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Mark R. Johnson, FAIA, CKD, AIBD

Whirlpool Corporation is committed to providing the design community with relevant and useful tools that promote sustainable design. One exciting new offering is an online network called *re:Source*. From the creators of the popular video series, “The Sketchup Show,” this new network is devoted to residential sustainable design and building. As a network sponsor of *re:Source*, we’re excited to lead this endeavor that blends technology, sustainability and education.

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The Kevin deFreitas sustainable home featured in *re:Source* includes KitchenAid® Architect® Series II appliances.*

of designing and building sustainable homes. Monthly episodes introduce problems that need sustainable solutions. Each program identifies and defines a problem, discusses real-world options, and highlights the impact of making a sustainable choice. Episodes are presented in the form of case studies, expert interviews, educational modules and installation tips.



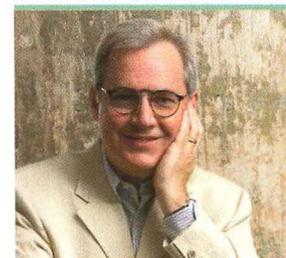
Exterior view of the Kevin deFreitas home.*

The first episode, which premiered at the 2008 International Builders’ Show®, is an in-depth case study of a sustainable home designed by California architect Kevin deFreitas, AIA. Online visitors are treated to a tour of the LEED®-qualified

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Behind the launch of *re:Source* is a team of passionate educators known as School. You’ll find their *re:Source* network is infused with knowledge, inspiration and technologies to communicate valuable ideas and information. Watch *re:Source* videos online, participate in an ongoing discussion about sustainability, and download 3D models of featured case studies and building products via the Google® 3D Warehouse.

We invite you to explore the full potential of *re:Source*. You can view the free episodes at resourcemedia.tv, or access them via the iTunes® Store, YouTube, Facebook, MySpace and industry websites.



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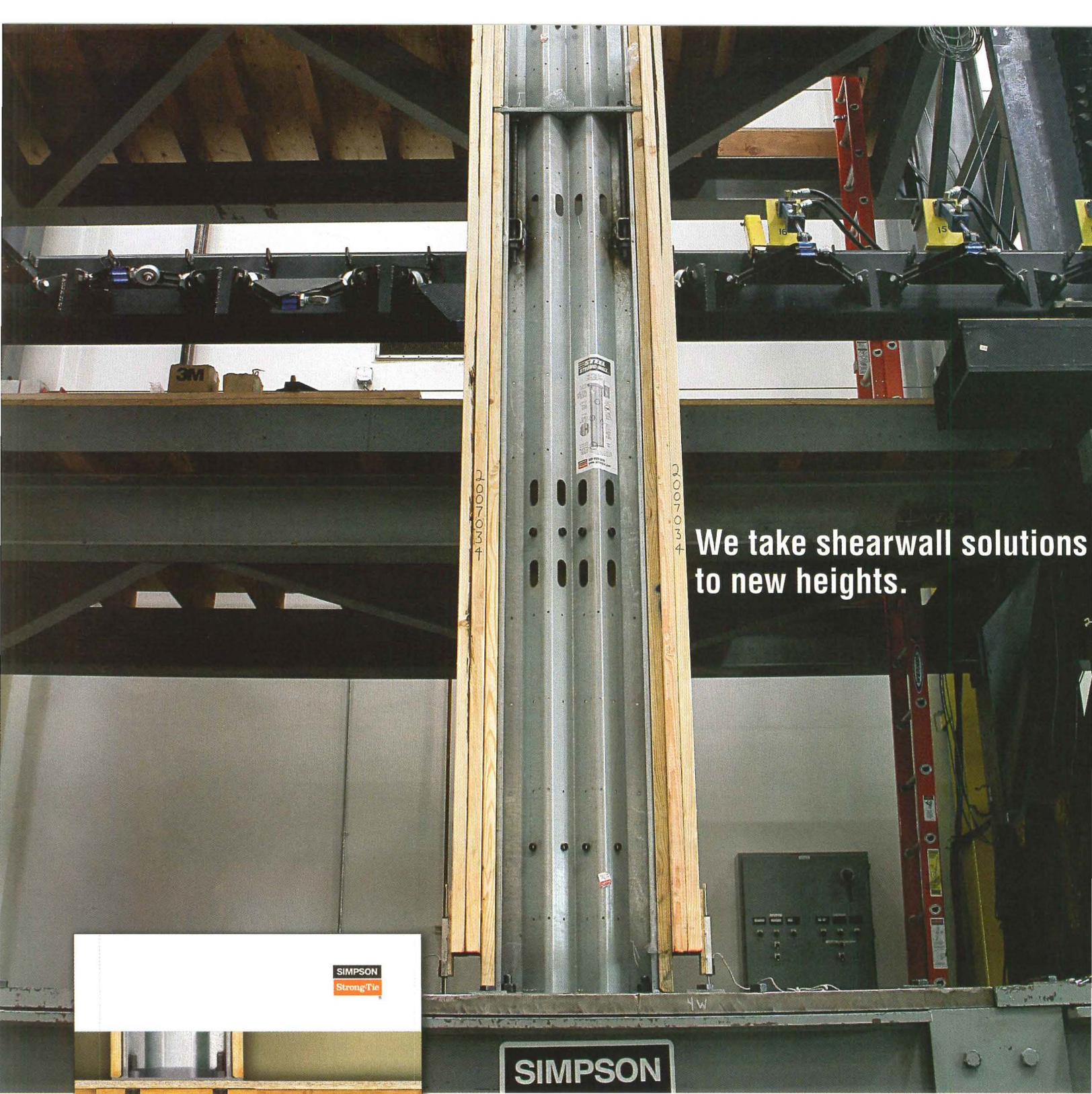


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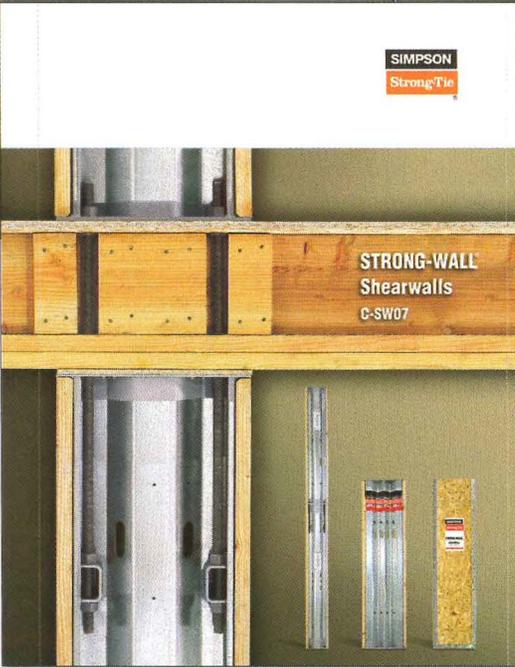
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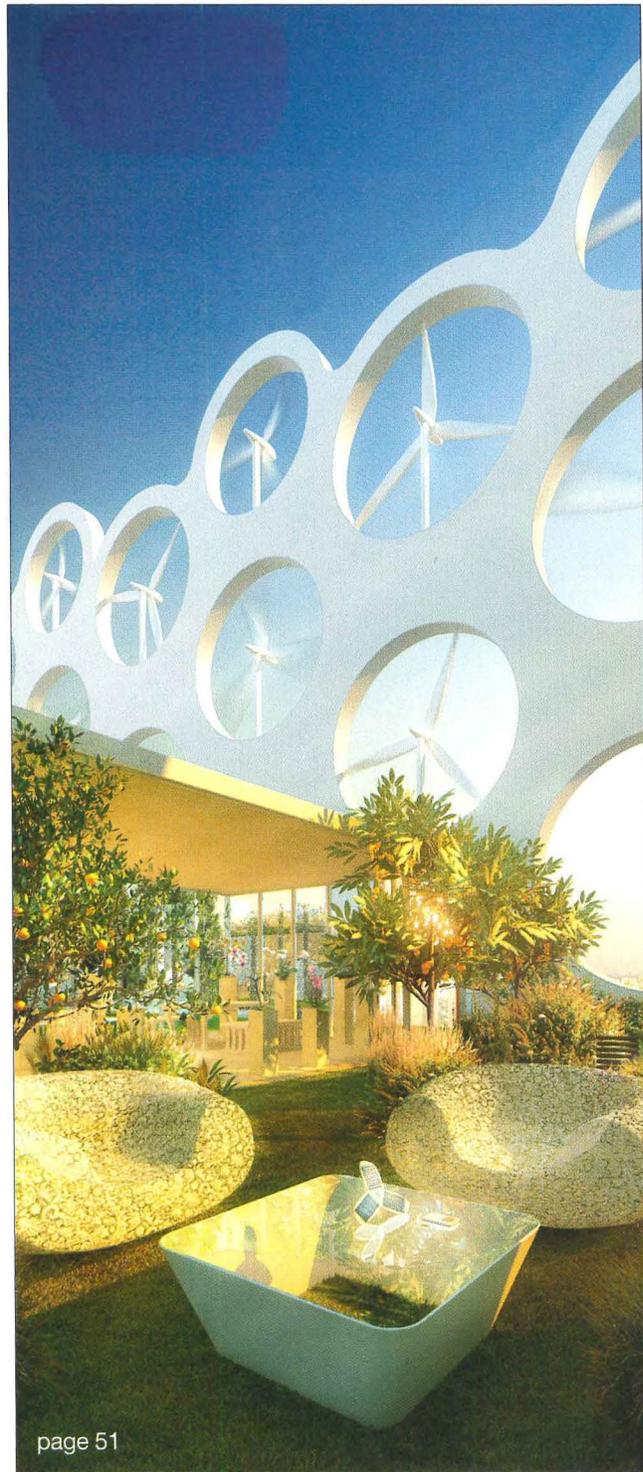


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Smarter choices for the future.

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Heather McKinney designs some fun into her highly functional Austin, Texas, loft apartment.



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Sustainable design is not a luxury reserved for the earth-conscious wealthy; it's a make-or-break necessity in housing our country's low-income residents.



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new heights

Economies of land use and energy consumption are naturally worked into the DNA of mid- and high-rise multifamily housing. But the latest designs on the boards push the building type's green aspirations even higher.

by Meghan Drueding, Nigel F. Maynard, and Shelley D. Hutchins

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Water, water nowhere. Now's the time to make major moves to conserve this most precious of all resources.

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As head of his own design/build firm, Dan Rockhill has firsthand, hands-on knowledge of earth-friendly products.

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Two San Antonio firms decide to join forces to redesign and occupy a former warehouse complex in the city's Southtown neighborhood.

Miami nice: Chad Oppenheim hopes to build the hot spot's first green high-rise condominium. Rendering: Courtesy Oppenheim Architecture+Design. Cover rendering: bioLINIA.



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let there be light

natural light, that is—from all directions.

by s. claire conroy

In these winter days, when darkness still comes early, I return home from work to find all the lights in my house blazing. My family thinks if the sun has set outside, then it's time to use every available watt to illuminate the interior of the house. I, on the other hand, believe ambient light inside the house should follow the circadian rhythm of the day. Quiet in the morning, peak in the early afternoon hours, quiet again in the evening—adding task lighting when and where appropriate.

There are a number of reasons why I should prevail in my preference, least of all the satisfaction of getting my own way. First of all, this lighting plan saves energy. Natural illumination bears the largest burden for brightening the interior, followed by downlights on their energy-conserving dimmed setting. Second, this strategy better matches the cycle of nature we have too quickly abandoned in our embrace of all things technological. In my opinion, it feels oddly uncivilized to pretend late into the evening that it's still high noon. Is it any wonder our children are still bouncing around the house

like barbarians at 8 p.m., when every room is on full alert? Our easy access to energy and to bulbs that promise 100 watts for 25 have trained us that lighting has two settings: on or off. On is for when we're in the room; off is for when we leave it (if we remember to flip the switch).

Why have we forgotten the basics of good lighting? Formerly cheap and plentiful energy is one cause. Another very important contributor is the dumbing down of design in our workplaces and our new houses. Just as we've unlearned everything we knew about natural ventilation since air conditioning was invented, we've also jettisoned important wisdom about natural illumination. If we're lucky, we have an office with one window to the outside, and our new house has a window wall on one side of the family room. One exposure. Even with full sun, you need to turn on lights to reduce the glare and shadows cast by this single source of daylight. And what happens to that natural light source when the sun shifts from the eastern sky to the western? More lights flipped on.

We turn on all these lights to feel balanced, centered in our space. But if our natural light were more



Mark Robert Halper

evenly dispersed—from a minimum of two sources and preferably three—we wouldn't need to drain the grid to lift our spirits. That infusion of daylight would fill our primal reservoirs and, come nighttime, we'd find ourselves ready to soften the hues.

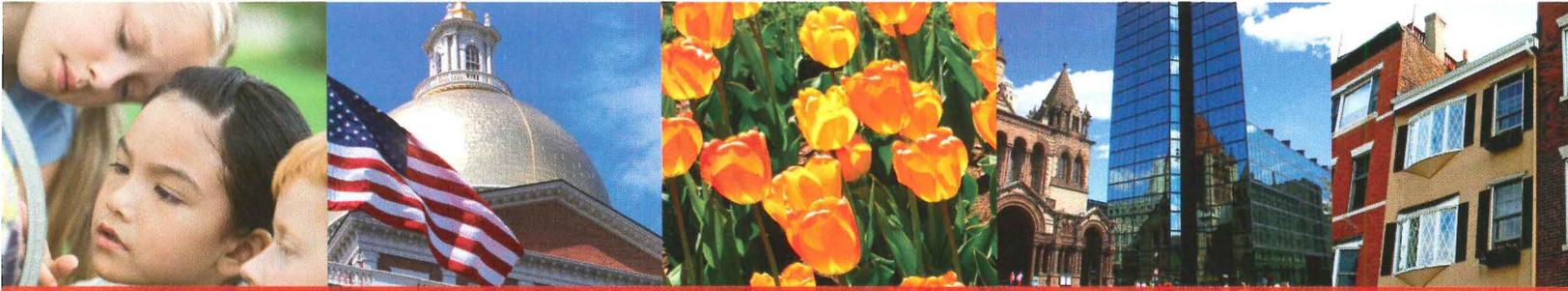
In many ways, green design—the theme of this issue—means a return to basics. We shouldn't fix with energy-consuming technology what we can achieve with solar orientation and good floor planning.

It's not as easy as it sounds when we're talking about tight sites with problems of proximity to and privacy from adjacent neighbors. And it's even more difficult if the structure is a multi-

unit, multifamily building. There are inherent economies to housing people in denser envelopes. Already, the building type is a green move. But it can forsake much of those savings if it requires more energy to illuminate because of single exposures or to ventilate because air cannot naturally circulate.

As architect Allison Ewing, AIA, LEED AP, of Hays + Ewing Design Studio says, we can't just add a "green roof toupee" to a building and call it sustainable. Let nature do the work for you, while she still can. **ra**

Comments? E-mail: S. Claire Conroy at cconroy@hanleywood.com.



