

CASE STUDIES

Changing the World in Concrete Ways

On the pages to follow, you'll find a few case studies outlining how the Redi-Rock system is used to solve various retaining wall challenges. We hope they, along with the myriad of others found online at redi-rock.com, provide the confidence and context you need to design and install Redi-Rock.

We also hope they provide a spark of inspiration about how the work you do can change the lives around you. If you have a story to share about how a Redi-Rock project you were involved with is changing the world in concrete ways—like providing a recreational connection for two mountain towns or protecting residents of a seaside community from 100-year storms—we want to hear it.

Nominate projects that are improving lives at redi-rock.com/nominate.



WATER APPLICATION:

Ocean Marina Wall Weathers Massive Storms

THE CHALLENGE

In the spring of 2012, a massive construction project to transform Rhyl's riverfront area broke ground. Rhyl, located in North Wales on the Irish Sea at the mouth of the River Clwyd, is part of the Wales Coast Path which follows the entire coastline of Wales.

The goal of the project was to increase tourism and boost the local economy, as well as deepen the river channel, enlarge the marina, and provide coastal erosion and flood protection. To accomplish this, the site required a retaining wall solution that could meet the complex structural requirements of the site—including significant tidal fluctuations—while providing a scenic park route for pedestrians and cyclists.

THE SOLUTION

Designers for the project chose Redi-Rock Positive Connection (PC) blocks to create the harbor wall that stands 24.3 feet (7.4 meters) high and stretches 617 feet (188 lineal meters). Produced locally by Redi-Rock manufacturer CPM Group, the Redi-Rock PC walls were able to meet the structural requirements of the site as well as provide an aesthetic Limestone finish at a lower cost than other options.

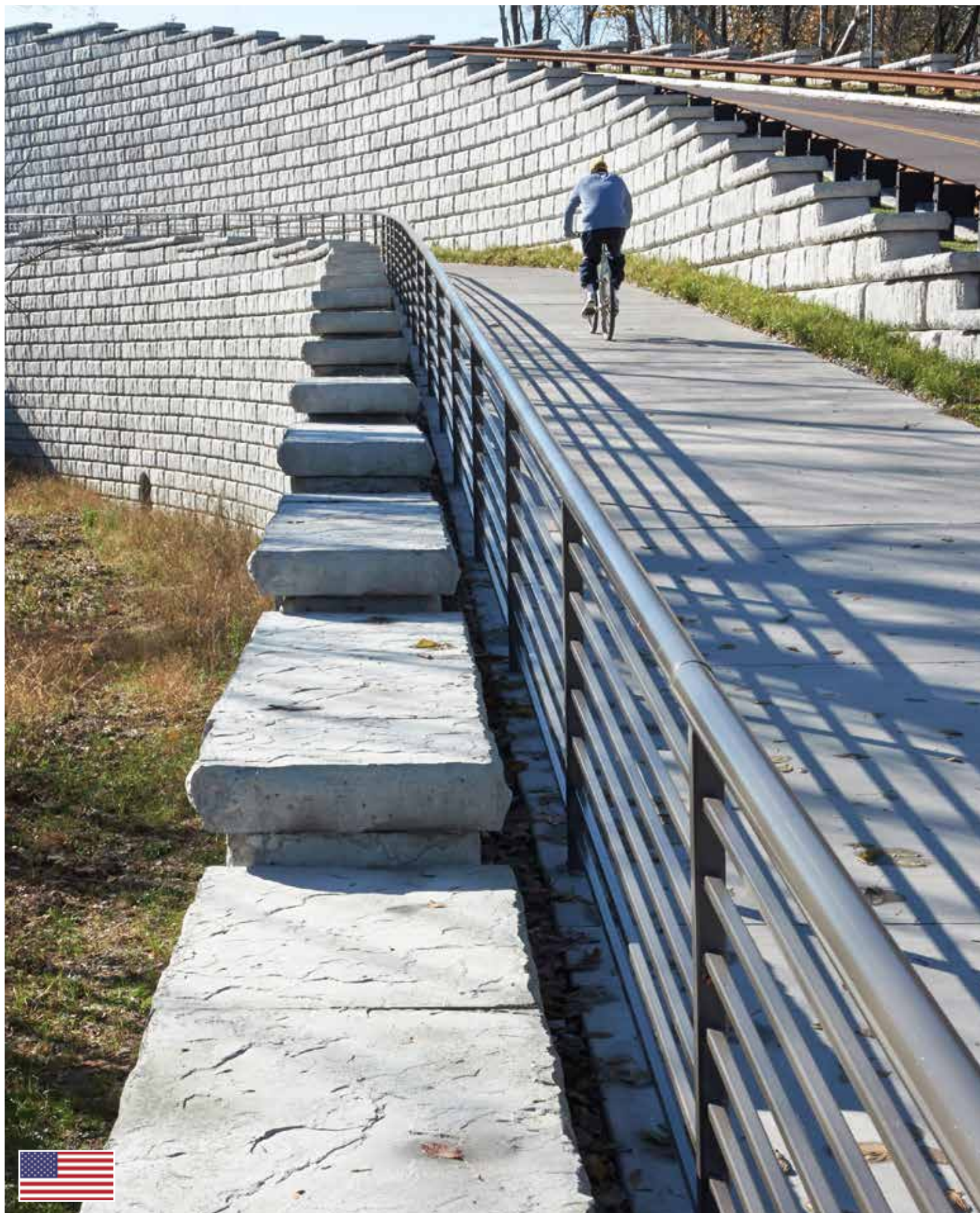
"The Redi-Rock product is very simple but massively effective," said Jamie Turner, site agent for general contractor Dawnus Construction. "It is easy to install and the end product looks fantastic, I would definitely use this product again."

