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Custom Builder of the Year

Green Day

David Warner is fast-tracking the sustainable future of custom building.

By Bruce D. Snider

Green Day

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“You don't get carsick do you?” The question comes from David Warner, at the wheel of his white Toyota Prius. The answer is unclear. We are on our way from his office in Marin County, north of San Francisco, to a jobsite meeting in the hills above Napa Valley. This is an important project for an important client, and we are running late. The narrow asphalt winds through a chain of S curves, and Warner pitches the little hybrid into the turns like a Formula 1 car. But our rate of travel seems to match Warner's metabolism, the sun is shining, and late or not, he's having a great day. “The edict on this house,” he says, “is to be greener than we've ever been before.” That is saying a lot, because Warner's company, Redhorse Constructors, has been at the leading edge of high-end, green custom building for just about as long as there has been such a thing.

The Napa house's exterior walls will be built of earth excavated from the site—in a precise mix with sand and high-fly-ash-content cement—shot to 18-inch thickness from a Gunnite rig against open forms, some of them 12 feet tall. All the wood used in the building will be either salvaged material or certified by the Forest Stewardship Council as sustainably grown. All sheet goods will also be FSC certified. The building will contain no pressure-treated material, not even for the sill plates, which will be salvaged redwood. The interior climate will be conditioned by a geothermal heat pump—15 wells, 250 feet deep, have already been bored into the hillside site—via heated and chilled floors. Powered by a 32-kilowatt system of 180 photovoltaic panels tied in to the local electrical grid, the 8,500-square-foot house will consume as much non-renewable energy as a conventional building a fraction of its size. Battery backup will allow it to coast indefinitely during power outages. The jobsite itself is pretty green, too. The crew separates all waste material—wood, concrete, plastic—for recycling.

Warner races through the list of features, which by now represent something like a standard spec for Redhorse projects. But by nature Warner is always focused on the next thing, and today's next thing is paint. "We're creating our own paint line for this project," he says. "We were trying think of the most benign, groovy stain we could think of, and we came up with iron oxide. Rust, that is." "It will be on the concrete and wood as a wash," he says, where it will make a nice, subtle contrast with the buff-colored earth walls. Much of the world's commercial iron oxide comes from Australia, Warner explains, and transporting it all that way entails an environmental cost that would cancel out any green points earned in using it here. "So we're extracting iron oxide from the scrap steel on the site." Behind a storage container on the site, his crew has fitted an array of plastic barrels with a recirculating pump that sprays water onto tangles of rebar, mesh, and steel wire. When the water turns a nice, rusty brown, they pour it off into buckets for storage. The final ingredient will be an acrylic binder, Warner says, "to sequester the rub-off factor. We're coming up with the final recipe now."

If the idea of earth walls and rust paint gives the impression that this house will be a very large hobbit hole, though, think again. The owner founded a well-known national company headquartered in the Bay area, and he plans to host corporate events on the property. The agenda for this morning's meeting includes discussion of a security system that will allow the owner to assign each visitor an individual clearance profile. During a big party, the system would control, based perhaps on retinal scans, who may enter a particular room and who may not. There's more. The property consists of two 80-acre parcels, one of which the owner will develop as a farm to supply organic produce for his company's headquarters. Redhorse will oversee that project, too, from the many layers of permitting required, to filling a 5-acre lake dug by the previous owner (a bulldozer hobbyist, of all things), to producing the buildings and infrastructure. Which might lead one to ask: If all this is going into one project, what is going into Warner's other 14 active jobs? And who is this guy anyway?

Given his green inclination, it seems fitting that Warner's background includes both construction and the sciences. "I paid my way through school doing construction work," says Warner, 52, who graduated from the University of California at Berkeley with a degree in conservation and natural resources. But running a construction company was actually Plan B. He was enjoying his first year as a public school biology teacher when California's Proposition 13 effectively eliminated his job. With funding for public education drastically curtailed, "There wasn't going to be much of a future for me in that area," says Warner, who turned to construction "because that's what I knew." Redhorse was born soon after. "In 1982 we were starting out with a core group of about five employees, and we were doing small projects, kitchen and bath remodels." The company's average job size grew quickly, along with its reputation. "All by word of mouth," Warner says, "just by producing good products and being able to work with clients and work with architects." As the company expanded, Warner took particular care in choosing people to join his staff. "A lot of them were friends of friends," he says. "We found the best approach was to find people that we had a commonality with."