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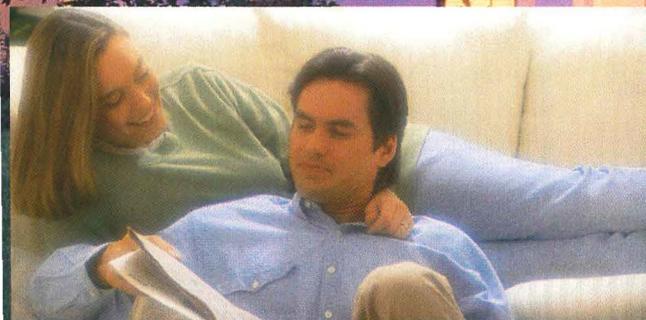
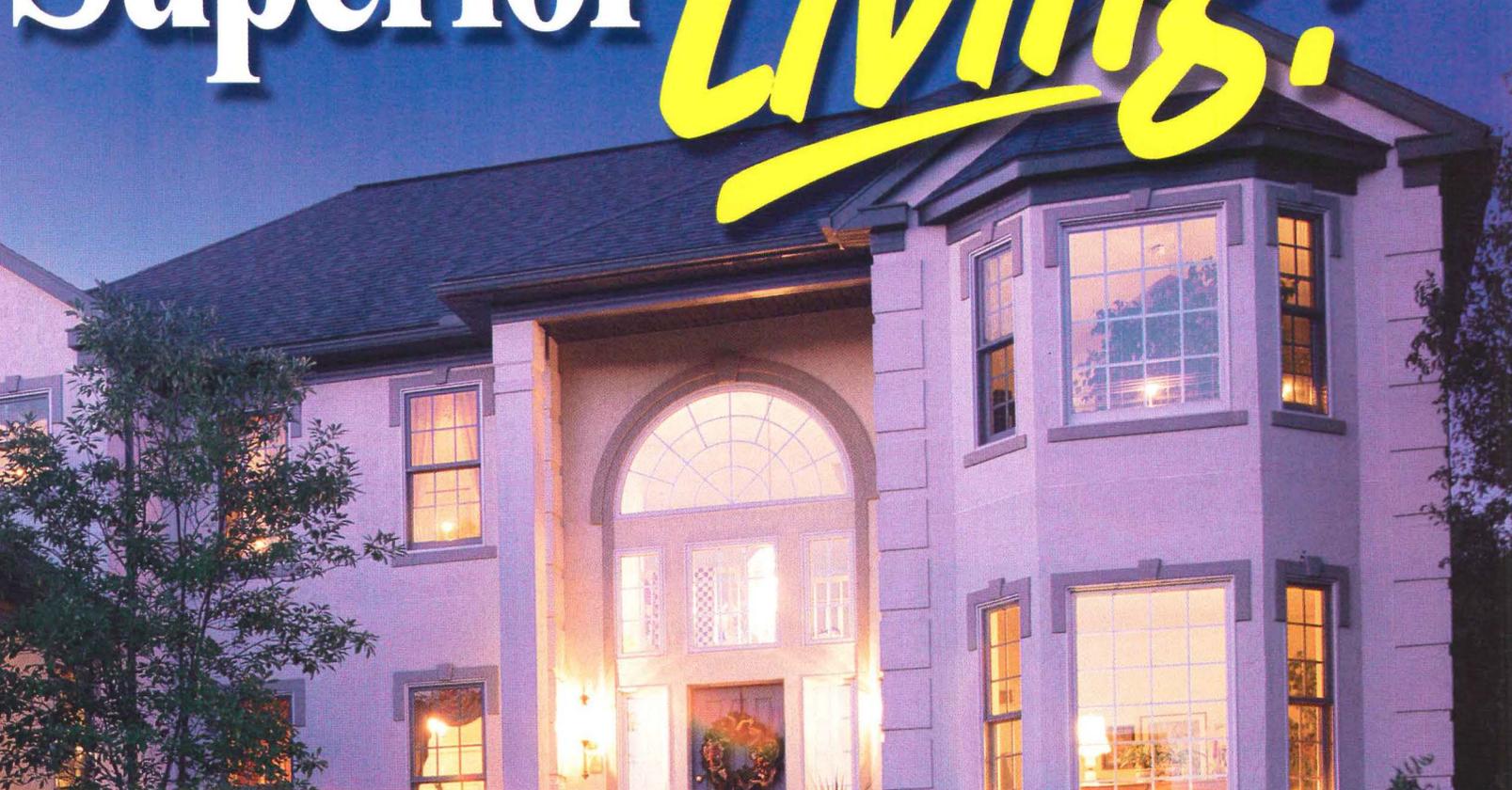
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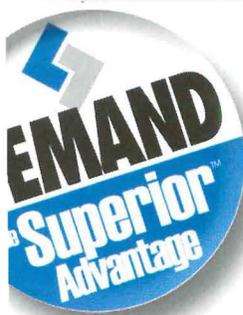
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home front

news from the leading edge of residential design.

hot prospect

The MillerHull Partnership of Seattle is known for rigorously designed and executed custom homes and condo buildings, but Safari Drive, a sustainable mixed-use development in Scottsdale, Ariz., marks its maiden voyage as master planner and

consists of seven three- to five-story buildings with underground parking. “Once the cars were gone, we were free to create whatever [above-ground] atmosphere we wanted,” Curtis says.

MillerHull’s four-phase plan stresses outdoor living and pedestrian circulation, emphasizing the interstitial spaces as much as the structures. It calls for a variety of parks, trails, courtyards, and outdoor public art.

Phase I includes 95 units of flats, townhouse-style units, and live/work lofts ranging from 900 to 2,300 square feet. “Almost every

architect. “We typically do one-building solutions,” says partner Craig Curtis, FAIA, LEED AP. “It’s very exciting for us.”

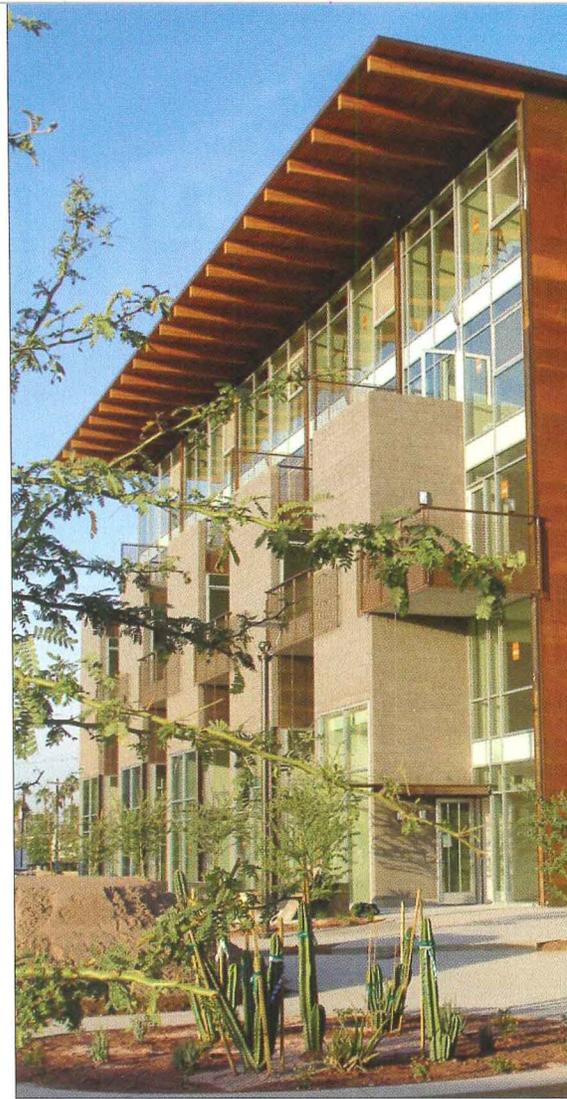
A partnership between Vanguard City Home and The Wolff Co., Safari is a resort-style 14-acre project comprising retail, hotel, office space, and residential. Phase I, currently under construction,

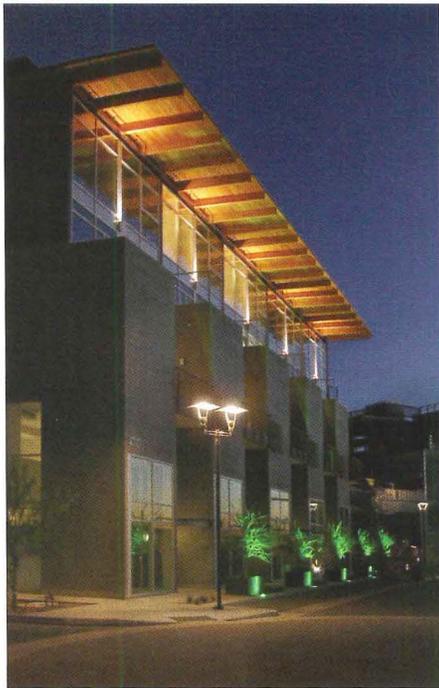
unit will be unique,” Curtis says, and will feature floor-to-ceiling glass, concrete floors, and 100 to 1,900 square feet of outdoor space. The buildings will have undulating skins to create shade

pockets that reduce heat gain; additional shading techniques will protect individual units from the harsh climate and western exposure as well. The architects also worked with mechanical engineers to



Photos: Courtesy The MillerHull Partnership





Miller|Hull wrapped Safari Drive's buildings in insulated concrete blocks and low-maintenance materials such as stucco, weathered steel, and exposed concrete.



design an evaporative tower to cool outdoor spaces.

Phase I is scheduled to be completed by the end of the summer, and Phase II will likely begin mid-year. Units are priced from \$699,000 to \$2.2 million.—*nigel f. maynard*

green horizon

Those who design high-end custom homes often dream of bringing their skills to a wider audience. For Olson Sundberg Kundig Allen Architects, this notion is no longer a fantasy. The Seattle-based firm has signed on to design the homes for Horizon at Semiahmoo, a second-home community in Semiahmoo, Wash. “The scale and diversity of this is new to us,” says partner Scott Allen, AIA.

The firm has designed nine different model homes (two are shown at right), each with sustainable elements such as green roofs, rain gardens, and passive solar orientation.

Seventy-four homesites are currently for sale, with a second phase slated to enter the market later this year. Along with the single-family residences, Horizon will eventually include retail space, condominiums, and townhouses.

Allen calls the community’s architecture “Pacific Contemporary” and says the goal is to have every house attain the equivalent of either LEED Silver or the area’s Built Green status. “To us, the attraction was the chance to do something consistent and with a high level of control,” he explains. “We also wanted to see how far we could push sustainable strategies.”—*meghan drueding*



Courtesy Olson Sundberg Kundig Allen Architects



studio/216

brewing up community

Like Miller|Hull, Lake/Flato Architects has widened its scope of work to include master planning. One such project, Pearl Brewery, is currently under way along the banks of the San Antonio River, just a mile and a half from the firm’s offices.



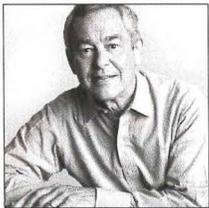
Courtesy Silver Ventures

Lake/Flato and developer Silver Ventures agreed housing would play a key part in the project, which adapts a former brewery into a mixed-use village. The firm’s master plan dictates that the historic structures on the site—some more than 100 years old—undergo restoration, while newer warehouse buildings are transformed. (The Can Recycle Building, above, with design concept by Lake/Flato and architecture by Durand–Hollis Rupe Architects, is an example of the latter strategy.) “The point was to keep the site kind of gritty,” says principal David Lake, FAIA. Old brewing vats will harvest rainwater, and a large array of PV panels will collect solar energy.

A handful of other designers are also involved in Pearl Brewery, including Lake/Flato progenitor Ford Powell & Carson and Moule & Polyzoides.—*m.d.*

home front
perspective
city green

Robert F. Fox Jr., AIA, LEED AP, is no newcomer to green design. First at Fox & Fowle Architects and now at Cook+Fox Architects in New York City, he's devoted his career to creating spaces that respect the environment. Among other projects, he and firm co-founder Richard A. Cook, AIA, are currently working on the Bank of America Tower at One Bryant Park, which is going for LEED Platinum certification. He spoke recently with *residential architect*:



Gunther Intelmann

What is the relationship between sustainability and high-rise residential buildings?

"Clearly our footprint on our planet is going to be greatly decreased if we can house more people

in greener buildings. Generally, high-rise buildings are in an urban environment where there's mass transit. These are the kinds of things we will have to move toward if we are to have any kind of balance with nature. This has to come—the building requirements have to change. We cannot continue to treat our environment as poorly as we have."



dbox

Fox emphasizes the need to locate high-rises near mass transit. The Lucida, by his firm, will offer New York City residents such proximity and the satisfaction of LEED certification.

and more construction. But tenants feel noticeably better and healthier. How can you ignore the opportunity to provide a healthy environment for the people in the building?"

If you could tell other high-rise architects to take one green step, what would it be?

"I would tell them to look at opportunities to save water. There are lots of opportunities to do that."

What will high-rises be like 20 years from now?

"In 20 years, all buildings are going to have to be producing their own energy through renewable sources and hopefully through some advanced technology."—*m.d.*

What residential high-rise building systems or technologies are you particularly excited about?

"The new central air delivery systems. Fresh air is taken in, filtered, and delivered to all of the apartments so residents don't have to have units that go through the wall, which are bad architecturally and mechanically. The system does add expense. It requires fresh-air units on the roof and both vertical and horizontal ducts, so there's more engineering

save the date

southern exposure: contemporary regional architecture through june 8

virginia center for architecture, richmond, va.



Richard Leo Johnson

Architects must consider regional culture, climate, and landscape if they hope to create contemporary buildings that are inviting, as well as environmentally responsible. This exhibition illustrates how Southern projects in a variety of genres ably blend with their sites while incorporating details tailored to geography and climate. Models, renderings, and photographs portray work by such regional architects as Frank Harmon, FAIA, whose Low-Country Residence in Mount Pleasant, S.C., is shown here. For details, call 804.644.3041 or go to www.virginiaarchitecture.org/vca_index.jsp.

continuing exhibits

Norwegian Wood, through April 18, AIA San Francisco Gallery, www.aia.org/Programs/Gallery.htm; **The Green House: New Directions in Sustainable Architecture and Design**, through May 4, Morris Museum, www.morrismuseum.org; **Lessons from Bernard Rudofsky**, through June 8, The Getty Center, www.getty.edu; **Thomas Hope: Regency Designer**, March 21–June 22, Victoria and Albert Museum, www.vam.ac.uk; **Gulf Coast Green 2008**, April 3–6, Reliant Park, Houston, www.gulfcoastgreen.org; **Alternative Building Materials & Design Expo**, April 25–26, Santa Monica Civic Auditorium, www.altbuildexpo.com; **Greening Rooftops for Sustainable Communities**, April 30–May 2, Baltimore, www.greenroofs.org.

