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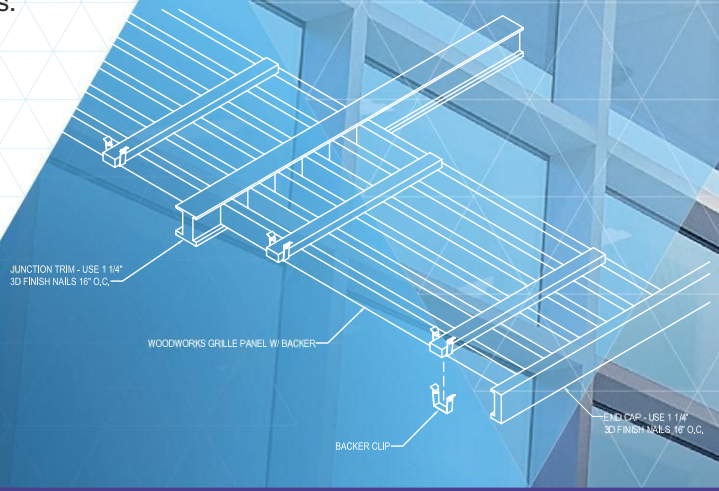

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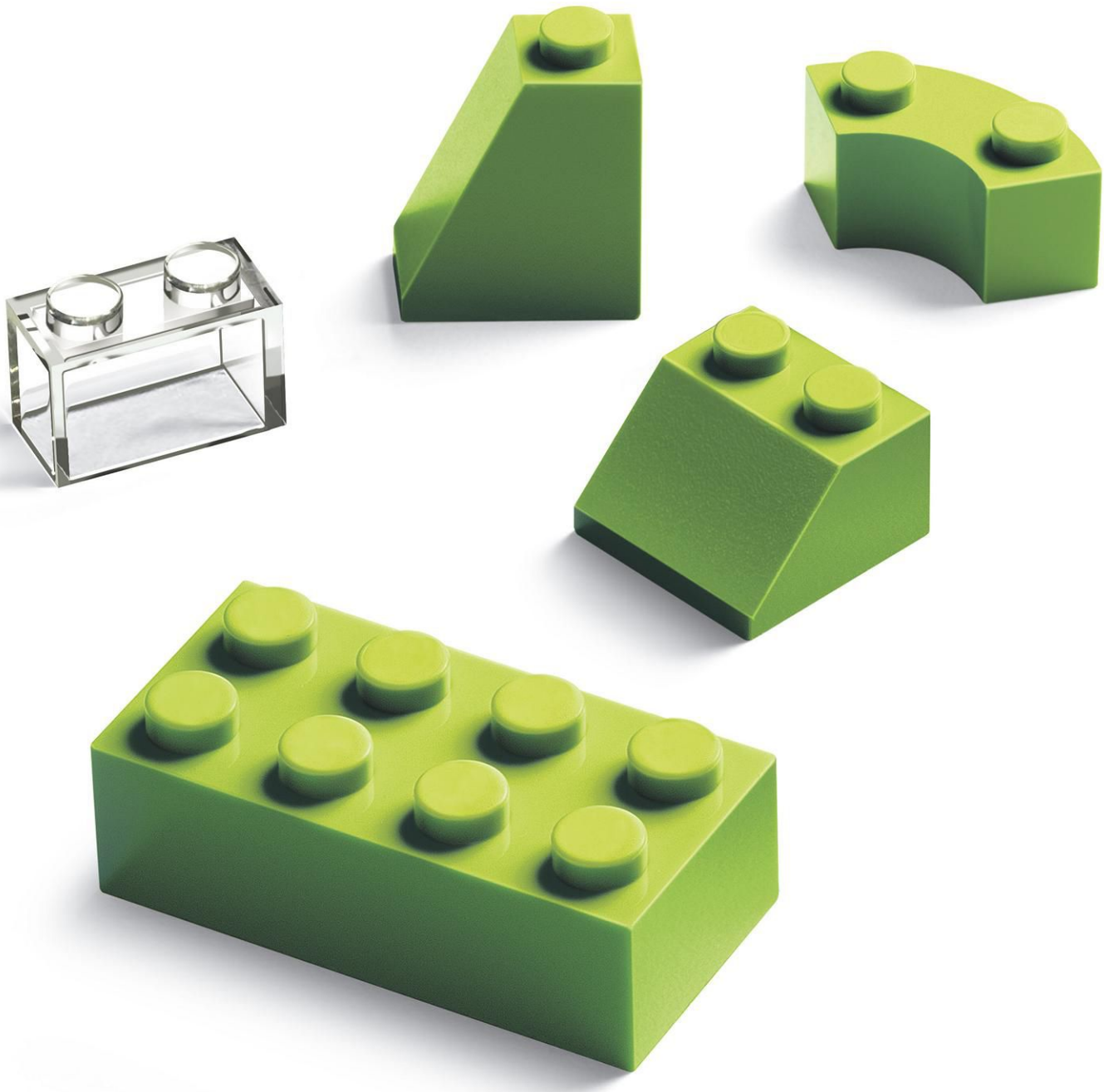

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Dens Element™ BARRIER SYSTEM
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Building a better wall at the University of Florida

How the University of Florida's O'Dome beat the buzzer

Faced with a countdown to basketball season and a LEED Gold requirement, project managers turned to an innovative new wall sheathing system.

UF also wanted to have the project certified as the first Leadership in Energy and Environmental Design (LEED V4 Gold) arena in the country.

Challenge

The Stephen C. O'Connell Center, commonly called the O'Dome, has been a vibrant part of campus life at the University of Florida (UF) since December 1980. It has hosted championship basketball games, sell-out concerts, joyous graduation ceremonies, and more than a few thrilling swimming, gymnastics, and volleyball competitions.

After more than three decades of intensive use, the O'Dome was showing its age. The UF administration approved a $64.5 million renovation that would add a dramatic two-story main entrance, a reconfigured arena, high-efficiency utilities, and new amenities for students, fans, alumni, and patrons.

Alternate Solutions

UF wanted the entire project completed with minimum downtime and ahead of the upcoming basketball season. UF also wanted to have the project certified as the first Leadership in Energy and Environmental Design (LEED V4 Gold) arena in the country.

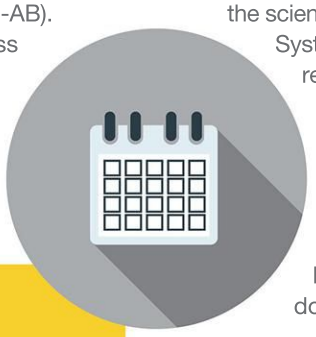
General contractor Brasfield & Gorrie decided a temporary wall would meet these requirements and it issued a request for proposals to install a 14,592 square-foot temporary wall using Georgia-Pacific DensGlass® Sheathing.

"It was a unique, atypical building," said Courtney Pittman, vice president and project manager for Davis Architects. "It was also an aggressive schedule with just eight months to do the majority of the construction work."

Mader Southeast, a Florida-based commercial construction company, won the contract and GP Gypsum field sales manager Alan Zeedyk contacted Mader Southeast senior project manager Jeff Henderson with a suggestion for delivering an even greater efficiency. "DensGlass® Sheathing is an outstanding product," Zeedyk said. "But with this extremely tight schedule, we thought Jeff might benefit from using our new DensElement™ Barrier System."

The DensElement™ Solution

The DensElement™ Barrier System offers an all-in-one water resistive barrier and air barrier (WRB-AB). Its new and technically improved fiberglass mat gypsum sheathing panel has an integrated layer of edge-to-edge material that provides water and air protection when finished with PROSOCO R-Guard® FastFlash® liquid flashing.



> "It was a unique, atypical building. It was also an aggressive schedule with just eight months to do the majority of the construction work."
>
> – Courtney Pittman, vice president, project manager, Davis Architects

GP developed the DensElement™ Barrier System to meet the demand for faster construction. It's a further evolution of DensGlass® Sheathing, which has been the industry's most architecturally specified fiberglass mat gypsum sheathing panel for more than three decades.

"It is such a resilient product that GP will warrant the DensElement™ Sheathing against deterioration or delamination for up to 12 months of exposure to normal weather conditions," said Barry Reid, the building envelope technical manager for GP Gypsum. The FastFlash® liquid flashing can also be applied even when the material is wet from rain or other condensation. These are important benefits for project owners who want to minimize delays and downtime and improve the bottom line.

GP offers a 5-year limited warranty for the DensElement™ Barrier System's performance as a WRB-AB with project registration in addition to the 12-month limited exposure warranty of the DensElement™ Sheathing*.

Performance Advantages

After further conversations with Zeedyk and studying the science behind the DensElement™ Barrier System, Henderson agreed it fit the O'Dome requirements and schedule.

"Brasfield & Gorrie had committed to finishing the project before basketball season," Henderson explained. "With this system, you put up the DensElement™ Sheathing, apply the FastFlash liquid flashing, and you're done. Fewer steps make it faster."

While there was little chance the temporary wall would leak during its approximately six-month service life, the 12-month limited warranty for exposure to normal weather conditions provided the other project participants with significant peace of mind.

"Florida has harsh weather," noted Henderson, "And the temporary wall was going to have a lot of exposure while the facility was still being used for activities. With the DensElement™ Barrier System, we were confident of keeping water out."

Fewer steps make it faster.

System Savings

The system's components eliminate the need for applying building wraps, thin or thick fluid-applied membranes, peel-and-stick membranes, or other additional WRB-AB layers.

"The DensElement™ Barrier System is a great system because it goes up quickly," Pittman said. "It suited our purposes perfectly, and we got great feedback from the installation contractor. I would certainly recommend it on future projects."

The O'Dome's renovation was completed on schedule, in time for UF's fall semester commencement in December 2016.

Visit DensElement.com

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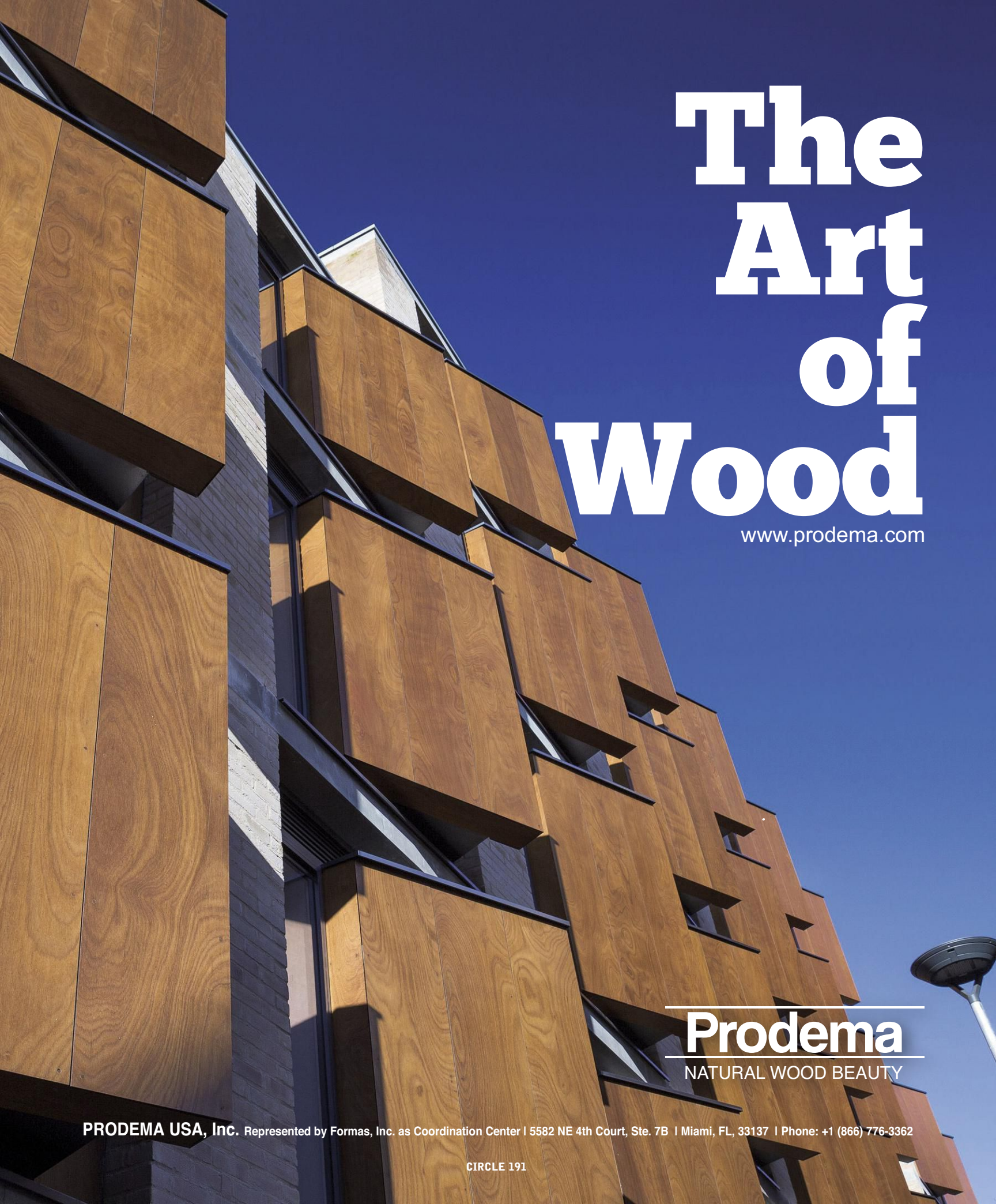

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NEWS

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PROJECT

BUILDING TYPE STUDY 982 TALL BUILDINGS

LIGHTING

THIS PAGE: POLY INTERNATIONAL PLAZA, BY SOM. PHOTO BY BRUCE DAMONTE.

COVER: 56 LEONARD STREET, BY HERZOG & DE MEURON. PHOTO BY ALEXANDER SEVERIN.

SEE ONLINE CONTENTS PAGE 16.

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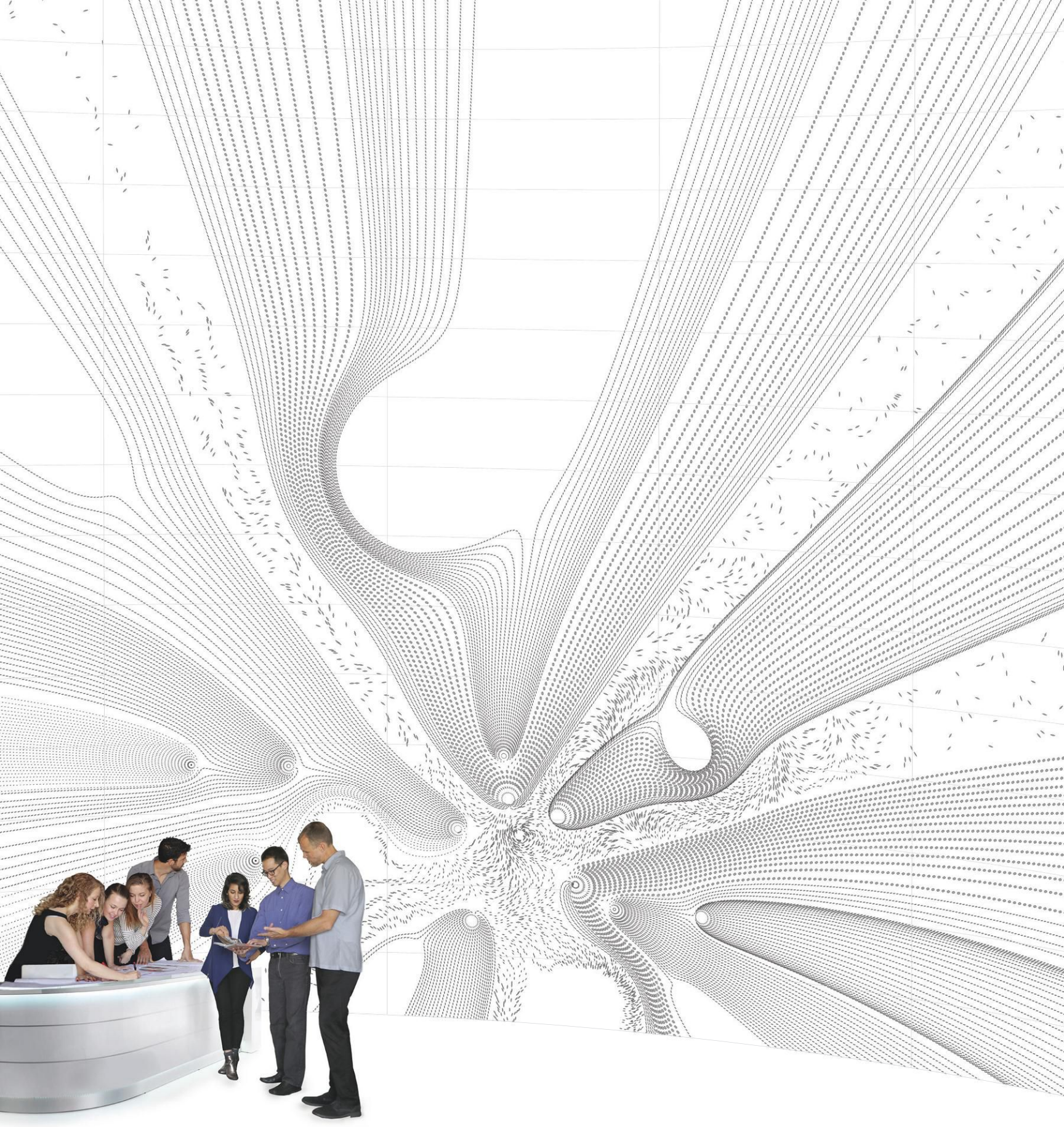

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SPOTLIGHT ON NEWS

AIA UPDATES
Catch up on our dispatches from the national AIA conference, which took place in Orlando at the end of April.

NEW EXHIBITION
Read about *The Oracle of Lacuna*, a new site-specific installation by Heather Hart, opening at Storm King Art Center in New York on May 13.

HIGHLIGHTS

RENOVATION VIDEO
Watch time-lapse videos of the Sculpture Gallery renovation at Philip Johnson's Glass House in New Canaan, Connecticut.

BORDER WALL RENDERINGS
See even more proposed designs for a wall along the U.S.-Mexico border.

CONSTRUCTION SHOTS
Click through the expanded slide show of up-and-coming tall-building projects to see the latest construction progress.

FEATURED HOUSES
Find photos, credits, and specifications for new residential projects in this monthly online feature.

OTRA NATION, A DESIGN FOR THE BORDER WALL BY MADE COLLECTIVE

HEATHER HART'S *THE ORACLE OF LACUNA* AT STORM KING

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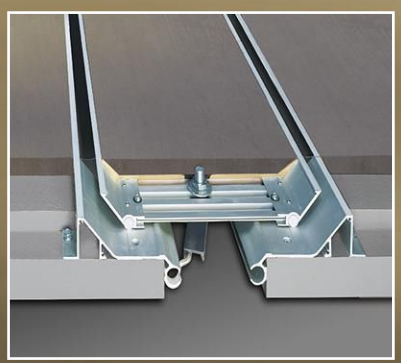

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High Times

Skyscrapers continue to capture the imagination of architects, who are finding more freedom to innovate and enliven the skylines of our cities.

LAST YEAR, more skyscrapers were completed around the world than ever: a total of 128 new buildings reached at least 200 meters (658 feet), according to the Council on Tall Buildings and Urban Habitat; of those, 10 were supertalls (984 feet or more). Not surprisingly, China held the record by a mile, with 84 new skyscrapers, while the United States came in second, with only seven.

Rapid urbanization and the increased densification of cities is pushing high-rise construction to new heights: there was a global grand total of 1,168 skyscrapers at the end of 2016, compared to only 265 in the year 2000—an amazing rate of growth that shows no signs of slowing down.

But when it comes to high-rises, height isn't everything. While the design of the Burj Khalifa (the world's tallest for now, but soon to be outstripped) is a play on a classic spire, architects are toying even more with form, sometimes abandoning the tower altogether. When Rem Koolhaas vowed to reinvent the skyscraper, he and his firm, OMA, helped start a trend, with their angled donut of a structure for CCTV in Beijing, completed in 2012. Around the same time, MZ Architects designed the Aldar headquarters in Abu Dhabi, a perfect circle in elevation, 361 feet tall, which opened in 2010. Other unconventional though not yet built ideas for high-rises include MAD's proposed Fake Hills Point Tower, part of the Fake Hills complex, in Beihei, China, a squiggle-like form 194 meters (636 feet) high; BIG's design for the Cross # Towers in Seoul, shaped like a hashtag; and Herzog & de Meuron's approved scheme for the 42-story Tour Triangle in Paris—it would be the third-highest structure in the city, with a shape that looks like a giant wedge of Camembert.

In this issue of RECORD, we explore formal invention in the design of tall buildings. "From a historical perspective, architects who built skyscrapers used to be a kind of corporate specialist who understood the bottom line. There just wasn't much license to innovate," says Carol Willis, founder and director of the Skyscraper Museum in New York. "But now that the commercial market has embraced architects as celebrities of sorts, there is more freedom to innovate."

For many corporate clients, the desire to stand out in increasingly dense cities is a strong motivator. In a new business district in Beijing, a developer wanted a singular centerpiece as a branding tool for an office complex, Poly International Plaza. SOM created a 529-foot high-rise with a dramatic exterior—a crisscrossing steel-and-concrete diagrid—called the Diamond Lantern (page 110).

In Istanbul, the client for the Maslak No. 1 Tower was looking for "an extravaganza" on a tight site surrounded by indifferent commercial buildings. Emre Arolat Architecture more than obliged with its design for a structure with a spatter-shaped plan and a sexy, undulating glass enclosure (page 98). Both the Istanbul and Beijing towers have double facades, with the space between the interior and exterior skins mitigating seasonal climate changes and urban noise.

PHOTOGRAPHY: © MICHEL ARNAUD

Kohn Pedersen Fox (KPF), veterans of the tall building type, have completed the first of 14 skyscrapers planned for Hudson Yards, the 28-acre development rising on the west side of Manhattan (page 116). The 900-foot tower will have a 1,300-foot-high companion, also by KPF, finishing in 2019. With their sloping facades and angled crowns leaning toward each other, the two towers will make a dynamic duo on the skyline.

An especially distinctive addition to the Manhattan cityscape is Herzog & de Meuron's first completed skyscraper, a 57-story residential tower. A layered confection of stacked, cantilevered boxes and jutting balconies, its design reflects the diverse layouts of the interior's 145 apartment units, resulting in the lively exterior visible from many parts of the city (page 92).

A new corporate headquarters in Indianapolis is less a showstopper on the skyline than an elegant addition to the urban context. In fact, Cummins Tower, by Deborah Berke Partners, is really a short high-rise, if that is not a contradiction in terms. At only nine stories, the first office building by the firm features narrow, cantilevered levels, whose arrangement was determined by sun and energy studies, to create workspaces on each floor with optimum daylight (page 104).

The skyscraper remains an aspiration for many architects—and opportunities for reinventing the form only make the challenges of designing the complex building type even more alluring.

