

**EnkaRetain & Drain®****DIVISION 7  
DRAINAGE &  
WATERPROOFING****Medical Building  
14,559 sq. ft. Green Roof***Owner:**Cheyenne 1 Development Group  
Houston, TX**General Contractor:**Jacob White Construction Company  
Houston, TX**Architect:**Webb Architects  
Houston, TX**Engineer:**BGA Engineers, Inc.  
Houston, TX***Medical Building is Solid Gold with a Roof That is Producing a Lot of Green**

Even without its 14,559 square foot living roof, the 251 East Medical Center in Webster, TX was green from the beginning. At the project's inception, Developer and General Contractor, Jacob White Construction of Houston, wanted the building to stand apart from all other commercial buildings in the Houston area. This wasn't going to be your typical three-story 48,000 square foot medical building. 251 East would be the first LEED Gold certified building this side of Austin.

As land prices continue to increase around the Houston-metro area, especially in proximity to the hospitals, the availability of affordable medical office space continues to decrease. "It's getting harder and harder for physicians to find space they can afford," said Jeff Mickler, President of Jacob White Construction. "Our goal was to develop prime medical space near the hospital that would be affordable, not only to build but to occupy as well," he added. Achieving affordability meant considering the unconventional, which led Mickler and the project team to take a closer look at the LEED certification process.

The LEED green building rating system—developed and administered by the U.S. Green Building Council, a Washington D.C. based, nonprofit coalition of building industry leaders—promotes sustainable design and construction practices that increase profitability while reducing negative environmental impact and improving occupant health and well-being.

Introduced in 1994, the program is still fairly new. But based on the potential operational savings alone, don't expect projects like 251 East to be the anomaly for long. According to Mickler, a LEED Gold certified building can cost an estimated 50% less to operate than a non-certified building. "Without that savings, we couldn't have justified the project," Mickler said.

To achieve LEED Gold status, the project team, consisting of representatives from Jacob White Construction, Webb Architects, BGA Engineering, McDonald Electric, J&S Mechanical, and Belknap Plumbing, all of Houston, incorporated a variety of energy savings technologies and systems that went well beyond the typical low-E glass. For example, a self-replenishing irrigation network, consisting of 700 linear feet of concrete culverts leading to an underground storage cistern, was built beneath the parking lot. The cistern holds 175,000 gallons of rainwater, enough to supply the facility's entire irrigation and grey water needs, inside and out, reducing city water needs by 70%.

Perhaps the most impressive and ambitious part of the project was the proposed green roof complete with gardens, walking paths, and a lush landscaped area. At 14,559 square feet, it would be the largest green roof in Texas and possibly the entire southwest. The sheer size presented some concerns.

**Enka-Engineered**  
BUILDING PRODUCTS



*EnkaRetain & Drain lays completely flat which is critical in horizontal applications.*



*Specially formulated planting medium and native plants are chosen for the project.*



*Green roofs provide many benefits — one being a recreation area for occupants.*

In November 2005, members of the project team, including Joe Webb of Webb Architects, attended GreenBuild 2005, the US Green Building Council's annual convention in Atlanta. There they met several of the country's leading green roof suppliers who assured the team that a conventional green roof system was well within their budget of \$10- \$15 per square foot. The project team proceeded accordingly based on those budget figures.

"When the actual estimates came in several months later, they were \$25 - \$35 a square foot," Webb said. That's when the project team went looking for an alternative solution. "We basically had to go back to the drawing board and rethink our whole approach," Webb mentioned.

After evaluating, mixing, and matching hundreds of products and combinations of products, they finally discovered a combination that not only delivers an R68 insulation rating, but costs a fraction of a conventional system and is much quicker to install.

The unique green roof structure began with a 4" layer of rigid foam insulation board with protective coating applied to the concrete /steel roof structure. Next, a 40-mil. reinforced waterproofing membrane was loose-laid over the foam board and was loose-laid to the roof sidewalls and drain assemblies. Finally, the drainage / water retention composite was installed directly on top of the waterproofing membrane. With the structure in place, a 9" soil mixture was specially developed by a local soil consultant who took into consideration proposed plant materials, water retention needs, and the wet weight limit set by the engineers. The specialized soil mass ensures plant growth potential and survivability.

A key to the roof's effectiveness is the drainage / water retention composite,

EnkaRetain & Drain, manufactured by Colbond Inc. of Enka, North Carolina. This unique product, designed specifically for green roof and planter applications, consists of a post-industrial, recycled polypropylene drainage core, fused and molded into a square waffle pattern. A super-absorbent water retention fabric is heat-bonded to the drainage core and is designed to hold 10 to 12 times its weight in water.

"We had used a similar Colbond drainage composite on a residential project four years ago, so we were familiar with the technology and performance," Mickler said. "We called them again to see if they had a drainage/retention composite that would work for this size project. That's when they showed us the EnkaRetain & Drain," he explained. Webb proved to be a slightly tougher sell. "I was concerned about the flow rates. Would it be able to move the runoff from the roof quickly enough after a hard rain?" he questioned.

In Denver at GreenBuild 2006, Mickler, Webb, and other project team members met with Colbond representatives to get the hard proof they needed. "We sat down at dinner one night and walked through it all. They were able to document every claim they made. Once I saw it, my comfort factor went from 95% to 100%," Webb said.

While difficult to estimate, Jacob White Construction believes that by using the combination of foam board, membrane, and EnkaRetain & Drain, they were able to save at least two to three weeks as compared to a proprietary system. Energy usage is also on track to deliver hefty savings. The material cost savings alone was in the neighborhood of \$250,000.

The environmental impact is equally impressive. Approximately 73% of all rain that strikes the roof is retained in the green roof to sustain the vegetation growth, while

the excess (approximately 24,000 gallons a month) is transported to the roof drains that direct it to the underground cisterns for storage. That reclaimed water is used for everything from irrigating the grounds to flushing the toilets.

But at the end of the day, says Mickler, this is not only about saving the environment. "It's about dealing with the realities and challenges of this business in a way that is smart, practical, and sustainable," he mentioned. By all accounts, 251 East Medical Center is all that and more.

The building was completed in January 2007 and will be applying for the LEED Gold certification in March. Based on occupancy rates, Jacob White Construction plans to add a second adjacent building in the future. It will be designed with the same environmental standards in hopes of becoming LEED Gold certified as well.

"We want to show the industry, tenants, and the general public that there is a better way to build," Mickler added.

*For more information about these and any other products marketed and manufactured by Colbond Inc. visit [www.colbond-usa.com](http://www.colbond-usa.com) or call 800-365-7391.*

## COLBOND

1301 Sand Hill Road  
P.O. Box 1057  
Enka, N.C. 28728  
Tel. (+1) 828-665-5050  
Toll Free: (+1) 800-365-7391  
Fax (+1) 828-665-5009

email: [enka-engineered@colbond.com](mailto:enka-engineered@colbond.com)  
website: [www.colbond-usa.com](http://www.colbond-usa.com)