For up-to-date, comprehensive calendar listings, go to www.residentialarchitect.com.—*shelley d. hutchins*



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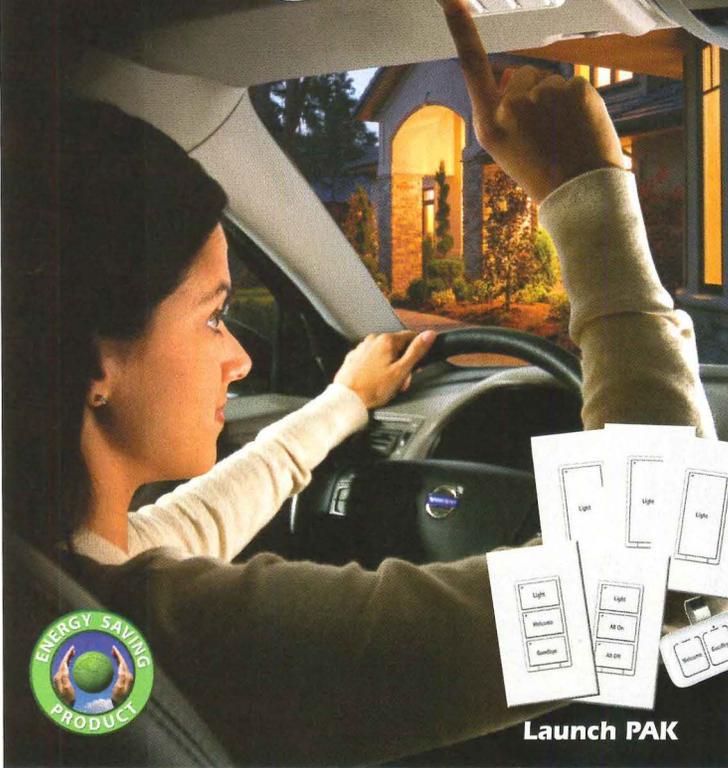


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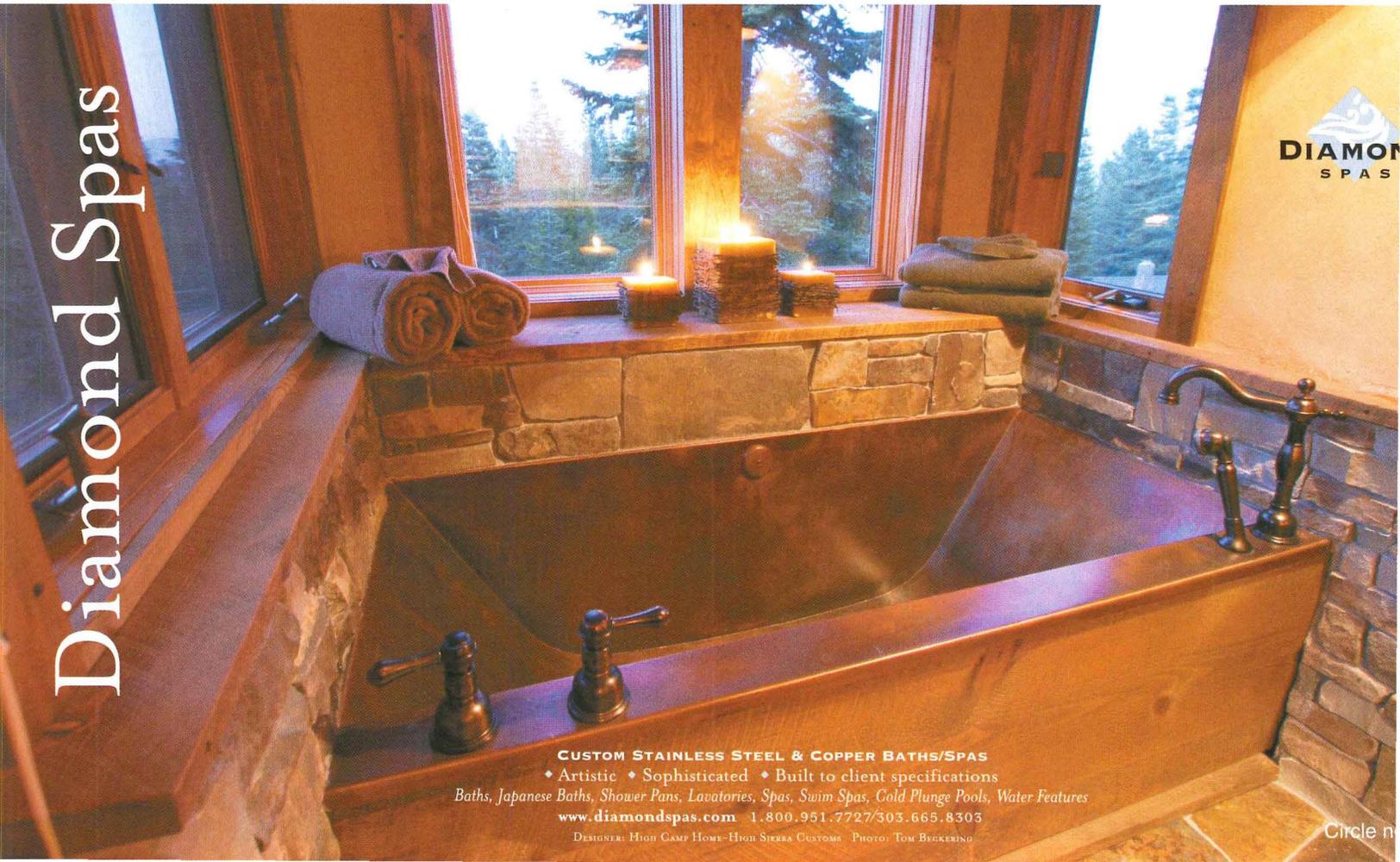
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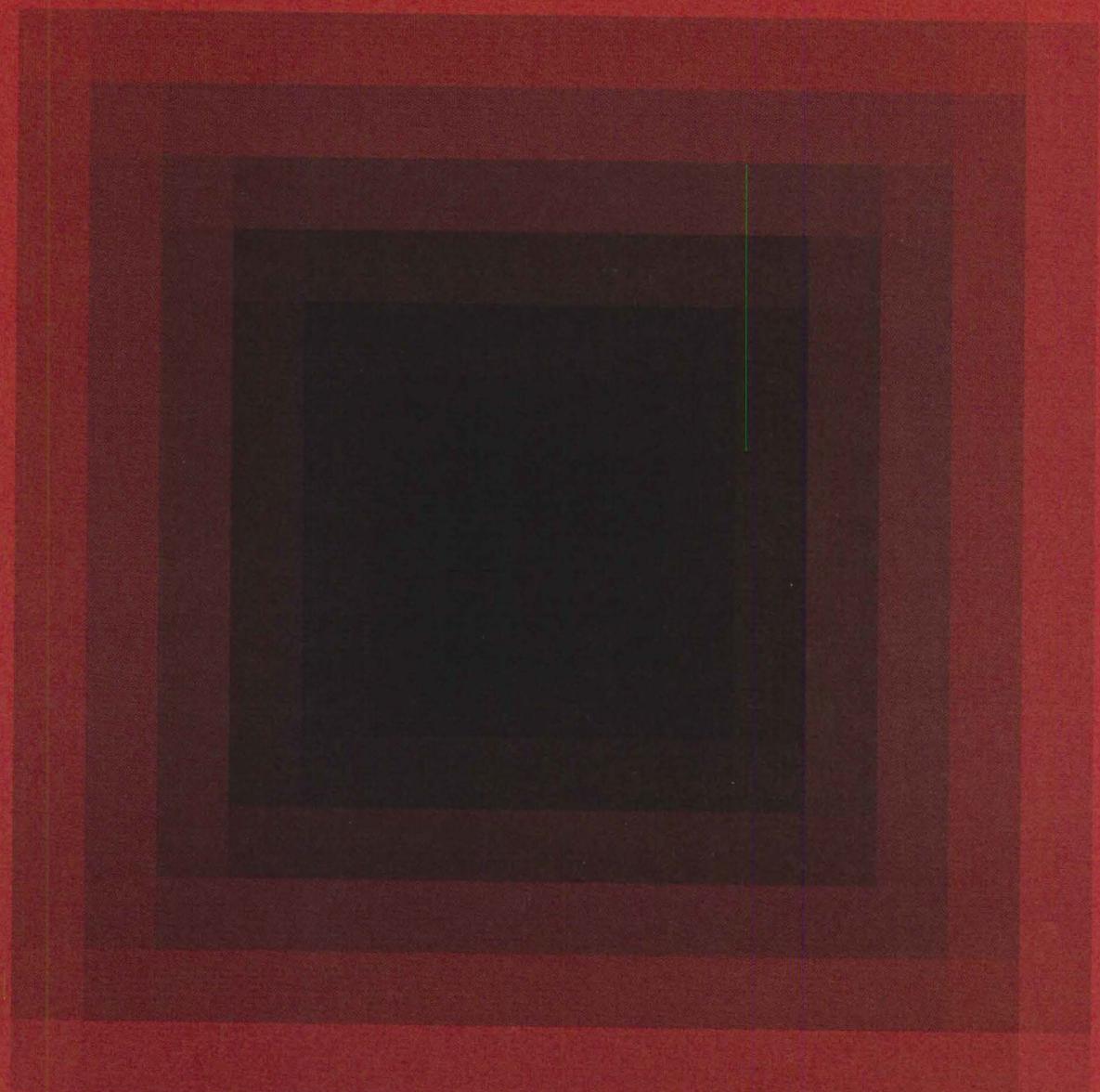
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rethinking green in l.a.



Lawrence Scarpa, AIA, usually wrestles with developers to ensure sustainable features aren't value-engineered out of a project. Not so for Cherokee Lofts. In fact, Scarpa—an inveterate green advocate and principal of Pugh + Scarpa Architects in Santa Monica, Calif.—found himself following the lead of Culver City, Calif.-based upstart green developer REthink Development.

Cherokee Lofts is a mixed-used project consisting of 12 one- to four-bedroom condo lofts and 2,800 square feet of retail space. The five-story building will have 9-foot to 16.5-foot ceilings, underground parking, a rooftop deck, and a green roof. It gets major green points for its urban location in Los Angeles. “The project has a really good location close to Melrose in a vibrant,” very walkable neighborhood, Scarpa says. Still, the orientation of the building posed a design challenge. “It has good views downtown to the east and ocean views to the west,” the architect says, “so thermally, it was terrible.”

Scarpa's solution is a movable perforated-metal screen that each homeowner can use to control daylight. The screen also serves as a design element, says Scarpa, who was “interested in creating a system that would change as people passed by.” Steve Edwards, REthink's principal and co-founder, says the screen is also the building's most important green feature. “The façade allows views, privacy, and breezes,” he says, “and is one of the main reasons the building is so efficient.”

Solar energy on the roof will light the building's common areas and power a percentage of its hot water needs, and owners can either plug into the grid or use the building's hybrid solar system to heat and cool floors, ceilings, and walls. REthink also reused wood and stone from the existing, historic Cherokee Studios building and recycled most of the construction debris. Other sustainable elements include recycled-newsprint insulation, dual-flush toilets,



Renderings: Courtesy Pugh + Scarpa Architects



To combat Cherokee Lofts' unforgiving western and eastern exposures, architect Lawrence Scarpa designed a secondary metal-mesh façade each unit owner can slide horizontally. The project will occupy a pedestrian-friendly location, with retail shops, a coffee bar, and a grocery store within a three-block radius.

hot water circulators, and FSC-certified flooring.

Cherokee Lofts is REthink's first project, and Edwards says it will set the tone for the company. “Our goal when we started [in 2005] was to do only green buildings,” he says. “We want to lead in this space.” The developers are going for LEED Gold certification, but they're hoping to achieve Platinum. Completion is set for March 2009; sales prices are not yet determined.—*nigel f. maynard*

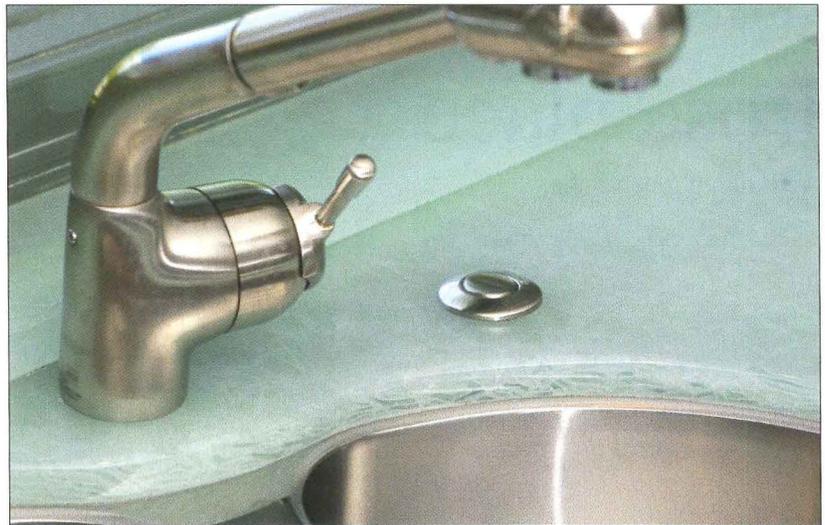
green pieces

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Cali Bamboo's marbled, fossilized bamboo flooring offers funky durability through an innovative process of compressing and intertwining the material's fibers. The San Diego-based company says the scratch-resistant planks that result have "twice the density and strength of almost any other flooring," making them appropriate for use with radiant heating systems and in high-traffic areas. Cali Bamboo, 888.788.2254; www.calibamboo.com.



raise a glass

The U.S. Green Building Council's LEED program encourages architects and builders to specify salvaged and reused building materials wherever possible. Short of that, the group sanctions products made with recycled content. Fortunately, manufacturers have rushed to fill this niche with a bevy of green goods, including flooring, insulation, and countertop surfacing. Bio Glass is one such product. Distributed by Miami-based Coverings Etc, the distinctive surfacing material is made from 70 percent to 100 percent recycled glass, depending on the color, and is nonporous and easy to clean. Cooler still, its textured, multidimensional appearance changes with the light. Available in four colors with polished or natural finishes. Coverings Etc, 305.757.6000; www.coveringsetc.com.



raw hide

EcoDomo takes tannery leather scraps that would otherwise end up in landfills and gives them a new lease on life. After shredding the scraps, the company binds them with natural rubber and acacia tree bark and then rolls the pulp into floor and wall tiles. The products come in eight colors, six textures, and a variety of shapes and sizes. Rolls measuring 54 inches wide by 100 feet long are also available. EcoDomo, 301.424.7717; www.ecodomo.com.

nice treads

The bamboo yarn used to make Anji Mountain's shag area rugs is naturally hypoallergenic, antimicrobial, and antibacterial, so your clients can tread comfortably without fearing the buildup of dirt and germs. The cushy pile blend of 80 percent bamboo and 20 percent cotton yields a soft floor covering with a stylish sheen. Select from rich hues such as sage, merlot, latte, coffee bean, and pewter. Anji Mountain Bamboo Rug Co., 888.344.5004; www.anjimountainbamboorugco.com.



q tip

Trend Q is a glass-based surfacing material whose thin profile makes it suitable for installation over existing walls, counters, and floors. Produced by Miami-based Trend USA, the 1/4-inch-thick product is comprised of 72 percent post-consumer recycled glass and pigmented polymer. The company says the material is impervious to stains and fading and ideally suited for kitchens and baths. It comes in 12-inch-by-12-inch tiles or can be custom-sized in 50 colors. Trend USA, 866.508.7363; www.trendgroup-usa.com.



asking for a rais

Want a Scandinavian-style freestanding wood stove for that apartment you're doing, but building codes forbid it? Luckily, Portland, Tenn.-based RAIS has unveiled a gas version of its popular wood-burning units. The Gabo Gas II has steel side and top plates (a soapstone top plate is optional), a curved-glass front, and ceramic logs. Available in black or gray, the stove has an output of up to 20,000 BTUs. RAIS, 888.724.7789; www.rais.com.

continued on page 26

aluminum can

Stainless steel isn't the only metal being fashioned into countertops these days. Portland, Ore.-based Eleek custom-forms 85 percent recycled aluminum into counter sections measuring up to 3 feet wide, making necessary cutouts for sinks, faucets, and appliances. A thin bead of clear silicone seals the nontoxic, stain-proof, ¼-inch-thick sections together. The company also manufactures recycled aluminum tiles. Eleek, 503.232.5526; www.eleek.com.



clean intelligence

Beam has added an electronic user-information panel to the Serenity IQS central vacuum system's list of features. A vivid blue LCD screen monitors the 640-air-watt system's cleaning efficiency, the amount of dirt in the collection tank, and service needs. As an added perk, it also delivers up-to-the-minute time and temperature updates. Beam Industries, 800.369.2326; www.beam.com.



pulp faction

Richlite's latest offering is a paper-based countertop made from 50 percent recycled corrugated cardboard and 50 percent softwood pulp. The Tacoma, Wash.-based manufacturer says the material is stain-, scratch-, and heat-resistant and dense enough to accommodate long cantilevers without additional support. Richlite Co., 888.383.5533; www.richlite.com.

continued on page 28

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green pieces



dri run

According to its Brooklyn, N.Y.-based manufacturer, DriTac 7500 eco-urethane floor adhesive can be used in areas where other types of compounds are restricted. The company also claims the VOC- and odor-free product meets EPA requirements. It can be used on various types of wood-based flooring and ships in 2-gallon and 4.5-gallon containers. DriTac Adhesive Group, 800.394.9310; www.dritac.com.



in the chips

Pavers aren't made of clay alone. Wausau Tile combines concrete and recycled glass (25 percent by volume) to produce them in sizes ranging from 12 inches to 36 inches square. The company also recently introduced a hexagon-shaped design. The pavers can be speckled in more than a dozen iridescent colors with a shot-blasted or washed surface. Wausau Tile, 800.388.8728; www.wausautile.com.