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief

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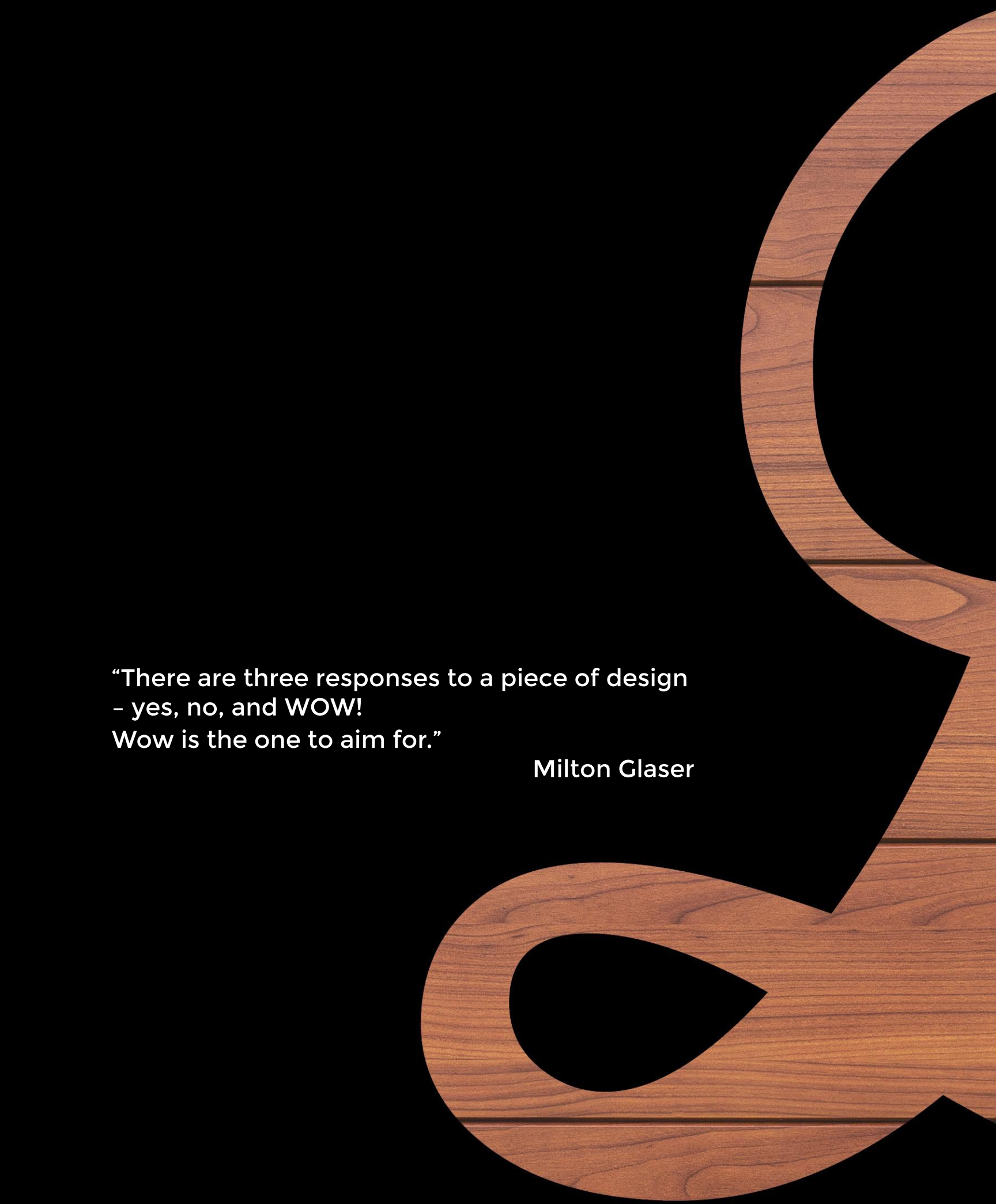

“There are three responses to a piece of design
– yes, no, and WOW!
Wow is the one to aim for.”

Milton Glaser

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perspective

Well, you know, everything has its ups and downs. —*HUD secretary Ben Carson, in an interview with Sirius XM after getting stuck in an elevator in an affordable-housing complex in Miami.*

LACMA Unveils Latest Zumthor Scheme

BY SARAH AMELAR

SOON AFTER Michael Govan became director of the Los Angeles County Museum of Art (LACMA) in 2006, he called Swiss architect Peter Zumthor to begin reimagining the museum's campus, with its awkward collection of buildings of various vintages (now seven in all). The exploration began in earnest in 2008, but the museum didn't present a scheme publicly until 2013. The institution has since unveiled four more iterations—most recently on April 5, when Govan hosted an onstage discussion with the architect. Less than two months earlier, during a talk at New York's Solomon R. Guggenheim Museum, Zumthor had hinted about significant design changes, and by April, a packed house at LACMA's Bing Theater awaited the latest revelations.

The initial design, in 2013, proposed a black, amoeboid building, hovering (with supporting vertical elements) above the ground. It evoked the dark, oily character of the adjacent La Brea Tar Pits, an archeological site and museum with prehistoric remains. Zumthor's 387,500-square-foot structure was designed to replace four existing buildings: LACMA's three original 1965 pavilions, by William Pereira, plus a 1986 addition by Hardy Holzman Pfeiffer Associates. (The museum says two estimates placed the cost of seismic and safety upgrades for those buildings at $300 million.)

Critics and skeptical locals soon nicknamed Zumthor's flat, curvy-edged project "the pancake," "the blob," or "the inkblot." And there was a major glitch: the siting threatened the protected tar pits. To address that issue without losing square footage or galleries all on one floor—a priority for Govan—each subsequent scheme has bridged Wilshire Boulevard to a LACMA-owned parcel across the street. "We called [the original scheme] 'the black flower,'" Zumthor explained from the Bing stage. "But then came the moment when we, more or less, had to cross Wilshire, and then [Michael] said, 'You understand, an organic form cannot cross Wilshire Boulevard.' So it had to develop urban energy." Harder-edged versions followed, ultimately taking on a quirky S-configuration. But spanning a grand thoroughfare like Wilshire is controversial—particularly with forms resembling freeway overpasses.

And the newly unveiled version risks reinforcing that analogy with its striking muscularity and sand-colored concrete. While this $650 million scheme—for which, the museum says, it's already secured commitments exceeding $300 million—doesn't break radically from the previous iteration, its significant changes include greater definition of indoor spaces.

Now the exterior and interior surfaces are all exposed concrete: "real, elemental materials, not sheetrock," said Zumthor. The main gallery level floats 20 to 30 feet above the ground, sandwiched between two massive horizontal plates: the floor plane and a deeply overhanging flat roof. Seven vertical elements—containing galleries and, at grade, a restaurant and other amenities—hold it all up.

Certain ideas have run through every iteration: the flow of a parklike ground plane beneath the building; continuous floor-to-ceiling perimeter windows; and an overall form that bends and looks back on itself and out to the city. "You always know where you are," said Govan. Also, the project has from the start eschewed a traditional front or back (a formality that tends to relegate some artworks to lesser, rear positions). Similarly nonhierarchical, "the circulation should be like a city or park," said Zumthor, "offering free choice and a sense of discovery, not a fixed path."

In the variety of spaces, interior scales, and daylighting conditions, the new scheme goes well beyond its predecessors, creating four types of art venues: "meander" galleries, doubling as circulation zones, along the side-lit periphery; intimate cul-de-sac "pocket galleries"; "cluster galleries" toward the interior; and, within the vertical shafts, high-ceilinged, clerestory-lit "tower galleries"—together accommodating LACMA's encyclopedic range of objects. ■

Peter Zumthor's latest design for LACMA still bridges Wilshire Boulevard (above) but has concrete surfaces and a greater variety of interior art and amenity spaces (top).

IMAGES: COURTESY ATELIER PETER ZUMTHOR (2)

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Long Road for NYC Public Projects

BY HEATHER CORCORAN

IT'S A COMPLAINT so common that it's nearly a cliché: working with the government can entail frustrating layers of bureaucracy and maddening delays. Now a new report released by the Center for an Urban Future (CUF) and Citizens Budget Commission (CBC) has revealed that even small-scale renovation projects at New York's city-backed libraries and cultural institutions take longer and cost more than comparable projects managed by other organizations.

Slow Build, a 36-page report based on a year-long study of 144 projects completed between 2010 and 2014, found that even small upgrades and renovations can languish for years while the median costs for new construction projects in the group were $930 per square foot—significantly higher than five-star hotels and roughly twice as much as the average office-construction project.

The study was based on information provided by the city's Department of Design and Construction (DDC), which oversees maintenance and construction of public projects. The research began after an earlier study by CUF identified libraries as a key generator of opportunity within communities, but found that the average branch library was more than 60 years old, and dozens of branches had maintenance needs of $5 million or more.

Steven Holl Architects' Hunters Point Community Library, commissioned by New York's DDC, has been in development since 2010.

PHOTOGRAPHY: © STEVEN HOLL ARCHITECTS

Using a mix of project data and interviews with people working in the system, CUF and CBC came up with a number of suggestions for improving the process, including a cutback on one of the key causes of delays: the many Office of Management and Budget department reviews triggered by change orders.

For their part, DDC notes that the study looks at projects undertaken during the previous mayoral administration and that a number of steps have been implemented to streamline the process, trimming the procurement cycle by 25 percent and cutting the design phase by 50 percent. To further cut down on delays, the agency also advocates for the city to follow the state's lead and implement a design/build approach.

But CUF says more can still be done to limit the impact of drawn-out projects on local communities. Says CUF executive director Jonathan Bowles, "There are very limited dollars out there to invest [in library and cultural projects] and we want to make sure that those dollars get stretched as much as possible—and that's not happening." ■

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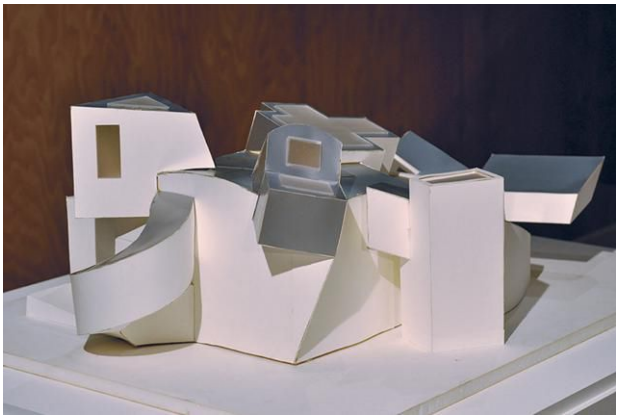
Gehry Archive Goes to Getty

BY ALEX KLIMOSKI



In addition to thousands of physical materials—including this working model of the 1989 Vitra Design Museum in Germany—the Getty also obtained digital files that showcase Gehry's groundbreaking work in developing software platforms critical to the materialization of his dramatic forms.

PHOTOGRAPHY: © FRANK O. GEHRY, COURTESY FRANK GEHRY PAPERS AT THE GETTY RESEARCH INSTITUTE

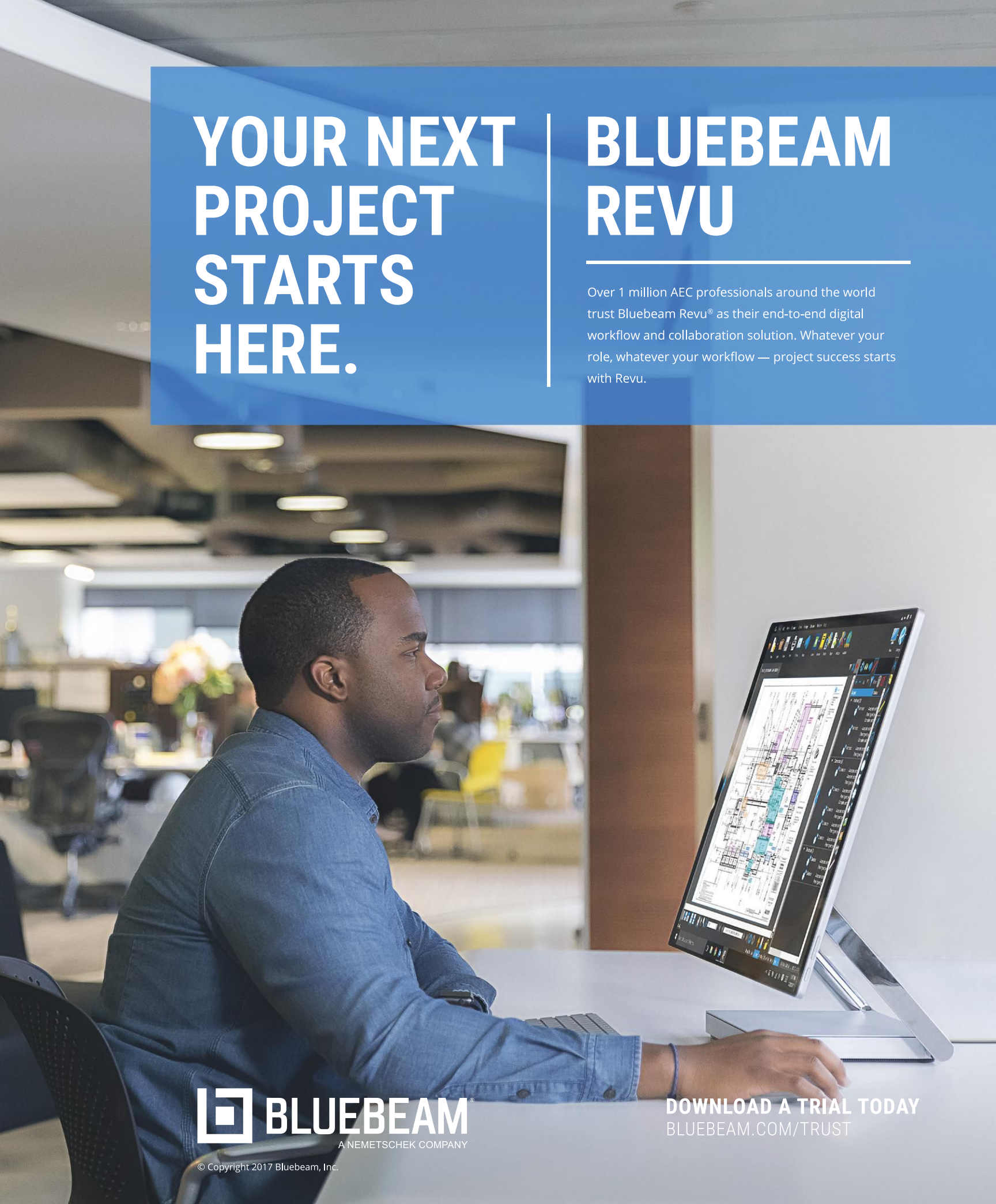
THE GETTY RESEARCH INSTITUTE in Los Angeles has procured the early archives of the "world's most famous living architect," in the words of director Thomas W. Gaehtgens: Frank Gehry. The acquisition, announced in late March, will cover three decades of Gehry's career—from 1954 to 1988—and comprise thousands of sketches, drawings, and photographs. It will also contain hundreds of office records, personal papers, and models for 283 projects, including his Santa Monica residence, the Walt Disney Concert Hall competition, and the Vitra Design Museum.

The extensive collection, part of which is being donated by Gehry and the rest purchased, represents a significant step for the Getty, which has been making efforts to comprehensively document the culture and influence of Southern California architecture. "Who has really made Los Angeles architecture go beyond L.A.?" asks Maristella Casciato, senior curator of architectural collections. "I think that Gehry is the perfect answer to that question."

Though the archives only include work predating the architect's 1989 Pritzker Prize, the time period is crucial in understanding Gehry's later work, according to Casciato—especially in showing how his presence around the L.A. art scene during the 1960s and '70s shaped his practice. Also apparent is the centrality of sketching and model-making to the 88-year-old architect's design process. "The models are 3-D answers to his sketches," says Casciato. Whether or not the Getty will obtain his later archives has not yet been discussed.

Over the next two years, materials will be transported from Gehry's office and L.A. model warehouse to the Getty. While drawings, photographs, and other papers will be kept at the Getty Research Institute, the plan for models is storage at an off-site facility. Three-dimensional photographs of the models, along with other selections from the archives, will be digitized and eventually put online. "Making Frank's legacy accessible was an important concern for both him and the Getty," says Casciato.

All the fuss seems to be lost on Gehry. In a statement, he said, "I'm very moved that this great institution, with its resources to search for the best examples of creativity in our world, has found me an interesting party." ■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Is Design to Blame When a School Underperforms?

BY ANNA FIXSEN

SOON AFTER Baltimore's Henderson-Hopkins School opened its doors to hundreds of students, the day after New Year's 2014, it was greeted with resounding critical acclaim across the design community.

The new K–8 public school (RECORD, June 2014, page 182), with its modern, rust-colored forms, spacious teaching areas, and light-flooded common spaces, was regarded as exemplifying the forefront of 21st-century school design—a model to be replicated. What's more, the school, operated by Johns Hopkins University in partnership with Morgan State University, and backed by the nonprofit East Baltimore Development Inc., was meant to be a boon for East Baltimore, the crown jewel of a new mixed-income development in one of the city's most disenfranchised neighborhoods.

For its innovative design and progressive educational and social agenda, Henderson-Hopkins, a competition-winning design by New York firm Rogers Partners, received numerous accolades, including an AIA Honor Award and Education Facility Design Award last year. As one jury member put it, the school was "Aldo van Eyck meets Alejandro Aravena in Baltimore."

But according to a recent investigation by *The Baltimore Sun*, the school hasn't been living up to its initial promise. Test scores have faltered; suspension rates have mounted. To some parents, the situation is so dire, they are considering pulling their children out, according to the newspaper.

The *Sun* article named several factors that have contributed to these issues, chief among them, the failure to achieve the school's goal of creating a racially and socioeconomically diverse student body, a condition research has shown contributes to successful learning. The creation of new housing for the surrounding $1.8 billion mixed-income development—intended to attract young, middle-class families (742 families were moved to make way for it)—has had a slow start.

But the article also pointed to another cause: the much-venerated building design.

The school, divided into five distinct "houses" to accommodate different grades, included a mixture of traditional classrooms, shared teacher spaces, flexible learning spaces, and several dining spaces. But such a design, according to the *Sun*, "hasn't worked well": teachers have found the large spaces difficult to teach in; wide hallways and open spaces have proved distracting for students; multiple cafeterias are difficult to supervise.

The Henderson-Hopkins School, designed by Rogers Partners, features a series of "houses" for different grades (above), each with spacious learning and commons spaces (left). But critics say the design is contributing to the school's poor performance.

Andrew Frank, special advisor to the president on economic development at Johns Hopkins, told RECORD in an e-mail, "Visitors today still marvel at the boldness of the design and light-filled corridors. But those of us who work or spend time in the building can only laugh at the poetry used by architect[s], juries, or journalist[s] to describe the building."

The school will begin to implement a series of design alterations over the summer, including the installation of new walls to divide some of the open spaces.

Rogers Partners' principal Robert Rogers suspects there has been a pedagogical disconnect in the way the school was designed and how it is currently being operated—a change spurred by leadership changes at the Johns Hopkins School of Education, the institution that oversees the school's day-to-day operations. The architects had worked closely with East Baltimore Development Inc., the nonprofit behind the development, and David Andrews, dean of the School of Education, who has since left. "The school was designed for specific ways of thinking and learning," Rogers says.

The architects also designed the school to anticipate change, integrating mechanical, electrical, and lighting systems that would allow spaces to be adapted as needed. They were also careful to engage stakeholders in the planning process by soliciting feedback and holding community meetings. But, says Rogers, "The nature of the school has made it a target for controversy from its day of origin."

Though a radical $53 million building like Henderson-Hopkins can provide a visible—and convenient—scapegoat, myriad factors contribute to school performance, says David Wilson of Learning Environments for Tomorrow, an institute run jointly by Harvard's schools of education and design. "In and of itself, the space isn't going to drive pedagogy—it's the people who are going to drive it," he says. "We could say, 'Let's reconfigure that space to better align with the practices that do exist,' or we could say, 'Look, we need to change some of those practices to better align with the vision of the space.'"

Though Rogers says the school has not yet contacted him about the design changes, he hopes to continue to be involved. "I think we're going to reach out and see if we can be of help—not at all in a protective sense, but because we want to learn too." ■

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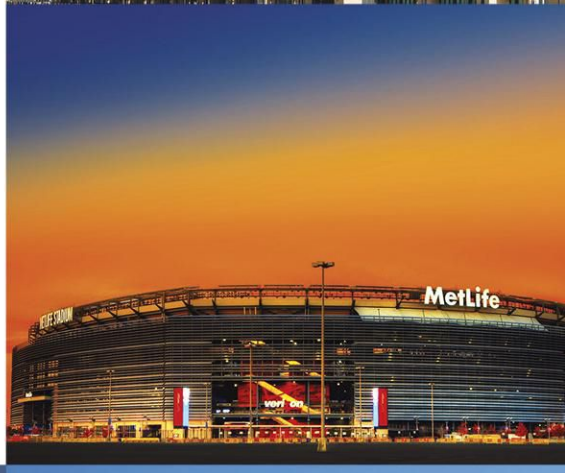
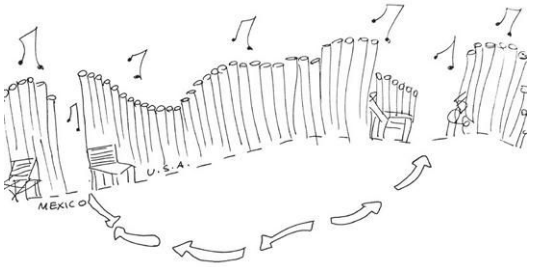


CIRCLE 207

Wall to Wall

BY ANNA FIXSEN

PRESIDENT DONALD TRUMP's mandate to build a "big, beautiful wall" between the United States and Mexico may have divided the architectural profession, but it didn't stop designers from both sides of the ideological fence from submitting a myriad of proposals to U.S. Customs and Border Protection last month. Certain schemes could be prototyped as early as this summer. In the meantime, here is a selection of preliminary ideas—from monumental to mischievous.



J.M. Design Studio, an all-female group of creatives based in Pittsburgh, submitted six design proposals, including a wall of 10 million pipe organs (above) that allows people to cross the border—"but not before sitting down to play a quick (or long) tune."

Penna Design of Fort Worth submitted two proposals, one of which consists of steel columns and double wire mesh to allow for visibility. The design calls for the incorporation of the U.S. seal as well as "neoclassical architecture influences."

MADE Collective, a group of architects, engineers, and planners, proposed the utopian Otra Nation, "the worlds's first continental bi-national socio-ecotone," to be shared by the U.S. and Mexico. The scheme reimagines the border as a transportation quarter, complete with a hyperloop.

WTC, an engineering, surveying, and construction-services firm in Texas, has devised a 24-inch-thick wall made of precast reinforced concrete panels meant to resemble rammed earth.

Collaborative Design Architects in Billings, MT, was inspired by concave hydroelectric dams in the area to build a "better barrier." The multipurpose concept features photovoltaics and a roadway for border-patrol vehicles. Its hollow core could house resource pipelines.

IMAGES: COURTESY (CLOCKWISE, FROM TOP, LEFT) J.M. DESIGN STUDIO; PENNA DESIGN; MADE COLLECTIVE; WTC INC; COLLABORATIVE DESIGN ARCHITECTS

Milton Curry Appointed Dean at USC School of Architecture

Effective July 1, Milton S.F. Curry will become the dean of the USC School of Architecture, succeeding the current dean, Qingyun Ma. Curry served as an associate dean at the University of Michigan Taubman College of Architecture and Urban Planning. He is the founder of the *CriticalProductive Journa*l, a peer-reviewed academic magazine that covers urbanism.

Bjarke Ingels To Get Feature-Length Documentary

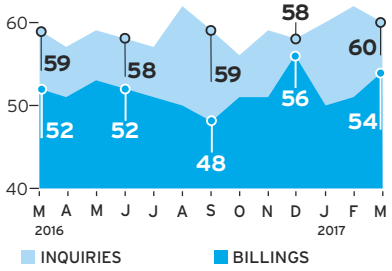
A Danish film-production company released a trailer detailing an upcoming feature-length documentary about the life and work of the architect and founder of the firm BIG, Bjarke Ingels. Directed by Kaspar Astrup Schröder, the film, *BIG Time,* will explore the pressure Ingels faces with growing global demand for his buildings. It will appear in Danish theaters May 3.

Architect Howard Elkus Dies at 78

Howard Elkus, cofounder of the Boston firm Elkus Manfredi Architects, died April 1 at the age of 78. The architect, who established the firm with David Manfredi in 1988, designed many structures throughout Boston, as well as developments and master plans across the United States and abroad. Notably, he designed the glass retail podium that will be constructed for the Hudson Yards development in New York.

AIA Announces Housing Awards

The AIA recognized 14 projects for its 2017 Housing Awards. Winning recipients include buildings by Lake|Flato, Olson Kundig, Marlon Blackwell, Brooks + Scarpa, Bohlin Cywinski Jackson, and Interface Studio Architects.



ABI on Steady Footing

The AIA's Architecture Billing Index (ABI) rounded out the year's first quarter in positive territory, scoring 54.3 in March, up 3.6 points from the previous month (any score above 50 indicates an increase in billings). The new projects inquiry index, however, dipped 1.7 points to 59.8 points. In spite of a slow start to 2017, AIA economist Kermit Baker said construction activity for the quarter has "ended on an upswing."

