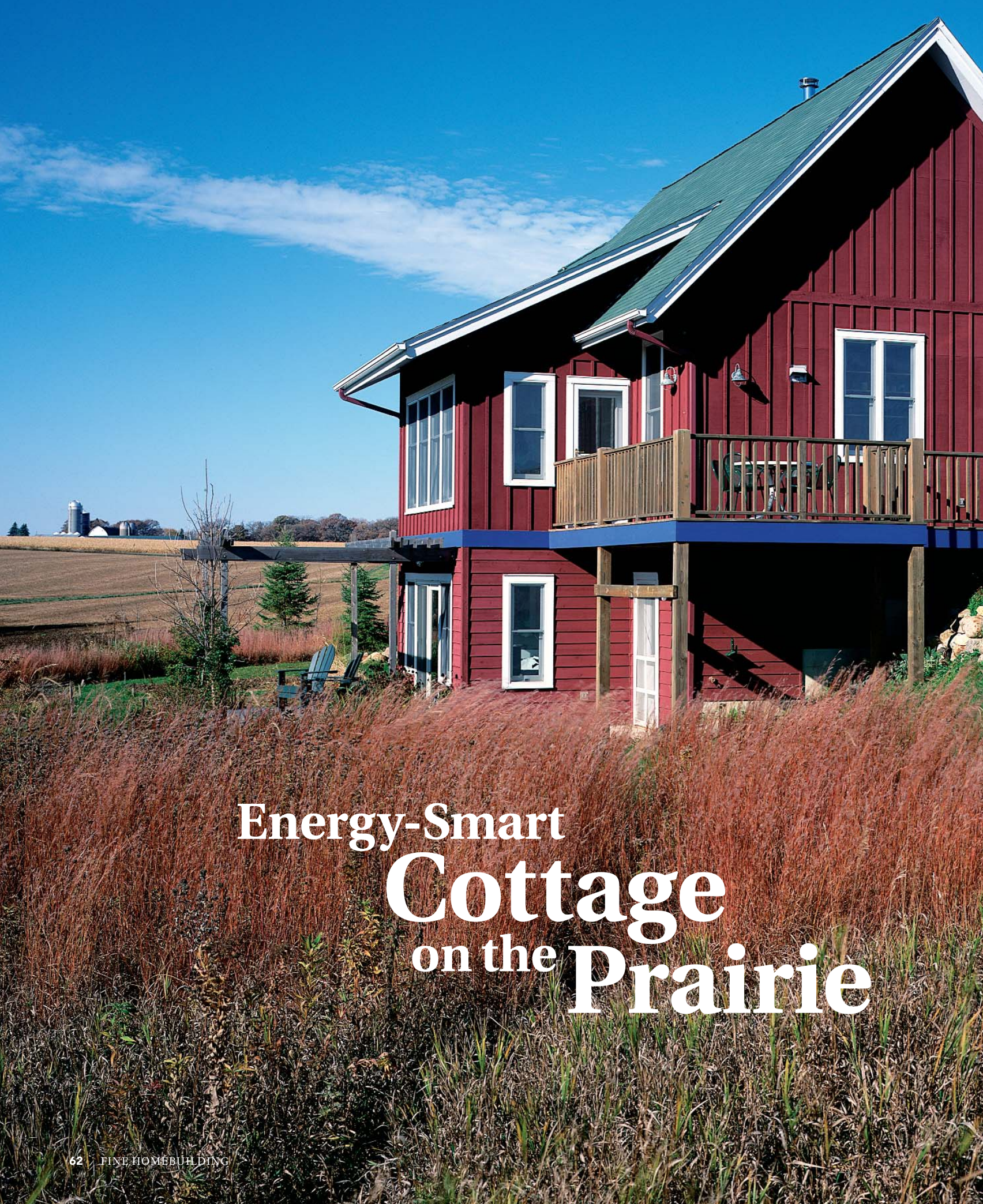
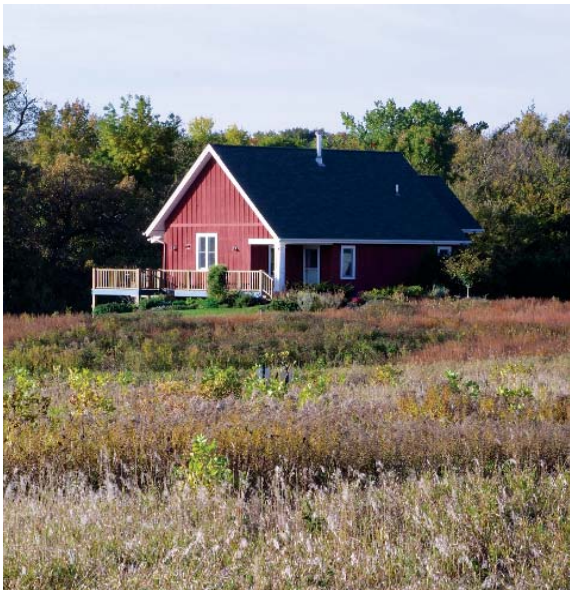


Energy-Smart Cottage on the Prairie





Studio, dining and living areas share a lofty, light-filled space crafted to a modest budget

BY JAY M. JOHNSON

For years, I've been concerned about the way new housing developments in rural areas can be insensitive to the local architecture. What would make a new house look proper here? Old barns and outbuildings fit beautifully in this setting. Maybe I'm just used to the way traditional Midwestern farmhouses look; I allowed tradition to guide me in making a contemporary home for my family fit the surroundings (photo left).