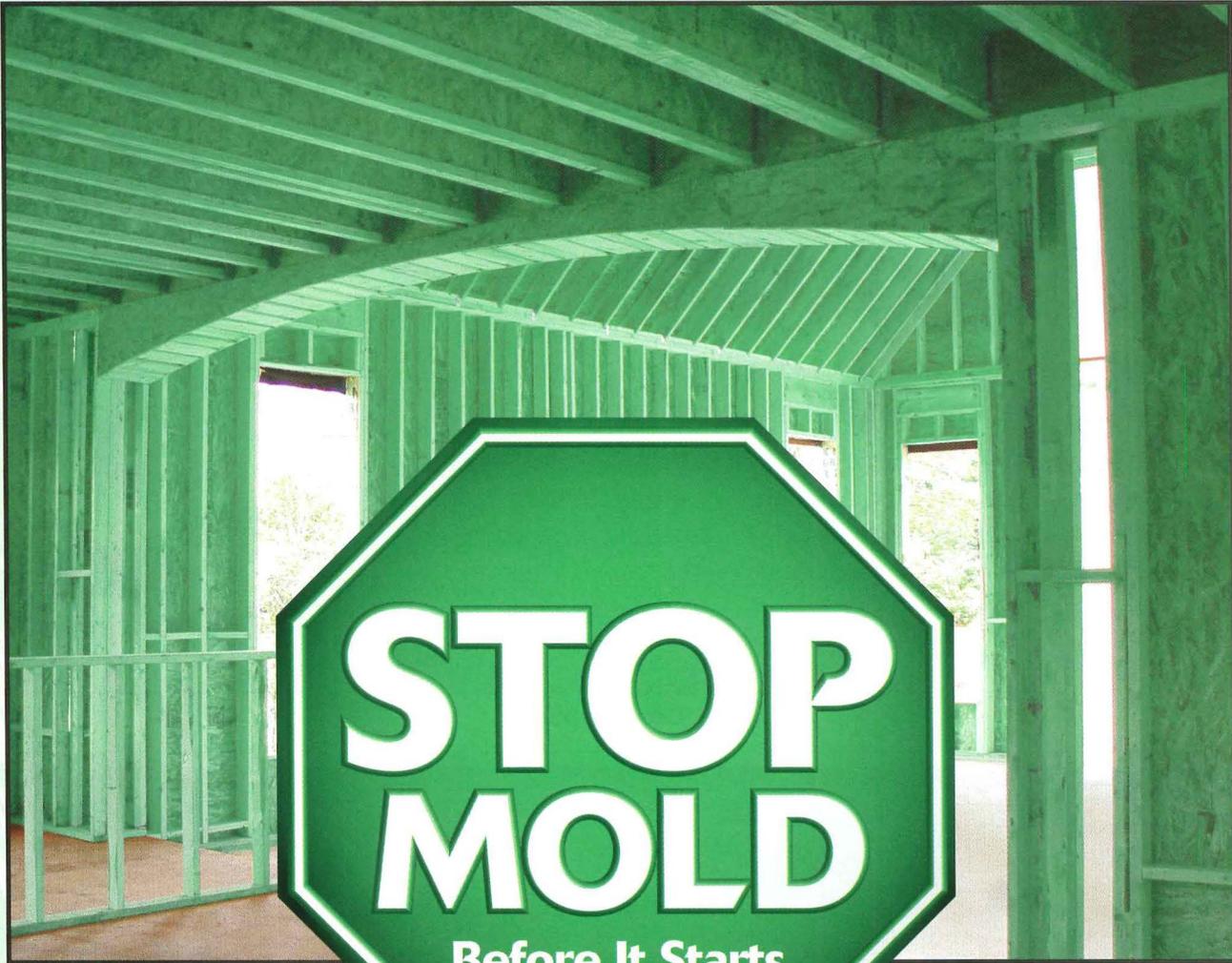


stout choice

Mountain Lumber has acquired wooden planks from 100-year-old barrels once used by Ireland's Guinness brewing company and has repurposed them into a limited-edition flooring line called Entique Guinness Oak. The English brown oak reclaimed from those storied vats has been kiln-dried and re-milled into boards that showcase their distinctive markings and knots. Mountain Lumber Co., 800.455.2671; www.mountainlumber.com.

—nigel f. maynard and shelley d. hutchins

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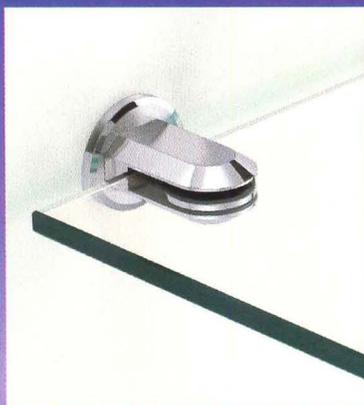
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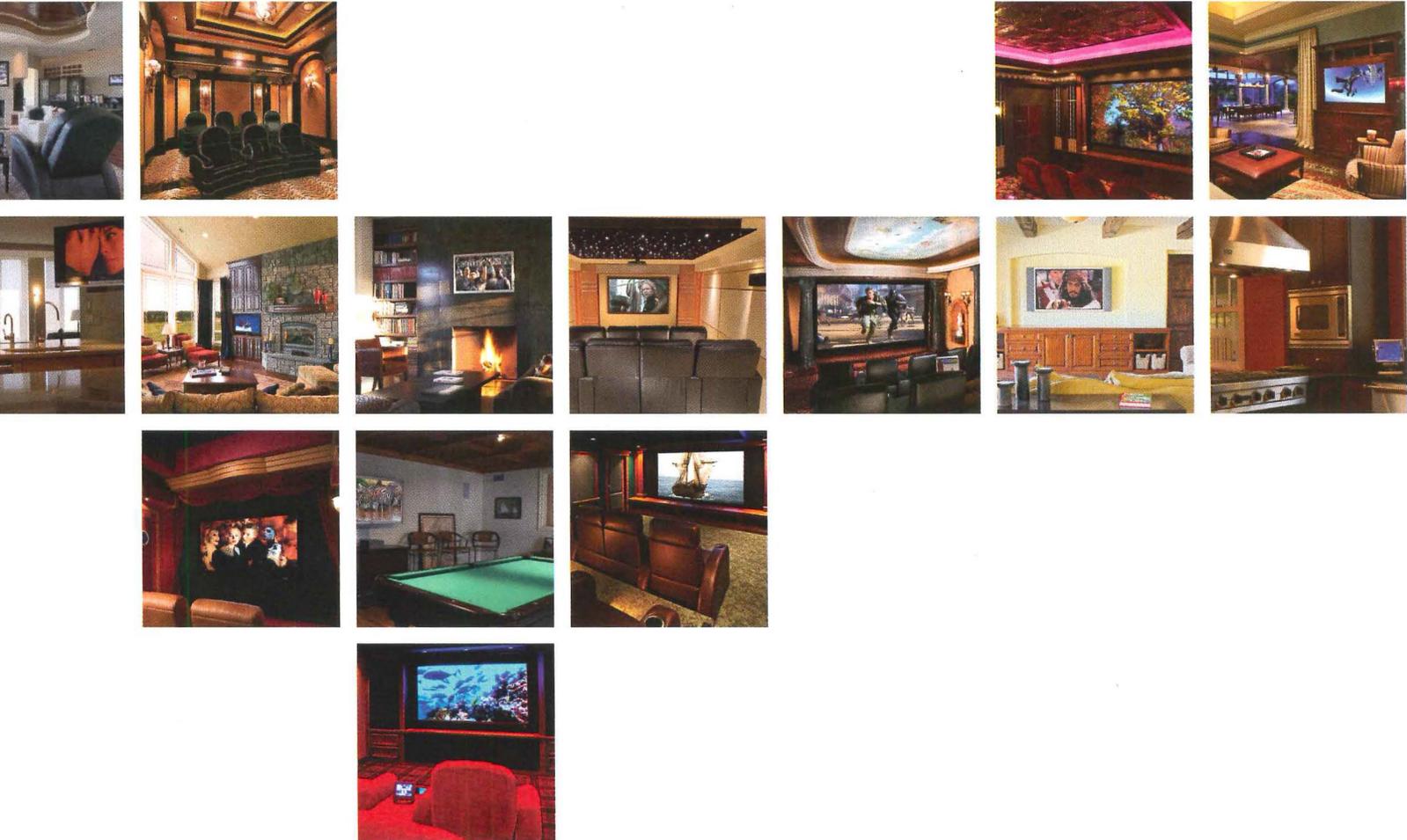
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kitchen: light duty

Architect and recent empty-nester Heather McKinney, FAIA, jokes that the refrigerator in her new loft is practically obsolete. She and her husband chose the sustainably built building, in part, because of its urban location. Work, restaurants, entertainment, and such grocery options as Whole Foods and the farmer's market are just steps away.

The fridge may be empty, but McKinney's kitchen is wholly appealing nonetheless, thanks to energy-efficient appliances and nontoxic materials (many of which can be or have been recycled). The 200-square-foot space is also brimming with storage to contain, among other things, the six sets of china the couple has accumulated over the years. (Frequent visitors ensure every piece is used with some regularity.)

Aluminum-framed, frosted glass doors and clear glass shelves help keep the copious cabinetry looking airy while also reflecting light into the room. The cabinets' wenge wood veneer balances the pale palette. "I always encourage clients to use veneers," McKinney explains, "because they use less-exotic wood but still look rich."

Although the kitchen captures some rays streaming in from a two-story window wall in the living room, its siting near the back of the apartment meant some artificial illumination would be required. To fill in where natural light can't, McKinney spec'd a C-shaped track with low-voltage lamps, low pendants over the island, and soft undercabinet lights. "An even amount of illumination lets you go with lower wattage," she says. And because the fixtures are independently controlled and dimmable, "you save energy and fill the space with light only where you need it."

project continued on page 34



Appliance towers flank the workspace along the walls and obscure views of its counters from adjacent living areas.

Photos: Thomas McConnell

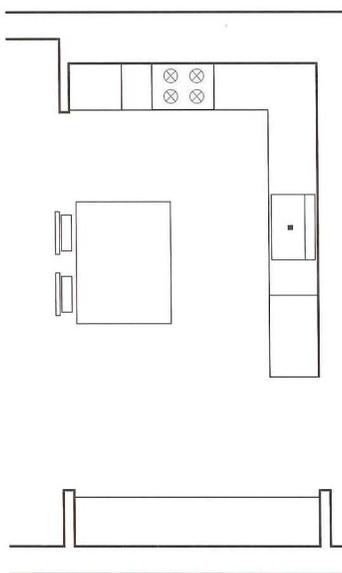


architect: McKinney Architects, Austin, Texas

general contractor: Leonard Duke, Austin

cabinetmaker: Arte Design, Austin

resources: dishwasher and range: Jenn-Air; plumbing fixtures: Dornbracht Americas; refrigerator: GE Consumer & Industrial (Monogram); tile: InterfaceTile, Waterworks





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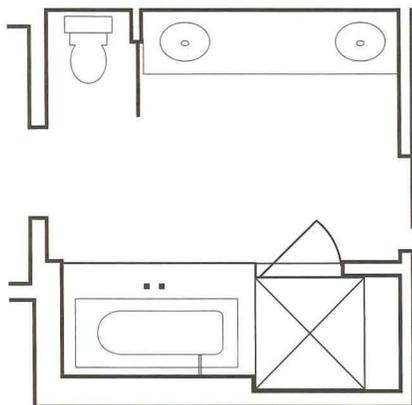
bath: glass play

Like the kitchen downstairs, the loft's master bathroom draws natural light from a single source—this time from the window wall in the adjacent bedroom. A double-wide doorway with a frosted glass sliding door facilitates the flow.

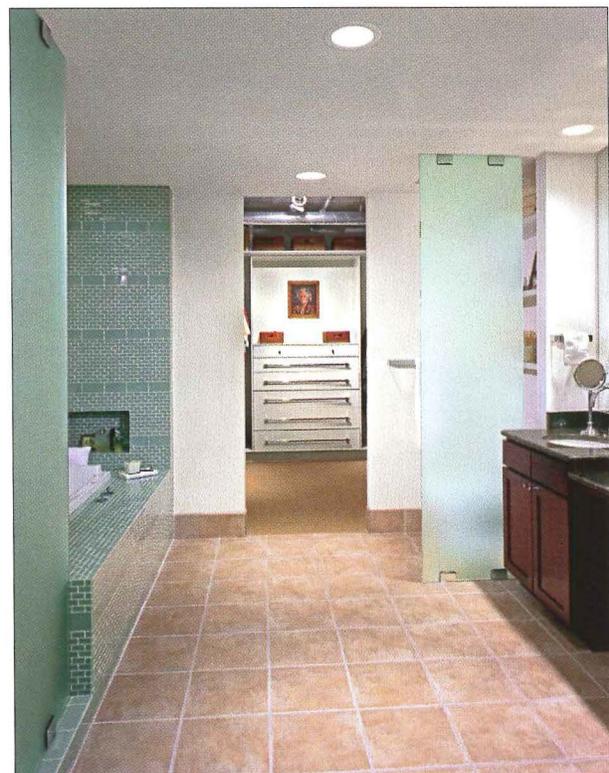
Material and design choices were driven by the desire to increase lighting while maintaining privacy. A frosted glass partition blocks views to the toilet, and a 3-foot-by-9-foot translucent, pivoting-glass panel protects the shower without fully enclosing it. To bring additional light into the space, McKinney eliminated doors from bath to closet. For the shower and adjacent tub, she designed a grid of light-reflecting tiles in various sizes.

The tactic, she says, breaks up the expanse of the aqua-hued glass and creates an interesting pattern. "It was quite a puzzle to always get an outside edge on the corners," she says, "but it was worth it."

As is her usual practice with any project, McKinney used low- or no-VOC paints here and throughout the loft. It's a good thing, too, because her building's ownership rules ban toxic finishes. "So many companies offer low-VOC products now that it's irresponsible *not* to use them," she says.—*shelley d. hutchins*



McKinney designed the shower-tub connection for function and delight. The tub has a surround that's wide enough to double as a seat for the adjacent shower, but its unusual access through the shower's frosted pivot door "is just kind of fun," she says.



Photos: Thomas McConnell



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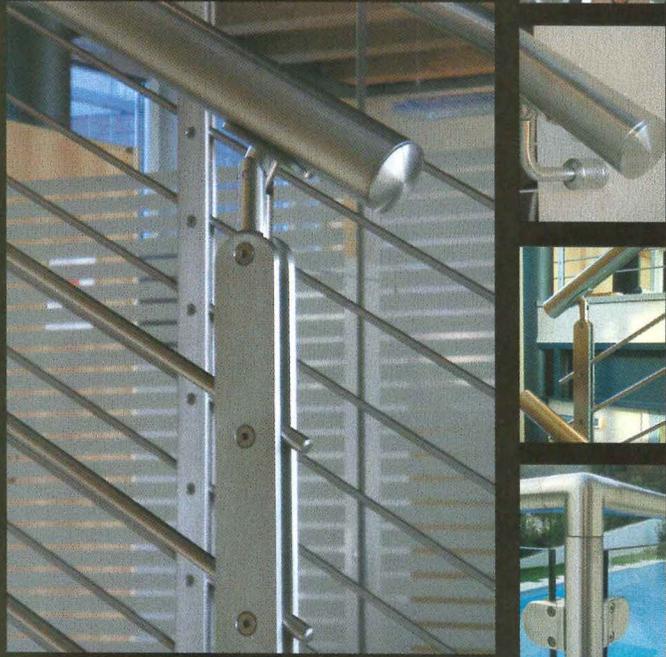
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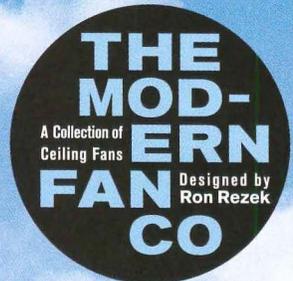
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going green, affordably

designing sustainable housing on a nonprofit budget.

by cheryl weber

Say green design, and what comes to mind are geothermal heat pumps, tankless hot water heaters, and roofs that plug into the sun. The most recognizable green features are also the priciest, and sustainable design is still viewed as an upgrade that only the well-off can afford. While there's some truth in that perception, the reality is changing as low-income housing developers join the party. They're on a mission to find high-performing, low-cost solutions, since green design can make a big difference in the lives of the poor. Families who are struggling financially have a greater need for clean air and low utility bills, and reducing a building's maintenance and energy loads benefits nonprofit landlords long-term.