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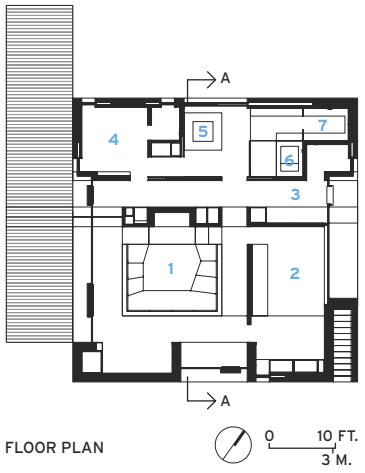
perspective **house of the month**

A FIRM REVISITS THE SITE OF ITS FIRST RESIDENCE TO CREATE A RELAXING BACKYARD RETREAT FOR A LONGTIME CLIENT AND FRIEND. **BY MIRIAM SITZ**

STELLA BETTS and David Leven have been partners in design and life for almost 20 years, and one of their most recent projects has brought them back to the earliest days of their practice. Named for its straightforward geometry, the Square House—a concrete guest cottage and spa—was methodically cast in place just behind the architects' very first ground-up residence.

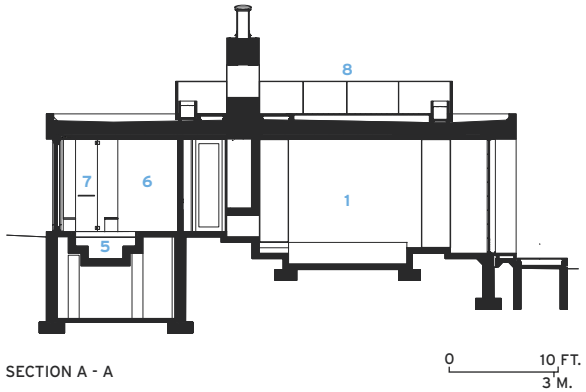
The duo established their firm, LevenBetts, in New York in 1999 and built a spec house in the Hudson Valley four years later. It piqued the interest of their friend Andrew Zuckerman, a photographer who had visited the site on a whim to shoot the freshly poured slab. Today, those photos hang in the living room of the home, which Zuckerman and the woman now his wife purchased as a weekend retreat and used as the locale for their wedding. More than a decade (and three children) later, the couple reenlisted LevenBetts to design a relaxing backyard getaway for their guests—and themselves. Hiding a varied section and program within a simple plan, the

Flanking the front entrance (above), an exterior concrete sink and a frosted sliding door to the bathroom grant easy access to the house's facilities from the yard. An external concrete stair (left) leads up to the roof garden, where an outdoor shower completes the suite of inside-out amenities.



FLOOR PLAN

1 LIVING ROOM
2 STUDIO
3 KITCHEN
4 BEDROOM
5 HOT TUB
6 SOAKING TUB
7 STEAM ROOM
8 ROOF GARDEN



SECTION A - A

PHOTOGRAPHY: © NAHO KUBOTA

one-bedroom structure is inspired by traditional Japanese inns, or *ryokan*.

"The project was conceptualized around the idea of bathing and observing nature," says Leven. A steam room, jacuzzi, and Japanese soaking tub, all made of hinoki wood—a rot-resistant variety of cypress native to Japan—comprise roughly one-quarter of the 1,600-square-foot structure. Operable skylights bring diffuse light to the space, which contains a small atrium with a ficus tree and looks out on a landscaped moss garden.

To further connect inside and out, the architects used oak harvested from the woody site to build cabinetry, and added oversized glazed openings—all of which can be recessed into wall pockets—to each side of the house. They also made many of the building's amenities accessible from the exterior: the structure's signature concrete stair leads to a roof garden, which serves as both an open-air living room and an elevated campsite for the kids; the modest bathroom opens to the yard through a narrow, retractable frosted door; and a large outdoor sink, which seems to extend through the glass as an offshoot of the kitchen counter, provides a place to wash up. With all the glazed doors retracted, the Square House becomes more pavilion than building. "We wanted the design to highlight how small the house could be but how big it could feel," says Betts.

To that end, interior spaces were also created to serve multiple purposes. In the sunken den, a sofa designed by the architects becomes prime real estate for sleepovers, and for movie watching when a retractable screen is lowered, while a studio, with discreet doors and a Murphy bed, quickly transforms into a second bedroom.

In both form and material palette, the guesthouse, firmly rooted in the earth, stands in stark contrast to the wood-clad original. "They have two different ways of responding to the landscape," says Betts. Where the main building adjusts to the land externally, perching and cantilevering on the sloped site, the Square House negotiates changes in topography internally, incorporating steps and drops within its section.

The architects chose cast-in-place concrete for its monumentality and texture, working with an expert contractor to build elaborate formwork that left notable striations from rough-hewn boards on long faces, but smooth surfaces on doorways and entries. "It took more than a dozen pours," says Betts. "It was a puzzle, but it was amazing." ■

The steps leading down to the sunken living room extend through the glazing (top). A window wall opposite the jacuzzi (above) opens the spa area to a landscaped moss garden. The wood deck (right) matches both the color of the concrete and the width of the board forms.

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perspective **interiors**

AN INNOVATIVE MOVIE THEATER DESIGNED BY ONE PLUS PARTNERSHIP LIMITED BECOMES PART OF THE SHOW. **BY ALEXANDRA A. SENO**

FOR A two-story movie house located inside a new mall in Guangzhou, one of China's wealthiest cities, Hong Kong interior design firm One Plus Partnership Limited found inspiration in shooting stars. Alex Law and Virginia Lung, the film-loving husband-and-wife team who founded the practice, thought that meteors had much in common with cinema. "This beautiful scene only appears in the sky for a very brief moment, and then vanishes without leaving any trace behind," says Lung.

Located in the suburban Haizhu district, the project called for something special. The multiplex operated by the Jinyi Cinema chain has a social hall, VIP rooms, and eight theaters with the latest IMAX and Dolby technology.

"A movie takes years, or even decades, to complete, comprising the hard work of a big team. We want to pay tribute to the filmmakers through the design of this cinema, to remind the audience of the passion and effort of these people," says Law.

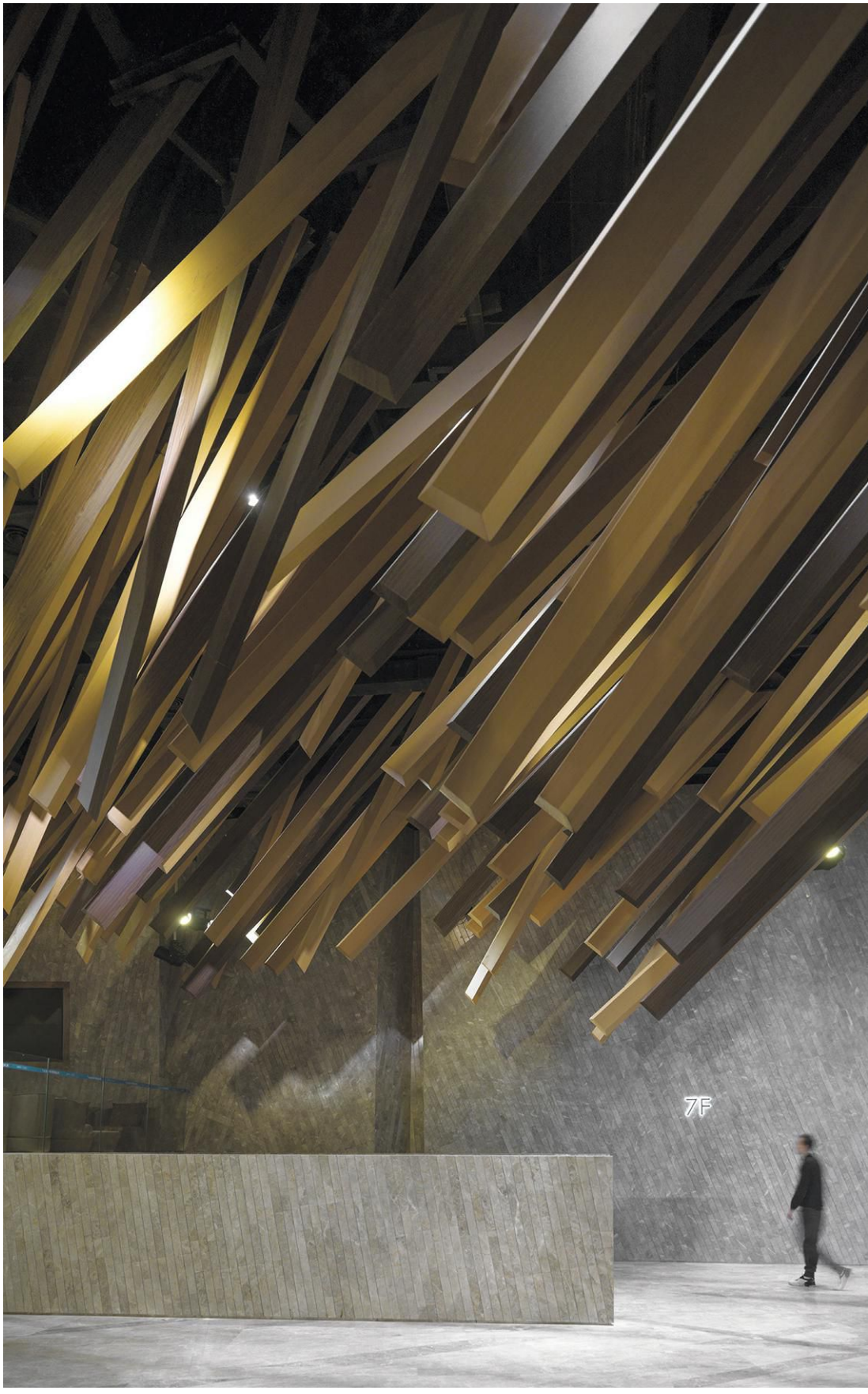
Contrasting with the marble floors and walls of the space, long cuboid shapes of aluminum descend from the ceiling, like frozen meteor showers. "Most designs with the theme of meteor shower are presented in the form of lighting effects. As we wanted a different approach, we had to think of a new way to portray a meteor shower," explains Law.

The aluminum is treated to look like timber. Says Lung, "Not only does the meteor shower look more three-dimensional and realistic, it also appears warmer and more humane." China's strict fire-prevention regulations led to the use of metal. In China, new public spaces like cinemas generally cannot be outfitted in highly combustible materials.

With ceiling heights in the lobby ranging from 16 to 26 feet, a metal structure was put in so that the aluminum could be installed uniformly. The extra space accommodated electrical and mechanical equipment, as well as the sprinkler system. The design required even more sprinkler heads than would be normal, Lung recalls, but the client liked the aesthetics so much that the extra cost was approved.

"Cinema design is gradually changing in China," says Lung, adding that groundbreaking schemes are surpassing traditional ones. "More and more owners are looking to enrich the audience viewing experience—and attract more customers." ■

Hong Kong-based Alexandra A. Seno writes about architecture and visual arts in Asia.



The rectangular cuboids were configured via computer program to point in various directions, enhancing the three-dimensional effect of a rapid meteor shower.

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Shelter from the Storm

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Insulated Metal Panels

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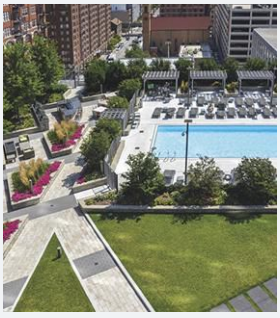

Trends in Urban Outdoor Amenity Spaces

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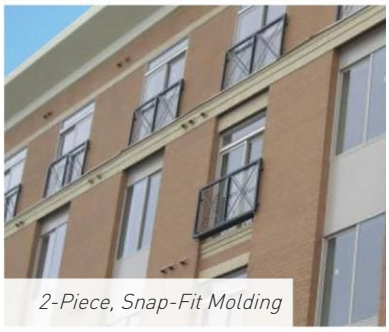

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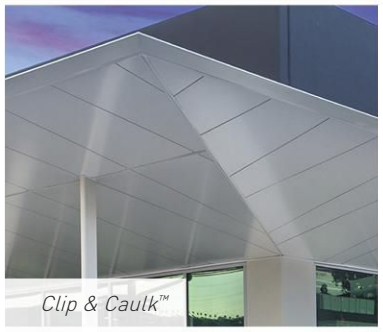

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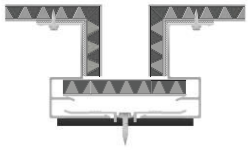

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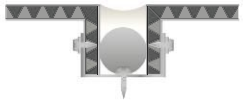

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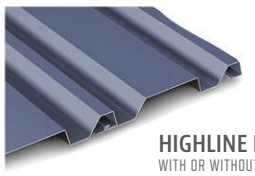

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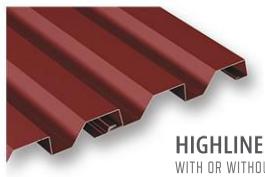

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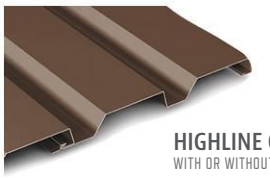

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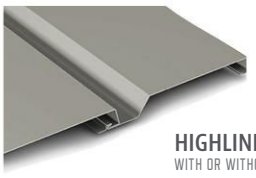

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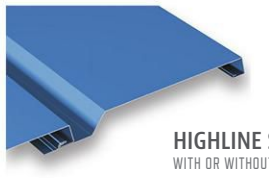

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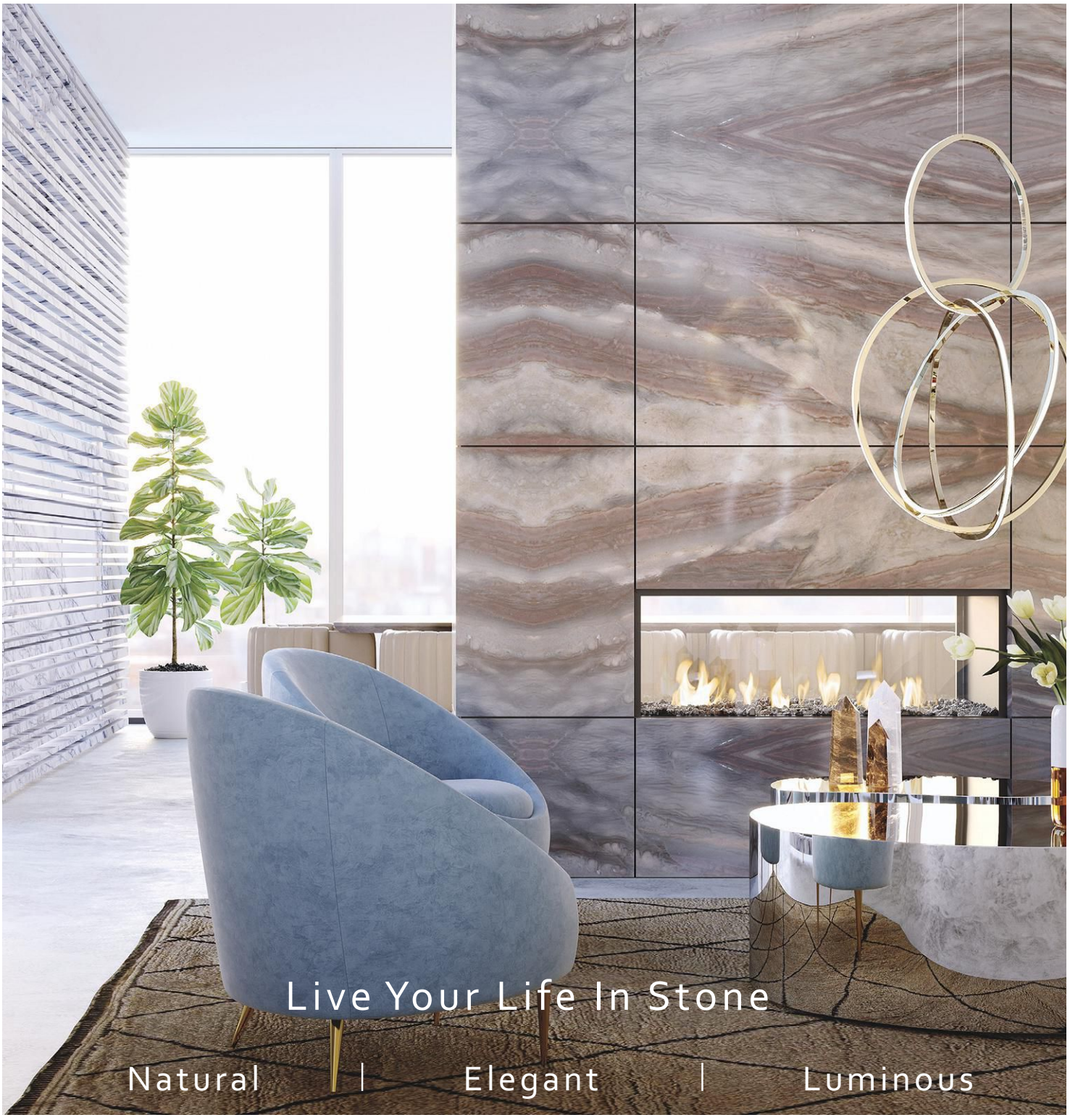

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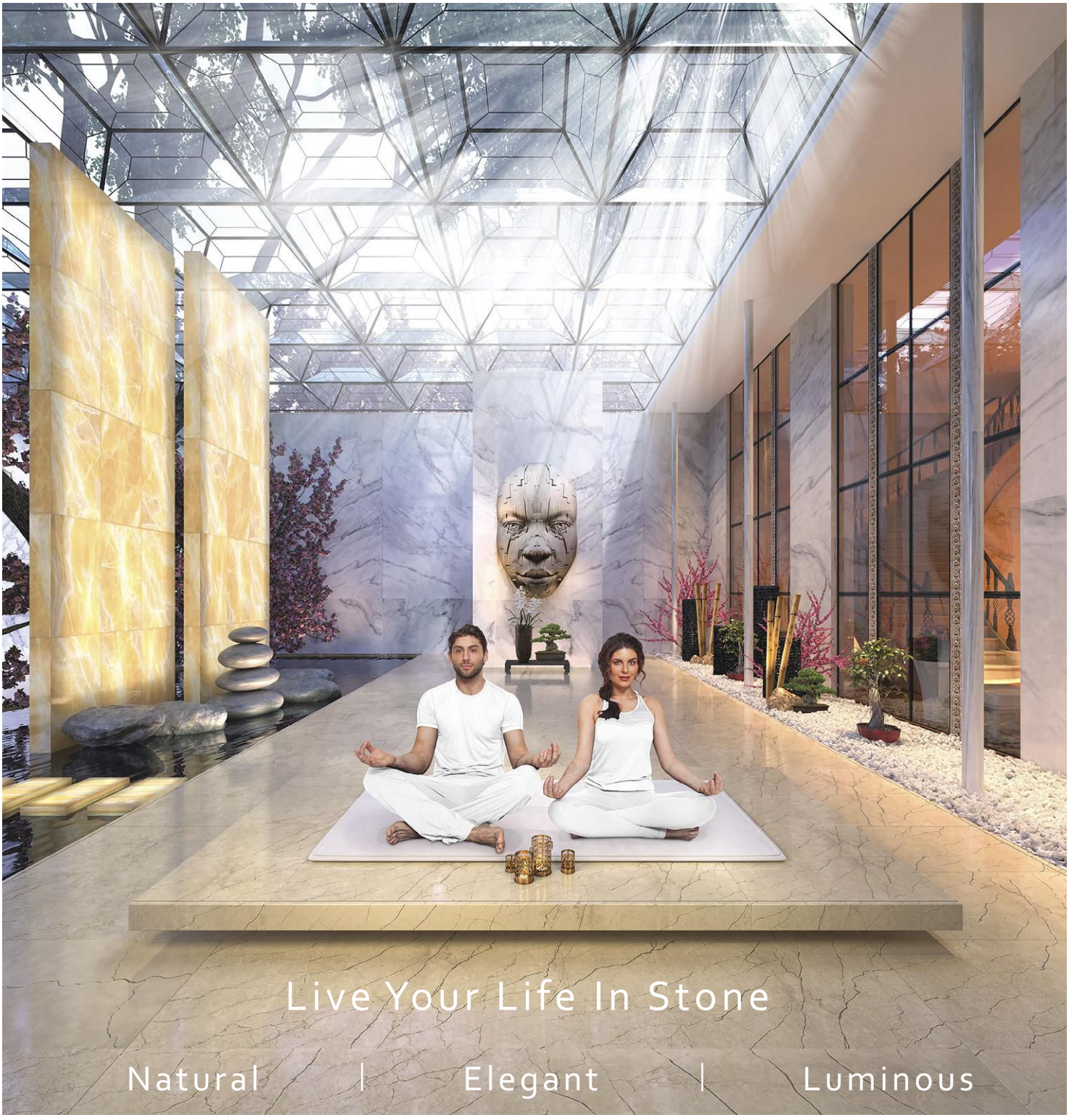

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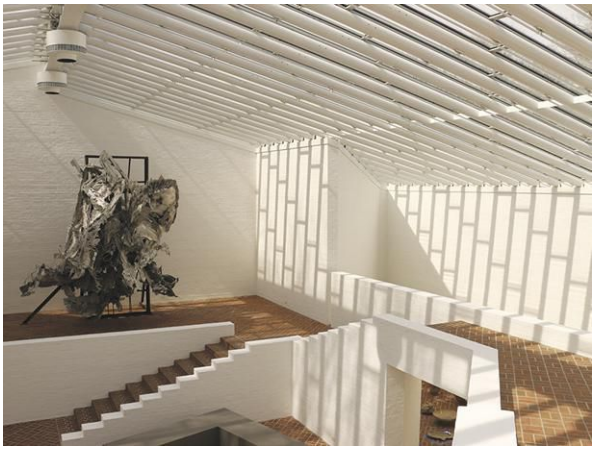
Skylights and Shadows

Philip Johnson's Sculpture Gallery at the Glass House shines once again.

BY MIRIAM SITZ

WHILE SCULPTURES by the likes of Robert Rauschenberg, John Chamberlain, Bruce Nauman, and Robert Morris deserve permanent places of honor in a building designed by one of architecture's legends, birds and rodents decidedly do not. Thanks to a major restoration of Philip Johnson's Sculpture Gallery at the Glass House, these priceless works are safe again from the elements—and the wildlife—of New Canaan, Connecticut.

This month, the Sculpture Gallery reopens to the public after a two-year-long renovation that leaves the structure—one of 14 on the 49-acre museum property—with a new roof, updated lighting system, and fresh paint inside and out. Built in 1970 to house Philip Johnson's personal collection, the gallery is thought to be inspired, in part, by the narrow streets and staircases of the Greek islands. Inside, a series of squares, offset from one another at 45-degree angles, are connected by shallow stairs and lead down to the lower galleries. (The steps are not up to current codes; visitors can only observe from the main landing.) During the day, sunshine streams in through the glazed roof, casting a shadow grid on the white walls and brick floors, while, at night, cold-cathode tube lights affixed to the steel structure overhead bathe the space in a peachy glow. It's said Johnson found the effect so pleasing that he seriously considered moving his residence from the Glass House to the gallery. Ultimately, he decided against it, asking, "Where would I have put the sculpture?"



New glazing and lighting restore the gallery (above) to its original glory. Constructed in 1970 (bottom), the building is home to works of art including Frank Stella's 1990 sculpture *Raft of the Medusa, Part 1* (right).

Time took its toll, and the Sculpture Gallery fell into disrepair: the steel was rusting, the lighting didn't work, the gutter liners were failing, and several of the glass panels making up the skylights had been replaced with imperfect matches, allowing water inside. "We made sure none of the art was damaged," says communications director Christa Carr, "but when it rained, we had buckets hidden behind the sculptures, and sometimes you'd come in and see birds flying or chipmunks running around."

Brendan Tobin, the Glass House's senior manager of buildings and grounds, oversaw the $2 million project, which kicked off in May 2015. Oldcastle BuildingEnvelope (an ARCHITECTURAL RECORD advertiser) donated and transported the custom UV-coated and insulated glass to rebuild the skylight system, working with legacy firm Philip Johnson Alan Ritchie Architects and contractor Nicholson & Galloway, both based in New York.

The project team removed the old glazing, as well as the coatings of all interior and exterior brick and steel, before installing and sealing the precisely fabricated glass. They also replaced the lighting with a new cold-cathode system modeled after the original, refurbished the vents along the top beam of the roof, and repainted all surfaces. Phase one ended in April, while further subgrade work to waterproof the perimeter will begin in July and take up to two months. Carr says it's the largest capital project the museum has undertaken since opening in 2007, but already the staff is looking to the next endeavor: a renovation of the Brick House, constructed in the late 1950s opposite the Glass House and initially used as a guesthouse and study.

