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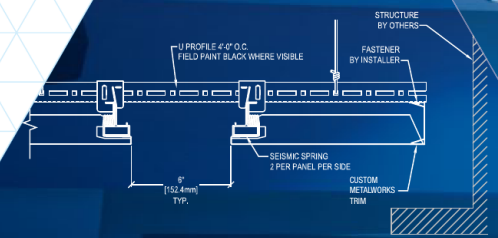

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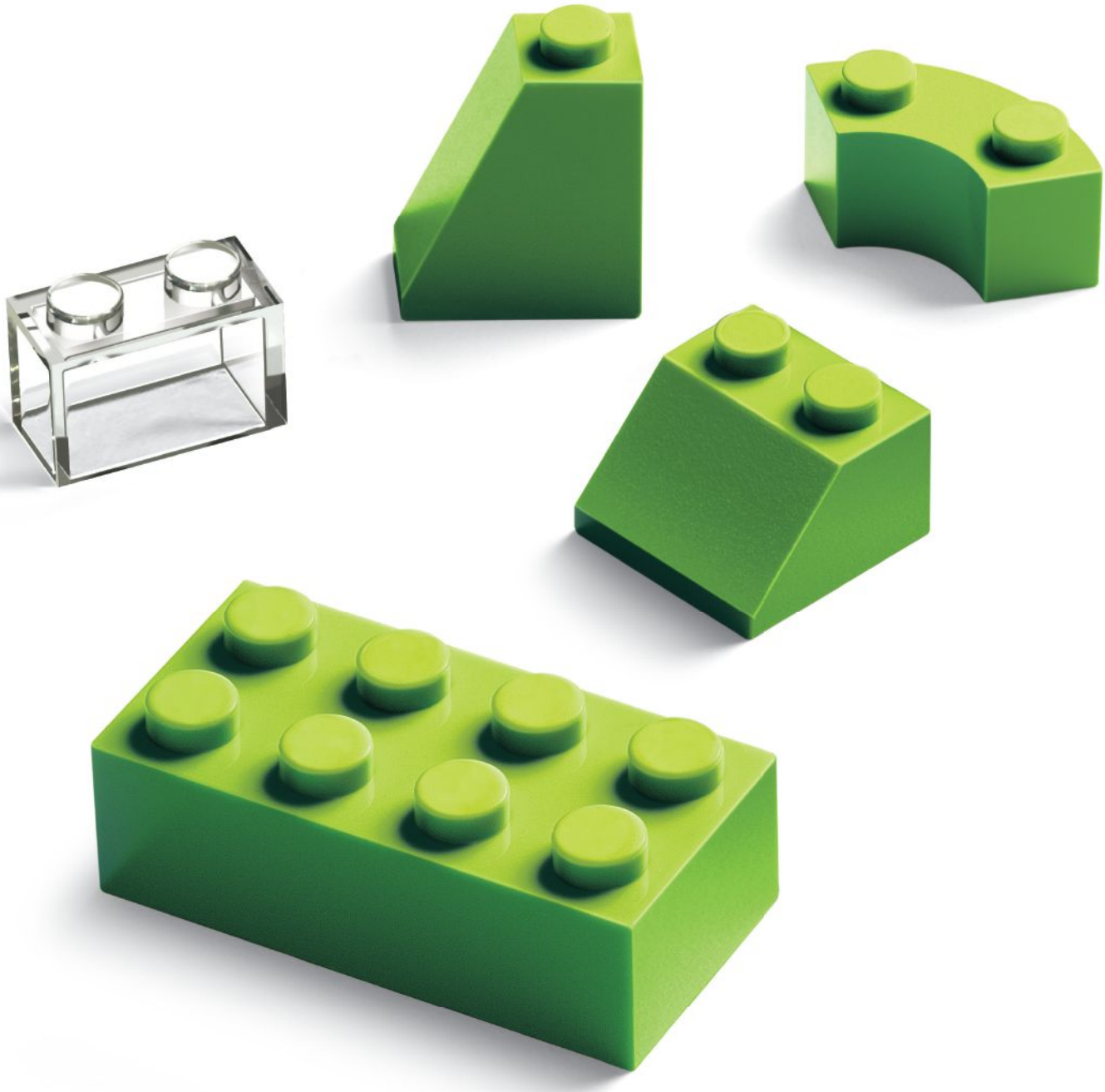

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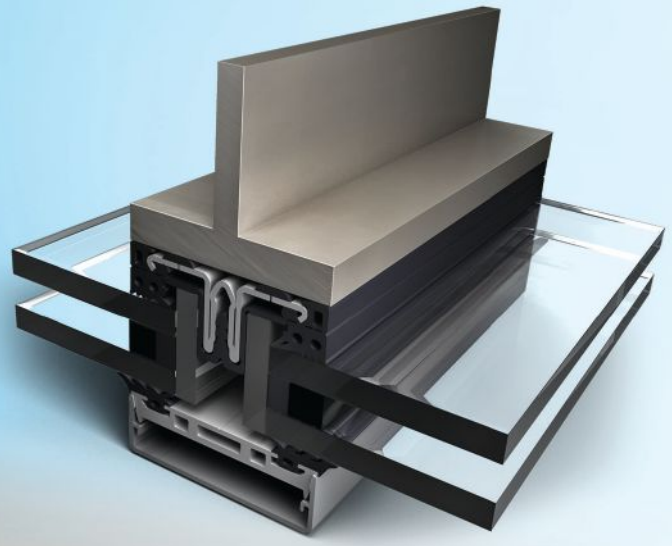

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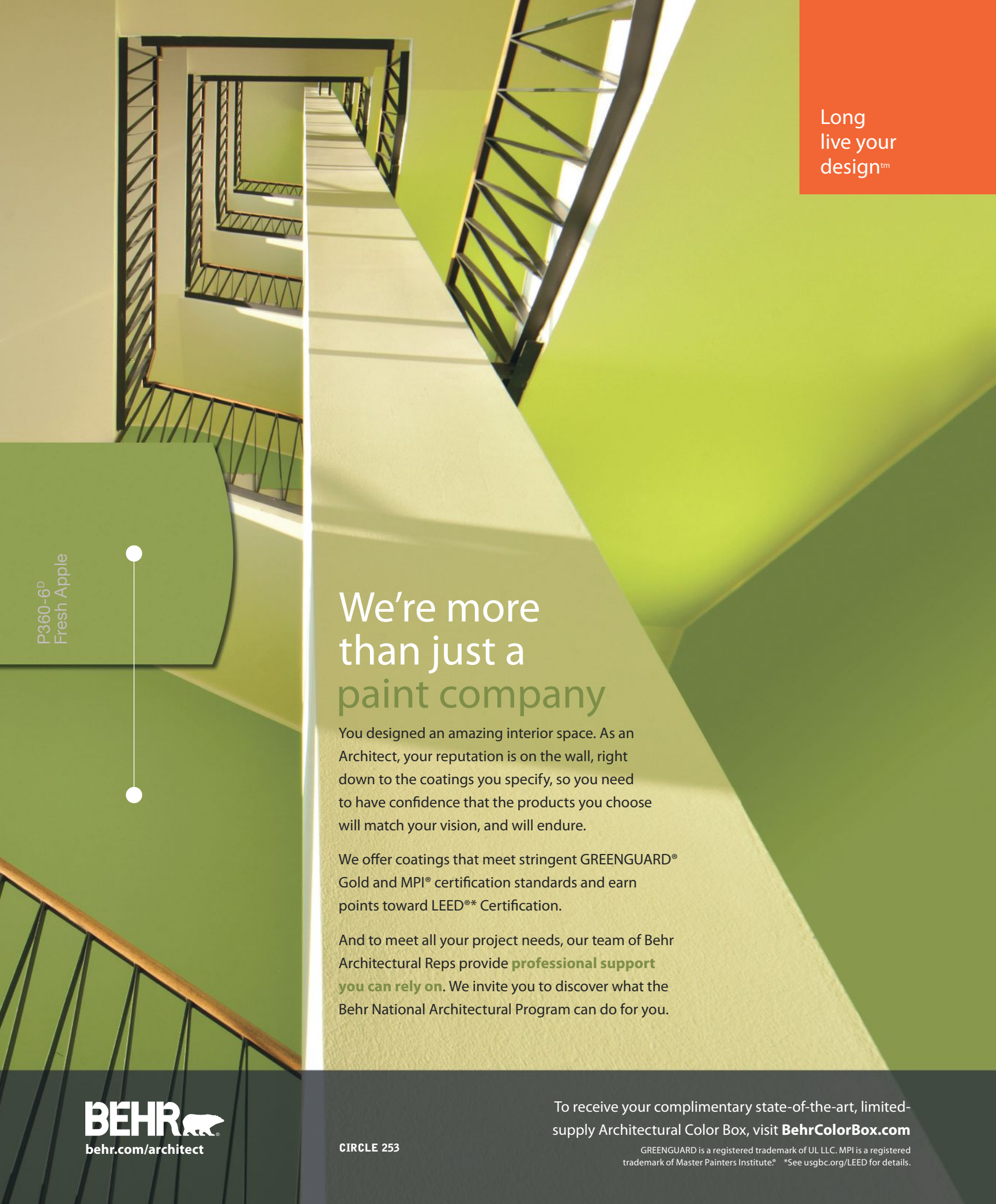

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See additional images of the Guildford Aquatic Centre by Bing Thom architects, including a construction video and behind-the-scenes shots. [PROJECTS]

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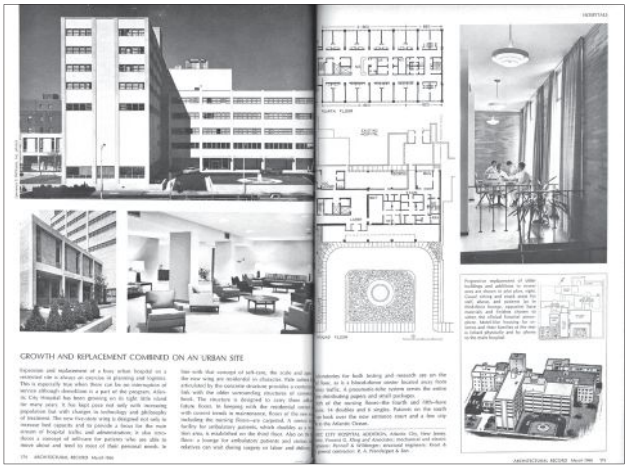

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This year's Venice Biennale takes a broad view of the role of the architect.

TO BE in Venice for this year's Architectural Biennale is to face an inevitable irony. The exhibition, with the theme Reporting from the Front, invited architects to focus on the world's most urgent problems—poverty, mass migration, environmental degradation, housing, social inequities of every sort. As you dive into sobering territory—and into a remarkable range of architectural responses to that critical thesis—there is no getting around the fact that, yes, you are in Venice, a sumptuous place where the gilded facades of Renaissance palazzos glitter along the Grand Canal, the gardens are fragrant with star jasmine, and where, as day turns to night and you leave the Biennale's exhibits behind, you are going to have a wonderful evening somewhere in that magical city.

But if you can navigate the distance between the setting and the subject—between privilege and the realities that underpin the Biennale, as curated by the Chilean architect Alejandro Aravena—there are riches of another sort in many of the exhibits in Venice's Giardini and the Arsenale (page 27).

Architecture as a discipline is rarely defined as broadly as it is in this Biennale. In Venice, today's architect is shown to be a renaissance man or woman, adept at research, statistics, data, scientific experimentation, political advocacy, history, writing, reporting, multimedia communication, graphic arts, materials analysis, and construction. The curators of the U.S. pavilion, which is focused on regenerating Detroit, commissioned speculative projects for real sites, but, in general, there is relatively little "pure" architecture (whatever that means). While some visitors to the Venice preview grumbled about that, the diversity of perspectives on view was exhilarating.

Of course, the Biennale is far too vast to neatly unpack all the objects, images, and ideas afterwards. But here are a few takeaways.

- Mud. There was a lot of mud. A special mud recipe was used to make bricks for a prototype of a vaulted droneport from the Norman Foster Foundation, to house drones that could transport crucial supplies to remote parts of the world. The award-winning German architect Anna Heringer built a surprisingly beautiful shelter of Venetian mud, polished to a soft golden hue, round and high, like a Doge's hat. Her goal: to promote mud as a readily available though overlooked building material—which, she says, is unfairly banned for use in construction in many places.
- Temporary settlements. The plight of refugees was a prevalent subtheme. Even the pavilion representing the refugees of Western Sahara was temporary—a tent pitched in the Giardini—and it promoted the striking architecture its displaced citizens have built in refugee camps where they've lived for decades, over the border in Algeria from their own beleaguered homeland. A different kind of temporary settlement, what architect Rahul Mehrotra calls "ephemeral urbanism," was on view in an astonishing exhibit he curated documenting the Hindu pilgrimages in India that draw to one place tens of millions of people for whom "stability is a luxury."
- Forensics. Exhibits showed how architectural analysis was used to verify the damage of drone strikes in Pakistan and bombs in Gaza. In one especially haunting installation, a historian, who was an expert witness in a lawsuit brought by a Holocaust denier, has recreated part of an Auschwitz gas chamber on the basis of his long, detailed study of fragmentary architectural evidence.
- Repurpose. Thrift, making do, and sustainability were present everywhere at the Biennale, beginning with Aravena's own introductory installation that recycled metal studs and gypsum board from the last Venice Art Biennale. Rural Studio, the Auburn University program in Hale County, Alabama, used stacks of lockers and plastic-wrapped bedsprings for their exhibit, which will be donated to social services for the homeless in Venice after the Biennale.

Yes, there are homeless people in Venice, far from the tourist throngs in St. Mark's Square. And as a historic crossroads for refugees, Venice actually has a certain resonance with Reporting from the Front. I strayed from the Biennale to visit the Punta della Dogana, the 17th-century building adapted by Tadao Ando for the billionaire French art collector François Pinault. In that private museum was another irony: a conceptual piece by Pier Paolo Calzolari that featured six mattresses affixed to the wall. I couldn't help but think of Rural Studio's beds for the homeless, while looking with a little bemusement at beds in an installation by an artist whose work sells for six figures. But, of course, it's not just in Venice that culture, commerce, and good intentions are bumping up against each other. It's the world we live in.

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief

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perspective

Being local now is a radical form of resistance. —*Brian MacKay-Lyons, speaking at* RECORD*'s Innovation Conference on June 8 in San Francisco.*

Governors Island Gains New Ground

BY ANNA FIXSEN

The Hills, a series of man-made peaks and valleys on Governors Island, opens to the public this month. The landscape firm West 8 used the undulating topography to frame dramatic views of New York Harbor.

PHOTOGRAPHY: © TIM SCHENCK

FROM THE top of Outlook Hill on Governors Island, the 172-acre land mass in New York Harbor, views of New York unfurl in a post-card-worthy panorama: the eye glides from the glossy skyscrapers of Lower Manhattan to the mint-green silhouette of Lady Liberty, across the channel to Brooklyn and the borough's iconic bridge.

Two years ago, this vista didn't exist. The peak, along with three others, was grafted onto the landscape as part of a multi-phased master plan by the international landscape firm West 8 and constitutes a new area on the island called "the Hills." On July 19, nearly a decade after the firm won a competition to reimagine the southern portion of Governors Island, the Hills will open to the public.

Led by Dutch landscape architect Adriaan Geuze, West 8 has created an elaborate game of hide-and-seek with the topography. Meandering paths wind through the Hills' sloping peaks and valleys and curve around expansive lawns, offering visitors fleeting vistas of the surrounding cityscape and bay. "All the time you are walking, you have a different view," says Geuze. "You are hardly aware how rich the landscape is but are fully engaged with the harbor."

Governors Island, though just 800 yards from Manhattan, was off-limits to the public for much of its four-century history, used for defensive purposes beginning with early Dutch settlers. Most recently, the U.S. Coast Guard had a base there until it closed in 1996, leaving behind a small city. When West 8 began work on the master plan in 2007, the island had only been accessible to the public for two years.

During the first phase of the plan, West 8 elevated the land 15 feet above existing grade, based on changing-sea-level estimates. After these resiliency measures, the landscape architects developed the parkland's first 30 acres, which included a landscaped plaza called Liggett Terrace adjacent to a McKim Mead & White structure, a grove dotted with mobile furniture and hammocks, and a lawn with two ball fields.

Asphalt bicycle paths were made to meander south toward the Hills created as part of the master plan's second phase. The paths are edged by bright-white concrete curbs stamped in squiggly organic patterns and built up at intervals to form seating.

The four hills—Outlook, Grassy, Slide, and Discovery Hill—are made from nearly 300,000 cubic yards of fill. (West 8 worked closely with geotechnical engineers so that the man-made portions of the island wouldn't sink.) The steepest slopes were formed in layers, "like lasagna," says Geuze. Debris from demolished Coast Guard residences underpins the hills (Outlook Hill, the tallest at 70 feet, also includes lightweight pumice stone). This layer was topped with 3 feet of topsoil and, at the steepest parts, secured by metal mesh. Finally, the landforms were seeded and planted. On the newly landscaped slopes, 860 saplings shudder in the strong salty wind.

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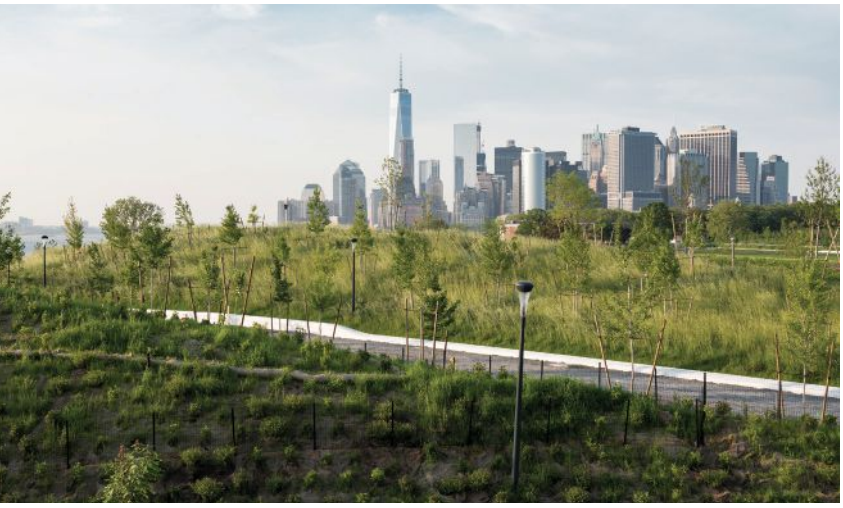

A new network of bicycle paths crisscrosses the southern portion of Governors Island (less than a half a mile from downtown Manhattan), outlined with bright-white concrete curbs (far left). West 8 prioritized playfulness in their design: the 36-foot-tall Slide Hill features four slides, including the longest in the city (left).

Mica-flecked granite blocks—remnants of the Island's old seawall—form a rough "scramble" to the summit of Outlook Hill. Geuze scales the slope and pauses at the top. "People will navigate here to take pictures," he says, snapping a photo of the harbor with his iPhone.

While this area offers amazing views, there are other surprises to be found here. On the south side of the 39-foot-tall Discovery Hill is *Cabin,* a ghostly installation by British artist Rachel Whiteread. On another hill, four steep slides are embedded in the slope. "The design is meant to trigger playfulness and lightness," explains Geuze. "It's ambiguous—are these for children or for all of us?"

Even more transformations are in store for Governors Island. In his state of the city address this February, New York Mayor Bill de Blasio announced plans for a new "Innovation Cluster" on the island to generate new businesses and job opportunities. "Governors Island is a treasure for the whole city, and it's ready for its next great chapter," the mayor said.

That new chapter is already begun: near Liggett Terrace, a girl on a bicycle zips down the white-piped paths, a redwing blackbird perches in a swaying tree surrounded by grasses, and schoolchildren in neon-green T-shirts file toward the ferry back to Manhattan.

"Your mindset changes when you are on the island," says Geuze. "People from every background meet on the ferry boat; you feel like you are on a journey together." ■

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CIRCLE 39

For the Congregation Beit Simchat Torah in New York, the architecture firm ARO designed the restrooms as a line of single-user stalls with a shared sink area (top). The 21C hotel in Durham, North Carolina, meanwhile, installed new restroom signage designed by artist Peregrine Honig in reaction to the state's controversial HB2 law (bottom).

Architects Propose Design Solutions for Equitable Restrooms

BY ANNA FIXSEN

OVER THE last few months, one of the most banal architectural spaces—the public restroom—has been at the forefront of a national civil rights debate. In late March, North Carolina passed the Public Facilities Privacy and Security Act (also known as House Bill 2) requiring that in public buildings, people use restroom and changing facilities that correspond to the sex listed on their birth certificate, not their gender identity. The bill was approved in fewer than 12 hours.

The backlash was just as swift. PayPal abandoned plans for an expansion into North Carolina. Companies including Apple, Google, and American Express followed. Bruce Springsteen canceled a Greensboro performance. The Justice Department sued the State of North Carolina. Even the AIA South Atlantic Region—comprising Georgia, North Carolina, and South Carolina—jumped into the fray, relocating its triennial conference from Wilmington, North Carolina, to Savannah.

"This action by the North Carolina legislature was in direct opposition to the values we as a professional organization have adopted," says AIA regional representative Steven Schuster.

Conservative lawmakers cited restroom safety as the rationale behind HB2. But opponents to the measure say such rulings put the LGBT community—a group that already suffers a disproportionate amount of physical and sexual violence—at serious risk. And after the massacre of 49 people at a gay nightclub in Orlando last month, the issue is sure to be the object of renewed focus.

Architects have a critical role in the future of this discussion. While design can never entirely address the pervasive societal biases LGBT individuals face, designers can employ strategic solutions to help ensure access to equal and safe facilities.

One good example of this approach is a new house of worship for Congregation Beit Simchat Torah, an LGBT synagogue in Midtown Manhattan (RECORD, May 2016, page 172). "The design of restrooms is something we take for granted. It's just sort of automatic—you lay it out and you do it," says the architect, Stephen Cassell, one of the principals of the firm Architecture Research Office (ARO). It was important to the rabbi and the congregation that the facilities have gender-neutral restrooms. The design of such a restroom was a new undertaking for ARO. But, says Cassell, "Like everything else, it was really about engaging a specific community." Through discussions with congregants, the architects executed a design with separate stalls, full floor-to-ceiling partitions, acoustically sound doors, and a shared sink space.

But building codes can be a roadblock for these sorts of designs. Most states and municipalities adopt regulations based on those put forth by the International Code Council (ICC). New York's plumbing code, for instance, says that "where plumbing fixtures are required, separate facilities shall be provided for each sex" and in equal number, save structures where the total number of employees or customers is 30 or fewer. Designs that deviate from this set of guidelines must get approval from the Department of Buildings. Though ARO's variance received a stamp of approval from a city inspector, Cassell said the process was time-consuming.

Some say providing "family-style" auxiliary restrooms that have single-user stalls and their own sink alongside multistall restrooms for men and women could bridge both sides of the gender-neutral restroom debate. But this design solution is only a stopgap, argues David Cordell, a technical coordinator and sustainability leader at Perkins + Will. Writing on the firm's blog, Cordell said the strategy "potentially singles transgender people out, increasing the likelihood of harassment." He cites Perkins + Will's Whitman-Walker health center in Washington, D.C., a clinic that provides HIV care. The team incorporated all-single-occupant restrooms across the seven-story facility, while still managing to achieve the fixture counts required by the code.

Advocates are proposing changes to the plumbing code to make such modifications easier. Last year, the AIA successfully introduced a change to the ICC that would allow the specification of single-user restrooms to satisfy all of a building's required toilet facilities, in lieu of separate-sex restrooms. This will be implemented as part of the 2018 International Plumbing Code (which is updated every three years). While it would expedite the process, it would ultimately be up to individual states and municipalities whether or not to adopt them. The development process for the 2021 codes begins in January 2018.

In the meantime, says Cassell, architects need to begin actively reconsidering the way they design restrooms. "When you fall into a series of defaults, you don't question the underlying assumptions," he says. "Good design comes from questioning those assumptions." ■

PHOTOGRAPHY: © ELIZABETH FELICELLA/ESTO (TOP); 21C MUSEUM HOTELS (BOTTOM)

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CIRCLE 233

Record Hosts First San Francisco Innovation Conference

BY FRED A. BERNSTEIN

Speakers at the San Francisco edition of RECORD's Innovation Conference included (clockwise, from top, left) Sharon Johnston, Diébédo Francis Kéré, and Brad Cloepfil.

INNOVATION DOESN'T always mean employing new technology—it can also mean renewing and refining methods known for centuries. That was a theme of RECORD's Innovation Conference, the magazine's 18th such gathering and its first in San Francisco.

Editor in chief Cathleen McGuigan set the tone by noting that architects are increasingly expressing a desire to "return to work produced by hand—to a feeling of craft." The conclave, which brought more than 200 architects to the University of California, San Francisco's Mission Bay campus, was titled Architecture and Making in the Post-Digital Age. Brian Mackay-Lyons, the founder of Mackay-Lyons Sweetapple Architects, came out swinging. "Is the digital era over already?" he deadpanned. As for innovation, he said, "a lot of it is just style or fashion." Mackay-Lyons, who designs oceanfront buildings in his native Nova Scotia that echo vernacular forms, found soulmates at the conference in Jesus Edmundo Robles Jr. and Cade Manning Hayes of the Arizona firm DUST, who showed a house near Tucson made of rammed earth.

Natural materials were on view throughout the day. Brad Cloepfil of Allied Works Architecture showed more than 100 tests he conducted to get the right texture of concrete for his Clyfford Still Museum in Denver. But those tests were something of a first-world luxury. Diébédo Francis Kéré, who was born in Burkina Faso and practices in Berlin, has no choice but to build with found materials and local labor in his hometown in Africa. One of his many innovations: weaving roof structures from rebar, and using the leftover rebar to frame school furniture. "I have no talent, but I have a lot of heart," he told the crowd, which showed its disagreement with a long ovation. ■

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[NEWSMAKER]

Norman Foster

BY ANNA FIXSEN

YOU WOULD be hard pressed to find an architect better equipped to talk about aviation than Norman Foster. Not only has the Pritzker-winning architect designed some of the world's most advanced flight facilities—including the first private hangar for space travel—but, over the years, he has piloted dozens of different aircraft. Now, at 81, the architect is setting his sights on drones. At the Venice Architecture Biennale, Foster, in collaboration with Jonathan Ledgard, director of the Afrotech initiative at the École Polytechnique Fédérale de Lausanne (EPFL), unveiled a prototype for a droneport that would be a hub for the delivery of vital cargo, such as medical supplies, in developing countries. It is the inaugural project of the Norman Foster Foundation, which will launch officially next year. RECORD caught up with the architect, at home in Switzerland, by phone.

Are you in London at the moment?

Well, I was in Madrid this morning and I am in Switzerland right now. I will be back in London by the end of the week.

I heard great feedback about the Biennale and your Droneport project there.

It was a really interesting biennale, I have to say. In totality, I think it came together very well.

Tell me about the Norman Foster Foundation.

I think it grows out of a kind of future beyond my involvement. The first objective is to promote the importance of architecture, engineering, and infrastructure to society. It's also to take up the challenges that architectural practices don't feel interested in or capable of doing, like responding to challenges for which governments don't have answers, like lack of access to water, power, and sanitation. We hope that the foundation, which doesn't have a commercial imperative, could harness the intelligence in universities and bring in funds to address those challenges. Really, I think as a first project, the Droneport fits.

How did that project come to be?

I have known Jonathan Ledgard for many years, and he came back into my life in an unexpected way when he was taken on by EPFL. He said, "Instead of drones' being associated with warlike activities, we would use them for humanitarian purposes. A drone could leap over mountains and lakes and could deliver very swiftly." And, with a smile, he said, "You've done the biggest airports in the world—how about doing the smallest?" What he didn't know was that I also flew drones with my 14-year-old son, who is a drone freak.

So this wasn't a far-out concept for you at all.

It was more like, "What's new [laughing]?" Anyway, a drone needs a base. In a way, a droneport would be the filling station of the future and, by extension, a community center, a health center, a technology center. I was very excited about the idea and shared it with colleagues. The foundation then got five universities involved—EPFL, ETH Zurich, MIT, the University of Cambridge, and the Technical University of Madrid.

You have assembled a kind of dream team—including artist Olafur Eliasson, LafargeHolcim, and others. How did you get everyone on board?

The common ingredient is the optimism of youth. The Venice prototype was developed over six months, with 13 days on-site, by a group of students led by a mason from Madrid. LafargeHolcim produced 18,000 pressed elements for the project—a cross between a tile and a brick. The vault is defined by something that looks like a carbon fiber fishing rod bent in a beautiful curve and supported by standard scaffolding; there is no steel in the structure. It has one tenth the carbon footprint of a conventional tin shed.

That's incredible.

If you have a burning interest in the translation of an idea into reality, then there is nothing like a deadline. Although, at times, the project had the qualities of a nightmare.

Oh, no!

Just one secretive aside: if you look at the text I wrote in advance for the Biennale catalog, the last sentence is "funding permitting." In other words, right up to the last moment, I wasn't absolutely certain we could deliver the project. Now—not to under- or overestimate the importance of Venice—I think it brings possibility of a network of droneports closer to reality because you can touch it, you can see it, you can demonstrate it.

Do you see yourself focusing on Africa?

No, I don't see the response being special to Africa; my interest is totally global. The fantastic thing about this project is the appetite that students and professors had for working together. It's also fantastic to be brought back to basics. It's almost like the pilots of sophisticated jets—can they rediscover their roots and fly a vintage aircraft? Sometimes those are life-defining moments. The pilot who landed in the Hudson River [in 2009] and saved everyone's lives—it was those basic skills that he didn't forget. But that's another story. ■

noted

Rains Destroy Award-Winning School in Lagos Shantytown

Heavy seasonal rains caused the collapse of Nigerian architect Kunlé Adeyemi's highly lauded Makoko Floating School on June 7. The founder and principle of NLÉ designed and built the educational facility and community meeting space in 2013 for residents of a floating slum on the Lagos waterfront. A replica of the school won the Silver Lion at this year's Venice Architecture Biennale.

Watergate Hotel Reopens After $125M Makeover

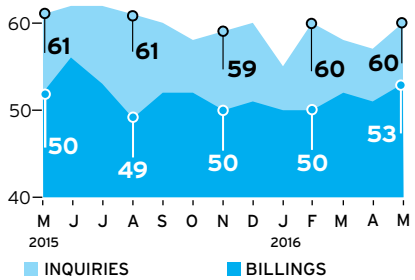
Shuttered for almost a decade, the historic Watergate Hotel designed by Italian architect Luigi Moretti has reopened. BBGM architects led the two-year renovation, which preserved the building's iconic facade but revamped interiors, adding more than 80 guest rooms and new amenities like a rooftop lounge, spa, and restaurant.

Gensler's Supertall Proposal for the Abandoned Chicago Spire Site

Gensler has released a conceptual design for a 2,000-foot-tall skyscraper called the Gateway Tower. Reimagining the high-profile property as a mixed-use building, the proposal diversifies revenue streams and increases public access by adding observation decks and a funicular that connects to the lakefront DuSable Park.

OMA and Mia Lehrer to Design New Park for Downtown Los Angeles

The city of Los Angeles has selected OMA and Mia Lehrer Architects to design a new park in the heart of L.A.'s downtown. The park will feature extensive tree coverage, open-air meeting spaces, and a two-story restaurant. The project is part of the city's larger initiative to address a lack of public parks.



ABI Reaches Year High

The AIA reports that its monthly Architectural Billings Index (ABI) experienced a strong surge in May, scoring 53.1, an increase of 2.5 points from the month prior. May's score is the highest in nearly a year (any score above 50 indicates an increase in billings). The projects inquiry index also had an uptick with a score of 60.1.

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CIRCLE 237

Building for an Unstable World

The Venice Architectural Biennale, in response to a raft of global problems, included few American architects but a wider American influence.

BY FRED A. BERNSTEIN

PHOTOGRAPHY: © IWAN BAAN

LOFTY AMBITIONS Inspired by past masters but empowered by new technology, a multinational team (ETH Zurich and Ochsendorf, DeJong & Block, with the Escobedo Group) created the "Armadillo Vault" in the Arsenale. The vault suspends 399 stone slabs without adhesives, solely through the use of compressive force.

DEEP IN one corner of the Egyptian pavilion at the Venice Architectural Biennale, students from the University of Pennsylvania displayed proposals for a dilapidated section of Cairo. Nearby, the Brooklyn-based filmmaker Gary Hustwit (*Helvetica*) debuted his documentary *Workplace*, about the New York offices of media giant R/GA. Off-site at the Palazzo Mora, Kevin Slavin, of the MIT Media Lab, was installing a beehive—part of a plan to create a microbiological map of Venice.

One criticism of this year's Venice Architecture Biennale—that the American presence was too small—seems overblown. There were works by Americans throughout the Biennale, and works by non-Americans often reflected U.S. influences. The Biennale's director, Alejandro Aravena, has taught at Harvard's Graduate School of Design—just one of scores of foreign architects in Venice with ties to the U.S. And global teams often included Americans. For example, the Cambridge, Massachusetts, firm Ochsendorf, DeJong & Block helped the famed ETH Zurich create a thin-shell vault of interlocking tiles, one of many "low-tech" buildings that characterized this Biennale.

Yet Aravena had reason to focus on architects from less-developed countries. This was a Biennale about how architecture can improve the lives of the underprivileged; he was explicit in wanting to address poverty, segregation, natural disasters, crime, traffic, and pollution. He called the show Reporting from the Front, and the U.S. is not the front he had in mind. But there were exceptions: Detroit, the focus of the U.S. pavilion, and Hale County, Alabama, home of Auburn University's Rural Studio, which was invited by Aravena to fill a section of the Arsenale. There, the Rural Studio created a small theater using bedsprings for walls and stacks of rigid-insulation panels as benches—materials that will be used to help Venice's homeless population when the Biennale closes (it runs through November 27).

Aravena's own installations included a cavelike space made with metal studs and plasterboard salvaged from the 2015 Biennale (message: work with what you've got). Nearby, in the Arsenale, Chinese architects Wang Shu and Lu Wenyu showed how masonry from demolished buildings can make new buildings greener and more beautiful, while the Paraguayan Gabinete de Arquitectura demonstrated how

FULL FRONTAL In the entryway of the Arsenale, director Alejandro Aravena covered the walls and ceiling with gypsum board and metal studs left over from last year's Art Biennale (above). A Paraguayan firm, Gabinete de Arquitectura, won the Golden Lion for Best Participant with a brick-and-timber arch designed to be built cheaply by unskilled labor (top, left). Following the theme Reporting from the Front, national pavilions put marginalized communities in focus. The U.S. Pavilion presented 12 speculative plans to regenerate Detroit (left), the German pavilion grappled with the migrant crisis (opposite, right), and the Japanese pavilion explored dense urban living (opposite, left).

Venice Biennale 101

IN ADVANCE of each Biennale, the director, usually a foreign architect appointed by the Venice Biennale board, selects a theme, and curates a show on that theme for two vast buildings: the Arsenale, Venice's former shipyard and armory, and the central pavilion in the Giardini, a nearby park. The Giardini also contain 30 national pavilions whose curators organize their own shows, generally addressing the chosen theme. Countries that don't have their own pavilions can be invited to show in sections of the Arsenale, in the central pavilion of the Giardini, or they may go elsewhere in Venice. The city, in fact, is packed with collateral events, lectures, panels, and exhibits, some commercial and some academic. At night, during the vernissage—the pre-public opening—there are parties, parties, parties. Five judges, appointed by the director, try to see every official exhibition, so they can give out the awards (Golden Lions and Silver Lions)—which, in light of the vastness of the Biennale, must make them feel like ants judging an elephant.

few bricks are required to build a latticework arch. Over and over, there were ideas for producing structures with materials sourced locally, even in remote villages, and assembled without power tools, that could create housing for millions. In that context, Peter Zumthor's model of a section of his proposed expansion of the Los Angeles County Museum of Art—a $600 million vanity project—looked, frankly, ridiculous.

But was there enough architecture in this architecture biennale? The parametricist Patrik Schumacher, of Zaha Hadid Architects, walked around the Giardini complaining "there is no work," meaning the complex, computer-dependent architecture he is known for. "We're architects, not sociologists," he added. But visitors seemed to like the pavilions that made strong sociopolitical points, including Germany's (where parts of walls were removed to symbolize openness to immigrants) or Poland's (where construction workers spoke, on video, about their sacrifices building for the wealthy).

Some observers described the U.S. Pavilion as retro because it displayed actual architecture, for actual sites. Twelve firms chosen by curators Monica Ponce de Leon and Cynthia Davidson toiled for months, meeting with residents and community leaders to develop possible programs for the sites, then creating elaborate models and renderings for their speculative designs, which filled the pavilion to the rafters. Indeed, there was too much to take in. (Luckily, the show will travel to the Museum of Contemporary Art Detroit next year.)

But in a Biennale that was largely about ways of housing the world's exploding urban population, the U.S. pavilion didn't win any awards—the prizes went to the pavilions of Japan and Spain, both of which mounted shows about doing more with less.

Yet cities need not only housing but schools, hospitals, government offices—complex buildings addressing complex programs. Aravena managed to turn the architecture world's attention to the problems of the underprivileged, and that makes him a hero. There was a lot of rhetoric, and a lot of ingenuity, at his Biennale. But, thanks in large part to Americans, there was also architecture. ■

PHOTOGRAPHY © FELIX TROKER (RIGHT) AND FRANCESCO GALLI (TOP, LEFT; OPPOSITE, BOTTOM), COURTESY LA BIENNALE; LUKE HAYES (BOTTOM; OPPOSITE, TOP)

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CIRCLE 178

Block Party

For Summer 2016, London's Serpentine Gallery has opened a temporary pavilion and four "summer houses."

BY JANELLE ZARA

"BIGAMY" IN architecture, at least according to the Copenhagen-based Bjarke Ingels Group, means the combination of diametrically opposed parts. "Quite often, interesting things happen when you take seemingly incompatible elements and you combine them into a new hybrid," Ingels said last month at the unveiling of his firm's design for the Serpentine Pavilion, a temporary structure commissioned each summer by London's Serpentine Gallery to grace the front lawn of Kensington Gardens.

For the 2016 pavilion, BIG's design uses modular elements to create organic shapes: 1,802 elongated composite fiberglass frames are stacked to form two enclosing walls that are pushed outward or "unzipped," as the Danish architect likes to say, to create a contoured, cavernous interior filled with simple geometric seating and a sculptural exterior.

Viewed head-on from the east or west, the hollow blocks form a matrix of right angles, but as visitors circulate, the calculated protrusions bring the walls to a swell. As do pixels, the surface of each rectangular frame captures the nuances of light and shadow, so the entirety seems like a host of formal contradictions and endless metaphors: "a wall becomes a

BIG's swirling hollow blocks of composite fiberglass (opposite) create an evanescent pavilion, outside and in. Yona Friedman's "summerhouse"(top, left) is composed of modules of wire hoops; Kunlé Adeyemi uses prefabricated sandstone blocks in a topsy-turvy abstraction (left). Barkow Leibinger created a canopy of curling wood ribbons (below), and Asif Khan employs white timber staves for an airy folly (above). All allude to the nearby neoclassic Queen Caroline's Temple.

hole," Ingels says, "a structure that is free-form yet rigorous; modular yet sculptural; both transparent and opaque; both solid box and blob."

As every year, the Serpentine Pavilion houses a café and serves as the centerpiece of the gallery's outdoor summer programming. This year it is joined by a four additional follies. As a final farewell to departing Serpentine Gallery director Julia Peyton-Jones, who launched the pavilion program in 2000, the gallery commissioned accompanying works by Yona Friedman, Asif Khan, Barkow Leibinger, and Kunlé Adeyemi. Each firm created a radically different "summerhouse" in response to Queen Caroline's Temple, a neoclassical folly attributed to William Kent that has adorned Kensington Gardens since 1734. Barkow Leibinger built a wood structure featuring a canopy of curling structural bands, and Khan erected a polished metal platform fenced in by white timber staves. Friedman's modular grid of wire hoops, meanwhile, refers to his 1959 urban-planning manifesto, *La Ville Spatiale*. For his part, Adeyemi created an "inverse replica" of the temple, using the proportions and forms of the neoclassical original while emphasizing its voids. The masses rely on prefabricated sandstone block similar to the stone used in the temple, and the architect upholstered its interior with a cushy white vinyl. "We wanted to pay homage to that 18th-century structure," Adeyemi says, about his "place for shade and relaxation." ■

Janelle Zara is a Los Angeles–based arts and architecture writer.

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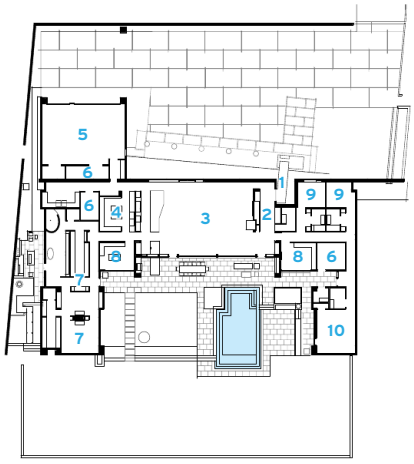
A DISCREET NASHVILLE HOME MASKED BEHIND EXPANSES OF CONCRETE AND WEATHERING STEEL OFFERS MORE THAN MEETS THE EYE.

BY LINDA C. LENTZ

WHEN MUSIC executive Joe Galante retired from his post as chairman of Sony Music Nashville in 2010, he and his wife, Phran, were ready to shed their frenetic, high-profile lifestyle. For a fresh start, the couple purchased 1½ acres in the city's quiet Woodmont Estates—a 1937 neighborhood created by Olmsted Brothers to flow with the landscape—tapping Hastings Architecture to design a more intimate home than their existing 13,000-square-foot suburban residence.

According to principal in charge David Powell, the Galantes wanted "an open, sun-drenched house" with ample glazing, around a central courtyard, and maximum privacy—a tall order within their new urban environs.

Situated on a gently sloping site, the 6,500-square-foot, single-story house is tucked behind an expansive paved forecourt and protected by retaining walls to the north and west. In keeping with the client's request for secluded quarters, the architects devised a 160-foot-long by 16-foot-high cast-in-place concrete wall for the north facade that, in essence, masks the remainder of the house from the street. They veiled this elevation with a sculptural row of weathering-steel panels that, in turn, conceal its only fenestration—a thin band of windows along the main living space inside.



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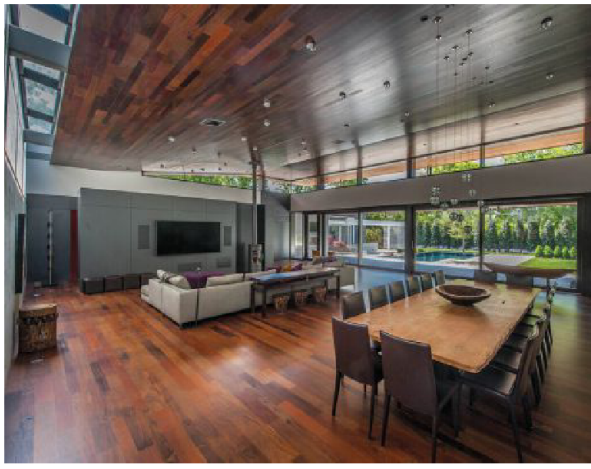

Named the Mask House, the Nashville residence is sequestered behind a series of walls for privacy (top). The generously glazed interiors open onto a comfortable outdoor living area (above). A raised weathering-steel panel becomes an entrance canopy (below).

"We discovered the Galantes' love for masks and illusion," says Powell, "so we used that as a jumping-off point for the design."

The load-bearing concrete wall, insulated with a layer of rigid foam, supports the steel structure of the home's core volume, a spacious living-dining-kitchen area. The building's roof, a folded plane, is visually detached from the large room's periphery by edge skylights and clerestory windows that maximize daylight penetration. Flanking this central space, two wood-frame wings accommodate the master suite, gym, two small guest rooms, and a pair of personal offices.

C-shaped in plan, the three volumes emerge at the rear of the house with glass window walls and doors that open onto a fully furnished and equipped south-facing courtyard. Deep ipé-lined overhangs control solar heat gain and glare and appear to spill into the main space, where the ceiling and floor are surfaced with the same rich wood.