THE OUTCOME

During the 2013-2014 winter season, the new harbor sea wall was put to the test. For days, a storm battered the United Kingdom and caused a 60-year high tidal surge. January wave heights were close to the 100-year level.

While this massive storm caused damage to many other structures in the area, designers were happy to see that the harbor wall performed exactly as engineered. The city was so impressed with how the Redi-Rock wall performed during the storm, they replaced 3,280 feet (1 kilometer) of other nearby walls with Redi-Rock.





ROAD APPLICATION:

Tall Reinforced Walls Make Road Construction Possible for Park

THE CHALLENGE

Creating a 21-mile (33.8-kilometer) long park system that encompasses more than 3,800 acres (1,538 hectares) is no small task, but it's what 21st Century Parks set out to do by linking four major parks with a park drive and trail network.

Due to the diverse topography of the Louisville, Kentucky, area, 21st Century Parks needed a flexible retaining wall solution that would meet the needs across multiple phases of construction.

THE SOLUTION

For their solution, they turned to Redi-Rock of K.I.T.

"[Redi-Rock] was chosen for a couple reasons," said Joe Daley, architect and project manager for

21st Century Parks. "One, was the aesthetics—this is a park project, not a highway project. It had to fit in with the stone and other materials being used in the park...Also, the cost and the time frame were big considerations."

The first phase of the project had both gravity and reinforced Positive Connection (PC) walls, and the next phase of the project included creating an overpass for Interstate 64 where a 1,200-square-foot (111-square-meter) gravity headwall was used.

An additional phase of the Parklands project required three separate walls, totaling 21,000 square feet (1,950 square meters) of Redi-Rock to handle the significant grade changes. One of those walls

was a 41-foot (12.5-meter) tall PC wall—the tallest Redi-Rock wall at the time of construction.

"The high efficiency of the PC system really made it possible to design tiered walls with those loads at that height," said design engineer Clint Hines, PE. "It would be hard to make it work with anything else."

THE OUTCOME

"I think everyone is really happy with the way it looks," Daley said.

The Redi-Rock retaining walls throughout the Parklands fulfilled the technical demands and the aesthetic desire for the project, which garnered accolades from entities like the National Park Service and the American Society of Landscape Architects.



UNIVERSITY APPLICATION:

Creating Space on Campus with Redi-Rock

THE CHALLENGE

Worcester State University (WSU) started as a teacher training school in 1874, transitioned to a liberal arts and sciences school in 1963, and became a state university in 2010. As the university grew, it acquired more students but struggled to find space for additional housing.