The restored Sculpture Gallery and overall Glass House museum are reopening for the 2017 season on May 1 with the Julian Schnabel exhibition *Paintings that I Hope Philip and David Would Like* and, later in the month, *Robert Indiana: Numbers ONE through ZERO*. ■

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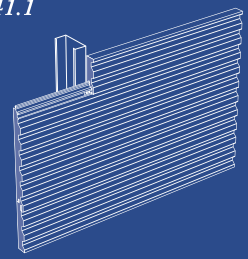

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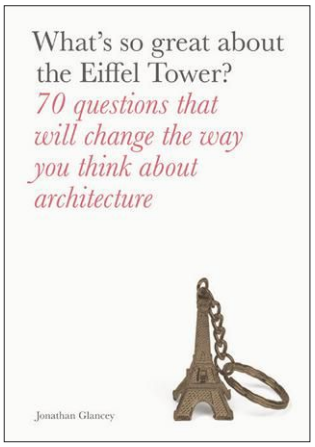

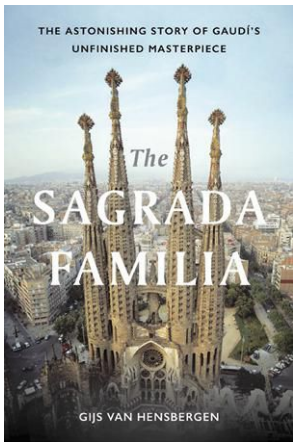

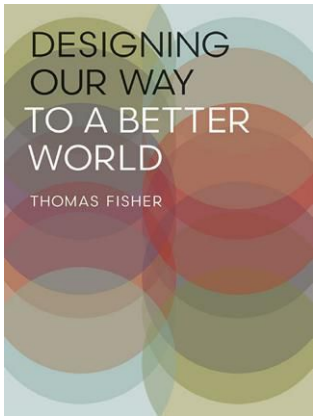

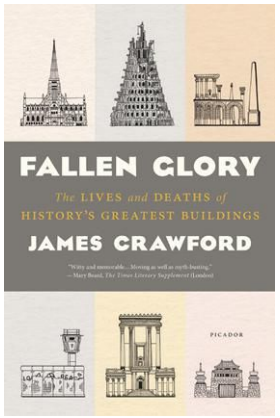

What's So Great About the Eiffel Tower? 70 Questions That Will Change the Way You Think About Architecture, *by Jonathan Glancey. Laurence King, 176 pages, $19.99.*

Actually, the question Glancey poses about the Eiffel Tower is "Engineering masterpiece or aesthetic blunder?" He answers amusingly with the outcry against the new edifice in 1887 by Guy de Maupassant, Charles Gounod, and the painter Bouguereau, going on to discuss the structure's later usefulness as a transmission tower—not only blocking German signals during WWI but becoming the vehicle for radio and TV broadcasts of the stories of de Maupassant himself. Glancey ends this section by quoting objections made the century before to the "gloomy" medieval cathedral of Notre Dame—in other words, both iconic symbols of the French capital raised outcries at different times. The ironic touch and wealth of information make reading this work by the former architecture critic for the *Guardian* a sparkling delight. The 70 topics range from Stonehenge (possibly made of wood before erected in stone) to "High Tech: *Boy's Own* adventure or revolutionary style for our times?" Along the way, he discusses the extraordinary Chapel of the Holy Shroud, Turin (1688-94), by Camillo-Guarino Guarini, pointing out that its complexities would be an undertaking to work out "even with today's computer programs." Glancey's behind-the-scenes perspective greatly enhances one's understanding of these buildings and makes you reconsider your own views.

The Sagrada Familia: The Astonishing Story of Gaudí's Unfinished Masterpiece, *by Gijs Van Hensbergen. Bloomsbury, 224 pages, $27.*

In the *70 Questions* book, the question Glancey poses about this still-unfinished cathedral is "Genius or gimcrackery?" Hensbergen, the author of a biography of Antoni Gaudí, would not entertain such skepticism. The first half of his volume may be taken as something of a biographical reprise, as much devoted to the architect—currently in line to be canonized by the Catholic Church, and possibly by Hensbergen—as to the building, detailing Gaudí's childhood love of nature and how that, along with local traditions, early Modernism, and increasing religiosity, informed his various works. The cathedral's construction, from 1882, under the sponsorship of a sect devoted to the human father in the holy family, Joseph, was impeded not only by lack of funds (all donated) and Gaudí's early death but by the political turmoil leading up to and including the Spanish Civil War, in which plans and models were destroyed. How the work was carried on makes up the remainder of this book. Unfortunately, the story is chaotically and myopically told, so that it's hard to discern where the minute but not always apposite details fit. The author wishes to astonish, but clarity would have been more to the point.

Designing Our Way to a Better World, *by Thomas Fisher. University of Minnesota Press, 231 pages, $29.95.*

Fisher begins with the seductive premise that the methods of design—imagination that anticipates unintended consequences, and creative leaps of thought—could be brought not just to cities and landscapes but to economies, public health, and politics for the purposes of universal justice and a healed natural environment. (Why not world peace, while we're at it?) In various chapters—on education, infrastructure, beliefs, and more—he invokes Freud, Einstein, American philosopher Charles Pierce, and events ranging from bridge collapses to the spread of flu. If there is a central point, it is the productivity of bringing together systems that do not normally intersect, citing, in his most startling example, the way the 9/11 attack joined architecture to air travel for spectacular, if dire, results. He'd like to see such creative juxtaposition used for spectacular good, pointing to the way Frederick Law Olmsted joined public health to landscape. Fisher sets the stage for Malcolm Gladwell–style logic and examples concerning how such ideas might be applied. The individual chapters, however, originated as independent articles or lectures; there is, as a result, a certain amount of repeating and little sense of going forward, leaving this text too often general and abstract.

Fallen Glory: The Lives and Deaths of History's Greatest Buildings, *by James Crawford. Picador, 640 pages, $49.*

This is a book about buildings that is also about civilization itself, engendering a feeling of contact with its absolute roots, its springboards of power, its limits, costs, and fruits—a truly mind-expanding experience to read. Juxtapositions that Fisher (above) might dream of here yield, at the least, frissons. Here's one relating to 9/11: the building likely to have inspired the story of the Tower of

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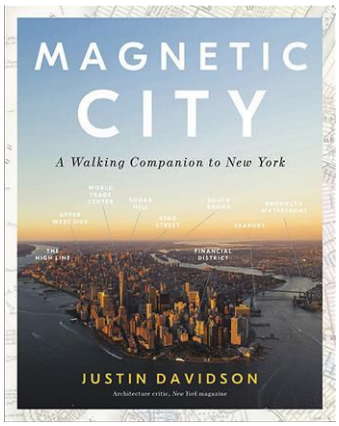
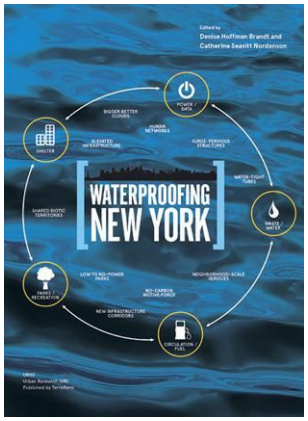
Babel is in sands under the feet of American soldiers in 2003, and they are in Iraq because *their* giant towers have been destroyed. In an equally fresh comparison, the story of the architect of those same Twin Towers, Minoru Yamasaki, collides with that of an architecture student advocating against skyscrapers—9/11 mastermind Mohammad Atta. The "biographies" of buildings surprise again and again: for instance, the 3rd-century-BC library at Alexandria did exactly as it was intended, generating knowledge that made Euclid's *Elements* possible, not to mention amazing contemporaneous inventions, such as an early-Egyptian steam engine, that anticipate the industrial and even digital revolutions by more than a millenium. Now a rebuilt Alexandrian library (2001) by Snøhetta houses the Internet Archive, with a database equivalent to 10 billion books. Crawford does not neglect to mention Borges's story of the world as an endless library or, elsewhere, to invoke Shelley's "Ozymandias," of which each great and lost monument is an exemplar. All that is missing from this magnificent trove is an index.





Magnetic City: A Walking Companion to New York, *by Justin Davidson. Spiegel & Grau, 222 pages, $22.*

It is good to be reminded that even the discrepancies between plutocratic palace-in-the-sky and slum are less grotesque than those between Akhenaten's colossal domicile and his slaves' mud huts, suggesting that democracy, however compromised, has at least a modest reflection in the structures of our roaring and blaring capital of finance. This volume by *New York* magazine's architecture critic takes its reader, with maps and directions, from the Brooklyn waterfront and the scant remnants of the Dutch at Manhattan's southern tip up to the Grand Concourse in the Bronx, embracing edifices of business and private houses, in addition to apartment buildings of every stripe along the way, while the text conducts an insightful tour of social history. "The struggle between memory and amnesia," he writes of this restless city, "is an urban-scale version of the ambivalence that so many of us feel about the passage of our lives . . . That's why wandering around a metropolis that rearranges itself at every pass feels like a form of hopeful introspection."

Waterproofing New York, *edited by Denise Hoffman Brandt, Catherine Seavitt Nordenson. Terreform, 189 pages, $40.*

This is a book for and by policy wonks, designers, and planners about a city with 520 miles of shore in an age of violent weather and rising seas. A series of essays begun in 2013, in the wake of Hurricane Sandy's depredations, and full of charts and pictures, it is radically varied in tone. Lydia Kallipoliti, citing Slavoj Zizek along with the TV show *Lost*, advises us to "conceive an alternative material universe" while Nordenson idealistically advocates turning Manhattan roadways into linear forests, for "storm surge reduction from coastal vegetation canopy." In a more grounded manner, Janette Sadik-Khan provides statistics showing how people actually commuted after Sandy, demonstrating their varied coping responses (e.g., carpooling) when the transit system was damaged. Byron Stigge's "A Tale of Two Substations" is a graceful exposition of the virtues of redundancy; and Frank Ruchala Jr. shows how people in Los Angeles came together to deal with subsidence caused by oilfields, which doesn't seem an obvious lesson for New York but proves beautifully relevant. An afterword by Terreform founder Michael Sorkin (a RECORD contributing editor) acts as a sensible (and witty) summation—we need giant engineering *and* eco restoration, hard solutions and soft but, above all, the stanching of climate change.

The Structure of Design: An Engineer's Extraordinary Life in Architecture, *by Leslie Earl Robertson. Monacelli Press, 335 pages, $60.*

You've heard of him, if you've heard of him, because he was the lead structural engineer of Minoru Yamasaki's Twin Towers. This volume is partly about the often unsung work that engineers do, detailing Robertson's own con-

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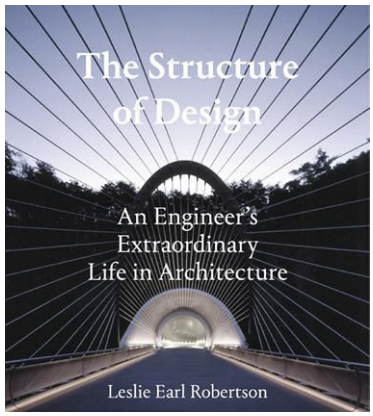

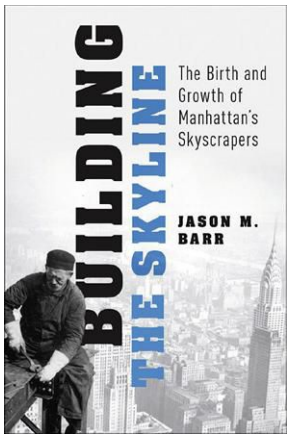

tributions to the many ambitious projects around the world to which he has been key—his extraordinary innovations in structural steel framing and countering wind dynamics, among much else. It is far from being a professional autobiography only. Following a pictorial spread of his projects from 1956 to 2015, is an account of his early life, from a hard childhood through discovery of the profession he loves. It's full, however, of weird lacunae: his mother disappears, and we're told almost nothing more. Later, there's a first wife of whom we learn less than of the car in which he left her. We read that he did badly in school but got into UC Berkeley, where he earned a B.S.—possibly in math and electrical engineering? Five years later, he has a license in civil engineering. He devotes a sliver of the book to a world-creation story satirizing the roles of architects and engineers, and a chunk to his pacifism, urging moral action on his readers; he clearly suffers guilt from his unintended involvement in 9/11 and the wars begun in its name. He says not much can be done about the potential impact of planes on tall buildings but, interestingly, doesn't suggest we should stop building them.

Building the Skyline: The Birth and Growth of Manhattan's Skyscrapers, *by Jason M. Barr. Oxford University Press, 437 pages, $49.95.*

Is it quite pertinent to Manhattan's skyline to detail the land's creation back to the Proterozoic age? Most relevant here are statistics lurking in later sections: building height has grown from 15 stories to over 100 since 1885 at an average of about 2 percent per year; income inequality increases the rate at which skyscrapers (buildings of more than 25 stories, for Barr's purposes) are built, doubling when the top 1 percent earn more than 20 percent of U.S. income; the average skyscraper is around 34 floors; all the recent supertalls have been made possible by sales of air rights and developers' promised provision of civic amenities (which can double an as-of-right height of 34 floors); 70 percent of the island's buildings are five stories or lower and 90 percent are 10 or lower—high-rises are only 1.7 percent of Manhattan. Barr, an economist, sees tall buildings as an engine of growth and believes that percentage should be greatly increased. His account conjures a real-estate economy like a squishy balloon, in which squeezing one part, through constraints such as zoning or price controls, causes distorting bulges in development (or lack thereof). Barr happens to have an M.A. in creative writing, but the text might not have had to be in quite such tiny print if the very frequent restatements had been weeded out. ■

Anna Shapiro's book reviews and essays have appeared in The New Yorker, The New York Times, The Guardian, *and other journals.*

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CIRCLE 95

On the Home Front

The New Old House: Historic and Modern Architecture Combined, *by Marc Kristal. Abrams, 240 pages, $60.*

Reviewed by Wendy Moonan

AS A former filmmaker, the writer Marc Kristal is a natural storyteller, which enlivens his 18 case studies about adding contemporary additions to old houses. The examples, 11 in the United States and seven in the United Kingdom, range from rustic cottages such as a stone ruin from the 1700s, on an island off Scotland, to modern classics such as a Los Angeles house designed in 1947 by Raphael Soriano for architectural photographer Julius Shulman. In each, Kristal traces how contemporary architects were able to weave together traditional and modern structures.

Kristal cites the Italian architect Carlo Scarpa as his inspiration for studying adaptive reuse of historic structures because of Scarpa's "clearly drawn distinctions between old and new." Scarpa's exposure of a structure's layers for clues to its history and his introduction of elegantly designed architectural objects that invest spaces with subtle detail are in line with the approaches on these pages.

One of the book's most successful examples is Ten Broeck, a modest 19th-century Dutch cottage in an apple orchard in Upstate New York. The New York–based architects Brian Messana and Toby O'Rorke stripped the structure to its frame, reclad it with warm brown cedar siding and shakes, and installed new six-over-six windows.

Then they added an extension in their signature modern style rather than attempting a faux Colonial wing. The one-story modern "box," clad in rusty Cor-Ten steel, houses a kitchen, bedroom, storage room, and bath. The architects chose steel after seeing how local residents park metal trailers next to traditional wooden houses.

The addition floats above a skylit exercise room in the cellar and is linked to the farmhouse by a narrow glass channel. The architects divided the original house's living and dining areas with a new wall and a double-sided fireplace. The plan is simple and the progression of rooms from old to new seamless. Scarpa would have loved it.

Another impressive example is London architect Richard Found's early 19th-century gamekeeper's cottage in the Cotswolds, which he belatedly discovered was a Grade II protected structure that had to be preserved. After a year and a half of negotiations, he was allowed to restore the tiny cottage and build a 5,000-square-foot modernist extension behind it with walls faced in the same signature Cotswold stone. The spare new minimalist wing has four bedrooms to the east of the cottage and a living and kitchen "great room" to the west, all made with poured-in-place concrete floors and ceilings. The rear is embedded in the hillside behind the cottage.

The roof of the living room wing is cantilevered to allow a long window wall on one side, with views of the lush, steeply sloping valley and two lakes. In 2012 the Royal Institute of British Architects gave the cottage a National Award.

Kristal writes in the introduction how he discovered that "complicated problems can be the best generators of design solutions, whether aesthetic, programmatic, performance-driven, or all three." Explaining how that worked in such different situations makes for an inspiring series of tales. ■

Wendy Moonan, based in New York, writes frequently about architecture and design.

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CIRCLE 233

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CIRCLE 237

Salone del Mobile 2017

With over 2,000 exhibitors and nearly 350,000 visitors last month, Milan's furniture fair still proves to be the best in the world.

By Josephine Minutillo

Cila

Designed by Barcelona-based Alberto Lievore and Jeannette Altherr, Cila was inspired by the image of layers of cloth enveloping the body, its distinctive curve a symbol of shelter. The lightweight plastic shell can be customized in six colors, with optional seat cushions or fully upholstered in a range of textures, colors, and styles. Base options include metal or wood legs, a metal sled, or a swivel base with castors.

arper.com

CIRCLE 127

Bookchair

Inspired by the relationship between space and the human body, Japanese architect Sou Fujimoto created Bookchair for the Italian line Alias. An object within an object, the compact shelving unit incorporates a chair that can be extracted. The bookcase is made of lacquered MDF. The seat is in the same finish and material.

alias.design

CIRCLE 128

Officina

The Officina collection designed by Ronan and Erwan Bouroullec for Magis features a curving wrought iron frame that gives the elegant seating an industrial bent. New this year is a bench as well as a series of upholstered pieces that includes an armchair, ottoman, and plush two- and three-seat sofas.

magisdesign.com

CIRCLE 129

Grasshopper

Piero Lissoni had several introductions for Knoll at the fair. Grasshopper is a dining table characterized by a slender tabletop in marble, glass, or wood and a thin cast-steel base that is either chromed, burnished, or painted. The top is available in a round shape or rectangular with rounded edges. Grasshopper also includes a family of low tables with the round top and similar finishes.

knoll.com

CIRCLE 130

products **trade show**

Baldo

Emmemobili is a family-run furniture maker that specializes in wood. For the Baldo table, conceived by renowned designer Ferruccio Laviani, the four legs that support the heavily veined marble top are designed as frames for small sculptures in wood. Laviani was inspired by early Modernism, combining the tradition of Italian rationalist design with metaphysical painting.

emmemobili.it

CIRCLE 131

Aleta

The Aleta collection of chairs and stools by Madrid-born designer Jaime Hayon was inspired by the form and movement of sharks—*aleta* means "fin" in Spanish. The comfortable upholstered seat is available with a high or low back, in a variety of fabrics and colors. There are a number of options for the base, including wood or metal legs, and a swivel base with or without castors.

viccarbe.com

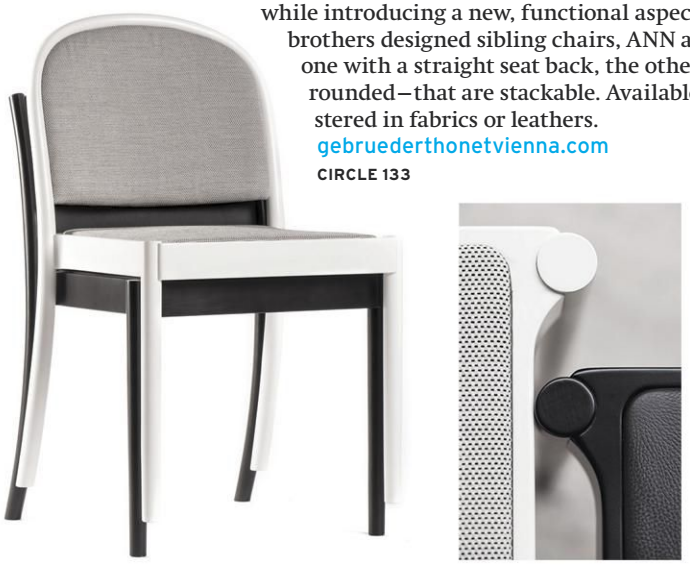
CIRCLE 132

ANN and SUU

Gebrüder Thonet Vienna has a nearly 125-year history of making bentwood chairs. This year, Milan-based architects Gabriele and Oscar Buratti built on that esteemed tradition while introducing a new, functional aspect. The brothers designed sibling chairs, ANN and SUU—one with a straight seat back, the other rounded—that are stackable. Available upholstered in fabrics or leathers.

gebruederthonetvienna.com

CIRCLE 133



Folio

Folio is a simple but expressive desk made from a single sheet of transparent 0.6"-thick extra-light curved glass. Inspired by folded paper, the desk's pared-back lines, flat planes, strategic arcs, and square edges celebrate craftsmanship and the qualities of clear glass. Folio is one of two products designed by Yabu Pushelberg this year for Glas Italia. The Toronto- and New York–based design firm also created a similarly scaled vanity called Strata.

glasitalia.com

CIRCLE 134

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CIRCLE 222

Wrap It Up

These weather-tight products will seal the deal for a variety of project categories and programs.

