

Dream Homes Now Available in Green

Written by Mark Bushey, freelance writer for the construction industry

The Rim of the World Scenic Byway in San Bernardino, CA has become one of the most picturesque locations in all of California. Stretching 87 miles between San Bernardino and Redlands, the road showcases a quaint setting with views of the mountains, thick forests and canyons that have made this area one of the most popular nature settings in the country. Given its beauty and rural setting, the Rim of the World Byway has become a serene getaway for many California residents. Alex Stathis is one of these individuals who has taken advantage of the inescapable beauty of this area.

Stathis, owner of Mountain View Plant Growers in San Bernardino, purchased a 420-square-foot cabin on Rim of the World Drive in 1978. Surrounded by thick woods and a breathtaking view, his home was the perfect escape from life in Southern California.

“The cabin was on one of the prettiest sites in California,” said Stathis. “The mountain scene and the natural setting make this location a place that most people only dream about.”

While the setting of his home was supreme, Stathis had visions of remodeling. In search of a roomy, more luxurious upgrade from his existing cabin, Stathis turned to Wayne Bowser, a home designer and builder based out of Lake Arrowhead, California. Introduced to Bowser by a relative, Stathis knew that Bowser would be able to provide a building design that would meet his needs.

Bowser, owner and founder of WJRB Consulting and Design, has been in the architectural design business for nearly 30 years. With extensive experience designing homes in California and a strong commitment to green building, Bowser proved to be the perfect person to design Stathis' home.

After speaking and consulting with Stathis, Bowser presented his idea of creating a home that would be one of the greenest homes in San Bernardino County. Utilizing environmentally friendly products, recycled materials and energy-saving appliances, Bowser wanted to make Stathis' home the first home in the county to meet LEED® credit requirements. Understanding the importance of energy conservation and environmental preservation, Stathis was receptive to the idea.

Bowser, with the assistance of Stathis, began to develop the plans for the state-of-the-art home. In order to make the home as natural and non-invasive as possible, Bowser looked for building products that would be environmentally friendly yet structurally sound.

From the beginning of the design process, Bowser knew that he needed a strong frame to provide structural integrity in Southern California's earthquake zone. After exploring various framing methods, Bowser realized that it would be extremely difficult to achieve LEED certification with his original idea of using R-19 stick-frame construction. Not to mention with stick framing, it would be difficult to construct one of his key design elements - two separate walls that were each 20 feet high. With stick framing, constructing wall heights of this size requires additional safeguards to ensure a sturdy, durable frame – something that is essential with Southern California building codes. In addition, Bowser had difficulty finding quality lumber that was not twisted, warped or bowed. In Bowser's experience, using imperfect lumber in construction compounds problems both during and after construction.

Seeking an alternative, Bowser discovered Structural Insulated Panels (SIPs) that were manufactured by Premier Building Systems. While they've been around for more than 40 years, SIPs have recently become one of the most popular green building materials. Constructed from an expanded polystyrene (ESP) foam core laminated between two sheets of engineered oriented strand board (OSB), SIPs offer one of the strongest framing systems available in the residential building industry. Pre-insulated SIPs also offer exceptional R-Values and are regularly referred to as the greenest framing products available today.

Bowser, along with a crew from Trinity Construction, out of Lake Arrowhead, CA, began the SIPs installation on Stathis' home without any prior experience with the product. Delivered to the job site pre-cut, based on Bowser's architectural drawings, the SIPs required minimal trimming and provided much faster installation than traditional stick framing.

The installation process began with unloading the large pre-cut panels into positions around the foundation of the home, and preparing the wall splines (panel connections) on the first panel. A mastic sealant manufactured by Premier was applied to the SIPs, creating an airtight seal around the panels. Before the initial panel was erected on the foundation, a sill plate was installed to the foundation, creating a sturdy foundation and attachment for the large panel. Once the plate was installed, holes were drilled through the panel splines to align with the horizontal electrical chases that are predrilled in the panels (allowing an electrician to pull wire through the chases without any drilling). After the drilling, more mastic was applied to the sill plate to provide yet another

airtight protective coating. Once the preparation was complete, the panel was raised to the vertical position and screwed quickly in place.

With the level and secure installation of the first panel, the additional panel splines were drilled and set into place so that the panels joined together, creating no room for air penetration. To ensure that the construction was airtight, more mastic was applied between the individual panels to create one solid wall structure.

While the initial panels were erected into place by hand, the design of Stathis' home called for several panels that were more than 20 feet high. These larger panels were lifted by a crane and easily guided into place by the construction workers.

"We attached a webbed strap to the panels," said Bowser. "The crane operator had to raise the panel just high enough off of the ground to avoid hitting the sub-flooring and the foundation. Once the panel had enough clearance, it was lowered and guided into place, then attached to the sill plate adjacent to the previously erected panel."

While a crane was required to maneuver the larger panels into place, a design with these specifications would have been virtually impossible with standard R-19 stick-frame construction.

"These 20-foot walls were one of the reasons that we investigated SIPs," said Bowser. "The amount of quality lumber needed to construct something of this size would have been difficult to find. Even if we were able to find the lumber and build the structure, the frame would have been inefficient in terms of energy."

With all of the panels installed in just a few days (rather than weeks), Bowser and the crew from Trinity Construction had the strong, straight frame they needed to correctly install the additional items in the home. In order to make the home as energy efficient and environmentally friendly as possible, Bowser used many unique products and techniques. When Stathis' original cabin was deconstructed, all of the building materials were recycled or reused. For the foundation form-work portion of the project, recycled lumber was the first to be used. In addition to recycled materials, the home also has many features that drastically reduce water use, as it is located in an area of California that experiences frequent drought. Bowser utilized high-efficiency fixtures in the toilets and showers and also utilized a rainwater harvesting and storage system, which Bowser designed, to capture more than 1,000 gallons of water to be used both for irrigation and to water Stathis's indoor plants.

In addition to water conservation, energy efficiency was also stressed by both Stathis and Bowser. While Premier SIPs have one of the highest R-values of any framing material, Bowser wanted to make sure that other additions had similar energy-efficient characteristics. Using energy-saving dual-panel windows and sealing all cracks and joints, Bowser was able to create an airtight building design.

In addition, Stathis wanted to make his home as self-sufficient as possible, saving both costs and energy and drastically minimizing the environmental footprint of his home.

“I did not want to be fully dependant on state-generated electricity,” said Stathis. “Everyone knows that California has issues providing enough electricity, so I wanted to do my part to decrease this usage. I decided to install photovoltaic panels on my roof and install a wind turbine that will create up to half of the energy that I need. The technology is available, so I wanted to put it into use.”

With the home nearing completion, Stathis and Bowser are proud of what they accomplished in building this home - transforming a 420-square-foot cabin into a 1,800-square-foot icon for energy efficiency.

“In building this home, we surpassed California’s Title 24 (Energy Code requirement) by more than 15%, which is an unbelievable accomplishment,” said Stathis. “Building the first home in San Bernardino County that is LEED certified is something that Wayne and I are proud of. I hope that others follow our lead and keep energy and the environment in mind.”