If high-end green products have made the environmental movement cool, designers of housing priced below market rate are making it practical—not only for low-income folks but for the middle market too. As recipients of grants and subsidies, their clients are charged with tracking energy performance and return on investment—data



Emiliano Ponzi

that's crucial to architects entrusted with modest budgets of any project type. So while elite early adopters play an important role in advancing green ideas, so does design at the other end of the spectrum. Architects of affordable housing are helping to put the emphasis where it ultimately belongs,

making eco-conscious gestures less of a status symbol and more accessible for everyone.

There are financial hurdles, to be sure. But for some architects, the new green consciousness has simply made it easier to perform high-quality work for a niche population

that needs extra care. Paul Freitag, LEED AP, development studio director for Jonathan Rose Companies in New York City, says that a year and a half ago, the nearly 20-year-old for-profit development company decided it no longer had to explain what sustainable

continued on page 40

practice

design is, because people know. “For developers striving to do high-quality affordable housing, the shift to making sure it’s also green isn’t that dramatic,” he says. Tight building envelopes and high-efficiency mechanical systems are nonnegotiable in its projects. So are nontoxic materials, since the company serves a population burdened by health issues such as asthma and AIDS. “Before green was codified, our ideas were the same,” Freitag says. “It just hadn’t been attached to a rating system.”

Freitag figures that the green cost differential of his projects is no more than 2 percent when compared to other quality work, and over the years he’s seen those higher first costs pay off. That’s because his company’s clients are as concerned about a project’s

bringing home green credits

by now everyone is familiar with the concept of undoing one’s daily damage to the earth by planting trees or contributing to environmental causes. It’s hip to be carbon-neutral, and in January, Enterprise Community Partners (ECP) launched its own version of the idea to help fund its mission of providing green homes for low-income families. In this two-part program, businesses and individuals can offset their carbon footprint with tax-deductible contributions to the Green Communities Offset Fund. In turn, ECP channels those funds directly to developers who can prove they’ve reduced emissions in their affordable housing projects.

There’s no cost to developers to participate, and ECP bears the cost of

measurement and verification, but the projects must be built to Green Communities criteria (see www.greencommunitiesonline.org/tools/criteria). “We’ll have a third-party entity measure how many tons of carbon have been reduced per project and then verify that the reductions are taking place over the life of that carbon credit,” explains Dana Bourland, senior director of ECP’s Green Communities Initiative.

The organization is creating a carbon calculator that will be available on Green Communities’ Web site to help contributors quantify their carbon footprint. “We’ll be the first contributor, paying to offset leftover carbon emissions from travel to our conference in Cleveland” last November, Bourland says.—c.w.

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long-term operation as they are about solving the problems of getting it built. "Right up front, you want to make sure you spec the right systems and have them installed and running properly," Freitag says. "Later on there might not be the sophistication you have in market-rate housing to tweak those systems. This is your chance to get it right, because the project struggles with a very tight operating budget."

Jonathan Rose Companies often works with Columbia, Md.-based Enterprise Community Partners (ECP), whose Green Communities arm dispenses advice and funding to low-income housing

"everyone needs to understand that this building is being designed to perform better and implement the best of what can be applied. set the tone that this building will be done differently—it will cost more and may need special attention to get the best performance."—dana bourland

developers. Recognizing a market gap in green guidelines that address affordable housing's unique challenges, Green Communities worked with groups such as the AIA, the U.S. Green Building Council, the EPA, and the National Center for Healthy Housing to establish a nationally applied point system for low-income housing. "The

initial questions to grapple with are not so much about throwing some green bling onto the next project to get a plaque," says Dana Bourland, senior director of the Green Communities Initiative at ECP, which awards \$1.2 million in grants annually. "Rather, it's asking what benefits of green building we can apply to this project to make

it more affordable in the long run and to positively benefit the environment. It's the starting point for an integrated design approach."

By that she means putting together a robust design team that ideally includes the owner, project manager, engineer, construction manager, building operations team, residents,

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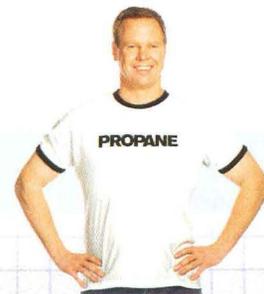


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and financing institutions. To tout the importance of collaborative first steps, ECP awards points for green charrettes. “Everyone needs to understand that this building is being designed to perform better and implement the best of what can be applied,” Bourland says. “Set the tone that this building will be done differently—it will cost more and may need special attention to get the best performance.”

Part of the beauty of green development is in how the specs play off of each other, and the team experts can help finesse these trade-offs. For example, a more efficient HVAC unit

“there’s a huge amount of efficiency just in the programming of these affordable projects, before you start talking about energy efficiency.”—peter waller, aia

might free up space for an extra closet or room. Spend a bit more to capture stormwater, and the owner will save on fees to the city. Having everyone involved creates synergy, and the opportunity to save leads to better design. In the last three years, Bourland says, this team approach is what has distinguished green from conventional design. “You can slap [photovoltaics] on and make it work, but the building

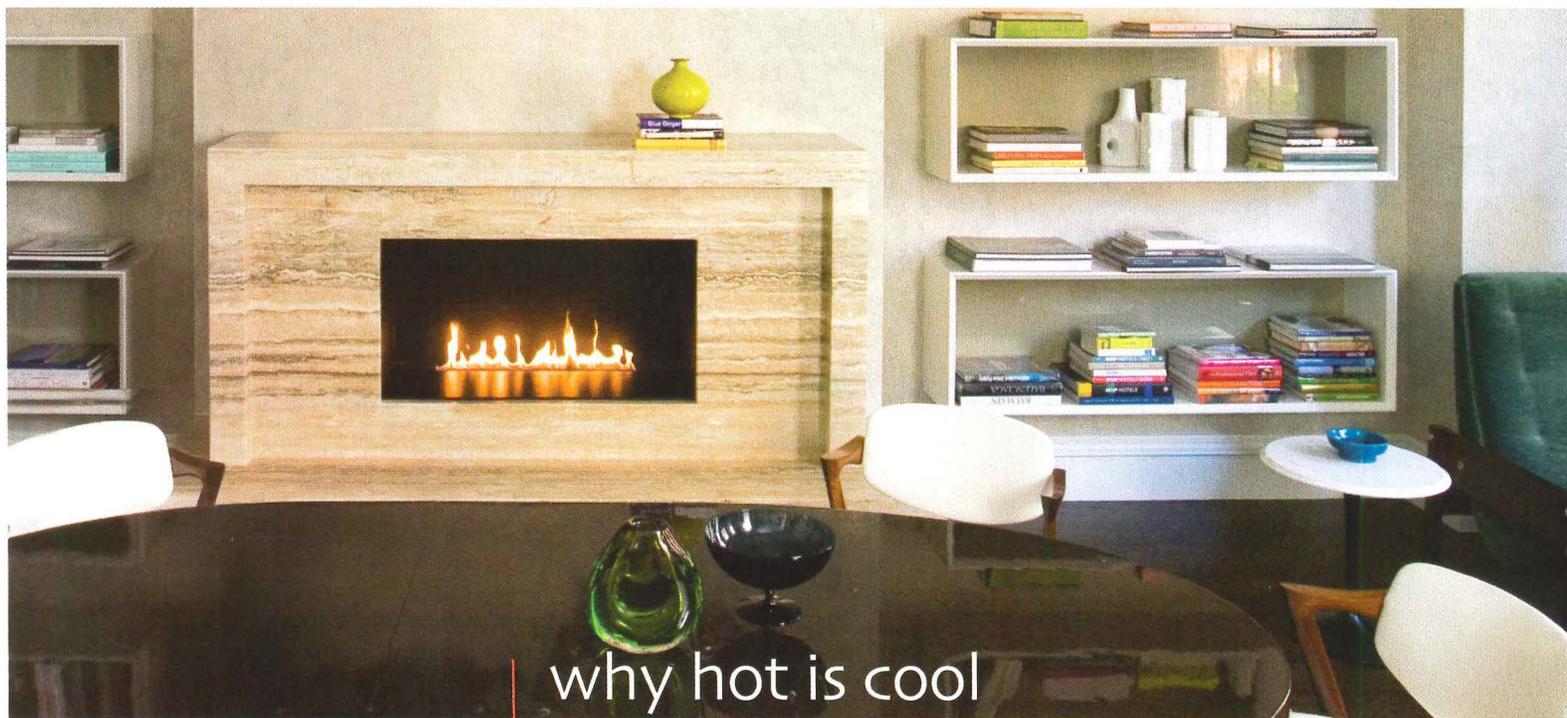
won’t necessarily perform better or be healthier or reduce construction waste,” she says. “It won’t be green in the sense of being more sustainable overall; it will just have this cool technology.”

a bottom-up approach

The goal is to hit the sweet spot of environmental health and economic return. And what that amounts to is helping nonprofits work through a set of complex

decisions having to do with costs, benefits, strategy, and available funding, based on the project type and what they are trying to accomplish. California, for example, offers a big incentive for energy efficiency. To qualify for funding programs for affordable housing, developers have to beat Title 24 Energy Code regulations by 15 percent. “The tax credit funding often pays for 50 percent

continued on page 44



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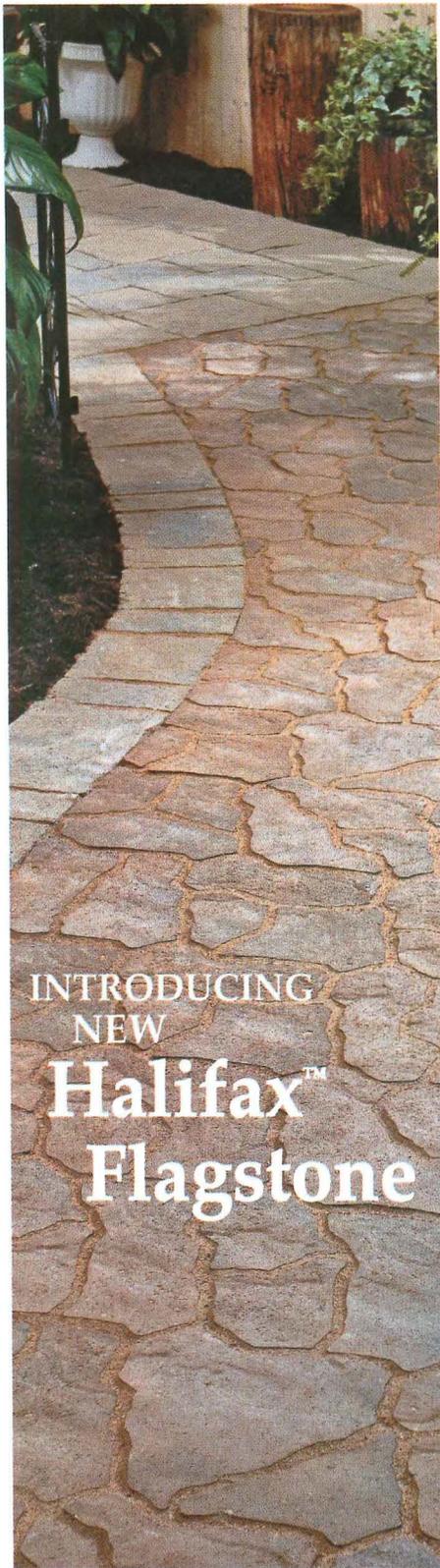
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to 60 percent of the total building cost, so it pays for much more than the additional cost of energy upgrades,” says Peter Waller, AIA, a principal at Pyatok Architects in Oakland, Calif. The firm is designing a project with structural insulated panels for a Fresno, Calif., housing authority. Springing for SIPs instead of stick framing will get them to the energy threshold needed to compete for funding.

Architects are constantly playing costs against value to get a sense of what works and what doesn't. While there are no tax credits for clean indoor air, items such as low-VOC paints and adhesives and formaldehyde-free carpeting require a relatively small investment. By contrast, FSC-certified framing lumber and sophisticated materials with a lot of recycled content do not have a direct cost benefit for the residents, Waller says. Neither do PV panels, with their 15-year to 20-year payback, or green roofs, which require more intense maintenance.

But nonprofits are very good at building densely, which puts them ahead in the green game. They often build on infill sites close to transit and shopping, thus reducing the need for cars and parking and allowing for more living units or open space on a site. “There's a huge

amount of efficiency just in the programming of these affordable projects, before you start talking about energy efficiency,” Waller says. He's seen several nonprofit developers in California designate a couple of parking spaces for a car-share program operated by an outside company, in lieu of 10 regular spots.

Indeed, nonprofit developers investing for the long haul respond to a rigorous decision-making process that starts with

street with parking on both sides. The narrower street reduced the amount of pervious surface, made the street child-friendly by slowing traffic to one lane, and increased the amount of land for development and landscaping.

From there, Mithun looks for the low-hanging fruit—green ideas that have no additional cost premiums, from drought-resistant landscaping to low-VOC paints. Then it considers things that cost more now but will

“green affordable housing makes so much sense, you wonder why for the last 80 years we've been ignoring it. it's a cool time to be in building design.”

—william kreager, faia

the site. To give clients a financial kick to go green, William Kreager, FAIA, a principal at Mithun in Seattle, first takes a reductive approach, asking which green moves cost less than standard procedure. It might mean minimizing grading, stockpiling and reusing soil, and grinding up demolished paving for reuse as trench backfill. At High Point, an 800-unit HOPE VI project in urban Seattle, Mithun won a zoning variance to create a 25-foot-wide

pay for themselves in the near future. “The choices depend on what's available locally and on what people recognize and value,” Kreager explains. For example, Energy Star appliances, whole-house fans, and compact fluorescent lighting cost a bit more and can be easily explained to clients and residents.

At High Point, the Seattle Housing Authority (SHA) also agreed that protecting the 1,000-plus trees planted in the

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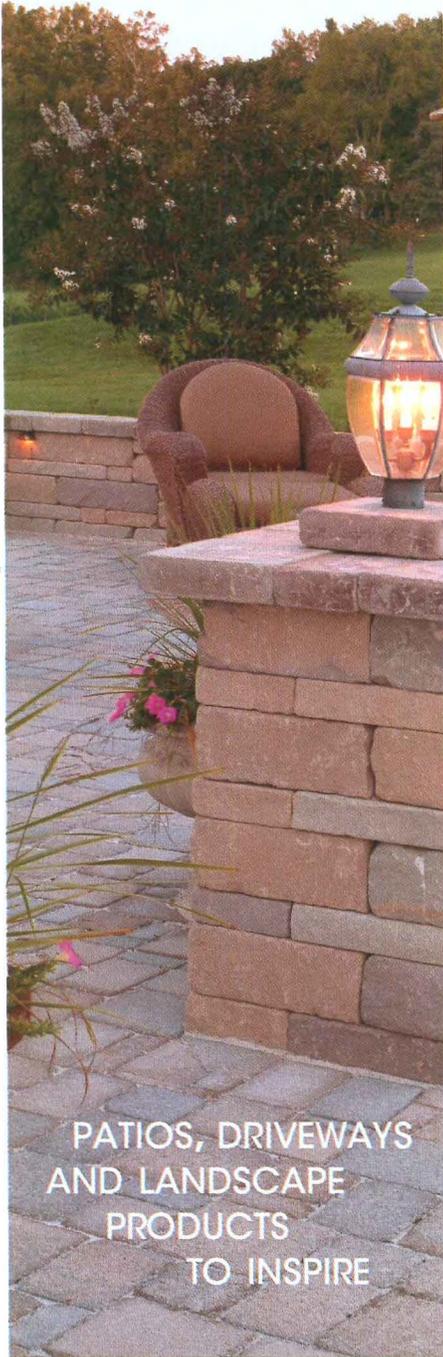


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1940s would be money well spent, contributing immeasurably to the feel of the new neighborhood. An arborist priced every tree that was worth saving—some replacement costs were as high as \$38,000—and the contractor signed off. The healthy trees that had to be taken down for construction were milled on site and reused. The SHA also splurged on higher R-value windows, Marmoleum flooring in the 36 homes designated for people with breathing problems, and a closed-loop hydronic heating system. “Things we’d love to have done but couldn’t afford were a districtwide heating system with one central boiler, PVs on the roof for solar hot water, and gray water reuse,” Kreager says.