Midwestern farmhouses were usually one room deep, with steep roofs to shed snow. Part of their natural-looking elegance came from being thin. The main space in our house (flanked by smaller spaces to the north and south) is just 14 ft. wide and 44 ft. long (photo above). Being only one room deep means that light enters the house from all sides, and you can see out in every direction, getting a nearly panoramic view of the sky, prairie, farm and forest.

But making the house part of prairie tradition was only part of the challenge. Our budget was $100 per sq. ft. Even though we ran over a little, the increased comfort and energy dollars saved were worth the

Taking advantage of a sloping site. *Lower-level bedrooms nestled into the hillside expose only the main floor to the north; salvaged outbuildings buffer winter winds. Photo left taken at A on floor plan. This traditional-looking, energy-efficient cottage lies at the transition between woods and prairie. Photo above taken at B on floor plan.*

Photo left: Dana Wheelock



An open floor plan spreads light to a new kitchen with old floors. *The main living area has no floor-to-ceiling partitions; only the kitchen island and art-storage unit separate the space. Photo above taken at C on floor plan. Choice window placement and a low wall at the stairwell allow light to enter from all sides. Photo right taken at D on floor plan. Photos: Dana Wheelock.*

expense. We used several strategies to increase energy efficiency (sidebar, p. 67).

Natural light and an open plan make the space seem larger

As you approach the house from the north (photo p. 62), it looks fairly traditional without many windows. Stepping inside, however, reveals a lofty, light-filled space with white walls and natural wood trim.

The kitchen, dining/living room and studio share one long, tall space, which is roughly divided into three sections by two individual pieces of cabinetry. The larger piece is an art-materials storage unit (inset photo, facing page) that divides the living area and the studio. Although it's a commanding piece, it encourages more light into the space than would a partition wall. The storage unit has casters and can be moved (although not often)

Formula for an artist's loft



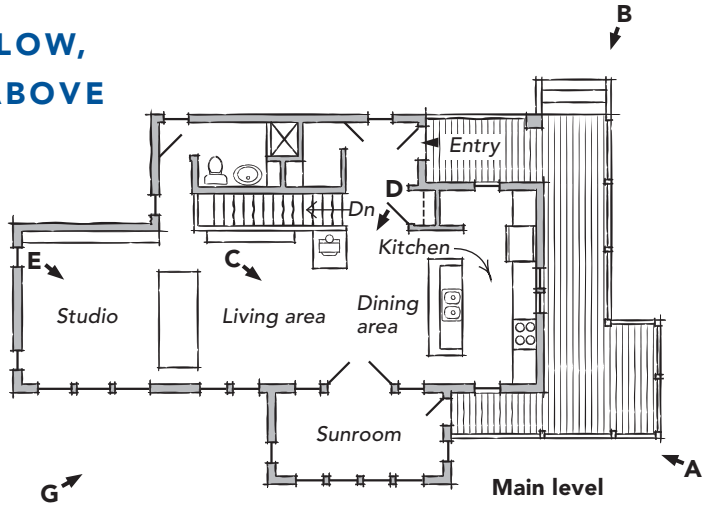
Finished on the living-room side, this large arts-material storage unit rests on casters, serving as a movable partition.The studio also doubles as overflow space for guests. The floor plan allows for this area to be partitioned off. Photo taken at E on floor plan.

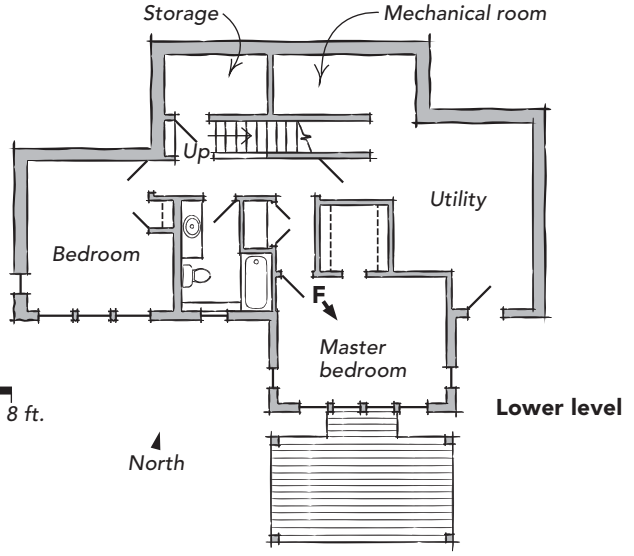


Lower-level bedrooms reduce costs. *Early designs placed the bedrooms above the main level. Moving them below, however, ruled out the need for a second story (three on the south side) and its accompanying expense. Photo taken at F on floor plan.*

BEDROOMS BELOW, LIVING AREA ABOVE

The advantages are that in the summer the lower level is cooler, and in winter, south-facing windows (on both levels) let in abundant light. The slate floor warmed by the sun and a radiant heating system make the lower level comfortable in winter. The loftlike main level is a long, open space divided into three sections by a kitchen island and a storage cabinet. The storage cabinet moves, allowing both of the adjoining areas to contract or expand as the need arises.