“WSU, along with the rest of Worcester, is nothing but hills,” said Casey Scavone of Redi-Rock Walls of New England.

THE SOLUTION

WSU chose Redi-Rock Walls of New England to help expand the buildable area for a new residence hall, student union, and dining commons overlooking the sports fields.

The site included a moderate slope and global stability issues, so

design engineer Eric Merluzzi, PE, had to incorporate geogrid reinforcement into the lower wall; but, he was able to optimize the design by using the gravity blocks for the top tier of the wall.

The project also incorporated many curving walls, which Merluzzi said were simple to achieve because of the tapered block shape.

“There’s no cutting, no trimming -- the blocks fit nice and neat,” he said. “It works well.”

Aesthetics were also very important to the university. Thousands of students and visitors will view the wall each year, due to its close proximity to Coughlin Field, the main athletic field on campus.

“They wanted something that looked natural and something that would

really stick out, so New England LedgeStone was a great fit,” said Scavone.

THE OUTCOME

Despite New England winter weather conditions, installers from Ernest Guigli & Sons, Inc. were able to install the walls in a three month period. The majority of the 1,200 blocks for the project were retaining blocks, though the wall was topped with freestanding blocks and caps to provide a finished appearance.

“This was a great project for us,” said Scavone. “With all the people that are going to pass this area over the years here at WSU, it’s a fantastic project. The install was beautiful—everything came out perfect.”





RAIL APPLICATION:

Back-to-Back Reinforced Walls Elevate CN Rail Line

THE CHALLENGE

In 2011, the Canadian National (CN) Railway and the Montreal Metro began construction to eliminate an at-grade crossing where the CN Rail line crossed over the Société de Transport de Montréal (STM) light commuter Metro line.

These two lines ran through a narrow corridor with several sections of track overlapping. To completely separate the tracks, plans were made to elevate the CN Rail line on a bridge structure and excavate to relocate the Metro underground. To elevate the CN Rail line, designers needed to build a gradual, walled slope leading up to a massive concrete bridge structure and then down the other side.

THE SOLUTION

Back-to-back poured-in-place concrete walls were an option for creating the ramps, but when CN Rail geotechnical engineers saw the Redi-Rock Positive Connection (PC) blocks at the Transportation Research Board (TRB) meeting in early 2011, they began incorporating Redi-Rock PC walls from local manufacturer Graymont Materials into the design.

“The PC system is the only block with this type of connection which allowed it to handle the loads,” said David Chartier, junior engineer with V. Fournier & Associés. “When you have massive loads so near the block facing, it’s hard to make a wall that will work. The walls are very high and the load is very close, but the civil engineering of this block made it a good fit.”

To install the geogrid for a PC wall, a 12-inch (305 millimeter) wide strip of geogrid was wrapped through each retaining wall block, tying the Redi-Rock facing blocks to the reinforced soil mass with a weight independent positive connection.

THE OUTCOME

In total, the project required 7,800 Redi-Rock blocks in the Cobblestone texture—equaling 44,850 square feet (4167 square meters). Trains made their first run on the line in late 2013, and the project has been performing exactly as engineered.

“It’s looking beautiful, that’s for sure. The city is very happy,” said Charles Poulin, ing. of CRT Construction.



construction



MUNICIPAL APPLICATION:

Recreational Path Connects Two Colorado Mountain Towns

THE CHALLENGE

All great visions have to start somewhere. This one began with over three miles of paved multi-purpose trail winding through scenic Clear Creek Canyon.

This was no easy task, as the terrain includes steep slopes, flooding issues along the river, active landslide problems and limited space. In addition, protecting the natural habitat of endangered species was a must.

Project engineer Matt Andrews from Muller Engineering Co. said, “One of the main objectives of this project was to create a trail and retaining walls that would blend so seamlessly with the canyon that users would think it had always been there.”