The green features accounted for roughly \$1.5 million of High Point’s \$43 million rental housing budget. Based on the energy efficiencies alone, Kreager estimates the yearly utility savings at 20 percent, or \$371 for a three-bedroom unit. Multiplied by 800 units, that adds up to a savings of nearly \$300,000 per year, resulting in a five-year payback for a project that will be in the SHA portfolio for generations. “Our clients are tracking the costs, and the University of Washington is monitoring a lot of what we did there,” Kreager

says, “so we’ll have some pretty unimpeachable sources.”

green network

With their checklists firmly in hand, many architectural firms also keep their own records of construction cost premiums. It’s the only way to understand how much these items truly cost and help clients make informed decisions. Hord Coplan Macht, a Baltimore-based architecture firm, asks contractors to segregate green items—Did they pay more for the paint or not? The firm often uses LEED guidelines as a starting point, even if it doesn’t intend to certify the building.

“In the first meeting, we strive to identify the strategies we’re trying to incorporate: Which credits will the client be able to get, and out of those, which ones are cost-effective?” says senior associate Monica Robertson, AIA, LEED AP. While there’s no way around energy-efficiency upcharges, water conservation is easy on the budget. The firm routinely calls for low-flow toilets and showerheads, as well as small aerators inside the fixtures that increase water pressure while reducing volume—gestures that Robertson says reduce water use by 20 percent. The economical solution

for exterior cladding, meanwhile, is often materials that use recycled content, such as metals, concrete, and masonry. “Fiber-cement siding has come down in cost quite a bit in the last couple of years,” she says. “And if we use masonry, we spec modules that are larger and less labor-intensive to install.”

Architects can do a lot of green good on a limited budget. At Dattner Architects, New York City, the emphasis is on things that are decidedly non-glitzy, such as installing more efficient boilers and tweaking the ventilation system to get better air quality. At the 85-unit David and Joyce Dinkins Gardens in Harlem, completed last December, a little design ingenuity overcame the air-quality issues of a double-loaded corridor. Rather than designing a common shaft that ties each apartment to an exhaust fan on the roof, each unit has its own fresh-air intake and fan. “If you’re a nonsmoker and your neighbor is a smoker, the smoke won’t contaminate your apartment,” explains principal William Stein, FAIA. “The cost of doing that was comparable to the traditional way of handling a vent and exhaust system, though it did involve addressing some regulatory issues to get it accepted.”

continued on page 48



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practice

It's true that planning and code variances, along with a careful patchwork of funding, are usually needed to raise the green bar on affordable design. Case in point is the

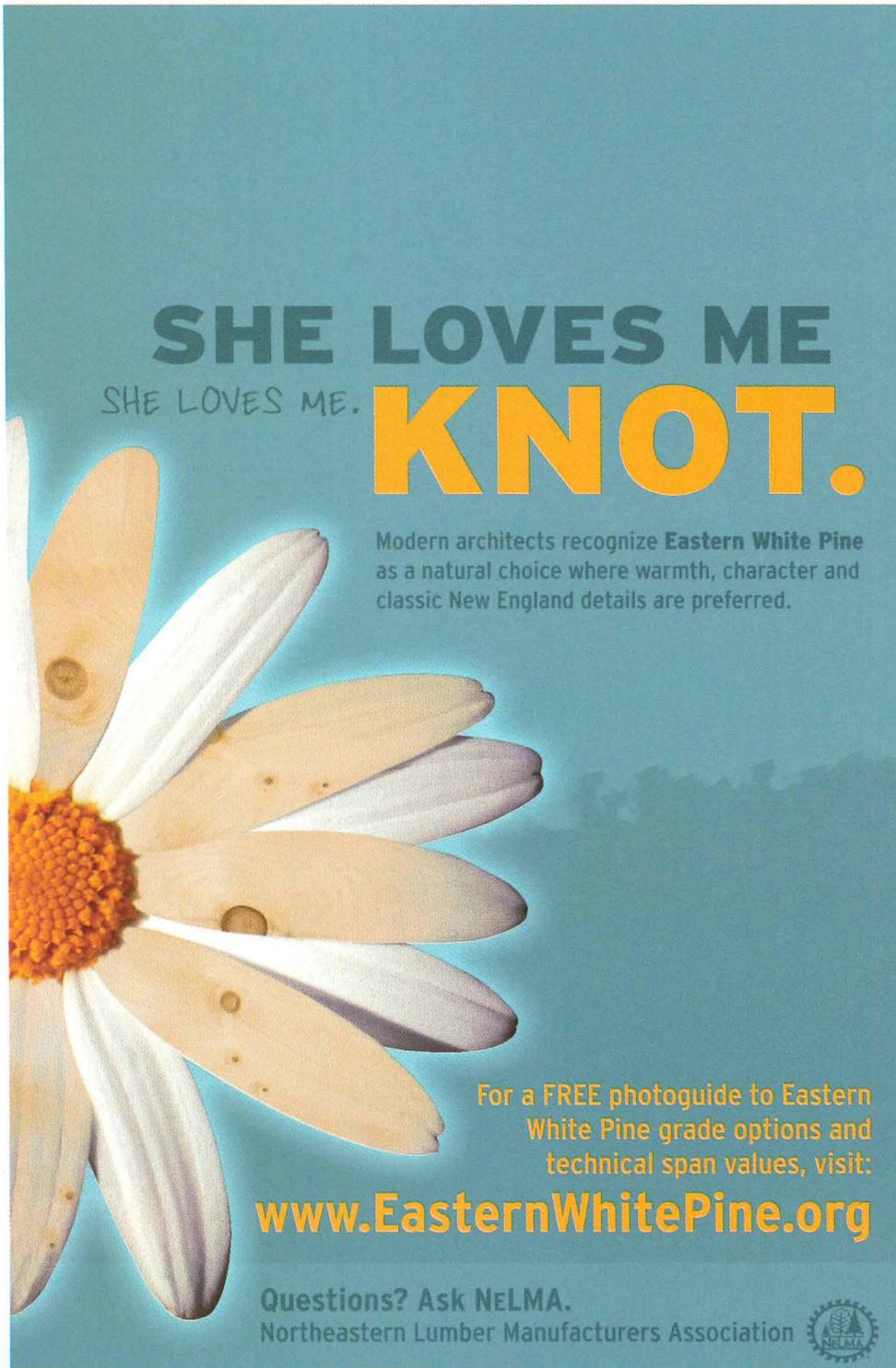
Roanoke-Lee Street Project in Blacksburg, Va., which won a 2007 Home Depot Award of Excellence for Affordable Housing Built Responsibly. Colin Arnold, AIA, LEED AP, who headed

up the project as director of Community Housing Partners' Community Design Studio in Christiansburg, Va., credits its success to an integrated design process and generous financial

support from nearly a dozen agencies and mortgage-assistance products. "We know how to build quality and performance; our goal is to find subsidies to fill the affordability gap," Arnold says. The 14-unit, for-sale duplexes, with their colorful fiber-cement siding and metal porch roofs, cost \$81 per square foot to build. That was accomplished with smart, low-cost measures such as advanced 2x6 framing and using energy modeling to ensure the efficiency of the electric heat pumps and ductwork. Site-development costs, which included rain gardens in lieu of a stormwater detention pond, brought the total project cost to roughly \$98 per square foot.

Despite the financial and construction challenges, there's a growing political will to make green housing accessible to those who need it most. "What makes affordable housing a good area in which to pursue green is that these developers operate the buildings over a long term," Waller explains. "There's so much more potential there than in for-sale housing for market-rate development, where the thinking tends to be more superficial because they're interested in green from a marketing point of view."

Kreager agrees: "Green affordable housing makes so much sense, you wonder why for the last 80 years we've been ignoring it," he says. "It's a cool time to be in building design." ra



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when going for
green, aim high.

new heights



Courtesy Studio Pali Fekete architects

you wake up, take a deep breath of scrubbed-clean air, and stroll outside to your terrace, plucking an organic orange from a vegetated wall. You head back inside to the kitchen to make yourself some fresh-squeezed juice, then take the dog down to the park on the 26th floor for a walk. Later you shower, comfortable in the knowledge that a gray water system will thoroughly filter and reuse the water to irrigate those shrubs on 26. You dress and hop the elevator directly down to the neighborhood transit station, where you catch the clean-fuel bus to work.

by meghan drueding,
nigel f. maynard,
and shelley d. hutchins

if those who study high-rise housing are correct, this vision represents the near future for many urban dwellers. According to the Population Reference Bureau, the global population—currently 6.6 billion—will balloon to 9 billion by 2050. To satisfy the world’s growing housing needs in a sustainable way, many experts are recommending building up, not out. Whether that approach translates into structures of six or 60 stories, it will certainly result in denser neighbor-

hoods, which generally consume fewer resources than sprawling ones do. “High-rises are green, without any question whatsoever,” says John McIlwain, senior resident fellow for housing at the Urban Land Institute. “Your average high-rise uses less energy than a LEED-certified development in the suburbs.” Most tall residential buildings are located in urban areas, close to public transit and retail. Their inhabitants can commute, shop, and dine out without driving—thus shrinking their carbon footprints.

new heights

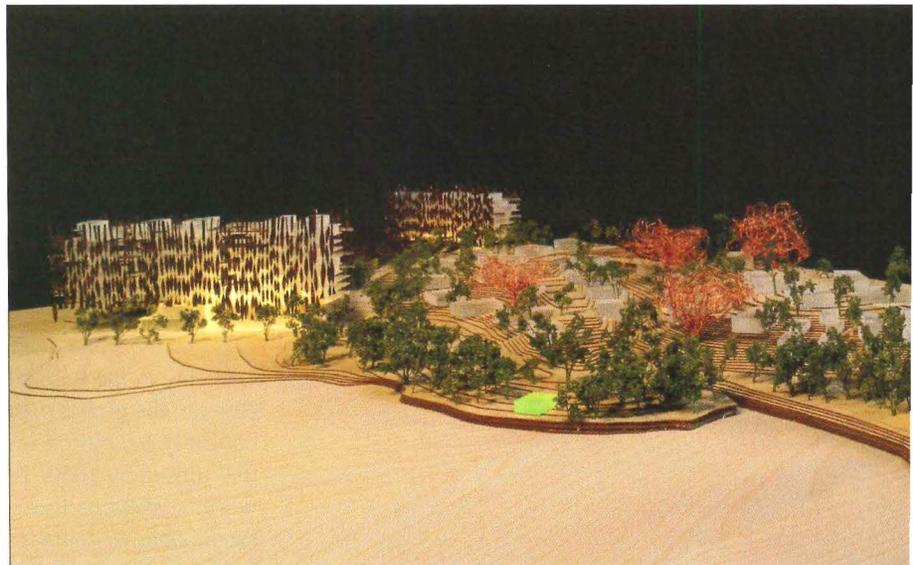
Pioneering green firms like FXFOWLE Architects, Cook+Fox Architects, and Pelli Clarke Pelli Architects are quickly bringing items like vegetated roofs and gray water treatment closer to the American mainstream. “The technologies necessary to build green high-rises used to cost more because they hadn’t reached a level where they were competitive,” says Carol Willis, founder and director of The Skyscraper Museum in New York City and an architecture professor at Columbia University. “Now they’re much better tested and more affordable.”

City governments also are doing their part to make green high-rises attractive to developers: Seattle, for example, offers increased height limits to projects registered for at least LEED Silver status. “There’s the strategic aspect of green building: the environmental impact, the energy impact, the public health impact. High-rises are very much a part of that strategy,” says John Dalzell, AIA, LEED AP, senior architect with the Boston Redevelopment Authority. “There are also economic advantages. The city becomes far more competitive when we adopt these sustainable strategies, and we attract more business.” He should know: since late 2006, Boston has required buildings exceeding 50,000 square feet to meet basic green standards.

For all their benefits, high-rises aren’t everyone’s favorite building type. They do tend to cast shadows and block views, and they usually contain high-embodied-energy materials like concrete and steel. But it’s hard to dispute the environmental logic of stacking dwellings within a relatively small envelope, rather than spreading them across the land. “There’s an inherent efficiency to locating a project within an existing urban fabric,” points out Brendan Owens, vice president of LEED technical development at the U.S. Green Building Council. “You’re not creating new roads and power lines. These buildings can be extraordinarily green.”

And ultimately, the price for a life-sustaining natural environment might be a blocked view or two. “In the end we all need to live with each other, for crying out loud,” says Zoltan E. Pali, FAIA, design principal of Studio Pali Fekete architects in Culver City, Calif. “There is no perfect solution. The population is growing.”

But these facts don’t stop him and his peers from striving for high-rise designs that unite aesthetic and environmental demands. As long as architects keep this goal in their sights, the possibility of a green and beautiful future is no tall tale.—*m.d.*





bioLINIA

vertical landscape

Zoltan E. Pali, FAIA, makes no bones about the steamy climate in Nausori, Fiji, where his firm, Studio Pali Fekete architects (SPF:a), is designing a pair of residential towers. “The temperature is always boiling there,” he says. Within this extreme environment, Culver City, Calif.-based Pali and his team created an evocative design that turns natural conditions to its advantage.

The 13- to 14-story project will use local materials and labor, which necessitated a simple, easy-to-build structure. Pali wants the buildings to work hand in hand with the area’s abundant sun and moisture, so he plans to cover their concrete framework with terra-cotta planters. Not only will the planters supply a place for shade-providing vegetation, they’ll also capture the region’s near-daily rainfall. “In Fiji, water percolates through volcanic rock,” Pali explains. “We thought we could do the same thing.”

