

Rebuilding It Better: Greensburg Kansas

By Darin Headrick

Our community has faced many challenges since May 4, 2007. The rebuilding of all the town's school facilities was just one of them. However, as we approach the end of the first year in the new building, we are happy with the outcome. The facility already feels like home.



Front entry to the Kiowa County School. Evident in the picture is water recovery/storage, native limestone cladding and reclaimed cypress.

On May 4, 2007, a massive EF-5 tornado destroyed 95% of Greensburg, Kansas. Over 900 homes and 125 businesses, including all school facilities were totally lost in the storm. Since then, the city and community leaders have been committed to rebuilding the town as a model sustainable rural community.

The challenges facing the community immediately after the storm were far reaching. However, the most significant challenge was to decide whether to rebuild the town the same as it was before the disaster or to rebuild the community in such a manner as to improve the community's chances for survival and recovery. We were a typical rural town with an aging population, deteriorating retail on Main Street, and a school population that was in decline. If we built it back the same as it was, we were destined to the same less than promising future.

The final decision was made after much thought and deliberation by community leaders. Let's rebuild the most sustainable community in America. Let's do everything we can to give Greensburg the chance at survival, offering something totally different than you see in most every other rural community. The result is a town that boasts a ratio of 1 LEED building for every 80 residents to date. There are at least 13 new buildings scheduled



Friday night Maverick football on the new synthetic turf field.

to be LEED certified in the next few months. The school is scheduled to be LEED Platinum and services 340 students, PreK through 12th grade.

Design Challenges

While searching and interviewing architectural firms to “lead” in the design of the new facility, we stepped away from the norm and hired a firm that had less experience in designing schools and more experience in sustainable design. We hired BNIM out of Kansas City. They have been fabulous to work with and we are very pleased with the end result.

Our goal was to design a school unlike most you will ever see. We had a strong, experienced administrative team that had a clear vision of what we

needed in our learning environments. We also didn’t want our new school to look like all of the other schools being built today. We wanted and demanded more from our architects.

We also had the challenge of working within the guidelines set forth by the Federal Emergency Management Agency (FEMA) with regard to disaster recovery. Though FEMA does not always get the highest of praise around the country, in our situation, they have been a great partner. Our initial challenge was to identify everything that was lost in the storm and determine the cost to replace these items to the same level they were before the storm.

The second, and more difficult challenge, was to find partners and to leverage money so that we could improve upon that and build a state of the art building with the latest in sustainable features. In the end, we accomplished both.

Energy Conservation

To reach the 50% energy savings and LEED Platinum certification goal, the school design team incorporated a number of energy conservation and efficiency measures.

Lighting

Immediately after the storm, the National Renewable Energy Lab

(NREL) encouraged me to take a trip to Raleigh, NC to look at some of the new school facilities they were building there and get ideas to incorporate into our design. The one feature that stood out the most to me was their use of natural daylighting, especially the use of north facing clear story windows. By orienting the building from east to west we are able to capture the abundant natural daylight from south and north facing windows which helps warm the building in the winter and floods the spaces with natural light.

This feature is most evident in our two gymnasiums. During the day it is rare that we ever need to turn on artificial lights to conduct classes. Regularly occupied spaces such as classrooms and corridors, along with the gyms, are fully day lit to reduce artificial lighting. When we do need artificial lighting, electronic timer light switches, indoor and outdoor photo-electric switches, and indoor occupancy switches determine how many lumens to use.

Building Envelope/Insulation

The walls and portions of the roofing system are constructed with structural insulated panels (SIPs) rated from R30-R40, which eliminate the heat/cold migration through the exterior building envelope that typically occurs with metal stud framing. It was also beneficial that the wall envelope system was constructed in an extremely controlled environment off site, reducing both on-site waste and construction time.

Heating, Ventilation, and Air Conditioning (HVAC)

One feature that is proving to be both reliable and energy efficient is our geothermal system used to heat and cool the building. We have a hybrid closed loop ground source heat pump system made up of 96 geothermal wells, each 410 feet deep. This system, combined with a fluid cooler, provides heating and cooling by extracting both from the earth.

In addition, a dedicated outdoor air system with energy recovery ventilators provides outdoor air based on



Interior picture of one of the high school science rooms.



Interior picture of the grade school music room. Featured in this picture are clerestory windows for natural light, reclaimed fir board panels and cabinets constructed of wheat-board.

demand. It controls carbon dioxide levels, allowing us to have fresh air in the building.

Wind Power

Every system in our building is operated with electrical power. That said, we have an on-site wind generator which produces 50-kW of power. It is scheduled to produce \$700,000 of power over its life cycle. To date, our generator is the top-producing 50-kW Endurance generator in the world. In addition, our entire city uses 100% renewable energy. The city has its own wind farm that produces all of the power required by the community.

Sustainable Features

The new school’s numerous sustainable practices and features provide a healthy indoor and outdoor environment for students, faculty, parents, and visitors. Our goal is to continue to improve and utilize the areas around the school for ecological classroom activities including a composting area and school garden.

Materials

All of the building materials were chosen with sustainability and reclamation in mind. The cost-effective and easy to maintain polished concrete flooring is manufactured with low volatile organic compounds (VOCs). Some interior walls are also constructed of regional concrete masonry unit burnished block that requires no painting and maintenance, further reducing VOCs.

Ceilings and walls in the hallways and classrooms are covered with reclaimed Douglas fir board paneling. The wood looks great aesthetically and acoustically benefits the spaces.

The outside of the building features more than 3,500 board feet of reclaimed wood salvaged from cypress trees destroyed in the Katrina Hurricane. The wood is accented by Kansas limestone cladding and a metal zinc material that has zero maintenance.

Water Efficiency

All of the rainwater that falls on the property is captured and stored in water storage tanks or cisterns. The cisterns store 121,000 gallons of water that is used to irrigate all of the grasses, plants, and shrubs on site.

In the interior of the building, waterless urinals and low-flow fixtures in all showers, faucets, and toilets reduce water use. As of now, we anticipate seeing over 50% reduction in water consumption.

In the parking areas and around the building, bioswales (straight runoff channels filled with vegetation) are incorporated to remove silt and pollution from surface runoff water.

Thoughts at the End of Year 1

Many people come here and say, “Wow...this is really nice.” And we agree. However, if given the chance to avoid the tornado in the first place most of us would love to have our old town back. Unfortunately, that wasn’t an option. Given our circumstances, we feel fortunate to have worked with the many people and companies that partnered with us in this endeavor. We have been able to give our students, who spent three years in temporary facilities, something they can be proud of. Beyond that, we feel like we have given them a state-of-the-art learning environment that will serve not only our current students, but students for generations to come. ■



Courtyard area illustrating the light shelves on the second story classrooms and one of the six water cisterns which store 121,000 gallons of water for irrigation.

Darrin Headrick is now in his 8th year as Superintendent of Schools in USD 422 Kiowa County.

In the wake of a devastating EF-5 tornado that decimated 95% of the city and 100% of the local school on May 4, 2007, he led the effort to construct temporary facilities and managed to open school on schedule on August 15, 2007. In addition, USD 422 just finished construction of the first LEED Platinum PreK-12 School in Kansas. Darin, along with numerous other public officials, is working toward the construction of a model community with the latest in green design.