Green Dirt

A COLLABORATION TO BUILD A HOME AT AN ORGANIC FARM PRIORITIZES SUSTAINABILITY AND FAMILY CONNECTIVITY.

By Jason F. McLennan , LEED AP

GIVEN A FINITE SUPPLY OF SALVAGED WOOD, THE DESIGN TEAM FACED THE UNIQUE CHALLENGE OF DESIGNING THE HOUSE AROUND THE MATERIALS RATHER THAN ORDERING SUPPLIES TO SUIT THE PLANS. PHOTO COPYRIGHT © BOB GREENSPAN.

Call it fate. Call it luck. I call it one of the most fulfilling examples of teamwork that I've enjoyed in my career.

It all came about when Sarah and John, who had recently relocated from Seattle to Missouri, heard me speaking about green building on a Kansas City radio program. Interested in constructing their own sustainable residence, they contacted me at Berkebile Nelson Immenschuh McDowell Architects (BNIM), where I worked at the time. We hit it off immediately, and I committed to the project, inspired by my new clients' determination to create an earth-friendly home for their family of five.

The new structure would be built on the site of Sarah and John's newly emerging organic sheep farm, Green Dirt Farm, which sells artisan cheeses and grass-fed meat. From the onset of the project, the couple made it clear that sustainability and family connectivity were their top priorities. They were interested in creating a homestead that truly represented their values. So we set out to create a net-zero home that would nurture their family, their property and the greater environment.

THE GREEN DIRT HOME SERVES AS A MODEL FOR SUSTAINABILITY AND HOUSES A FAMILY FULLY COMMITTED TO LIVING AND WORKING THE GREEN ETHIC ON AN ORGANIC FARM. PHOTO COPYRIGHT © BOB GREENSPAN.

THE NET-ZERO ENERGY GREEN DIRT RESIDENCE MEETS NEARLY EVERY REQUIREMENT OF A LIVING BUILDING, FEATURING RE-PURPOSED BUILDING MATERIALS WHILE MEETING THE HIGHEST STANDARDS FOR ENERGY EFFICIENCY AND CARBON REDUCTIONS. PHOTO COPYRIGHT © BOB GREENSPAN.

A Tightknit Group

Clearly, I had strong partners in these clients. The next step was to surround myself with talented professionals who could assist in realizing Sarah and John's deep-green vision. The result was among the strongest, most rewarding teams I've had the pleasure to work with:

- **Co-designer:** I first met Chris DeVolder through his wife, who worked at my firm at the time. Chris later became the drummer in my Irish rock band, and we quickly developed a strong friendship that spilled over into the collaboration at Green Dirt. If you can make music with someone, who better to collaborate with on a creative project?
- **Builder:** When Chris and I found Greg Rothers, we knew the house would meet the clients' highest expectations. Originally trained as an architect, Greg possessed design sensibilities rare among builders. His expertise truly enriched the process.
- **Mechanical engineer:** My friend, colleague and mentor, Houston-based Ron Perkins was the natural choice for this project given his innovative talent and vast green experience.
- **Etc.:** Many others contributed greatly. Topping the list were Bob Solger who helped with the energy systems and Kansas City-based Elmwood Reclaimed Timber who guided us through the process of re-milling and re-using the salvaged wood we purchased.

Seeking and Sizing the Right Materials

As it happened, I was aware of a substantial stock of salvaged wood that had come from a torn-down Kansas City warehouse and was awaiting its next incarnation after being purchased by Bob Berkebile, my mentor and partner at BNIM. Sarah and John agreed to use this gorgeous 120-year-old heart pine, a substance that is now nearly impossible to find. In spite of the fact that we had to scan each board with a metal detector to locate and remove all old nails (we filled buckets with them) and re-mill the wood, the unbelievable beauty and character it brought to the structure made the extra effort more than worthwhile and kept this historic wood in the community.

Given the finite supply of the wood available to us, we faced the unique challenge of designing the house around the materials rather than ordering whatever supplies would suit our drawings. We adjusted column heights and rethought certain interior and exterior architectural features based on the sizes and shapes of the pieces we had. It was unquestionably an investment in time and money, but it yielded incredible results. Most importantly, we played with the notion of design, beginning with what we had on hand rather than a blank slate. In so doing, we stayed truer to the notion of practicing within a system of constraints.

Net-Zero Energy from Efficiency to Renewables

The house itself is a net-zero energy structure. All electricity requirements are met through a combination of integrated photovoltaic panels and an on-site wind turbine located at the top of the hill. In addition, hot water is provided through a solar thermal system, and much of the space heating comes from direct passive solar. Mechanical conditioning, when needed, is provided through a ground source heat pump.

We oriented the home along an east-west axis and considered the position and specifications of each window. (Most, except the south, are triple pane.) Roof overhangs and shading devices add maximum seasonal efficiency. Structural insulated panels provide an excellent thermal envelope with minimal bridging. Rainwater is collected from the roof, serving the property's landscaping and irrigation needs, and is used efficiently with dual-flush toilets and other water-saving devices.

In its entirety, the Green Dirt residence meets nearly every requirement of a living building. (For details on the Cascadia Region Green Building Council's Living Building Challenge, visit www.cascadiagbc.org.)

Long-Term Solutions

In every sense, the Green Dirt home serves as a model for sustainability. It houses a family fully committed to living and working the green ethic (on a working farm producing organic food), and it showcases the effectiveness of re-purposing beautiful building materials from demolished structures while meeting the highest standards for energy efficiency and carbon reductions.

Attractive and inspirational, this structure will serve for generations as a powerful early example of what deep-green building is all about. ed+c

JASON F. MCLENNAN, LEED AP, SERVES AS THE CEO OF THE CASCADIA GREEN BUILDING COUNCIL, THE PACIFIC NORTHWEST'S LEADING ORGANIZATION IN THE FIELD OF GREEN BUILDING AND SUSTAINABLE DEVELOPMENT. CASCADIA IS A CHAPTER OF BOTH THE U.S. GREEN BUILDING COUNCIL AND THE CANADIAN GREEN BUILDING COUNCIL. JASON IS THE AUTHOR OF THE LIVING BUILDING CHALLENGE, AN INTERNATIONAL GREEN BUILDING PROGRAM AND CO-CREATOR OF PHAROS, AN ADVANCED BUILDING MATERIAL RATING SYSTEM.

GREEN DIRT FARM RESIDENCE

Size: 2,500 square feet

Location: Weston, Missouri

www.greendirtfarm.com

Materials

Reclaimed timbers for columns, trusses, decking, finish carpentry and more.
Corrugated metal, board-formed concrete, cedar siding, standing-seam metal roofing on exterior.
Triple-paned windows and structural insulated panels for an efficient envelope.
Low-VOC paints and sealers with minimal finishes inside the house.
Solar hot water, geothermal heat pumps with radiant floor heating and cooling, laminated amorphous silicon photovoltaic solar panels and a wind turbine on site.
Compact fluorescent lighting, ENERGY STAR appliances, dual-flush water-saving toilets.
Wood-burning masonry heater (Kachelofen) for backup and also as a bread oven.
Low-maintenance native landscaping and outdoor kitchen for summer cooking.
Rainwater collected from roofs for agricultural needs.
Natural ventilation for cooling during shoulder seasons.