THE SOLUTION

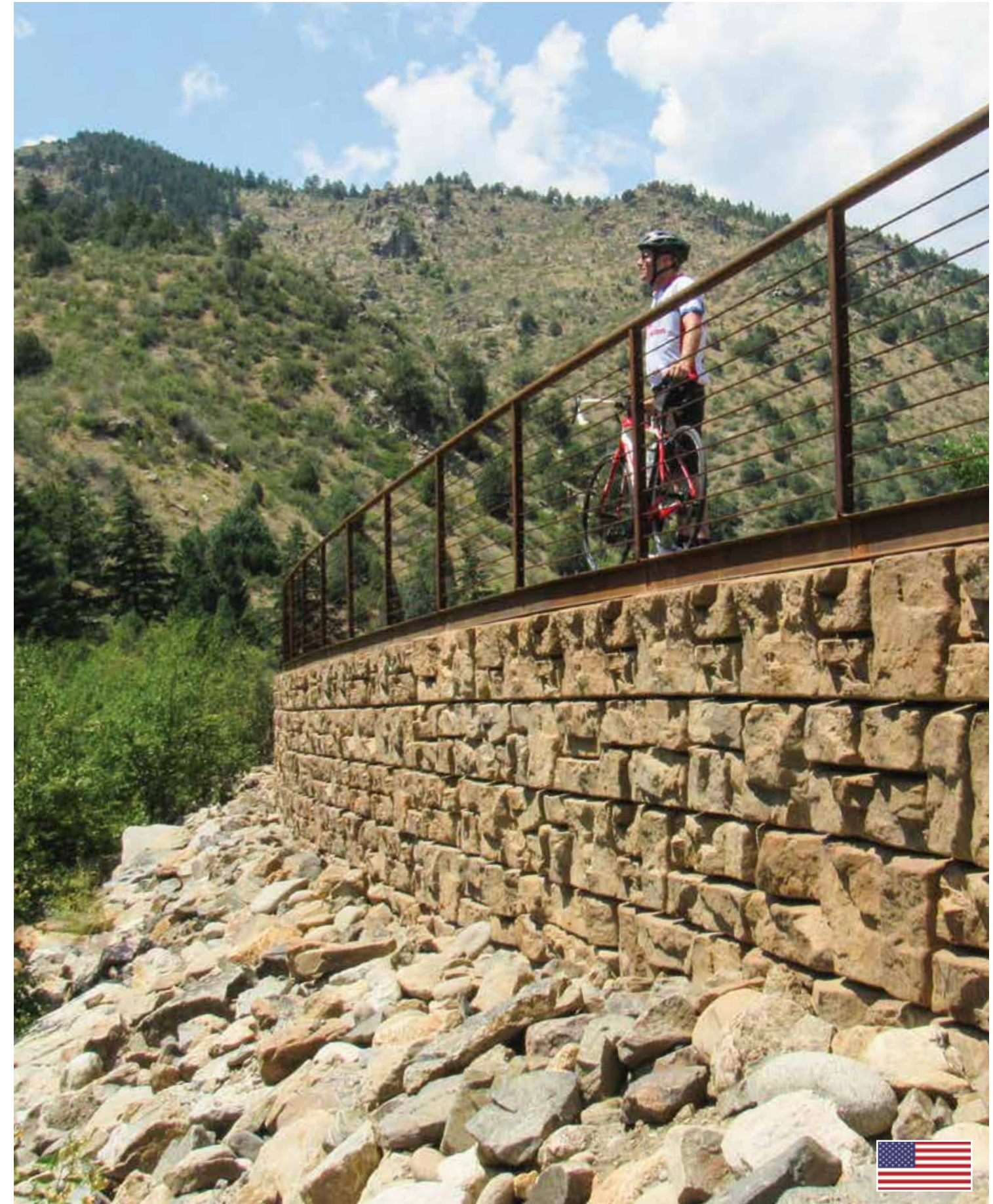
The engineers carved out the best route in the narrow canyon to create a 10-foot (3-meter) wide trail, using many miles of Redi-Rock retaining walls above and below the trail line.

“The Redi-Rock gravity system was the perfect solution for the constricted space because it doesn’t require reinforcements,” said Seth Clark from Signature Stone, the local Redi-Rock manufacturer. “In addition, Redi-Rock products allowed the walls to blend beautifully into the landscape because each block is cast in a mold taken from real natural stone—the LedgeStone texture perfectly matched the natural rock in the area.”