Fittingly, the architects' imaginative, seclusive strategy is most apparent (and surprising) at the home's entrance, which is indicated by a raised weathering-steel panel extending out beyond the concrete wall. Pierced with a pixilated pattern of acrylic-rod peepholes, the red lacquer pivot door has no visible hardware. That's because this large, satiny portal can only be opened from inside. The homeowners enter through the garage. ■

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CIRCLE 19

While industrial materials, such as white-painted car parts, define the lower level, natural ones, like the auto-inspired bamboo grilles and decorative marble columns cum bookshelves, predominate upstairs.

Brand Driven

Wonderwall builds a luxurious venue for Lexus in Dubai.

BY NAOMI R. POLLOCK, AIA

CREATED BY the Tokyo design firm Wonderwall, Intersect by Lexus, Dubai, is essentially a car showroom minus the cars. Though commissioned by the luxury automaker, new releases and test-drive models are nowhere in sight. Instead, the combined restaurant and event space showcases the brand by associating it with art, design, technology, and cuisine.

"What I wanted to do was create the Lexus owners' clubhouse," says Wonderwall principal and founder Masamichi Katayama.

But you don't have to own a Lexus to enter. Located inside a 7-story structure in the Dubai International Financial Centre, the 2-story space is approached from the public corridor and entered on its upper level. There a monumental stair immediately provides views of both floors. Beyond the stair, the upper level holds a lounge-like eatery, an open chef's table, and two enclosed kitchens. The lower level contains offices and the multipurpose "Garage" used for parties, performances, and displaying concept models.

Though sales are not the main focus, automobiles are the driving force behind Wonderwall's design. Following in the tracks of Intersect by Lexus, Tokyo, completed by the firm in 2013, the Dubai venue features bamboo screens inspired by the automaker's signature spindle grille on its upstairs walls. Another recycled Tokyo motif: the Garage floor's collage of 573 car parts, all painted white and protected by glass panels.

While Wonderwall aims for consistency among locales, site-specific elements matter too. In Dubai, the ceiling upstairs is comprised of 2-inch-thick plastic sheets whose wavy profile acknowledges the sand dunes nearby. Undoubtedly, Wonderwall is striving for a similar balance at the next Intersect by Lexus slated to open in New York in 2017. ■

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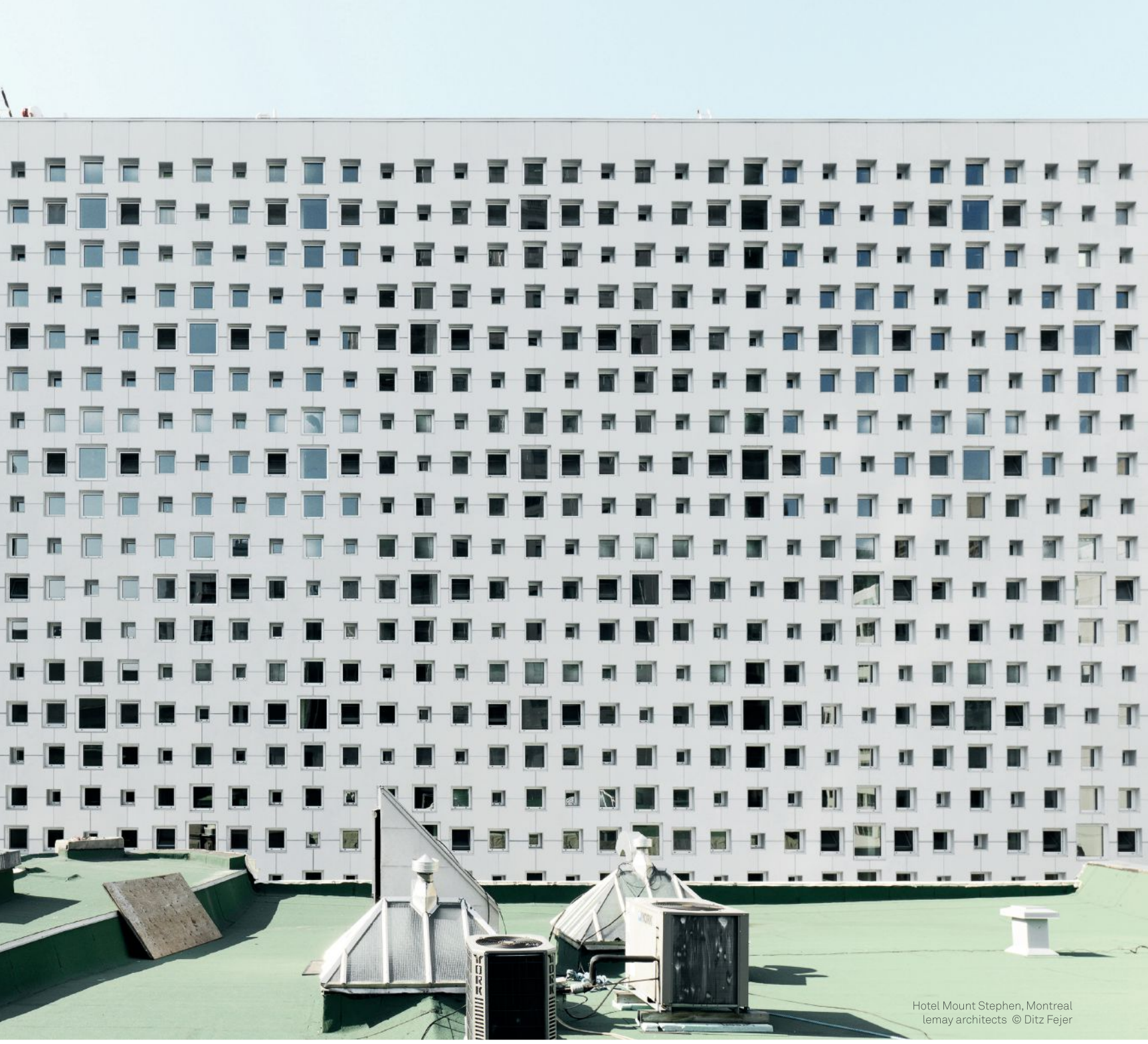

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RIEDER

CIRCLE 134

Design Within Reach

Studio Weave stitches together people and resources to create projects that strengthen community.

BY ANNA FIXSEN

Je Ahn (left, top) and the team at Studio Weave recently completed Midden Studio, a zinc-clad artist's getaway in Scotland on the footings of a structure that once housed animal manure (top, right). In Kent, they built a zany outdoor classroom (above). RIBA South East named it Building of the Year in 2013. A pavilion for Clerkenwell Design week makes ingenious use of fiber-cement (bottom).

WHEN PRESENTED with a design challenge, the London architecture practice Studio Weave doesn't hesitate to scribble outside the lines—way outside of them. For a beachside promenade, the firm devised a curlicuing 1,000-foot-long bench. When presented with a pile of 15,000 LEGOS for a London Festival of Architecture competition, it constructed a mini metropolis complete with a tiny monorail. Within the firm's online portfolio, work is presented through both standard project factoids and original fairy tales.

Whimsy may be a hallmark of Studio Weave's built work, but the firm addresses serious questions concerning how people engage with their surroundings and neighbors, particularly in London, where construction cranes are rising as rapidly as rents.

"The professional role of an architect is to design according to a brief," says Studio Weave founder Je Ahn, "but, as citizens, we also have duties."

Studio Weave's offices are located in the city's Hackney area in a formerly industrial building, complete with an impressive trussed roof and a foosball table. One afternoon last spring, the firm's 10 members—referred to internally as "Weavers"—were busy at work on their biggest project to date, a multimillion-dollar, 250-unit social-housing complex in central London, a huge scaling up from the firm's previous work. "I was always interested in how people lived," says Ahn, describing his initial interest in architecture. "Coming from a culturally different place—South Korea—architecture's impact on how we behave was fascinating to me."

The studio was founded in 2006 by Ahn and Maria Smith while both were studying architecture at London Metropolitan University. (Smith has since left the firm.) Called 140 Boomerangs, their first collaboration consisted of modular timber components which could be configured to create site-specific helical structures. First displayed at the London Architecture Biennale (now called the London Festival of Architecture) 140 Boomerangs was used to hold workshops for local children. The project was so successful, commissions—including the seaside bench in Littlehampton, England—followed. It made sense to officially establish a practice.

In 2012, the studio won a competition to improve an unsightly facade of the Great Ormond Street Hospital for children. With their sense of playfulness, Studio Weave added pipework as well as gramophone-like horns to create a surreal 10-story landscape they dubbed the Lullaby Factory. A calming soundtrack by composer Jessica Curry can be heard by patients through a selection of "listening pipes" and a special radio frequency. The project won numerous awards, including an AR+D Award for emerging architecture.

"We try to get under the skin of the commission," explains Ahn of the firm's outlook. "Often, an architectural proposal is only part of the answer."

A prime example of this approach is an ongoing regeneration project in the small town of Callan, Ireland, where the main thoroughfare had become a civic dead zone because of heavy traffic. Starting in 2014, Studio Weave worked with the municipality on a series of temporary street closures, staging pop-up events and children's activities. Last year, they worked with locals to spruce up facades and make the street an interactive theater. According to a local reporter, the festival gave the town "a morale boost that any town or village in Ireland would welcome."

Last June, Studio Weave and London firm Architecture 00 joined forces to create "Project 00," a consortium of architects, social scientists, programmers, and urban planners. The studio is also part of a Royal Institute of British Architects (RIBA) exhibition about the future of housing, working on a woodland classroom for special-needs children, and wrapping up a project for the Crown Estate in central London.

"We are not experts at anything," says Ahn, "but we try to get the best out of a situation by linking the right people together." ■

PHOTOGRAPHY: © JIM STEPHENSON (3), JOHNNY BARRINGTON (TOP, RIGHT)

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Contemporary Curve

Jefferson County Western Health Center, Midfield, AL
Owner: Jefferson County Department of Health
Architect: Birchfield Penuel & Associates, Birmingham, AL
General contractor: M.J. Harris Construction Services, Birmingham, AL
Installing contractor: CSC Roofing, Birmingham, AL
Profiles: Tite-Loc curved, Reveal Wall Panels
Colors: Cardinal Red, Sierra Tan

"The curved roof in Cardinal Red and the Sierra Tan metal wall panels complement the other materials and really create a contemporary appearance..."

Tom Kidwell, senior associate and project architect, Birchfield Penuel & Associates

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The answer to the June issue's Guess the Architect is **HOWE & LESCAZE**, a firm that designed the Philadelphia Savings Fund Society in 1932 in central Philadelphia—the first International Style high-rise in the United States. In 2000, the bank, office, and retail building was converted to the Loews Philadelphia Hotel.

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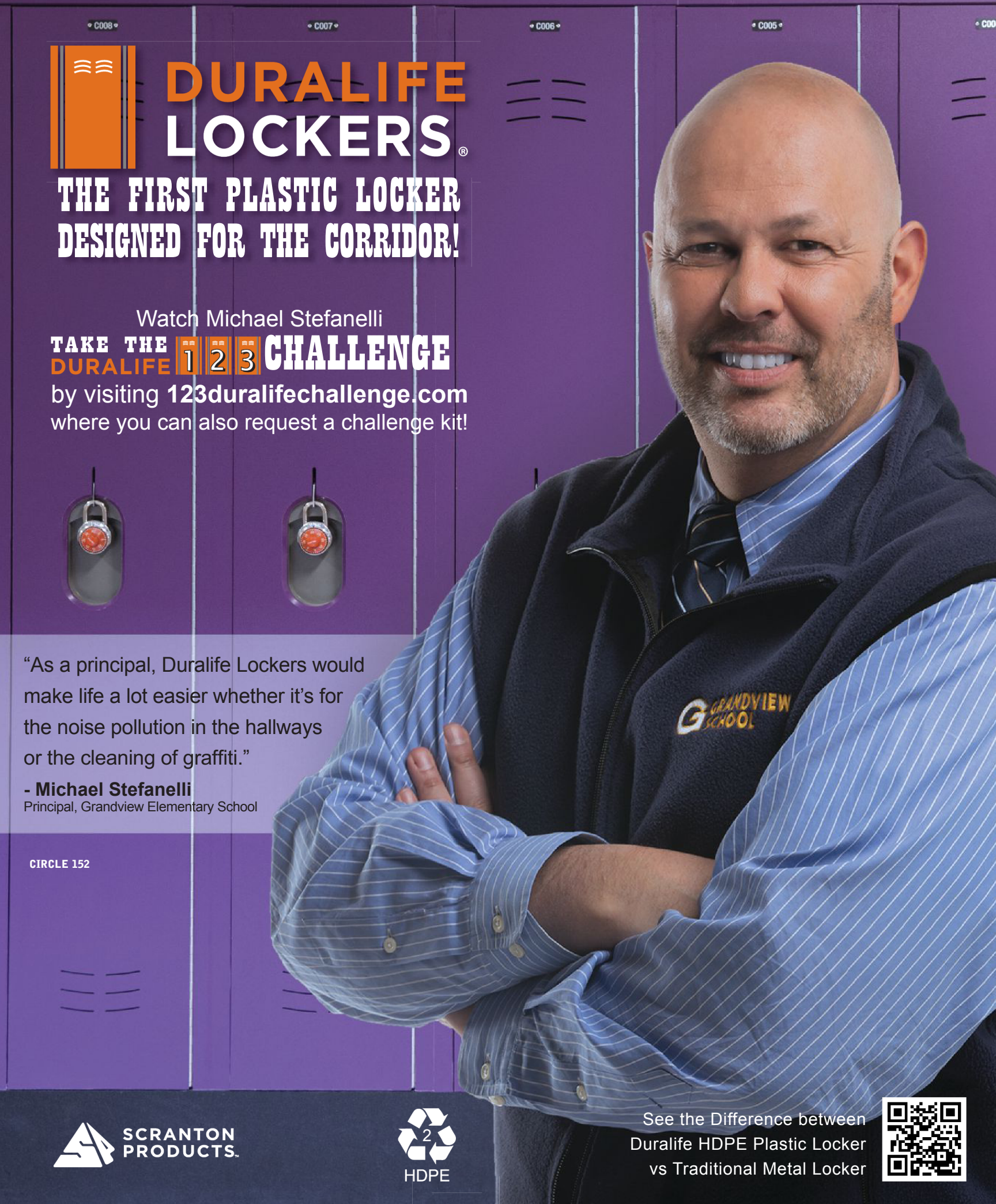

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- Michael Stefanelli
Principal, Grandview Elementary School

CIRCLE 152

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Different Roads to Urbanization

Beyond the City: Resource Extraction Urbanism in South America, *by Felipe Correa. University of Texas Press, June 2016, 192 pages, $40.*

Dragons in Diamond Village: Tales of Resistance from Urbanizing China, *by David Bandurski. Melville House, October 2016, $22.39.*

Reviewed by Michael Sorkin

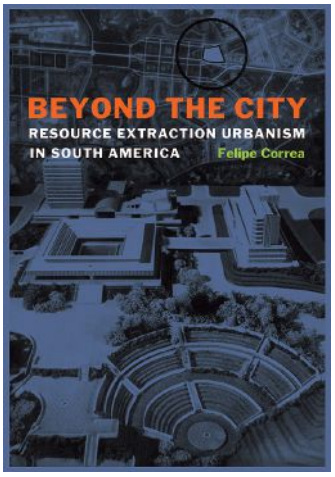
TWO EXCELLENT new books, *Beyond the City*, by Felipe Correa, director of the Urban Design Degree Program at Harvard University, and *Dragons In Diamond Village*, by David Bandurski, editor of the China Media Project at the University of Hong Kong, offer contrasting but fascinatingly connected analyses of resource-extraction urbanism.

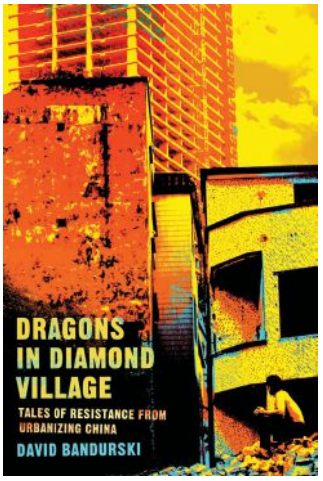
In Correa's case, the extraction is literal: his work describes a series of *ex novo* urban and regional projects in South America sited and designed to facilitate the mining or harvesting of natural resources. This arresting group of incarnated dreams offers a vivid alternative—or critically supplementary—history of the modern city, embodying an aspirational possibility in which both creating an urban design and realizing it can be imaginative and literal all at once.

The story begins with Belo Horizonte in Brazil, a new capital for a region rich in coffee and iron, built from scratch in the 1890s: its elegant "progressivist" baroque/city-beautiful plan by Aarao Reis was an obvious precursor to Brasilia. Clearly under the influence of Haussman, Ildefons Cerda, and—especially—Pierre L'Enfant, the design exemplifies the way the circulation of utopian planning ideas saturated the creative atmosphere, penetrating even to the South American hinterland. Correa cites, among others, Vincenzo Scamozzi, Robert Owen, Arturo Soria y Mata, Patrick Geddes, Clarence Perry, and Le Corbusier as part of a richly mixed parentage, mating paradigm, purpose, and place.

If Belo Horizonte is a "classic" set piece, the city of Maria Elena, built in 1916 in the Atacama Desert of Chile, is a node within a vast network of nitrate mines, oases, rail links, and coastal ports, an immense territorial urbanism consecrated to a single purpose.

A similar mono-economy characterizes the towns of Judibana and El Tablazo, products of the explosive petroleum-driven growth around Lake Maricaibo in Venezuela, which moved from squalid camps to highly planned settlements seen as "messengers of modernity." Judibana, designed by Skidmore, Owings & Merrill in 1948, merges a company town—characterized by a dominating employer, stratified housing types, and "rational" zoning—with something more elegantly prospective, the U.S. suburban dream.





At the eastern edge of Venezuela, Ciudad Guyana—with the help of planners largely based at Harvard and MIT—developed at a nexus of iron and bauxite mining and hydroelectric potential. The city has a linear layout, stringing neighborhood "units" designated (like Chandigarh's) with maniacally segregated socioeconomic formal typologies.

Correa judges the city a considerable success for the accommodating logic of its spinal organization, the transformation and mixing of use in its constituent zones, and its growth from an original population of 50 thousand to its current 1 million. The book concludes with a discussion of the 1962 Vila Piloto ("pilot city") in Brazil's Parana River basin, part of a TVA-scale program for a chain of dams. The circular town is remarkable for its pie-graph organization and for the intention that it be dismantled when the nearby dam was done.

The most arresting elements of Correa's book deal with a variety of infrastructures–some at continental scale—that have conduced to extraction urbanism in its "pure" form: not conventionally planned cities but the spontaneous proliferation of settlements drawn to highways, electrification axes, ports, waterways, mines, oil fields, and plantations. The author's evocation of the urban and the territorial is acute and revelatory, a nuanced analysis of the interaction of formal ideals and the aggressive extraction of the earth's resources.

Dragons In Diamond Village is a mesmerizing description of another form of extraction city, the runaway development of so-called urban villages in China. These are the result of the exponential expansion of Chinese cities to surround—and physically absorb—agricultural villages on their peripheries. The key wrinkle is the easily exploited ambiguity of ownership that has resulted from the post–Deng Xiaoping devolution of power to a condominium of municipalities, state institutions, and private developers relying on *rent* as the primary basis of their economic self-interest. However, in a system that still retains collective ownership for rural settlements, these "villages-in-city" have found themselves with fields that yield far higher returns from real estate than from sorghum, cucumbers, or fruit trees.

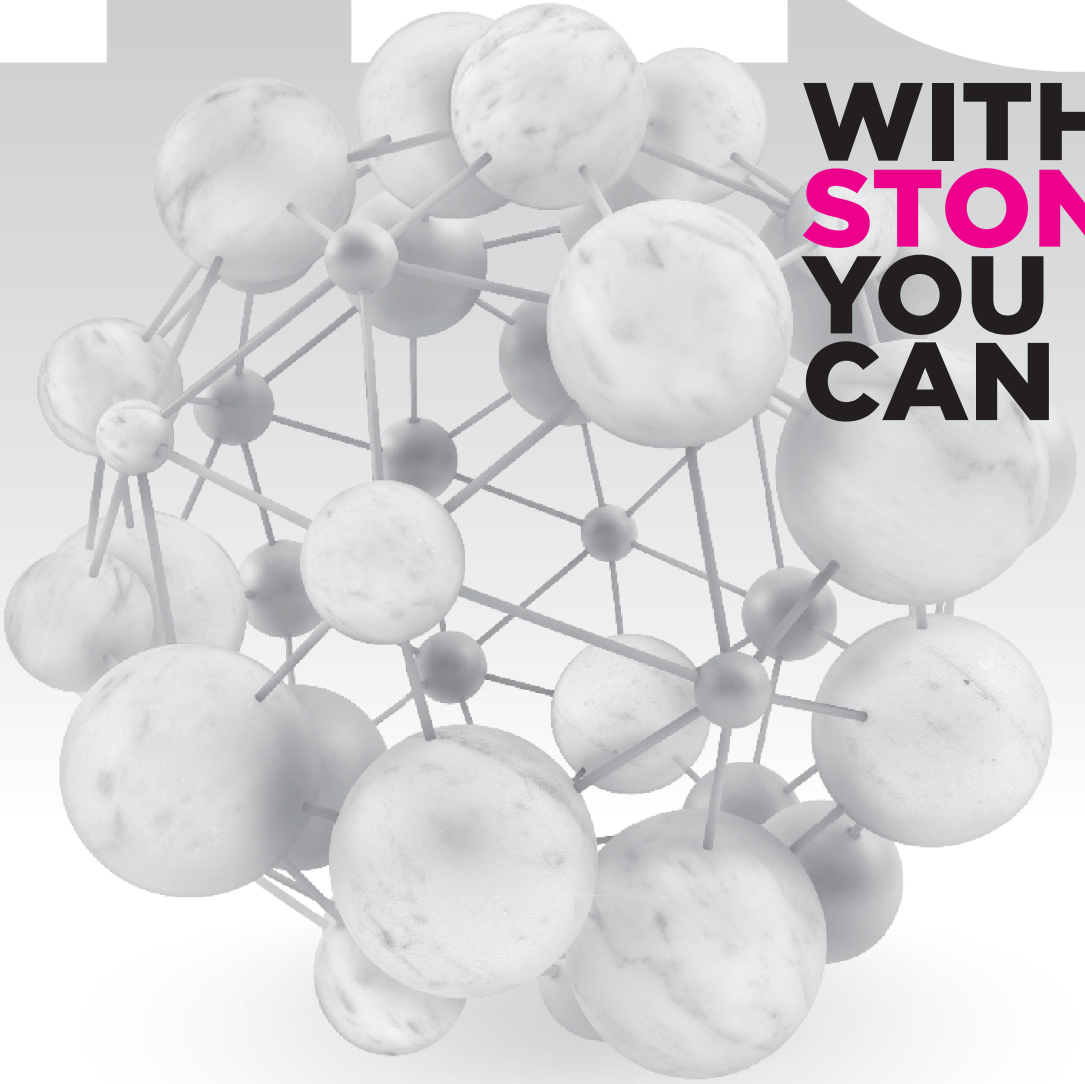
In what has become a typical pattern, communal plots are developed hyper-densely with small apartment buildings, the primary residential option for the millions of "floating" migrants from the countryside. These people labor at the bottom rungs of the new economy, fixed in status by the *houkou* system that makes many basic services unavailable.

Bandurski's richly ethnographic tale is a gripping account of both the nominally informal system that has generated this urbanism and of its effects on local communities and individuals. Focusing on a village in Guangzhou, his sympathetic engagement with its struggles to resist the corruptions and social dislocations of the development steamroller are remarkably detailed and researched. We're shown suicides, houses rigged with defensive explosives, and Kafkaesque legal maneuvering. Framing the narrative are descriptions of the covert building and launch of village dragon boats in the face of official attempts to thwart the villagers, and the beautiful, if pyrrhic, victory they won.

Bandurski offers a riveting account of a civil society struggling to be born, with deep insights into a culture we too often read as an impossibly monolithic juggernaut. Like Correa, he portrays a crudely extractive urbanism but in its most rarefied form: in the urban village, the cash crop is space itself. ■

Michael Sorkin, principal of the Michael Sorkin Studio in New York, is the director of the Graduate Urban Design Program at the City College of New York and president of Terreform, a nonprofit center for advanced urban research.

YES



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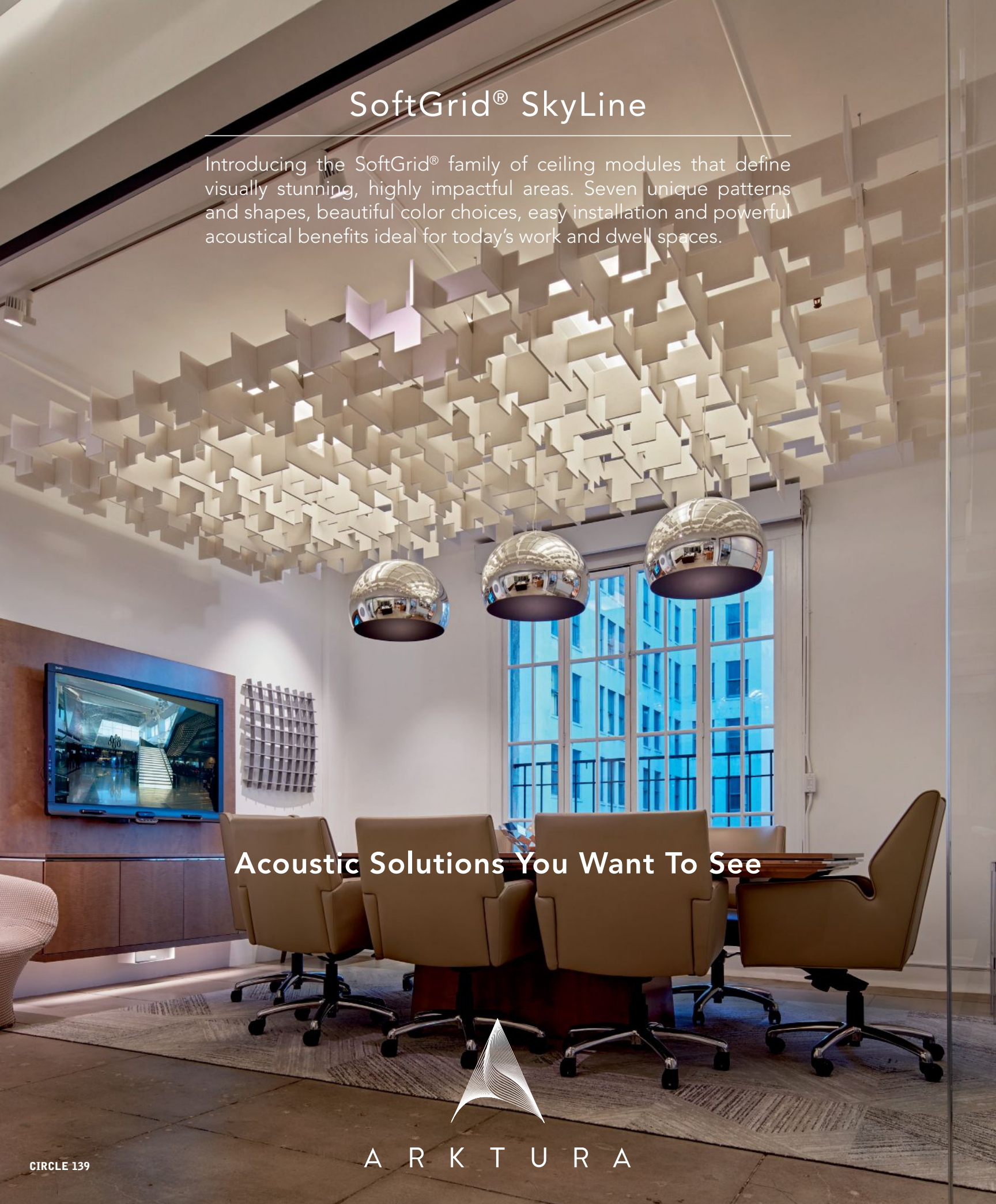

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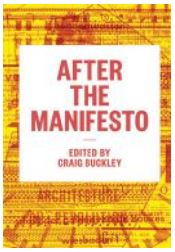
CIRCLE 139

If Words Had Power

After the Manifesto: Writing, Architecture, and Media in a New Century, *edited by Craig Buckley. Columbia GSAPP Books on Architecture, March 2015, 176 pages (paper), $35.*

Reviewed by Philip Nobel



THE FIRST lines of Craig Buckley's introduction to this collection of essays from the proceedings of conferences on the subject of manifestos at Columbia and the University of Navarra in 2012, seem surprising. "There has been something like a mania for the manifesto in recent years," he writes. After an absence, "Today we seem to be surrounded by them." Surrounded? I hadn't noticed a single one.

Buckley reports a variety of events from 2008 through 2014 that elicited architectural calls to action in manifesto form. Although he provides a solid list, the events he cites were held at minor if respectable venues from New York to Istanbul. Many associated revolutionary texts were also published, in print or online. Yet they reinforced my qualms about the manner in which contemporary architects effect change. After weighing the essays in the book—by architecture figures such as Beatriz Colomina, Mark Wigley, Bernard Tschumi, and their counterparts at Navarra—my qualms turned to skepticism.

If someone inhabiting my own small media niche, at most one subculture away, could entirely miss this "mania for the manifesto"—and indeed all of the writings themselves—it does more than signal a fundamental decline in the utility of that vehicle of persuasion for architects: it is confirming evidence of the broader rift that calls into question the power of any traditional form of communication to encourage big, pancultural change in a world defined by vast forums for communication and the resulting isolation of its cultural centers.

The manifesto, in its 20th-century heyday, relied on the press for its relevance. Several contributors to Buckley's book celebrate the fact that when "Le Futurisme" was published in 1909, it sprawled over the front page of *Le Figaro*. Seen at once by many thousands, the piece of writing we know as the Futurist Manifesto did come to change the way we—the biggest *we*, not the little *we* in direct professional engagement—see and make art and buildings.

Yet few essays in *After the Manifesto* address the fact that the infrastructure or platforms that allowed would-be revolutionaries to shout effectively beyond their own subcultural frontiers no longer exist.

Failing to engage with the shared experience through social media we all now take for granted—although Colomina discusses the internet before she punts—the publishing effort remains decidedly historical. We never get a sense of the present or a glimpse of the future.

It's a missed opportunity. The only relief in our lives from the isolation of the new normal is a fleeting and occasional echo of a lost communal space that presents itself in our mass-consumed *virality* (e.g., "going viral"). This phenomenon is so exceptional and dear precisely because it holds the promise of a unifying experience, consolidating intention and catalyzing change across subcultures. Denied the paths manifestos once traveled, no words about architecture will ever wield so much power again. Yet, whether rendered or photographed or filmed, architecture still can break through.

So, architects, let your buildings be the messengers of your ideas. No one is reading your manifestos. ■

Philip Nobel, the editorial director of SHoP, writes frequently on architecture.

Goodbye to All That

The Four Seasons Restaurant, designed by Philip Johnson in 1959, leaves the Seagram Building with only memories intact.

BY SUZANNE STEPHENS

AN UNEXPECTED downside of landmarking an interior is that movable components are not part of the deal. This is sadly true of the elegantly modernist furniture, place settings, and graphic design—even the logo—integral to the identity of the ultra-luxe Four Seasons Restaurant designed by Philip Johnson in the Seagram Building at 52nd and Park Avenue in New York. Yes, the landmark protection for the 29,500-square-foot space for the Grill Room, Pool Room, and lobby includes the swank bronze-railed stairways, walnut-paneled walls, sleek aluminum ceilings, and the ebonized oak or travertine floors. It also applies to the swagged anodized-aluminum beaded curtains and to the gold-dipped brass-rod sculptures by Richard Lippold suspended over the bar and mezzanine of the Grill Room. But the rest of this *gesamtkunstwerk* will be auctioned off on July 26, 10 days after the fabled 57-year-old culinary and architectural institution closes.

Granted, the price of admission, even for a Pinot Noir, is steep. Yet you always feel you are entering a shrine to Architecture with a capital A the moment you encounter its beautifully proportioned precincts, where the burnished sheen of lush materials forms the gestalt. Now Mies van der Rohe's Barcelona and Brno chairs—as well as those by Charles Eames and Hans Wegner, bronze tulip tables and pedestal chairs by Eero Saarinen, sofas by Philip Johnson, banquettes by Florence Knoll, and tableware by Garth and Ada Louise Huxtable will soon be dispersed to parts unknown.

A new restaurant management then takes over, brought in by the current Seagram Building owner Aby Rosen of RFR Holding. The reason for the upheaval: Rosen upped the rent to a point that the Four Seasons proprietors Julian Niccolini and Alex von Bidder felt forced to look elsewhere for new premises. Rosen wasn't willing to pay the price for the furnishings, and it would have been difficult to integrate the ensemble into a new space, so the restaurateurs are selling the lot. "We decided not to duplicate anything from the original," says von Bidder. "I always say, 'Don't step into your father's shoes, but seek what he was seeking.'"

For the restaurant's 40th anniversary, celebrants included Phyllis Lambert, center front, with Philip Johnson and Ada Louise Huxtable on either side. Next to Johnson is Richard Lippold, and sitting on the bar is Julian Niccolini, with Alex von Bidder on the left.

PHOTOGRAPHY: © MICHAEL O'NEILL, COURTESY CANADIAN CENTRE FOR ARCHITECTURE; EZRA STOLLER/ESTO (OPPOSITE, BOTTOM 2)

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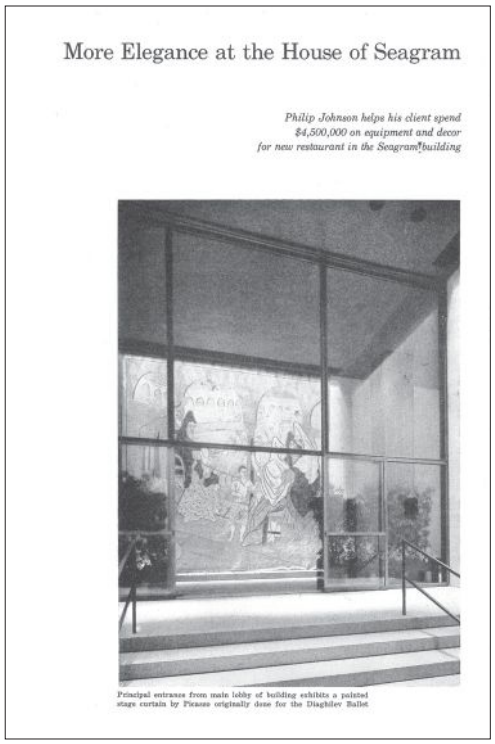
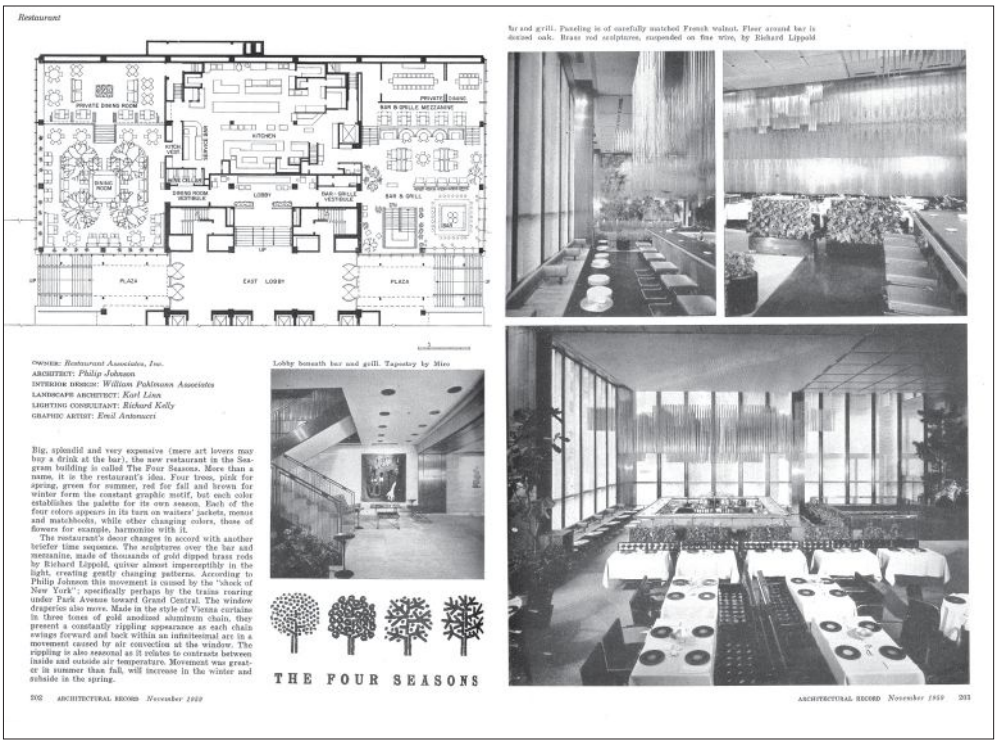


More Elegance at the House of Seagram

Philip Johnson helps his client spend $4,500,000 on equipment and decor for new restaurant in the Seagram building

Principal entrance from main lobby of building exhibits a painted stage curtain by Picasso originally done for the Diaghilev Ballet



Restaurant

OWNER: *Restaurant Associates, Inc.*
ARCHITECT: *Philip Johnson*
INTERIOR DESIGN: *William Pahlmann Associates*
LANDSCAPE ARCHITECT: *Karl Linn*
LIGHTING CONSULTANT: *Richard Kelly*
GRAPHIC ARTIST: *Ernst Antonucci*

Big, splendid and very expensive (mere art lovers may buy a drink at the bar), the new restaurant in the Seagram building is called The Four Seasons. More than a name, it is the restaurant's idea. Four trees, pink for spring, green for summer, red for fall and brown for winter form the constant graphic motif, but each color establishes the palette for its own season. Each of the four colors appears in its turn on waiters' jackets, menus and matchbooks, while other changing colors, those of flowers for example, harmonize with it.

The restaurant's decor changes in accord with another briefer time sequence. The sculptures over the bar and mezzanine, made of thousands of gold dipped brass rods by Richard Lippold, quiver almost imperceptibly in the light, creating gently changing patterns. According to Philip Johnson this movement is caused by the "shock of New York"; specifically perhaps by the trains roaring under Park Avenue toward Grand Central. The window draperies also move. Made in the style of Vienna curtains in three tones of gold anodized aluminum chain, they present a constantly rippling appearance as each chain swings forward and back within an infinitesimal arc in a movement caused by air convection at the window. The rippling is also seasonal as it relates to contrasts between inside and outside air temperature. Movement was greater in summer than fall, will increase in the winter and subside in the spring.

Lobby beneath bar and grill. Tapestry by Miro

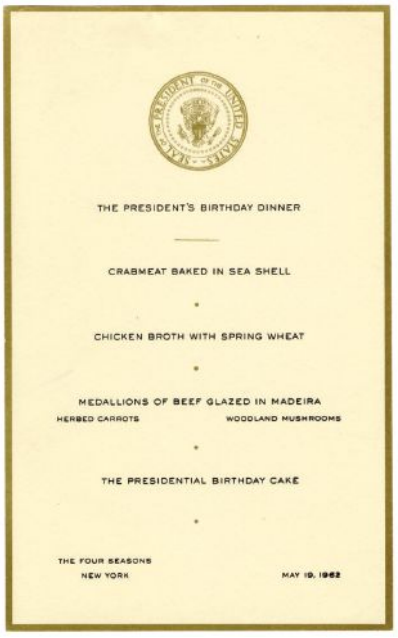
THE FOUR SEASONS

RECORD published the restaurant in November 1959 (top). Other photos of that time show the entrance to the Grill Room (above) and the bar (above, right).

The Four Seasons will take its name, logo, the graphic design, and the theme of changing seasons to 280 Park Avenue at 48th Street. There São Paulo–based architect Isay Weinfeld has about 18 months to complete a scheme for the new 20,000-square-foot establishment in the ground floor of the office tower designed by Emery Roth & Sons in 1961. Weinfeld, selected through a process guided by critic Paul Goldberger, is responsible for the sleek mid-century-modern look of the Fasano Hotel in São Paulo. "He has a soulfulness to his designs that is magical," says von Bidder.

The Four Seasons Restaurant was born a year after the completion of Ludwig Mies van der Rohe's masterful Seagram Building (RECORD, July 1958, page 139). Samuel Bronfman, owner of the spirits company, had hired Mies to design its corporate headquarters on the recommendation of his daughter, Phyllis Lambert, named as the director of planning for the project. As Lambert tells it in *Building Seagram* (2013), Bronfman thought a restaurant and coffee shop (the Brasserie) seemed a natural addition to the plaza in the mid-rise wing east of the tower. He enlisted Restaurant Associates (RA) to run the dining facilities, but Seagram provided the complete architectural fit-out, including kitchen equipment, carpeting, draperies, and art. It also contributed to the cost of the furniture.

Mies decided to give his sidekick on the tower, Philip Johnson, the entire job of designing the restaurant's two column-free 60-by-90-foot dining spaces, with 20-foot ceilings and 485 seats. (Johnson also designed the 150-seat



The Pool Room, named for its square white Carrara-marble pool with live trees planted at each corner, was a hit (above). President Kennedy celebrated his 45th birthday 10 days early on May 19, 1962, at the Four Seasons (menu, right).

Brasserie, tucked into the 53rd Street side.)

A major challenge was the placement of the street entrance—in addition to one at the back of the Seagram lobby on the plaza. Since the grade dropped from Park Avenue to the east, the direct access to the Four Seasons on 52nd Street would actually be below the plaza-level dining spaces. As Johnson said, "There was no precedent for bringing people in from down below and walking them up. Americans don't do that." The architect created a white travertine lobby off the street, where a broad stair gracefully ascends to the Grill Room and bar.

A second challenge for Johnson was that RA wanted him to team up with William Pahlmann, who had restaurant-design experience. The latter had been responsible for what Lambert calls the "ornate, eclectic" and "overbearing," interiors of RA's Forum of the Twelve Caesars, also in Midtown. As it turned out, Pahlmann knew how to place the furniture and to plan the kitchen—and it was his idea to install the 20-foot-square white Carrara-marble pool in the middle of the dining room soon named for this distinctive feature. Johnson conceived of the Venetian-style beaded curtains executed by textile designer Marie Nichols that gently ripple in the breeze of the air-handling system. And Johnson commissioned Richard Lippold to create the suspended rod sculptures that give a sense of intimacy to the Grill Room.

When it opened, RECORD presented an array of photos of the masterwork by Johnson and his team (RECORD, November 1959, page 201). Revealed was the dramatic sequence of spaces leading from the lobby up to the marvelously proportioned dining rooms and bar.

The restaurant made a splash, especially the Pool Room. Marilyn Monroe singing "Happy Birthday" to President John F. Kennedy at Madison Square Garden on May 19, 1962, is famous; less so that the birthday dinner preceding the event was held at the Four Seasons.

In subsequent years, the Grill Room began attracting a fabled lunchtime crowd of writers such as Nora Ephron and Tom Wolfe, along with those in politics, publishing, media, and finance like Henry Kissinger, Barry Diller, Barbara Walters, and Jackie Onassis. In one corner, Table 32 still exudes the aura of having been "owned" by Johnson for decades.

Nothing is forever. Seagram sold its building to Teachers Insurance and Annuity Association (TIAA) in 1980, with provisos re maintenance. Although the exterior was designated a landmark in 1988, TIAA fought the designation of the restaurant interiors. While it lost that battle in 1989, the architectural community heaved a sigh of relief when Rosen bought the Seagram from TIAA in 2000. Here, at last, was an "enlightened" developer—who had leased the 1952 Lever House, and was restoring it.

By then the restaurant, whose ownership had been passed like a baton to those with strong allegiances to the place, was in the hands of Niccolini and von Bidder along with Edgar Bronfman Jr. and Matthew Bronfman, both grandsons of Samuel. The first sign of trouble with the new landlord came about when Rosen decided to remove *Le Tricorne*, the stage curtain that Picasso had created for Diaghilev in 1919. One of the signature statements of the Four Seasons, it enlivened the hallway connecting the two dining areas, known as "Picasso Alley." But in 2014 Rosen claimed the wall behind "the schmatte," as he called it, was crumbling. Today the Picasso hangs in the New-York Historical Society.