Photos taken at lettered positions.

to alter the shape and the size of the adjoining rooms.

At the opposite end of the main living area, a storage cabinet/island divides the kitchen and dining area. Unlike the art-storage cabinet, the 4-ft. tall island allows unobstructed views of the larger space from each side. The sink (along with a few occasional dirty dishes) is hidden from the dining/living room by a low rail that wraps around three sides of the island. And the island's cabinetry, the pantry and the open shelves provide plenty of storage without requiring cabinets on the walls.

The floor plan allows for the studio to be enclosed in the future if a more traditional master bedroom with adjacent bath is desired on the main living level.

Sloped site used to its advantage

Early designs had the bedrooms above the main living area. But the height and scale of a two-story (three on the south) house just didn't work on this site. In addition, it would have meant building more square footage and more expense: a full basement level plus two upper levels.

Because the grade sloped down on the south side, the idea of putting the bedrooms on the lower level evolved, and I saw a number of

SPECS

Bedrooms: 2
Bathrooms: 2
Size: 1600 sq. ft.
Cost: $118 per sq. ft.
Completed: 1997
Location: Nerstrand, Minnesota
Architect: Jay M. Johnson
Builder: Steven Schmidt Construction

Floor-plan drawings: Paul Perreault



Let the sun in. *On the the elongated rear of the house, south-facing windows on the main and lower levels maximize solar gain in winter. Wide overhangs keep out the summer sun on the main level. Photo taken at G on floor plan.*

advantages to this plan. We were able to increase the number of windows on the south side of the house while shielding the lower level's northwest side from winter winds. This design also allowed the main level to remain at grade in the front, exposing only one floor to the north.

In summer, the lower level is cool, which makes for good sleeping without air conditioning. In winter, the windows (and patio door in the master bedroom) admit sunlight that warms the slate floor, which then slowly releases the heat (photo facing page).

Reclaimed materials make a new house feel older

After living in an old house for 23 years, we found the idea of using new materials welcome but somewhat strange. One way of lending a more mature feel to our new house was by using some reclaimed and salvaged materials. The wide-plank floors are old-growth Douglas fir, which was reclaimed from warehouses built in the early 1900s (photo left, p. 64).

White and red were the colors that came with the early settlers, so we chose red for the siding and white for the trim on the main house. Traditional farmhouses also had corncribs, barns and outbuildings of all sizes and shapes. Our outbuildings are garages that were salvaged from Minneapolis/St. Paul neighborhoods and were purchased from a secondhand garage lot. We searched until we found a couple of solid units that looked right to us. After our building contractor prepared the slabs, the garages were delivered and then freshened up with a few repairs, a new roof and paint. □

Jay M. Johnson, AIA, is an architect with The Weidt Group, a firm specializing in energy-design assistance, daylighting and building sustainability. Photos by Chris Green, except where noted.

Passive-solar design and efficient systems lower energy demands

With harsh Minnesota winters being the norm, it's important to take advantage of the often brightly shining sun. By creating a tight building envelope with high-performance windows and using passive-solar design, our energy costs are approximately 20% lower than a conventional house of similar size. Here are some of the main points.

- **Extensive southern exposure maximizes solar gain. The overall glass area isn't much different from that of other houses; it's rearranged favoring the south (photo above). Also, the low-e, argon-filled windows are larger, and the main-level ceiling is higher on the south.**
- **Wide overhangs on the 12-in-12 pitch roof help to keep out the sun in the summer and the weather in winter.**
- **Living spaces are buffered from the winter winds. The bathroom and storage/entry areas are on the north side of the house; the garages and landscaping are positioned to the north and the west. Large glass doors are used to close off the sunroom on the southern side from the living room.**
- **The house is built to stringent energy standards that include sealed construction with interior vapor barrier; sealed electrical boxes at exterior walls; air-to-air heat exchanger; and 2x6 stud walls that have R-23 blown-in insulation. The vented attic has R-60 insulation.**
- **The heating system combines radiant heating on the lower level and in the sunroom with forced air on the main level. A high-efficiency propane water heater supplies the radiant heat; the forced-air system uses a 96% efficient propane-pulse furnace.**
- **The house has no air conditioning.**
- **Stored heat from the slate floor on the lower level and in the sunroom evens out temperature swings. The concrete-block foundation and floor slab are well insulated from the outside, keeping the thermal mass warm in winter and cool in summer.**

—J. M. J.