

A Crisp, New Ranch Nestled Among the Pines

BY ERIC ODOR

It was an overcast morning when Tonya and Heiko Schoenfuss came back to our office. They had been interviewing architects for some time before finally deciding to work with our firm. As far as I could tell, a freestanding fireplace that we had designed for a new home was ultimately what brought them back to us. The fireplace had a broad palette of materials including stone, steel, wood, and concrete, yet the simple and crisp joinery between the dissimilar materials seemed to resonate with Tonya and Heiko. On their return to our office, they brought both a survey of their building

lot and a thoughtful vision for their home. Although they made it clear that they honored the design process and had no preconceptions about what form the house might take, Tonya and Heiko shared a love of well-crafted living spaces with clean lines.

During our meeting, I learned that they also were devoted to energy efficiency and sustainability. As luck would have it, my colleague John Abbott was available to take the lead design role with these exceptional clients. About this time, I realized that the sun had emerged from the morning clouds.

What makes this ranch sustainable?

- Passive-solar design with thermal-massing concrete floor (drawing facing page)
- Natural daylighting

- Aerobic septic system
- Recyclable steel roofing
- Durable fiber-cement and metal siding materials

- High-efficiency windows, doors, fixtures, and appliances

Innovative site work and a thoughtful floor plan preserve views and a stand of mature pine trees

The design process began with a visit to their lovely site. We entered the property from the south, through a dense stand of tall pine trees, emerging in a narrow clearing beyond which the land plunged down a steep, wooded bluff to a lake. Hoping to save as many of the trees as possible, we all agreed that the house should sit in the existing clearing in the woods.

Two schemes began to emerge: one single-story and one two-story. With less roof surface, a compact, two-story home would cost less to build. However, a single-story ranch, stretching east to west along

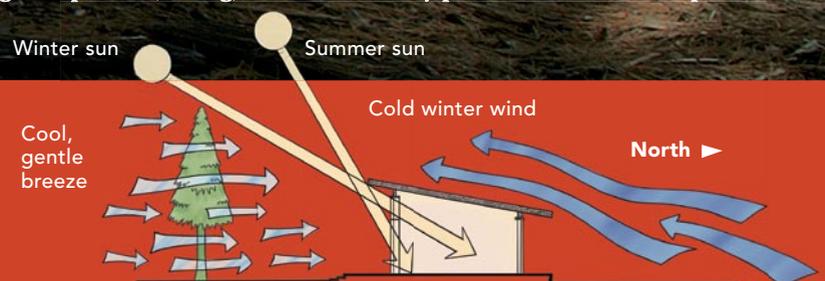
the bluff, turned out to be more compelling for a number of reasons (photo above taken at A on floor plan). This design fit better in the open understory of the pines, and the shed-roof design mimicked the slope of the bluff beyond. The ranch's orientation and form also were better suited for solar gain and natural ventilation, not to mention for capturing panoramic views of the lake to the north.

Heiko and Tonya planned to share the house with two large dogs, which meant that we needed to divide it into a public (dog) zone and a private (no-dog) zone. A two-story plan would have accomplished

- Pervious driveway and native landscaping

- Geothermal heating and cooling

- Narrow profile and open plan for passive ventilation



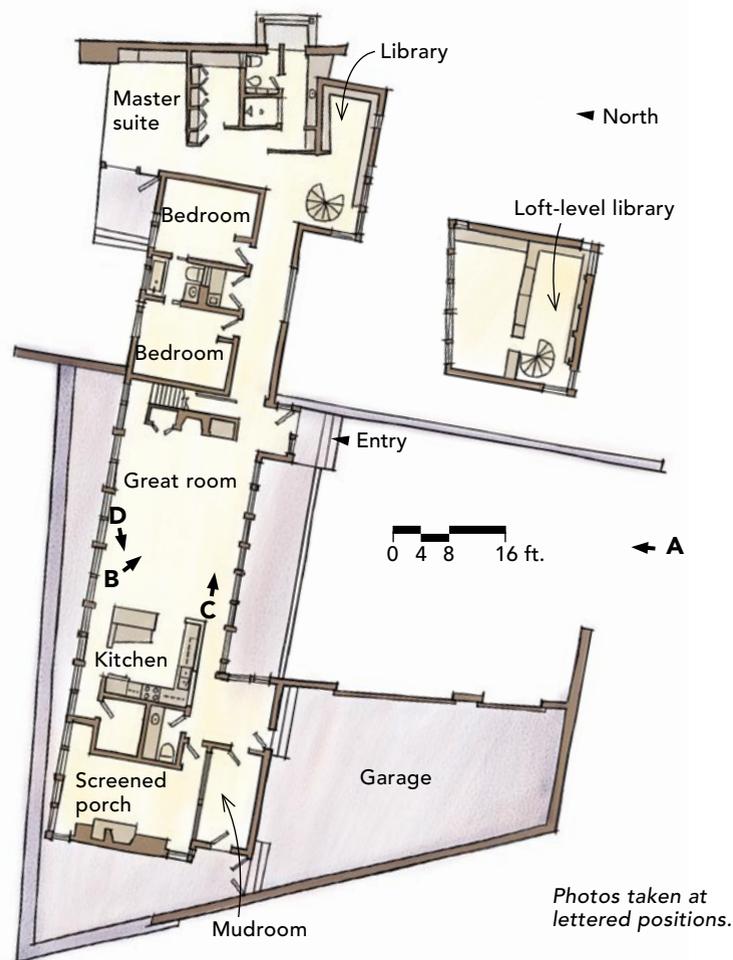
this division vertically, separating the zones on different floors. We needed some creative thinking to accomplish the division in a single-story plan. The solution was to separate the zones at the entry, drawing the line with a change in flooring and a large metal sliding door. The house became a composition of opaque garage and bedroom wings bracketing a transparent podium of concrete floors and patio doors.