When it became clear that Four Seasons would have to leave, Rosen hired Annabelle Selldorf as the architect of the new establishment. After he failed to get certain desired changes through the Landmarks Preservation Commission, Rosen also brought in William Georgis, an architect he had worked with.

So here we are at the final curtain. The Four Seasons, it is hoped, will find success down the street; the replacement in the Seagram Building may survive as well. The original restaurant remains only a memory. This testament to the extraordinary commitment of the Bronfman family, the astonishing collaboration of architectural, interior, landscape, and lighting designers, remaining vital by dint of steadfast restaurateurs, that seemed safe in landmark status, is gone. ■

PHOTOGRAPHY: © EZRA STOLLER/ESTO (LEFT); COURTESY THE CULINARY INSTITUTE OF AMERICA MENU COLLECTION (RIGHT)

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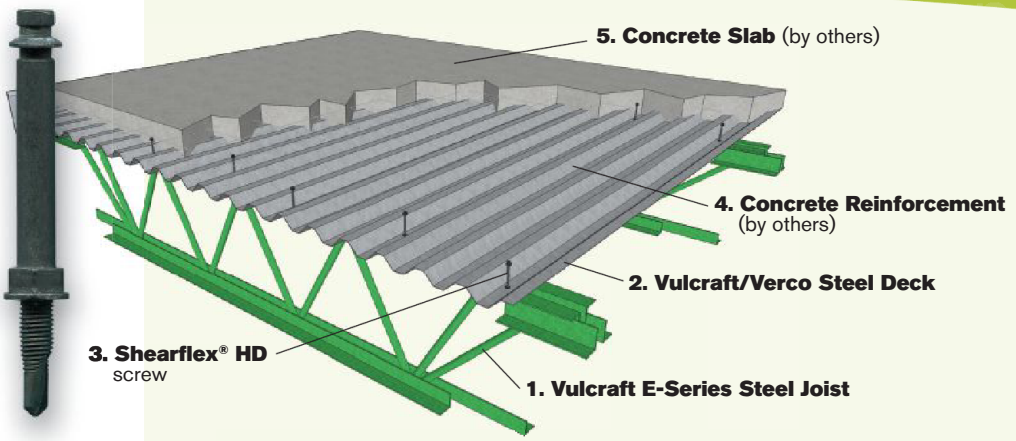

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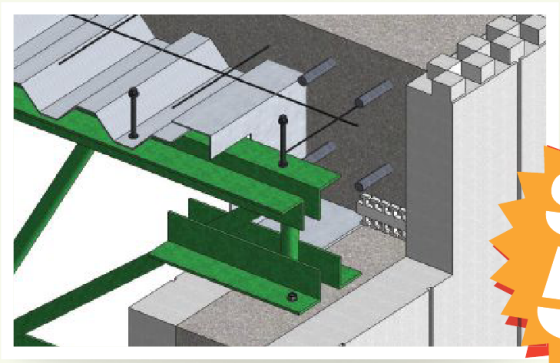

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CIRCLE 38

Labor of Love

A short-term-housing village in Malawi by MASS Design Group provides safety and comfort for expectant mothers.

BY MIRIAM SITZ
PHOTOGRAPHY BY IWAN BAAN

AGAINST THE backdrop of a brush-covered hilltop in central Malawi, women in brightly colored clothing gather to cook, chat, or simply rest amid a cluster of small buildings that rises from the sparsely vegetated landscape. Boston-based MASS Design Group's latest project—a "maternity waiting village" near the Kasungu District Hospital—aims to address high infant and maternal mortality rates by placing high-risk expectant mothers in close proximity to medical professionals during the final weeks of pregnancy.

Densely populated but largely rural, Malawi, in southeast Africa, is one of the most dangerous places in the world to give birth: many women must travel long distances from remote areas to reach medical providers, and nearly seven mothers and 50 infants die for every 1,000 live births, So-called maternity waiting homes, located near hospitals or health centers, can dramatically improve chances for a successful delivery.

MASS, founded in 2008 by Michael Murphy and Alan Ricks, is known for humanitarian projects, including the Butaro District Hospital in Rwanda, the GHESKIO Cholera Treatment Center in Haiti (RECORD, June 2015, page 104), and the Ilima Primary School in the Democratic Republic of Congo (RECORD, January 2016, page 80). In 2013, the firm joined with multiple partners—including the Malawi Ministry of Health, the University of North Carolina, the Bill and Melinda Gates Foundation, and the Autodesk Foundation—in responding to a presidential initiative that called for the construction of 130 maternity waiting homes throughout the country. Though the Ministry of Health had already approved plans for a bare-bones prototype (a barnlike structure, dark and poorly ventilated, with 36 beds separated by partitions), MASS began investigating ways to

PREGNANT PAUSE Expectant mothers often arrive in the company of two or three "guardians"—female relatives who help care for the women while they wait. Designed with this tradition in mind, the buildings' extended awnings create sheltered exterior spaces to accommodate many more than just the 36 temporary residents.

SPECIAL DELIVERY Tapered columns and benches built into building exteriors serve as comfortable outdoor seating areas. Expectant mothers and their guardians cook in the communal kitchen (opposite, bottom left) and just outside the perimeter (opposite, top).

create a new model designed in the regional vernacular that would better meet women's needs while staying close to the $100,000 budget.

"We asked ourselves, 'How do we transform a waiting experience into an empowering experience?'" says MASS director Patricia Gruits, who led the project with Christian Benimana. "How do we make it not only safe, healthy, and comfortable, but build community and dignity? That's what drove our design."

The team conceived of the waiting village as a cluster of small, separate buildings. Riffing on the traditional Malawian home, their scheme comprises three units of three rooms each, with four beds per room. It also increases the number of bathrooms, placing two toilet/shower facilities in every 12-person unit, for a total of six—two more than the Ministry's prototype.

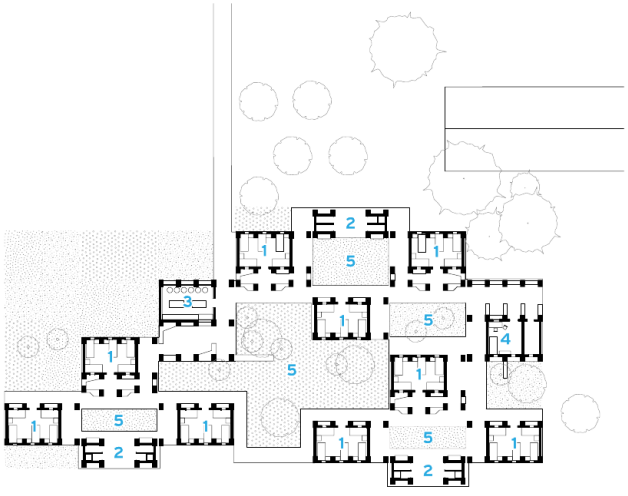
Covered pathways connect the units to one another and to shared spaces (a kitchen, medical consultation and screening room, and classroom), providing shelter from the harsh sun and heavy seasonal rains, while also fostering a sense of community. Design team member and on-site construction manager Jean Paul Sebuhayi Uwase explains, "In Malawi, people spend most of their time outside, chatting and doing chores, so we created courtyards and added overhangs and benches to the exteriors, to make space for people to interact."

Local workers constructed the buildings with compressed stabilized earth blocks (CSEB)—a budget-friendly move that also addressed environmental concerns. Under Sebuhayi's direction, laborers fabricated the soil-and-cement blocks using a press that MASS then left behind for future use. "In Malawi, it's not easy to find good bricks," he says. "It was important to teach the workers this new skill." Additionally, deforestation is a major concern for the country; unlike traditional bricks, CSEBs are not fired, eliminating the need for kindling.

MASS did use wood for the trusses supporting the sheet-metal roofs—though it wasn't easy. "The wood locally available was of a quality that made it difficult to meet our structural demands," says Gruits. "But Jean Paul worked with laborers on-site to perfect a technique of joining pieces together to get the strength we needed."

The team designed the roof geometries with the region's fluctuating climate in mind. Direct sunlight does not enter windows, keeping buildings cool during the daytime, but strikes the upper portions of the tall masonry walls, which passively warm the buildings when temperatures drop at night. Sharply angled and connected by gutters that channel rainwater into the village's catchment system, the roofs are also equipped with solar panels to power the lights.

The Kasungu Maternity Waiting Village—open just since the fall of 2015—could become the new prototype for this type of facility in Malawi and other countries across Africa, and the MASS research team is launching a qualitative and quantitative evaluation study to understand how the design has impacted both mothers and babies. "We're working to make this as affordable as possible," says Gruits, "and to get the proof that design can improve health outcomes." ■



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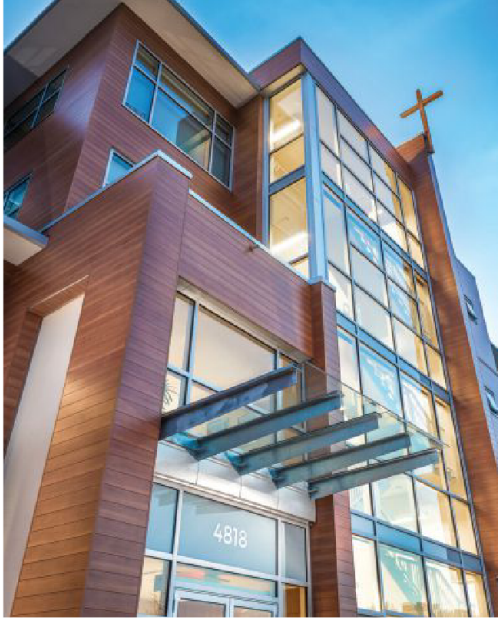

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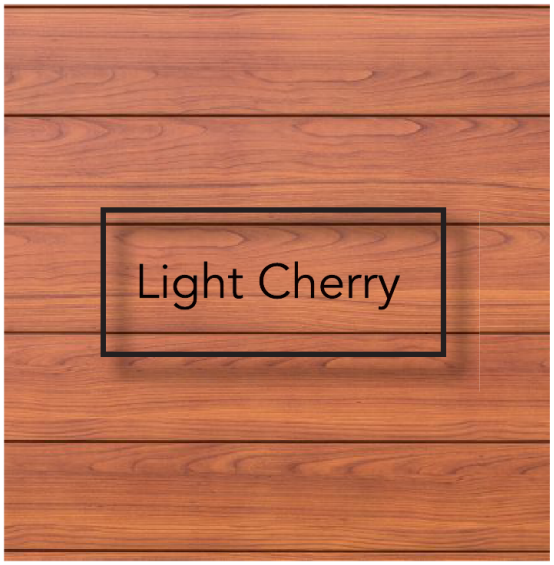

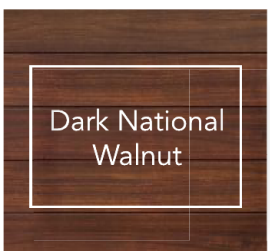

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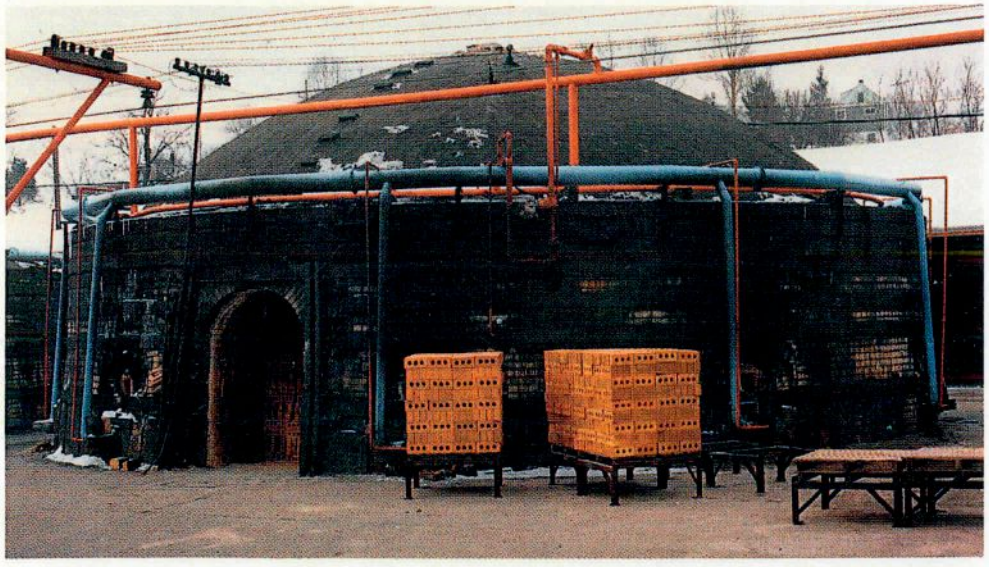

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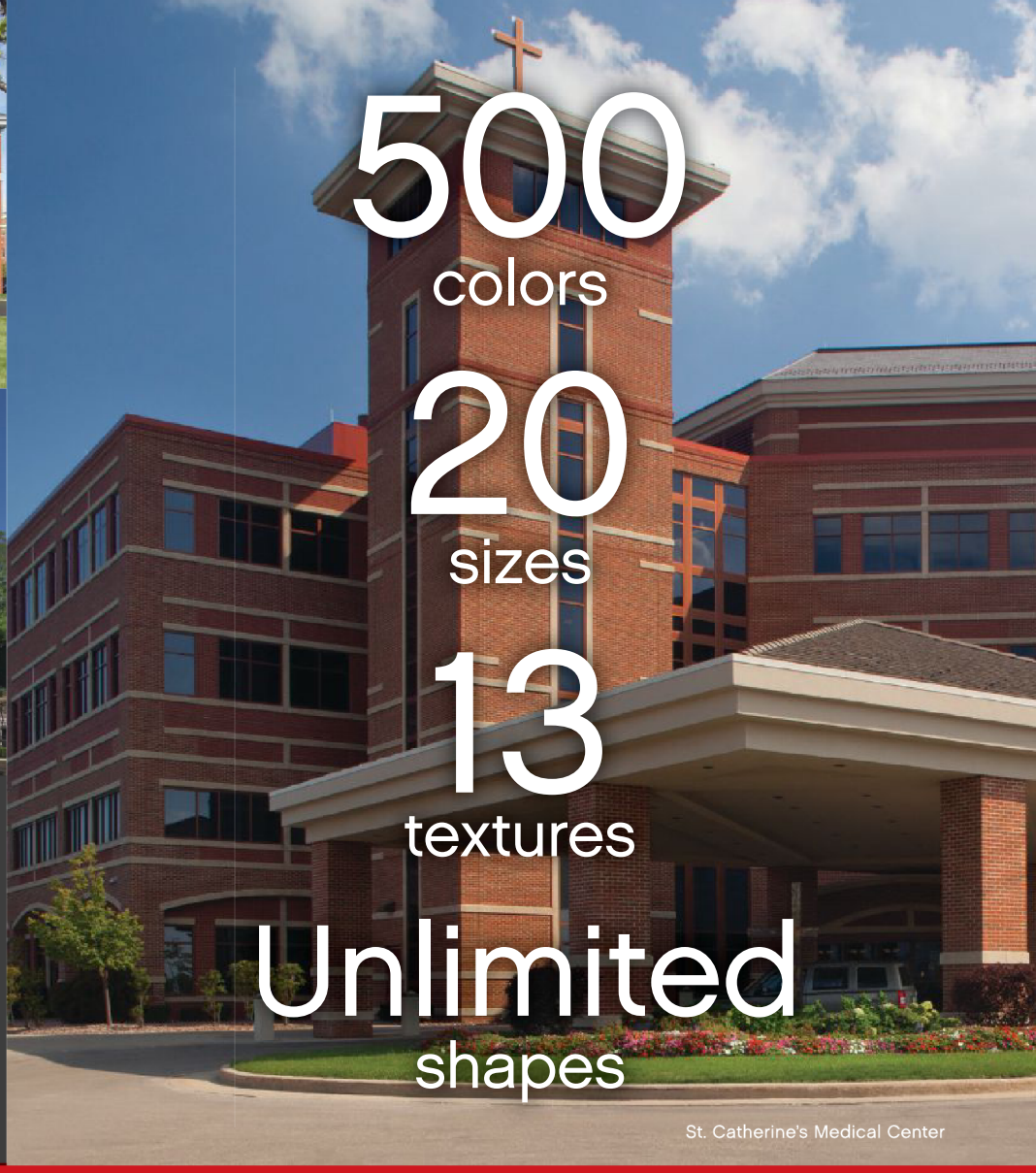

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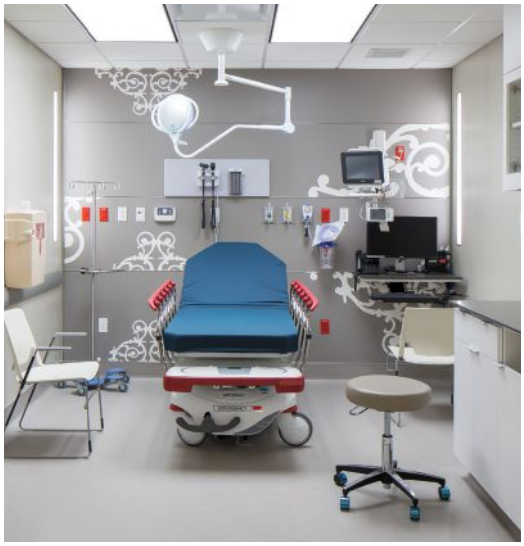
CIRCLE 180

Support Systems

Comfort and convenience abound in these staples for hospitals, clinics, and assisted-living facilities.

By Julie Taraska



Headwall

Made from Wilsonart's Aeon high-impact plastic laminate, this headwall—designed for the University Medical Center in New Orleans (page 104) by project architects NBBJ and Blitch/Knevel—features a custom scroll pattern that references the city's wrought-iron balustrades. Woodward Design + Build fabricated both light and dark versions of the panels, which appear in the patient rooms and pre- and post-op areas, among other locations.
wilsonart.com
CIRCLE 101

Ombre

A double-cloth construction gives this 100% Trevira CS polyester privacy fabric a feel akin to Egyptian cotton, yet the crisp textile, which features a horizontal design, also meets health-care codes, including NFPA 701 for flame retardancy. Ombre comes in a 72" width and choice of four colorways (color 10, shown).
carnegiefabrics.com
CIRCLE 100

Lightframe

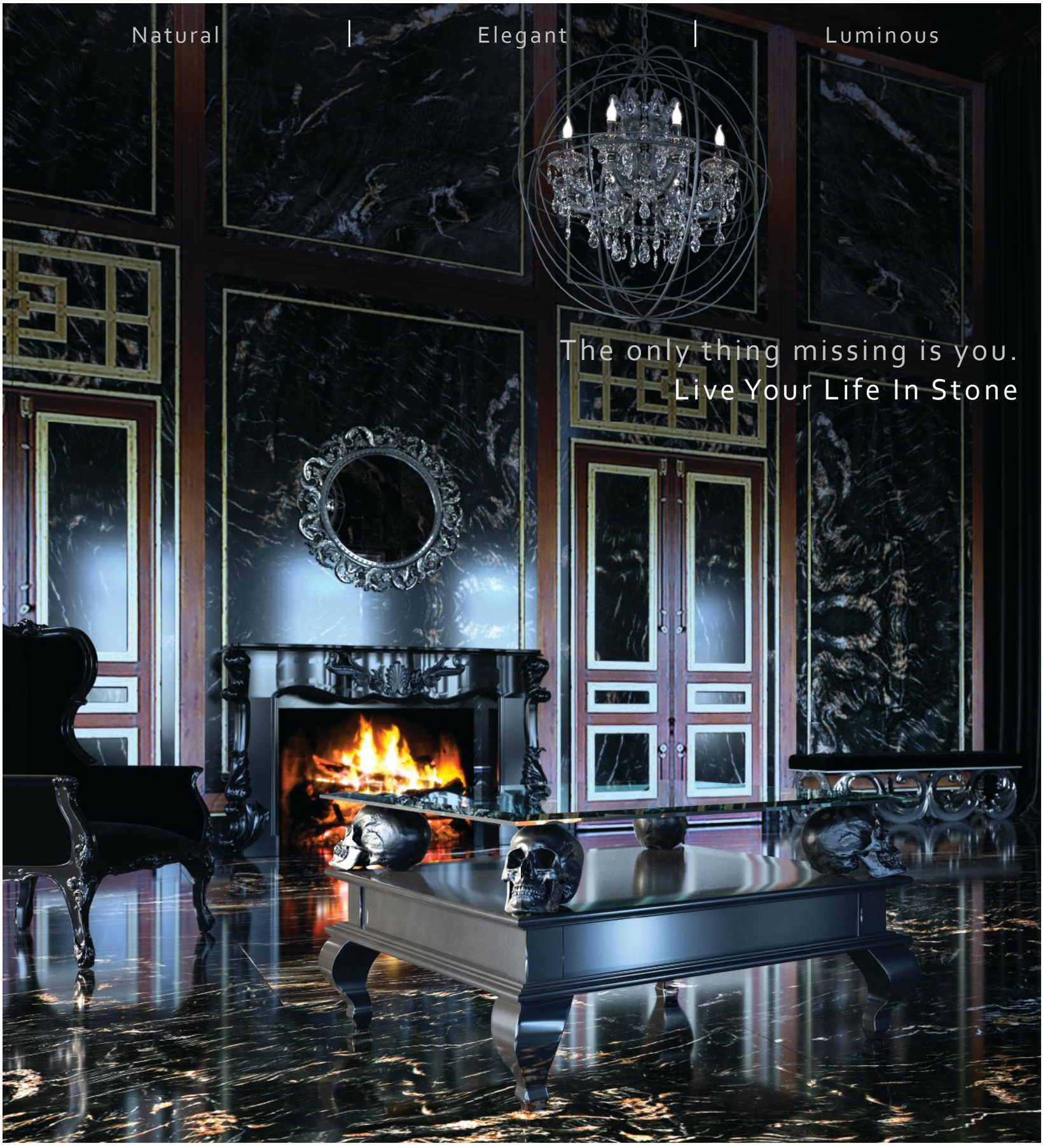
Reengineered to provide a standard NRC of up to 0.90, this modular textile ceiling system comes with a choice of UV-resistant antimicrobial PVDF or PTFE fabric. Certain models of the VOC-free and fire-rated system suit indoors or out. It can also serve as walls, room dividers, and awnings.
sefar.us
CIRCLE 102

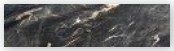
UltraClear

This interior float glass is color-neutral, offering less visual distortion and more natural light transmission than standard green-tinted glass. The low-iron product comes in thicknesses from 2mm to 12mm and sizes up to 130" by 204"; its uses include walls, partitions, and entryways.
guardianglass.com
CIRCLE 103

MedLink

A complement to Humanscale's TouchPoint T7 mobile cart, this drawer system works in conjunction with Microsoft's Active Directory software to organize bedside medicine delivery. When integrated in accordance to Health Level 7 privacy standards, the software can lock and unlock the configurable drawers, providing greater security and accountability. It also can stream patient data to the cart.
humanscale.com
CIRCLE 104

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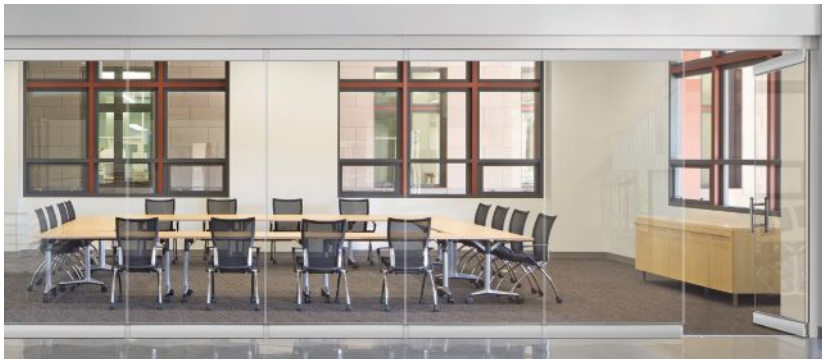
products health care



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A special interlayer reduces the transfer of noise through this movable glass wall system, reducing its sound transmission class (STC) to 36—a level superior to that of most fixed-glass partitions. Panels for the single-track PrivaSEE come in heights up to 10' 6" and widths up to 4' 1". The system's aluminum framing also is available in four finishes (clear anodized, shown).

nanawall.com

CIRCLE 105

Barrel

Soraa's first foray into the fixtures market offers up to 3,200 lumens of uniform, glare-free light in a choice of 3,000K, 3,500K, and 4,000K. The unit's curved aluminum housing is a mere 3" deep, making it ideal for lay-in and gypsum-board ceiling plenums where HVAC and structural interferences are issues. Barrel is available in two sizes and works with standard dimming driver options.

soraa.com

CIRCLE 106

Check-In

Residential and hospitality textiles inspired this collection of eight coordinating health-care fabrics, each available in numerous colorways. Materials range from vinyl to solution-dyed nylon, with options including Durablock moisture barriers, acrylic backings, and stain-resistant finishes.

designtex.com

CIRCLE 107

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This clinician's chair features a desklike surface that rotates 360°, allowing care providers using digital and mobile technology to chart and share information with patients without turning their backs to them. The chair's swivel seat and passive lumbar support add comfort; they also permit users to have more conversational postures during consultations.

steelcase.com

CIRCLE 109

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in-dapt.com

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CIRCLE 40

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Here Comes the Sun

Textiles, coatings, window films, and shade structures keep solar rays at bay.

By Julie Taraska

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This 100% Trevira CS polyester window covering reduces heat, glare, and sound via an effective combination of yarn, weave, and metalized backing. The textile offers a light-transmission degree of 27% to 45% and a light-reflection degree of 24% to 43%; it also provides an NRC of 0.4 when flat and 0.55 when draped.

carnegiefabrics.com

CIRCLE 111

Tensilation

Designed with Grimshaw Architects, this modular shading system for events comprises individual 13'-tall diamond or square-shaped units fastened to one another with clips. The umbrella features UV-rated polyester fabric draped over aluminum spokes, with the mast anchored by tensile stainless-steel cables, and it comes in a choice of 11 colors (shown: white).

mdt-tex.com

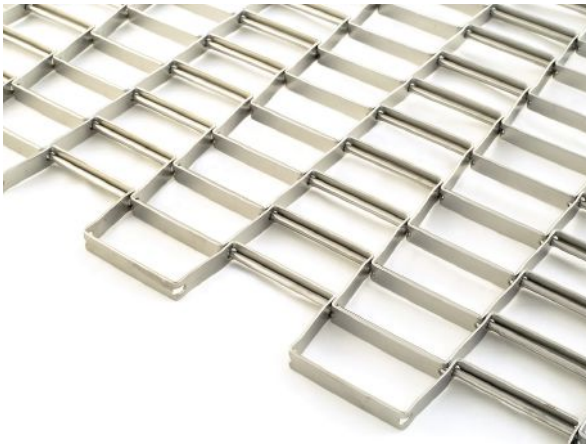
CIRCLE 110

Hudson

A stainless-steel mesh facade system for parking garages, Hudson features an open area of 82%, enough to provide a high level of ventilation yet still screen indirect sunlight. The flexible pattern can span vertical surfaces with minimal intermediate structure; it also may be attached with the company's pre-engineered Eclipse, Scroll, or Eye-Bolt hardware.

cambridgearchitectural.com

CIRCLE 112



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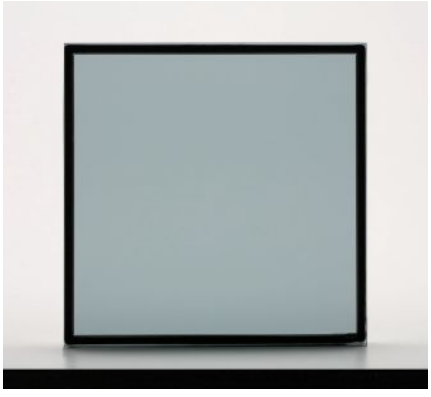

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ppgideascapes.com

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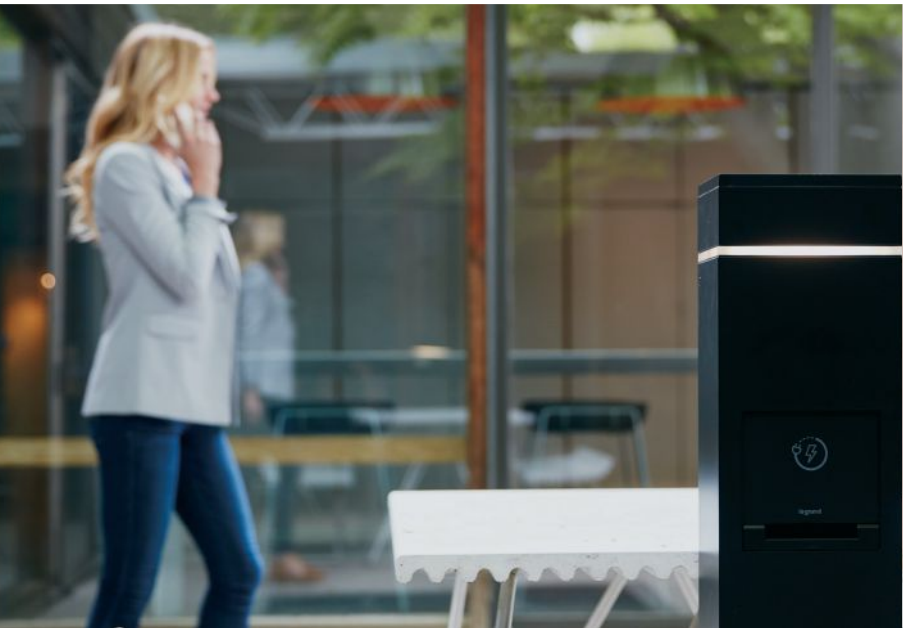

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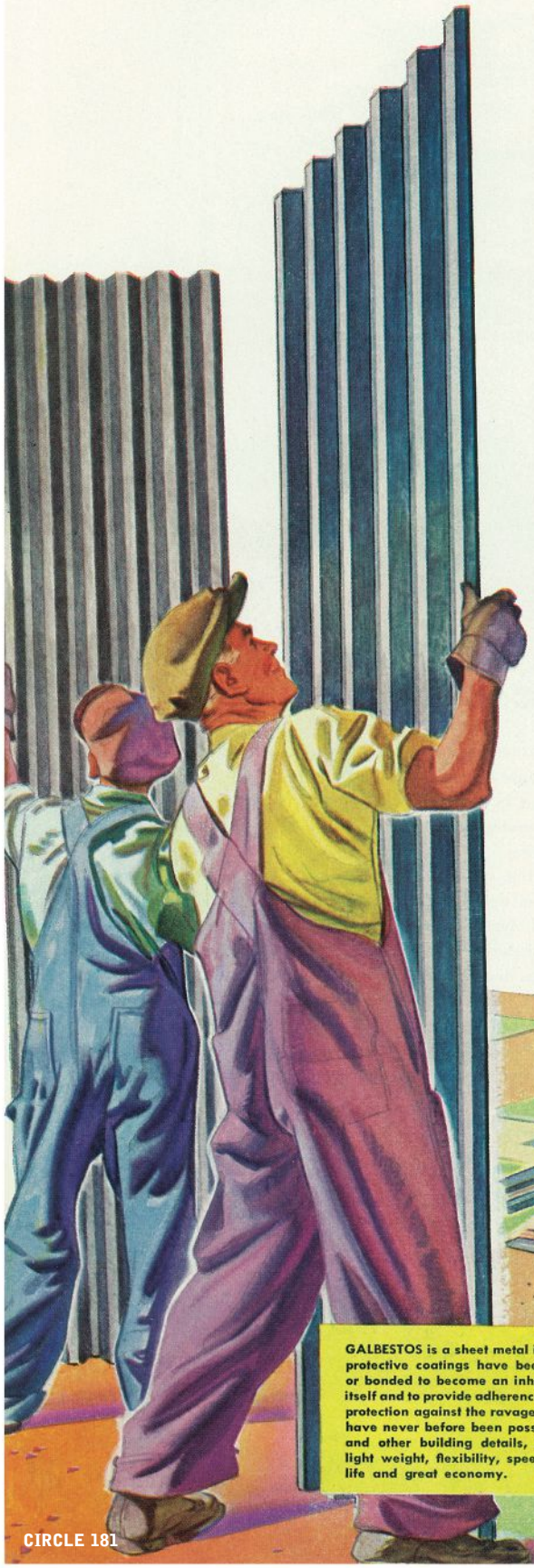

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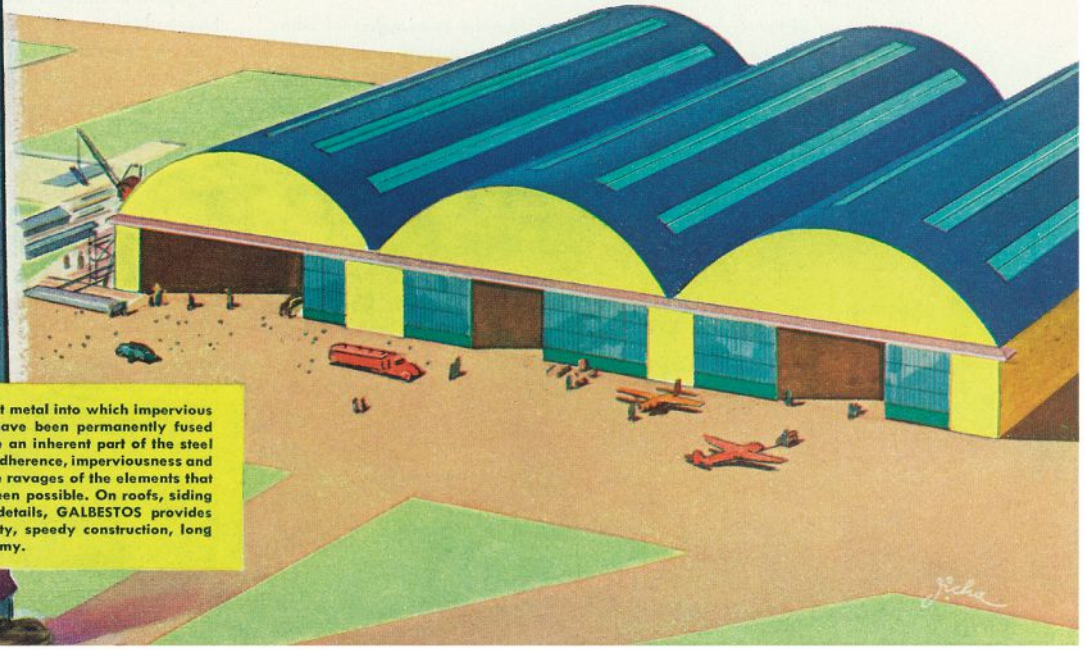

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CIRCLE 181

Reprinted from THE ARCHITECTURAL RECORD, Issue of September, 1926

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Breckenridge, Texas
Clyde Woodruff, Architect
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Switching It Up

For its second act, a landmark museum continues its tradition of inspiring awe.

BY CHRIS FOGES

PHOTOGRAPHY BY IWAN BAAN

Switch House: Tate Modern Expansion
London | Herzog & de Meuron

Herzog & de Meuron's extension to London's Tate Modern completes a project that the architects outlined in 1995 when they won the competition to create an art museum out of a decommissioned power plant. And while the result is remarkably coherent, the new work is a sequel, not a repeat. The firm returned "as a team whose experience and way of thinking had grown immensely," says Tate director Nicholas Serota, while the museum itself faced fresh challenges: how to show new art forms and build on its role as a public forum.

The first phase of the Tate Modern project, transforming two of the three parallel bar buildings of the former power plant, was completed in 2000. The Boiler House—facing the Thames—was converted into galleries, and the central Turbine Hall was emptied, inviting artists to create large-scale installations. The adjoining Switch House remained in use by the power company but was earmarked for the museum's future extension. With industrial operations now confined to the eastern end of the structure, Herzog & de Meuron has replaced its western half with a stack of new galleries and constructed an adjoining 10-story tower over two retained subterranean oil tanks.

The tower's truncated pyramidal form is a sensible response to programmatic considerations and was "strongly informed by the geometry of the tanks, as well as existing street lines and protected views," says Jacques Herzog. "We don't rely on intuition or the ability to make unusual shapes to make buildings; our approach is conceptually driven." The tower's square top is rotated relative to the square of its ground plan, twisting the form. To avoid

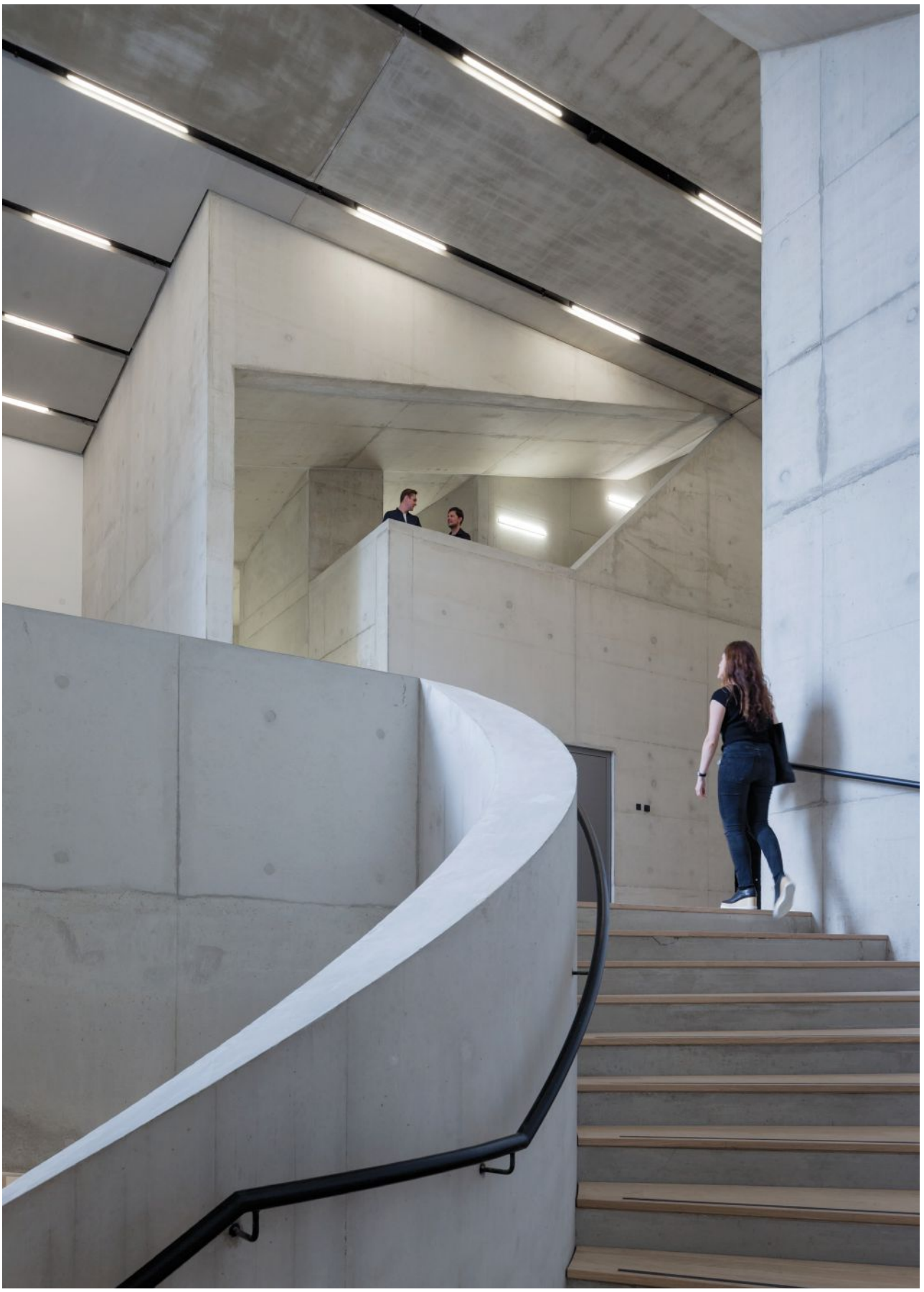
SOLID FOUNDATION The Switch House is built over subterranean oil tanks whose circular footprint is revealed by new concrete walls enclosing outdoor terraces (left). Rising to 210 feet behind the former power plant, the tapering tower is visible from Foster & Partners' Millennium Bridge to the north (above).

"warped" or curved facades, a diagonal crease was scored across each of the four elevations, producing eight variously angled planes.

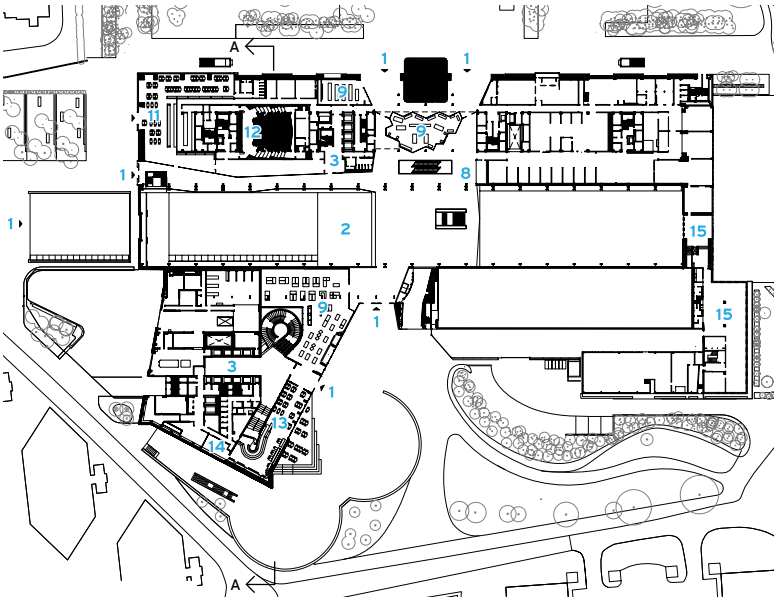
A perforated brick skin stretches over the precast concrete frame like a veil; allowing light to seep out at night but preventing views in by day, it has an enigmatic quality. The extension's textured masonry reinterprets the material character of the host building but was a late alteration. The architects first proposed boxy forms stacked in a seemingly haphazard fashion within a glazed envelope, but "we really began to feel that we were caught in a trap," says Herzog. Though the concept allowed a sense of freedom in design, its transparency would have imposed too many restrictions on gallery operations, so was revisited.

The tower stands alongside a terrace and two small parks that echo the plaza on the river side, suggesting parity in status between front and back. A new entrance allows visitors to come directly in, and another on the south side cuts a passage through the building to the river, effectively weaving its interior into the city's public routes (museum entry is free).

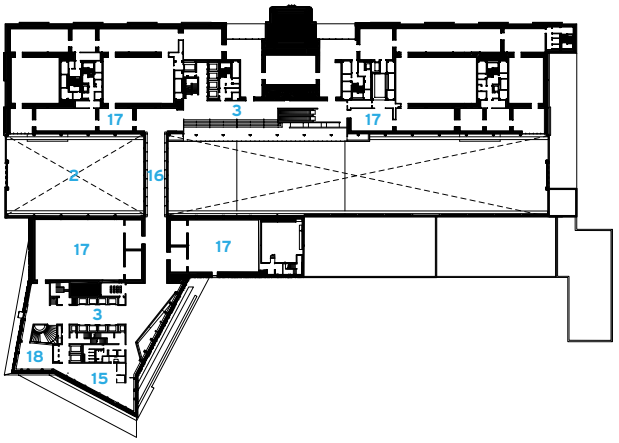
The museum's heart remains the Turbine Hall, into which a broad, gentle ramp descends from grade. If that vast space is the nave of Tate Modern's cathedral, the galleries created for this second phase within the two underground Tanks are its chapter house. The cylindrical structures are among a range of unconventional rooms in the Switch House and serve the ambition "to explore the



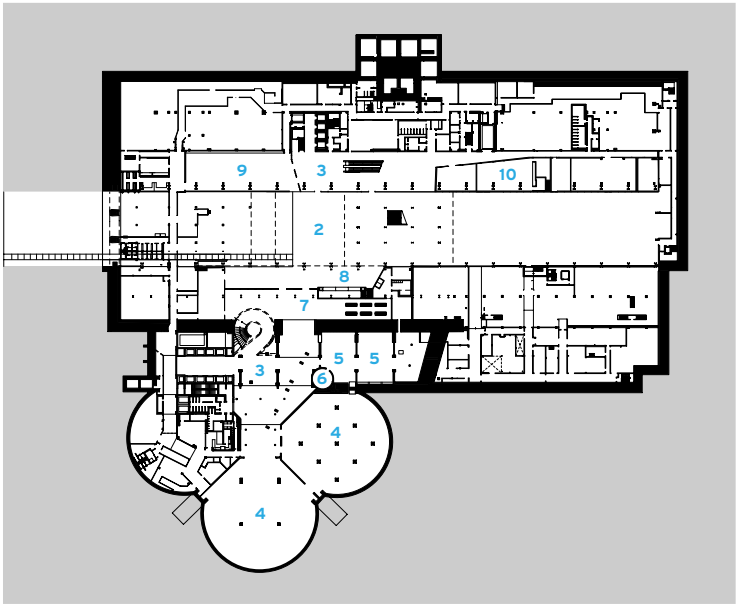
WITH A TWIST
The circulation route that wraps around the tower's central core creates distinctive spaces analogous to urban landmarks, says the architect (above and right). These aid orientation and provide meeting points. Sinuous stairs are formed of poured-in-place concrete, while the exposed structural frame and ceilings are precast.