Robert Houser

Every successful custom builder can point to a coming-of-age project in his or her company's history, and for Warner, acceptance into the upper echelon came early, with a significant in-town San Francisco residence designed by architect Lewis Butler. A tear-down/infill job on a difficult site for a client in a hurry, the house was complex, Warner says, with "big galleries hanging from the ceiling. It was a threshold piece for us." Soon after, the company won the contract for a high-profile recreation center project in the city. "It was only like 2,000 square feet," Warner says, "but it was designed by Jim Ream, who is a noted church designer. It was a gorgeous little jewel box. There was a lot of ceremony about it. That helped us too, because it was a public project and it caught the eye of a lot of people." The common theme in these two early projects was Warner's willingness to tackle technically challenging, high-visibility work. It is a theme that runs through the company's work to this day.

But there are others. "Probably simultaneous with that," Warner tosses in, "was one of our first sound studios for a rock band." A remodeling job for Huey Lewis led to some work for guitarist Joe Satriani, and before long Redhorse had developed a subspecialty in private sound rooms and recording studios. "We did work after that for all of the band members of Metallica. We did work for the Grateful Dead. We're doing some small work for Green Day." Like much of what defines Redhorse, the music connection is the result of Warner's inclination to say, "That sounds cool; we can do that."

"I love music, but I don't play music at all," he says. "I'm just really good at figuring out mechanical issues in terms of what people want." Across the bay in San Francisco, Warner says, "We're doing the most advanced sound room in the country." Designed by John Storyk, the architect and

acoustical designer responsible for Jimi Hendrix's famed Electric Lady Studios, it may also be the greenest recording studio ever built.

That's another thing about Warner: There always seems to be another thing about him. Here's one more: It was a connection in the music business that led him, by and by, to set up a factory in Alberta, Canada, to produce environmentally friendly structural sheathing panels from wheat straw (see "Straw Man," below).

But before we can get too far on that subject we pull up at another Redhorse project, this one near Palo Alto, Calif., 100 miles to the south of the Napa house. The site is a narrow ravine that rises steeply from a seasonal streambed. "This is a 10-acre bowl," Warner says. "The property goes all the way to the ridge tops." The house, now nearing completion, literally bridges the ravine, a 196-foot, flat-roofed bar whose ends disappear into the opposing hillsides. The building's exterior walls are lined with Corten steel panels, hung with a system of clips that Warner developed, and broad runs of glass that reflect the site's dry grass and green trees. Inside the garage—whose perforated stainless steel door accordions up and out, like an airplane-hangar door—journeyman carpenter Keith Wiley is cutting the aluminum channel that will wrap some interior steel columns. Inside, the building has the spare, quiet air of a contemporary art museum, with an 84-foot wall of floor-to-ceiling glass facing uphill to the rear, stringently simple geometry, and zero trim.

How green can a house like this be? Very green. For one thing, Warner says, "Very few woods are used, except the wood on the floor, which is FSC-certified maple." If you hiked the hills that rise above the house, you would see the rooftop photovoltaic array that will produce most of the energy the building will consume. The exterior will never need paint, and the interior materials and finishes will not off-gas unhealthy compounds. The clients wanted a building-as-machine Modernist house, and that's what they got, but with Warner as their builder, they got much more than that. "The owners didn't realize it, but we made them go green," Warner says, laughing again. "And it was seamless. You can be green in any style."

Where this house stands out, however, is in its relationship to its site. The stream that it bridges is the Corte Madera Creek, which, Warner explains, "has one of the last runs of salmon in the Bay area." Getting a project like this permitted, much less built, takes someone who has not only studied the regulations, but understands the science behind them. "A lot of what I do is on entitlement processes," Warner says, using the term of art for nailing down what a property owner will be allowed to do. California's environmental regulations have made that job vastly more involved "than 10 years ago, or even five years ago," he says. "On one ranch project we had 42 permits from different agencies," from the California Coastal Commission to the Department of Fish and Game to the Army Corps of Engineers to the National Oceanic & Atmospheric Administration. A current project at the base of a steep 200-foot bank on the shore of the San Francisco Bay presented, shall we say, access challenges. "On the big steel pieces," Warner says, "we had a helicopter drop," which required coordination with the Coast Guard. Projects like that in times like these, he says, have made permitting a specialty unto itself. "It's becoming too complicated even for architects." But Warner is not complaining; the approvals process is a briar patch where he feels completely at home.