By Rita Catinella Orrell

H3 FeelSafe Windows

Sierra Pacific's new line of storm-tested, impact-rated H3 FeelSafe windows combines a high-tech design with a zone 3 rating (PG +50/-60). Made of extruded aluminum, vinyl, and solid wood, the double-hung and casement windows are ideal for builders who don't want to step down to a vinyl impact-rated window price-point product or increase the budget for a zone 4–prepared window.

sierrapacificwindows.com

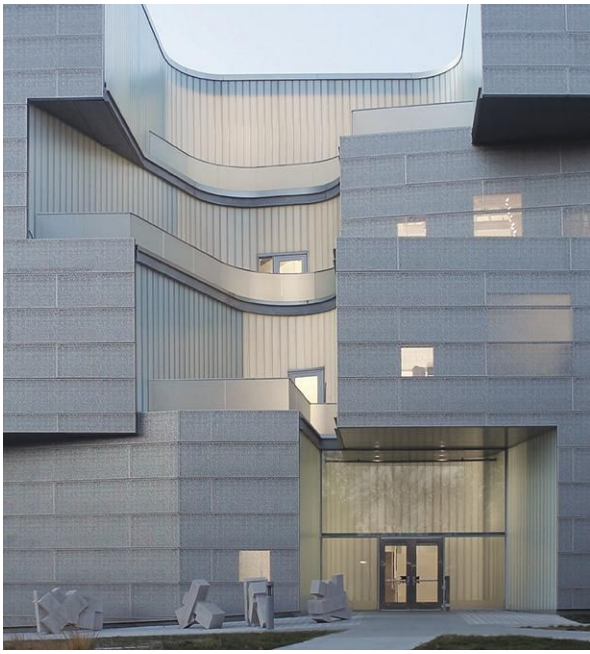
CIRCLE 100

Curved Glass Wall

Using channel glass from Bendheim, Steven Holl Architects created 20'-tall curved walls of glass that bring filtered daylight into the studios and open loft spaces inside the new University of Iowa Visual Arts Building in Iowa City, Iowa. The architects selected the 3-D, U-shaped glass to create multiple "centers of light" that break up the otherwise flat expanses of the rectilinear building form.

bendheim.com

CIRCLE 101



Weyerhaeuser Diamond

This engineered subfloor panel is designed to provide wet-weather performance, superior strength and nail retention to help eliminate squeaky floors. Specifically manufactured to resist inclement weather, the subfloor features the company's patented Down Pore self-draining technology that uses a notch-and-groove system to channel water from the end of the panel and the supporting member.

weyerhaeuser.com

CIRCLE 102

Typar Drainable Wrap

The latest addition to the Typar Weather Protection System, Typar Drainable Wrap features a layer of multi-directional polypropylene fibers that diverts bulk water from exterior wall cavities, creating a highly efficient drainage gap that sheds more bulk water than traditional house wraps. The wrap comes with a lifetime-limited warranty and meets code requirements for drainage efficiency.

typar.com

CIRCLE 104

HPI-1000 Building Insulation Blanket

Based on silicon aerogel technology, Dow Corning's new building insulation blanket has a slim profile that can be easily cut and conformed to complex shapes and tight curvatures, even in difficult building-envelope connection points such as areas where glazing systems meet cavity walls, where below-grade systems meet above-grade systems, and where parapets meet roofs.

dowcorning.com/construction

CIRCLE 103

For more information, circle item numbers on Reader Service Card or go to architecturalrecord.com/products.

products **building envelopes**

Kebony Clear

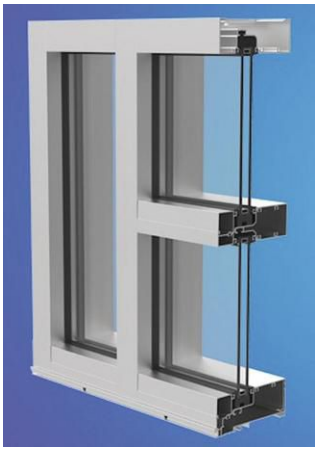
Oslo-based Kebony is now offering its clear-grain decking and cladding products in North America. Appropriate for residential and commercial applications, the line includes a ¾" x 4 ¾" FSC-certified lap siding that rivals tropical hardwoods. As with all of the company's wood, Kebony Clear is treated with a bio-based liquid that provides outstanding durability and dimensional stability.
kebony.com/us
CIRCLE 105

3M DI-NOC Exterior Series

3M now offers a range of vinyl architectural finishes recommended for exterior surfaces. The 3M DI-NOC Exterior Series conforms to a variety of nonporous flat or curved surfaces, including aluminum and galvanized-and-painted steel, and comes in 24 stock styles, ranging from a solid color to wood-grain, metallic, or abstract motifs. Applications include the renovation of branded environments such as storefronts, awnings, signs, and other architectural features.
designtex.com/products/3m-di-noc.html
CIRCLE 106

JetSpray Thermal Insulation System

Knauf's JetSpray spray-on glass mineral wool insulation can be used in netless sidewall application for projects ranging from single- and multifamily dwellings to modular or light commercial structures. It is easily installed around wiring and other wall obstructions to completely fill cavities without settling. JetSpray typically dries within 24 hours, meaning drywall can be installed the next day.
jetspray.knaufinsulation.us
CIRCLE 107



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Part of YKK AP America's new YES 60 line of storefront systems, the YES 60 FI storefront design is structurally 10% stronger than the line's other two systems, allowing for greater vertical and horizontal spans. The YES 60 FI accepts low-E insulating glass from ¼"–1", delivering the performance necessary for climate zones 1 and 2.
ykkap.com
CIRCLE 108

Steel Door Collection

Jeld-Wen's Craftsman Collection of exterior steel doors is the first on the market to offer homeowners the look of craftsman design while incorporating the security and affordability of steel. The doors are available in three variations, including two-panel, three-panel, and single-panel options in a variety of widths. Available in 20-minute and 90-minute fire ratings, the doors can be custom color matched.
jeld-wen.com
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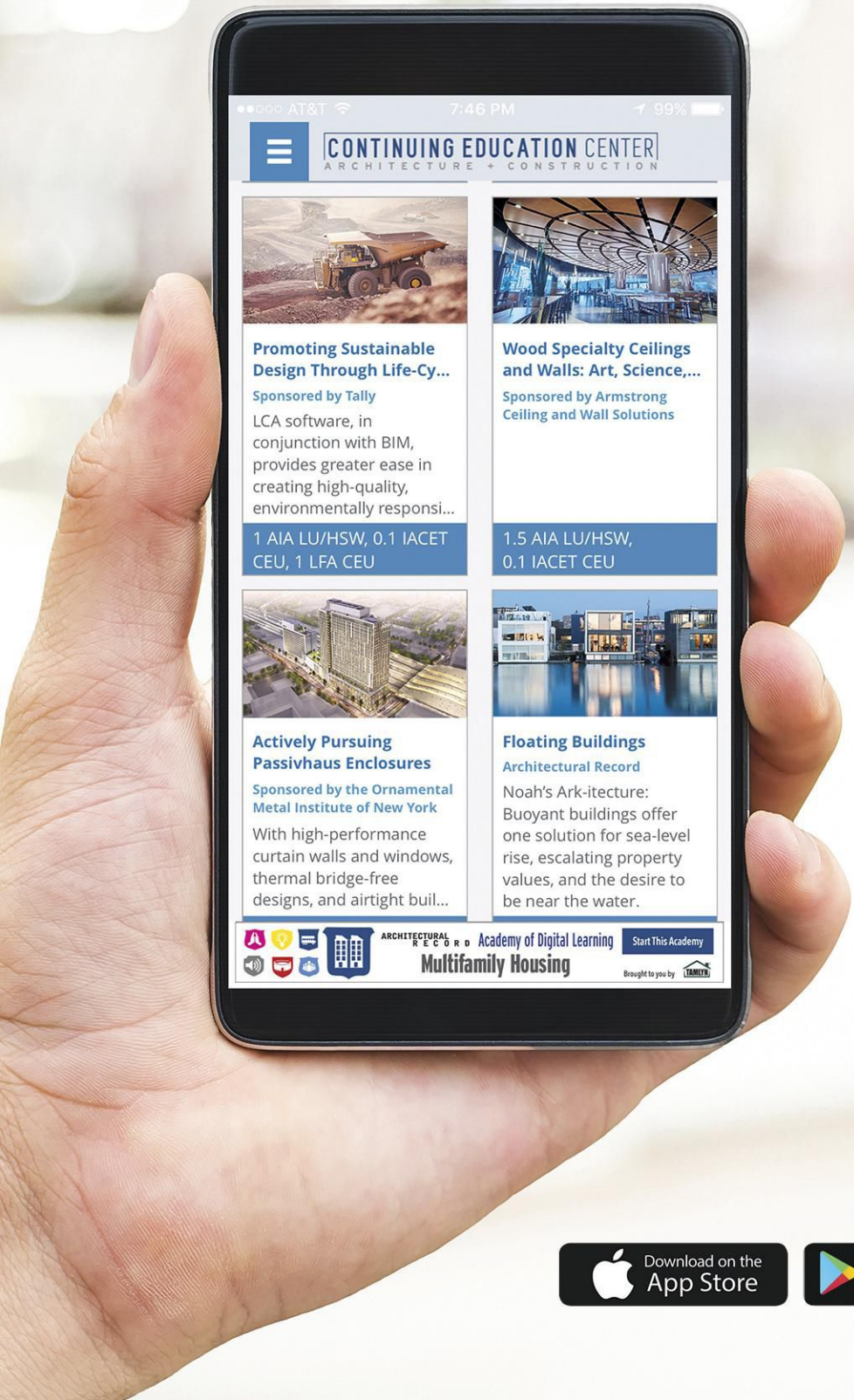

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contractor: Turner Construction (Philadelphia, PA)
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By Rita Catinella Orrell

FrostGuard

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pentairthermal.com

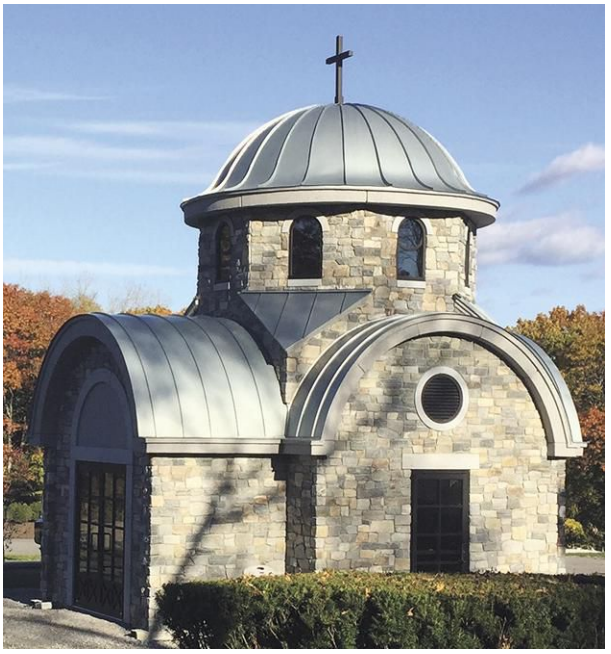
CIRCLE 111

JTS 1 Sealant

This sealant from Mule-Hide allows contractors to easily seal large joints and roof termination bars, even those submerged in water. Available in eight colors, this moisture-cure urethane sealant contains no solvents and adheres to EPDM and PVC membranes, concrete, masonry, wood, vinyl, and other common materials. Primer is required when using it on TPO roof membranes.

mulehide.com

CIRCLE 113



Custom Roofing Panels

The Holy Resurrection Chapel (2016), at the Gardens at Gethsemane cemetery in Boston, was designed in the classic Byzantine style by architect Yervant Nahikian, with a multifaceted dome clad in 24 custom zinc panels from Rheinzink. The blue-gray metal—also used on the building's half-round barrel vaults and sloping triangular elements—enhances its stone exterior.

rheinzink.us

CIRCLE 110

SolarHide

This one-step radiant barrier underlayment from DaVinci Roofscapes also serves as a vapor barrier. Roofers using a single layer of SolarHide in conjunction with DaVinci Shakes, Slate, and Bellaforté products can attain a Class A fire rating. Made from raw materials, SolarHide is produced with woven and nonwoven fabrics as well as pure aluminum. The underlayment is 100 percent recyclable and exceeds Miami-Dade specifications.

davinciroofscapes.com

CIRCLE 112

Sedona Canyon

To help homeowners choose a shingle color, Owens Corning introduced the Shingle Color of the Year program. This year's winner was Sedona Canyon, selected for its resemblance to real wood shakes. The asphalt composition shingles' subtle shades—burnt umber, chestnut, butterscotch, and twists of blue-gray—pair with a range of fashion-forward and traditional colors.

owenscorning.com/roofing

CIRCLE 114

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CIRCLE 208

Columbia University's Arts and Science Centers | New York | Renzo Piano Building Workshop

Stake in the Neighborhood

Two buildings open on a new campus in upper Manhattan, with a promise to enhance the community.

BY FRED A. BERNSTEIN

With the new Whitney Museum of American Art, Renzo Piano Building Workshop (RPBW) bestowed lavish gifts on Manhattan, including a series of terraces overlooking the High Line, going far beyond the museum's core programmatic needs (RECORD, May 2015, page 181). The firm does something similar with its Jerome L. Greene Science Center and neighboring Lenfest Center for the Arts, the first completed buildings at Columbia University's Manhattanville Campus, a 17-acre site in Harlem, northwest of Columbia's main Morningside Heights location. Greene contains laboratory space for neurological research; Lenfest, a stack of exhibition and performance venues. But both also make generous contributions to the neighborhood. Those include Greene's lobby, which is open to the public seven days a week until 10 p.m. Handsomely appointed and generously proportioned, it bisects the building, leading straight through from its east-facing main entrance to a new plaza on its western side. That plaza is shared with Lenfest, which also contains public spaces, including the Miriam and Ira D. Wallach Art Gallery, relocated from a hard-to-find spot on Columbia's main campus. (RPBW's third Manhattanville building, a conference center called the University Forum, is already under construction immediately south of Greene, while its fourth, the Global Center, will rise

OPEN AND SHUT The mostly opaque Lenfest Center for the Arts (at left, opposite), contains galleries and theaters, while the predominantly transparent Jerome L. Greene Science Center (at right, opposite, and below) holds neurobiology research facilities. A subway viaduct (below) sets an industrial tone for the site.

PHOTOGRAPHY: © COLUMBIA UNIVERSITY/NIC LEHOUX (OPPOSITE AND THIS PAGE)

GOOD NEIGHBOR Jerome L. Greene's southern facade (left) will soon look onto the forthcoming University Forum, a conference facility that is part of the larger master plan. An internal stair and airy social space (opposite) help promote informal interactions in the science center.

west of Lenfest.) In providing the amenities that it promised the community when it announced the controversial expansion—its largest in more than 100 years—Columbia is off to a rip-roaring start.

The university hasn't always used architecture so deftly. In the 1960s, its expansion plans, according to *The New York Times*, included "purchasing apartment buildings all over Morningside Heights, displacing thousands of poor, mostly black and Puerto Rican residents." When it then attempted to build a gym in city-owned Morningside Park, anger erupted into riots, and the plan was dropped. In the decades that followed, the university turned inward. It commissioned I.M. Pei to design a master plan (1968–70) that included a pair of skyscrapers on the original McKim, Mead and White–designed Morningside Campus. A few years later (1974), it shoehorned the new Dodge fitness center by Eggers Partnership into the same crowded quadrangle. And in 1999, its student center, Lerner Hall, designed by then-architecture dean Bernard Tschumi, turned a forbidding face to busy Broadway.

This time, with the need for space especially pressing, Columbia couldn't afford to alienate its neighbors. It won community support, or at least acquiescence, by offering sweeteners, including housing and a job-training program for residents. And it promised a campus that would welcome locals as well as students. True, the Greene Center, home to the Mortimer B. Zuckerman Mind Brain Behavior Institute, was hardly destined to become a neighborhood hangout. But, ingeniously, its ground floor houses a community wellness center, with mental health and stroke-prevention programs devised by Columbia physicians—thus bridging the gap between the work being performed inside the building and what's happening around it. There is also a separate education center for local children.

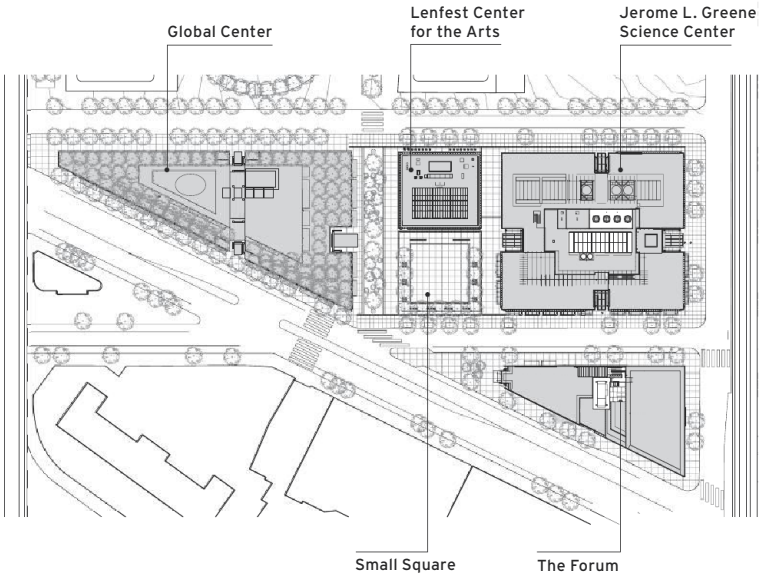
Other promises were embodied in the campus master plan, by RPBW and Skidmore, Owings & Merrill: Columbia committed to keeping the cross streets through the Manhattanville campus open to traffic, and it promised to create a pedestrian thoroughfare running north–south from 125th to 133rd streets, connecting two new plazas—the one adjacent to Greene and Lenfest, and a larger one that will be flanked by a pair of business-school buildings designed by Diller Scofidio + Renfro in collaboration with FXFOWLE. Both Greene and Lenfest have upper levels that

PHOTOGRAPHY: © COLUMBIA UNIVERSITY/NIC LEHOUX (OPPOSITE AND THIS PAGE)

cantilever over their ground floors, in order, says Antoine Chaaya, the RPBW partner in charge of the projects, to maximize the width of sidewalks and the dimensions of plazas. In addition, Columbia put parking lots, mechanicals, and other back-of-house facilities underground, in what will ultimately be a 2 million-square-foot subterranean complex. That eliminated loading docks and many other street-level encumbrances.

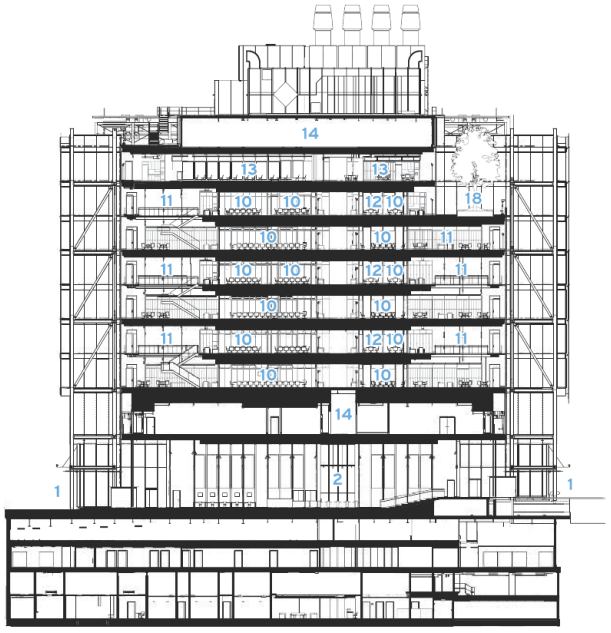
Given the density of the complex, much hinges on the architecture. In recent years, RPBW has developed a kit of parts, used in projects as diverse as the Whitney, an ensemble of port buildings in Genoa, and the additions to the Los Angeles County Museum of Art. The parts include metal facade panels (often painted pale blue or gray); exposed structural elements (including diagonal bracing); cantilevered glass awnings; and red or orange accents. Here, the erector-set approach seems particularly apt. The campus is flanked by a subway viaduct to the east and an elevated highway to the west. "The soul of the site is industrial," Chaaya observes.

JEROME L. GREENE SCIENCE CENTER



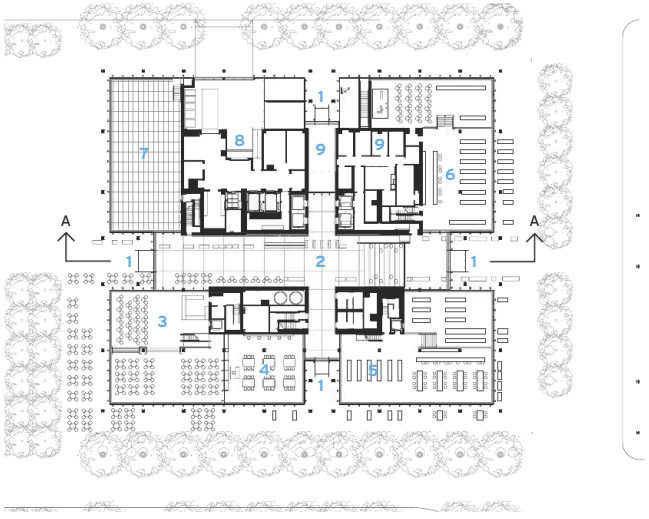
SITE PLAN

0 100 FT. 30 M.



SECTION A - A

0 30 FT. 9 M.

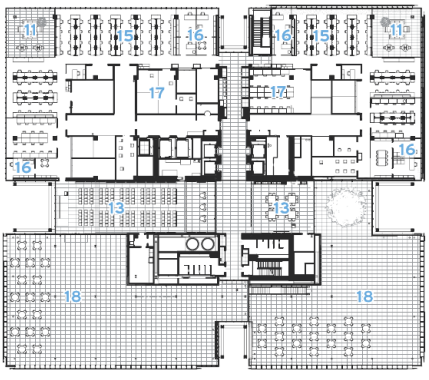


LEVEL-ONE PLAN

0 50 FT. 15 M.

LEVEL-THREE PLAN

0 50 FT. 15 M.

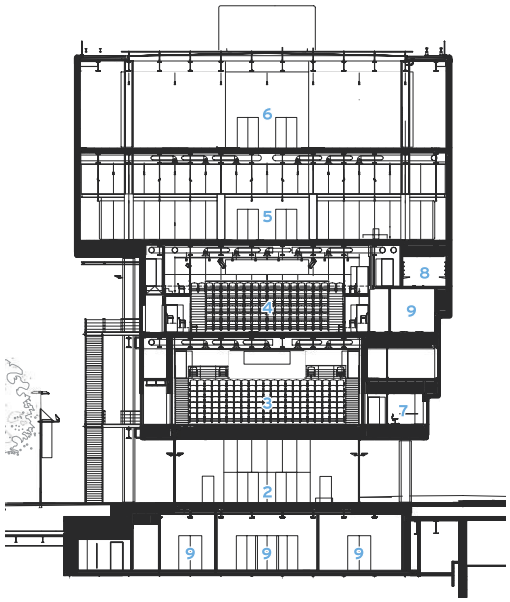


LEVEL-NINE PLAN

0 50 FT. 15 M.

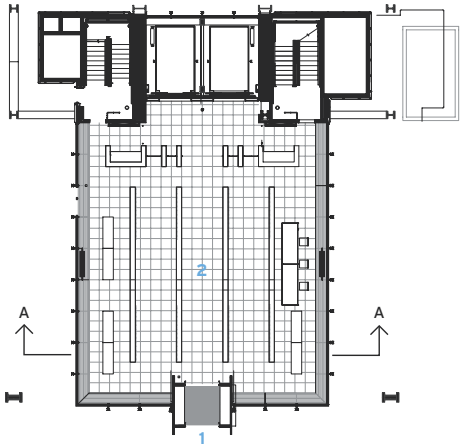
1 ENTRY
2 LOBBY
3 CAFÉ
4 EDUCATION LAB
5 ATHLETIC/RECREATION/ RETAIL
6 RESTAURANT/PERFORMANCE
7 IMAGING LAB
8 LOADING/STORAGE
9 WELLNESS CENTER
10 MEETING
11 INTERACTION/BREAK SPACE
12 VIDEO CONFERENCE
13 LECTURE ROOM
14 MECHANICAL
15 LAB
16 OFFICE
17 LAB SUPPORT/BACK OF HOUSE
18 TERRACE

LENFEST CENTER FOR THE ARTS



SECTION A - A

0 30 FT.
9 M.



GROUND-FLOOR PLAN

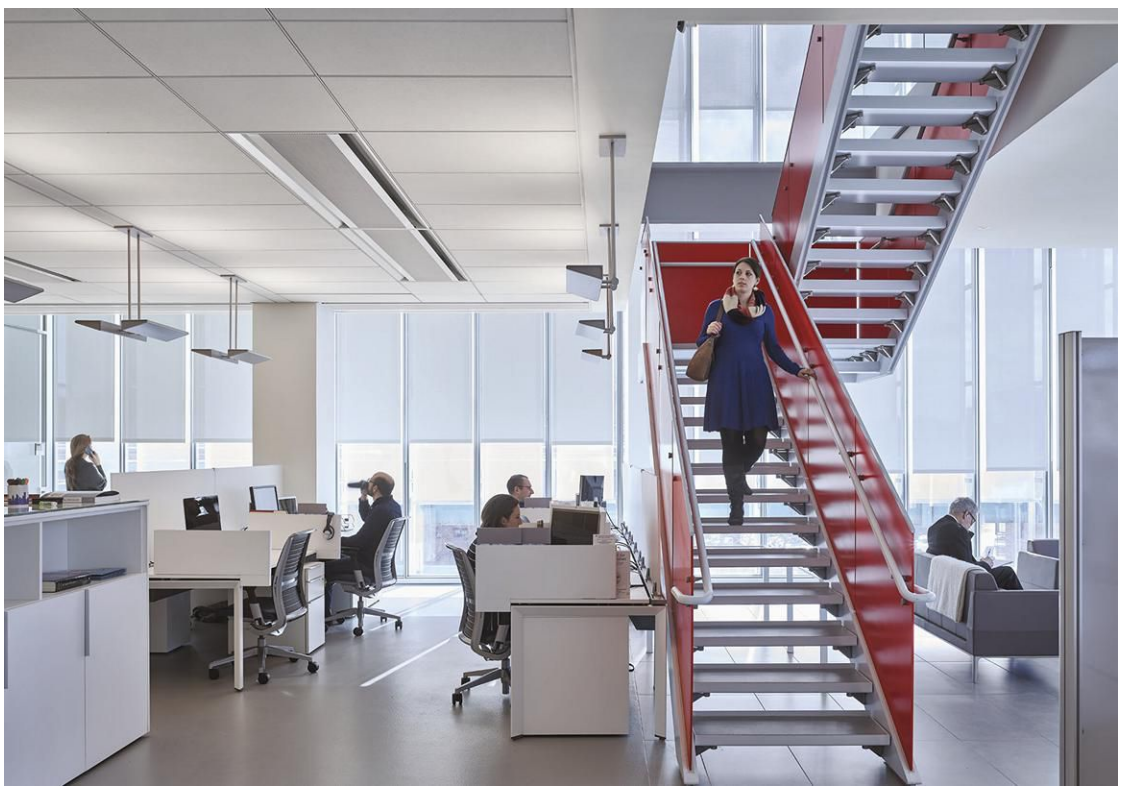
0 20 FT.
6 M.

1 ENTRY
2 LOBBY
3 KATHARINA OTTO-BERNSTEIN FILM SCREENING ROOM
4 PERFORMANCE SPACE
5 MIRIAM AND IRA D. WALLACH ART GALLERY
6 EXHIBITION/EVENT SPACE
7 OFFICES
8 DRESSING ROOMS
9 SUPPORT SPACES

MIND BLOWING Jerome L. Greene's lobby, open to the public, features a digital artwork, *Brain Index,* based on neuro-imagery by Laura Kurgan (of Columbia's Graduate School of Architecture, Planning and Preservation) and Mark Hansen (of the Graduate School of Journalism).