LEVEL-ONE PLAN

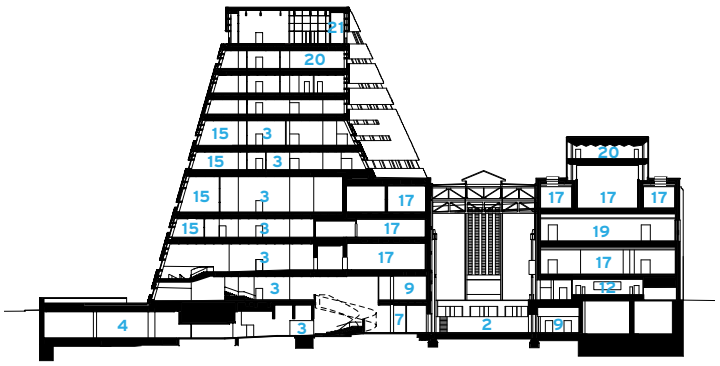


LEVEL-FOUR PLAN



BASEMENT-LEVEL PLAN

0 60 FT.
20 M.



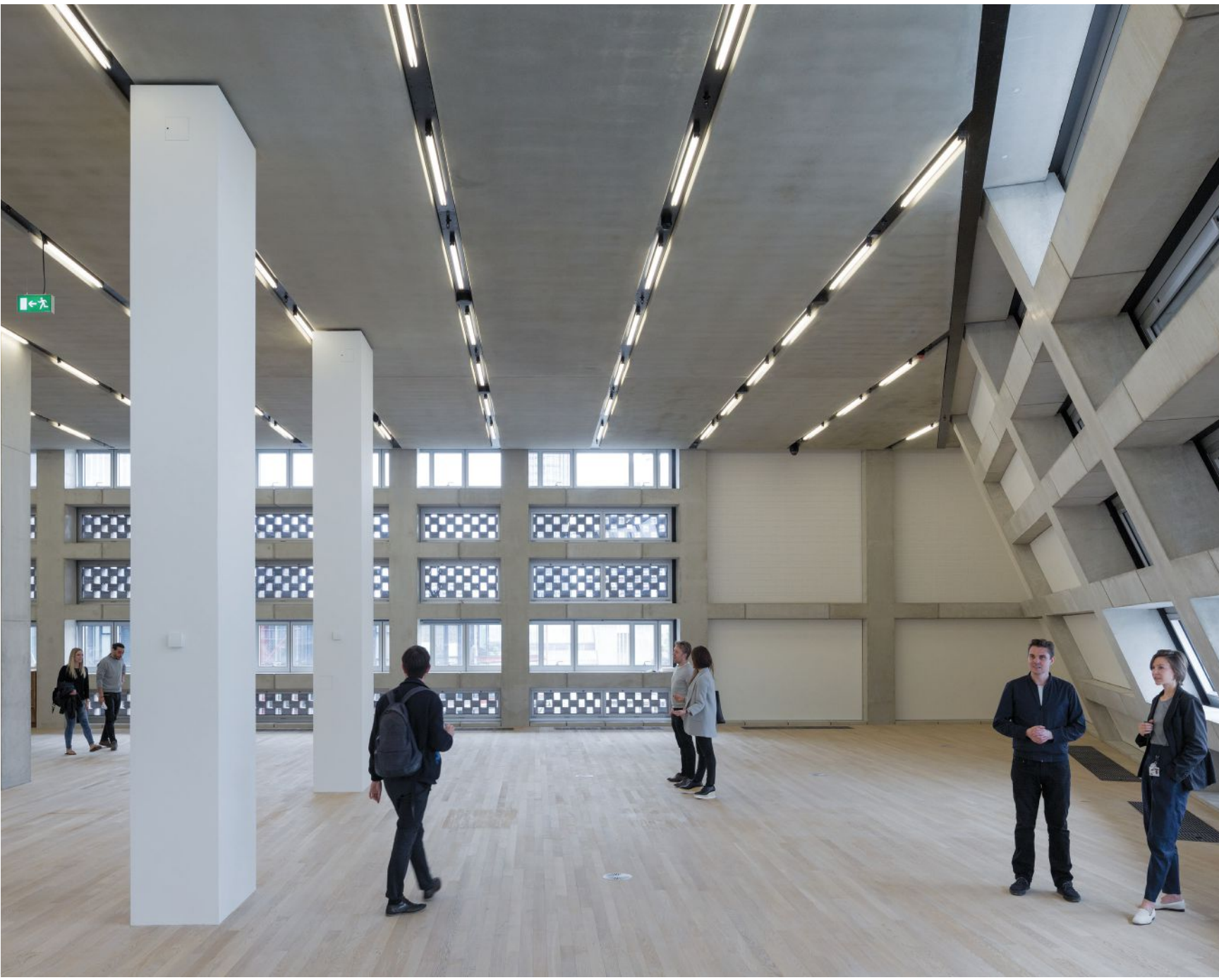
SECTION A - A

0 60 FT.
20 M.

1	ENTRANCE	8	INFORMATION/TICKETING	15	OFFICE
2	TURBINE HALL	9	SHOP	16	BRIDGE
3	CONCOURSE	10	LEARNING CENTER	17	COLLECTION
4	TANK	11	CAFÉ	18	CONSERVATION
5	TRANSFORMER	12	CINEMA	19	EXHIBITION
6	DRUM GALLERY	13	BAR	20	RESTAURANT
7	LOBBY	14	COMMUNITY ROOM	21	TERRACE

period after the 1960s, when art became active," explains Tate Modern director Frances Morris. Its galleries were designed to enable audience interaction with sculpture and installations, and allow for the display of film, sound, and "live" art. Performance-based works take place among and alongside interactive and dynamic sculptures and installations such as David Medalla's bubble fountains and those that have abandoned the plinth to occupy galleries in new ways, such as Carl Andre's *Bricks* and Roni Horn's weighty glass cube, *Pink Tons*.

The concrete Tanks "are literally and figuratively the foundation of the new building," says Serota, who heads all four of Tate's museums and initiated Tate Modern. They

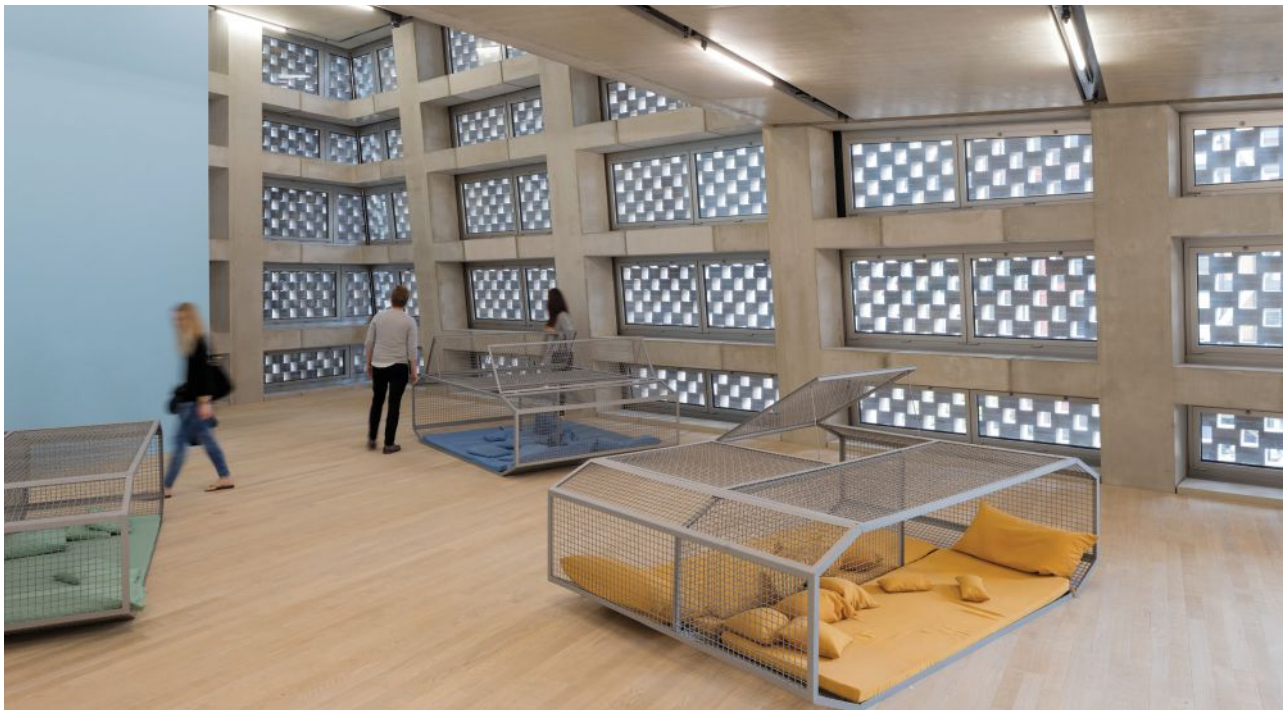


FLEX TIME
Tate Exchange, on the fifth floor (above), is a forum for collaborative projects with partner institutions, including talks and pop-up shows. Daylight is filtered by the exterior masonry screen, formed of prebonded brick pairs, each fixed to adjacent pairs by steel dowels and supported on stainless-steel corbels.

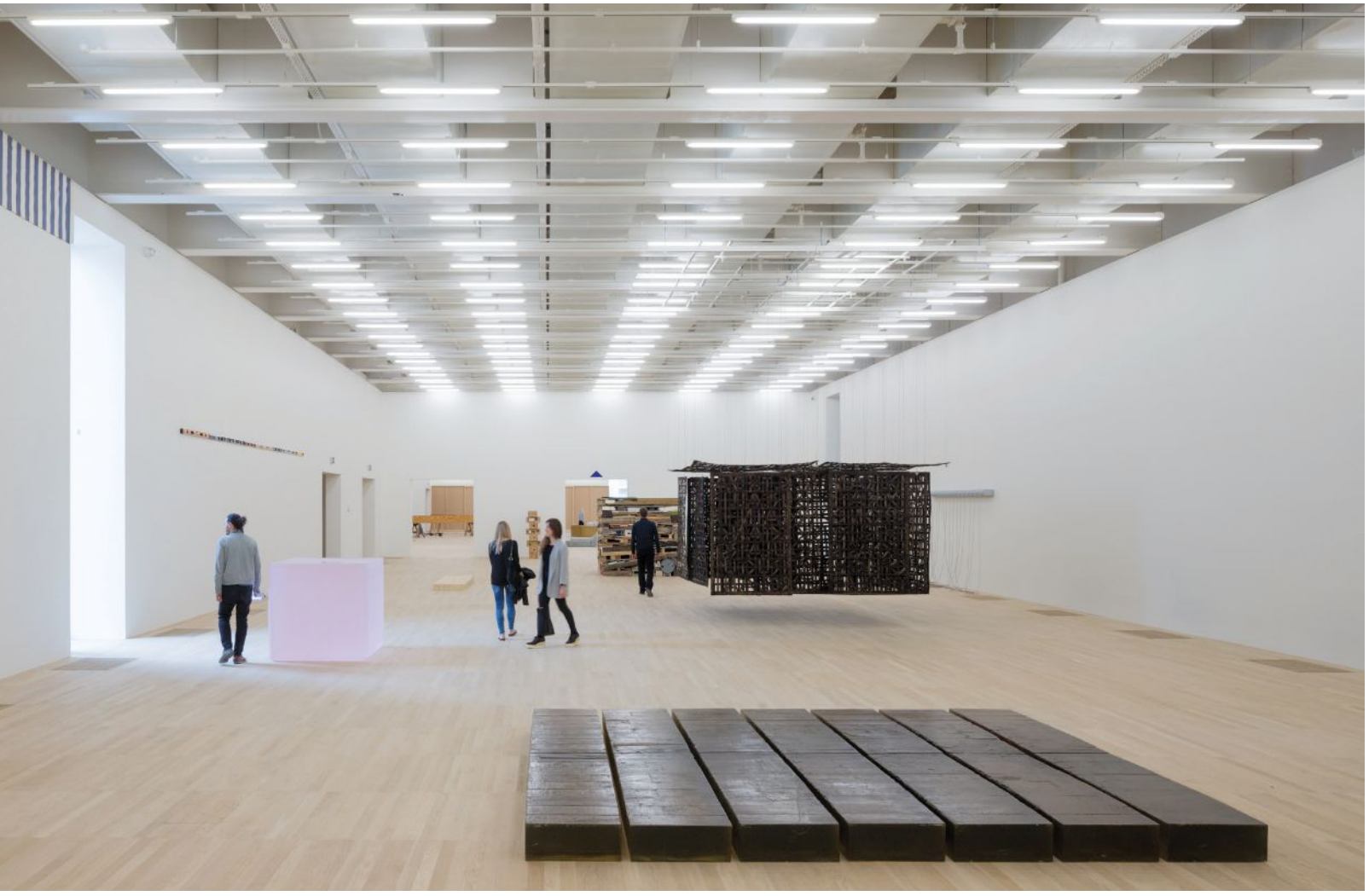
set the curatorial tone and introduce the material language and spatial idiosyncrasy developed in circulation spaces on the upper floors. In the Boiler House, the concourses proved unexpectedly popular as spaces for relaxation and reflection, so here they are given greater prominence. Rather than confining stairs to a core, the architects let them wander around the plan, inscribing a ribbonlike processional route through the building.

Beside the Tanks, a luxuriantly curvaceous stair winds up from the basement, transporting visitors to the second-floor concourse in a jaw-dropping moment of revelation. Overhead, floors pull back from the inward-leaning concrete frame to create a slanted atrium that visually links the tower's three gallery levels. Robust materials are elevated by refined detail; the sophistication of the chunky structure is revealed in its complex angles and neatly aligned joints, while the heavyweight brickwork that screens the windows has been laid to minute tolerances and invisibly pinned with steel dowels. Echoes of the power plant's matter-of-fact construction are clear. "It's a very 'direct' building," notes Herzog & de Meuron partner Ascan Mergenthaler. "Not just in the use of materials, but also in that the windows can be opened; you feel that it's not hermetic."

Small antechambers separate each climate-controlled gallery from the naturally ventilated concourses, slowing



HIGH ART
Formal, rectilinear galleries are organized in a stack flanking the Turbine Hall (below). Angular, daylit spaces within the tower are also used to display art, including Ricardo Basbaum's interactive *Capsules (NBP x me-you)* on the second floor (left). Ribbons of light animate the museum's western facade (opposite).



the pace of visitors as they enter. The upper-floor exhibition spaces are variations on the white cube and come in a range of sizes appropriate to the display of diverse work. The largest–200 feet long, 18 feet high, and column-free–has two tall windows to the outside and another overlooking the Turbine Hall, and is "a dream for us," says Morris. "The curatorial possibilities are endless."

Above the galleries are five floors containing social, dining, and education spaces, as well as a showcase for projects by partner organizations, crowned by an observation deck in the form of a double-height glazed room with a wraparound loggia. Bathed in daylight, it is a joyous conclusion to the upward journey from subterranean darkness and offers panoramic views of central London. This perspective is otherwise available only from the luxury apartment buildings that now crowd around the museum, by architects including Rogers Stirk Harbour & Partners. The developers who arrived to capitalize on the prestige of the Tate's art and architecture may have "destroyed innocence, in a way," as Herzog suggests, but the extension to Tate Modern is a strong defense of the ideal of common ground. It is porous, generous, and, as Serota puts it, "civic, but not pompous." ■

credits

ARCHITECT: Herzog & de Meuron – Jacques Herzog, Pierre de Meuron, Harry Gugger (until 2009), partners; Ascan Mergenthaler, partner in charge; John O'Mara (associate project director), Kwamina Monney (project manager), Ben Duckworth (associate), Christoph Zeller, team

ENGINEERS: Ramboll (structural, from 2008); Arup (2005–07)

CONSULTANTS: Vogt Landschaftsarchitekten (landscape); AECOM (cost); Gardiner & Theobald (project managers); Uxus (retail); Cartlidge Levene with Morag Myerscough (wayfiding and signage); Mott MacDonald (acoustics)

GENERAL CONTRACTOR: Mace

CLIENT: Tate

SIZE: 254,000 square feet

COST: $368 million

COMPLETION DATE: June 2016

SOURCES

METALWORK: Lee Warren, Steel Arts Metalwork, Watson Steel Structures, Bourne Group

CONCRETE: Loveld

FACADE BRICKWORK: Swift Brickwork Contractors

ROOFING: Prater

GLAZING: Seele

FURNITURE: Vitra, Jasper Morrison

Pierre Lassonde Pavilion | Québec City | OMA

Since the 1970s, OMA has established a reputation for pushing the boundaries of architecture—on a theoretical and, then, on a physical level. The worldwide offices of the firm have, in recent decades, completed numerous mixed-use, residential, cultural, and retail projects, often boldly defying gravity and conventional notions of scale and materials. But the public museum is a building type that has mostly eluded them, especially in North America.

True, OMA has found success building museums for private clients in Europe—last year saw the opening of the Prada Foundation in Milan and the Garage Museum of Contemporary Art in Moscow (RECORD, July 2015, page 56 and 50, respectively). On this side of the Atlantic, the New York office, which works somewhat independently from the Rotterdam headquarters, has tackled a variety of often smaller art spaces, including galleries, studios, and residences, collaborating with artists and collectors Marina Abramović, Cai Guo-Qiang, Robbie Antonio, and Alan Faena. Now, finally, it has a full-fledged museum under its belt with the completion of the Pierre Lassonde Pavilion in Canada.

"Renzo Piano was not in the running," jokes Line Ouellet, executive director of the Musée National des Beaux-Arts du Québec (MNBAQ), where the 164,000-square-foot addition opened on June 24. The project was overseen by partner Shohei Shigematsu, who had been closely involved in the unrealized—and literally over-the-top—design for the Whitney Museum in New York's extension in 2000, which eventually led to the Piano design for an entirely new building for the Whitney in downtown Manhattan. The design for MNBAQ represents an evolution in approach, one that is decidedly more mellow.

Like many venerable institutions, MNBAQ was saddled with inadequate facilities for showcasing contemporary art. The museum complex includes a Beaux Arts structure (1933), a former prison (1867) converted into galleries and offices, and a mostly below-grade pavilion (1991), all ensconced within the historic Parc des Champs-de-Bataille. What MNBAQ needed were high, column-free galleries in which to install its collection of large-scale art.

OMA offered a provocative, yet pragmatic, solution. Similar to the cantilevering Milstein Hall at Cornell University (2011), the other major building completed by the New York office since Shige-

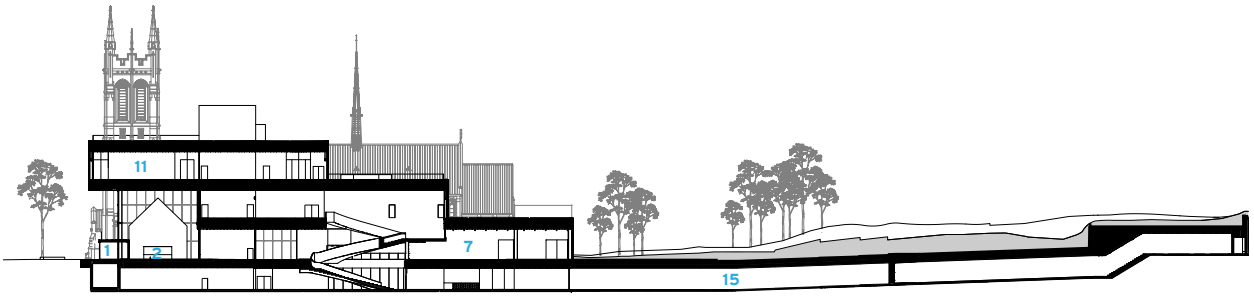
ON THE GREEN The cantilevering new building is an extension of the historic Parc des Champs-de-Bataille overlooking the St. Lawrence River in Québec City, its terraced roofs planted to mimic the site's topography (above). The entrance along the Grande Allée, a main boulevard extending from the city's old quarter, connects the museum campus to the city (right).

Raise a Glass

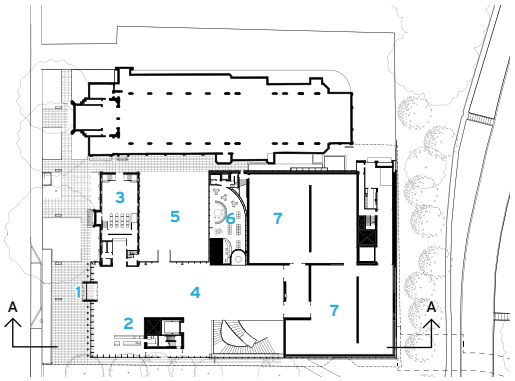
A series of stacked glazed boxes offers an alluring street presence for an art museum's parkland complex.

BY JOSEPHINE MINUTILLO

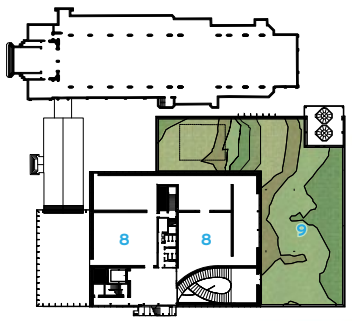
PHOTOGRAPHY BY BRUCE DAMONTE



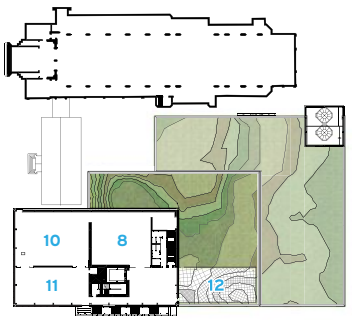
SECTION A - A



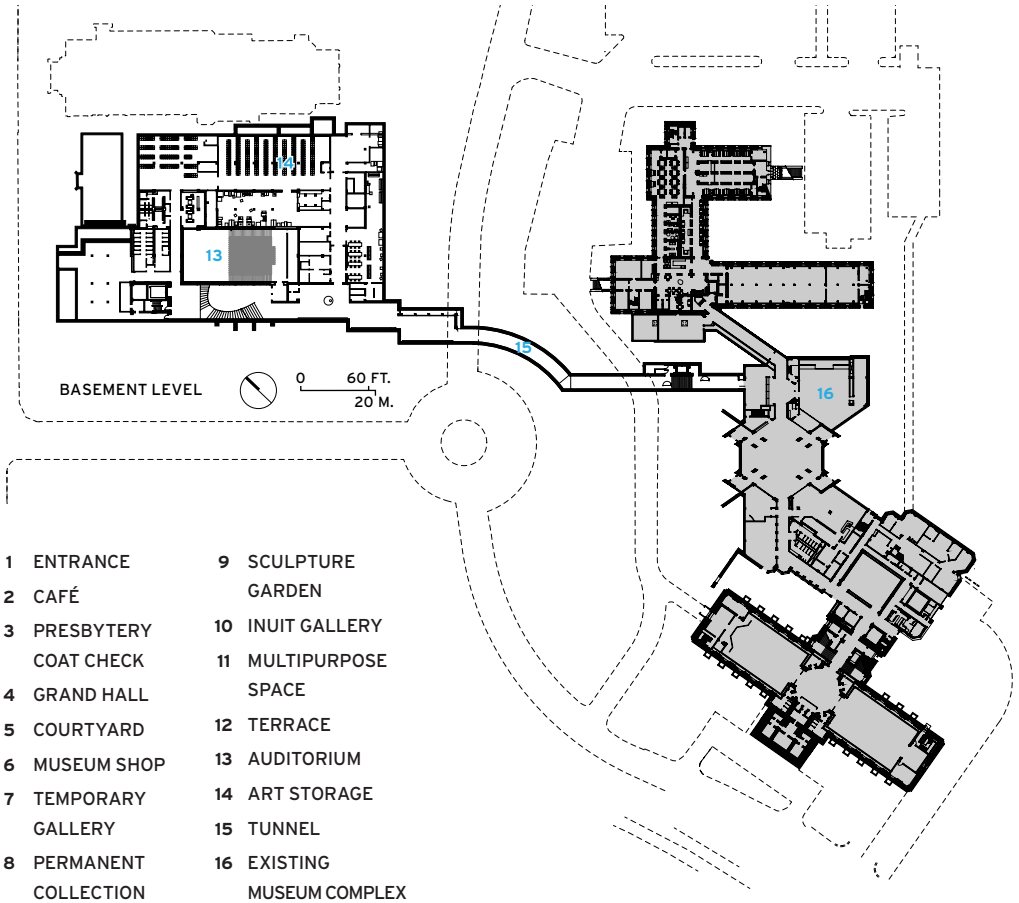
GROUND FLOOR



SECOND FLOOR



THIRD FLOOR



1 ENTRANCE
2 CAFÉ
3 PRESBYTERY COAT CHECK
4 GRAND HALL
5 COURTYARD
6 MUSEUM SHOP
7 TEMPORARY GALLERY
8 PERMANENT COLLECTION
9 SCULPTURE GARDEN
10 INUIT GALLERY
11 MULTIPURPOSE SPACE
12 TERRACE
13 AUDITORIUM
14 ART STORAGE
15 TUNNEL
16 EXISTING MUSEUM COMPLEX

credits

ARCHITECT: OMA (New York)

ASSOCIATE ARCHITECT: Provencher_Roy Architectes

ENGINEERS: SNC Lavalin (structural); Bouthillette Parizeau, Teknika HBA (m/e/p)

CONSULTANTS: Buro Happold (lighting); Front (facade design); Patenaude Trempe, Albert Eskenazi, CPA Structural Glass (facade engineering); Trizart Alliance (auditorium); Technorm (code); Legault & Davidson (acoustics); Exim (vertical transport); CHP (cost)

GENERAL CONTRACTOR: EBC

CLIENT: Musée National des Beaux-Arts du Québec

SIZE: 164,000 square feet

COST: $50 million

COMPLETION DATE: June 2016

SOURCES

GLASS: Gamma, NuPress

LIGHTING: Elliptipar (interior ambient); Lumenpulse (uplights)

INTUMESCENT PAINT: Isolation Air-Plus

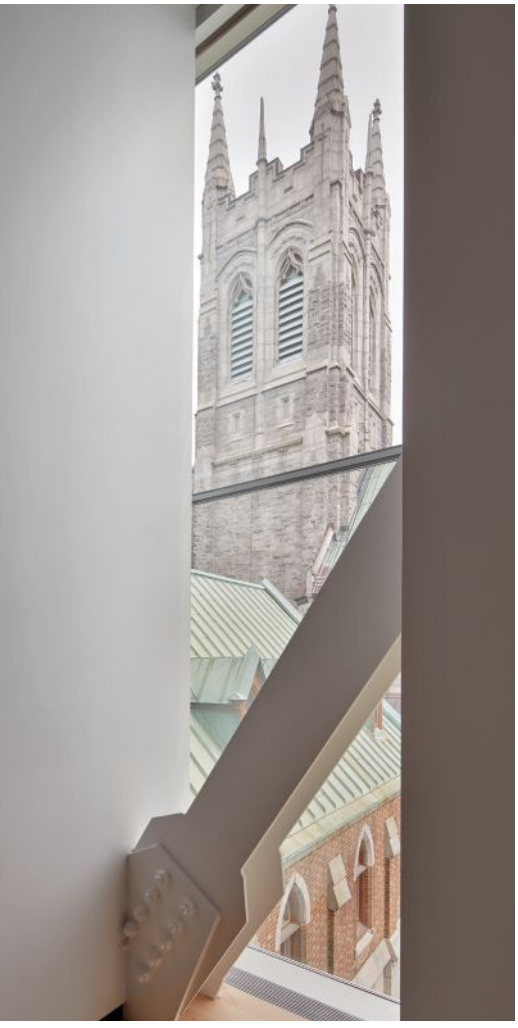
ELEVATOR: Ascenseurs Lumar

matsu became director in 2006, the muscular Lassonde Pavilion anchors the intersection of a bucolic campus and an emerging arts district, while deftly deferring to existing structures. It serves as the museum's new main entrance.

Located next to a church on a major boulevard a mile outside Québec City's old quarter, the new structure is composed of a series of stacked glass boxes that climb on top of one another, a seeming reference to the hilly promontory along the St. Lawrence River on which the provincial capital is built. The parti extends the green swath of the 265-acre Champs-de-Bataille—designed in 1908 by Frederick Todd, a disciple of Frederick Law Olmsted—onto the building. With each box smaller than the one below it, the terraced green roofs are planted in a design that mimics the contour lines of the parkland beneath.

The structure sits on the site of a former L-shaped building the museum acquired that comprised a monastery and presbytery. The monastery portion was razed and the new building now abuts the pres-

HOMEFRONT The gable form of the presbytery is mimicked in concrete through the glass wall in the 41-foot-high lobby at the museum entrance (top). The largest work in the museum's collection is a sequence of 30 paintings by Montreal-born Jean-Paul Riopelle that hang contiguously in a band stretching over 130 feet in a basement passageway, which connects the new building to the older museum complex (above).



bytery and employs some of its spaces. As collisions go, this is a rather subtle one on the exterior—and a playful one on the interior.

The uppermost box's 65-foot cantilever, supported by simple Howe trusses, appears less dramatic than it actually is, extending only 18 feet past the glass fin wall enclosing the lobby. Below that soaring element, the gable form of the sliced presbytery wall—reinforced and reimagined in poured concrete that is several feet thick in parts—features prominently in the 41-foot-high lobby. An opening at its base, painted bright green, serves as a coat check that extends into the ground floor of the presbytery. (The church priest still resides on a floor above.)

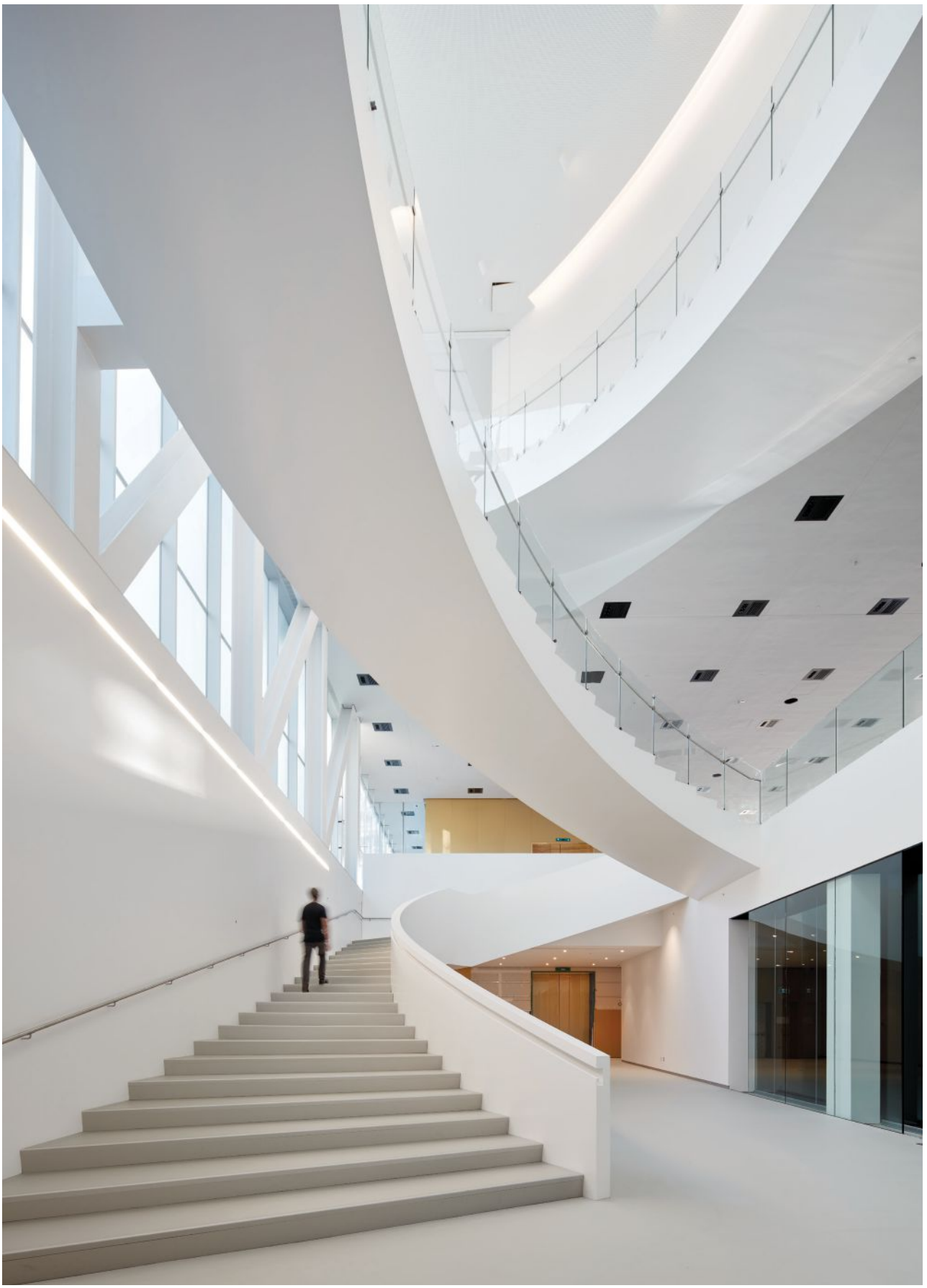
The ground level, its floor covered in black granite, encompasses a ticket desk and what the architects call the Gold Core. Covered in gold-painted aluminum panels, it houses vertical circulation and a small kitchen for the café. A grand hall leads to the temporary galleries, a wood-clad museum shop, and an intimate outdoor courtyard featuring site-specific art in the nook between the church and presbytery. A sweeping, and very inviting, spiral staircase interrupts the building's orthogonal composition. Spanning three floors, from the basement to the second level, the sculptural steel stair encourages visitors to progress naturally through the building rather than take the elevator.

When compared with the aluminum-foam walls and extravagant black travertine floors of Prada, or the glossy polycarbonate walls of the Garage—both projects designed by Rem Koolhaas—the Lassonde Pavilion's galleries are frankly conventional. "We deliberately chose nondescript materials and finishes, banal even," says Shigematsu. "I'm comfortable with a simple, neutral space that allows the art to shine."

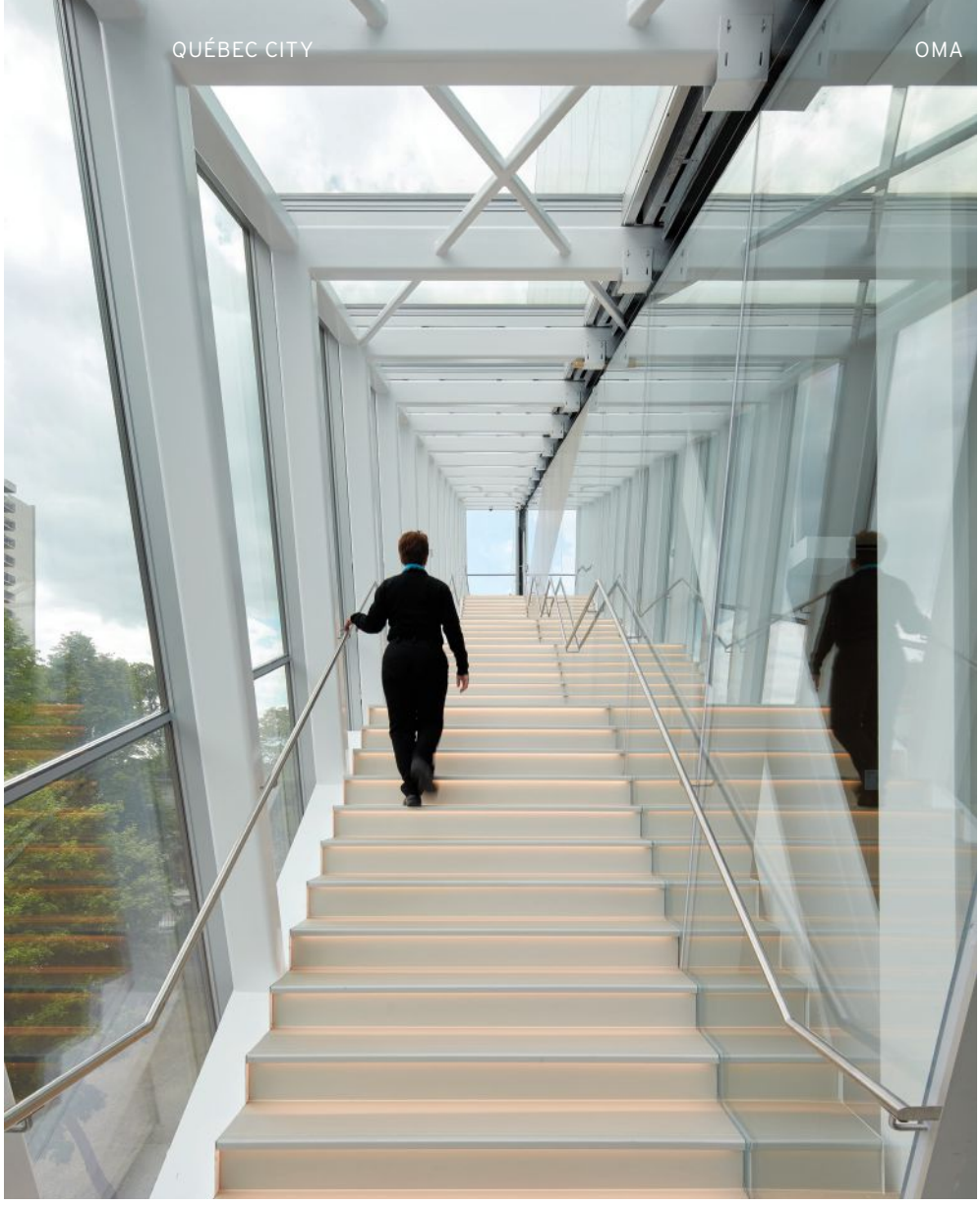
It's also an aesthetic that kept costs down—there was no Italian fashion icon or Russian billionaire financing the Québec building. Canadian philanthropist Pierre Lassonde, for whom the building is named, contributed an initial $7.8 million, but the $50 million project was mostly made possible through funding from the local and national governments.

The 16½- to 18-foot-high galleries, including a top-floor space dedicated to Inuit art, have ceilings of simple gypsum board and Canadian maple floors. What makes them special is the feeling of daylight penetrating through select transparent glass panels and from completely daylit auxiliary spaces. In a city where heavy stone or concrete walls characterize most buildings, the choice of an all-glass building was a bit unusual. "We are aware of museum fatigue, so we wanted natural light and views throughout the entire sequence," says Shigematsu. The designers took advantage of the elements surrounding the building—the park, the city, the river, the existing museum complex, and the church—by offering distinct peeks at them as one circulates.

A glass-enclosed diagonal stair connecting the second and third floors—similar to the one Morphosis stuck onto Dallas's Perot Museum—is affixed to the side of the building. It too offers respite from looking at art, giving one the feeling of walking among the treetops.



SWEPT AWAY
An inviting spiral stair encourages museum visitors to ascend the building by foot from the grand hall (top). It also leads to the basement, where large windows allow daylight streaming from above into the auditorium (right). Panels of transparent glass offer discrete views of surrounding elements, including the church, as you circulate through the building (opposite, bottom).



SCALING UP The 18-foot-high ground-floor gallery has been installed with large-format art from the museum's collection for the opening exhibit (opposite, bottom). Second-floor galleries have access to ample daylight and views (opposite, top and this page, bottom). The "stair window" seems to float among the trees (right).

The greenish tint of the building's glass panels is most visible on the facade where the "stair window" brings three-dimensionality to an otherwise flat wall, and in the back of the building. The verdant hue blends in with the parkland setting, the copper roof of the adjacent church, and the three planted roofs of the terraced structure itself—of which only a small portion on the third floor is accessible to visitors. The triple-layered insulated glazing units range from completely transparent to opaque. Most are translucent, textured, and with a frit pattern, and all change in appearance over the course of the day, glowing at night to animate the street.

Other interior spaces include a 256-seat auditorium, with chairs upholstered in the rich blue of the Québec flag; art storage; a model room; loading dock; and a 425-foot-long basement passageway that links to the existing museum complex.

In a year when major museum buildings—SFMOMA, Tate Modern (page 70)—are opening at the same time that classic structures like Marcel Breuer's Whitney and Louis Kahn's Yale Center for British Art are being refreshed and reopened, there are the inevitable comparisons among them, raising the question: is it possible to build as sumptuously today as in the past? But those comparisons may be unfair, as art spaces increasingly need to accommodate a diverse range of activities.

"Museums are asked to do very different things from what they did five decades ago, and very rarely within a discrete piece of real estate," says Janne Sirén, director of the Albright-Knox Art Gallery. That museum just hired OMA New York to design an addition to its complex of Neoclassical and modern buildings, by Edward B. Green and Gordon Bunshaft respectively, within a Frederick Law Olmsted–designed campus in Buffalo. It will be OMA's first museum in the U.S.

When members of the Albright-Knox's selection committee visited the Pierre Lassonde Pavilion under construction, they were doubtless impressed that such a smart, highly contextual design was built at a startlingly modest budget without looking cheap. Now finished, it is a building that thoughtfully engages the park and the city while offering great spaces to display a variety of art. ■

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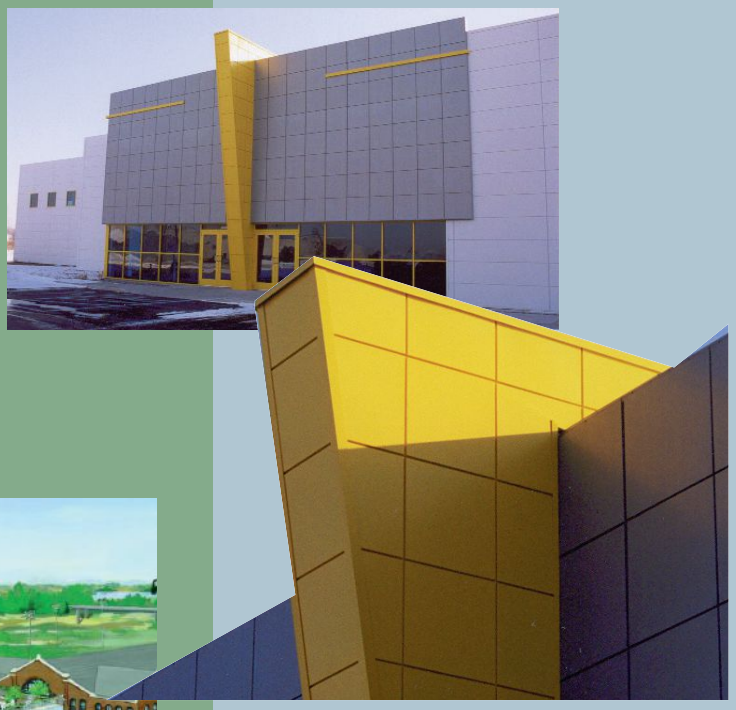

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Mill Woods Library, Seniors and Multicultural Centre - Edmonton, Alberta
Architects: Dub Architects and HCMA Architecture + Design

Making a Splash

Two striking indoor pools, by Bing Thom and Hughes Condon Marler, use wood in unexpected ways and provide a Vancouver suburb with new landmarks.