The design calls for water to filter through the planters into a central collector, then undergo more purification for reuse elsewhere in the building. The low-tech system welcomes the climate, instead of trying to shut it out. And, in contrast to the high-end resorts at the other end of Fiji’s main island, the project will provide a full-time housing option for local residents. Part of a mixed-use complex called The Haven, the towers are tentatively scheduled to start construction in 2010 and to be completed in 2012.—*m.d.*

project: The Haven, Nausori, Fiji

key green strategies: Vegetated walls, rainwater harvesting, natural ventilation, local materials, and mixed-use

architect: Studio Pali Fekete architects (SPF:a), Culver City, Calif.

developer: Executive Development Properties, Suva, Fiji

general contractor: To be determined (TBD)

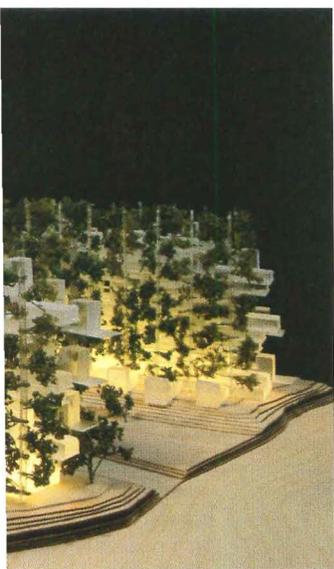
project size: 800 square feet to 1,400 square feet per unit

site size: 19 acres

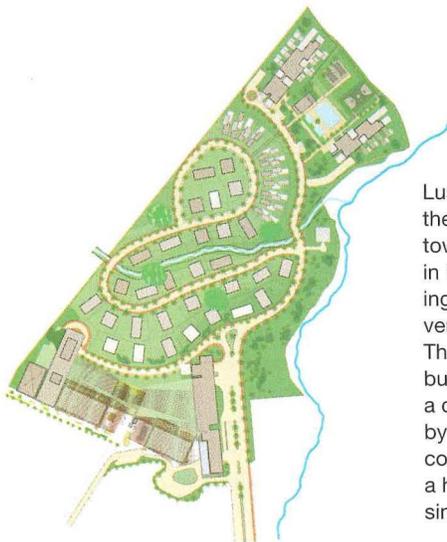
construction cost: TBD

rental price: TBD

units in project: 127



Courtesy Studio Pali Fekete architects



Lush vines will soften the two residential towers at The Haven in Nausori, Fiji, lending them a distinctly vernacular identity. The naturally ventilated buildings will lie within a community designed by various firms and containing offices, a hotel, shops, and single-family houses.

new heights



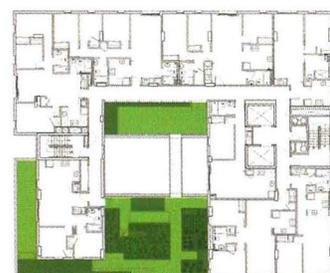
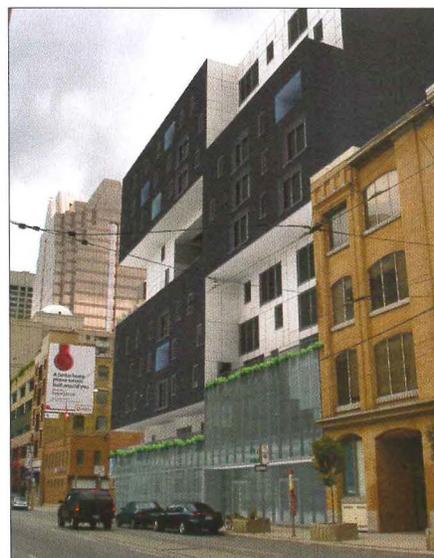
food for thought

Toronto-based Teeple Architects is interested in architecture that not only occupies its environment, but is a full-fledged extension of it. The 60 Richmond Street East Housing Co-operative project is an application of the principle. “The idea was to explore the form of the city,” says principal Stephen Teeple. “It seeks to reinvent what the high-rise can be.” In this iteration, it’s a sustainable urban entity that grows food, cools and cleans the air, and helps prevent stormwater runoff.

The affordable project consists of 85 one- to four-bedroom units for workers in the hospitality industry and a teaching kitchen/restaurant that will provide inexpensive meals to the public. The building’s green roofs will grow food for the restaurant, and a compost garden will

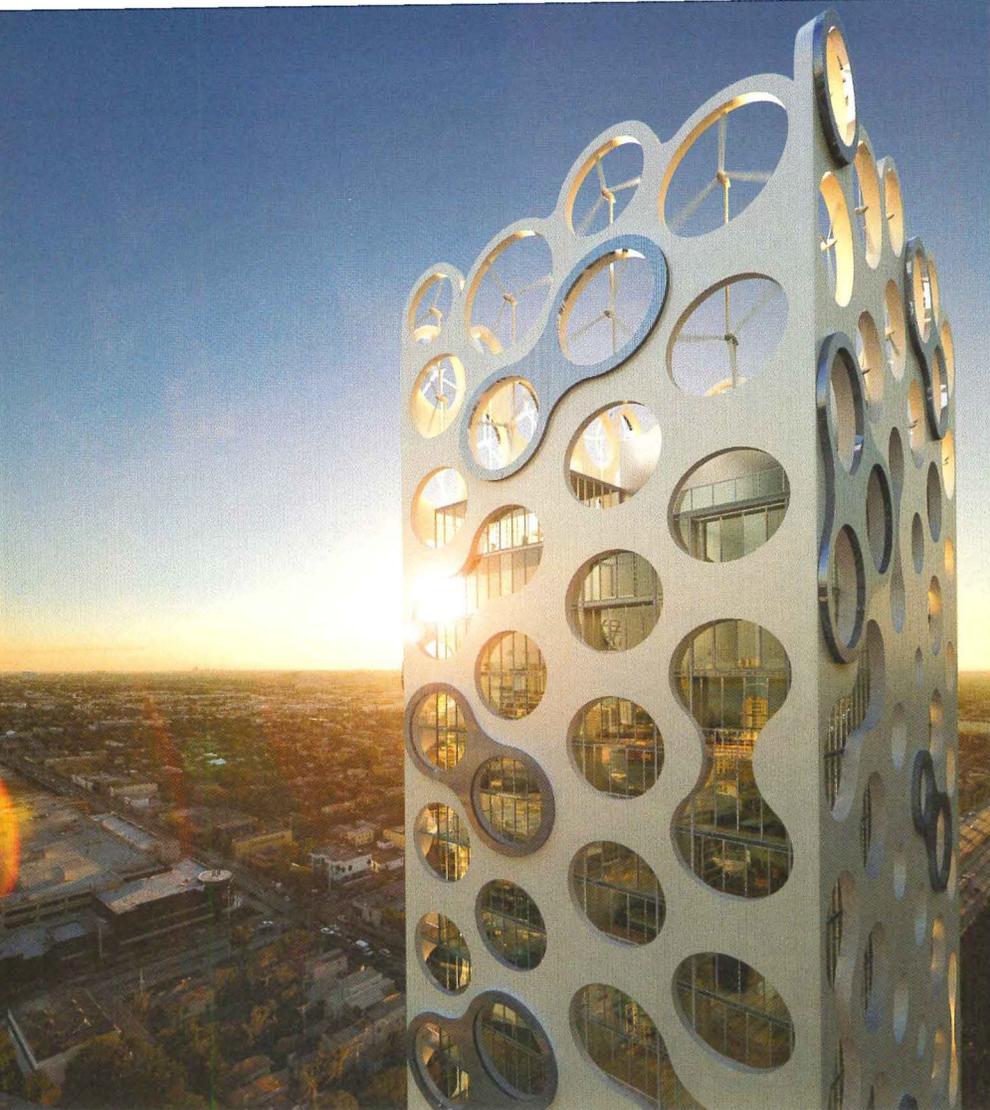
handle its waste. Second- and third-floor units will have two levels, and most will have private terraces. An ideal ratio of 40 percent high-performance glazing and 60 percent solid exterior wall will ensure energy efficiency, while a carved-away façade will maximize natural light. A collection system will channel water to the rooftop cistern for landscaping.

Engineers helped design complex mechanicals that will transfer energy from the warm side of the building to its cold side. A heat-recovery system and insulated rainscreen cladding also will help control climate extremes efficiently. “This project was a beautiful opportunity, and all the pieces fit together nicely,” Teeple says. It’s expected to be completed by July 2009 and will be seeking LEED Gold status.—*n.f.m.*



project: 60 Richmond Street East Housing Co-operative, Toronto
key green strategies: Insulated rainscreen, high-performance glazing, green roofs, compost gardens, water-catchment system, and sophisticated mechanical and heat-recovery systems
architect: Teeple Architects, Toronto
developer: Toronto Community Housing, Toronto
general contractor: Bird Construction Co., Toronto
structural engineer: CPE Structural Consultants, Toronto
project size: 538 square feet to 1,292 square feet per unit
site size: 2.3 acres
construction cost: \$178 per square foot
rental price: \$790 to \$1,382 per unit per month (70 percent of units will rent at 30 percent of qualifying renter’s income)
units in project: 85
renderings: Courtesy Teeple Architects

With 60 Richmond, Teeple Architects seeks to reinvent the high-rise as a self-sufficient city. The building’s carved-out façade will animate the urban streetscape while conveying natural light deeper into the structure.



spin control

Rising above the sun-drenched skyline of Miami's Design District, COR aspires to green heights for renewable energy use, water conservation, and indoor air quality. In fact, when the 400-foot tower is completed, it will be the city's first sustainable, mixed-use condominium project, says architect Chad Oppenheim, AIA.

"One of the most remarkable things about this building is the integration of structure, ecology, and architecture in one," he says, referring to the building's concrete-and-stucco exoskeleton, which provides thermal mass for insulation, shading for natural cooling, enclosure for terraces, and armatures for wind turbines. "The skin is also the structure, which will result in limited columns in the living spaces," he adds.

The building's wind turbines are designed to generate 30 percent of its energy and to power lighting for the common areas and garage; solar units on the roof will provide domestic hot water. High-performance glazing will reduce solar heat gain, and rain-water collection and gray water reuse will minimize public water consumption.

The 113 residential flats and duplexes also will employ low-toxicity paints, dual-flush toilets, energy-efficient lighting, and low-flow water fixtures, among other eco-sensitive features. The estimated completion date is 2010.—*n.f.m.*

project: COR, Miami

key green strategies: Wind energy, solar hot water, green roofs, solar shading, water-catchment system, gray water collection and reuse, high-performance glazing, low-flow fixtures, Energy Star appliances, low-VOC paints and carpets, dual-flush toilets, and Forest Stewardship Council-certified wood

architect: Oppenheim Architecture+Design, Miami

developer: Nexus Development Group, Miami

general contractor: To be determined (TBD)

structural engineer: Ysrael A. Seinuk, P.C. (YAS), New York City

project size: 930 square feet per unit

site size: 0.48 acre

construction cost: TBD

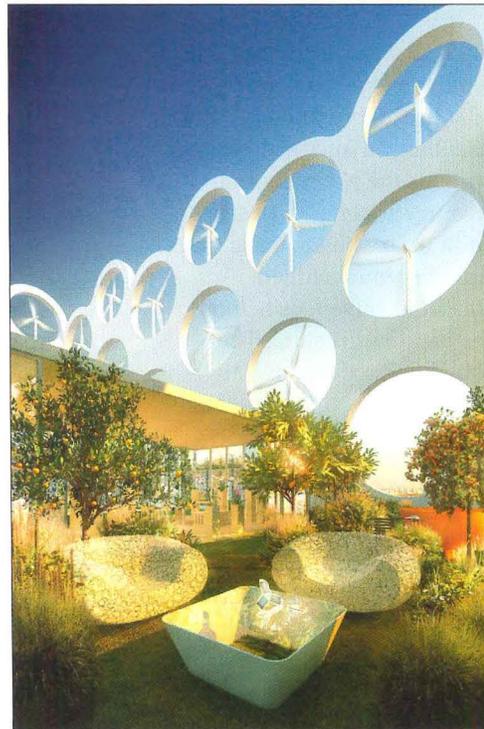
sales price: TBD

units in project: 113

renderings: Courtesy Oppenheim Architecture+Design



Chad Oppenheim designed COR using strategies that benefit the building as a whole (wind energy, water conservation, and solar hot water) and those that help unit owners (low-toxicity finishes and paint). It will be Miami's first sustainable mixed-used condo building.



new heights



Encouraging community interaction is a chief goal for Andersson. To that end, he laid out terraces at the street and mezzanine levels as inviting public spaces—including vantage points for watching live televised broadcasts of “Austin City Limits.”

texas chill

Arthur Andersson, AIA, looked to Southwestern cliff dwellings when designing Block 21 in Austin, Texas. The mixed-use project contains the television studios and performance venue for “Austin City Limits,” office and retail space topped by a W hotel, and private residences. Those high-rise caves inspired him to design shaded balconies carved into the east and west façades, for longer hours of daylight without heat gain.

Shading is key, because staving off the Texas heat consumes large amounts of energy. The project’s high-performance glazing blocks UV rays and reflects heat away from interiors while providing natural light. But the building still needs cooling, so Andersson found an alternative method in Austin’s central water-chiller system.

“You buy cold water from the city’s central chiller and when it gets hot, you send it back,” he explains. “But we’re designing an intermediate step where we send the water through a heat-recovery system.” That step garners heat for the building and saves energy for the central chiller.

Another innovative idea helped shrink the parking structure. The 37-story building requires mostly nighttime and weekend parking, while nearby commercial buildings use garages during business hours. A shared parking agreement lets Andersson get away with just 450 spots—about half the usual requirement. Block 21 currently qualifies for LEED Platinum status, and the team feels strongly they’ll be able to maintain that status throughout construction, which concludes in 2010.—*s.d.h.*

project: Block 21, Austin, Texas

key green

strategies: Green roof, xeriscaping, low-flow fixtures, low-VOC paints and adhesives, local materials, optimal daylighting, on-site recycling, high-performance glazing, central water-chiller system, and mixed-use

architect: Andersson-Wise Architects, Austin

architect of record: BOKA Powell, Dallas

developer: Stratus Properties, Austin

general contractor: Austin Commercial, Austin

project size: 638 square feet to 4,204 square feet per unit

site size: 1.76 acres

construction cost: \$275 per square foot

sales price: \$300,000 to \$1.5 million per unit

units in project: 196 (plus 250 hotel rooms)

renderings: Courtesy Andersson-Wise Architects





elbe pirouette

Sensitive urban revitalization often goes hand in hand with sustainability. When an underpopulated neighborhood blossoms, its city becomes denser and more resource-efficient. Hamburg, Germany, provides a timely example, with its ambitious plan to turn the industrial HafenCity area into a cultural, business, and residential hub. The slate of projects under construction there includes the undulating Marco Polo Tower by Stefan Behnisch, RIBA, Martin Haas, and David Cook, RIBA, of Stuttgart, Germany-based Behnisch Architekten.

Scheduled for completion in 2009, the 16-story tower is projected to house 59 luxury apartments, as well as a ground-floor restaurant. On the same 2.2-acre plot will sit the headquarters for Unilever Germany, which the firm is also designing.

Marco Polo Tower's biomorphic form affords views of the city and the adjoining Elbe River. Its curved balconies will double as shading devices and provide shelter from winter winds. The architects also hope to include energy-conserving triple-glazed window walls. And a planned rooftop solar cooling system, in which solar-heated water drives an absorption cooling machine, will lower the building's ecological impact while ensuring chilled indoor air in hot weather.—*m.d.*



Marco Polo Tower's rooftop solar panels power an interior cooling system, its covered terraces facilitate passive cooling, and its curvaceous form promotes a variety of floor plans to maximize views and natural light.

project: Marco Polo Tower, Hamburg, Germany
key green strategies: Triple glazing, solar cooling, passive cooling, and mixed-use
architect: Behnisch Architekten, Stuttgart, Germany
developer: HOCHTIEF Projektentwicklung, Hamburg
structural engineer: Weber Poll, Hamburg
project size: 431 square feet to 2,476 square feet per unit
site size: 2.2 acres (includes Unilever Germany office building site)
construction cost: To be determined (TBD)
sales price: TBD
units in project: 59
renderings: Courtesy Behnisch Architekten

new heights

Each unit will enjoy 38-foot spans (or more) of window walls for free-flowing natural light. Their shallow depth—a mere 30 feet—will allow Portland's limited sunshine to penetrate the entire space.

fractal simile

John Holmes, AIA, and Mack Selberg, AIA, have been talking for years about designing a building based upon fractal geometry. So, when some forward-thinking developers approached Holmes to do a multifamily high-rise in Portland, Ore.'s Pearl District, he called upon his old friend for help. Their design for 937 Condominiums uses random mathematical patterns to determine the placement of windows and balconies. "We then chose sustainable strategies that reinforced the building design philosophy," Selberg explains.

One strategy they chose was to place living and sleeping areas along the exterior walls, maximizing natural light. And they carved out interior rooms working within the windows' fractal patterns. The projecting balconies on the façade will also serve to shade the generous glazing.