Lenfest is by far the smaller, and simpler, of the two new buildings. An eight-story, 60,000-square-foot tower, its glass-walled lobby doubles as an exhibition space. "We are pretending that the plaza continues into the lobby," Chaaya says of the ground floor's transparent facades. Elevators—whose north and south shaft walls are clear glass at the lobby level, so as not to interrupt views through the building—ascend to a second-floor screening room/lecture hall and a forth-floor "black box theater." Above that is the 20-foot tall, 3,600-square-foot Wallach Gallery, and a similarly proportioned top-floor gallery that boasts expansive skylights with exterior baffles. Because all the spaces may be used at the same time, a great deal of effort went into establishing acoustic separation, Chaaya says.

The larger Greene Center, at 450,000 square feet, also has an admirably clear parti. The roughly square building is divided into quadrants, with social spaces near the core and shared laboratories along the edges. Interior stairs connect workspaces and breakout areas, while exterior ones connect spacious terraces;



TEACHABLE MOMENT
Student groups, from the neighborhood and beyond, will learn about the brain in an education space on Jerome L. Greene's ground floor (above). A stair connects the building's workspaces and provides a colorful accent (left).

the goal, as in many new research facilities, is to maximize opportunities for spontaneous interactions among scientists.

Extra structural supports were provided to shield sensitive brain-imaging equipment from building vibrations. Another challenge was bringing the sound of the subway, at 88 decibels, down to an acceptable 44 decibels, according to Chaaya. This was achieved by using a double-glass skin for much of the exterior. In addition to providing acoustic insulation, the 16-inch channel between the glass layers reduces heating and cooling loads: air that has already circulated through the building is exhausted through this space, moderating indoor temperatures. It also brings a welcome layer of visual complexity—a kind of filigree—to what is otherwise a somewhat repetitive exterior.

When completed, the entire Manhattanville campus is expected to contain 6.8 million square feet of facilities on 17 acres, compared to a total of 5.6 million square feet on the 32 acres of the Morningside campus. That density, and the unavoidable newness of the buildings, could produce a kind of antiseptic office park on steroids rather than the inviting new neighborhood Columbia has promised. But with the architecture of the first two buildings, RPBW seems to have found a winning formula for blending town and gown. ■

credits

ARCHITECT: RPBW – A. Chaaya, partner in charge; S. Drouin, K. Doerr, E. Garnaoui, associates.

ARCHITECT OF RECORD: Davis Brody Bond – W. Paxon, J.M. Bond, D. Williams (Jerome L. Greene), partners. Body Lawson – V. Body-Lawson, partner; A. Walker, associate

CONSULTANTS: WSP/Parsons Brinkerhoff (structure); Jaros, Baum & Bolles (m/e/p); Atelier Ten (sustainability); James Corner Field Operations (landscape); IBA (facade)

CLIENT: Columbia University

SIZE: 450,000 square feet (Jerome L. Greene); 60,000 square feet (Lenfest)

COST: withheld

COMPLETION DATES: October 2016 (Jerome L. Greene); April 2017 (Lenfest)

SOURCES

CURTAIN WALL/CLADDING/GLAZING: Enclos, Interpane

ROOFING: Hydrotech, Kemper System, Hanover

ACOUSTICAL CEILING: Armstrong

INTERIOR PANELING: Saint-Gobain

PLASTIC LAMINATE: Formica

RAISED FLOORING: Haworth

FURNITURE: Steelcase, Vitra, Herman Miller, Knoll

LIGHTING: iGuzzini, USAI

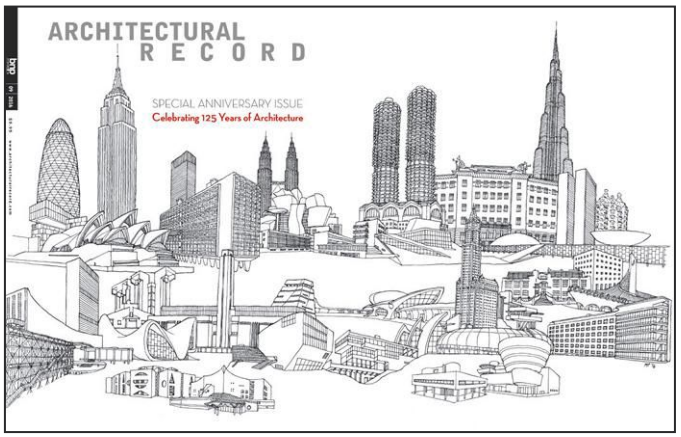
DIMMING SYSTEM: Lutron

ELEVATORS: Otis

DOUBLE DUTY Lenfest's screening room (top) also functions as a lecture hall. The building's new south-facing Wallach Gallery (above) occupies nearly a full floor, as does a similar gallery above it.

JESSE H. NEAL AWARDS
Est. 1955

2017 Record Achievements



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Best Single Issue

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Record History

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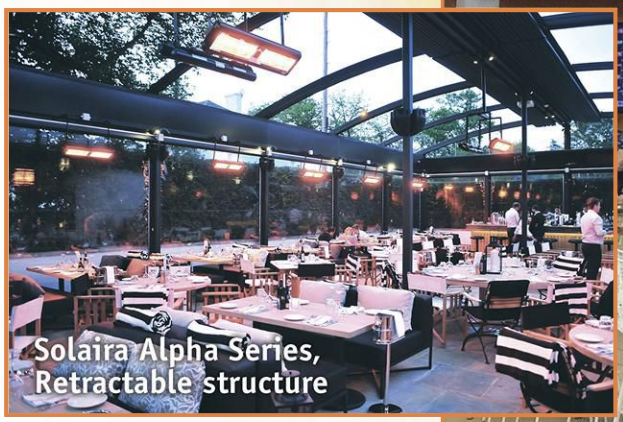
2015—Special Neal Award in recognition of Architectural Record being the member with the most Neal Awards at the 60TH Anniversary Ceremony

2012 Grand Neal—New York: The Death and Life of a Great American City

Radiant Infrared Heating Technology


The Breakers,
Palm Beach, FL


The Ritz-Carlton, (Recessed)
Toronto, Ont.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TALL BUILDINGS

Developers, corporations, architects, and clients invariably want to make their mark on the skyline. But as the following projects demonstrate, there is more to designing a good tower. It's not all about image, or simply gazing up. It's also about the experience of occupying such structures—with ample daylight and access to views—and how they engage the surrounding environment.

Continuing Education

To earn one AIA learning unit (LU), including one hour of health, safety, and welfare (HSW) credit, read the five "Tall Buildings" project stories on the following pages and complete the quiz at continuingeducation.bnpmedia.com or by using the Architectural Record CE Center app available in the iTunes Store. Upon passing the test, you will receive a certificate of completion, and your credit will be automatically reported to the AIA. Additional information regarding credit-reporting and continuing-education requirements can be found at continuingeducation.bnpmedia.com.

Learning Objectives

1 Describe unusual approaches to tall building structures, including exoskeletons.

2 Discuss the potential performance benefits provided by a double facade.

3 Describe some of the structural and human comfort challenges presented by especially slender tall buildings.

4 Discuss resilience strategies suitable for tall buildings and new urban districts, such as co-generation.

AIA/CES Course #K1705A

PHOTOGRAPHY: © MICHAEL MORAN

10 HUDSON YARDS, NEW YORK, BY KOHN PEDERSEN FOX ASSOCIATES

56 Leonard Street | New York | Herzog & de Meuron

Stacking the Deck

A New York residential tower presents a new take on the city's classic skyscrapers.

BY JOANN GONCHAR, AIA

PHOTOGRAPHY: © IWAN BAAN, EXCEPT AS NOTED

HIGH LIFE 56 Leonard Street, in the Tribeca neighborhood of Lower Manhattan (above), is an assemblage of glass-ensclosed volumes and cantilevering terraces, with the most exuberant projections occurring near its top (opposite).

For quite a while, it seemed as if Herzog & de Meuron's 56 Leonard Street project—a 57-story residential tower in the Tribeca neighborhood of Lower Manhattan—would never get built. For four years during the financial crisis, construction was at a total standstill. But now, nearly a decade after ground was broken, the structure, made up of stacked glass-enclosed volumes and projecting terraces, is almost finished, and residents are starting to move in.

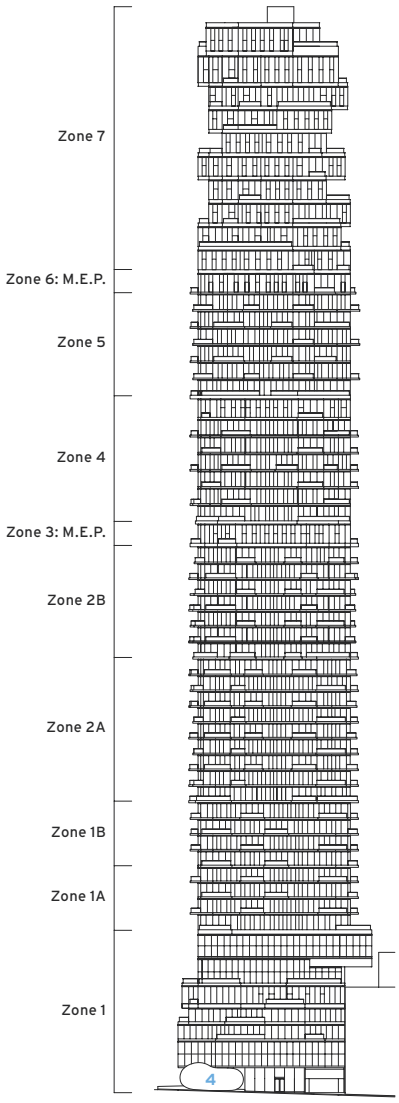
Ascan Mergenthaler, a Herzog & de Meuron partner, says that the idea behind the unusual cantilevering geometry was not to defy gravity, but to design the units from the inside out and then express the individual apartments and their generous outdoor spaces in the form of the architecture.

Although 56 Leonard has been referred to as "Jenga-like" countless times in the press, the result is an assemblage that appears carefully balanced in equilibrium rather than on the verge of toppling over. Its protruding elements recall the famous image of a disembodied hand sliding one apartment into a model of Le Corbusier's Unité d'Habitation in Marseille, France. This sensation of pushing and pulling, together with its reflective glass envelope, give the building a compelling chimera-like quality, with features that seem to change depending on one's vantage point, the weather conditions, or the time of day.

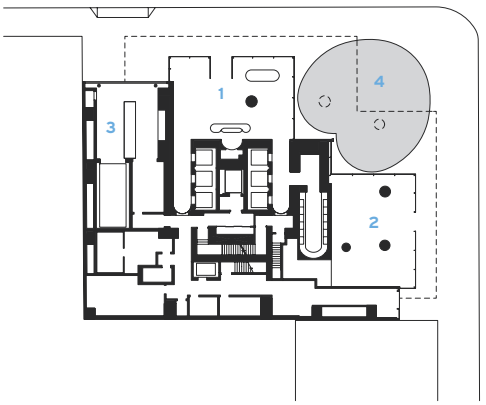
The 831-foot-tall reinforced concrete structure (see sidebar, page 96) contains only 145 condominiums, ranging from 650-square-foot studios to penthouse apartments of more than 6,000 square feet. Although no two floors within the building are exactly the same, the unit types are organized into seven zones that can be discerned from the outside if one carefully studies the shift in the patterns of the extending balconies. The most exuberant projections occur near the top.

But even if the expressive crown refers to an earlier time of New York's classical skyscrapers with silhouetted spires, Herzog & de Meuron's building, which has a width-to-height ratio of about 1:10.5, is also representative of an emerging New York typology. This is the tall, slim, luxury residential tower with spectacular city views. In the case of 56 Leonard, depending on an apartment's position and orientation within the structure, occupants look out over the surrounding neighborhood and toward the Hudson and East rivers, Wall Street and the World Trade Center, and, in the distance, Midtown. These vistas—as well as views of the tower from elsewhere in Manhattan—could actually remain unobstructed due to the peculiarities of the 12,500-square-foot parcel, which is surrounded by a mostly low-rise, height-restricted historic district. The 56 Leonard lot, previously owned by the New York Law School, was exempt from these limits. And when the developer, Alexico Group, purchased it in 2006, it also acquired the air rights transferred from the school's adjacent properties.

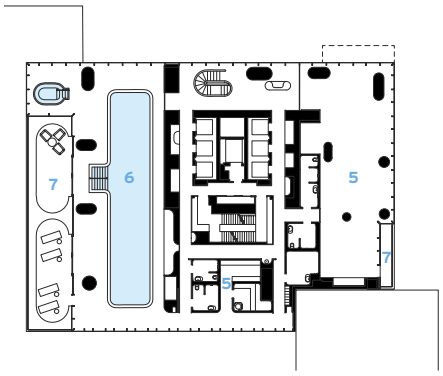
It should be noted that Leonard Street's peers in slenderness, such as the completed 432 Park by Rafael Viñoly, or under-construction towers like SHoP's 111 West 57th and Jean Nouvel's 53 West 53rd, have sparked



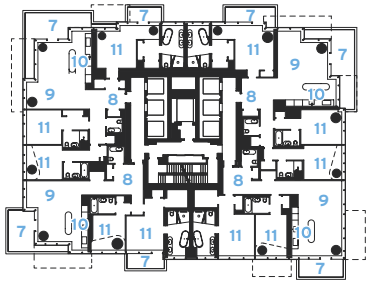
NORTH ELEVATION



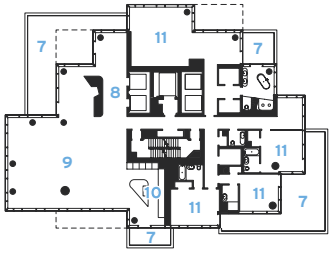
BASE: LEVEL-ONE PLAN



BASE: LEVEL-SEVEN PLAN



ZONE 2B: LEVEL-25 PLAN



ZONE 7: LEVEL-49 PLAN

1 LOBBY
2 RETAIL
3 GARAGE ENTRY
4 ANISH KAPOOR SCULPTURE
5 GYM/SPA
6 POOL
7 TERRACE
8 FOYER
9 LIVING ROOM
10 KITCHEN
11 BEDROOM

PHOTOGRAPHY: © ALEXANDER SEVERIN (OPPOSITE, BOTTOM)

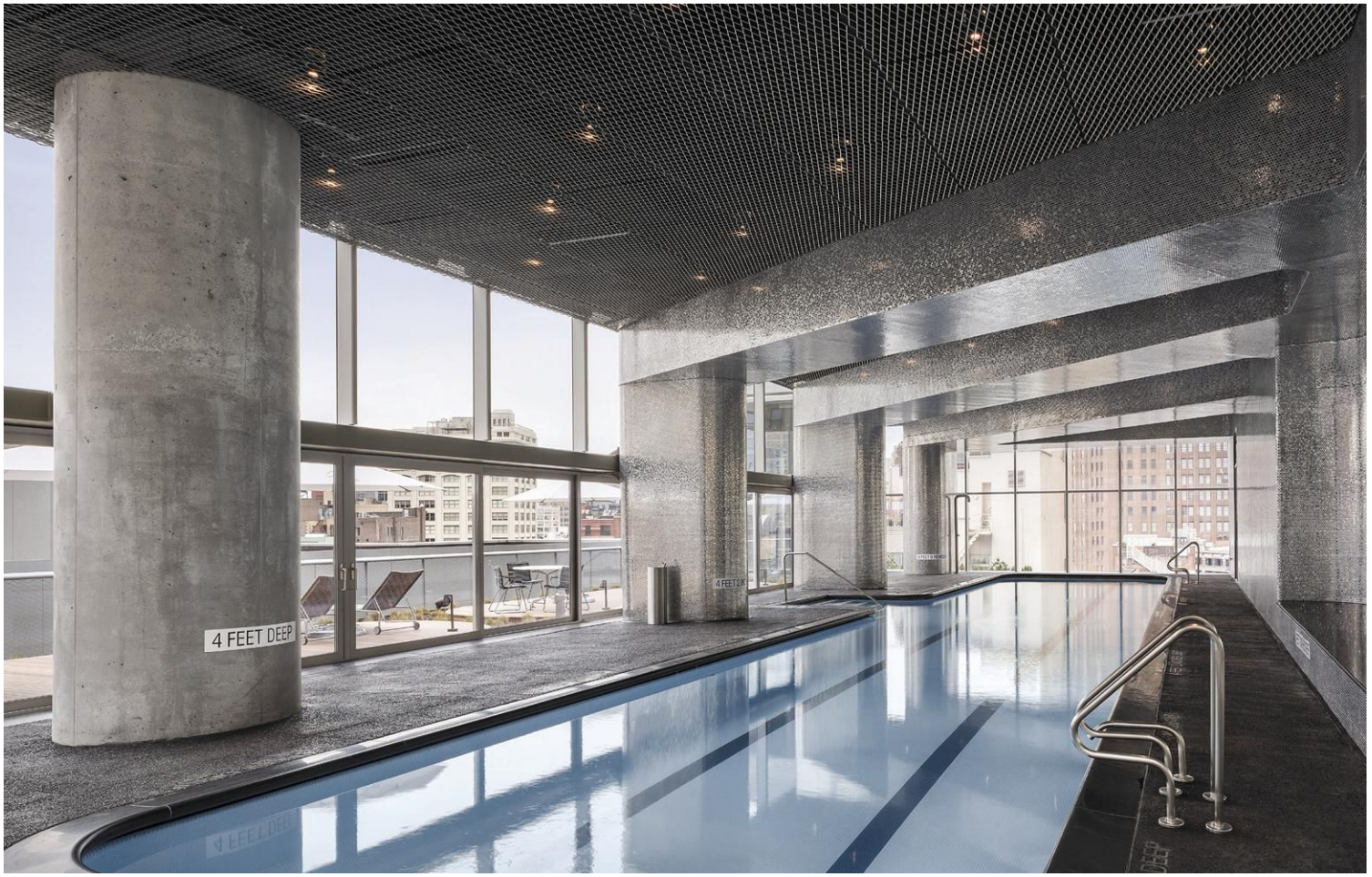
criticism on many fronts. One complaint is that the apartments' uber-wealthy investors will rarely occupy them, leaving the buildings—most of which are concentrated around the southern end of Central Park—empty and lifeless.

Both Herzog & de Meuron and Alexico take pains to distinguish their tower from their uptown super-skinny cousins. The apartments at 56 Leonard "are not safe deposit boxes in the sky," says Mergenthaler. "The majority of the owners are really living there." Many of the buyers are moving from elsewhere in Tribeca, says Izak Senbahar, Alexico's president. He points out that the neighborhood has a paucity of buildings with amenities like those at 56 Leonard, which include parking, a 75-foot-long lap pool, and a movie screening room. Though construction is still not entirely complete, about 45 apartments are already occupied.

Most of these residents may well be actual New Yorkers, but they are without question very affluent ones. All except two of 65 Leonard's units have been sold, fetching an average of $3,250 per square foot, according to one local real-estate publication. All that remains is a 15th-floor one-bedroom, with an asking price of just over $3 million, and a 3,700-square-foot penthouse listed at $17.75 million.

To reach the apartments, residents and visitors travel through a very sober lobby. It has walls clad in lozenge-shaped black granite tiles, exposed concrete slab as the ceiling, and a light gray terrazzo floor. But once 56 Leonard's deni-

BACK IN BLACK
Views of 56 Leonard should remain unobstructed from the nearby streets (opposite) since it is surrounded by a height-restricted district. Residents and visitors enter the building through a sober lobby with walls clad in lozenge-shaped black granite tiles (right). The amenity spaces continue the dark palette. The pool (bottom) has black terrazzo floors, treated to make them slip resistant.



VIEW MASTER Floor-to-ceiling window walls (left) wrap the entire perimeter of every apartment, providing spectacular views, especially from the upper floors. All the units have projecting balconies (opposite), but none line up with those on the floors above or below.

zens ascend, daylight and the dramatic views take command. Inside the units, the ceilings are a minimum of 11 feet high, while some penthouses have almost 19-foot ceilings. Finishes are primarily soft-toned and light-reflective, including white oak floors, acid-etched mirrored kitchen cabinets, and bathroom walls covered in white marble. The insulated glazing, which stretches from slab to slab and around the entire perimeter, includes two different coatings to help control heat gain and glare. (It is up to the owners to install the window treatments they will presumably want for privacy.)

One of the project's rare missteps is a planned public art piece by Anish Kapoor. As shown in renderings, the sculpture will be an unfortunate adaptation of his beanlike *Cloud Gate* at Chicago's Millennium Park. The aim is to help anchor the building to the ground, says Senbahar. But it is hard to imagine how the mirrored sculpture will accomplish that: the piece will be awkwardly lodged under one corner at street level, appearing as though it is slightly deflated from the weight of the structure above.

Fortunately, most people will be able to avoid the Kapoor sculpture and admire the building as an arresting addition to Lower Manhattan's skyline. ■

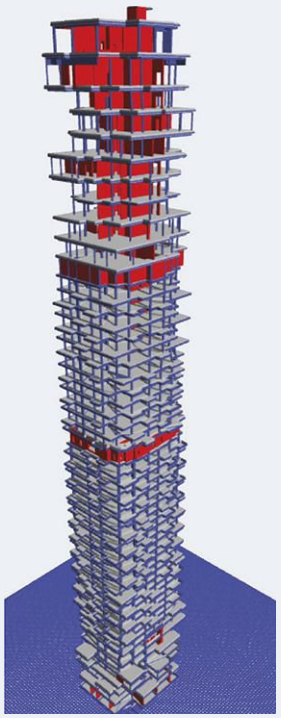
CLOSE-UP: The Skinny on the Structure

The basic structural elements for 56 Leonard sound conventional enough: the building has a concrete core and concrete flat-plate slabs supported by concrete columns and shear walls. But though it sounds typical, it was highly challenging to engineer and construct. Its scheme of stacked and shifting volumes meant that no two consecutive floors are the same. "It's a monumental sculpture," says Silvian Marcus, director of building structures at WSP|Parsons Brinckerhoff, the project's structural engineer.

Because the columns don't align from level to level, Marcus and his team designed "walking columns." These are one- or two-story structural walls that transfer loads between floors. To support the building's many cantilevers, in most cases the engineers used the thickness of the slabs, but for some they added beams. The longest cantilevers—which project as much as 25 feet—required Vierendeel trusses extending over two stories.

To significantly increase the rigidity of the structure, the engineers connected the columns to the core at mechanical floors 32 and 46 with outriggers and belt walls that wrap the perimeter.

Despite such measures, the slender tower—with an aspect ratio of about 1:10.5—still has a tendency to sway. But it includes a liquid slosh damper at the top. This tank, measuring 32 by 36 feet by 10 feet tall, is filled with water that moves to counteract the sometimes perceptible wind-induced "acceleration." The device is not a safety or code requirement, says Marcus—it is purely for occupant comfort. "The code does not care about feelings," he says. *J.G.*



STRUCTURAL MODEL

credits

ARCHITECT: Herzog & de Meuron – Jacques Herzog, Pierre de Meuron, partners; Ascan Mergenthaler, partner in charge; Philip Schmerbeck, project director; Mehmet Noyan, project manager; Vladimir Pajkic, associate

EXECUTIVE ARCHITECT: Goldstein, Hill & West Architects

CONSULTANTS: Cosentini Associates (mechanical); WSP|Parsons Brinckerhoff (structural); Schwinghammer Lighting (lighting); Gordon H. Smith Corporation (facade)

CONSTRUCTION MANAGER: Lend Lease

CLIENT: Alexico Group

SIZE: 490,000 square feet

COST: withheld

PROJECTED COMPLETION DATE: June 2017

SOURCES

WINDOW WALLS: Enclos

OPERABLE WINDOWS: Schüco

WOOD FLOORS: RO Floors

LIGHTING: Maison Lucien Gau; Patrick Nash Design

IMAGE: COURTESY WSP|PARSONS BRINCKERHOFF

Maslak Tower No. 1 | Istanbul | Emre Arolat Architecture

The Ripple Effect

Concealing a straightforward office tower within, a curvilinear exterior commands attention.