That may be because Warner views environmental regulations as more than pointless hassles. In fact, as he warms to the subject he begins to sound less like a builder and more like a biology

teacher Stream corridors like the one that runs down the center of this property, he says, are vital pathways for a whole community of animals: salmon, deer, the wood rats that thrive at the rural/suburban fringe and are the sole food source for the endangered spotted owl No stream, no rats, no owls "These are some of the ripple effects," he explains "People don't realize the importance of keeping these corridors open" By bridging the creek—70 feet of its length is over open air—this house leaves the way open for even the largest mammals in the area As if on cue, a single deer picks its way under the house and warily past the Redhorse crew gathered outside on lunch break "Proof of concept," says Warner "The site is precious, and you have to build with a high level of execution And if you build with a high level of execution, it will remain precious"

Unlike many builders who have gone green in recent years, Warner experienced no conversion process; he was green before he became a builder Still, and to his credit, he does not preach doom on the subject He is minutely aware of the consequences of building-as-usual: resource depletion, environmental degradation, climate change He views a transition to green building as an imperative rather than an option But coming from Warner, that prospect sounds energizing rather than frightening He emphasizes the direct benefits of this approach—a comfortable, healthy indoor environment; long-term structural durability; mechanical systems that pay for themselves in energy savings; life-cycle costs substantially lower than for conventional buildings—without moralizing "I never started out being an ideologue, saying, 'I can't work with you unless you do it this way'" His credo is simple, positive, and sustainable in itself: "Whenever possible, go green Any level is a victory" Focusing always on the attainable, Redhorse first scaled the lower slopes of that green mountain, Warner says, "then got to base camp, then got to summit"

Starting out in the Bay area, where Warner grew up, didn't hurt Redhorse's geographical range, from the Napa and Sonoma valleys north of San Francisco to the Palo Alto area to the south, has more than its share of spectacular sites Its population also represents one of the world's great concentrations of wealth, advanced education, entrepreneurial energy, and environmental awareness Warner's market lies at the point where these phenomena overlap "We have a very diverse clientele," he says, "all industries and all age groups We have clients in their 80s starting a new home, and we have young clients in their 30s and late 20s" The most important common traits among them are creativity and interest in trying new things "Some of my best clients"—business owners, inventors, musicians—"are ones who are kind of pushing the envelope" One, he says, "invented a little gizmo called the Palm Pilot"

Warner is not free to disclose who owns the next house we visit, but it provides a perfect case in point The road from the property's keypad-operated gate winds for three-quarters of a mile, through groves of live oak and eucalyptus, crossing two bridges over deep ravines, and climbing to a ridge with commanding views of the valley floor below The owner bought 300 acres that abut a 1,800-acre preserve, keeping 20 for his home site and donating the rest as public open space The house, dug into the shoulder of the hill, encloses 8,000 square feet of living space Site superintendent Scott Vreeland, a fit, energetic man in his mid-40s, meets us in the parking area above the house, a vantage point from which the building appears as a series of wavelike copper roofs emerging from the hillside Stone steps descend to a terrace and pool at the entry level, where we can see the other side of that roof: undulating laminated fir beams, up to 18 inches by 8½ inches in section and up to 60 feet long, supported on columns of stripped and varnished Douglas fir logs that range from 10 feet to more than 25 feet in height This house is all about wood, and there is not

a drop of paint to be seen anywhere The exterior walls are salvaged redwood The custom windows are FSC-certified mahogany on the outside and domestic cherry on the inside Every square inch of interior wall is paneled in horizontal tongue-and-groove cherry boards And, as Vreeland proudly points out, the paneling layout is consistent throughout You could pick two horizontal joints at the furthest ends of the house and count only whole boards between them "This was a mathematical equation all the way through," he says

