



*Retaining Excellence™*

## Thurgood Marshall Middle School

### San Diego, California

#### “The Great Wall of Scripps Ranch”

The new Thurgood Marshall Middle School in San Diego, California welcomed its first students in fall 2007 with a campus and athletic fields rivaling that of some colleges. Along with premier educational facilities, the new school’s campus is also home to one of the tallest Keystone segmental retaining walls ever built in California. The wall, which was built to combat a 150-foot elevation change, reaches approximately 45 feet at its tallest point and nears 48,000 square feet in total coverage.

“Originally a cast-in-place wall was discussed, but the cost was way out of budget. Soltek changed the site design a bit and reconfigured the retaining walls to make it more cost-effective for the school,” said William Naylor, Design Build Program Manager and Vice President, Soltek Pacific.

Fifteen other Keystone retaining walls were built throughout the site, along with the 45-foot tall wall, to level the area and create enough room to construct the school and its facilities. The Keystone Standard unit was selected for all the walls, which totals approximately 100,000 square feet, because it provided a structurally sound and cost-effective solution that also met the critical needs of efficient installation and aesthetic appeal.



<b>Project:</b>	<i>Thurgood Marshall Middle School</i>
<b>Location:</b>	<i>San Diego, California</i>
<b>Keystone Product:</b>	<i>Keystone Standard Unit</i>
<b>Keystone Manufacturer:</b>	<i>RCP Block &amp; Brick</i>
<b>Total Wall Area:</b>	<i>16 walls totaling approximately 100,000 square feet Largest wall: 45 ft. high; 1,700 ft. long</i>
<b>Wall Contractor:</b>	<i>Geogrid, Inc.</i>
<b>General Contractor:</b>	<i>Soltek Pacific</i>
<b>Wall Engineer:</b>	<i>ABI Engineering Consultants, Inc. Daya Bettadapura, P.E.</i>





### Project Site Challenges

The Thurgood Marshall Middle School and its facilities are built on 36 acres of a hillside that is near the Marine Corps Air Station Miramar. Before it was reestablished solely as a Marine Corps Air station, the navy and army both occupied this area. The past military activity conducted at Miramar required the site undergo an extensive “unexploded ordinance removal” effort before any construction could begin. The original unexploded ordinance removal effort, which was planned to be a two-inch screen for 120,000 yards, was changed to a one-inch minus screen for the entire site of 400,000 yards. The extension of the unexploded ordinance removal screening delayed an already tight construction schedule and made efficient wall production an even more critical factor.

Along with site challenges, stringent building codes and the rigorous approval process of the Division of the State Architect (DSA) added to the project’s complexity. The DSA ensures California’s K-12 schools and community colleges are seismically safe and accessible by reviewing all construction project plans for structural safety, fire and life safety and accessibility.

### Design/Installation

“The wall designs had to meet the stringent DSA requirements considering the high seismic accelerations at the site, global stability and on-site soils,” said Daya Bettadapura, P.E., President, ABI Engineering Consultants, Inc.

The retaining wall design includes extensive reinforcement with geogrid lengths reaching 40 to 50 feet. The original wall design proposed screening all the on-site material, which consisted of conglomerates of rock and boulders for larger sized soil, and excavating the soils that could not be used for backfill.

“Since the school’s construction could not begin until the wall was finished, there was concern about whether the project could be completed on time especially considering the additional screening and excavation of on-site material. Geogrid proposed using a portable crusher to crush the on-site material instead of screening it. Crushing the material meant that it could be used as backfill and that we could immediately start building the wall. Also, significant costs would be saved,” said Ed McCaffrey, Chief Operating Officer and Project Manager, Geogrid, Inc.

Crushing the on-site material and building the 48,000-square-foot wall, now referred to by the local community as “The Great Wall of Scripps Ranch”, were conducted at the same time. Approximately 20,000 yards of 3/4-inch crushed rock/gravel, 20,000 yards of class 2 base and miscellaneous materials were produced from the crushing. According to Bettadapura, the more than 80 foot-wide backfill area was filled with the crushed on-site material that was deemed to provide high internal angle of friction.

Geogrid, Inc. constructed the 48,000-square-foot wall within 29 days. The use of several 627 CAT scrapers to import the fill expedited the wall’s construction because it allowed Geogrid to place 155,000 yards of backfill behind the wall in the shortest time possible. Also, an estimated \$1 million was saved by crushing and using the on-site material.

“Overall, the construction and coordination between Geogrid, Soltek’s team and subcontractors, went unbelievably well for walls that size and a site that complex,” said Naylor.

The remaining walls were also built to create level areas for athletic facilities, other buildings and parking areas for the school. The walls vary in height reaching up to 25 feet and were built at various times throughout the



school’s overall construction. The tallest wall was one of the most important elements of the site’s overall development and its efficient installation generated a three-month advance in the overall construction schedule.

Development of Thurgood Marshall Middle School required a major land development solution that would also work within a tight construction schedule and meet stringent building requirements. The Keystone Standard unit provided a complete solution that was structurally-sound, aesthetically appealing and could help maximize production.

For more information on Keystone Standard Unit or other innovative Keystone products, please visit [www.keystonewalls.com](http://www.keystonewalls.com) or call 800-747-8971. Keystone Retaining Wall Systems, Inc. is a subsidiary of CONTECH Earth Stabilization Solutions Inc. ([www.contechess.com](http://www.contechess.com)).