BY SHONQUIS MORENO

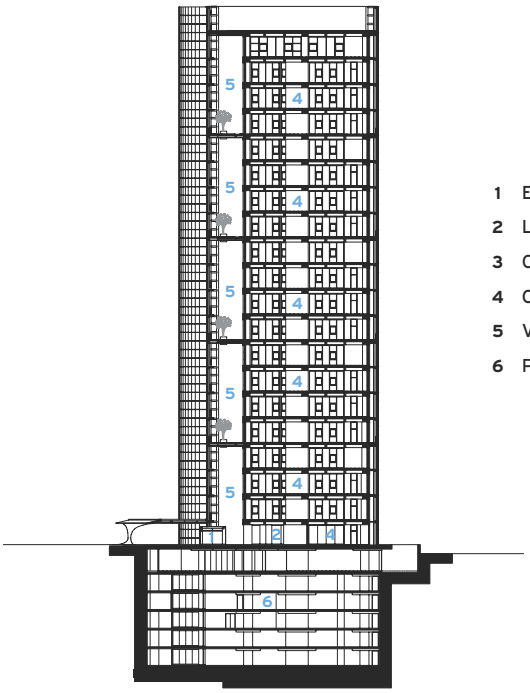
PHOTOGRAPHY BY THOMAS MAYER

Turkey's recent boom economy, though now bust, is manifest in Maslak, Istanbul's business district. Office blocks, malls, and high-rent residential towers, arising haphazardly, have formed a skyline with little coherence. In the absence of urban planning, Turkish corporations have vied to embody their power and prestige in buildings, forming a mismatched, chest-beating architectural tribe. There is one office tower in the area, however, whose voluptuous, textured silhouette stands out against the hard, glossy grids and erratic geometries. Designed by Emre Arolat Architecture, Maslak Tower No. 1 is named for its street address. It occupies an irregular site—at the confluence of two busy boulevards, limited by local code to a footprint of only 7,535 square feet and 20 stories (280 feet) high—while surrounding towers rise to about 50 stories.

"The client was looking for an extravaganza, something distinct from the others," Arolat says, "but the business partners didn't have a site on which it was possible to do a grandiose or powerful-looking building. I told them that it's not easy, when everyone is shouting, to make yourself heard. To distinguish oneself, it's better to be very, very quiet." It turned out that, although regulations restricted the building's floor area, there was no limitation on the volume of the building. "We realized that if we created a void inside, it wouldn't count in the regulation's numbers," explains Arolat's partner, Gonca Paşolar, "but the building would look much bigger than it really was."

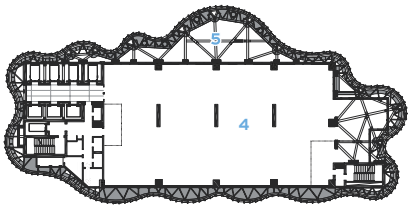
The architects decided to build a rather ordinary, inexpensive, reinforced-concrete building with a double-glazed curtain wall inside an outer, strikingly unique, curvilinear facade. This facade would have overlapping laminated, fritted, and clear glass panels. Its undulating exterior wall stands apart from the basic inner box for office space, so that an airy void is created between the two. This peripheral interior space contains 66-foot-high vertical gardens facing southeast with planters on every fourth floor, and metal grate walkways on the north, which can be accessed by the occupants. The void has its own natural microclimate: it is warmer in winter and cooler in summer, providing ventilation

MIESIAN DREAMS Mies van der Rohe's early, unbuilt skyscraper designs, including his curvilinear one of 1922, continue to influence architects today. The 20-story Maslak Tower No. 1 in Istanbul (right) renders the modernist prototype in fritted and clear glass. Its biomorphic outer wall is connected to the interior concrete-and-glass curtain wall structure by an exoskeleton of steel and curving beams (opposite).

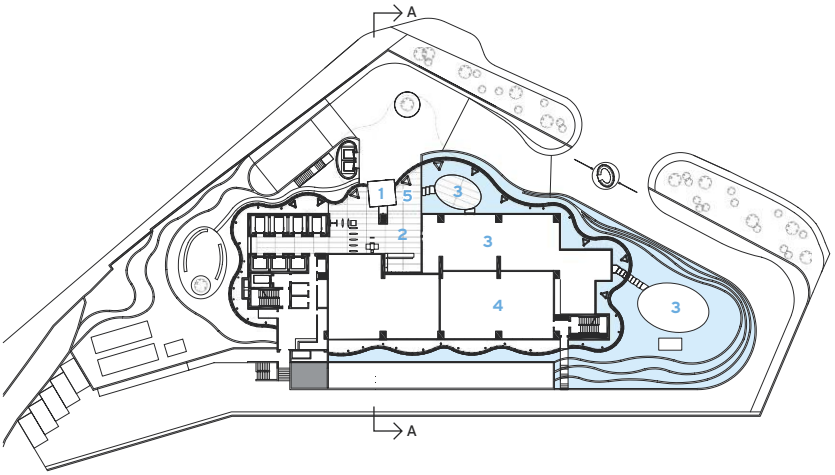


1 ENTRANCE
2 LOBBY
3 CAFÉ
4 OFFICE SPACE
5 VOID
6 PARKING

SECTION A - A

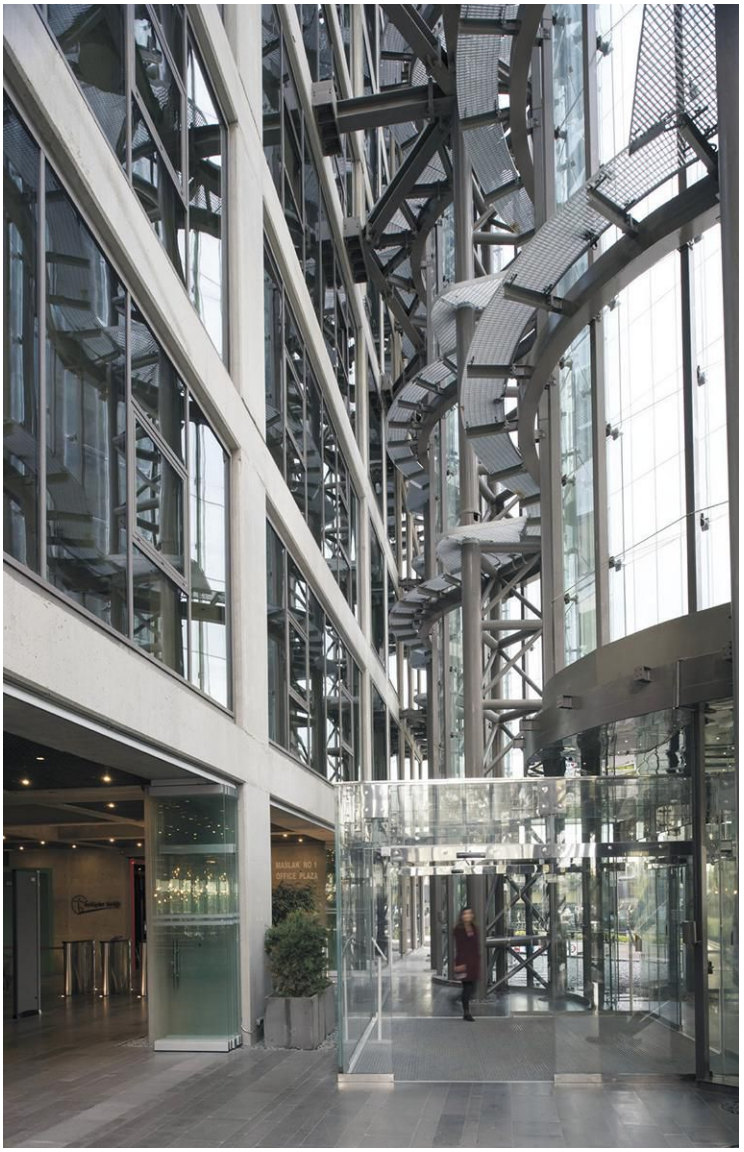


TYPICAL UPPER-FLOOR PLAN



GROUND-FLOOR PLAN

0 30 FT.
10 M.



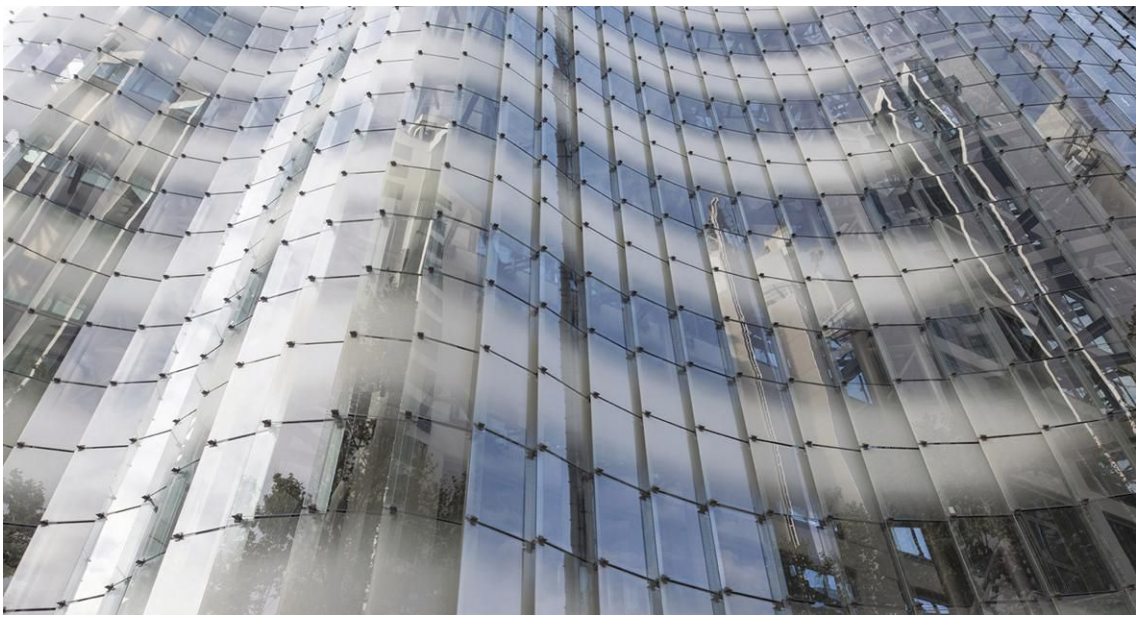
and lower energy consumption while filtering light, cutting street noise by 70 percent, and shielding the offices from wind and dust.

The biomorphic facade hides an explicitly industrial exoskeleton that anchors the outer skin to the inner structure. The architects left these columns and curving beams exposed within the cavity to preserve sight lines from the ground to the roof.

The building's spatter-shaped plan consists of 12 folds or extrusions from the face of the building that generate a variety of views in and out. "There are very fast roads around the building," Arolat says, "so when you see it, it always appears at a different angle and in a different color or light."

Security is a priority in Istanbul, where political coups, shootings, and bombings occur, and new sections of the city are characterized by gated communities. One of the resulting failings of Maslak's neighborhood is its lack of public or green space. Access, controlled by guards and X-ray monitors, is limited to employees, which makes the ground floor of most towers impermeable. To mix security and porosity, exclusivity and inclusivity, Arolat designed indoor and outdoor spaces for a café (called Prototype No. 1) at street level. Only employees can enter upper floors—there are no floor-selection buttons in the elevators because staff IDs admit them only to the levels they work on—but

WITHIN THE WHORL
The exterior facade's overlapping fish scale–like cladding covers the curvilinear facade (right). Spaces between the fins allow air to enter the void located between the outer skin and the interior concrete structure (above). At the ground level, the void between the exterior and interior enclosures provides space for the entrance lobby (opposite).



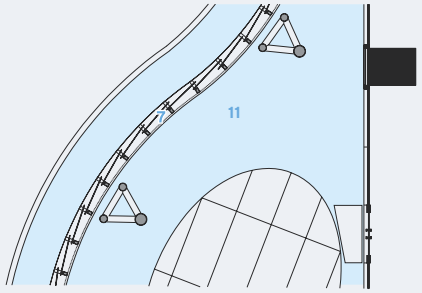
CLOSE-UP: A Thicker Skin

To create the outer skin, data describing the climatic conditions affecting the tower were modeled in three dimensions. The resulting curvilinear facade is comprised of 3,792 rectangular, tempered, laminated-glass modules that are 43 inches wide by 52 inches high, spaced 4 inches apart. Those on the west and south facades are fritted with translucent enamel in various opacities and mapped strategically onto the building. The inner skin is insulated glass with a low-E coating.

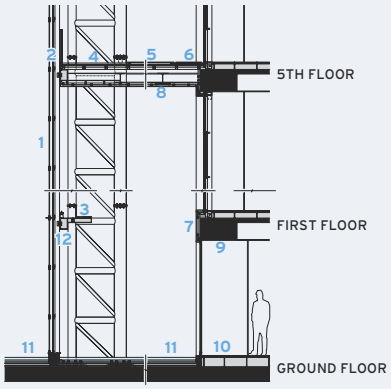
The outer facade is anchored to the inner building's structure at every fourth floor, creating levels with vertical "gardens" on the southeast—though these are just a few large planters and can only be accessed by opening interior windows. On the north face, however, employees can open glass doors onto metal-grate walkways that extend the length of every floor and provide lounges.

To connect the outer glass skin to the concrete building, structural engineer Altineller used three-dimensional vertical trusses on the wider facades facing north. These are the ones fastened to the main structure every fourth floor via a 27-by-27-foot grid of steel beams. The trusses support curving steel beams—dubbed "snail beams." They follow the form of the undulating outer skin, resting on steel supports that coincide with every glass module. Each of these modules are attached to the inner building by four steel U-profiles. The exposed structure keeps sight lines open. Arolat says, "I consider the structural engineer one of the architects of this building." *S.M.*

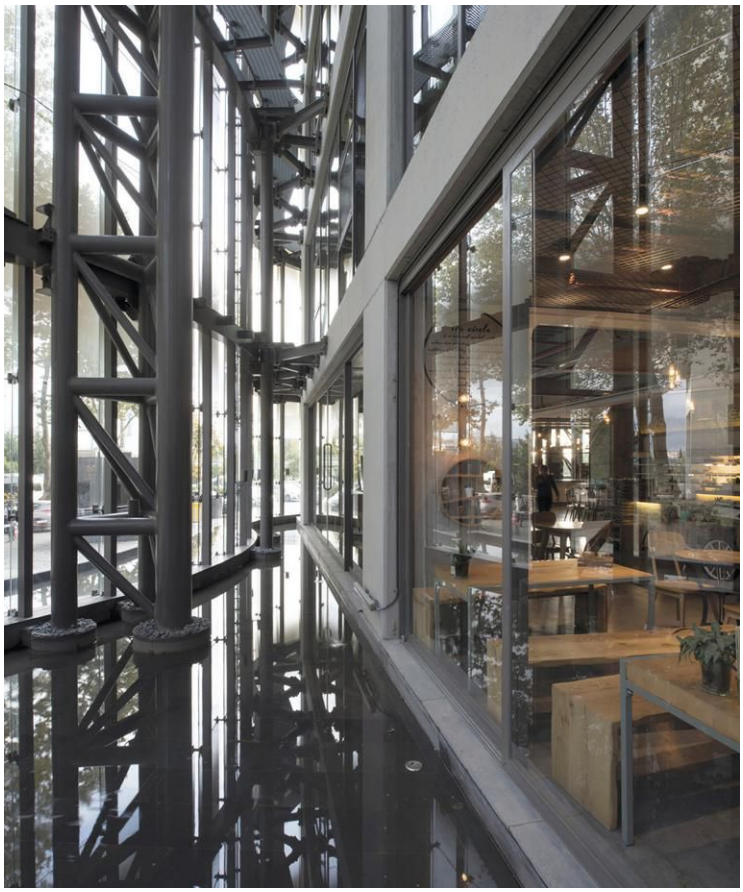
1 LAMINATED GLASS
2 STEEL L SECTION
3 CATWALK
4 GRAVEL
5 WOOD
6 STONE
7 COMPOSITE PANEL
8 PERFORATED ALUMINUM
9 EXPOSED CONCRETE
10 RAISED FLOOR
11 WATER
12 STEEL SUPPORT



DOUBLE FACADE - PLAN DETAIL



DOUBLE FACADE - SECTION DETAIL



LAYERED LOOK The offices within the concrete-and-glass inner structure open into the void (left). This space also allows for a café off the lobby (opposite, bottom). Offices are fitted with operable windows for natural ventilation (opposite, top). The interior is not revealed on the outside (opposite, right), which is enclosed with fritted and transparent glass.

the eatery is open to any passerby.

And that, not coincidentally, is where the void begins. Those sitting on the café's island-like inner terrace, surrounded by a shallow pool of water and its reflections, can look up through the building's industrial filigree and feel the sun filtering through onto their faces. Not far from security, it is a manifestly peaceful space. ■

Shonquis Moreno is a design and architecture journalist based in Istanbul, San Francisco, and Brooklyn, New York.

credits

ARCHITECT: Emre Arolat Architecture – Deniz Kösemen

ENGINEERS: Altineller Engineering (structural); Tanriöver Engineering (mechanical); Aykar Engineering (electrical)

CONSULTANTS: Marka (landscape)

GENERAL CONTRACTOR: Alsar Reic

CLIENT: Alsar Reic, Koçkaya Holding Company

SIZE: 312,000 square feet

COST: $20 million

COMPLETION DATE: August 2014

SOURCES

MASONRY: Nuh Yapi

METAL PANELS AND RAINSCREEN: Erbay Aluminum

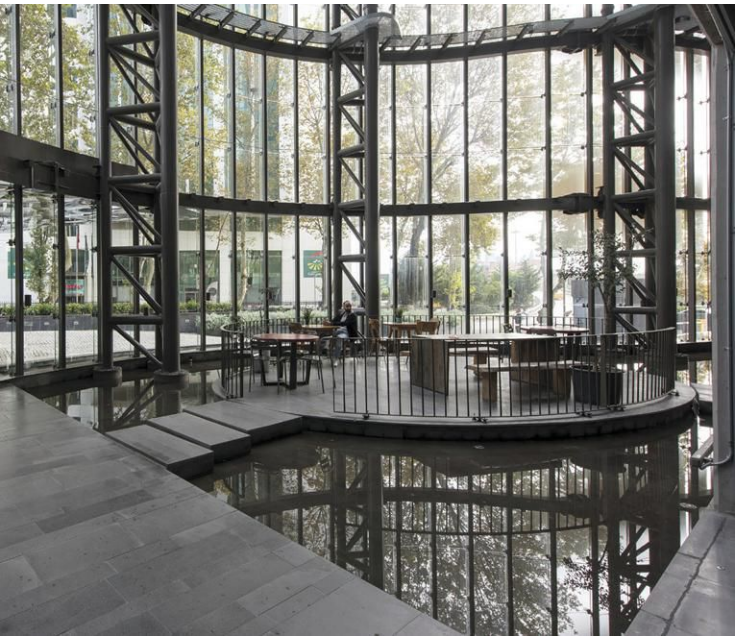
METAL FRAME: Erbay Aluminum, Schüco

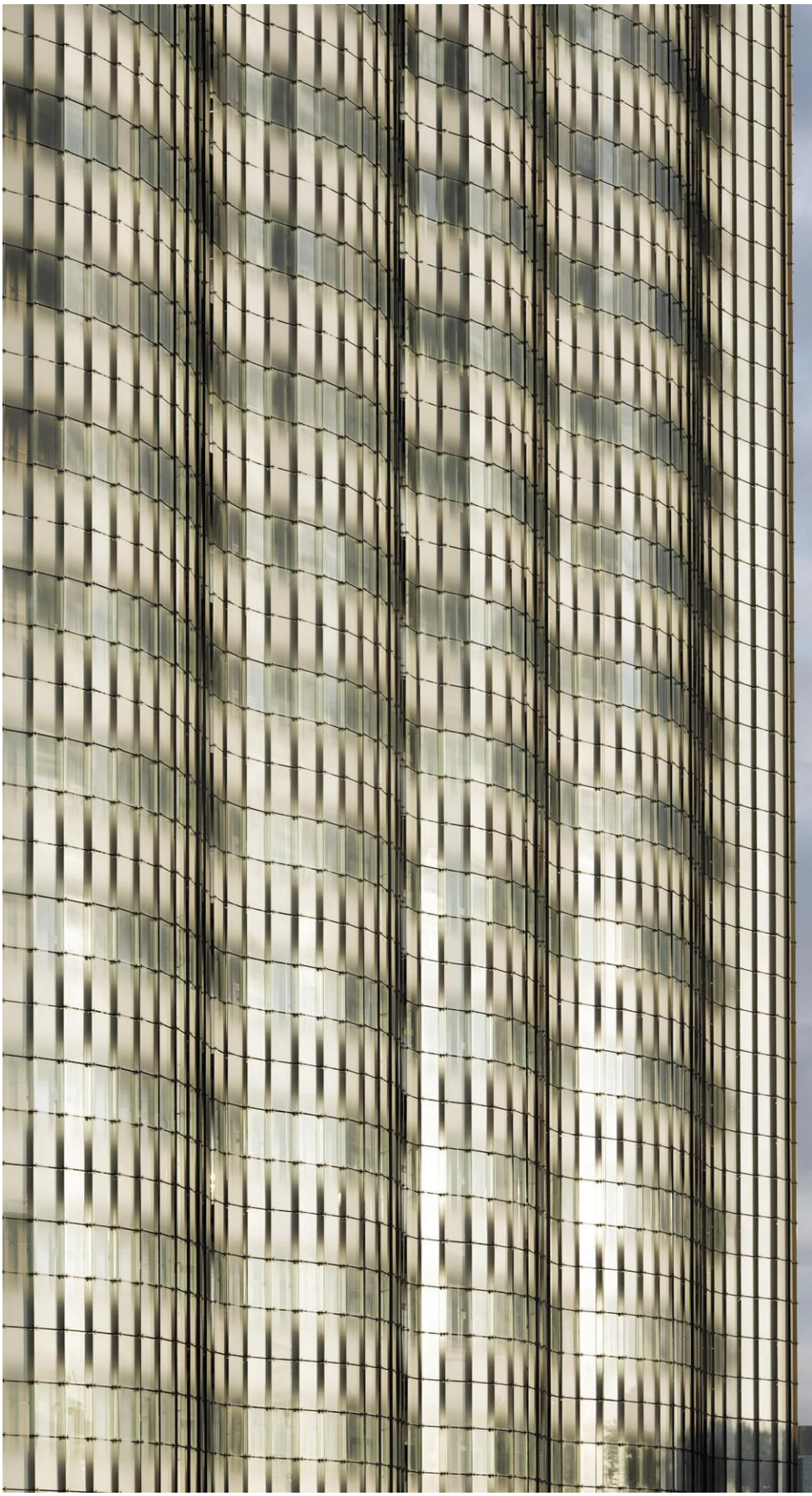
GLASS: Trayka

ENTRANCES AND HARDWARE: Dorma

ELEVATORS: Otis

PLUMBING: VitrA





Cummins Tower | Indianapolis | Deborah Berke Partners

Packing a Punch

A new corporate headquarters makes a big impact both inside and out.

BY BLAIR KAMIN

PHOTOGRAPHY BY CHRIS COOPER

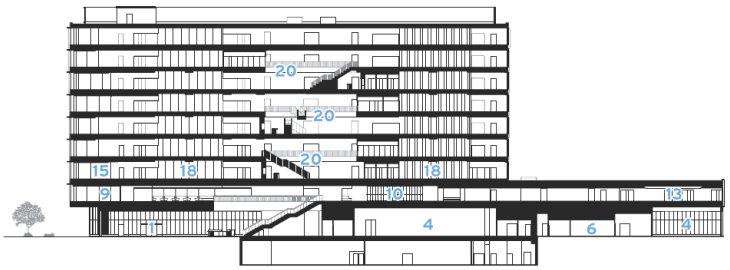
Supertall skyscrapers get all the attention, but far shorter office buildings deserve deliberation too. After all, they're much more pervasive—and, thus, have a greater impact—than the world's Burj Khalifas. Consider the new nine-story Cummins Distribution Business headquarters in downtown Indianapolis, the first office building designed by New York architect Deborah Berke, founder of the eponymous firm and dean of Yale's School of Architecture. It's an impressive, innovative debut, one that extends this Fortune 500 engine maker's tradition of forward-looking patronage from nearby Columbus, Indiana—the small town that the company transformed into a showcase of modern architecture—to the state's largest city.

That Cummins tradition began in 1957, when the company's late CEO, J. Irwin Miller, created a charitable foundation that encouraged the design of progressive new school buildings in Columbus. Miller's commitment to design excellence prodded other local executives and officials to sponsor equally distinguished architecture, including a newspaper building by Skidmore, Owings & Merrill, a church by Eero Saarinen, and a library by I.M. Pei. While Cummins remains headquartered in Columbus, 40 miles south of Indianapolis, its new building brings the company closer to its global-sales and customer-support network via proximity to the city's international airport and nexus of interstate highways.