Here are some more numbers: The foundation includes retaining walls up to 27 feet high, reinforced (this being earthquake country) with two vertical layers of No 8 rebar at 3 inches on center "We had to use special plasticizers in the concrete to get it to flow around that much steel," Vreeland says The longest roof beam bears on "five vertical hit spots, and three of them are visible, and one of them is on the stone wall At 17-cents-a-second crane time, it had to hit right the first time" For the 17 fir columns, the company located a supply of north-slope trees whose slow growth yields a less tapered, more stable log than those grown on sunny south-facing slopes ("I can guarantee you that was not a spec," Warner says) To seal the stripped logs, Vreeland says, "We built dip tanks and dropped them in and rolled them around," first in a borax solution, to kill mold spores, then in an environmentally friendly spar varnish Out of sight up the hill are two large, ground-mounted photovoltaic arrays and a bank of solar hot-water panels, 17 300-foot geothermal bores, and a 12,000-gallon concrete water storage tank that ensures adequate water pressure and a margin of safety in case of fire The client himself designed the computerized controls for the house's advanced mechanical systems Sensors mounted in every room monitor the building's climate "to the point where he knows the efficiency of the systems," Warner says, and can optimize them remotely over the Internet

Touring the house has taken us into dinner time, but Vreeland is in no hurry to leave He has spent the last three years of his life on this project, and he is clearly savoring the last few days before he hands over the keys He has worked with Warner for more than 25 years—they used to train for triathlons together—and the two talk comfortably about what comes next Noting the exterior's "boat-level finish," Warner says he has already spoken with the owners about an inspection and maintenance schedule As we take in the view across the valley from the house's rooftop observation deck (complete with a weather-tight compartment for telescope storage), neither man is taking the least bit for granted what they have accomplished here And they are in full agreement about what it takes to make something like this happen "You never snivel, and there is no stop," Warner says, quoting what has become a company motto The same standard applies to everyone on the job, from laborers on up: "They don't show up on the job unless they're in for perfection," he says Vreeland nods, "If it's not right, it's wrong" You can see it in the attitudes of the subcontractors on Redhorse jobs Like Harvard freshmen, they realize that not everyone gets the chance to perform at this level; they seem to view it as a privilege

None of them more than Warner, though, who seems so continuously charged by his job that such necessities as eating (by now we're at the far side of dinner time) and sleeping might seem superfluous Aside from his family—Warner is married, with two sons—one of the few things that compete for his attention is cycling, for which he harbors a lifelong passion The bicycle, 100 percent energy efficient and environmentally friendly, seems an appropriate vehicle for a green builder But if you envision Warner on a three-speed, hauling groceries from the food co-op, your imagination is running in the wrong direction Warner likes to ride fast—he's spun a wheel socially

with Lance Armstrong's coach—and he loves high-tech gear. His current ride is a carbon fiber road bike that weighs less than 15 pounds. Bikes don't get a lot lighter than that, and this one does it by replacing metal parts with those made of featherweight carbon-fiber-reinforced plastic. Warner likens the advanced technology involved in the bike he rides to the houses that his company builds. He especially likes the Modernist houses, which must pack a full complement of advanced technology into an attenuated structural envelope. "You don't have copious amounts of space to drive things through, big attics and big soffits," Warner says. Instead, "You drive all the shop drawings and you drive all the systems analysis of what you choose very hard. It's like a bike. You want to ride the carbon, and some of these houses are riding carbon."

That description applies equally well to Redhorse, which packs a prodigious range of capabilities into a light, efficient corporate structure. And we can stretch the cycling metaphor further still. Each time Lance Armstrong won the Tour de France, he did so with the support of a highly skilled, though largely anonymous, team. No team, no trophy. And the same is true for Warner. From the time he founded Redhorse, Warner says, "It was a very dynamic situation. It wasn't like I had a five-year plan. I was looking at daily opportunities; it wasn't even weekly opportunities." The guiding principle, he says, was avoiding the mundane projects, following his interests, "going where the juice was." But someone has to mind the store, and Warner knew that he wasn't that guy. "I'm good on global and not so good on micro," he says. "I've always had a good controller in the company, and a good accounting company. That's one of the bigger things. You've got to know your strengths and cover your weaknesses with people you totally trust."