BY ADELE WEDER

PHOTOGRAPHY BY EMA PETER

The Vancouver suburb of Surrey, British Columbia, is a city in high-minded transition. Newly aware of the financial, logistical, and environmental costs of its low-density, car-oriented sprawl, its municipal leaders have recently taken steps to transform the bedroom community into a better-defined and more fully equipped modern city. The harbinger was the construction of Surrey Central City: a shopping, office, and educational complex, designed by Bing Thom Architects (BTA), that created a sense of a downtown within Surrey. Now the city has two new public aquatic centers, each with a program that is the very epitome of urban vitality. Like the public library, the community swimming pool serves as a modern-day church of sorts, a gathering place empowered by North America's dual obsessions with fitness and fun.

Community indoor swimming pools—natatoria, in the lingo—present logistical and technical challenges that require architectural ingenuity. First and foremost is height, in order to accommodate the high-divers and water-sliders, as well as to disperse the chlorine-saturated air. And for obvious reasons, the large interior space must have a long, clear span.

Near the city's southern border, Hughes Condon Marler Architects (HCMA Architecture + Design) has designed an aquatic center with an Olympic-size competition pool, diving platforms, a family-oriented leisure pool with water slide, hot tubs, a sauna, a steam room, and a weight room—all that in an area that until very recently has been sparsely populated agricultural land, but is slated to be developed into a vast residential neighborhood. HCMA has designed seven other aquat-

GRANDVIEW HEIGHTS The undulating roof of HCMA's aquatic center imbues it with visual drama while providing the needed height for diving platforms (opposite). The building's size and massing (this page) will make it the centerpiece of a new residential neighborhood to be developed on the surrounding farmland.

GRANDVIEW HEIGHTS The ceiling's roller-coaster-like contours are made up of pairs of exceedingly slender curved glue laminated beams (opposite). They are supported at each end of the building by concrete buttresses and at midspan by V-shaped concrete columns that help articulate the entrance area (above).

ic centers in the Vancouver region. But the Grandview Heights commission posed a new kind of challenge. "We had a completely blank slate," says Darryl Condon, HCMA principal. "We were asked to build the centerpiece of a community that doesn't exist yet."

HCMA's answer to this problem was a roof that reads like a series of giant cresting waves from the outside and a billowing sheet of fabric from the inside. The undulating form, so dramatically evocative, was functionally driven. Devised with the help of structural engineers and timber specialists Fast + Epp, the roof is made of improbably long and thin ribbons of glue laminated wood. These slender elements (comprised of pairs of 4-inch-wide by 10-inch-deep beams tied together) are anchored at either end by post-tensioned concrete buttresses and a row of enormous canted V-shaped concrete columns at midspan. They perform in tension, much like the cables of a suspension bridge, notes Condon, allowing an area free of vertical supports for the 50-meter-long, 10-lane-wide pool. They also create catenary curves that reach a maximum height of 49 feet to clear the diving platforms, falling to 29 feet at the roof's lowest points.

At the other end of Surrey, its northeastern corner, the Guildford Aquatic Centre bookends the evolving city. Designed by BTA in partnership with Shape Architecture, the Guildford pool expands an existing recreation center on the site. Like Grandview

credits

ARCHITECT: HCMA Architecture + Design – Darryl Condon, Stuart Rothnie, principals; Melissa Higgs, project architect; Aiden Callison, Alexandra Kenyon, Steve DiPasquale, Craig Lane, Craig Simms, Nicolas Worth, design team

CONSULTANTS: Fast + Epp (structural); AME Consulting Group (mechanical); AES Engineering (electrical); RF Binnie (civil); PFS Studio (landscape); Daniel Lyzun & Associates (acoustical)

GENERAL CONTRACTOR: EllisDon

CLIENT: City of Surrey

SIZE: 95,000 square feet

COST: $43 million

COMPLETION DATE: February 2016

SOURCES

GLULAMS: Western Archrib

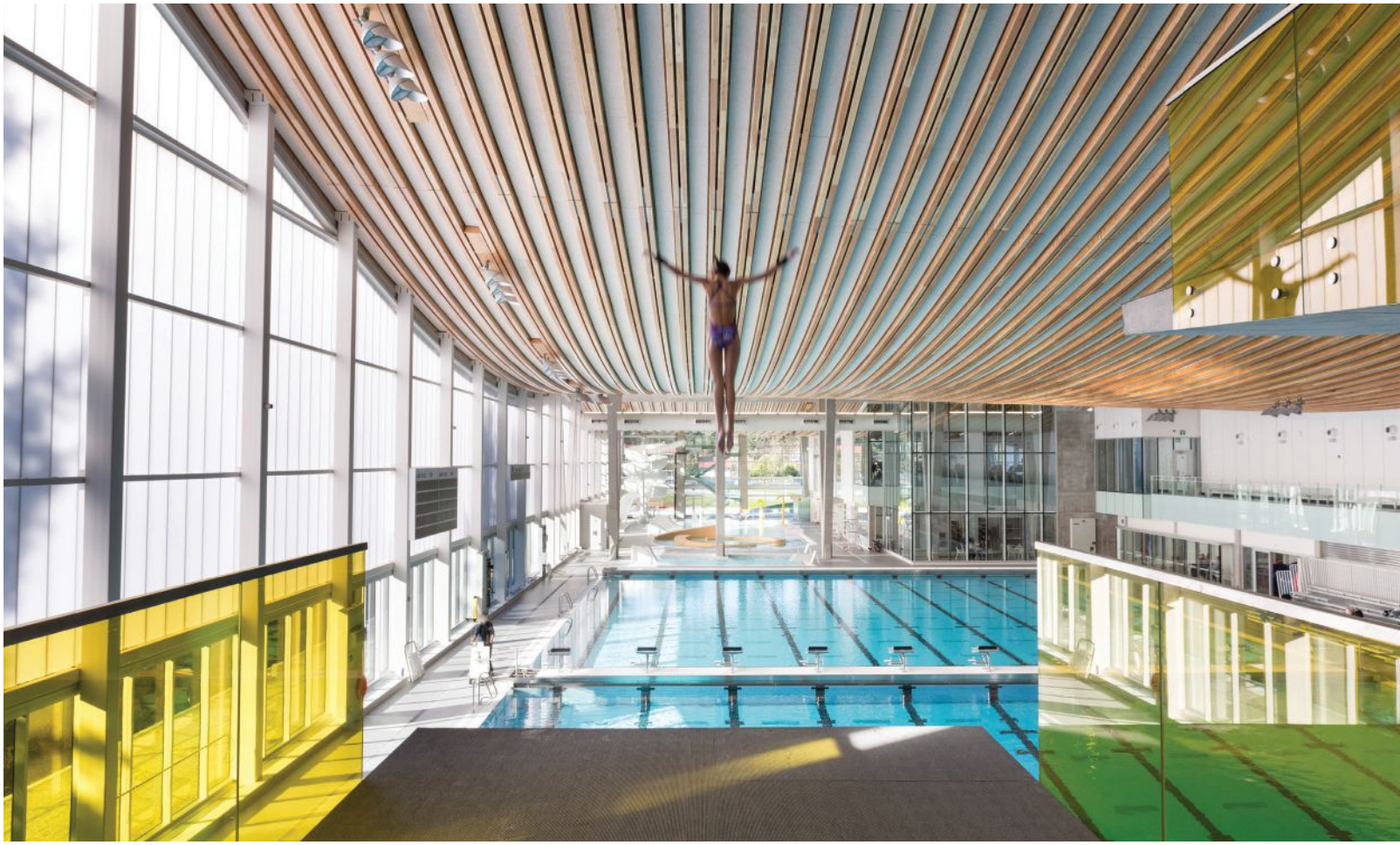
METAL PANELS: Alucobond, Apolic, Kingspan

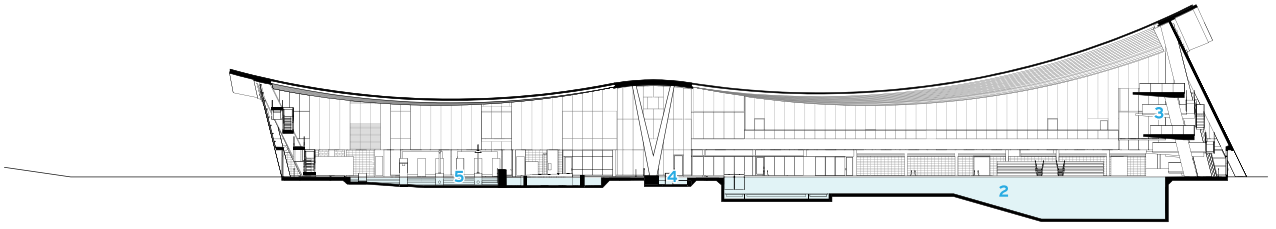
CURTAIN WALL: Columbia Glazing Systems

FLOOR AND WALL TILE: Daltile, Buchtal

DOWNLIGHTS: GE Lighting

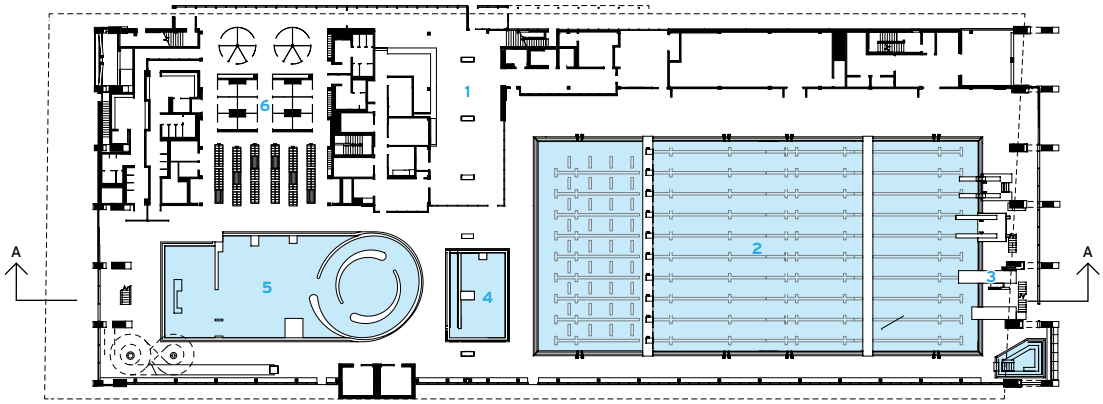
ACOUSTICAL CEILINGS: Tectum





SECTION A - A

1 LOBBY
2 LAP POOL
3 DIVING PLATFORMS
4 HOT TUB
5 LEISURE POOL
6 CHANGING ROOMS

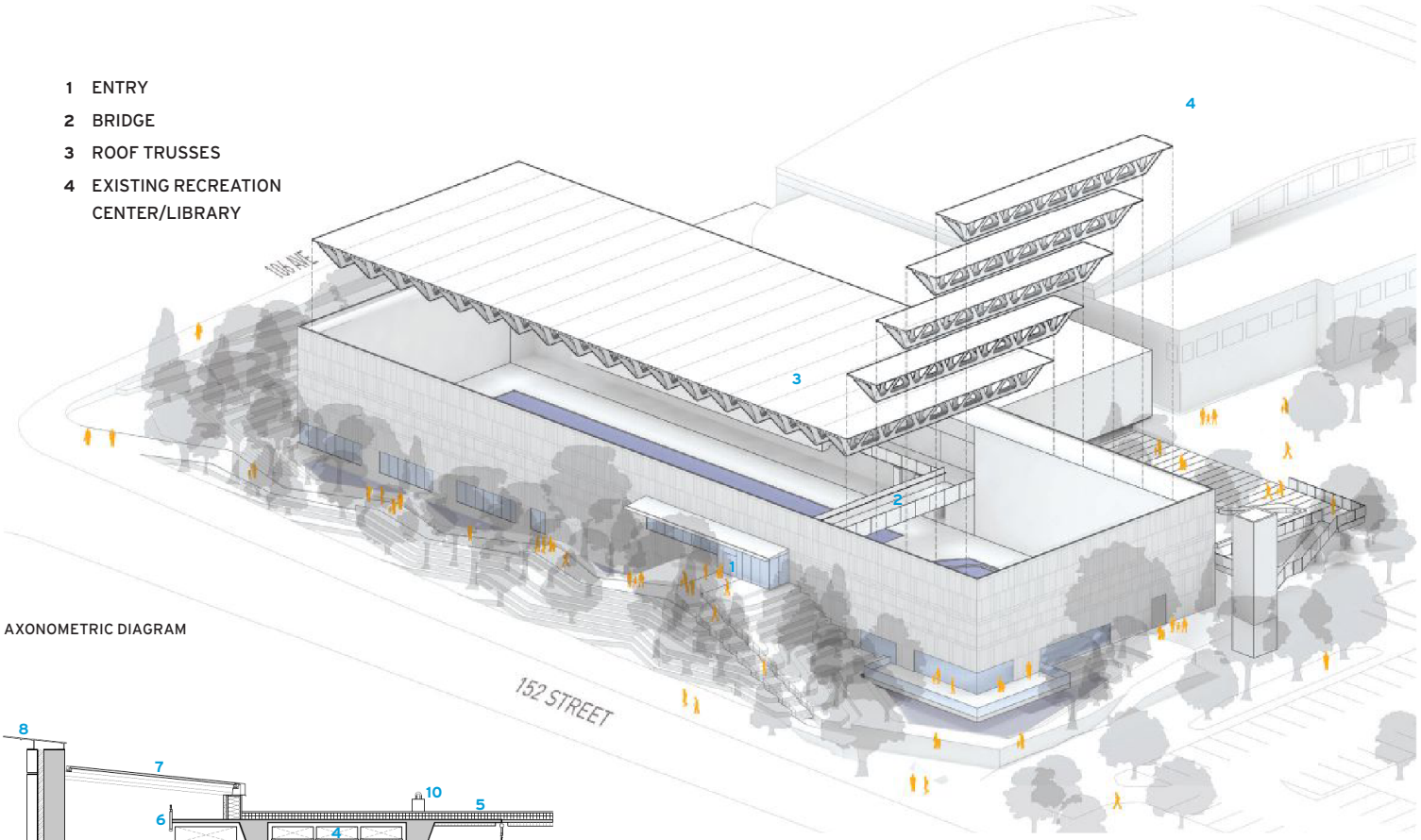


GROUND-FLOOR PLAN

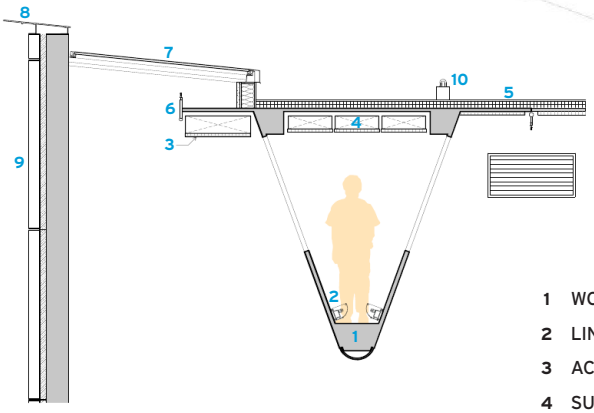
0 30 FT.
10 M.


37M

GUILDFORD Afternoon sun seeps through Bing Thom's discreet row of skylights, casting stripes of light upon the east wall (opposite). The precast aggregate-concrete panels that clad the building were tinted three different shades and fabricated in varying sizes to animate the facade (left). A pedestrian bridge (below) runs over the pool, linking the main entrance and a secondary entrance.



AXONOMETRIC DIAGRAM



1 WOOD TRUSS
2 LINEAR FLUORESCENT
3 ACOUSTIC INSULATION
4 SUPPLY AIR
5 ROOF ASSSEMBLY
6 SPRINKLER
7 SKYLIGHT
8 FLASHING
9 PRECAST CONCRETE WALL
10 ROOF ANCHOR

TRUSS SECTION

Heights, the Guildford natatorium contains a lap pool suitable for competition, plus a leisure pool, a water slide, and a "lazy river." It too is visually defined by a roof with an innovative wood structure engineered by Fast + Epp and in keeping with British Columbia's "wood first" policy, which promotes (though does not require) the use of engineered timber in new buildings; the material is also better suited than steel to the potentially corrosive pool environment.

But despite the two facilities' similarities—both serve as community magnets and have innovative wood structures—there are striking differences. The Guildford facility's architectural introversion, with its rectilinear, mostly opaque exterior of precast concrete panels, contrasts starkly with the exuberant volumes of its counterpart at Grandview Heights, enclosed in a curtain wall of glass and translucent polycarbonate.

Where Grandview's ceiling ribs wow the visitor with their long and slender proportions, Guildford's roof system impresses for different reasons. BTA's 95-foot-long ceiling trusses—22 in all—evoke the underside of a train trestle, painted white but with the barely visible grain of the laminated strand timber showing through. The structure animates what would otherwise be a straightforward, shoebox-like volume.

Ingeniously, the trusses conceal infrastructure such as mechanical equipment and sprinklers—and, at 10 feet high and 8 feet wide, they are large enough for maintenance staff to walk inside to service these systems.

Linear fluorescent lighting is also hidden within the trusses. Along with subdued daylight that seeps in through small skylights at the roof's perimeter, the indirect electric illumination helps create an almost meditative atmosphere.

This contemplative environment is reinforced by the site strategy. To mute the cacophony from an adjacent traffic-filled artery, the design team created a large berm that serves as an aural and visual barrier, giving the illusion that the addition is partly submerged in the ground.

Leading from the main entrance, the architects devised an interior catwalk-like bridge that runs through the building, over the pool—for modern flaneurs, gazing at the swimmers—and out the building's other side into the parking lot. The bridge-walkers don't have to pay admis-

GUILDFORD The prefab trusses are made of laminated strand lumber painted with semitransparent white exterior-grade paint. At 10 feet high, 8 feet wide, and 95 feet long, each truss is large enough for a person to walk through to service the sprinklers, lighting, and mechanical systems hidden within.

sion: they can be commuters taking a shortcut to a nearby bus stop. The idea, says BTA principal Venelin Kokalov, the lead designer on Guildford, is to "project the future" by making pedestrians feel as welcome as possible.

What form that future development takes will be key to the full success of both projects. Like much of Surrey, the Guildford and Grandview Heights neighborhoods still require much more density and astute urban planning to be considered truly pedestrian-oriented. Fortunately, the city now has two more important anchor buildings that can help foster a lively, more walkable community—someday. ■

Adele Weder is a Vancouver-based architectural journalist, critic, and curator, and the coauthor of several anthologies and monographs.

credits

ARCHITECT: Bing Thom Architects – Bing Thom, Michael Heeney, Venelin Kokalov, James Brown, Shinobu Homma, Ling Meng, Francis Yan, Lisa Potopsingh, Apollinaire Au, Alexander Buss, Nicole Hu, Marcos Hui, Amirali Javidan, Johnnie Juo, Eileen Keenan, Arthur Tseng, Andy Yan

ASSOCIATE ARCHITECT: Shape Architecture

CONSULTANTS: Fast + Epp (structural); AME Consulting Group (mechanical); AES Engineering (electrical); PWL Partnership (landscape)

CONTRACTOR: Heatherbrae Builders

CLIENT: City of Surrey

SIZE: 112,000 square feet

COST: $30 million

COMPLETION DATE: February 2015

SOURCES

TRUSSES: StructureCraft

GLAZING AND SKYLGIHTS: Glastech Glazing, Kawneer

PRECAST CONCRETE: Centura Building Systems

ACOUSTIC CEILINGS: Rockfon

CIRCLE 213

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HEALTH CARE

With the continuing emphasis on value-oriented health care, the importance of design in increasing patient comfort and safety has enhanced the role of architects. In the U.S. and abroad, hospitals and clinics are less the antiseptic, unwelcoming environments of old. Instead, private rooms with ample daylight, furnishings that accommodate visitors, and a warmer palette of finishes are becoming common. In the following pages, Kengo Kuma softens a concrete maternity clinic he designed two decades ago in Japan with wood and traditional craft. NBBJ plans a new general-care hospital in New Orleans whose rooms are all private and whose public spaces prominently feature art installations. At Stanford, architects TEF emphasize the importance of large windows with daylight and views. And in Phoenix, ZGF brings the look and feel of a hotel to a cancer center through the lavish use of travertine and copper, along with desert plantings.

PHOTOGRAPHY: © NICK MERRICK/HEDRICH BLESSING

THE UNIVERSITY OF ARIZONA CANCER CENTER, PHOENIX, ZGF ARCHITECTS

Situated in the Sonoran Desert and ringed by mountains, Phoenix can be an inspiring but difficult place to create architecture. The natural topography and turquoise sky are a powerful backdrop, but the blistering sun, which can generate temperatures of 100-plus degrees, imposes severe design limitations. ZGF Architects embraced these conditions while conceiving the new University of Arizona Cancer Center, resulting in a distinctive, climate-responsive building that offers a tranquil atmosphere for patients. "Everyone is under stress in a cancer center," said Doss Mabe, a design partner at the firm. "We wanted to provide a shelter in the desert."

With deep experience in the health-care sector, ZGF's Los Angeles office teamed up with general contractor Hensel Phelps for the design-build project. Encompassing 220,000 square feet, the five-story center is equipped to deliver outpatient services, from chemotherapy and radiation treatments to yoga and cooking classes, for more than 500 people per day. The facility is operated by St. Joseph's Hospital and Medical Center, one of the region's top hospitals, in affiliation with the Tucson-based University of Arizona. Completed in June 2015, the center is the first clinical facility on a research-focused biomedical campus in downtown Phoenix.

The goal from the start was to produce an exemplary facility that ranked high on performance and comfort. L-shaped in plan, the building comprises rectilinear volumes clad in glass, travertine, and various shading devices. On the sun-blasted east and west elevations, the walls are sheathed in a faceted, copper-colored screen whose appearance evokes the scaly skins of desert reptiles. Composed of perforated aluminum panels that are gently folded and slightly spaced apart, the brise-soleil alleviates heat gain and glare while enabling outward views and ushering in daylight.

DESERT FLOWER The rhythmic placement of folded copper-colored screens on the east and west facades not only serves as a shading device but also creates a unique identity for the new building, which features large expanses of stone and glass as well.

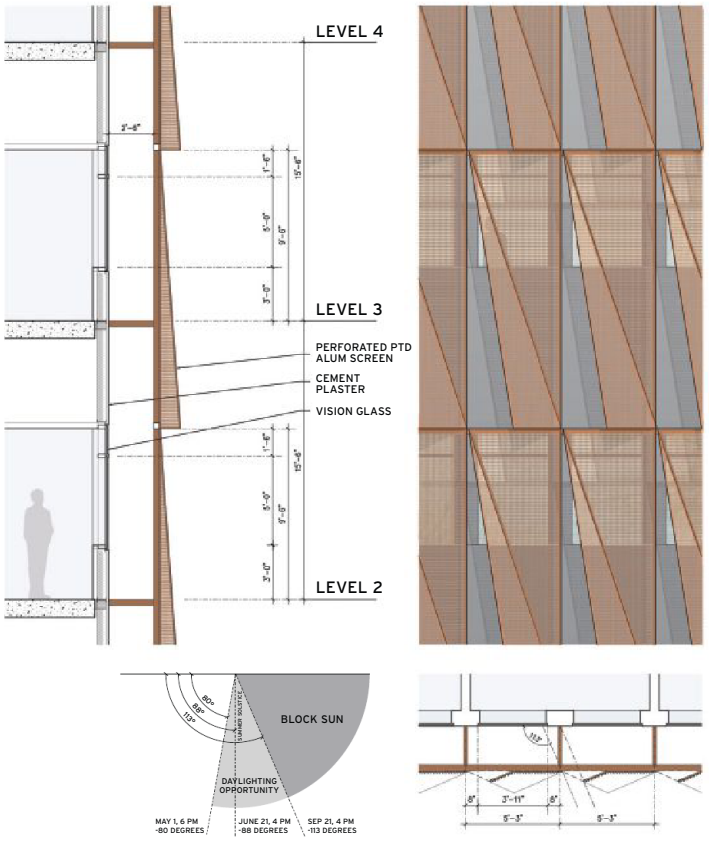
The University of Arizona Cancer Center | Phoenix | ZGF Architects

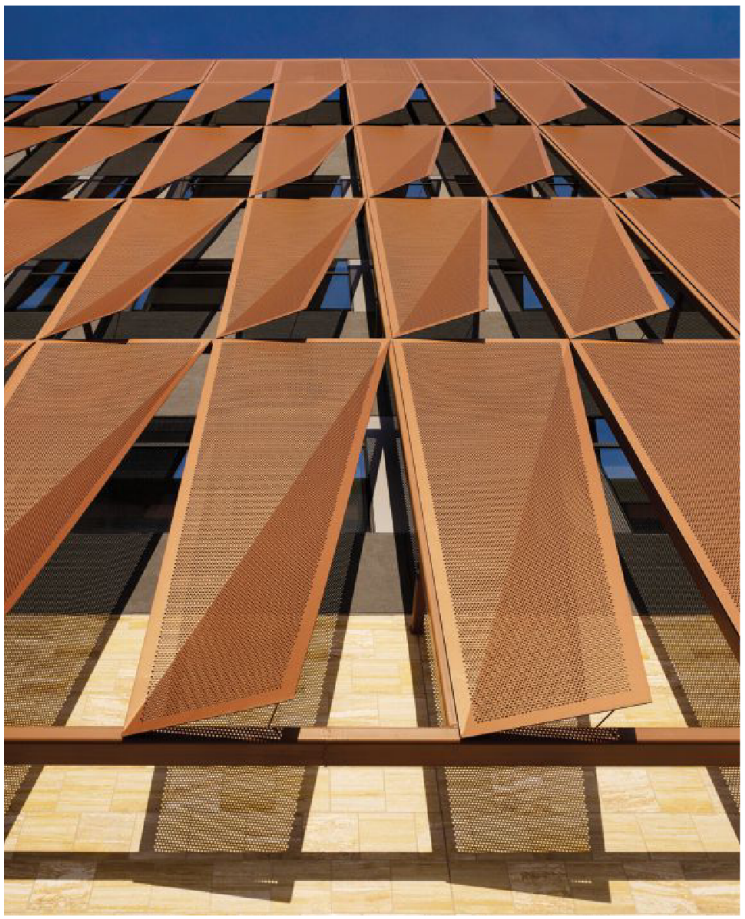
A PLACE IN THE SUN

A high-performance building in the desert serves as a therapeutic refuge for cancer patients.

BY JENNA M. MCKNIGHT

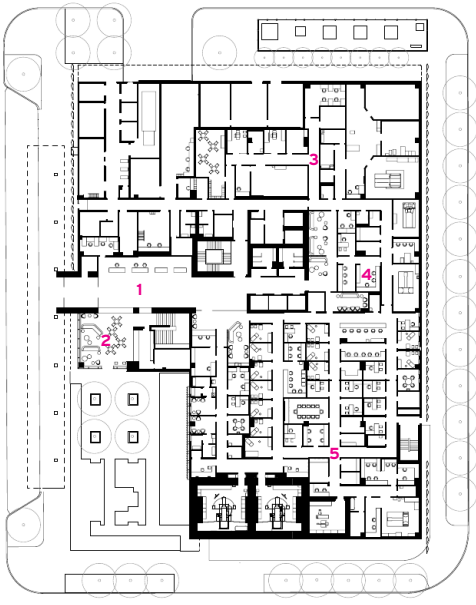
PHOTOGRAPHY BY NICK MERRICK





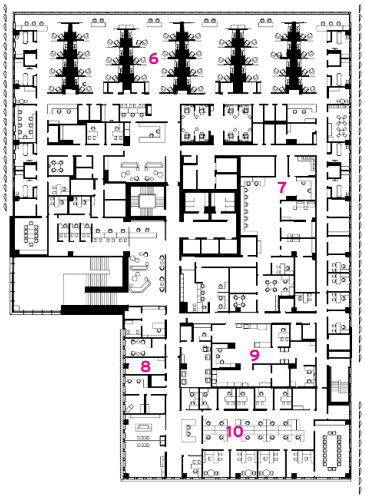
1 WELCOME DESK
2 CAFÉ
3 RADIOLOGY
4 DRY RESEARCH
5 RADIATION ONCOLOGY
6 INFUSION THERAPY
7 PHARMACY
8 SURVIVORSHIP PROGRAM
9 LABORATORY
10 ADMINISTRATION
11 GYNECOLOGY PROGRAM
12 BREAST PROGRAM
13 SUPPORTIVE CARE
14 DERMATOLOGY

COPPER TONE Multiple scenarios for the exterior screens on the east and west facades were tested for their performance and optimal design related to materiality, fold, perforation size, and distance from window (above). A transparent design in the infusion area brings daylight to every treatment space (opposite, top). The idea behind the interior design was to create comfortable spaces that lend a sense of security and tranquility (opposite, bottom).

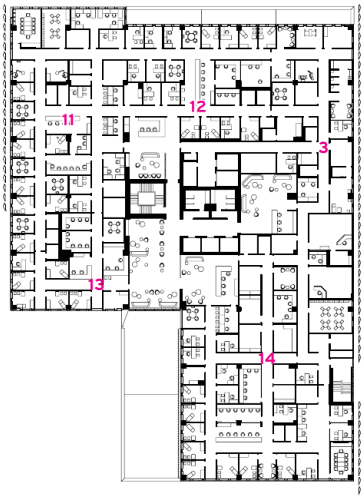


FIRST-FLOOR PLAN

0 30 FT.
10 M.



SECOND-FLOOR PLAN

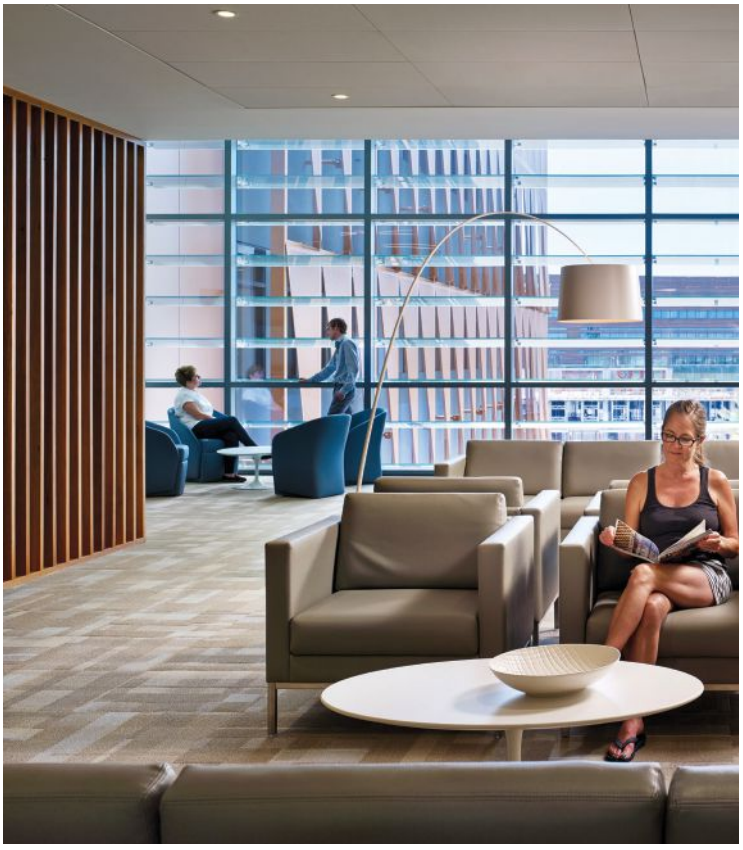


THIRD-FLOOR PLAN

The other facades required somewhat less protection from the harsh sun. Horizontal glass fins with a dense frit were placed on the southern face, while glazing on the north was left fully exposed, providing "uninterrupted views of the landscape and the city," notes Mabe.

Inside the facility, the environment is more akin to a luxury hotel than a sterile hospital—an approach that has become increasingly common in health-care projects. "We wanted to create a hospitality feel for the patients—for it to be warm and embracing," says Mitra Memari, a project manager for ZGF.

The team employed a neutral color palette and earthy materials such as stone and wood. Visitors enter a quiet, streamlined lobby bathed in diffused light and bordered by a coffee bar and healing garden with native plants. Elevators shuttle patients to intimate waiting lounges on each floor, where they can relax in contemporary-style sofas and chairs. The lounges are delineated by slatted walls made of vertical strips of white oak, making the areas both airy and private.



Of course, creating a successful medical facility is about more than ambience. "It's a balance between having a welcome feel and an efficient work flow," says Marcia Gruber-Page, the center's vice president of oncology services. In planning the layout, ZGF focused on minimizing travel times within the facility. Each floor houses clinics dedicated to specific forms of cancer, with complementary services colocated wherever possible (a 12-bay recovery room, for instance, is shared by the endoscopy and interventional radiology departments). The clinics have their own reception areas and exam and treatment rooms, along with spaces for support specialists such as nutritionists and financial counselors.

To promote multidisciplinary collaboration among doctors, the architects placed meeting rooms in close proximity to patients. "We have a lot of space to meet as teams and also to see patients," says

MATERIAL SCIENCE
The second-floor waiting room employs a layering of materials (top, left). A central stair connects all levels, to encourage connectivity between program areas (above). Radiotherapy delivers high-energy radiation via a linear accelerator; the new center has two such machines (left). A protected seating area outside the café can be used for dining or quiet reflection (opposite).

PHOTOGRAPHY: © TOM HARRIS (BOTTOM)

Dr. Nathalie Zeitouni, a dermatologist specializing in skin cancer. "The building is very functional for all of us. It's large without being overwhelming."

One of the facility's special features isn't visible to the naked eye. The team incorporated a chilled beam system for heating and cooling, reportedly the first such system in an Arizona health-care facility. It not only reduces energy consumption, it enhances occupant comfort, since it doesn't produce drafts of cool air—an important consideration, given that cancer patients tend to feel cold.

Exhaustion is also common among people battling cancer. "Fatigue is the most frequent and most distressing symptom they have," says Gruber-Page. She once worked at a sprawling Houston facility where patients were transported to different areas by golf carts. In contrast, the University of Arizona Cancer Center offers a spectrum of services within a compact yet light-filled facility, preventing distressed patients from feeling lost. From its hardy shell to its soft interiors, the thoughtfully designed building serves as a welcoming and therapeutic refuge in a vast desert metropolis. ■

credits

ARCHITECT: ZGF Architects

ENGINEERS: Affiliated Engineers (m/e/p); Martin, White & Griffis Structural Engineers/John A. Martin & Associates (structural); Dibble & Associates (civil)

CONSULTANTS: Francis Krahe & Associates (lighting); Atelier Ten (environmental); Wheat Design Group (landscape); Colin Gordon Associates (acoustical); Jensen Hughes (code); Lerch Bates (vertical transportation)

CLIENT: University of Arizona

SIZE: 220,000 square feet

COST: $135 million

COMPLETION DATE: June 2015

SOURCES

METAL PANELS: Kovach Building Enclosures

METAL/GLASS CURTAIN WALL: KT Fabrication

GLASS: Viracon, Skyline Designs, Safti First

SPECIAL DOORS: C.R. Laurence

ACOUSTICAL CEILINGS: USG, Decoustics

PAINTS AND STAINS: Sherwin Williams, Carboline

WALLCOVERINGS: Flavor Paper, Forbo

UPHOLSTERY: Maharam

ELEVATORS: Otis

SOLAR SHADES: Mechoshade

University Medical Center | New Orleans | NBBJ and Blitch/Knevel Architects

AFTER THE STORM

Architects create a healing environment for post-Katrina New Orleans.

BY JOANN GONCHAR, AIA

A typical hospital is an assault on the senses, says architect Mackenzie Skene, a partner in the Seattle office of NBBJ. Hospitals are noisy and chaotic. When designing the new University Medical Center New Orleans (UMC) with local firm Blitch/Knevel Architects, Skene says, team members constantly asked themselves, "Does it have to be that way?" So, instead of visual cacophony, the first thing a visitor or patient will notice when entering the 42-foot-high, daylight-filled lobby, with its gleaming white terrazzo floors and public art, is aesthetic calm.

This hushed environment is all the more remarkable considering that the medical center, with 446 beds—almost all in private rooms—and 19 state-of-the-art operating rooms, is the successor to the state-owned Charity Hospital, which cared primarily for the poor and uninsured. After Hurricane Katrina—when Charity's basement flooded, and staff and patients were stranded there without power or supplies—the imposing Art Deco structure at the edge of the Central Business District was shuttered. Some say it was closed unnecessarily, but others contend that the almost 80-year-old building—which had outdated equipment and open wards with as many as 10 beds to a room—was long overdue for replacement, even before the devastating 2005 storm.

The new $1.1 billion facility opened last August and serves as the region's only level-one trauma center. It was built largely with funds from the Federal Emergency Management Agency and the State of Louisiana, and it sits about half a mile from the still-vacant Charity in an expanding medical district in the Mid-City neighborhood. Though owned by the state, UMC is run by a private nonprofit operator. And to make the finances balance out, the facility will need to attract privately insured patients. But officials insist that the institution's goals are unchanged. "Our mission remains the same—to serve all patients," says Peter DeBlieux, UMC's chief medical officer. The architectural challenge, says Skene, was to make everyone feel welcome, regardless of their ability to pay.

To do so, the design team arranged UMC's programmatic elements into five- and six-story blocks, reducing the massing of the undeniably large 1.6 million-square-foot complex. Its most public face is oriented toward Canal Street—one of the city's major boulevards—where three

MAKING AN ENTRANCE The medical center's Canal Street–facing elevation consists of three 6-story volumes containing patient rooms (opposite). Many visitors and patients will arrive from Canal, through the glass-enclosed entry pavilion (this page).

PHOTOGRAPHY: © BENJAMIN BENSCHNEIDER, EXCEPT AS NOTED


UNIVERSITY
MEDICAL CENTER
NEW ORLEANS

SPLASHES OF COLOR A sculpture by Philadelphia-based artist Ray King that references historical maps of New Orleans hangs in the 42-foot-high entry pavilion (left). Brightly colored back-painted glass walls (above) are used as wayfinding devices for the 1.6-million-square-foot complex. The registration area's waiting room (opposite) has furnishings and finishes that resemble those of a hotel.

L-shaped volumes contain patient rooms. Beyond is a diagnostic and treatment building, which houses operating rooms, the emergency department, imaging, and laboratories. And attached to this, through the glass-enclosed entry pavilion, is an outpatient clinic.

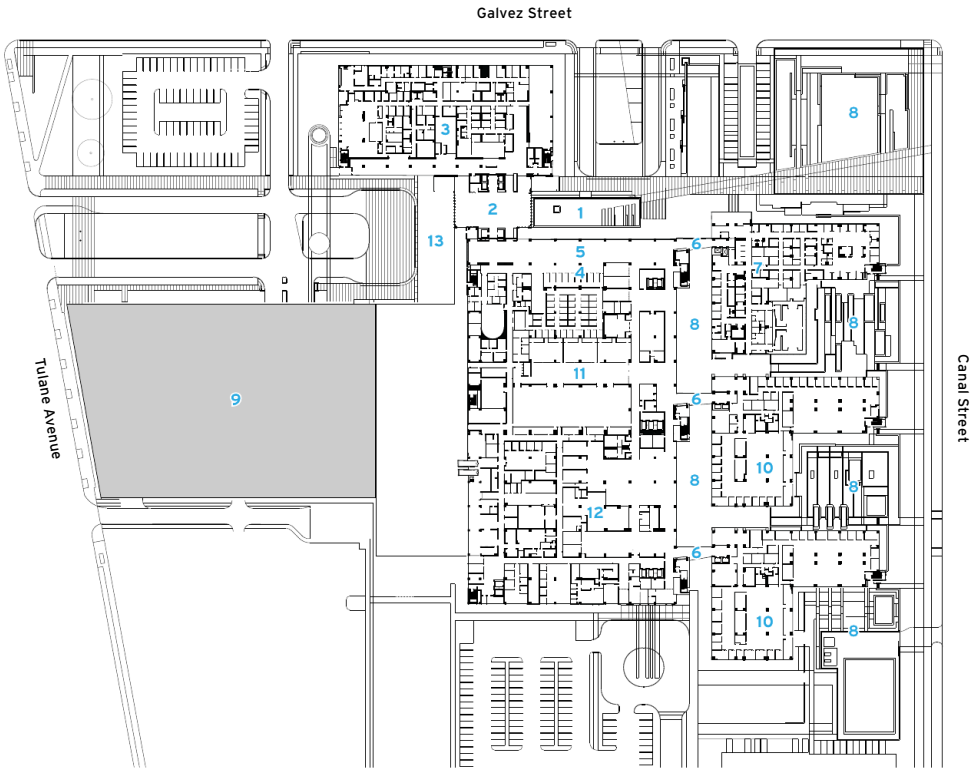
The facades are highly articulated, to give them texture as well as scale. Tall and narrow precast concrete panels clad the patient-room towers and the diagnostic and treatment building, some of which have pronounced aggregate, while others are smooth. One edge of each panel is slightly thicker, producing a subtle play of light and shadow. The windows between the panels, whose positions shift from floor to floor to create a syncopated rhythm, incorporate several types of shading devices, including mesh, vertical fins, and a horizontal frit.

Plazas and gardens with water features, tall grasses, and bamboo, interspersed among all the programmatic components, act as the connective tissue for the complex. Inside, spaces are arranged to take full advantage of these outdoor environments, which are reminiscent of the famous courtyards found throughout the city of New Orleans, says Jose Sama, NBBJ's lead designer on the project. Accordingly, the architects placed the conference facilities, which help further UMC's role as a teaching hospital, at the base of the diagnostic and treatment building so that receptions and other events can spill outside when the weather permits. The patient rooms, as well as some treatment areas, have views of the gardens and plazas, further taking advantage of the therapeutic benefits of these outdoor oases.

Other patient-room features are becoming the new normal in hospitals: a sofa that converts to a cot for family members; several types of electric illumination for ambient, task, and exam lighting; and draperies and perforated roller blinds that can be adjusted to control the views and the sunlight. In one departure from current health-care trends, designers opted not to hide the connections and mounting plates for monitors, call lights, and other equipment that typically accumulate on the wall behind the bed. Instead, designers have managed these elements by arranging them on plastic-laminated panels that include an abstracted pattern inspired by the ironwork balustrades commonly seen throughout New Orleans.