Site work saves the trees

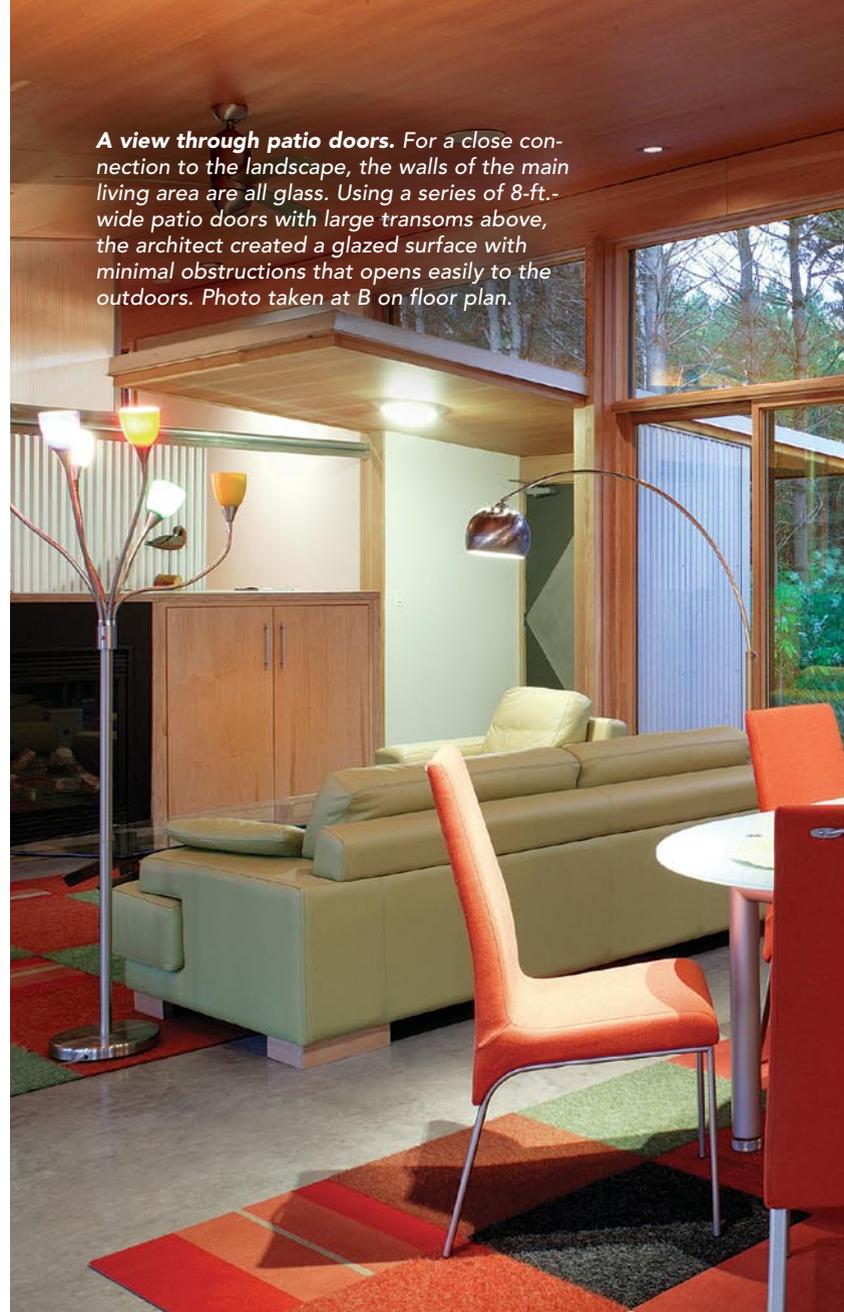
Once the house was nestled conceptually beneath the pines, we worked on minimizing the impact of site infrastructure. Due to limited access and bluff-setback requirements, the driveway, the septic system, and the geothermal system all needed to be within the stand of pine trees we were working to save.