Today Warner's first line of backup is a trio of lieutenants: project managers Jay Blumenfeld and Michael Houts and CFO Neil Holland. Blumenfeld and Houts share Warner's responsibilities for project oversight. Each takes an equal share of the job list, though Houts adds, "David gives special attention when need be. He is available to any owner at any time. He never turns the phone off. He lives, eats, and breathes his work." These three seem to be eating and breathing their share of it too, and Houts is on familiar ground when he discusses how work." These three seem to be eating and breathing their share of it too, and Houts is on familiar ground when he discusses how Redhorse differs from its competitors. Unlike builders who subcontract most or all of their field work, he says, "Our crews are well versed in all aspects of building, from coming up out of the ground to handing the project over." On-site administration is three layers deep—a project manager, a site superintendent, and a site administrator to manage paperwork, budget, and schedule—"That's what that scale of a project requires. We do not ever let a subcontractor on the site without Redhorse presence."

The company distinguishes itself also by the scope of services it will administer. "We try to take on the full package, as much as the owner will allow," Houts says, listing the professionals he might coordinate on a typical project: land use attorney, civil engineer, surveyor, soils scientist, water testing company, mechanical consultant, electrical engineer, solar consultant, structural engineer, and wildlife biologist. "We have failed if, at the end of the job, a client asks, 'Why didn't you tell me about that?'"

CFO Holland influences the client experience too. "We build a custom home, but also a custom contract," he says. "We customize the contract and the billing." To make the process as transparent

as possible to the client, the company's contract, accounting, and billing documents all use the same format

In a company of 60 employees doing $25 million annually of intensely complex work, this layer of management is the difference between chaos and order More importantly, though, it frees Warner to be Warner "We try to keep up with him," Houts says And the captain clearly sets the pace It is Warner's enthusiasm and drive that are the company's mainspring; his intellectual curiosity and confidence that turn chance encounters into business niches; his imagination and relentlessly positive outlook that advance greener ways of building And for Warner, it all comes back to green building "If you take the passion for green building as a way that we have to go to be a successful culture on the planet," he says, "and apply that passion to your work, then you get more and more into applying new technologies and accepting new technologies faster Our ability to apply new technologies is a huge asset" Accept change, validate new technology, and put it to work, Warner says; that is the process "You've got to make risk your friend That's why I'm up in Canada building a factory We're not waiting for someone else to do it We're doing it That's what I live for That's my day"

So, I was hanging out with the Grateful Dead ??" We know, a lot of your stories start that way too, but David Warner happens to be telling the truth "We did some work for them in their studio with [road manager Steve] Parish," he says "They were redesigning the Wall of Sound"—the band's famous 75-ton sound system—"and they had located these hemp panels" No surprise there, you might think But the material, particleboard made of hemp fibers rather than wood, piqued Warner's curiosity He quickly grasped its potential: If fiber from an easily harvested annual crop could replace the wood in OSB panels, the environmental payoff would be enormous "There's about 3 to 4 million acres [of trees] a year that are felled for panels in the United States," Warner says "It's not a sustainable yield We have to find an alternative It's just a matter of time" Parish directed Warner to Canada's Alberta Research Council, which had been promoting the idea to the panel industry but finding no takers "They saw it as just another way to lose money," says Warner

He and Parish thought otherwise Partnering with Michael Klein, a former Redhorse client and co-founder of the conservation group Rainforest Action Network, they founded Above Board Technologies to produce the world's first "tree-free" structural panel "Instead of waiting for the green product to arrive," Warner says, "we're creating it" Using wheat straw—an agricultural waste product—instead of wood fiber, Above Board has engineered an alternative to OSB and plywood in structural sheathing applications "We are in certification testing now," says Warner, who expects the product, TigerBoard, to hit the market in March It's a long road from the Grateful Dead's studio to a panel mill in Saskatchewan, but the effort has only confirmed Warner's initial take on the subject "These are the fibers of the future," he says: hemp, wheat straw, rice straw, bamboo As we reach the limits of what the earth's forests can sustainably provide, "They'll do the structural duty"