THE OUTCOME

“Due to the size of the blocks, along with the LedgeStone texture, we were able to design the wall to follow the grade rather than have steps in the wall,” added Clark. “This concept worked very well, and the subtle changes in the wall profile adds another level of beauty to the project.”

On July 29, 2016, the Clear Creek segment of the trail was ceremoniously opened for people to enjoy this picturesque canyon. From families out for a casual hike or bike ride, to experienced outdoor adventurers, this trail offers something for everyone.





RESIDENTIAL APPLICATION:

Major Landscape Upgrade for Washington Home

THE CHALLENGE

Mark Hattenburg wanted to add a terrace and pool to the backyard of his home near Spokane, Washington. He knew he would need to do something about the 8-foot (2.4-meter) grade change on the property, and he really wanted something that would look good.

But, he had no design plan and wasn't quite sure where to begin.

THE SOLUTION

While driving down Little Spokane Drive one day, Rick Lindberg from local Redi-Rock manufacturer Wilbert Precast noticed an excavator in the field behind Hattenburg's house. Curious about the project and knowing it would require a retaining wall, he spoke to Hattenburg about his plans.

"He knew he needed a wall, but he just didn't know what he was going

to do," said Lindberg. Lindberg's background is in landscape design, so he offered to help Hattenburg by designing the backyard landscape using Redi-Rock.

Hattenburg owns a construction company called Hattenburg Excavation. Having installed Redi-Rock walls in the past, he knew Redi-Rock would be a good fit on this project, too.

The Hattenburgs were happy with the design which included Redi-Rock gravity retaining and freestanding walls, plus coordinating columns, steps, and caps, all in the Cobblestone texture. A waterfall feature was incorporated into the design to conceal the utilities for the pool.

Because of his professional experience with Redi-Rock, Hattenburg installed the walls himself explaining, "It was pretty

straight forward; we didn't really have a whole lot of challenges once we got the plans set."

THE OUTCOME

Over 500 Redi-Rock blocks were used to complete the beautiful yard and pool area with walls that went up to 10 feet (3 meters) high at the tallest point.

Hattenburg and his family are very pleased with how their backyard turned out.

"They all like it...we're always in the backyard in the pool," Hattenburg said. In fact, they are now using Redi-Rock for more property updates.

"We're working on designing his entry now," said Lindberg.



REDI-ROCK XL APPLICATION

XL Hollow-Core Retaining Blocks Optimize Gravity Wall at Airport

THE CHALLENGE

When the excavation for a cut wall at John C. Tune Airport in Nashville, Tennessee, unearthed a geotechnical can of worms, it was time to go back to the drawing board to design a taller wall.

Civil Constructors unearthed that an unstable fill material had been used on the development of the adjacent property, which created an issue with the crest slope of the wall. There were also buried boulders instead of solid rock in some locations, and the limestone rock cut wasn't as tall as originally anticipated.

THE SOLUTION

After exploring several alternatives, wall design engineer Clint Hines, P.E., was able to keep the wall a

Redi-Rock gravity wall by using the newest innovation in the Redi-Rock system—Redi-Rock XL Hollow-core Retaining blocks.

“The only way we could get up and down at the heights that were now required was really going to be with the XL units,” said Hines. Three new block sizes round out the Redi-Rock system to help build taller walls in tight spaces while using less concrete.

For this wall in particular, Hines was able to reach a maximum height of 25.5 feet (7.8 meters), using 806 XL blocks of various widths, then transitioning to standard Redi-Rock blocks at the top of the wall to optimize the design.

He worked closely with the project geotechnical engineer to gather

new, accurate data, and then used the Redi-Rock Wall Professional software program to design, analyze, and optimize the wall.

THE OUTCOME

While the hangar isn't slated to finish until 2019, Redi-Rock of K.I.T. manufactured and installed the wall, and Hines attributed the success of the redesign process to two things.

“Having that whole system of products available and then having the Redi-Rock software that you could model such an intricate geotechnical model to make sure that you had everything covered, it was really the marriage of the two—the software and the product,” he said.