We began with the driveway, which we originally conceived as an impervious, paved path, most likely concrete, aiming straight at the house. With the pines in mind, however, we decided to keep the driveway porous, which would allow as much rainwater as possible to soak into the ground. The straight paved driveway we all had in mind turned into a gravel path that winds through the trees—and saved Tonya and Heiko thousands of dollars.

The next consideration was the septic system. A typical septic drain field for a 2500-sq.-ft. home can be as large as 40 ft. by 80 ft., which would have eliminated many of the pines. Fortunately, Tonya and Heiko were willing to spend extra money on a more-compact aerobic system that pretreats waste and, consequently, required only a 20-ft. by 40-ft. mounded field. Although aerobic systems can cost



A view through patio doors. For a close connection to the landscape, the walls of the main living area are all glass. Using a series of 8-ft.-wide patio doors with large transoms above, the architect created a glazed surface with minimal obstructions that opens easily to the outdoors. Photo taken at B on floor plan.



TWO DISTINCT ZONES DEFINED AT THE ENTRY

Deciding to keep the house to one story posed a challenge: how to separate the public areas (dog friendly) from the private spaces (no dogs allowed). The boundary, drawn at the entry, is defined with a transition from concrete to bamboo floors and with a metal sliding door. To the east side of the boundary, the private zone includes a master suite, two additional bedrooms that share a bath, and a loft library. To the west, the public zone has a more-open feeling and includes a great room, a kitchen, and a screened porch. Photo right taken at C on floor plan.

SPECS

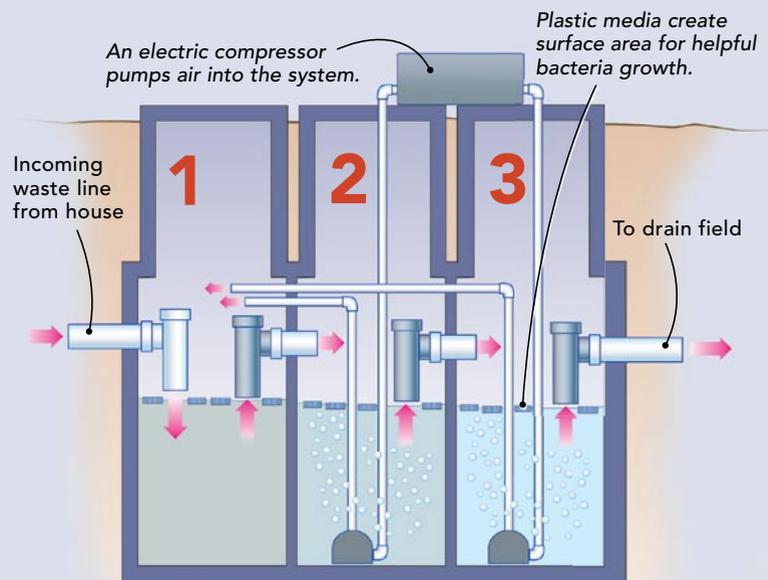
- Bedrooms:** 3
- Bathrooms:** 2½
- Size:** 2500 sq. ft.
- Cost:** \$250 per sq. ft.
- Completed:** 2005
- Location:** Buffalo, Minn.
- Architect:** SALA Architects; Eric Odor, John Abbott, and Ken Zehoski
- Builder:** Bruce Provost Construction
- Landscape design:** Alta Nursery



AEROBIC SEPTIC SYSTEMS GIVE SEWAGE A WORKOUT

Most septic systems separate solid and liquid waste in an anaerobic, or oxygen-free, tank. The solid-waste components occasionally are pumped from the tank, and liquid flows to a drain field. Because the liquid contains dissolved waste and harmful bacteria, anaerobic systems require a large drain field that filters the liquid slowly, absorbs the remaining waste, and allows time for the bacteria to decompose.

