® 24XT & 10XT.



Miragrid® and Schedule 80 PVC pipe connection to Verdura 60 block.

It's a high strength, heavy (132 pounds), 18-inch deep block. As each course of blocks is stacked, the high strength lip of each upper block interlocks with the two blocks below it. This allows the heavy scrapers to operate right behind the wall facing. Imported select fill with a friction angle 32 degrees was used in the wall construction. The fill was strategically stockpiled in front of and above the wall zone to increase scraper production. Miragrid® 24XT and 10XT high strength polyester geogrids were connected to the Verdura blocks using the continuous Schedule 80 PVC pipe connection (see connection photo on pg. 1). Using the higher strength Miragrid® maximized geogrid spacing to 2 foot vertical increments. The Miragrid®, layers were overlapped without soil cover in between them in the areas of tight curves and corners. Construction of the wall area of 15,000 SF was completed in 9 days while the construction schedule allowed 30 days.

Most of the wall is shaded by the 5 story parking structure and in order to inhibit vegetation growth, a one foot wide gravel zone was placed

at the wall face. The sunny portion of the wall along the 73 toll road was constructed with earthen fill in the wall face to promote plant growth. Irrigation lines were installed in this area of the wall as well.

THE PERFORMANCE

The use of a cast in place cantilever wall was considered "un-build-able" due to the grade separation heights in excess of 50 feet. The SRS Verdura Wall provided a cost effective grade transition between the office building and the parking garage. Even with the complicated wall geometry, the Verdura Wall was constructed well ahead of schedule. The sturdy interlocking Verdura Block units allowed the use of heavy scrapers in wall construction and high strength Miragrid® geogrid maximized reinforcement spacing to optimize wall production time. The rapid completion of the Verdura Wall allowed the general contractor Snyder Langston to accelerate construction of the 5 story parking structure to parallel completion time with the 9 story office building.



SRS Verdura Wall in construction

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