Sacramento Habitat Home Earns LEED Platinum, Contains No Certified Wood

How one Habitat home racked up 80+ LEED points without FSC...

by Libby Maurer

On April 24, Francisca Flores and her kids got the keys to their brand new 1100 sq. ft. home in Sacramento. Make that a LEED certified home. A LEED certified Platinum home, the highest of four levels, to be exact.

When the design team—or "charrette" in LEED lingo—met early on to discuss the project, they selected Gold certification as their target. That day, they fleshed out the project timeline, exceeding the minimum California energy requirements, and various advanced framing options. But there was one thing they never even considered: FSC certified wood. If you guessed the Flores' new home doesn't contain any certified wood, you guessed right. Their home overshot the initial target rating and achieved LEED Platinum status without it.

Why would a not-for-profit, budget-minded outfit like Habitat pursue green certification? "We build green homes for one reason," said Dan Wilson, Project Director for Sacramento Habitat for Humanity, "energy efficiency." Wilson said their goal is to build homes that are affordable to build and maintain. That means lowering the families' utility costs as much as possible. The thrust of the LEED program, he said, is energy efficiency. By aligning itself with the program, Wilson can guarantee each home will meet certain energy efficiency thresholds and reduce homeowners' monthly living expenses. As a single mom to six children, Flores will no doubt appreciate the measures Habitat's commitment to low energy bills.

The minimum point thresholds for Gold and Platinum certification are 65 and 80 respectively.

Norm Scheel Structural Engineering was brought on as the building designer and engineer of record. In addition, Scheel served as the project's "energy consultant" and LEED Accredited Professional (AP). He said early collaboration on design and energy objectives were key in achieving the Platinum rating. In particular, the advanced framing techniques used in the walls and roof system allowed the team to add valuable energy efficient features. Roughly 25 percent of the total LEED points earned come from design and energy efficiency measures that tighten the energy envelope and reduce utility costs.

But builders need not choose LEED certification to achieve an energy efficient home. "Most of these elements are things that, if really involved, homeowners would automatically want because they simply make sense," said Scheel. "It's important for people to know you *can* green build without adding a lot of cost," Wilson said. "Our homes will always meet the basic LEED certification level, even if they don't have [USGBC's] official stamp of approval. Following the guidelines of a certain program doesn't have to add more cost."

LEED Platinum without certified wood? Here's how they did it.

Assemble Project Team & Design Charrette

The project team must meet once a month to review project goals. In this case, the LEED Accredited Professional, structural engineer, mechanical engineer, landscape architect, solar energy consultant and project manager comprised the project team. The design charrette is typically made up of these same people, but the charrette is required to meet just once (in the design development phase of the project).

Wilson and Scheel insist a well-connected design team is critical to achieving the level of integrated framing and energy efficiency in a home like this. "You don't get a well-designed, efficient house until you get the experts all together. One person can't think of everything," said Wilson.

The Bottom Line:

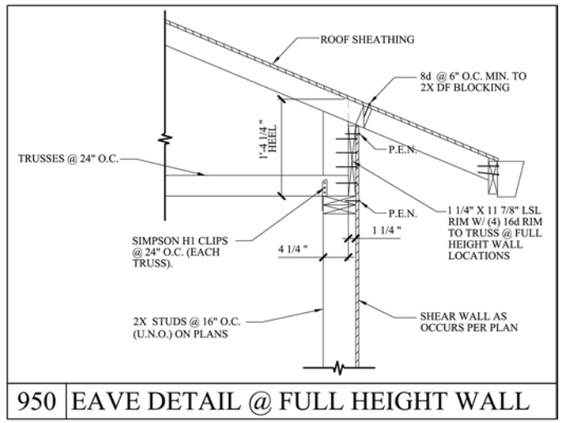
2 points awarded in ID1 for an integrated project team and a design charrette.

Use Raised Heel Trusses

Raised heel trusses provide for an array of points. The most obvious is additional space for continuous insulation. Now, higher R-value alone won't earn you any LEED points. But it pays off in spades when it comes to a category called "exceptional energy performance." Here's how.

A LEED prerequisite for California homes is Energy Star compliance. Then the home is rated per the minimum energy requirements set forth in the California Building Code's Title 24. LEED energy performance points are awarded for

Continued on page 14



Raised heel trusses (also known as "energy heels") allow for more insulation.


A tankless water heater is mounted to truss verticals. Utilizing this extra space in the attic meant the hot water lines could be limited to 20 feet or less.

Sacramento Habitat Home...

Continued from page 13

any percentage beyond this minimum. The energy consultant conducts a software-based assessment and a rating score is issued. The score is based on building envelope tightness and heating, cooling and plumbing elements. The green rater then verifies that the Energy Star prerequisite has been met, affirms the percent above Title 24 reached, and determines the number of LEED points to be awarded. Wilson aims for 25% over the baseline energy rating. "Our goal is to make sure the home will not only be efficient today, but in another 30 or 40 years as well," he said.

Wilson's team blew past the Energy Star prerequisite and his own 25 percent goal, reaching 32 percent above Title 24 benchmarks. Incorporating raised heel trusses allowed the team to meet R-19 and R-38 insulation factors in the walls and roof. Wilson said other features like an on-demand water heater (discussed below) and solar photo voltaic cells also contributed to the high energy rating. Thanks to the raised heel trusses supplied by Homewood Truss Company, the project team earned an impressive 11 energy performance points.

The Bottom Line:

11 points awarded in EA1 for exceptional energy performance.

On-Demand Water Heater

Another benefit of raised heel trusses is their roomy open spaces double as places for mounting mechanicals and energy-saving appliances.

Raised heel trusses provide additional space for fresh air ducting. Outside air passes through a filter, circulates through this mechanical system and into the house.