Aerobic systems pretreat wastewater by introducing oxygen (via a compressor) into the system, thus causing bacteria to break down before the liquid component is drained to the earth. Because the water leaving the tank is cleaner, the drain field can be considerably smaller. Although an aerobic septic system likely will cost more to install, it can be an ideal solution for small or restrictive lots, for environmentally sensitive areas, and for sites with poorly draining soil.



1 In this anaerobic chamber (which, despite its number, is actually the last step in the processing of waste), waste begins to separate into solid and liquid components. Soluble nitrogen turns into nitrogen gas, which can be released into the air. Gravity pushes waste to chamber two.

3 In this second anaerobic chamber, the nitrification process continues. Liquid waste either is routed back to chamber one or is sent to the drain field. Waste circulates up to five times during the day before being pumped to the drain field during late-evening hours.

2 Pumped with air, this aerobic chamber promotes the growth of organic elements that begin to turn ammonia into nitrogen. Although this is the second chamber in the system, it is the first step in waste processing. The settling of solid waste continues; some is pumped back to chamber one via an airlift pump, and some flows to chamber three.





Handy homeowners

By Tonya and Heiko Schoenfuss

Playing a hands-on role in the design and construction of our home was important to us. We worked closely with the architects throughout the design process, but we were unable to be our own general contractor because of the complexity of the project and because we both have full-time jobs. We were fortunate to find a builder, Bruce Provost, who was willing to include us in the process.

Other than installing an electrical system and lighting, we focused mainly on finish work. We installed all the flooring, trim, and paneling; painted and stained the interior and exterior of the house; built cabinets; poured concrete countertops; and landscaped. We even made the handblown-glass light fixtures that hang over the kitchen island (photo above

taken at D on floor plan). For each job, we bought the necessary tools and researched the process by reading code books and magazines, and by consulting experienced friends. When a job became too big to handle, we quickly hired a pro to avoid costly delays or mistakes.

Bruce estimated our sweat equity at more than \$100,000. Although these savings are appealing, the time investment and the emotional drain were substantial and will continue for years because tasks not required for securing the mortgage were deferred until time permits. Still, our involvement allowed us to be truly invested in our new house. Our satisfaction from using the glass light fixtures, one-of-a-kind doors, and concrete countertops that we designed and built is well worth any hardship.

twice as much as conventional septic systems and require slightly more maintenance, they can make an unbuildable lot buildable.

Finally, we addressed the geothermal heating and cooling system, which was chosen for energy efficiency. Geothermal heating and cooling typically requires a field of buried piping that can be similar in size to a standard septic field. The option that we were able to employ here was a vertical open-loop system incorporated into the well. This configuration was possible only because of the lake and the high water table; otherwise, we would have had to install a closed-loop system that costs as much as \$10,000 more. Our low-impact approach to the site was a natural introduction to the sustainable-design features and materials of the house itself.

The glass walls are the compromise

A simple cross-section drawing of the house amply illuminates the passive elements of the design (drawing p. 73). The airfoil-designed roof is canted gently downward to route harsh winter winds up and over the house. The roof overhang shades the house from summer sun but allows warm winter sun to access the thermal mass of the concrete floor. Most of the house is built on a slab; however, the bedroom wing has a basement that houses utilities, including the geothermal pump.

Early on, Heiko and Tonya had expressed great interest in integrating their home's public areas with the landscape. The north- and south-facing walls of the living area are glazed, filling the house with natural light. The design is based on 8-ft. patio doors, which allowed for the least visual barrier and for maximum light and ventilation. When the doors are open, it's hard to believe that you're not part of the landscape and the spectacular views.

However, the large quantity of glass—while great for light, views, and passive ventilation—was one of the few compromises in energy efficiency.

Collaboration built the house

Every successful project is the product of creative ideas and contributions from the client, the architect, and the builder alike. This particular collaboration was one of a kind, primarily due to extensive client involvement in all aspects of the project.

The project unfolded in three phases: the design process, the construction of the shell, and the interior finish work. The emphasis in the design phase fell on the architects, with considerable input from the homeowners and the builder. In the construction phase, the builder led the way with the owners and the architects in assistance. In the final phase of interior finish work, the homeowners took the lead with minimal counsel from the architects and the builder. Although our firm designed the shell in great detail, the cabinetry and the finishes were all Tonya and Heiko's vision.

The level and quality of owner involvement, as well as their commitment to well-crafted sustainable design, are what made this project both challenging and rewarding. The project and process proved to be as delightful as the clients were unique. We can only hope that many more such clients, and homes, walk through our doors. □

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