

## From concept to reality: Green-home work begins

### Couple break ground, though much remains uncertain in bid to meet strict requirements of Living Building Challenge

By Fara Warner / *The Bulletin*

Published: August 29, 2011 4:00AM PST

Editor's note: Two years ago, Tom Elliott and Barbara Scott invited *The Bulletin* to follow their efforts to build a "green" home. After revising their home's design twice, the couple now are working toward meeting the stringent requirements of the Living Building Challenge, a green-building certification overseen by the International Living Future Institute. The certification focuses on seven "petals" or areas of sustainability, including requiring the couple to use building products with strict sourcing requirements, produce their own energy using sustainable energy sources, grow food and de-link from municipal electric, water and sewer systems. A final requirement challenges the couple to live in the home for 12 continuous months to prove they have used no outside electricity, water or sewer services.

The Bulletin is following the couple's project from start to finish through periodic stories that look at their goals, decisions, costs, concerns, problems and achievements. This installment looks at the continuing challenges the couple face as they finally break ground and submit plans to the City of Bend to receive building permits by mid-September. Construction planned to begin in October if the permits are approved.

Almost a year after they first planned a ground-breaking ceremony on their building site at NW Shasta Place — and more than two years after they began planning their dream green home — Tom Elliott and Barbara Scott finally climbed into a backhoe in late July and started digging.

The couple, joined by about 30 invited guests, performed several ceremonies including reading poetry, shoveling soil with a gold-painted shovel and placing rocks around a "living well" made out of the stump of a 201-plus-year-old Ponderosa pine they had removed from the property. (The couple planted 201 Ponderosa saplings in Shevlin Park to make up for cutting down the tree and will use the resulting lumber in the home construction).



Photos by Dean Guernsey / *The Bulletin*

Tom Elliott and Barbara Scott, top center, address friends and colleagues during the ground-breaking ceremony for their new home in Bend.



Tom Elliott and Barbara Scott break a bottle of champagne over the bucket of an excavator during the ground-breaking ceremony for their new home.

The couple also spent some time discussing the challenges that they have been working through as they attempt to build and live in what may be one of the greenest houses in the U.S., if not the world — if they receive the Living Building Challenge certification. To date, according to the Living Building Challenge’s website, three commercial buildings have received full certification, but only one home has come close, receiving five out of the seven requirements possible.

Scott wrote in an e-mail a few weeks after the groundbreaking that one of the biggest challenges, particularly financially, was making the decision to scrap plans for their first house.

That house would have been more than 4,000 square feet with the conventional trappings of a dream home: living room, office, den and three bedrooms with a view of the Deschutes River and the Cascade Mountains. But the size would have made it difficult to meet the energy, water and materials requirements for a sustainable home, she wrote.

The couple revised the original plans to around 3,200 square feet, but that size still presented financial and sustainability problems.

Now the home’s design is planned for 2,236 square feet with an additional 489-square-foot guest apartment. Having two dwellings gives the site enough roof area to capture rainwater into an underground cistern and sunshine through a solar system to, they hope, meet the energy and water needs of the house.

“Personally, we are learning to celebrate the idea of restraint,” Scott wrote in an e-mail in late August as the couple cycles across the U.S. from Oregon to Maine. “Size for the sake of size creates a vicious cycle as buyers spend more to purchase, heat, cool, and maintain their homes.”

They also have reduced the cost of building the home, once estimated at \$600 per square foot to build to around \$366 square feet. The couple already has spent \$459,821 as of July 1 on designing and redesigning their house, which they now call Desert Rain II, and taking the first steps in meeting the requirements of the challenge, such as sourcing building materials that aren’t on the challenge’s “red list.” These are materials such as lead, wood treatments such as creosote and PVC, or polyvinyl chloride. Materials also are controlled by the distance they have to travel. For example, heavier materials such as stone are required to be sourced closer to the site while lighter goods may be sourced from



Tom Elliott and Barbara Scott break a bottle of champagne over the bucket of an excavator during the ground-breaking ceremony for their new home.



Dean Guernsey / The Bulletin

Al Tozer of Tozer Design compares the latest architectural design, foreground, with the previous design for the Living Building Challenge home of Tom Elliott and Barbara Scott.

farther away.

“The materials requirement is not like any other I’ve worked on,” says M.L. Vidas of Bend-based Vidas Architecture LLC who is serving as sustainability coordinator on the project. She has worked on green certification projects such as LEED, or Leadership in Energy and Environmental Design, but considers the sourcing of materials for this challenge to be one of the most rigorous she has been involved in.

“But I like it because it focuses attention on where you end up,” she said. “It’s more comprehensive and all-encompassing.”

#### *Aiming for approval*

The new house design was developed from the ground up with the Living Building Challenge in mind, Scott wrote, including net-zero energy, self-contained water, beauty, function and materials.

The couple paid \$3,000 for a certification review earlier this summer by the LBC’s certification director Amanda Sturgeon to give the team of architects, contractors and suppliers an idea of whether they were on target to meet the goals, or not. But Sturgeon cautioned that her review, which the team was given in mid-August, was only for guidance, it’s not a ruling. Certification won’t come until the house is built and the couple live in it for a year, she said.

But even as the couple have taken major steps to meet the challenge’s requirements, they still have to abide by the rules of the City of Bend — or try to change the rules if they want to receive a full certification.