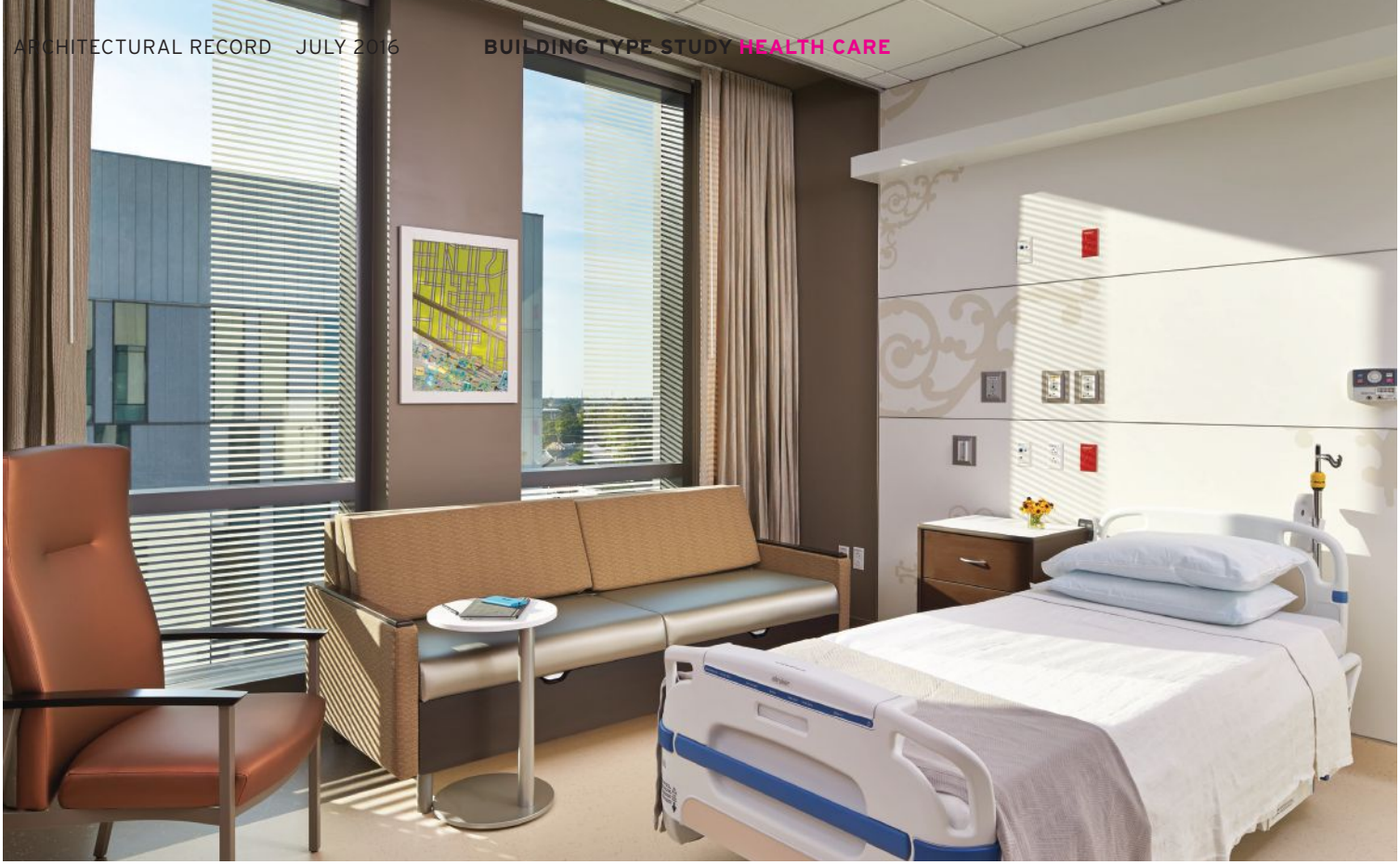
Elsewhere in the complex, surface treatments unusual for health-care environments include corners protected with a highly impact-resistant material made of paper and resin stained a warm walnut brown and typically used for countertops. The terrazzo floor found in the lobby extends to all public spaces, and even some back-of-house corridors where gurney traffic is expected to be heavy. These were chosen, says

PHOTOGRAPHY: © SEAN AIRHART (LEFT)



GROUND-FLOOR PLAN

1 ENTRY COURTYARD
2 ENTRY LOBBY
3 CLINIC
4 REGISTRATION
5 WAITING
6 PATIENT-TOWER RECEPTION
7 ONCOLOGY
8 COURTYARD
9 PARKING GARAGE
10 ADMINISTRATION
11 CONFERENCE CENTER
12 DINING
13 VEHICLE DROP-OFF



Janet Dugan, NBBJ's lead for the project's interiors, for their durability. But their effect is a pleasing contrast to the antiseptic finishes of most hospitals.

Features that are less apparent but nonetheless critical address disaster mitigation. The UMC complex is configured so that all facilities essential to patient care are located on the second floor or higher, at least 21 feet above base flood elevation. The ambulance ramp can be accessed by boat if the surrounding streets are inundated. The glazing should survive hurricane-force winds and the impact of airborne debris. In addition, the emergency power and other building systems are designed so that the medical center can operate for up to a week without outside support or supplies. The complex is considered so robust that DeBlieux worries about having the safest building in the city. If it becomes a destination for those seeking shelter in an emergency, he says, "we will be struggling to care for the people we need to."

How the medical center will perform in an emergency naturally occupies New Orleanians' minds. But other metrics will indicate UMC's success, including the facility's day-to-day operations and how well it balances its commitment to the poor and uninsured with its need to attract the more affluent. Since it has only been open a year, it may be too soon to say. But it is clear that the hospital's physical environment matches the high level of care its staff aspires to provide all its patients. ■

credits

ARCHITECT: NBBJ – Mackenzie Skene, partner in charge; Jose Sama, Janet Dugan, Eric Hanson, principals; Dave Owsiany, senior associate

ARCHITECT: Blitch/Knevel Architects – Ronald Blitch, Ken Knevel, partners; Marty Tovrea

CONSULTANTS: AECOM (structural, m/e/p, civil), Torre Design Consortium (landscape)

GENERAL CONTRACTOR: Skanska-MAPP Joint Venture

CLIENT: State of Louisiana

SIZE: 1.6 million square feet

COST: $1.1 billion

COMPLETION DATE: August 2015

SOURCES

CONCRETE CLADDING: Gate Precast, Jackson Precast

METAL PANELS: Centria

GLAZING: Soprema, Johns Manville

GLASS: Viracon

WINDOW WALL: Harmon

ACOUSTICAL CEILINGS: Armstrong, 9Wood

PLASTIC LAMINATE: Arborite, Abet Laminati, Formica, Treefrog, Wilsonart

SOLID SURFACING: Dupont, Richlite

BIOPHILIC BENEFITS
Interspersed throughout the complex are gardens and plazas (this page) reminiscent of the courtyards that New Orleans is famous for. The patient rooms (opposite, top) look out onto these outdoor spaces, as do some of the treatment areas, including the oncology infusion rooms (oppsite, bottom).

Umeda Hospital | Hikari, Japan | Kengo Kuma and Associates

SOFT TOUCH

Kengo Kuma introduces new materials to take the edge off his earlier concrete design.

BY NAOMI R. POLLOCK, AIA

PHOTOGRAPHY BY DAICI ANO

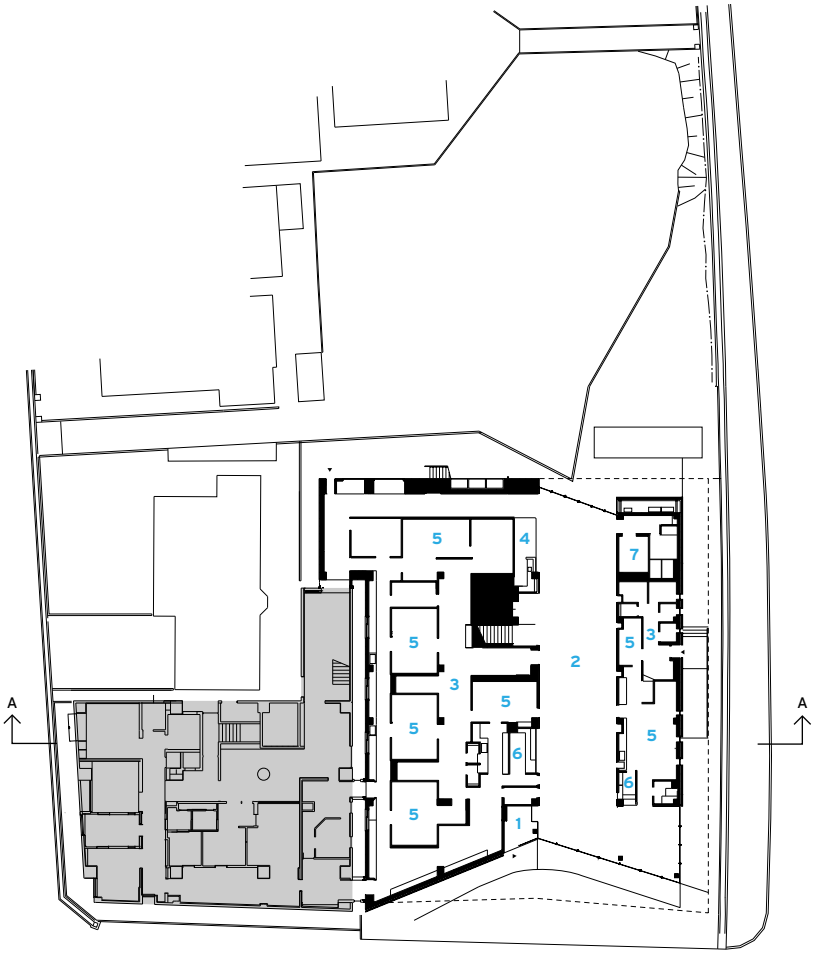
A chunky concrete box fronted by an elegant wood-louvered addition, the Umeda Hospital brackets the extremes of Kengo Kuma's architecture. While concrete and glass once characterized the Tokyo-based designer's work, today wood, bamboo, and other natural materials are his signature. Separated by 17 years and exemplifying different modes of architectural expression, the base building and its new addition house a 34-bed maternity hospital plus an outpatient pediatrics clinic. Departing from the sterile coldness of generic health-care centers, the warmth of the reborn hospital welcomes patients both big and little.

Located alongside a four-lane thoroughfare in Hikari, a town of 54,000 at the southern tip of Honshu (Japan's main island), the new construction is anchored to Kuma's original building. Like many small medical facilities in Japan, the privately held Umeda Hospital bears the name of its owner and head doctor. A 14th-generation physician, Dr. Kaoru Umeda initially hired Kuma in 1996 to create a replacement for the hospital that had been constructed during his father's tenure. When that facility was starting to show its age and needed rejuvenation, the client turned to Kuma once again and asked him to update his own building. In keeping with the hospital's credo, the doctor wanted a distinctive structure that maximizes patient comfort but is friendly toward its neighbors too.

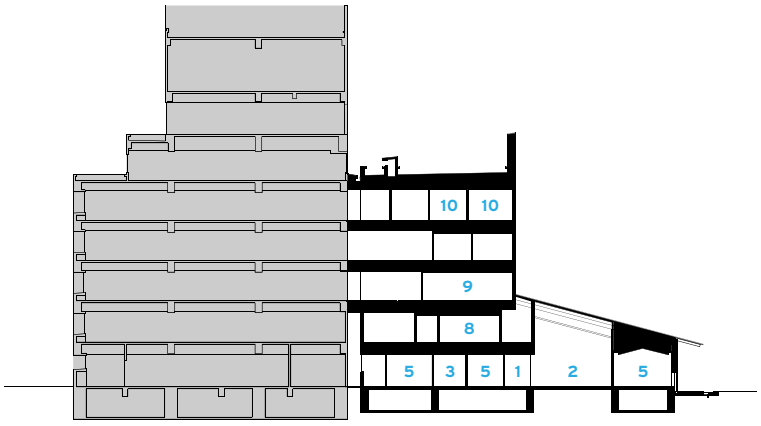
In response, Kuma excised the four-story front of the existing hospital and replaced it with a five-story L-shaped addition. The facility's main entrance, it opens to a lobby-like gallery flanked by the pediatrics department on one side and obstetrics on the other. Occupying a single-story space alongside the heavily trafficked street, the children's clinic consists of curtained exam and treatment areas plus a segregated section with direct street access for sick kids. The women's department contains a variety of outpatient exam rooms at grade, two operating suites on the second floor, a day care center (a service available for children born at the hospital), patient dining and exercise rooms on the third, staff dining and meeting rooms on the fourth, and doctors' rooms, such as on-call suites and offices, on the fifth. Hallways at either end of each level tie the new construction to the old. Left untouched, the earlier building is color-coded by floor and contains the delivery suites plus private rooms for each patient.

Concentrated in the addition, state-of-the-art treatment spaces are one benefit of the reconstruction. Another is the hospital's fresh identity—it hardly looks the part of an institutional building type.

MOTHER AND CHILD
Kuma's first building for Umeda Hospital was a boxy concrete assemblage. The new addition features a five-story steel-clad structure fronted by a one-story wood-clad storefront that serves as the main entrance (far left). The sloping roof reaches its low point at the north corner beside a converted London bus, used now as a play area for kids, helping to promote the hospital's friendly image (above). Traditional *taruki* joists are visible on the underside of the 7-foot-deep eaves (left).



GROUND-FLOOR PLAN



SECTION A - A

1 ENTRANCE
2 GALLERY
3 WAITING ROOM
4 SHOP
5 EXAM ROOM
6 RECEPTION
7 RESTROOM
8 X-RAY
9 DAY CARE
10 OFFICE

"We think the relationship between the hospital and the community should be much closer," remarks Kuma. Defined by slender wood louvers and an extensive galvanized-steel roof, the addition's exterior masks the original building behind it as it greets the street in front.

Jutting out from the steel cladding covering the addition's upper floors, the roof's swooping surface terminates in 7-foot-deep eaves that extend protectively over the sidewalk. Inspired by traditional Japanese architecture, the overhang is supported by delicate *taruki* joists, parallel steel bars visible on the eaves' underside. Despite its overall size, the roof descends gracefully to its low point at the north corner, where it hovers at a residentially scaled 7 feet above the ground. Picking up the parallel lines of the roof and eaves, cedar louvers conceal the concrete portion of the addition's street front while glass walls open its gallery to passersby.

The gallery's arrangement of plush seating, small gift and sundry shops, and a sunken play area all improve the patient experience, yet Kuma's material palette is largely responsible for the interior's relaxed atmosphere. In another quote from history, *yamatobari* walls made of lapped cedar planks line the spacious room. "If the wall is flat, people cannot understand the thickness of the material," explains Kuma. The rhythm of the walls is echoed in the louvered, canted ceiling as well as in the wood floor. In the treatment rooms, white walls predominate, but plywood accent pieces such as ¾-height partitions and built-in furniture mollify the antiseptic appearance of these areas.

Complementing Kuma's interiors, signage created by the graphic designer Kenya Hara conveys a sense of both cleanliness and softness deemed appropriate for a facility catering to the well-being of mothers and children. A redo of Hara's concept developed for the hospital's first Kuma building, the first of many collaborations between the designers, the signs are made of white cotton cloth with red lettering—a play on the first aid color scheme. Acknowledging white's tendency to show dirt, Hara fashioned the signs to be like garments that can be removed, washed, and put on again. While mitten-shaped markers identify individual rooms, two arm-like wood-and-cloth sign poles point the way to functions on either side of the gallery.

Despite Japan's dropping birth rate and the consequent competition for patients, the Umeda Hospital routinely delivers 70 to 80 babies each month. Undoubtedly this volume of births reflects the appeal of the facility's patient-centric approach; it is a testament to Kuma's gentle building, which puts everyone at ease. ■

credits

ARCHITECT: Kengo Kuma and Associates
ENGINEER: YSE
GENERAL CONTRACTOR: Obayashi Corporation
CLIENT: Dr. Kaoru Umeda
SIZE: 21,400 square feet
COMPLETION DATE: March 2015

SOURCES

METAL ROOF: Eroof
WOODWORK: Okazaki Mokuzai
SLIDING DOORS: Sanwa Shutter
LIGHTING: Panasonic
ELEVATOR: Hitachi

SIGN OF THE TIMES The walls and ceiling of the large first-floor gallery are clad in lapped cedar planks for a warm feel (top). Signs, fashioned like garments that can be removed, are made of white cotton cloth (right). A patient dining room features large windows with views into the kitchen and to the outside (above).

HISTORICAL REFERENCE Vertical bands of fenestration on the new center's street-facing exterior wall (this page) mimic those on the adjacent Hoover Pavilion, an Art Deco hospital building from the last century (opposite).

Stanford Neuroscience Health Center
Palo Alto, California | TEF Design

HEAD FIRST

A new facility offers a streamlined place of healing for patients with brain disorders.

BY JOSEPHINE MINUTILLO

PHOTOGRAPHY BY BRUCE DAMONTE

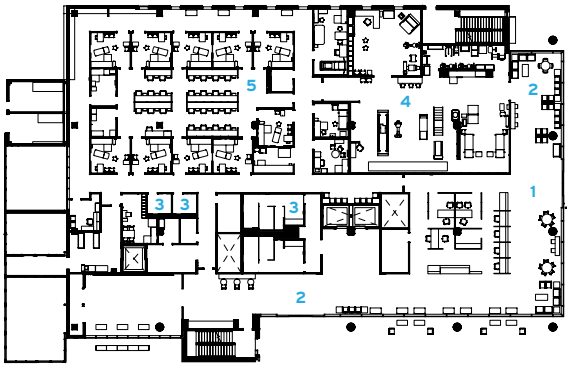
Just off to the side of the palm tree–lined main entry to Stanford University's stunning campus in Palo Alto, California, sits the compact Hoover Medical Campus. Its handful of buildings is well known to TEF Design. The San Francisco–based firm was first hired to renovate the nearly 100-year-old Hoover Pavilion. That Art Deco pile—the original Palo Alto hospital that now houses several primary-care clinics and the main branch of the Stanford Health Library—inspired many aspects of TEF's design for the Stanford Neuroscience Health Center. From composition and scale to materials and organization, the new 95,000-square-foot center borrows telling aspects from its prominent neighbor.

"We wanted the new building to fit in on the campus without overwhelming the Hoover Pavilion," says Alyosha Verzhbinsky, TEF principal in charge, "but also to have its own identity." Mimicking the terra-cotta bands of fenestration on the older building, all but one facade of the new four-story structure features similarly scaled vertical strips with windows.

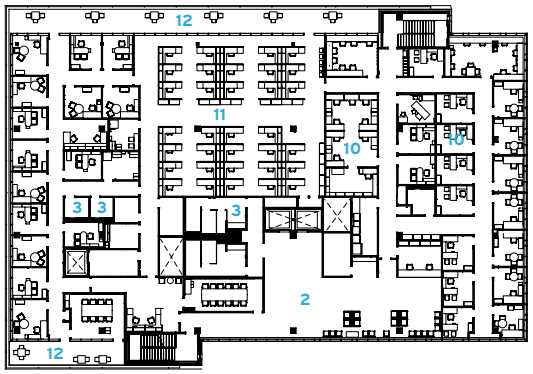
With a multibillion-dollar project for the same client—Stanford Health Center, by Rafael Viñoly Architects—under construction nearby, this facility was left with a tight budget. A conventional glass curtain wall wraps parts of the building, and much of the remaining exterior features stucco, with discrete portions clad in terra-cotta block.

The neuroscience center, an outpatient facility and the last building to be erected on this smaller campus, needed to be built quickly. "Some

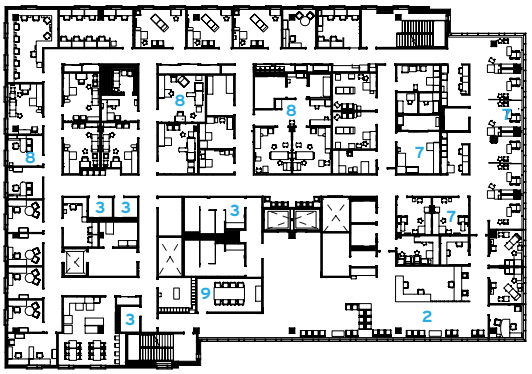
BASEMENT-LEVEL PLAN



LEVEL-ONE PLAN



LEVEL-FOUR PLAN



LEVEL-TWO PLAN

0 20 FT.
6 M.

1 MAIN ENTRANCE
2 PUBLIC SPACE
3 RESTROOM
4 REHAB
5 CLINICAL
6 IMAGING
7 PROCEDURE/INFUSION
8 LAB
9 OFFICE
10 NEUROPHYSIOLOGY
11 ADMINISTRATION
12 TERRACE

planning was going on simultaneously with construction," says Verzhbinsky. "What's normally a sequential process had to be integrated." That process also included extensive input from a patient advisory board, physicians, and staff to address every aspect of the building's design.

From the sprawling entrance lobby—with its centralized computer check-in kiosk—to the corner waiting rooms, the architects made the public spaces bright and welcoming. The designers also chose light-colored finishes, unusual for such a highly trafficked building, with touches of wood. Patients with brain injuries or neurological disorders can get easily disoriented; artwork throughout features clean, graphic lines and immediately discernible shapes. This type of attention was carried to the landscaping as well. A mobility garden offers patients undergoing rehabilitation an opportunity to improve strength and balance by walking on uneven surfaces in an outdoor setting.

Equal consideration was given to staff areas. Their top-floor offices open onto generous terraces with outdoor seating and views to the neighboring foothills, and to the building that inspired their own.

Exam rooms are configured into pods of care to allow clinical teams to function in a multidisciplinary fashion. Seven-foot-wide corridors ease circulation through the clinical areas and provide nooks for seating. An area for infusion therapy on the second floor offers patients daylight-filled spaces with views, since they can spend up to eight hours receiving medication there.

SUNNY SIDE At the main entrance, a large reception area welcomes patients for sometimes daylong appointments (top). Patients receiving infusion therapy on the second floor have daylight-filled spaces with views (above). An exterior wall is a balanced composition of glass, stucco, and terra-cotta (opposite).

WINDOW TREATMENT Patient waiting rooms are spacious, sun-filled areas (above). A terrace on the fourth floor with views of the Hoover Pavilion provides staff with a space for outdoor dining and gathering (below).

In fact, patients often pass an entire day at the facility, which streamlines the diagnosis and treatment of neurological disorders by consolidating all aspects of the healing process in one building. "We own the complexity and the coordination," explains Mark Tortorich, Stanford Health Care's vice president of Planning, Design and Construction. It is a chief reason the neuroscience department opted to give up its spread-out spaces on Stanford's main campus. Here, the dedicated building becomes a one-stop destination where patients, up to 300 a day, come to see multiple doctors, receive rehabilitation therapy, or get a scan in a single visit.

With 16-foot-high ceilings, the basement level accommodates the large equipment for MRI and PET scans, including magnets that can weigh over 20,000 pounds. Walls, however, are flexible, to allow this equipment to change every few years as technology advances.

The one confined space in the building is on the second floor. Designed like a sauna, with a dressing area and shower suite, a special laboratory offers controlled temperature, humidity, and airflow. The first-of-its-kind custom-built thermoregulatory sweat test room diagnoses conditions such as autonomic and small fiber neuropathy and impairment in other neurodegenerative disorders like Parkinson's disease.

The architects' two-pronged effort is commendable. They provided interior spaces for innovative research and state-of-the-art technology with a noninstitutional-looking design; at the same time, they integrated the low-budget, modest building into its pastoral, and historic, campus. ■

credits

ARCHITECT: TEF Design

ENGINEERS: Degenkolb Engineers (structural); Sandis (civil); ACCO Engineering Systems, Interface Engineering (mechanical)

CONSULTANTS: BFS Landscape Architects (landscape); Charles M. Salter Associates (acoustic)

GENERAL CONTRACTOR: Cahill Contractors

CLIENT: Stanford Health Care

SIZE: 95,000 square feet

COST: withheld

COMPLETION DATE: December 2015

SOURCES

ROOFING: Johns Manville

SLIDING DOORS: AD Systems

GLAZING: Viracon, Oldcastle BuildingEnvelope

The Cultivated Facade

Greenery on buildings is gaining traction, but needs validation.

By Peter Fairley

FACADES ARE a building's most visible element, and adding plants offers entirely new dimensions of texture, symbolism, and seasonal dynamism. As French botanist and green-wall pioneer Patrick Blanc has said, "A simple wall can become something poetic." Of course, poems can be tragic, and the risk of failure that comes with vegetating facades has tempered many architects' enthusiasm. To put it bluntly, green walls can die.

Katia Perini, an instructor at the University of Genoa's architecture school and an expert in green walls, says the perception of risk has slowed their acceptance. "As architects, we're not used to having to relate to a growing material. If you use concrete or steel, you know how it will work. In the case of vegetation, everything can change," says Perini.

A steady uptick in green-wall installations shows that architects are getting past anxiety. Researchers, green-wall providers, and architects say the mainstreaming of planted roofs, marked growth in interior green walls, and accumulated insight from exterior projects to date are all engendering greater comfort with planted facades.

They also see rising awareness of green-wall benefits—from sound and thermal insulation and provision of habitat for bugs and birds to cleaner air and the generalized sense of well-being known as biophilia. "The combination of all these benefits is starting to get traction. Green walls are now something that people are taking seriously," says Gary Grant, a principal with London-based Green Infrastructure Consultancy.

It still takes "the right developer" to push forward a project, says Grant, because green walls are not cheap. But he sees a clear trend toward integration of green walls and says the excitement they offer justifies the expense. "When people want something, they find the money."

Two Faces of the Green Wall

Engineered green walls take two forms. One type, which academics like Perini refer to as "green facades," grows climbing vines and ivy on cables or scaffolds, forming a living screen over a built facade. While plants have crawled up walls for millenia, the modern green facade took shape in Berlin in the 1980s and 1990s, where eco-minded incentives spurred the installation of more than 2.5 million square feet of them.

The other green walls—living walls—are dense vertical gardens whose plants seem to burst out of a building's skin. These consist of preplanted panels or modules affixed to a structural wall or frame, the first of which were developed by Blanc in the 1990s. They gained global fame in 2005 with his 8,600-square-foot installation at Ateliers Jean Nouvel's Musée du quai Branly in Paris. Blanc's plants grow hydroponically within a water-soaked mesh fabric, while competing systems employ lightweight soils (akin to the growth

BLOOMING SPONGE
At the Rubens at the Palace hotel, London's largest living wall flourishes year-round (opposite and this page), with 10,000 ferns and herbaceous plants. It is irrigated by runoff from the hotel roof.

PHOTOGRAPHY: COURTESY RUBENS AT THE PALACE HOTEL

media developed for green roofs) in fabric pockets or trays. All require continuous irrigation and infusions of nutrients and fertilizer.

Living walls' verdant and varied plantings offer a far more diverse pallet of textures and colors. This design power and biodiversity can be expensive, however. Living walls can reach $125 per square foot, according to Perini. That is three to 10 times the cost of green facades, and she says living walls also require more maintenance.

Grant and other green-wall designers say both types are improving as their creators learn what plants thrive under which conditions. The designers say they are also educating clients better, steering them away from projects facing higher risks of horticulture failure, and preparing them for natural variation.

As Grant puts it, green walls will not always be green. Plants on a southern exposure in London, for example, will die back under summer heat. "They may not look their best all the time. It's about managing expectations," says Grant.

Jungle Walls in the Tropics

Green walls are at their greenest and most dramatic in verdant Southeast Asia. Climate helps in locations such as Singapore and Malaysia, where relatively high humidity and narrower temperature swings put less stress on plants and demand less of irrigation systems.

For Malaysian architect and ecologist Ken Yeang, who started planting facades in the 1980s, green walls are first and foremost about engineering ecosystems. Yeang employs flora that supports local fauna, and stresses habitat connectivity to maximize ecosystem value.

Yeang wrapped a vegetated wall around a data center near Kuala Lumpur. The project, completed in 2010 for cellular provider DiGi Telecommunications, includes about 16,000 square feet of plants that angle up from the ground at one corner and zigzag around the structure. Continuous greenery, he says, makes the building an extension of the surrounding habitat. The living wall is also used creatively to improve other building functions. For example, air intakes lie behind the living wall, filtering out particulates and providing what he calls a "small degree" of precooling.

The architect makes no apologies for the pruning, replacement of dead plants, and other maintenance required. "I tell the owners that it's like having your own garden, where

ENGINEERED ECOSYSTEM Plant selections and continuity of vegetation from the ground up maximize the diversity of birds, butterflies, and other fauna finding refuge and foraging at the DiGi data center in Malaysia.

you must cut the grass and look after the flowers. They must be committed to looking after the garden," he says.

More recent projects in Southeast Asia blend planted facades, terraces, and roofs to literally drape structures in greenery. In contrast to DiGi, where a band of living wall visually complements the otherwise rectilinear facade, for these projects the organic-inorganic frontier almost disappears.

Twin skyscrapers under construction in Kuala Lumpur, another of the many collaborations between Nouvel and Blanc, will be splashed with growing greens and reds across most of their 49 and 43 stories. Video released by Hong Kong–based developer Wing Tai shows living walls at the penthouse levels, while flowering plants climb stainless-steel cables to adorn the bulk of the towers' steel-and-glass facades. One newspaper described the effect as "jungle-themed."

Jungle certainly evokes the work of Singapore-based WOHA whose buildings seem enveloped in greenery, as well as recent projects by Vietnamese architect Vo Trong Nghia. Take the Sheraton Phu Quoc Resort designed by Nghia's Ho Chi Minh City–based firm for Starwood Hotels, scheduled to open in July 2017. In some renderings, the nearly 380,000-square-foot structure nearly disappears into its wooded surroundings under a continuous coating of vegetation.

Vertical Green in Portland

Making green walls practical at higher latitudes is a taller order. Larger seasonal shifts and extreme weather stress plants, and they test the irrigation systems required to sustain living walls. One region showing progress even so is the Pacific Northwest.

Despite their reputation for moderate climates, cities like Seattle and Portland freeze in winter and their summers can be bone dry. "We've gone 90 to 110 days without rain in recent summers," notes Brian Heather, managing partner at SolTerra Systems, a Portland-based design-build developer with a penchant for living walls.

Heather says that SolTerra has gained a great deal of knowledge since creating a proprietary living-wall system in 2009, especially about irrigating big walls. Irrigation systems must automatically drain during cold snaps to protect water lines from bursting, and they must anticipate gravity and wind to distribute water evenly. "You can end up with a lot more water at the bottom of the wall than at the top," he says.

In 2010, concerns about irrigation helped torpedo 200-foot-high green walls proposed for the extensive overhaul of the 1970s-era Edith Green–Wendell Wyatt Federal Building in Portland. Initial plans called for vertical fins adorned with plants to shade the 18-story office tower's western facade from intense midday sun and heat. But doubts about the

GREENFALL Vietnamese architect Vo Trong Nghia's design for the Sheraton Phu Quoc Resort combines an extensive green roof with the "Greenfall" facade of vines and a steel trellis that he used on a 2013 Hanoi house renovation.

PHOTOGRAPHY: © T.R. HAMZAH & YEANG (TOP); COURTESY STARWOOD HOTELS (BOTTOM)

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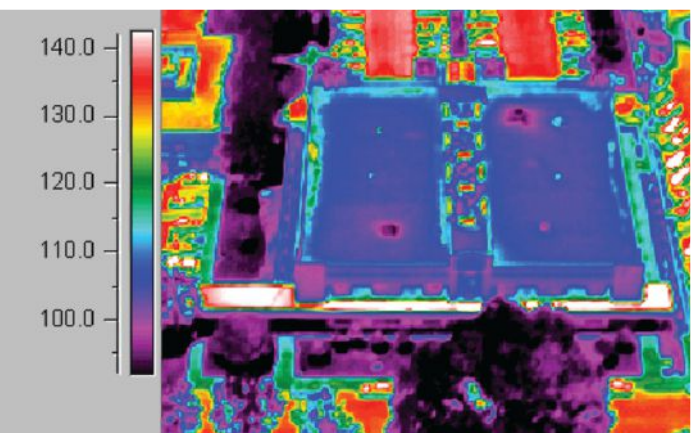

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GROUNDED AMBITION Early plans for overhauling Portland's Edith Green–Wendell Wyatt Federal Building anticipated 200-foot-high vegetated panels shading the western facade. The renovation, completed in 2013, instead used aluminum rods for shading amid concerns about the proposed living walls' cost and their viability under wind and strong sun. Vines growing up the facade from ground level retain a green design element.

viability and cost of maintaining living walls in that harsh environment killed the original green-wall plan.

Cutler Anderson Architects and SERA Architects, who designed the renovation, ultimately used aluminum rods to shade the facade. But they retained a vegetated fringe at the bottom by sending vines up the rods from ground-level planters. The climbers have thrived since the project's 2013 completion and add "a lot of visual interest," according to Amy Chomowicz, an urban planner in Portland's Bureau of Environmental Services. "The vines must be at least 30 feet high," she says.

SolTerra, meanwhile, is now scaling up its own living walls after "years of trial and error," says Heather. They feature in SolTerra's first completed development and in almost all of the 12 more under construction or at the permitting or design stage. Its 18-unit Woodlawn development in Portland, an apartment building with ground-level commercial space completed last year, teems with 3,500 plants covering most of its vertical surfaces that aren't glazed.

Green walls head skyward in the next SolTerra projects, including an office project under construction in Portland, Oregon. It will feature a 70-foot-high, 40-foot-wide living wall mural. Heather says green walls project the ecology and wellness-oriented marketing strategy behind SolTerra's LEED Platinum developments. With rental revenue running 40 percent higher than projected, he says the walls are worth the cost: "There's a huge amount of payback for our company from incorporating sustainable features, and the living walls in particular."

Green Infrastructure

Green walls may ultimately follow the trajectory of green-roof adoption, combating a broad array of urban ills such as flooding, overheating, and air pollution. Grant, from the Green Infrastructure Consultancy, took an early stab at putting walls to work against stormwater surges in a 2013 installation at London's Rubens at the Palace hotel.

Greening the roof was not an option, structurally, for the century-old building, so Grant designed a 38,000-square-foot living wall—London's largest—to turn the Rubens's previously unadorned brick face into a living sponge. Two 2,600-gallon cisterns buffer the runoff, then pump it to the wall's ferns and herbaceous plants.

Planner Chomowitz, who champions green roofs, spearheaded a more direct stormwater wall at the Portland EXPO Center in Oregon. The city commissioned local landscape architect GreenWorks to fashion custom planters, arrayed across the EXPO's north wall, to filter runoff from its 9,400-square-foot roof.

Completed in 2014, the living wall's 20-foot-long planters overflow with ferns, salal, and other rain forest natives. A pair of mallards took up residence this spring. Irrigation sustains the rain forest scene through the summer, evoking the flora of the nearby Columbia Gorge.

Mike Faha, GreenWorks' founding principal, says the StormWall employs the same media typically used to soak up water on large green roofs planted with desert sedums and bunch grasses. But here the growth media is four to five times deeper, maximizing water retention.

Tim Kurtz, a city engineer tracking the StormWall, estimates that it reduces peak flows by 50 to 70 percent during big storms. "It's definitely having an impact," says Kurtz. If implemented at a large scale, he says, such walls could reduce the number of times rainfall overwhelms sewers and wastewater-treatment plants.

Green walls can also treat the urban heat island (UHI) effect whereby solar radiation absorbed by roads and buildings makes cities hotter than surrounding rural areas. UHI is not just a future threat associated with climate change. In Melbourne, where UHI effects increase air temperature as much as 7 degrees Centigrade, a 2009 heat wave caused a 62 percent spike in human mortality.

Vegetating surfaces provides shade and also cools through transpiration of water vapor. Researchers at Australia's University of Melbourne and Monash University identified important roles for green walls in a recent

Photo Credit: Dekker Perich Sabatini Architects

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DESIGN-GROW-BUILD Portland-based developer SolTerra employs proprietary living walls as a marketing symbol; 1,100 square feet of vertical vegetation surrounds its LEED Platinum–certified Woodlawn development (left and above).

review of strategies for mitigating UHI. Economical green facades, they write, could cool large swaths of the city where limited open space precludes tree planting.

Trees can block ventilation and become counterproductive in tight city spaces. According to the Australian review, living walls—which cost more but will probably deliver more cooling—could target these hot spots.

Mainstream Green

Green walls are beginning to get credit for their ecological and societal benefits under development codes that increasingly mandate green screening. SolTerra is taking advantage of Seattle's Green Factor landscaping mandates, which award developers extra points for green walls to encourage innovation.

However, researchers say better quantification of green wall benefits is needed to underpin incentives such as Seattle's and spur investment by developers. While green roofs have proven their ability to pay for themselves through energy savings, stormwater mitigation, and extended roof lifetime, a dearth of data on green walls means they remain largely driven by aesthetic whim.

Perini took an early stab at a cost-benefit study in 2013, modeling south-facing green facades and living walls for a fictional four-story Genoa office building. Using data drawn from the academic literature, she estimated property value appreciation and energy savings worth a combined $4,200 per year for a living wall and about $2,300 per year for a green facade. The green facade paid for itself. The living wall, with its higher installation and maintenance costs, did not.

However, she says the study was deliberately conservative, since it relied on other researchers' data. To get better data, Perini and her colleagues built Genoa's first living wall and have been studying it since the end of 2014. She has yet to disclose the wall's performance, but hints that their data put living walls in a better light. "We do hope to demonstrate that living walls can be economically sustainable," says Perini.

Some of the less tangible benefits of green walls, such as biophilia, may be hard to quantify, but their value is easily observed. SolTerra's Heather recounts watching a couple with a young child outside the Woodlawn development, pointing up to a bird nesting in the living facade. "It adds to the neighborhood," he says. "It is something that people are much more proud of than a traditional building." ■

Peter Fairley, a journalist based in British Columbia, covers environmental issues for multiple publications including Technology Review *and* Nature.

STORMWALL Roof runoff from Portland's Expo Center filters through a 30-by-60-foot array of planters en route to city drains. The StormWall slows the runoff, much like a green roof, while giving the adjoining space a rainforest feel.

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Learning Objectives

1 Outline the ecological benefits of green walls and other types of green infrastructure.

2 Describe the different types of green walls.

3 Explain how each type is installed and characterize their maintenance requirements.

4 Discuss available data regarding the costs of green walls.

AIA/CES Course #K1607A.

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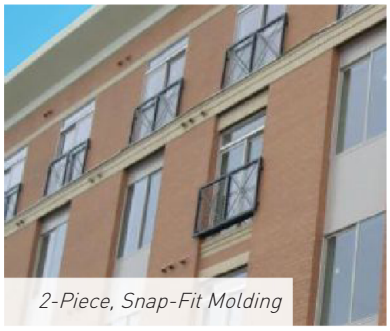

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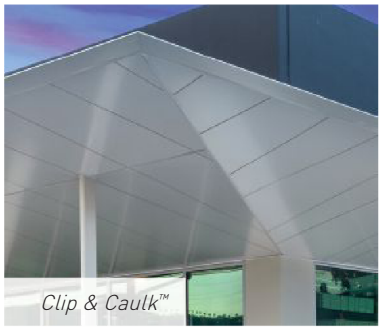

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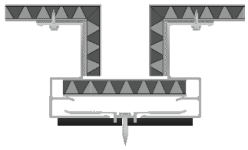

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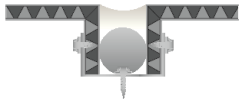

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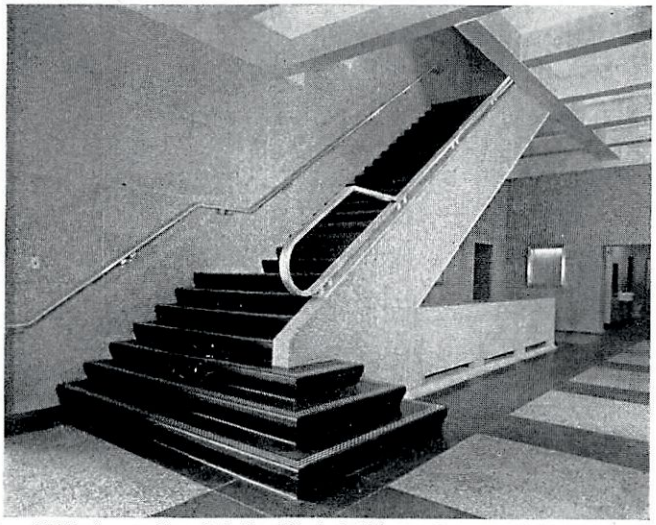

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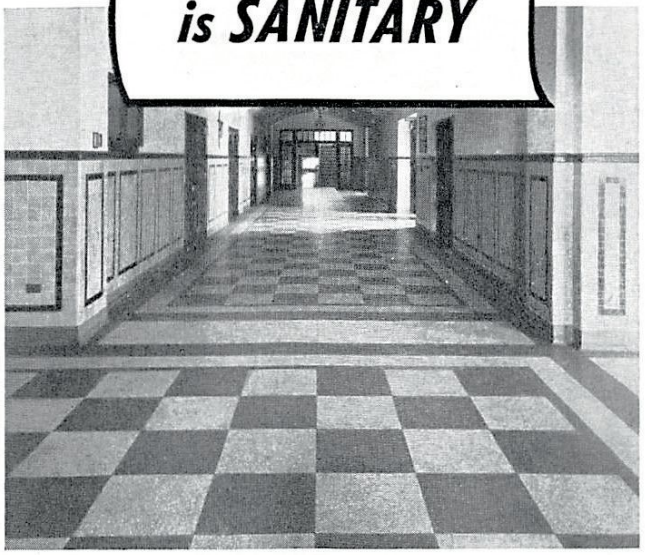

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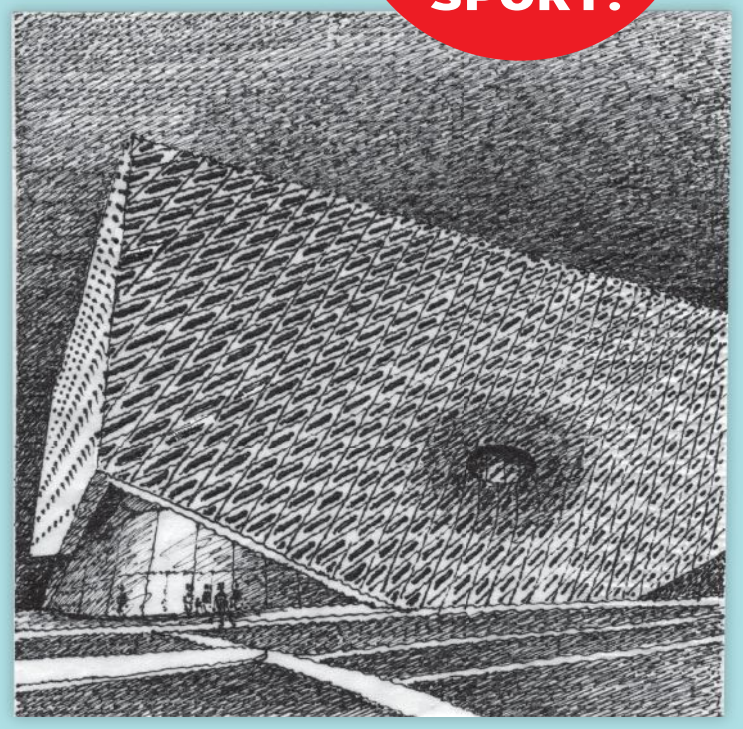

"The Broad Veil on Grand" by Daniel Sauerbrey, 2015 runner-up

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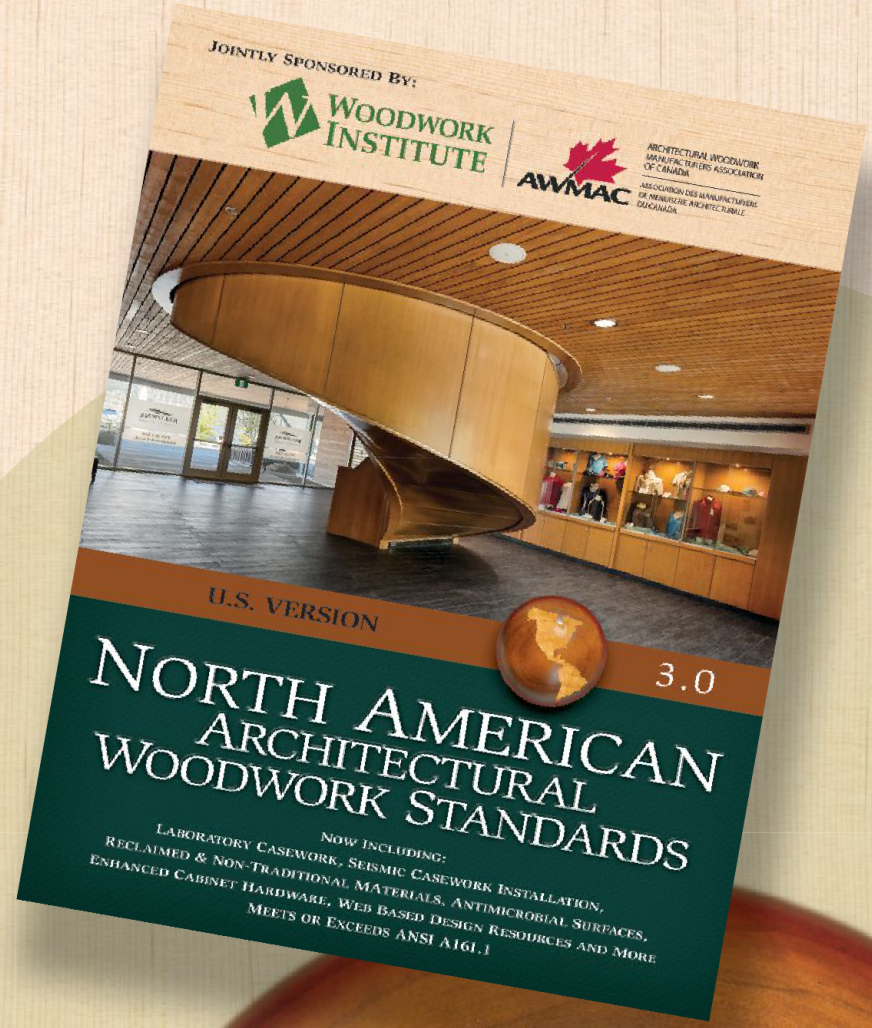

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Multi-Slide Glass Doors

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CREDIT: 1 AIA LU/HSW; 1 GBCI CE HOUR

Photo courtesy of Inpro

Latest and Greatest Features in Linear Drains, Wall Coverings, and Flooring

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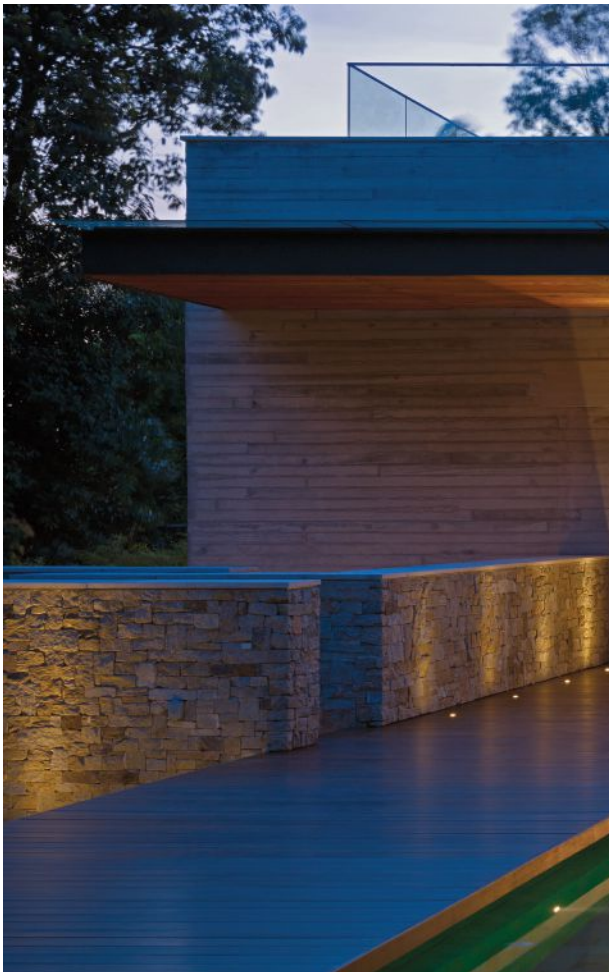
Buildings of all types and designs can benefit from incorporating multi-slide glass doors to enlarge the perceived usable space.