Those erratic windows and balconies will overlook 4,000 square feet of plantings atop a plinth of retail spaces below. The green roofs should produce oxygen, help cool the air, and

filter and reclaim stormwater runoff. "It will act more like an open planted field than a building," Selberg says of the project, which is slated for completion by the end of the year.—*s.d.h.*

project: 937 Condominiums, Portland, Ore.

key green strategies: Photovoltaics, green roofs, local materials, rainwater harvesting, construction material recycling, bicycle parking, high-efficiency heat pumps, and dual-flush toilets

exterior architect: John Holmes, AIA, Holst Architecture, Portland

interior architect/sustainability consultant: Mack Selberg, AIA, Ankrom Moisan Associated Architects, Portland

developers: Patrick Kessi and Geoff Wenker, 937 Group, Portland

general contractor: Greg Martin, Andersen Construction Co., Portland

project size: 946 square feet to 2,494 square feet per unit

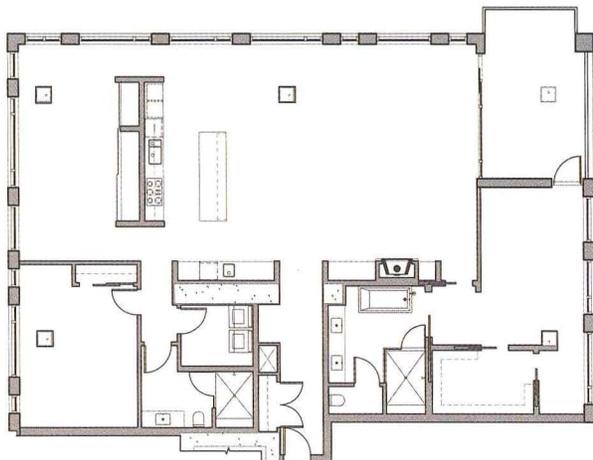
site size: 0.5 acre

construction cost: Approximately \$200 per square foot

sales price: \$339,000 to \$2.25 million per unit

units in project: 114

renderings: Courtesy Holst Architecture



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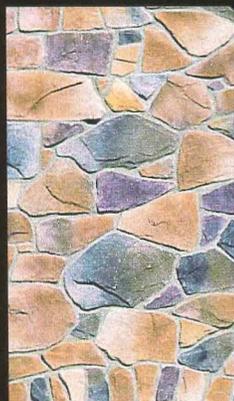
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water woes

supplies are running low, but conservation of this precious resource has never been easier.

by nigel f. maynard

The U.S. freshwater supply is drying up. Well-documented shortages in the West have been spreading east to Atlanta, Florida, and the Carolinas, among other areas, and clean-water advocates and government officials are concerned. Sandra Postel, director of the South Hadley, Mass.-based nonprofit Global Water Policy Project, cites multiple causes for the problem. “In the West, cities have been growing at a rapid rate in areas where water isn’t available,” she explains. “We’ve had rapid growth in the East, too, but it’s wetter here, so the [larger] issue is how we manage water.”

In a September 2002 report, “Managing America’s Water — Toward a More Modern Approach,” the U.S. Army Corps of Engineers (USACE) painted a gloomy picture. “This country is facing a looming water crisis,” USACE warned. “We are seeing frequent regional droughts, disputes over allocation brought on by growing population demands, and widespread disagreement over competing purposes for water resource use. It is likely that water will generate as much

controversy in the 21st century as oil did in the last century. If America doesn’t act, there will be more serious water conflicts in the next 20 years.”

the rain-egades

It’s unlikely development will cease, but forward-thinking architects and developers *have* heeded the warnings. Many are taking a more thoughtful water-saving approach when conceiving and building projects, and some are even arguing that on-site rainwater collection should be a central focus of the water debate. San Francisco green developer LORAX Development, for example, believes so strongly in the practice that it fought the city’s Department of Building Inspection to gain approval for San Francisco’s first residential rooftop rain-catchment system.

Installed atop a 2,600-square-foot Noe Valley home, the system collects up to 20,000 gallons of rain annually, filters it, and stores it in tanks below an exterior deck for toilet, laundry, and irrigation use. “We’re always looking at new techniques and teaching ourselves about green features,” says LORAX’s Mike Kerwin, who, with his partners, saw the system at a trade show and felt compelled to use it.



Courtesy LORAX Development

Designed by John Maniscalco, AIA, this house has San Francisco’s first rain-catchment system. LORAX Development fought a long battle with city officials to gain approval for the system.

City officials didn’t approve —at least, not initially. “They told us, ‘You can’t be your own water plant,’” Kerwin says. “It became an obsession for us.”

Cherokee Investment Partners, a Raleigh, N.C.-based firm that specializes in the sustainable redevelopment of brownfields, also makes water conservation a key component of its projects. “We’ve always been aware of water shortages,” says senior director Jonathan Philips. “We consider it a critical resource.” The firm even built the Mainstream GreenHome to encourage more people to come to the same realization.

Located in Raleigh, the 4,000-square-foot home uses up to 50 percent less water than a typical house, Philips says. It has automatic faucets, faucet-flow restrictors, dual-flush toilets, instant hot water tanks, and a high-efficiency irrigation system that relies on moisture sensors in the soil. Anchoring the project is an 8,000-gallon rainwater-harvesting system—the first to gain city approval—that retains on site up to 95 percent of all stormwater. That feature alone will prove significant, Cherokee claims, since a 2,000-square-foot home in an area with 41

continued on page 62

inches of annual rainfall has the potential to harvest 46,000 gallons of freshwater each year.

Atlanta's Urban Realty Partners took a similar approach with Oakland Park, a 65-unit loft project it co-developed with Savannah, Ga.-based Melaver. Dual-flush toilets, water-efficient appliances, and rain-collecting cisterns will realize efficiency gains of 30 percent to 40 percent over conventional buildings of similar size. Simon J. Tuohy, development associate for Urban Realty Partners, admits that such features cost more to implement, but he's convinced that "more builders should do projects that have them," if for no other reason than because it's the right thing to do.

Architect Thomas P. Doerr agrees. On his Web site, the principal of Boulder, Colo.-based Doerr Architecture promotes rooftop water-catchment systems, but he also encourages clients to consider recycling gray water from sinks, showers, and washing machines and to choose water-efficient equipment. "Water-conserving toilets, showerheads, and faucet aerators not only reduce water use, they also reduce demand on septic systems or sewage treatment plants," he writes.

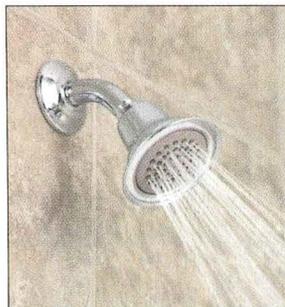
water wise

Until recently, it seemed that Energy Star appliances and standard 1.6-gallons-per-flush toilets could suf-

ficiently mitigate the problem. But rising populations and increased demand have outpaced those measures. Gov. Arnold Schwarzenegger took a step toward more rigorous conservation last October when he signed into law a bill requiring all new construction in California to use even more efficient toilets and urinals. Beginning in 2010, AB 715 will require 50 percent of all toilets sold in California to meet the new flush standards; 100 percent of toilets sold in the state must comply by 2014.

Fortunately, high-efficiency toilets—those that flush with 1.28 gallons of water and dual-flush units that use 0.8 gallons to 1.6 gallons per flush—are now widely available, as are various ultra-low-flow fixtures. Kohler Co., for example, already offers a variety of dual-flush units through its Sterling brand. It also recently introduced the San Raphael Pressure Lite, which uses a mere 1 gallon of water per flush. According to the company, the pressure-assisted toilet could potentially save a household of four 7,000 to 10,000 gallons of water annually, when compared with a standard toilet. "These toilets represent the future of flushing technology," says Shane Judd, Kohler's product manager for toilets. "The industry is progressing to better technology and improved performance."

More efficient faucets exist too. Piscataway, N.J.-based American Standard



FloWise offers a default 1.5-gallons-per-minute water flow rate; the San Raphael Pressure Lite needs just 1 gallon to flush.

now offers FloWise, a showerhead line with a dual-function feature that allows users to choose a 2.5- or 1.5 gallons-per-minute flow rate. Other manufacturers, including Kohler and Grohe, also make faucets with reduced water output.

Even the best faucets and most efficient heaters can't prevent waste while users wait for the water to reach their desired temperature, however. Cherokee Investment Partners found a solution to this problem when specing its Mainstream GreenHome: the Metlund Hot Water D'MAND System. Manufactured by Costa Mesa, Calif.-based ACT, Inc. Metlund Systems, the D'MAND recirculates ambient-temperature water so hot water is virtually instant and little is wasted down the drain.

drops in the bucket

The EPA says the nation's population doubled from 1950 to 2000, and during that same time period, public demand for water more than tripled. The American Water Works Association reports that the average single-family household uses 70 gallons of water per



Photos: Courtesy American Standard (left) and Kohler

day. Factor in water usage for landscaping, and the severity of the problem is magnified.

State and regional officials routinely employ temporary restrictions when water is in short supply, but green advocates believe such limits may become permanent as the stakes rise and as interest in sustainable building continues to grow. "I think municipalities and states will start implementing restrictions year-round," rather than simply during periods of drought, says Chris Miles, principal of GreenCraft Builders in Lewisville, Texas. "You're going to see a major shift in water attitudes." Already, county supervisors in Stafford, Va., are eyeing a plan that would restrict water use from May 1 to Oct. 31 every year and could permanently limit which days residents can water their lawns each summer.

Architects and developers can help the cause by adding water-conserving design features to their projects; by specing energy-efficient appliances, faucets, and fixtures; and by designing simple, affordable water-collection systems. As the EPA's WaterSense program notes: every drop counts. **ra**

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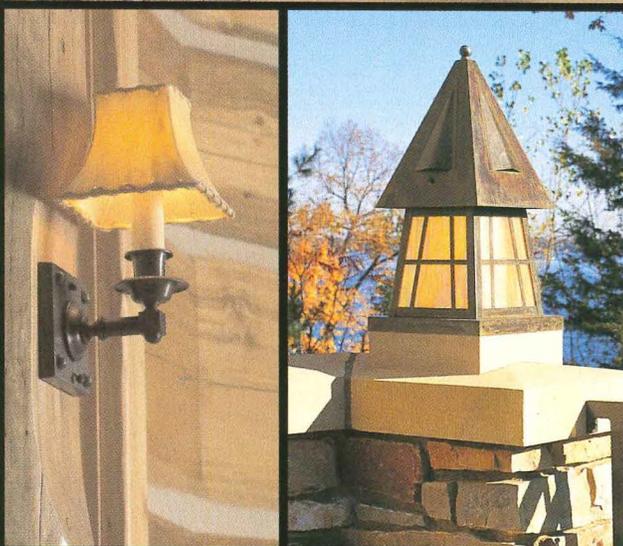
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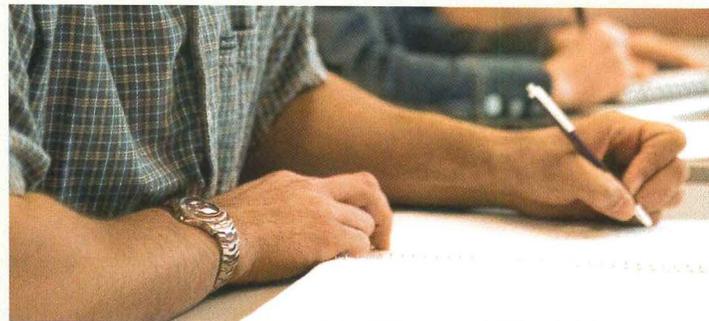
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rockhill and associates



Courtesy Rockhill and Associates

dan rockhill

lecompton, kan.

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ground control

Rockhill uses ECO-TERR's StabiliGrid ground-reinforcement system to mitigate stormwater runoff from his projects. "It's easy to install, cost-competitive with concrete or any other hard surface material, and looks great," he says. Manufactured from recycled polyethylene, the water-permeable grids protect roots from damage and can be used for driveways and hillside-erosion control. ECO-TERR, 425.657.7958; www.stabiligrd.com.



driven to xcell

In lieu of fiberglass insulation, Rockhill specs Xcell spray-in cellulose because of its "great R-value." Made from recycled newspaper and treated with fire-retarding boric acid, Xcell is said to prevent air leakage more effectively than conventional batt insulation. Its manufacturer also claims it reduces outside noise and sound transfer between rooms. Central Fiber Corp., 800.654.6117; www.centralfiber.com.

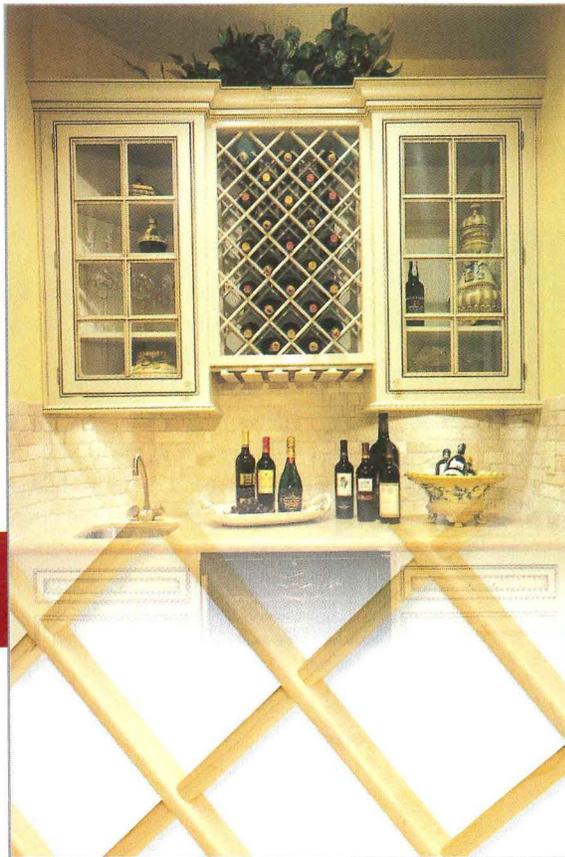
—nigel f. maynard

Wine Storage

Wine cellars are fast becoming a standard feature in upscale homes. Everyone from Baby Boomers with larger collections to younger folks with a budding interest are seeking a way to store and display their wine. Whether you're a novice or an expert, you must store your wine properly or risk losing the inventory you have, be it five bottles or 500.

There are many factors that go into proper wine storage. Temperature and humidity are prime considerations, of course, affecting everything from layout to location to construction materials used. In addition to these crucial but practical concerns, homeowners should decide whether to build a room solely for wine storage or to create a showroom with furniture, lighting, and decor.

By keeping abreast of the wine storage market and advising clients who have an interest in wine, builders and architects can tap into a larger market and improve their own profitability. Read on to learn about a racking system that is easy to install and will preserve your clients' valuable wine collections.



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Photos: Chris Cooper Photography

Soon after the principals at O'Neill Conrad Oppelt Architects started looking for new office space, they learned their compatriots at Alamo Architects were doing the same. The two San Antonio firms decided to jointly purchase two old warehouse buildings in the city's burgeoning Southtown area. With a bit of renovating and cleaning up, the structures made a perfect pair of offices connected by a landscaped courtyard.

"We share a lot of the same values," says Mark Oppelt, AIA, referring to partner Mickey Conrad, AIA, and Alamo principals Mike Lanford, AIA, NCARB; Mike McGlone, AIA; Jerry Lammers, AIA, LEED AP; Irby Hightower, AIA; and

Billy Lawrence, AIA. "We all designed the renovation together—it was a little bit like being back in design studio in school."

The firms are applying for LEED Silver status for the year-old project. In addition to maximizing daylighting, using nontoxic finishes, and reusing materials from the existing building, they also installed a cistern that captures rainwater for irrigation. And the project's location just outside downtown San Antonio lends itself to low-impact commuting options, including biking, walking, and public transportation.—*meghan drueding*



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