In this case, Scheel designed the trusses with extra load and space to accommodate this tankless or "on-demand" water heater. This is a perfect example of how high-performance energy systems and framing design can be coordinated to make the most out of space. "This is why truss manufacturers have a lot to offer in these high performance houses. The points for high energy wouldn't be possible without trusses."

The location of this on-demand was also critical. To get the points, each branch line from the water heater to appliances had to be 20 feet or less. Wilson said designing the specification for the heater mount, the truss engineering and layout was one of the things the design team coordinated early on. "You talk about centralizing the location of the on-demand water heater. We were actually able to save money on the hot water runs because we planned so much in advance."

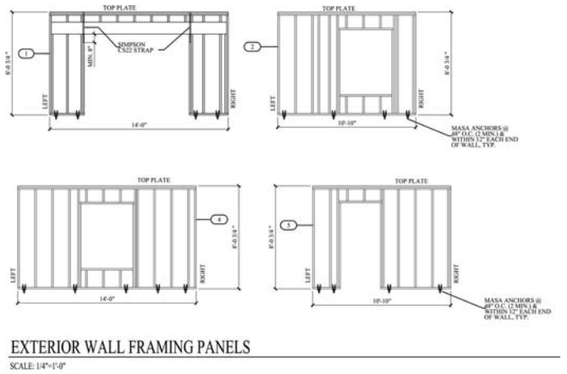
Another benefit of these spaces is the ability to route fresh air ducts through the trusses. This is critical for high performance homes like this to eliminate moisture and mold growth.

The Bottom Line:

2 points awarded in EA7 for compact hot water distribution system.

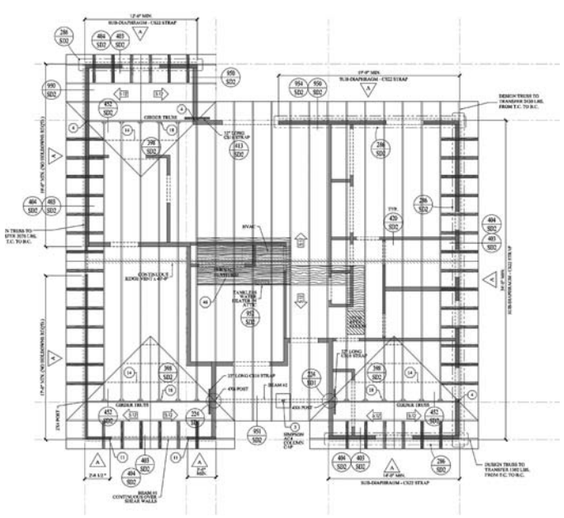
Continued on page 16

Eliminating headers above window and door openings makes the energy envelope more efficient by replacing the wood with insulation, which has four times the resistance to heat flow. LEED awards credits for framing efficiencies like this. Sealant further reduces air leaks and helps seal the energy envelope.



Above: Exterior wall panels were built by site supervisors and selected volunteers at the Habitat facility. Panel numbers correspond to numbered wall sections on floor plan. 1 point awarded for detailed material cut lists/lumber orders.

Right: Roof framing plan. 1 point given for detailed framing documents such as a truss placement diagram.



Sacramento Habitat Home...

Continued from page 15

Eliminate Headers Above Openings, Add Other Framing Efficiencies

While the raised heel trusses shown above didn't earn any direct LEED points, other framing efficiencies do. For instance, getting rid of all headers above openings. "There's no need to have a header over windows, especially when the trusses are running the same direction as the window," Scheel said. He explained that extra materials like this contribute significantly to increased energy consumption. The project also earned points for: wall panel and roof truss packages, roof truss more than 16" on center (in this case truss spacing is 24" on center) and 2-stud corners.

Another area to skim extra points from: A detailed framing document and cut lists or lumber order will get you two easy points.

The Bottom Line:

4 points awarded in MR1 for advanced framing practices.

Affording the Cost of LEED Certification

With the average monthly utility bill for Sacramento Habitat homeowners landing between $25 and $35, Wilson said it's clear that building these homes to maximize energy efficiency pays off. "It's usually not until new homeowners get the first couple bills that they realize how much they're saving," he said. "They are so grateful when that time comes."

He explained that the fees of attaining LEED certification are paid for with grants from various organizations. But he acknowledges that without these grants, LEED certification may be cost prohibitive. "It wouldn't be possible. But right now there are enough grants out there," he said.

It's also clear that using FSC certified wood in this home would not have made much of a difference. It certainly wouldn't have contributed in any way to low energy bills, a more streamlined framing schedule, or a higher level of

LEED certification. Aside from an extra LEED point or two, using FSC wood accomplishes one thing: higher material cost and ultimately higher cost to the end user. When the goal is affordable housing for people like Francisca Flores, certified wood doesn't make the cut. **SBC**

STRUCTURAL BUILDING
COMPONENTS™
THE FUTURE OF FRAMING

www.sbcmag.info

Dear Reader:

The mission of ***Structural Building Components Magazine (SBC)*** is to increase the knowledge of and to promote the common interests of those engaged in manufacturing and distributing of structural building components to ensure growth and continuity, and to be the information conduit by staying abreast of leading-edge issues. SBC will take a leadership role on behalf of the component industry in disseminating technical and marketplace information, and will maintain advisory committees consisting of the most knowledgeable professionals in the industry. The opinions expressed in SBC are those of the authors and those quoted solely, and are not necessarily the opinions of any affiliated association (SBCA) .

Truss Publications, Inc.

6300 Enterprise Lane • Suite 200 • Madison, WI 53719
608/310-6706 phone • 608/271-7006 fax
www.sbcmag.info • admgr@sbcmag.info