Multi-Slide Glass Doors

Bringing indoors and outdoors together through design and performance

Sponsored by LaCantina Doors | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

Creating a visual connection between indoors and outdoors has long been a design goal in both commercial and residential buildings. Going beyond the visual and creating an actual physical connection between the two has often relied on a series of doors with interrupted access at the spaces between those doors. However, new product offerings using multiple sliding door panels that stack or store in wall pockets now make it possible to fully connect indoor and outdoor spaces, without the interruptions. When open, the indoor spaces extend outward to create an outdoor living experience with all the benefits of fresh air and daylight. When closed, attention to details and performance characteristics assure that the multi-slide doors provide the needed protection from the weather and climate conditions.

DESIGNING FOR OPEN SPACES WITH MULTI-SLIDE GLASS DOORS

Many building designs seek to capture outdoor spaces as part of the overall usable space related to a particular building. In commercial building designs, restaurants, office buildings, and apartments, all can benefit when outdoor weather conditions make it more compelling to function outside rather than indoors. In residences, rooms that flow into patios, decks, or natural outdoor areas such as beaches or wooded areas give residents a direct connection to those outdoor spaces. In all cases, it is the interaction between indoors and outdoors that becomes the key design focus—how to create the transition space or mechanism to allow the enjoyment of the outdoors but still access the functional needs of the indoor spaces.

CONTINUING EDUCATION

1 AIA LU/HSW

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Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the characteristics of high-performance multi-slide glass doors as defined by national standards.
2. Investigate the design potential and innovative opportunities to create buildings that allow direct connection to the outdoors.
3. Assess the functional contributions of multi-slide glass doors as they contribute to green and sustainable design.
4. Specify multi-slide glass doors in a variety of green and conventional buildings, and formulate appropriate selections related to specific applications.

To receive AIA credit, you are required to read the entire article and pass the test. Go to **ce.architecturalrecord.com** for complete text and to take the test for free.

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Photos courtesy of LaCantina Doors

Multi-slide glass doors seamlessly connect indoor and outdoor spaces when open, while quality fabrication assures proper performance when closed.

Many 20th century architects worked with this concept of connecting indoors to outdoors but were limited by the technology and products of the time. The glass houses of Phillip Johnson and Mies van der Rohe created the celebrated visual connections but relied on conventional swinging doors to make the physical connection. Frank Lloyd Wright often used a series of double-swinging French-style doors that opened out against the sides of a column or pier, making the whole assembly appear as a colonnade with the doors visually disappearing. All of this was contemporized into the mainstream home construction market through the use of sliding patio glass doors that typically provided one fixed and one movable sliding panel of framed glass at the same head height as other swinging doors.

Architects today who are looking to use this same design concept of connecting indoors and outdoors have more options and better choices than those who preceded us. In particular, designing with multi-panel sliding glass doors provides an opportunity to create a seamless connection between indoor and outdoor spaces, while blending fully into the total building design. As a product, multi-slide glass doors are typically comprised of a number of individual sliding door panels that are guided on a head track above and ride on a floor sill below with bottom-mounted rolling hardware. When open, they can either stack in one or more parking bays along the plane of the opening or recess into a pocket designed for that purpose. Similar to systems that use a series of panels that fold, the sliding operation also offers flexibility in terms of space requirements and configurations. Other notable features of sliding systems are discussed further as follows.

Typical Applications

Multi-slide glass doors are being used in a full range of building types and functional applications. Residential buildings are able to open up entire walls and connect main living areas with outdoor spaces. Multifamily developments use them to help create the feel and appeal of a larger living unit by extending to outdoor balcony and common spaces. Restaurant and retail buildings can cater to customers who prefer to relax in outdoor spaces, while still being directly connected to the indoor facilities available.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP, *is an architect and green building consultant who has authored more than 120 continuing education and technical publications as part of a nationwide practice.* ***www.linkedin.com/in/pjaarch***

Photo courtesy of Inpro

New products have been developed to help designers address common challenges in health-care interiors.

Latest and Greatest Features in Linear Drains, Wall Coverings, and Flooring

Selecting the products designed to meet the unique needs of different interior spaces

Sponsored by Gerflor USA, Infinity Drain, and Inpro | *By Jeanette Fitzgerald Pitts*

Interior spaces are designed for a purpose. They are designed to be spaces where learning can occur or healing can take place. They are designed to inspire creativity or reflection or productivity. As spaces with a purpose, they also have special needs. The challenges in designing one interior space include meeting different applicable building and energy codes, applying the latest findings in evidence-based design to create spaces that are constantly better in some way than what was previously done—healthier, more environmentally friendly, or more efficient—and selecting finishes and furnishings that make an appropriate aesthetic statement, while being functional, staying on budget, and addressing the conflicts that arise between these goals when they occur, all while ensuring that the space fulfills its original purpose.

New products are constantly being developed to help designers address the challenges in different interior spaces. Technological advancements in drains, wall coverings, and flooring make it possible for designers to select products that do more, achieve design objectives more easily or completely, or equip spaces to perform at a level not previously possible. This course will examine a few different specific types of space: health-care interiors, high-traffic interiors, commercial interiors and bathrooms and the new drains, wall coverings, and flooring now available that are making it easier for designers to do more with their designs.

HEALTH-CARE INTERIORS

There may be no better example of interior space with a purpose than the interiors of hospitals and health-care facilities. As such, the challenges posed when creating a space designed for healing are complex. Spaces must be designed to accommodate people at all stages of health and mobility, and the finishes and furnishings must be easy to clean, appear clean, and contribute toward the cleanliness, without feeling sterile or institutional. It is a

CONTINUING EDUCATION

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Learning Objectives

After reading this article, you should be able to:

1. Design ADA-compliant, barrier-free showers that provide better water management than traditional showers with center-placed drains.
2. Enhance healing environments and other interiors with high-resolution digital art that is designed to withstand abuse and is easy to clean.
3. Explain how certain new flooring features contribute more toward the overall cleanliness and indoor air quality of a health-care interior.
4. Specify linear drains, flooring, and wall coverings that address many of the challenges designers currently face in health care and commercial spaces.

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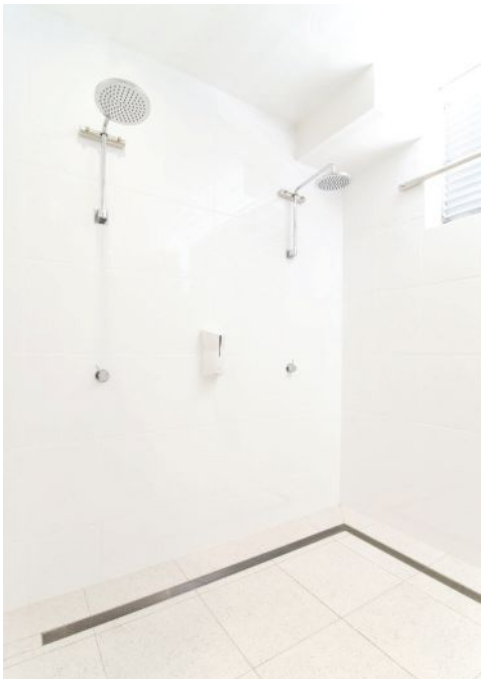

For years, designers have struggled to create barrier-free showers in health-care applications, and now linear drains can provide the barrier-free drainage solution they have been seeking.

place where the functional performance of the space must support the talented professionals who work there, and the aesthetic environment and indoor air quality must cater to the sensitive patients who are healing there. As with any interior environment, it is created through the application of the design practice, the selection of the right products and materials, and systems that work together to create something bigger—something with a purpose.

Create Barrier-Free, ADA-Compliant Showers

The Americans with Disabilities Act (ADA) 2010 Section 608.1 offers the following advisory statement: "Shower stalls that are 60 inches wide and have no curb may increase the usability of a bathroom because the shower area provides additional maneuvering space." For years, designers have struggled to create barrier-free showers in health-care applications, which are showers without a curb or obstruction at the shower entrance, that are ADA compliant and effectively manage the movement and drainage of water in the shower space. Linear drains can provide the barrier-free drainage solution they have been seeking.

ADA-Compliant Shower Compartments

There are three types of ADA-compliant shower compartments detailed in Section 608. They are: the transfer type shower compartment, the standard roll-in type shower compartment, and the alternate roll-in type shower compartment. The transfer type shower compartment is designed for bathers that do not require an aide and can physically transfer themselves onto a seat in the shower compartment. This is the smallest shower enclosure allowed by the ADA and the only configuration that allows the presence of a curb up to two inches tall. The two roll-in type compartments are designed to accommodate the use of a wheelchair in the shower and allow a small curb along the threshold of the compartment that is no taller than ½-inch and beveled to make it easier to roll over.

The open shower is another type of barrier-free shower design that is found in a hospital. The open shower concept employs a shower curtain to create the visual barrier, instead of a physical shower enclosure.

Creating an ADA-compliant shower for a hospital requires the inclusion of many unique elements. Beyond satisfying the dimensional minimums of the space, designers must incorporate grab bars, controls, hand-held sprays, accessible trays or shelves, and seats (where applicable). In terms of creating a barrier-free shower, the drain is a critical piece of the water management solution.

Drain Options: Linear vs. Traditional

There are essentially two types of shower drains available on the market today. The traditional center-placed drain and the linear drain. Traditional center-placed drains require that the shower floor feature a four-way pitch, creating a 360-degree bowl around the drain. Linear drains are often positioned along a wall or along the threshold of the shower enclosure. The shower floor slopes in one direction, instead of four, toward the drain.

One of the advantages to using a linear drain in a barrier-free hospital shower area is that the linear drain can serve as the floor drain for the entire bathroom. This is useful because without a physical boundary, such as a curb, to keep water from moving beyond the boundary of the shower area, often referred to as a wet area, to the dry area where the sink and toilet are located, it is practical to waterproof the entire room and equip the wet room with a floor drain. Traditional center-placed drains must be located in the center of the shower compartment and are ill-equipped to manage water that escapes beyond the boundary of the shower space.

There are three important design considerations when using a linear drain to create a barrier-free shower space: create a wall-to-wall fit, provide the necessary pitch in the floor to direct water toward the drain effectively, and achieve equal floor heights between the shower area or wet room and adjacent rooms.

Wall-to-Wall Fit

The linear drain is often placed along the threshold of the shower to create the barrier-free or curbless shower. When designing a bathroom with the linear drain in this location, it critical that the linear drain achieve a wall-to-wall fit. If the drain is too short, and there is a gap, water can run from the shower into the surrounding space. If the drain is too long, it will be impossible to install, as it cannot be installed through a wall. Avoid installation issues by identifying the finished wall-to-wall dimension and ensure that the linear drain is sized appropriately.

Appropriate Floor Pitch

The pitch of the floor is responsible for directing the water to the drain and out of the space. The typical recommended slope in the shower is ¼-inch rise per foot. The recommended slope on the dry side of the space is a more gradual ⅛-inch rise per foot.

Consistent Floor Height

Creating a consistent floor height from one area to the next is a basic tenet of good design. In hospitals and other spaces where the mobility of occupants may be limited, consistent floor heights that are easy to navigate are especially important.

When designing a barrier-free shower, the depth of the linear drain is a significant contributor in determining the final height of the floor. Deeper drains require more buildup to

Images courtesy of Infinity Drain

There are two common types of drains: traditional center-placed drains and linear drains.

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Shallower drains make it easier to keep the floor heights consistent between the wet area in a bathroom and adjacent areas.

accommodate and result in greater floor heights, which may require that designers create a more managed transition to help occupants move from one floor height to the next. Shallower drains can help to keep floor heights low, making the transition to other spaces easier.

The Waterproofing Myth

Many designers believe that any drain will work in any type of waterproofing. This is untrue, and pairing a waterproofing technique with an unsuitable drain can have disastrous effects on the jobsite. It is critical to be aware of the waterproofing technique that will be used by the project team and select a linear drain accordingly.

Here is a basic description of the two different types of waterproofing and why they affect drain selection. The two types of waterproofing are referred to as traditional waterproofing and modern waterproofing. The modern waterproofing technique uses materials that make it possible to tile directly on top of the waterproofing surface, which saves a lot of floor height and can accommodate a shallower linear drain. It is also easier to waterproof an entire space with the newer method because the waterproof membrane is simply painted or laid on. Traditional waterproofing materials require an additional mortar layer between the waterproof surface and the tile, which adds thickness, and the typical waterproofing membrane is a pan liner, which is nearly impossible to form to accommodate an entire bathroom area in order to create a wet room.

A hybrid of these traditional and modern waterproofing techniques also exists and is often used in hospitals and health-care facilities. This method uses a waterproof sheet that must be clamped to a drain. The waterproof sheet is also used as the final flooring throughout the entire bathroom. This allows for a seamless waterproofing room with minimal buildup. Common materials for these applications include vinyl "safety flooring," epoxy coatings, and others.

Special Considerations of Walls in Health Care

Just as linear drains have been designed to address the hospital need for effective water management in barrier-free showers, a new printed wall solution has been designed to satisfy the hospital demand for walls that contribute toward the carefully crafted healing aesthetic, while offering enough durability to withstand the daily wear and tear that can occur in high-traffic areas filled with rolling patient beds, wheelchairs, and equipment carts.

Promote Healing with Digital Art

The notion that art may make a positive impact in the health-care environment is not new or novel. In the introduction of "Visual art in hospitals: case studies and review of the evidence" by L. Lankston (et. al), published in the December 2010 issue of the *Journal of the Royal Society of Medicine*, the authors state: "There is moreover increasing evidence that the display of visual art, especially images of nature, can have positive effects on health outcomes, including shorter length of stay in hospital, increased pain tolerance, and decreased anxiety."

For quite some time, designers have supported this general idea and used color and art as instrumental components of a healing space. Advances in technology and printing capabilities are expanding the possibilities of the scope and quality of images that can be used for this purpose. Outfitting hospital walls with large-scale, high-resolution digital artwork can contribute much more to the overall aesthetic than paint or wallpaper. With these new visual art products, designers can use the hospital walls as a canvas to showcase serene and calming panoramic views of nature, share inspirational quotes or dramatic photography, offer directional cues for wayfinding, provide information, or tastefully incorporate facility logos and branding throughout a building.

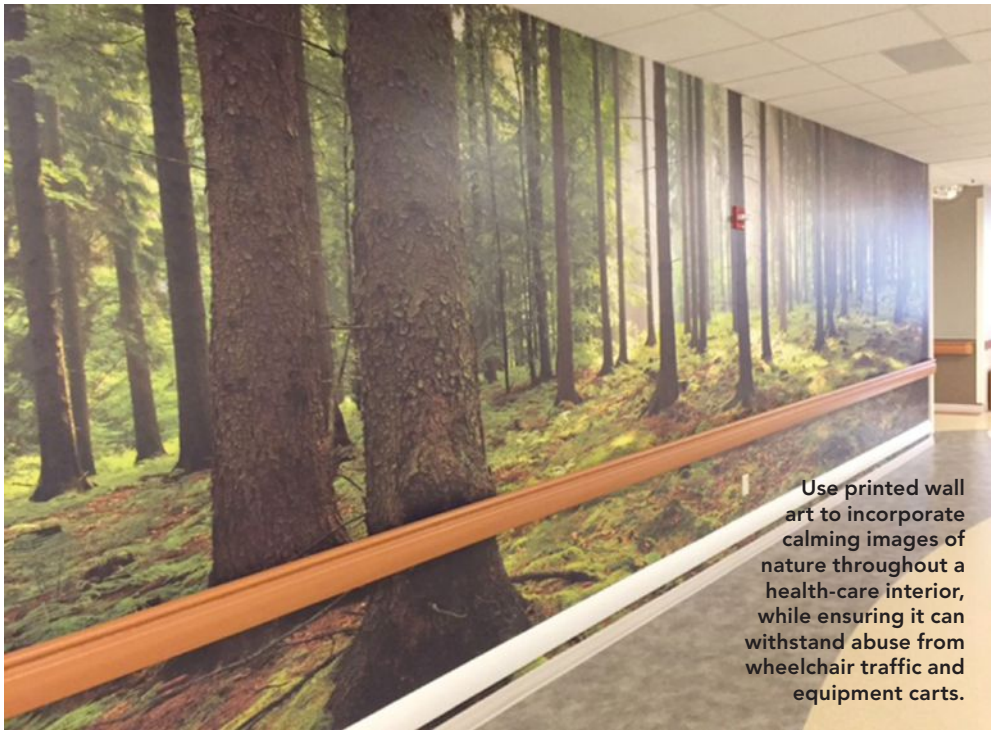
An advantage of digital artwork is that it is entirely scalable and can be printed to fit the dimensional needs of any space, from hanging a singular art piece on a wall to creating an expansive photomural to run the length of a corridor.

Withstand Wear and Tear and Resist Dirt

Finishes and artwork used in hospital interiors must be capable of withstanding significant wear and tear. These busy interior spaces host patients, staff, and visitors 24/7, and the corridors are super highways for patient beds, wheelchairs, equipment carts, and food delivery and maintenance gear.

In the past, designers who have used the walls in a hospital to contribute toward the healing aesthetic have searched in vain for a solution that would safeguard the image, without covering it up and obscuring it in plastic protection. Now, the design is the protection. Scalable, digital

Photo courtesy of Inpro



Use printed wall art to incorporate calming images of nature throughout a health-care interior, while ensuring it can withstand abuse from wheelchair traffic and equipment carts.

artwork is printed onto a durable substrate, also referred to as a rigid sheet, that protects the image from receiving scratches, dents, and scrapes. The rigid sheet is then covered with an invisible barrier film, which assures that any imperfections that may exist on the wall will not be visible through the image. This new product combines the limitless aesthetic possibilities of digital art with high-impact wall protection.

In order to compare the relative strengths of different surface coatings, the American Society for Testing and Materials (ASTM) developed a test method to evaluate the abrasion resistance of a coating referred to as ASTM D4060-14: Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser. When specifying a product that claims to resist damage from impact, request the results of the ASTM Abrasion Resistance test to verify product performance and compare solutions.

Not only do these new printed wall solutions withstand dents and scratches, but they are also designed to resist dirt and grime and be easily cleaned. The ASTM D6578: Standard Practice for Determination of Graffiti Resistance determines the ability of a coating to resist graffiti and evaluates how easily the surface can be cleaned. The test divides products into five levels of cleanability. Level 1 refers to coatings where the graffiti was completely removed with a dry cotton cloth. Level 2 coatings can be completely cleaned with a 1 percent aqueous detergent solution. A coating that earns a Level 3 rating indicates that graffiti can be completely removed with a citrus cleaner. On a Level 4 coating, graffiti can be removed with isopropanol. A Level 5 cleanability rating signifies that graffiti can be removed from the coating with methyl ethyl ketone (MEK). If a coating is deemed Not Cleanable by the ASTM test, graffiti remained after all of the cleaning solutions were used, or the gloss ratio was substantially reduced. There are printed wall solutions that have earned the highest rating of stain resistance and cleanability on the ASTM D6578 test.

Important Features in Health-Care Flooring

Technological advancements in flooring have transformed this interior finish from a simple underfoot surface to a solution that can help hospitals and health-care facilities achieve important performance goals, improve the overall patient experience, and offer a safer work environment for staff and visitors. Flooring today can help to protect indoor air quality, stop the spread of infection, manage sound, resist tough stains, and contribute to the level of cleanliness perceived by patients and staff.

Photo courtesy of Gerflor USA/Robert Frith

Flooring today can help to protect indoor air quality, stop the spread of infection, manage sound, resist tough stains, and contribute to the level of cleanliness perceived by patients and staff.

Floorscore® Certified for Low VOC Emissions

Protecting the indoor air quality of hospitals is extremely important in designing interiors that promote health, healing, and well-being. When selecting flooring, a product's emission levels of specific volatile organic compounds (VOCs) is a primary concern for designers hoping to maintain the integrity of their interior environment.

FloorScore® certification, managed by the Scientific Certification Systems (SCS), was developed to test and certify flooring products as being in compliance with the indoor air quality emission requirements adopted in California. The California standard, titled California Department of Public Health Standard Method for Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, commonly referred to as CA 01350, has become the dominant standard for product emissions testing and is commonly referenced in rating systems and building codes.

Flooring products that bear the FloorScore seal have been independently certified to comply with the VOC emissions criteria of the CA 01350 standard and are deemed products that will contribute to good indoor air quality.

No-Wax Flooring

Vinyl composition tile (VCT) was once the standard flooring choice in health-care and education facilities. Although durable and good in high-traffic areas, these products required a rigorous strip, wax, and buff regimen to maintain their shiny and polished appearance and protect the floor. There are many notable disadvantages to this maintenance routine.

Floor stripping refers to the removal of old wax, soil, and debris found on the floor. The stripping process is both labor and time intensive, and it is common for even experienced cleaning professionals to make mistakes when stripping floors. Furthermore, the products used to wax and strip the floors often contain toxic VOCs, such as formaldehyde (a known carcinogen). A life-cycle study of flooring installation and maintenance found that the amount of VOCs emitted from a single waxing of a floor may be comparable to the amount of VOCs emitted from the flooring itself over its entire life.[1] Floors regularly required this routine once or twice a year. The maintenance costs in time and attention were tremendous.

Continues at ce.architecturalrecord.com

***Jeanette Fitzgerald Pitts** has written dozens of continuing education articles about a variety of building products.*

PRODUCT REVIEW

Latest and Greatest Features in Linear Drains, Wall Coverings, and Flooring

Gerflor USA

Photo courtesy of Gerflor USA

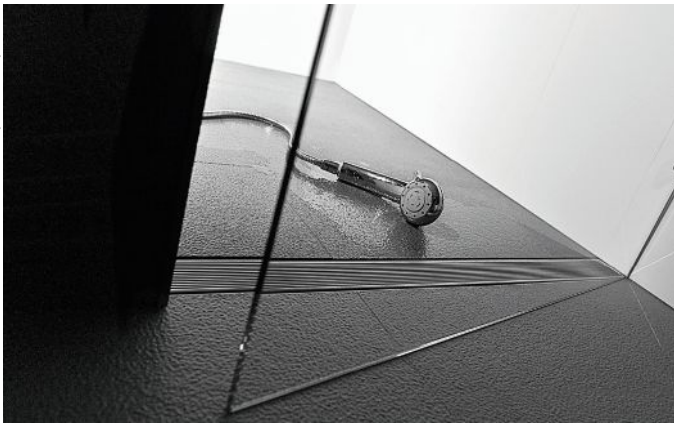
Gerflor Creation LVT

Welcoming, healing environments start with Gerflor Creation luxury vinyl tiles and planks. It's the only LVT that is ISO 22196 certified to limit the spread of infections at 99 percent. Offered in wood, stone, and textile designs evoking natural surfaces and styles, Creation LVT provides the perfect palette to create modern, warm, and nurturing environments.

www.gerflorusa.com *Circle 100*

Infinity Drain

Photo courtesy of Infinity Drain



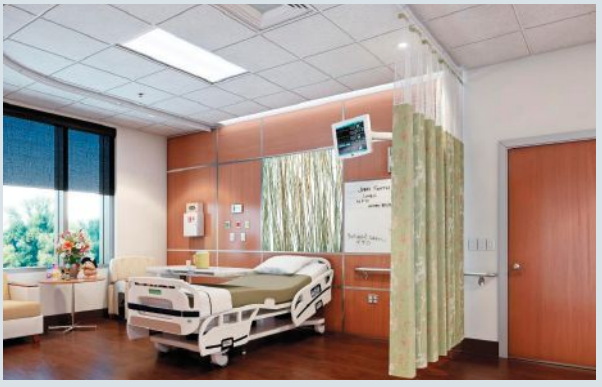
Site Sizeable Linear Shower Drains

Infinity Drain offers the only "Site Sizeable" linear drain, which allows for the channel length and outlet placement to be modified on-site for easy setup and perfect wall-to-wall installation. Available in stocked sizes and multiple finish options. Fabricated in Long Island, New York.

www.infinitydrain.com *Circle 101*

Inpro

Photo courtesy of Inpro



Aspex™ Printed Wall Products

For more than 35 years, we've been a leader in wall protection products. Combine that with 15 years experience in cutting-edge sign products, and you've got Aspex™ Printed Wall Products, a world-class solution to not only protect your walls but enrich them. Aspex Printed Wall Products allow you to display high-resolution graphics on your walls to enhance your building's environment. Choose Aspex to create interiors that inspire.

www.inprocorp.com *Circle 102*

CONTINUING EDUCATION

Resilient Building Design

Design passion combined with digital technology can create sustainable results

Sponsored by Vectorworks, Inc. | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

The intersection of the natural environment with the built environment can be investigated and designed for resiliency and sustainability using tools such as building information modeling (BIM).

Image courtesy of McGregor Coxall and Vectorworks, Inc.

All buildings, regardless of location, are subjected to the conditions and forces imposed upon them from the natural environment. These forces can come from common weather conditions, such as sun exposure, wind, rain, snow, hail, and the like. They can also come from other more significant phenomena, such as earthquakes, flooding, wildfires, hurricanes, tornadoes, or drought. Design professionals and building codes can readily address the typical or common concerns of most of these occurrences at least to a basic extent. However, it has become clear in recent years that buildings and entire communities are experiencing situations that aren't all that typical. Climate changes and unusual weather patterns have created storm events that are more intense or more frequent than usual. Increased population density has meant that more people are impacted when an event does occur. Older buildings and infrastructure are not always able to deal with these increased conditions and forces. And social, economic, and political conditions in many places around the world are exacerbating the problem through disproportionate impacts on those least equipped to deal with them. Recognizing the importance of addressing these situations, organizations, government bodies, and individuals are rallying around an emerging planning and design principle—increasing the resilience of buildings and communities for all of their inhabitants.

DESIGN WITH PURPOSE

Resilient design goes beyond the realm of building architecture and engineering. It is necessary to involve the larger community in all of its aspects. Some of the natural local conditions that likely contributed to the creation of a community in the first place, such as climate, topography, water resources, or vegetation, can also be some of the causes for natural disasters. The political makeup of a community and the effectiveness of the elected leaders to orchestrate actions that work for the benefit of all people certainly makes a difference in terms of the smooth operation of a community, but it is also critically important in times of crises or natural disasters. The socioeconomic condition of the community plays a significant role not only in the ability of a community to withstand severe weather events, but also to recover from them.

Architects are among many professionals who have recognized the multifaceted and truly interdisciplinary nature of communities in both good times and during times of need. Some have taken it upon themselves to

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Identify the characteristics of resiliency in building design, and the role that design professionals and building technology can play in improving resilience.
2. Investigate the design issues related to creating buildings that can bounce back from extreme environmental conditions.
3. Assess design strategies related to common severe weather events, such as high winds, heavy rain, flooding, intense sun, earthquake, and fire.
4. Recognize the role that building information modeling can play in achieving building designs that are more resilient and sustainable.

To receive AIA credit, you are required to read the entire article and pass the test. Go to **ce.architecturalrecord.com** for complete text and to take the test for free.

AIA COURSE #K1607C

devote a portion, if not all, of their practice to the concept of purpose-driven design, which is focused on responding to extraordinary needs of a community. These needs could include social issues, such as poverty, overcrowding, and migration, with innovative, affordable designs for shelter and housing. Some address the scarcity of resources in a region, such as water or energy shortages, with creative ways to extract, conserve, or distribute those resources. Others have focused on helping a community recover following a natural disaster with damage assessment, master planning, and improved building designs to withstand any repeat occurrences. Regardless of the issue or focus, the design services rendered are offered for the purpose of serving the greater good of the community, whether at the level of a region, neighborhood, or building. This purpose-driven design approach has been undertaken by many American and international firms as part of the firm philosophy and culture. In some cases, the work is provided pro bono, while in other cases, some level of fees are paid depending on the circumstances of engagement. In all cases, it influences design decisions from the broadest to the most specific levels.

Beyond individual firms, there are a number of organizations that have been champions for this concept of purpose-driven design. One of the more celebrated organizations is the former Architecture for Humanity founded by Cameron Sinclair. While it conducted significant humanitarian-based design and building projects around the world, its founder left to pursue other things, and the organization closed down several years later. Nonetheless, it brought worldwide attention to the role that architects and other design professionals can play in addressing community issues. Similarly, in Tokyo Japan, the 2014 Pritzker Prize winner, Shigeru Ban, Hon. FAIA, has used his notoriety and his firm to establish an organization known as the Voluntary Architects Network (VAN). Shigeru Ban Architects began disaster relief work in 1994 in response to 2 million refugees in Rwanda being misplaced from their homes as a result of that country's civil war. Ban made a proposal to the United Nations (UN) to use "paper-tube shelters"—a medium that he has famously used as a trademark for innovation and affordability. The UN liked the proposal enough that he became a consultant, and his Voluntary Architects Network has worked ever since in multiple countries helping thousands of people recover from natural disasters. Specific projects have included the Paper Shelter in Haiti, the Hualin Temporary Elementary School in China, and Paper Log Houses in India.

Architects like Pritzker Prize winner Shigeru Ban have included purpose-driven design, like this "paper house," as a significant part of their practice using alternative materials and local resources to provide housing following a natural disaster.

Closer to home, the American Institute of Architects (AIA) has a long and continuing history of addressing purpose-driven design for communities. As early as 1972, the AIA formally recognized the role of architects in community issues, such as emergency response efforts. In 2004, the AIA Center for Communities by Design brought together programs not only in disaster assistance but also community planning, including the popular Regional/Urban Design Assistance Team (R/UDAT) and the Sustainable Design Assessment Team (SDAT) programs. These programs have worked across the United States and in places around the world using volunteer teams led by AIA members and staff to address planning and rebuilding efforts in a variety of communities. Some locations served include Louisiana and Alabama following hurricane Katrina, Haiti following a severe earthquake, and places in Asia that suffered tsunami damage. The national effort has led to the creation of a Disaster Assistance Program with members located in AIA chapters across the United States. This has spawned significant planning and response efforts in places like the state of Oregon to address seismic concerns and the New York City area following superstorm Sandy. Note that disaster assistance with the AIA is not about being a first responder to help individuals. Rather, it is about architects lending their expertise in assessing damage, arranging temporary relief in the short term and, more significantly, in offering design expertise to help rebuild and reshape communities. Particular emphasis is placed on design to withstand future disasters—that is designing for resilience.

DESIGNING FOR RESILIENCE

In the context of purpose-driven design, the notion of resiliency takes on a broader meaning. It isn't just about making stronger buildings that can withstand severe weather or natural disasters; it is about the ability of the people to not merely survive, but to thrive where they are located. True resilient design for buildings and communities focuses on the anticipation

Source: www.aia.org/about/initiatives/AIAS075265

AIA Communities by Design
ENVISION. CREATE. SUSTAIN.

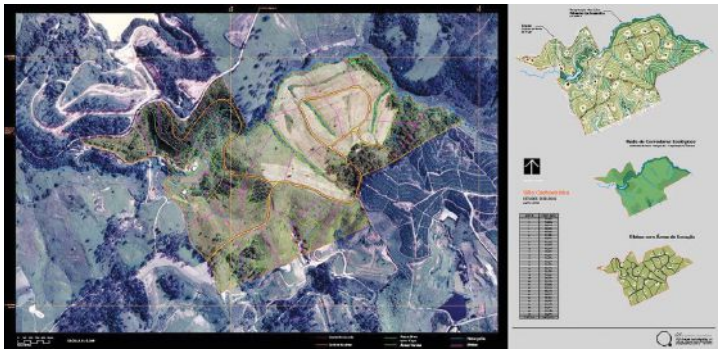
The American Institute of Architects (AIA) maintains the Center for Communities by Design that provides a means for architects and other professionals to assist communities in improving their design for overall livability, disaster responsiveness, and sustainability.

of extraordinary conditions that can create extraordinary human needs. This has been played out in far too many news reports in recent years, where a disastrous event has quickly taken its toll on buildings and infrastructure, but the impact on the people has lasted for months or, more typically, for years as cleanup, recovery, and rebuilding take place. The consequences for non-resilient design is often reported in terms of the millions or billions of dollars of damage. But the real consequence is the loss and disruption in people's lives, sometimes causing a mass exodus out of a region as seen following hurricane Katrina or as currently being played out in refugees fleeing Africa and the Middle East.

The means to protect people, minimize disruption, and maintain long-term viability comes down to design. Each community is unique in its challenges and needs; therefore, the design response needs to be uniquely tailored to each community. Nonetheless, most of the common critical design conditions that need to be accounted for are becoming readily known such that specific design criteria for resiliency are emerging. The process includes identifying the potential of hazards from severe weather events and natural disasters, determining the relative risk and vulnerability of buildings or a community to those events, and establishing appropriate design criteria in response. For example, the wind and rain resistance of roofing, windows, and other building envelope systems may need to be increased for new and existing buildings prone to such weather events.

There are also long-term issues that need to be addressed, such as changing climatic cycles that are causing droughts in many areas. An appropriate design response here may be to incorporate water storage or water use reduction strategies in buildings or entire communities, but it may also include increased attention to fire resistance in areas that are experiencing more dramatic wildfires due to drought. Further, most buildings are served by some form of public utilities, such as drinking water, sewer,

Images courtesy of Vectorworks, Inc.



Resilient design involves an understanding of the larger, regional, and community scale environmental issues, as well as the performance of new and existing buildings.

electricity, and communications. They are such a routine part of everyday life that it is easy to take them for granted until there is a lapse in that service and normal activities come to a virtual halt. This is not only disruptive from an economic and productivity standpoint, but it can also be life threatening, particularly if it extends for any period of time. Designing the infrastructure to be protected to withstand impacts is one approach to resilient design, but designing buildings to function temporarily without them is another. This isn't an "either/or" option in most cases, but more likely a "both/and" situation, where infrastructure should be addressed and strengthened and buildings should be designed so they can live without them for an extended time.

As the amount of attention being paid to resilient design has grown in recent years, a number of organizations are emerging as design resources for people of many disciplines. The not-for-profit Resilient Design Institute (RDI) is one such organization, with a mission to "create solutions that enable buildings and communities to survive and thrive in the face of climate change, natural disasters, and other disruptions." It not only sees the short-term benefits of overcoming immediate issues, but envisions a longer-term approach to design that can create a more sustainable built environment. The RDI ties resilience to climate change, recognizing the need for adaptation to the wide range of regional and localized impacts that are expected with a warming planet: more intense storms, greater precipitation, coastal and valley flooding, longer and more severe droughts in some areas, wildfires, melting permafrost, warmer temperatures, and power outages.

As a means to provide architects and others with some relevant tools, RDI has developed a list of ten Resilient Design Principles as a basis for planning. These 10 principles recognize the importance of things like scale, redundancy, durability, passive systems, natural resources, and social equity in resilient designs, as well as the limitations that need to assume interruptions will still occur and that total, absolute resilience is not realistically anticipated. They also offer a series of resilient design strategies scaled to the individual building level, the community level, and the regional level of design. Some of the strategies may seem obvious, like anticipating impacts from hazards but actually addressing them in a design is significant. Others are more focused, such as optimizing the use of on-site renewable energy or on-site harvested water. All of these concepts are discussed in more detail at www.resilientdesign.org.

The AIA has also taken on a leadership role on resilient design in several ways. First, the organization has a member-vetted, formal position statement of support that includes the following: "Buildings and communities are subjected to destructive forces from fire, storms, earthquakes, flooding, and even intentional attack. The challenges facing the built environment are evolving with climate change, environmental degradation, and population growth. Architects have a responsibility to design a resilient environment that can more successfully adapt to natural conditions and that can more readily absorb and recover from adverse events. The AIA supports policies, programs, and practices that promote adaptable and resilient buildings and communities."

To back up this position, the AIA has also put together a set of sustainability initiatives and resources on resilience as part of the government advocacy efforts of the organization, which can be found at www.aia.org/advocacy/AIAB106185. In particular, it sees the role of the architect as valuable within four stages of a disaster cycle. Once a disaster occurs, the first step is the response, where architects can assist with building damage assessments and temporary housing design. During the recovery stage, architects can provide planning and design assistance for repairs, rebuilding, or relocation efforts. Preparedness is the next stage, where architects can help assess vulnerabilities and conduct analyses, training, and education all geared toward helping building owners and communities become prepared in a calmer, non-emergency mode. The final stage is the implementation of mitigation measures for new, renovated, or existing buildings and infrastructure with the intent that when another disaster strikes, the impact on people and property is notably lessened.

In the interest of engaging a broad discussion across many stakeholders, the AIA joined with the National Institute of Building Sciences (NIBS) and in 2014 led the effort for more than 30 design and construction organizations representing more than 750,000 professionals to sign the joint "Building Industry Statement on Resilience." This step affirms that "As the leaders of this industry, we are committed to

RESILIENCE TERMS AND DEFINITIONS

The following are based on work of the Resilient Design Institute (RDI) and the American Institute of Architects (AIA).

- **Resilience** is the capacity to adapt to changing conditions and to maintain or regain functionality and vitality in the face of stress or disturbance. It is the capacity to "bounce back" after a disturbance or interruption.
- **Resilient design** is the intentional design of buildings, landscapes, communities, and regions in response to vulnerabilities to hazards. As used by the RDI, resilient design focuses on practical, on-the-ground solutions. As discussed by the AIA, it is the inherent durability or flexibility in a design providing the ability to not only bounce back, but move forward after experiencing a natural disaster or disruptive event.
- **Hazards** are anything that pose a threat to health, safety, or welfare resulting in negative outcomes, such as injury, death, or property damage, as well as social and economic disruption.
- **Risk** is the quantification of a threat from a hazard. Risk defines the likelihood of occurrence and intensity of the hazard. Determining the level of "acceptable risk" is critical to designing appropriate mitigations.
- **Vulnerability** assesses the specific impacts from hazards that buildings, individuals, and communities can be subject to. It includes interdependencies recognizing that a resilient building in a vulnerable community isn't truly resilient.
- **Mitigation** is the means to reduce or overcome negative impacts. Mitigation measures are often developed in accordance with lessons learned from prior incidents. Mitigation is most successful when policies and decision making support appropriate development, land use, site selection, and adoption of model building codes.
- **Adaptation** is the ability for a building or a community to change either now or in the future—even if it means changing some mitigation measures.

© Tsunami Design Initiative, Harvard GSD and SENSEable City Laboratory

Using structural guidelines extracted from the analysis of buildings that survive a tsunami, the Safe(r) House, coordinated by the SENSEable City Laboratory, merges low-tech construction with high-tech BIM design, producing a dwelling that is better prepared to outlast a tsunami.

significantly improving the resilience of our nation's buildings, infrastructure, public spaces, and communities." All of the organizations have agreed to work together to promote better education, improved materials and building methods, and cooperation with government agencies at all levels to create "new practices in order to break the cycle of destruction and rebuilding."

In October 2015, the AIA convened a Resilience Summit inviting some of the best people in the country to participate. (See "Reframing Resilience: Proceedings of the AIA 2015 Resilience Summit" at www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab108004.pdf). Among the outcomes of this event, four themes emerged:

- Industry partnerships are needed to tackle complex design problems at scales of efficiency to achieve greater cost benefits.
- Experienced professionals need to continuously reeducate the profession about disaster prevention and resilience, and provide awareness and hope to the public.
- Existing policies, tools, and programs must be coordinated at the state and federal level to resolve contradictions, identify opportunities and synergies, and fill gaps.
- Greater collaboration across the building industry with the public's participation is needed to align community performance goals and to determine design thresholds.

All of these are being addressed with new programs and initiatives by the AIA and others all in the interest of achieving greater resiliency in buildings and communities nationwide.

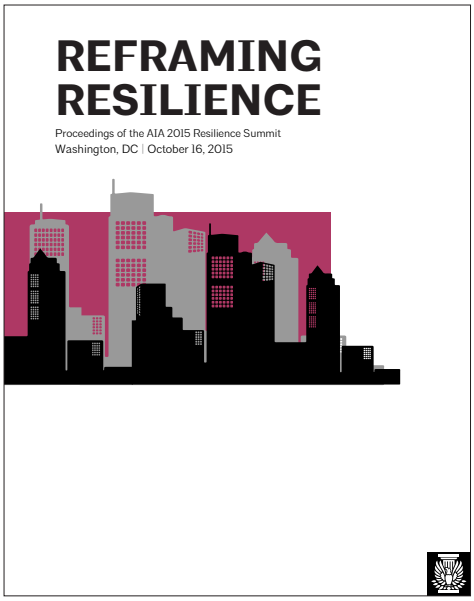
CONNECTING RESILIENCE AND SUSTAINABILITY

Anyone who has been engaged in green or sustainable building and community design will recognize that there are many shared design strategies with resilience. At the most basic level, this starts with an understanding of the regional climate zone and other natural conditions that will affect the design and operation of the buildings in that region, whether in normal or severe times. Green building designs typically look at these regional issues as a basis for energy code compliance at a minimum or full site analysis to determine how to take advantage of the resources available. Resilient design benefits from this same analysis and approach first to understand and plan for both the normal and anticipated changes in natural conditions, weather, temperature, etc. Then, an assessment of the on-site or local resources that can be tapped into as permanent or temporary reserves for building operations can inform vulnerabilities or risk reductions based on the availability of those resources. These natural resources can be used to overcome interruptions in service by public utilities and maintain a degree of normalcy until full service is restored.

Water is a primary concern in both sustainable and resilient design on several fronts. First, a reliable drinking water supply is needed for human life, but water conservation techniques make sense in all cases to avoid the unnecessary wasting of water.

Continues at ce.architecturalrecord.com

Image courtesy of The American Institute of Architects (AIA)



The AIA Summit on Resilience produced a report that is useful to all architects and other stakeholders involved in resilient communities.

Peter J. Arsenault, FAIA, NCARB, LEED AP, *is a practicing architect, sustainable building consultant, continuing education presenter, and prolific author engaged nationwide in advancing better building performance through design.* ***www.linkedin.com/in/pjaarch***

CONTINUING EDUCATION

Creating a New Path for Forest Products In Green Buildings

A new pathway to earning LEED points is encouraging more legal, responsibly sourced, and certified forest products to be part of the green building supply chain

Sponsored by The Sustainable Forestry Initiative Inc.

Architects and builders choose wood because it is a superior building material. Wood is a beautiful, renewable resource that is easy to work with. It also offers numerous environmental benefits. Using wood in green building projects supports many of the benefits offered by responsibly managed working forests, including clean air and water, biodiversity, habitat for wildlife, and employment for local communities. Now, a new LEED Alternative Compliance Path (ACP) for forest products will strengthen the positive impact of responsibly managed working forests in the construction sector. The U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) program is one of the most powerful drivers of sustainable building in the United States.