The design team, led by Al Tozer of Bend-based Tozer Design LLC, submitted the plans to the city’s building permits office Aug. 17. He said he expects that the permits, if approved, will come through in early to mid-September and that construction could begin as early as October.

“I am pretty optimistic,” Tozer said of receiving approval. “We’ve been working with the city for a long time. They have an understanding and appreciation for what we want to do. No one at City Hall says this is crazy — or at least not to our faces.”

#### *The wastewater issue*

While materials have been one of the big challenges for the team of contractors and suppliers working on the project, the city is

## The 7 ‘petals’

The seven “petals,” or requirements that must be achieved to certify for the Living Building Challenge are:  
**Site:** Requires that building take place on brownfield or grayfield sites to cut down on urban sprawl; this petal also includes the requirement to set aside land for food production.

**Water:** 100 percent of water used must come from collecting precipitation, and wastewater must be treated on-site and reused.

**Energy:** 100 percent of the site’s energy needs must come from on-site renewable sources.

**Health:** Focuses on the relationship the site has to humans as well as to natural elements. The project’s air quality also is monitored, including testing for particulates and volatile compounds before occupancy and nine months into the occupancy. No smoking is allowed within the project’s boundaries.

**Materials:** No “red list” materials can be used during construction and the team must advocate for materials that are sustainably sourced, as well as source materials based on a calculation of distance and weight. The project must conserve, reuse and recycle throughout all phases of the project.

**Equity:** The project must be built on a “human scale,” not “automobile scale.” It must be accessible to all people, including providing handicapped access.

**Beauty:** The project must contain design features intended solely for human delight and the celebration of culture.

Source: Living Building Challenge 2.0: A Visionary Path to a Restorative Future April 2010

#### *On the Web*

More information about the Living Building Challenge can be found at [www.ilbi.org](http://www.ilbi.org).

more likely to be concerned primarily with plans to re-use all wastewater on the site. One of the requirements of the challenge is that the house not be connected to the municipal sewer system. But city regulations require the house to be connected to the sewer for disposal of sewage and wastewater, also called graywater, which comes from showers, baths, laundry and bathroom and kitchen sinks.

The team believes it has pushed off the problem to a future discussion with the city by creating a sewer connection that can be opened or closed. The city has approved the system, according to earlier reports by The Bulletin, but the city's private development engineer Jeff England was clear in those reports that wastewater, even if treated on-site, must go into the city sewer system.

The city's senior planner, Heidi Kennedy, said last week that she had started work on the plans and didn't see any issues or concerns from a planning perspective, which deals primarily with land use and the house's exterior and height, for example. She said concerns regarding building codes, such as sewer use, are overseen by the city's engineers. England did not return a call or e-mail to his office before deadline.

During the certification review, Sturgeon was firm on her guidance that the house would receive only partial certification if the sewer is used by the couple during the 12-month review. "You won't live up to the LBC if you are hooked up and use the system," she told the team during a conference call at Tozer's offices to discuss the review. The challenge requires that all wastewater be treated and used for purposes such as irrigation to create a closed loop for their water needs.

Morgan Brown, president of Whole Water Systems — the company creating the on-site treatment systems that will include constructing a wetland — said that initially they will be required to put the wastewater into the sewer line.

Sturgeon suggested that the team could set back the start of the year-long occupancy to work out any issues, including what to do with the wastewater. During that time, Brown said the team could monitor the systems to show that the water was as clean if not cleaner than what comes out of the city's sewage treatment plant. "Ideally, we would convince the city that we don't need to put it into the sewer," he said.

Such advocacy to change policy is also a goal of the challenge. Sturgeon said that municipal sewer systems take the responsibility away from the people who create the waste. "It goes down the pipe and disappears," she said, while the creators of the challenge believe that "we should take responsibility for our wastewater."

### *Potential problems*

Beyond the water requirement, Sturgeon pointed out two other issues that may be problematic, although less challenging than the water or materials requirements, for the couple as they move forward with certification. One will be meeting the food-growing requirements of the challenge. The couple has to grow food on a percentage of their land, but Central Oregon's short growing season and its dry climate may make that difficult.

Traditional food crops may be difficult to grow and sustain in sufficient quantities to meet the challenge. So the couple has proposed planting native plants such as serviceberries and woods rose. They also can put in plants that support honey bees. They also are considering hoop houses, or small greenhouses, that could be used for a backyard garden.

And finally, Sturgeon cautioned that the team may not be doing enough "intentional" thinking about the beauty requirement. The challenge "envisions designs that elevate our spirits," according to an overview of the requirements. "It has to be intentional action," she said. "Thinking about how you move through the house, the patterns of nature and what is inspired by the community."

While the house at present is only a two-dimensional architectural design, Tozer says that the house will represent the community and environment that it is in — an urban area in Central Oregon. “The colors and textures will be inspired by where we are,” he explained, including using the manzanita as an inspiration.

He also described a wall that will curve through both the indoor and outdoor spaces to carry people through the home and to separate the public spaces from the private and what he called “intimate” spaces.

“It’s been quite fun to contemplate all of this including the ... wall that will include the Ponderosa stump that now has a serviceberry tree growing out of it,” he said.

Fara Warner can be reached at 541-617-7822 or [fwarner@bendbulletin.com](mailto:fwarner@bendbulletin.com)

---

Published Daily in Bend Oregon by Western Communications, Inc. © 2010

[www.bendbulletin.com](http://www.bendbulletin.com)