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Apply the new Alternative Compliance Path to get LEED credits for using legal, responsible, and certified-sourced forest products in projects.
2. Discuss SFI standards as mechanisms for sustainable forest management, verified supply chains, and responsible procurement of forest fiber.
3. Explain the importance of verifying legal forest products to prevent widespread illegal logging and deforestation.
4. Examine the connections between using forest products as a desirable, renewable resource, and protecting and expanding forests, through research, conservation, and strong community programs.
5. Document SFI forest products for the LEED Alternative Compliance Path.

To receive AIA credit, you are required to read the entire article and pass the test. Go to **ce.architecturalrecord.com** for complete text and to take the test for free.

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The Kordyban Lodge is the winner of the first SFI Wood Design Award as part of the 10th Annual Wood WORKS! BC Wood Design Awards. The lodge contains wood products from certified sources, the majority of which are certified to the SFI Standard, and provides a comfortable and peaceful home away from home for cancer patients and their caregivers. The stunning wood building spans 25,000 square feet and includes 36 beds, a meditation room, lounge, family room, massage therapy room, and more. Neale Staniszkis Doll Adams (NSDA) Architects.

Photo courtesy of Wood Design & Building Awards

In April 2016, the USGBC announced a LEED ACP that greatly expands the recognition of legal, responsible, and certified forest products to contribute to LEED credits. In the past, only forest products certified by the Forest Stewardship Council (FSC) were recognized in LEED. The new ACP pilot adds the Sustainable Forestry Initiative (SFI), the American Tree Farm System (ATFS), the Canadian Standards Association (CSA), and other forest management standards that are endorsed by the international Programme for the Endorsement of Forest Certification (PEFC). The new path applies to all LEED v4 rating systems, including Homes v4, and to all LEED 2009 rating systems.

This course explains in detail how architects can use the new ACP pilot credit to count forest products certified to the SFI Standards toward LEED points. Pilot credits allow LEED projects to achieve existing credits using approaches that are not part of the existing rating tool. An ACP pilot is used to test and refine new approaches to LEED credits. If adopted, it becomes part of the LEED rating system.

This course also outlines how the change will encourage environmentally responsible forest management and the use of forest products in innovative, sustainable buildings supported by LEED.

In addition, the course will explain the use of SFI's three major standards: for managing forests, for responsibly procuring fiber, and for tracking forest fiber content throughout the building materials supply chain. Wood is one of the most commonly used building materials in the world so these standards and the new LEED path are important components in efforts being made around the world to use natural resources more wisely, protect the environment, and strengthen the communities that will take sustainable building into the future.

WHY A NEW ACP?

Wood has been a popular building material since humans began building. Today, it remains one of the most widely used building materials—from ordinary lumber and light-frame residential construction to highly engineered, advanced products suitable for almost every building type. The range of projects using wood continues to widen, including high-rises and many other innovative structures, and interiors where wood is chosen as much for its beauty and appeal to the senses as for its high performance.

Lately, wood has also become a cornerstone of green building. On the scale of an individual building, the life-cycle cost and environmental impact of wood products are low compared to other common building materials.[1] Wood is renewable and has a light carbon footprint in terms of manufacturing, transport and end-of-life recycling, re-use, or disposal.[2]

Image courtesy of SFI Inc.

But the environmental value of wood goes far beyond the individual building. Forests improve the environment on a planetary scale. Trees renew the air supply by producing oxygen and improve air quality by absorbing ground-level ozone, carbon monoxide, and sulfur dioxide. In a year, a single tree can produce 260 pounds of oxygen and absorb 10 pounds of air pollutants, including ozone and particulates.[3] At the same time, trees absorb and store carbon dioxide from the atmosphere as they grow, and incorporate absorbed carbon into the forest products that are produced from a tree. Through sequestration of carbon and offsetting fossil energy that would otherwise be required, just one tree can clean 330 pounds of carbon dioxide from the atmosphere every year.[4] All of this helps lower the construction sector's significant contribution to global climate change. Forests also improve water quality by acting as natural filtration and storage systems. The ability of forest vegetation and soils to absorb and filter water also increases groundwater, as clean water trickles down to feed aquifers, and reduces runoff during rainstorms.

Forests additionally provide habitat for both rare and common species, thus fulfilling an important role in stewardship of the environment. Forests create recreational opportunities, and provide aesthetic values that improve quality of life for millions of people.

In order for the source of wood products to remain renewable and for forests to provide their multiple benefits, forests must be healthy and thriving. Globally, that health is threatened by many factors, both naturally occurring and those resulting from human activities. Forest health and vitality can be threatened by climate change, invasive pests and pathogens, the severity of wildfires, illegal logging, and global deforestation.

One critical step to meet the challenge of deforestation is to ensure people understand the difference between irresponsible and responsible approaches to forestry. Real deforestation occurs when forests are converted to other land uses, and is distinct from harvesting under sustainable forest management regimes. Fortunately, in North America, strong laws and responsible forestry frameworks, like forest certification, help safeguard against deforestation. North America is universally regarded as a low-risk source of supply. But the global problem of illegal logging and deforestation is increasing, and with it the involvement of organized crime. A recent UN-Interpol report estimated that up to 30 percent of global logging is connected to organized crime. In some areas, such as parts of South America, Central Africa, and Southeast Asia, the percentage is much higher.[5] Deforestation accounts for at least 10 percent of all carbon emissions caused by humans and results in devastation in the Amazon rainforests, the "lungs of the planet," and in many other less high-profile areas.[6]

Trade in illegal forest products in the United States is prohibited by the Lacey Act and other laws (see www.forestlegality.org), and is closely monitored under credible forest certification programs that disallow the inclusion of illegally sourced materials. Architects, builders, and building operators have a responsibility to ensure they are using legal forest products.

Forest certification, in addition to offering a proof point to address these environmental problems, provides the added benefits of ensuring the promotion of the full range of values emanating from a responsibly managed forest,

such as biodiversity, carbon storage, and water quality. LEED has taken an important step in strengthening the framework for decision making about wood products by widening the scope of accepted certification schemes through the ACP pilot.

The new LEED ACP offers greater access to responsibly sourced forest products and reinforces the value of certified forests, responsible sourcing, and chain-of-custody (CoC) for forest products.

WHAT IS THE NEW ACP?

MRpc102 Legal Wood is a new ACP for forest products to achieve points in the Materials and Resources credit. The ACP applies to all LEED v4 and LEED 2009 systems where forest certification is referenced. This includes Building Design and Construction (BD+C), Interior Design and Construction (ID+C), Existing Building: Operations and Maintenance (O+M), and Homes (H) v4. All of the relevant credits are shown in Figure 1.

The ACP requires architects and builders to verify the legality of forest products used in LEED buildings and awards credit for the use of forest products certified to programs like SFI. In order to count toward a LEED point, the user must verify the following, as defined by ASTM D7612-10 (2015):

- 100 percent of the forest products are from legal (non-controversial) sources; and
- 70 percent of the products are from responsible sources.
- Once these two thresholds are met, the certified sources delivered through chain-of-custody certification can be used to obtain a point.

ASTM D7612-10 (2015): Standard Practice for Categorizing Wood and Wood-Based Products defines a framework for identifying and distinguishing among legal, non-controversial, responsible, and certified sources. The distinctions are important. Only 10 percent of the world's forests are certified, which represents about 25 percent of the global roundwood production, but this does not mean that 90 percent of the remaining forests are illegal or even that they are irresponsibly managed.

However, identifying and supporting the increase of responsible and certified sources is the only way to verify that forest products are not only legal, but are from forests that are managed and overseen in a way that keeps them healthy and sustainable.

Later in this course, a step-by-step approach to qualifying for the new ACP pilot will be discussed in more detail. But the major direct route now opened for architects is through standards developed by certified third-party sources identified in ASTM D7612-10 (2015), as shown in Figure 2.

Figure 1:
Credits in LEED v4 and LEED 2009 that the Alternative Compliance Path Applies to

	LEED V4	LEED 2009
Building Design and Construction (BD+C)	MR Credit: Building product disclosure and optimization – sourcing of raw materials	MRc7: Certified wood
Interior Design and Construction (ID+C)	MR Credit: Building product disclosure and optimization – sourcing of raw materials	MRc7: Certified wood
Existing Building: Operations and Maintenance (O+M)	MR Credit: Purchasing – facility maintenance and renovation	MRc1: Sustainable purchasing – ongoing consumables
	MR Credit: Purchasing – ongoing	MRc3: Sustainable purchasing – facility alterations and additions
Homes (H)	MR Credit: Environmentally preferable products	

Source: SFI Inc.

Figure 2:
Forest Certification Standards and Sourcing Categories as Defined by ASTM D7612-10 (2015)

PROGRAM NAME	LEGAL (NON-CONTROVERSIAL) COMPLIANT?	RESPONSIBLE SOURCES COMPLIANT?	CERTIFIED SOURCES COMPLIANT?
Sustainable Forestry Initiative (SFI)			
• Forest Management (via SFI CoC certificate or PEFC CoC certificate)	Yes	Yes	Yes
• SFI Fiber Sourcing certificate	Yes	Yes	No
American Tree Farm System (ATFS)			
• Forest Management (via SFI CoC certificate or PEFC CoC certificate)	Yes	Yes	Yes
Canadian Standards Association (CSA)			
• Forest Management (via SFI CoC certificate or PEFC CoC certificate)	Yes	Yes	Yes
Programme for the Endorsement of Forest Certification (PEFC)			
• Forest Management (via PEFC chain-of-custody certificate)	Yes	Yes	Yes
• PEFC Due Diligence System	Yes	No	No
Forest Stewardship Council (FSC)			
• Forest Management (via FSC chain-of-custody certificate)	Yes	Yes	Yes
• FSC Controlled Wood certificate	Yes	No	No

Source: USGBC

Among these recognized standards is the Sustainable Forestry Initiative Inc. (SFI) program. SFI Inc. is an independent, nonprofit organization that is solely responsible for maintaining, overseeing, and improving the internationally-recognized SFI program. SFI works at the intersection of sustainable forests, thriving communities, and responsible procurement. SFI is governed by a three-chamber board of directors representing environmental, social, and economic sectors equally. SFI Program Participants are responsible for more than one quarter of the global supply of certified forests. SFI maintains and publishes a list of all companies that have received SFI certifications, including which certification, where to look for the label (e.g., on tags, stamps, wraps, inserts, etc.), and what types of products are certified (e.g., lumber, plywood, oriented strand board [OSB], specialty engineered products, paper products, etc.).

Wood and paper products from these program participants meet one of three SFI standards, which in turn meet the requirements set out in the new LEED ACP pilot. All three of these standards require independent audits by competent and accredited certification bodies.

SFI 2015–2019 Forest Management Standard, for managing forestlands, promotes sustainable forestry practices, including measures to protect water quality, biodiversity, wildlife habitat, species at risk, and forests with exceptional conservation value.

SFI 2015-2019 Fiber Sourcing Standard, for responsibly procuring fiber, distinguishes SFI from all other forest certification programs because it sets mandatory practice requirements for the responsible procurement of all fiber sourced directly from the forest, whether the forest is certified or not. This standard is for manufacturers that do not own forestland but procure fiber directly from the forest. These fiber-sourcing requirements include measures to broaden the practice of biodiversity, use forestry best management practices to protect water quality, provide outreach to landowners, and utilize the services of forest management and harvesting professionals.

SFI 2015-2019 Chain of Custody Standard, for tracking forest fiber content, is an accounting system that tracks forest fiber content (certified forest content, certified sourcing, and recycled content) through production and manufacturing to the end product. Companies can use chain-of-custody certification to track and communicate forest fiber content using one of three optional approaches: physical separation, average percentage, and the volume credit method.

In relation to the new ACP, forest products certified to the SFI Fiber Sourcing Standard count as legal and responsible, while forest products delivered through the SFI Chain of Custody certificate count as legal, responsible, and certified sources.

HOW TO COUNT CERTIFIED PRODUCTS FOR A LEED POINT

USGBC released LEED v4 in the summer of 2013, and it will eventually replace LEED 2009. However, builders, architects, and/or building operators can still submit projects under LEED 2009 if they register their projects by October 31, 2016. If the projects are registered on or before this date, the builders, architects, and/or building operators have until June 30, 2021 to complete their projects under LEED 2009. LEED v4 takes a more holistic approach than the LEED 2009 rating tool and focuses on all building materials to get a better understanding of the effect those materials have on the environment. Figures 3–5 highlight the various categories under the new ACP and what counts toward the credit. It's important to note that LEED v4 and LEED 2009 use different accounting methods, which are discussed in detail below.

Figure 3

LEED V4 CREDIT CALCULATIONS
CALCULATING IF THE WOOD PRODUCTS CAN COUNT TOWARDS THE SOURCING OF RAW MATERIAL CREDIT
(EXAMPLE FOR COMPARISON PURPOSES)

	PRODUCT TYPE	COST	SOURCING	LEGAL SOURCES (MUST BE 100%)	RESPONSIBLE SOURCES (MUST BE 70%)	CERTIFIED SOURCES (COC)
Product 1	Flooring	$1,500	SFI forest management via SFI Chain of Custody	$1,500	$1,500	$1,500
Product 2	Case Work	$900	SFI - fiber sourcing	$900	$900	$ -
Product 3	Windows	$25	ATFS forest management via SFI CoC or PEFC CoC	$25	$25	$25
Product 4	Furniture, fixtures and equipment (FF&E)	$250	CSA forest management via SFI CoC or PEFC CoC	$250	$250	$250
Product 5	FF&E	$100	PEFC forest management via PEFC CoC	$100	$100	$100
Product 6	FF&E	$100	PEFC - due diligence	$100	$ -	$ -
Product 7	Doors	$275	FSC forest management via FSC CoC	$275	$275	$275
Product 8	Structural lumber	$375	FSC - controlled wood	$375	$ -	$ -
Product 9	FF&E	$40	Not certified	$ -	$ -	$ -
Total		$3,565		$3,525 (99%)	$3,050 (86%)	$2,150

*CoC = Chain of Custody

VALUE OF ELIGIBLE "CERTIFIED" WOOD THAT CAN COUNT TOWARDS THE CREDIT

LEED V4 CREDIT CALCULATIONS
CALCULATING THE SOURCING OF RAW MATERIAL CREDIT
(EXAMPLE FOR COMPARISON PURPOSES)

Total value of all permanently installed building products (wood, concrete and steel)	$10,000
Value of non-wood products (concrete and steel) that meet the responsible extraction criteria	$1,500
Value of eligible "certified" wood products that meet the responsible extraction criteria	$2,150
Total value of all eligible products that meet the responsible extraction criteria	$3,650
% value of all eligible products that meet the responsible extraction criteria vs total value of permanently installed building products.	36.5% (meets the 25% test)
Point Achieved under LEED v4 "Sourcing of Raw Material" credit	1

Source: SFI Inc.

To help with determining if a product meets the new ACP, USGBC has published a credit calculator (www.usgbc.org/resources/legal-wood-pilot-acp-calculator) that shows what forest certification standards count toward the various categories as defined by ASTM D7612-10 (2015).

Continues at ce.architecturalrecord.com

Diamond Foods Innovation Center
Location: Salem, Oregon
Architect: ZGF Architects
Engineer: KPFF Structural Engineers

Photo: Eckert & Eckert

Opportunities For Wood in Low-Rise Commercial Buildings

A versatile and economical approach to large openings, tall walls, and open floor plans

Sponsored by reThink Wood | *By Scott Breneman, PhD, SE, PE, WoodWorks*

When designing restaurants, stores, and low-rise offices, certain features come to mind as typical. These buildings tend to have large openings that allow plenty of daylight. Many have high ceilings and (by extension) tall walls, open floor plans, and the ability to reconfigure the interior as tenant needs change. They often include irregular shapes, such as architectural features that make a chain restaurant instantly recognizable in a row of strip mall stores. Many also have flat roofs and parapets that hide rooftop mechanical units.

What doesn't always come to mind is the fact that wood construction has the flexibility to meet all of these needs; that wood can achieve the structural performance and quality objectives of even a large 'big box' store, cost-effectively, while providing a host of other advantages.

This course is intended for building designers who want to learn more about the use of wood framing systems in low-rise commercial projects. For many, the motivation will be cost. As this course illustrates, wood structures can cost significantly less than comparable buildings made from other materials. Others are attracted to the idea of wood's versatility, ease of use, and adaptability, while others still appreciate its renewability, sustainability, and light carbon footprint. Depending on the application, aesthetics and the growing body of research supporting wood's biophilic qualities—i.e., the positive impact that exposed wood can have on a building's occupants—may be the biggest driver for its use.

Intended to provide practical information that can be applied to projects, the course begins with code-related topics, including cost implications of construction type, opportunities for achieving unlimited area, and implications of multi-tenant occupancies. It provides an overview of wood wall and roof systems commonly used in commercial buildings, and highlights key design considerations. Examples

CONTINUING EDUCATION

1 AIA LU/HSW

1 GBCI CE HOUR

Learning Objectives
After reading this article, you should be able to:

1. Explain how wood-frame systems can be used to achieve design objectives commonly associated with commercial structures, such as tall walls, flat roofs, parapets, and open-front floor plans.
2. Identify cost savings associated with Construction Types III and V compared to Types I and II, per the International Code Council's Building Valuation Data.
3. Discuss opportunities for achieving unlimited area for wood-frame commercial buildings under the International Building Code and implications of multi-tenant occupancies.
4. Review applications of wood-frame construction in low-rise commercial buildings, with an emphasis on restaurant, retail, and office occupancies.

To receive AIA credit, you are required to read the entire article and pass the test. Go to **ce.architecturalrecord.com** for complete text and to take the test for free. This course may also qualify for one Professional Development Hour (PDH). Most states now accept AIA credits for engineers' requirements. Check your state licensing board for all laws, rules, and regulations to confirm.

AIA COURSE #K1607G
GBCI COURSE #0920008844

of wood-frame buildings are highlighted, and a recent cost and environmental comparison of a big box store designed in wood versus steel is summarized. Code references refer to the 2015 International Building Code (IBC) unless otherwise noted.

CONSTRUCTION TYPE AND COST

Under the IBC, most low-rise commercial buildings fall under one of the following occupancy groups:

- Assembly (Group A-2): Nightclubs, restaurants, taverns, bars
- Business (Group B): Banks, barber and beauty shops, dry cleaning and laundries, professional services
- Mercantile (Group M): Department stores, drug stores, markets, motor fuel-dispensing facilities, retail or wholesale stores, sales rooms

For these (and other) occupancy groups, structural wood framing is permitted in Construction Types IIIA, IIIB, IV, VA, and VB. The IBC specifies allowable height and area for each, and each has different requirements, largely related to fire protection. As shown in Figures 1–3, which highlight information from the International Code Council (ICC) Building Valuation Data, August 2015, the average cost for each construction type also varies widely.

Figure 2 highlights the difference in cost between two construction types commonly used for low-rise commercial buildings—Type IIA, which doesn't allow structural wood framing, and Type IIIA, which is typically wood-frame. Both have similar allowable heights and building limitations, but the average Type IIIA building costs $16 to $22 per square foot less.

In Figure 3, Type IIB Construction is compared to Type VA—also commonly wood-frame—and shows an even larger savings of $24 or more per square foot for the wood building. Allowable heights and areas remain similar, with exceptions that include greater height for Type VA Assembly and Mercantile occupancies, and greater height for Type IIB Education and Business occupancies.

HEIGHTS AND AREAS

One of the changes in the 2015 IBC compared to the 2012 version is a restructuring of the section on heights and areas. The equations are simpler, but there are more of them, along with more tables that are also larger and more complex. Among the specific changes there are separate tables for allowable heights (IBC Table 504.3) and allowable stories (IBC Table 504.4), with results based on occupancy classification, construction type, and whether the project is sprinklered.

Although Types IV and V may be more appropriate depending on the objectives of a project, architects interested in choosing wood structures should be aware that almost any

Photos: MBH Architects

YARD HOUSE BAR & GRILL

Location: Chino Hills, California
Architect: MBH Architects
Engineer: Goodson Engineering

For this 6,500-square-foot restaurant, wood was used to span the dining room and create a cantilever over the outdoor patio. The trusses were left exposed, and redwood planking was used to cover the interior of the vaulted ceiling. Other wood products include dimension lumber stud framing for exterior walls, architectural grade Douglas-fir glulam beams, solid Douglas-fir posts (vertical truss posts), wood I-joists, plywood sheathing, cabinet-grade plywood (maple veneer), solid maple hardwood, and butcher block maple.

Figure 1

	CONSTRUCTION TYPE								
Occupancy Group	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
A-2 Assembly	177	172	166	160	150	147	155	136	132
B Business	182	176	170	162	148	142	155	129	124
M Mercantile	132	128	122	116	106	103	111	92	88

Published $/Square Foot of Building Area

Structural Wood Framing Allowed

Figure 2

	CONSTRUCTION TYPE		
Occupancy Group	IIA	IIIA	Difference
A-2 Assembly	166	150	$16/sf
B Business	170	148	$22/sf
M Mercantile	122	106	$16/sf

Published $/Square Foot of Building Area

Figure 3

	CONSTRUCTION TYPE		
Occupancy Group	IIB	VA	Difference
A-2 Assembly	160	136	$24/sf
B Business	162	129	$33/sf
M Mercantile	116	92	$24/sf

Published $/Square Foot of Building Area

Source: ICC Building Valuation Data, August 2015

low-rise commercial building can be designed in wood using the Type III designation. For common low-rise commercial and mixed-use occupancies (Assembly, Mercantile, Business, and Residential), Type II and Type III Construction in IBC 2012 and 2015 have equal building height and story limits.

Opportunities for Unlimited Area

To determine allowable height and area, many designers look to the IBC tables covering occupancy versus construction type (IBC Table 506.2) and use the equations to determine the tabulated limits for their buildings. Sometimes overlooked is the fact that commercial projects of Type III, IV, and V Construction—including Assembly, Education, Business, Factory, Mercantile, and Storage Occupancies—may qualify for unlimited area in IBC Section 507. This is because of the open space that often surrounds commercial projects, such as parking lots and major roadways, which, in addition to sprinkler protection, increases safety by providing fire-fighting access to multiple sides of the building.

The typical baseline requirement is 60 feet or more of open space on all four sides. However, a project may still qualify for unlimited area if a portion of the building has as little as 40 feet of open space—if the exterior walls and openings on the side with the reduced frontage have a 3-hour fire-resistance rating.

Where a project includes multiple buildings that are less than 40 feet apart—such as a group of offices or retail stores—the IBC allows them to be considered as a single building for the purpose of determining whether unlimited area applies, providing they have 60 feet of open space around them, and provided they would all otherwise qualify for unlimited area.

Two-story buildings of Business, Factory, Mercantile, and Storage occupancies of any construction type can have unlimited area providing they have the required surrounding open space and are equipped with a National Fire Protection Association (NFPA) 13-compliant automatic sprinkler system (IBC Section 507.5). Additional allowances for Assembly occupancies related to unlimited area building can be found in IBC Sections 507.4 and 507.7.

Multi-Tenant Buildings

For commercial buildings, determining allowable height and area typically includes considerations related to multiple tenants or occupancies. For example:

- Incidental uses (IBC Section 509) are those that pose greater risk of fire than the main occupancy, such as machine rooms, laundry rooms, and mechanical equipment rooms. Providing they comprise no more than 10 percent of the area of the given story and have the required fire separation, smoke separation, and/or NFPA 13-compliant automatic sprinkler systems, they are not classified as a separate occupancy for the purpose of determining allowable building height and area.
- Accessory occupancies (IBC Section 508.2) don't pose the same level of risk as an incidental occupancy and therefore do not have the same dedicated passive or active fire safety requirements. To quality as an accessory occupancy, the area must comprise less than 10 percent of the story area and the IBC 506 "NS" allowable limit value. For commercial buildings, no separation is required between the accessory occupancy and the main occupancy, and only the main occupancy needs to be considered when calculating height and area. Examples include storage in an office or kitchen in a community space.
- Nonseparated occupancies (IBC Section 508.3) have another level of restriction in terms of fire protection systems (IBC Chapter 9) and allowable height and area, as well as other requirements based on the most restrictive occupancy of the mix. However, the advantage is that they don't require specified fire-rated assemblies between occupancies. An example would be the same office/storage scenario, but where the storage comprises more than 10 percent of story area. To check the allowable heights and areas of nonseparated occupancies, the nonseparated occupancies should be checked as if the

Photos: Eckert & Eckert

DIAMOND FOODS INNOVATION CENTER

Location: Salem, Oregon
Architect: ZGF Architects
Engineer: KPFF Structural Engineers

Designed to complement and expand an existing warehouse and shipping facility, this 7,350-square-foot office includes a partial second story and multiple double-height spaces. Walls are traditional wood-frame construction using 2-by-4 and 2-by-6 dimension lumber; the truss roof includes glulam and exposed structural tongue and groove decking; and the floors are comprised of wood I-joists with glulam in select areas. The facade is an innovative combination of Douglas-fir wood siding and heat-treated pine.

entire area consists of each of the contained occupancies, with the most stringent check governing the allowable height and area of the nonseparated occupancies.

- Separated occupancies (IBC Section 508.4), as the name suggests, require fire-rated assemblies between occupancies. This separation allows for larger allowable areas than nonseparated occupancies, while allowable height is based on occupancy—i.e., the IBC allows a specific elevation or number of stories for each occupancy group. Because of this, an architect may be required to put certain occupancies on lower versus higher floors.

A good resource for height and area analysis is the *2015 Code Conforming Wood Design*, a joint publication of the ICC and American Wood Council (AWC), available at www.awc.org. WoodWorks also offers a free downloadable Heights and Areas Calculator, available at www.woodworks.org, which reviews and analyzes building height and area compliance with the 2012 IBC for buildings up to six stories, with up to four occupancy groups at each level. As 2015 IBC allowable height and area limits are almost identical to the 2012 IBC limitations, this calculator offers a quick way to estimate the 2015 limitations for mixed-occupancy buildings.

Fire Resistance and Detailing

Types I, II, III, and V Construction are further subdivided into two categories (IA and IB, IIA and IIB, IIIA and IIIB, and VA and VB) with the difference being the degree of fire resistance required for various building elements and assemblies. For example, in Type VA Construction, all interior and exterior load-bearing walls, floors, roofs and structural members are required to have a minimum 1-hour fire-resistance rating. In Type VB Construction, no fire-resistance rating is required.

While a detailed discussion of fire resistance is beyond the scope of this course, there are many sources for tested fire-rated assemblies. Fire-rated wood-frame assemblies can be found in publications such as:

- Underwriters Laboratories' (UL) *Fire Resistance Directory*
- Intertek Testing Services' *Directory of Listed Products*
- Gypsum Association's *Fire Resistance Design Manual*

Fire-rated assemblies may also be selected from one of the prescriptive assemblies provided in IBC Section 721, which are based on ASTM E 119 or UL 263 test results, by calculating an assembly's fire resistance using IBC Section 722 or by other methods indicated in Section 703.3 of the code. The AWC publication, *Design for Code Acceptance (DCA) 3 – Fire-Rated Wood Floor and Wall Assemblies*, also contains fire ratings of wood-frame wall and floor/ceiling/roof assemblies and is available free at www.awc.org/codes/dcaindex.html. For an overview of fire protection in wood buildings, the CEU, *Designing for Fire Protection*, is available at www.reThinkWood.com.

WOOD BUILDING SYSTEMS

Building designers interested in using wood for commercial projects have a variety of options, from exposed mass timber systems using innovative products such as cross-laminated timber (CLT), nail-laminated timber (NLT), and glued-laminated timber (glulam), to traditional dimension lumber framing that can be used to economically and effectively meet the objectives of almost any low-rise commercial project.

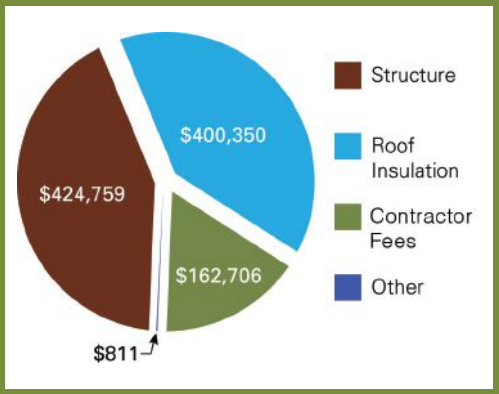
Wall Framing

Options for wall framing include solid sawn and finger-jointed dimension lumber, glulam framing, and structural composite lumber (SCL) products.

Ceiling height is the primary driver of wall height, and it is common for commercial spaces to have ceiling heights of 12 feet or higher. Solid sawn dimension lumber, ranging in size from 2-by-4 to 2-by-12, is commonly used

BIG BOX RETAIL: WOOD SAVES NEARLY $1 MILLION

Cost and environmental studies compare wood to steel



To evaluate the opportunity for wood use in the commercial building subcategory known as big box retail, WoodWorks commissioned two studies—one cost comparison and one life-cycle assessment (LCA)—on the same big box project designed in steel versus wood.

Having received the drawings for a one-story, 54,800-square-foot steel-frame big box store in California, WoodWorks commissioned the design of a comparable building using wood materials. Both buildings are designed according to the 2010 California Building Code, which is based on the IBC. The two designs share the same geometry, structural layout, and column grid. They also have the same gross floor area, floor plan, and layout.

According to the cost comparison, the wood building design saved an estimated 22 percent, or $988,626, compared to the steel building design. The largest cost savings were associated with the structure and roof insulation. Structure cost savings associated with the wood design totaled approximately $425,000. In order of highest to lowest savings, they were concentrated in roof framing beams, roof decking, roof framing columns, primary roof framing such as trusses and joists, and wall framing. Savings associated with roof insulation represented the largest single element savings (more than $400,000) due to the cost difference between rigid insulation (steel design) and batt insulation (wood design).

The LCA study concluded that the impacts of the proposed wood building are lower than the steel building for all indicators except ozone depletion, where the proposed building results were 5 percent higher. Impacts were analyzed from raw materials through demolition/disposal and also with the additional stage of recovery/reuse/recycling. Highlights through demolition/disposal include:

- Global warming potential: Wood building saves 642 metric tonnes of carbon dioxide equivalent (CO_2e).
- Nonrenewable energy use: Wood building saves 9,116 gigajoules (GJ).
- Raw material supply and manufacturing: Wood building has an average of 30 percent less impact across all indicators.
- End-of-life transport: Wood building has 11 percent less impact across all indicators.

Adding the recovery/reuse/recycle stage had minor effects on the overall comparison between the wood and steel buildings. As with the analysis excluding this stage, the wood building outperforms the steel building overall and for all indicators except ozone depletion potential, where the proposed building results were slightly higher.

Detailed information on these studies is available in the WoodWorks report, which includes a section on opportunities for big box wood design.[1]

Photo: Russell Abraham Photography

BOUDIN SF

Location: Santa Rose, California
Architect: Hedgpeth Architects
Engineer: MKM & Associates

This 7,233-square-foot restaurant and coffee shop features a wide range of wood products. The roof is dimension lumber and Alaskan yellow cedar glulam; the walls are LVL, LSL, and PSL; and the exterior siding was milled from redwood members reclaimed from the site's previous building. Acoustical ceilings are made from Douglas-fir planks, spaced to allow sound to be absorbed by cavity insulation between the ceiling and roof.

for interior and exterior walls. For posts under concentrated load locations, 4-by and 6-by solid sawn lumber may be available depending on the region. Designers can also use multiple 2-by members nailed together to create larger composite members.

Again depending on the region, structural framing lumber is available in four main species groups: southern pine, Douglas-fir-larch, hem-fir, and spruce-pine-fir. Lumber in each of these groups can be made from a range of species as defined by the grading rules. Visually graded lumber is the most commonly used, with grades that include select structural, #1, #2, stud grade, etc. In some areas, machine-graded lumber may also be available, including machine stress rated (MSR) and mechanical evaluated lumber (MEL). Because product availability varies widely, designers are advised to consult with local distributors and industry experts to determine which products are most appropriate for specific applications.

Related to dimension stud lumber is finger-jointed lumber (referred to as 'end-jointed' lumber in the IBC), which is comprised of shorter sections of wood glued together into longer members. Per IBC Section 2303.1.1, if approved for the building application, properly graded and stamped finger-jointed lumber can be used interchangeably with the same grade and species of solid sawn lumber. Some finger-jointed lumber is labeled as "vertical use only" or "stud use only." This lumber is not appropriate for nonvertical uses, such as headers, beams, joists, or anywhere sustained bending or tension loads are expected. For fire-rated assemblies, finger-jointed lumber must be stamped "HRA" to indicate that a heat-resistant adhesive was used in its manufacture.

Glulam framing is manufactured using small pieces of lumber that are glued together to make significantly larger beam and column elements. Glulam beams are manufactured in a variety of sizes, with custom products greater than 4 feet deep and 100 feet long available.

SCL is made from a variety of wood fiber products smaller than dimension lumber, such as veneers, and strands. This category of products includes laminated veneer lumber (LVL), laminated strand lumber (LSL), parallel strand lumber (PSL), and oriented strand lumber (OSL). These products are often used for floor beams under heavy loads and as studs in tall walls (see section below).

Manufacturers offer some glulam and SCL products specifically sized for wall applications. They can also be used for headers, heavily loaded trimmers and jacks, and sometimes posts (though solid sawn is more frequently used for this application).

While detailed structural design is beyond the scope of this course, it is valuable to know the high-level approaches to structural code compliance in framing design—i.e., prescriptive versus engineered.

With prescriptive framing design, applications suitable for each framing approach are defined and the calculation of loads onto framing members is not utilized. Prescriptive approaches applicable to some commercial buildings can be found in IBC Chapter 23 (conventional construction), and portions of the Wood Frame Construction Manual (WFCM), a referenced standard published by AWC. In both cases, the scope of the prescriptive approach is limited to 40 pounds per square foot (psf) live load on wood floors, which limits their use to commercial occupancies on the ground floor.

With an engineered approach, the wood framing system is designed to handle code-required minimum loads as defined by the IBC and referenced standards, with loading often calculated using ASCE 7-10: Minimum Design Loads for Buildings and Other Structures, and wood framing commonly designed in accordance with AWC's National Design Specification (NDS) for Wood Construction, and Special Design Provisions for Wind and Seismic (SDPWS). The WFCM also provides an engineering approach to wood framing components.

Tall Wall Design

Although defined as 'low-rise,' many commercial structures require 'tall walls'—20 feet and taller—to achieve desired interior heights. Wood is both appropriate and effective in these applications.

Wood-frame tall walls offer the same benefits as other wood stud walls:

- They're able to resist snow loads on the roof and wind loads on the wall, without requiring an additional load-bearing frame.
- When wood sheathing is added to studs, the wall is effective at resisting the lateral racking loads caused by high wind and seismic events.
- They can be easily insulated to provide excellent thermal resistance.
- They can be finished with a wide range of finishing materials.
- And they can be easily modified to adapt to changing tenant/owner needs.

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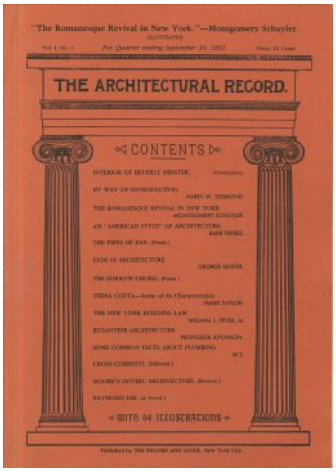

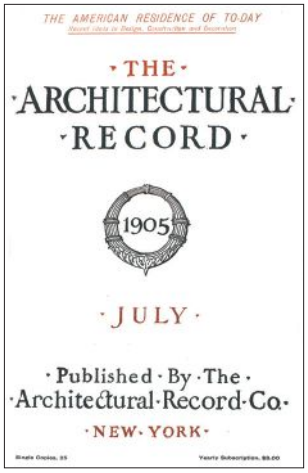

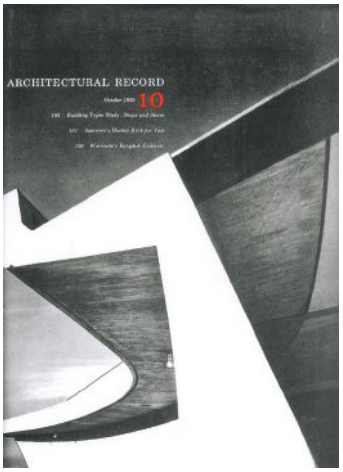

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Ⓡ Regional AD

New and Upcoming Exhibitions

Folly 2016: Sticks
New York City
July 9–December 31, 2016
Sticks, a work by Josh de Sousa and Nancy Hou of Hou de Sousa (who were selected as winners of the annual Folly architecture competition by Socrates Sculpture Park and the Architectural League of New York), will provide a hub for Socrates Sculpture Park's Education Studio. The architects are reusing existing resources, including scrap materials stored on-site, to build *Sticks*—a design choice central to the sustainable mission of Socrates Sculpture Park. For more information, visit socratessculpturepark.org.

Ongoing Exhibitions

Architects Drawings
Washington, D.C.
Through July 30, 2016
Architects Mark McInturff, FAIA, and Dhiru Thadani cocurate *Architects Drawings*, an exhibition that celebrates drawings and sketches made by hand rather than being digitally created and manipulated. Drawings and prints include the work of Richard Meier, Rob Krier, Rodolfo Machado, Tom Kundig, Rand Elliott, Ray Gindroz, Deborah Berke, Tony Ames, and Andrea Ponsi. At Cross MacKenzie Gallery, in partnership with the National Building Museum. For hours and information, visit crossmackenzie.com.

Extraordinary Playscapes
Boston
Through September 5, 2016
Curated by Design Museum Foundation, *Extraordinary Playscapes* explores contemporary playground design and makes a case for the importance of free play to healthy child development, thriving communities, and social equity. The exhibition features a project that reimagined a defunct ambulance as a children's playground at a hospital in Malawi, and examples of Danish designs that integrate nature and play, in addition to innovative play-centered design closer to home, on the Boston waterfront. *Extraordinary Playscapes* includes interactive installations, videos, scale models, and hands-on elements for visitors to explore the art, history, and science behind play. For more information, visit architects.org.

Roberto Burle Marx: Brazilian Modernist
New York City
Through September 18, 2016
The Brazilian artist and landscape architect Roberto Burle Marx (1909–94) undertook projects ranging from the mosaic pavements on the seaside avenue of Rio de Janeiro's Copacabana Beach to the multitude of gardens that embellish Brasilia (one of several large-scale projects he executed in collaboration with famed architect Oscar Niemeyer). This exhibition at the Jewish Museum explores the richness and breadth of the artist's practice—from landscape architecture to painting, from sculpture to theater design, and from tapestries to jewelry. Visit thejewishmuseum.org

Atmosphere for Enjoyment
New York City
Through September 25, 2016
Artist Harry Bertoia might fairly be called the maestro of the metal rod. Best known for his wire-mesh Diamond chair, he discovered in the 1960s that when metal rods are struck against each other, they create a lush, resonant sound. Bertoia then began exploring the potential relationship between sculpture and sound, eventually creating a significant oeuvre that would crown his life's work. Referred to collectively as Sonambients, these sculptures are interactive, kinetic, and audible forms composed of bundled metal rods that collide and set off radiant tones. *Atmosphere for Enjoyment*, at the Museum of Arts and Design, explores the Sonambients, their installation in Bertoia's stone barn, and their legacy as sound art. For more information, visit madmuseum.org.

15th International Architecture Exhibition: Reporting from the Front
Venice
Through November 27, 2016
Taking place in the Giardini and the Arsenale and in various other venues in Venice, this annual exhibition features success stories in which architecture made and will continue to make a difference in expanding what's possible. Designed to appeal to a broad audience, *Reporting from the Front* explores what it is like to improve quality of life while working within the margins, under tough circumstances, and facing pressing challenges. It asks, "What does it take to be on the cutting edge and trying to conquer new fields?" in a collective effort to better the built environment. For more information, visit labiennale.org.

Lectures, Conferences, and Symposia

International Bauhaus Colloquium
Weimar, Germany
October 26–29, 2016
The 13th International Bauhaus Colloquium at the Bauhaus-Universität Weimar is entitled *Dust and*

dates&events

Data. It will reflect on the almost 100-year history of the Bauhaus at its original sites in Germany—Weimar, Dessau, and Berlin—as well as the history of its international reception and migration. Because the conference is intended as a historiographical laboratory of sorts and a barometer of shifting political landscapes, the 2016 iteration will celebrate this legacy by examining both architectural history and methods in order to address contemporary political transformations. For more information, visit bauhauskolloquium.de.

Competitions

AIANY COTE Awards 2016
Entry deadline: August 12, 2016
Established in 2014 by the New York chapter of the AIA's Committee on the Environment, this awards program recognizes results-oriented projects that are socially and environmentally responsible, promote sustainable design in the urban context, and reveal the process behind innovation. Apply now at aianycoteawards.org.

Young Talent Architecture Award 2016
Entrant-specific deadlines of July 15, 2016, and August 31, 2016
The Young Talent Architecture Award (YTAA) aims to support the talent of the recently graduated architects, urban planners, and landscape architects who will be responsible for transforming our environment in the future. YTAA emerged from curiosity about, and interest in, the initial stages in these students' development and a desire to support their talent as they enter the professional world. Visit ytaaward.com to register and apply.

Rose Architectural Fellowship 2017–19
Entry deadline: July 10, 2016
Sponsored by Enterprise Community Partners, an affordable-housing and community development organization, the Enterprise Rose Architectural Fellowship partners early-career architectural designers with local community development organizations, where they can facilitate an inclusive approach to planning and building to create green, sustainable, and affordable communities. For the 2017–19 cycle, fellows will be hosted in Baltimore, Boston, Nashville, New Orleans, Philadelphia, or Oregon. Apply at rosefellowship.org.

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2016 CALL FOR ENTRIES Design Vanguard

The editors of ARCHITECTURAL RECORD are looking for the best emerging architecture firms from around the world to feature in our **2016 Design Vanguard** issue. Although we do not have an age limit, we try to select architects and designers who have had their own practices for less than 10 years. Winners will be featured in the December 2016 issue.

There is no fee to enter. For full details and to submit your entry, visit: designvanguard.architecturalrecord.com.

Submissions are due September 2, 2016.

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POSITION VACANT

Architectural Designer (Queens, NY)

Research, plan, design, render and draft building projects. Req.: Master in Architecture or relevant major, 1+year experience, proficient in Revit, CAD, Rhino and Adobe Series.
Mail resume & portfolio to:

Di Domenico + Partners, LLP
3743 Crescent Street, 3rd Floor
Long Island City, NY 11101

CIRCLE 15

2016 CALL FOR ENTRIES Record Products

The editors of ARCHITECTURAL RECORD are currently accepting submissions for the **2016 Record Products** competition. Manufacturers and designers may submit items introduced in the U.S. between September 2015 and September 2016. A panel of architects and specifiers will judge the entries on criteria including innovation, functionality, and aesthetics. Winning products will be featured in the December 2016 issue.

The fee is US$25 per entry. For full details and to submit your entry, visit: recordproducts.architecturalrecord.com.

Submissions are due September 2, 2016.

snapshot

PROJECT SULWHASOO FLAGSHIP STORE
LOCATION SEOUL
ARCHITECT NERI&HU DESIGN AND RESEARCH OFFICE

PHOTOGRAPHY: © PEDRO PEGENAUTE

INSPIRED BY glowing lanterns, Shanghai-based Neri&Hu has transformed an existing five-story building by Seoul-based architecture and planning firm IROJE into the flagship store for Korean skincare brand Sulwhasoo. Located in the fashionable Gangnam District, the project is characterized by brass latticework that extends from the interior—where it shapes and envelops the different programmatic zones—to the facades and roof terrace. Inside, mirrored volumes reflect the golden grid, creating the feeling of an infinite structure throughout the retail area, spa, and offices. Beige terrazzo, gray brick, and wide timber floorboards add warmth to the space, which is illuminated by custom light fixtures installed amid the metallic framework.
—Miriam Sitz

SGA / IBI Group Architects in joint venture with Will Alsop
Cast node photograph: Dieter Janssen

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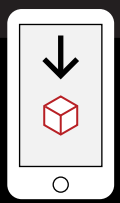

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