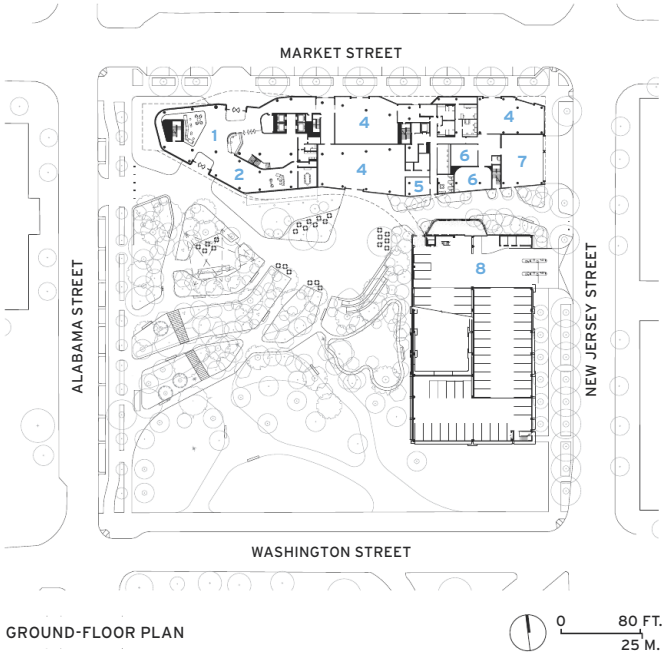
Located two blocks east of Monument Circle, the Beaux-Arts heart of downtown Indianapolis's L'Enfant-esque mile-square plan, the 142-foot-tall structure rises on a four-acre site once occupied by the now-demolished Market Square Arena, an anti-urban behemoth where Elvis Presley performed his last concert in 1977. A block-long podium skirts the site's north edge and frames the urban corridor of Market Street. A multilevel parking garage forms the bottom leg of the L-shaped Cummins complex, defining the edge of an adjacent park and orienting the site toward a transit center to the southwest. A second-story bridge links the carefully detailed garage to the office building and creates a gateway into the site from the east. Such moves turn the necessity of the garage into an urban design virtue.

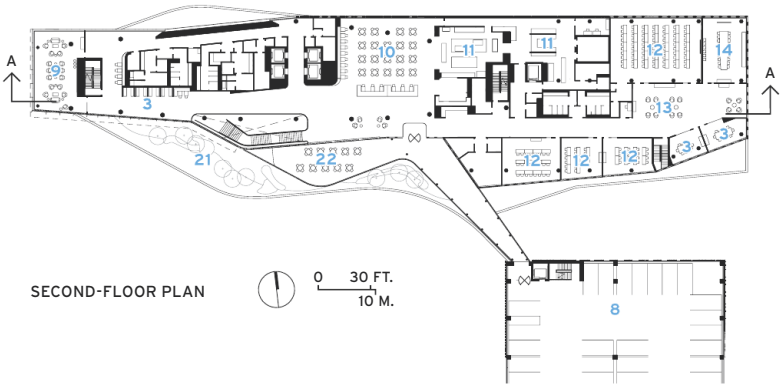
While the office building can be accused of indulging the

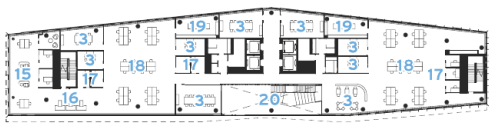
SITE SPECIFIC Enlivened by cantilevers and sunshades of varying depths, the south-facing wall of the Cummins Distribution Business headquarters (opposite) is calibrated to optimize energy efficiency. The nine-story building's north and west walls (above) frame the urban corridor of Market Street and gesture toward Monument Circle, the heart of downtown Indianapolis.



1 LOBBY
2 DISPLAY AREA
3 MEETING
4 RETAIL
5 BIKE ROOM
6 MAINTENANCE/ MECHANICAL
7 LOADING
8 PARKING
9 READING ROOM
10 THE SQUARE
11 KITCHEN
12 TRAINING ROOM
13 PRE-FUNCTION
14 BOARD ROOM
15 QUIET ZONE
16 WALKING STATIONS
17 FOCUS BOOTHS
18 OPEN OFFICE
19 RESOURCE/ LOCKERS
20 SOCIAL HUB
21 GREEN ROOF
22 TERRACE







GRAND ENTRANCE Kendall Buster's engine-inspired sculpture and a dramatic staircase animate the ground-floor lobby (opposite).

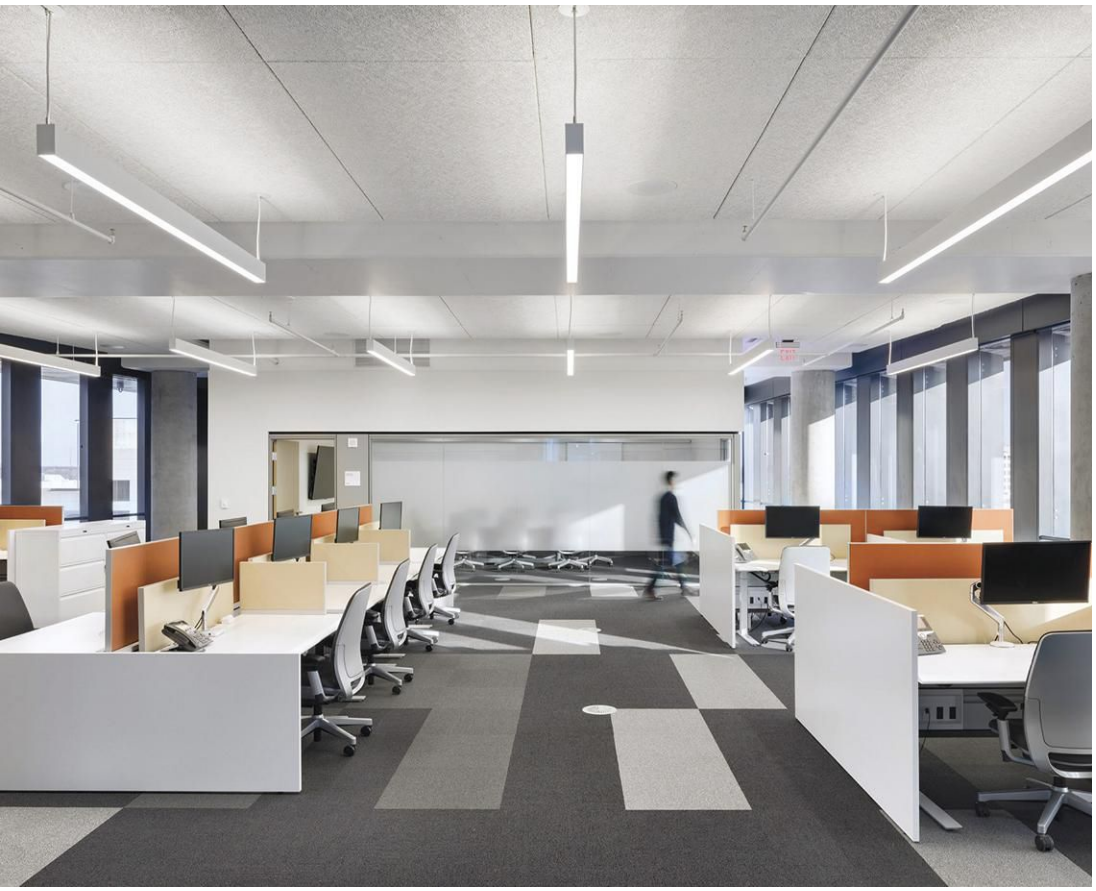
current architectural fashion for stacked boxes, its form actually derives from three rational imperatives: provide a light-filled work environment, reduce energy consumption, and continue Cummins's tradition of distinguished modern architecture. A sun-and-energy study prepared by Atelier Ten in cooperation with Berke's firm led to a tower of shifting floor plans whose overhangs create dynamic massing and provide sun-shading. Vertical fins and brises-soleil offer more protection from the sun as well as rich textures and visual rhythms. The sun-shading elements vary not only from facade to facade, but within a facade, based on the position of the sun and the interior function of the space behind the glass. The exterior "is calibrated in terms of performance and syncopated in terms of aesthetics," Berke says, explaining that Cummins's precision-oriented engineers embraced the notion of calibration. Her narrow floor plates enable daylight to penetrate deep into the interior of the post-tensioned concrete structure and further reduce the need for electric illumination. The design is projected to cut peak cooling loads by 10 percent, she says.

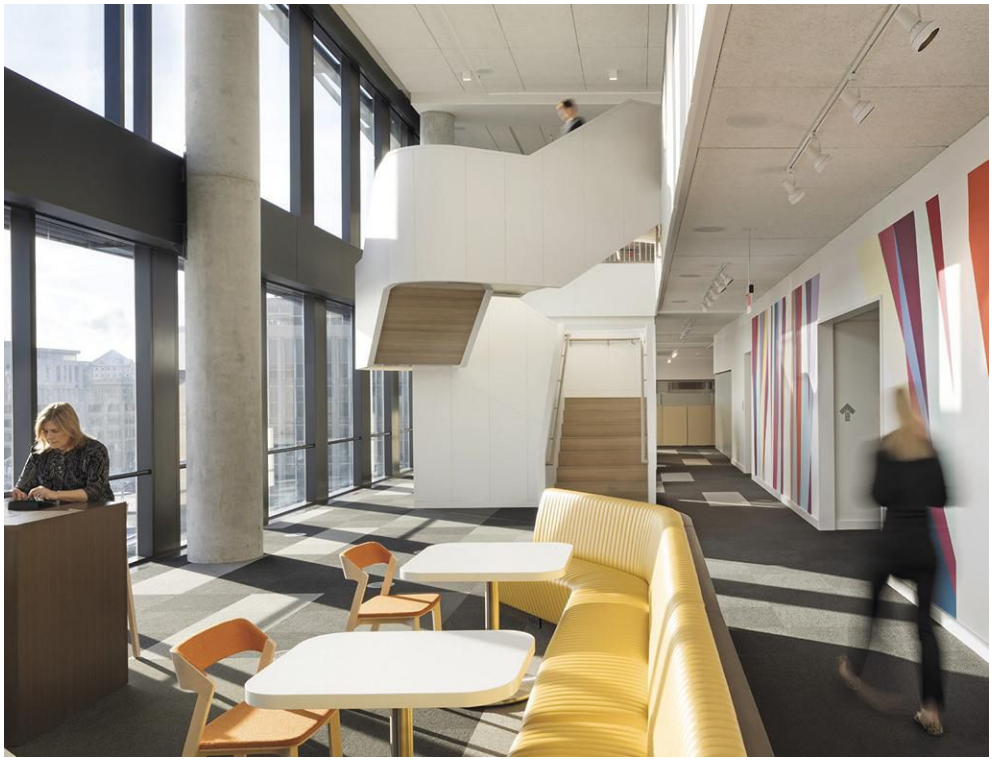
Just as the building engages the city around it, so it bids Cummins's employees to interact with each other. That communitarian impulse is evident in a streetlike second-floor corridor that gathers workers coming into the building from the garage with those who ascend a dramatic staircase from the generously proportioned lobby. The design, as Berke says, creates "a moment in the building where people all come together in one place."

The most intriguing spaces occupy the upper floors, which are organized in pairs (3-4, 5-6, 7-8, with the empty 9th reserved for expansion). Along the south-facing wall, double-height "social hubs" create airy, light-filled meeting zones and, along with internal stairs, link four sets of open-plan "neighborhoods," two on each floor (there are no private offices, not even for executives). Workstations in these are not reserved for one person because many Cummins employees are often on the road. Accordingly, workers must clean their desks at the end of the day and are encouraged to place family pictures on top of their lockers. But what they give up in ownership of a particular cubicle the design compensates for in an alluring variety of work environments.

Small rooms known as "focus booths" provide space for speaker-phone conversations or isolated work, and treadmill-like "walking stations" enable staff to get in their exercise


Cummins





FIT FOR THE JOB The narrow footprint draws natural light into the "neighborhoods" (top). Employees, who often travel, use workstations on a revolving basis. Three "social hubs," linked by staircases of varying design (above and opposite), line the south-facing wall and provide light-filled meeting areas. Odili Donald Odita's multistory mural enlivens each hub and, at night, projects a colorful image to passersby.

while checking e-mails. Employees have embraced the new offices and give high praise to the abundant natural light and the opportunity, afforded by the social hubs and other gathering spots, to communicate face-to-face rather than by e-mail.

Still, there are myriad questions about this building, on which Cummins spent at least $30 million. Will it reduce energy costs and increase productivity enough to justify premium features like the articulated curtain wall? How will it function and feel in the future if, as anticipated, the number of employees swells from the current 300 to as many 450? And will those now-pristine workstations stay uncluttered? Whatever the answers, Cummins and Berke have provided a striking essay in what can be termed, with apologies to Louis Sullivan, "the short office building, artistically considered." ■

RECORD *contributing editor Blair Kamin is the* Chicago Tribune*'s Pulitzer Prize–winning architecture critic.*

credits

ARCHITECT: Deborah Berke Partners – Deborah Berke, principal; Marc Leff, project leader; Arthi Krishnamoorthy, project manager; Ameet Hiremath, project designer (interior architecture); Noah Biklen, project designer (facade & exterior); Stephen Brockman, project designer (interior design); Yasemin Tarhan, Thao Nguyen, Dasha Khapalova, Jessie Peksa, Stephen Lam, design team

ARCHITECT OF RECORD: RATIO Architects

ENGINEERS: Fink Roberts & Petrie (structural); Robert Silman Associates (design/structural); Circle Design Group (m/e/p); Syska Hennessy Group (design m/e/p); Civil & Environmental Consultants (civil)

CONSULTANTS: Atelier 10 (sustainability); Front (facade); One Lux Studios (lighting)

GENERAL CONTRACTOR: F.A. Wilhelm Construction

SIZE: 179,600 square feet

COST: withheld

COMPLETION DATE: December 2016

SOURCES

METAL/GLASS CURTAIN WALL: Erie Architectural Products

SUNSHADES: Clover Architectural Products

ELASTOMERIC ROOFING: Firestone Building Products

GLASS: Viracon, Cristacurva

ACOUSTICAL CEILINGS: Tectum, Armstrong, RealAcoustix

CARPET: Shaw Contract

RAISED FLOORING: Haworth

OFFICE FURNITURE: Knoll

DIMMING SYSTEM: Lutron

ELEVATORS/ESCALATORS: Kone

Poly International Plaza | Beijing | SOM

Diamond Standard

A high-rise for a Chinese conglomerate showcases its distinctive structural system.

BY ALEXANDRA A. SENO

PHOTOGRAPHY BY BRUCE DAMONTE

Much of contemporary Beijing's urban layout has its roots in the 15th century, when the Ming Dynasty built the Forbidden City as its seat of power. Today the sprawling metropolis is still organized according to districts and ring roads encircling the former imperial palace. In the Wangjing area, half-way between the traditional city center and the international airport to the northeast, a shiny new business district has risen in recent years on what was formerly farmland and tracts of squat Soviet-style buildings.

Today the area's glass-clad skyscrapers house the headquarters of financial firms, the homegrown Alibaba technology behemoth, and industrial companies. China Poly Group—one of the country's biggest state-supervised conglomerates—received from the city government a choice piece of land that in the last decade it transformed into high-end apartment buildings and Poly International Plaza, the group's most prestigious commercial project, which sits on a 5.7-acre lot.

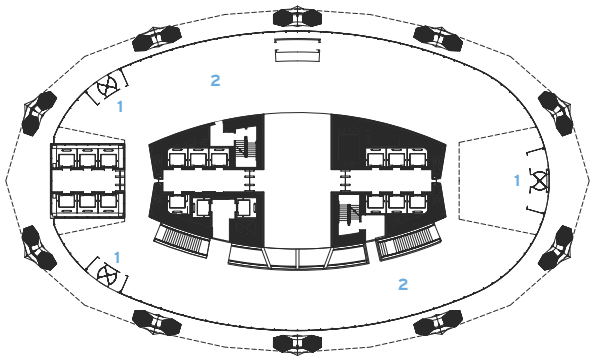
With a portfolio ranging from real estate to one of the country's biggest art auction houses, the company wanted to build a modern and elegant complex befitting its public profile. For the three office buildings on the site and the master plan, the company turned to Skidmore, Owings & Merrill (SOM), which had designed several projects for it, including the Poly Real Estate Headquarters in Guangzhou and the Poly Corporation Headquarters in central Beijing. The firm has been active in China for 25 years, having designed the U.S. Consulate in Guangzhou (ARCHITECTURAL RECORD, March 2014, page 132), as well as the U.S. Embassy in Beijing.

The San Francisco office of SOM took charge of the project and envisioned it as three elliptical towers connected by a shared basement, set against manicured stone-and-shrubbery gardens. With a smile, Poly executive Zhang Wei says, "We wanted something that can make our company more famous." As a key project manager for the complex over the last five years, Zhang has seen the Poly development unfold to much acclaim in both the local and international press.

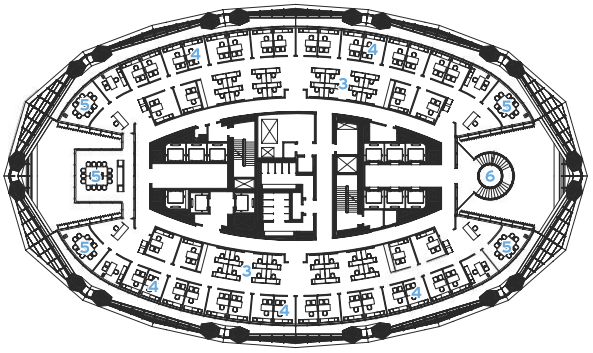
The centerpiece of the complex is a 499-foot-high building, nicknamed the Diamond Lantern, that is flanked by two shorter buildings, 276 feet and 220 feet high (all three were completed last year). While the shorter towers—since sold by Poly—are discreetly clad in vertical grids of dark metal rods, the main building—which Poly intends to keep and mostly lease out—features a crisscrossing steel-and-concrete diagrid,

PUSHING THE ENVELOPE Nicknamed the Diamond Lantern, Tower One rises 499 feet, flanked by a pair of lower buildings also designed by SOM and completed in 2016 (opposite). Its distinctive exoskeleton creates an animated facade, as well as a covered space at ground level where people enter the building (below).

SITE PLAN

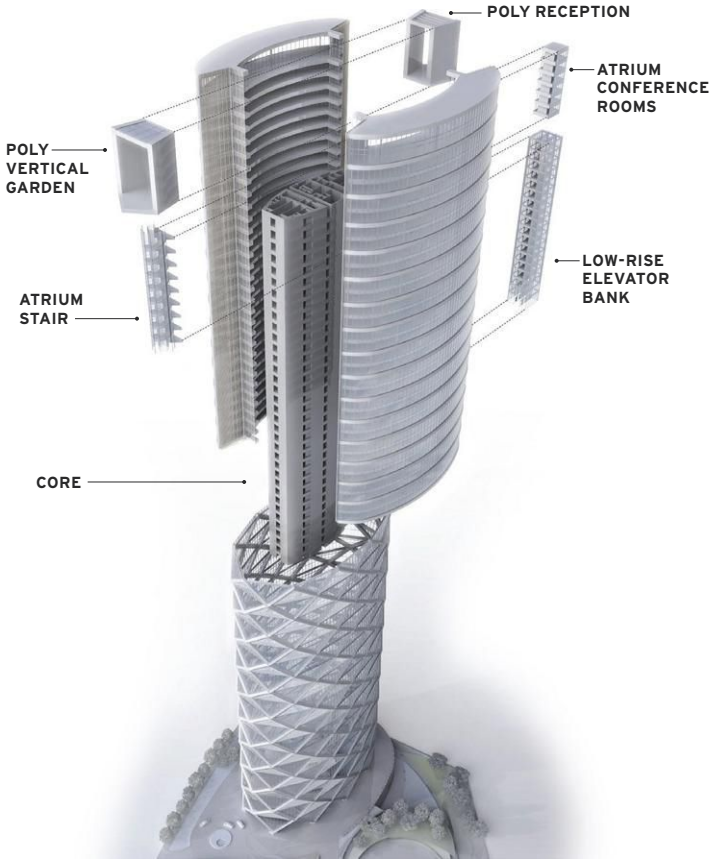


GROUND-FLOOR PLAN



TYPICAL UPPER-FLOOR PLAN

1 ENTRY
2 LOBBY
3 OPEN OFFICES
4 PRIVATE OFFICES
5 CONFERENCE ROOMS
6 ATRIUM STAIR



EXPLODED AXONOMETRIC DIAGRAM

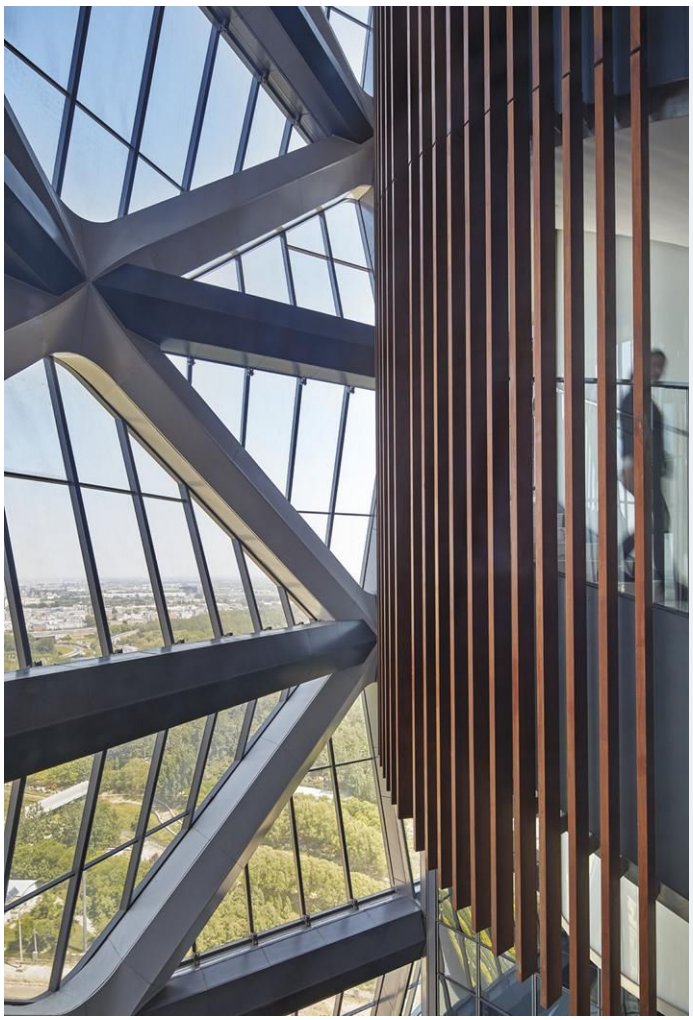
along with a concrete core. These make up the primary load-resisting system (see sidebar page 114). This white aluminum–clad exoskeleton and the facade's angled glass give the building the appearance of an origami lantern, especially at night when it is dramatically illuminated by lights embedded in the structural elements.

Nestled alongside Poly's residential development, called Central Park—"ultraluxury," Zhang points out—the office buildings project a genteel, contemporary character distinct from the bustle and flash of much taller buildings nearby or the undulating forms of Zaha Hadid's Wangjing SOHO complex visible in the distance.

"We went through a process of soul-searching with the client," says structural engineer Mark Sarkisian, one of the leads on the project for SOM. "We looked at what the site means and developed something iconic and responsible."

Leo Chow, the SOM partner who headed the design team, says the architects sought to satisfy "the functional and business needs of the owner, creating a high-performance space that elevates the daily experience of the users and achieves a cultural resonance with the site." In

STAIR MASTER A skylit atrium rises the full height of the 31-story tower, offering views of the other buildings in the complex and the surrounding area (opposite). A circular stair near the top of the atrium connects some of the upper floors.

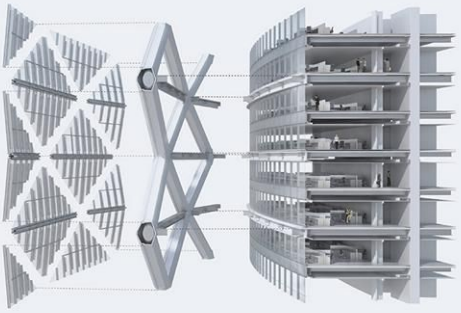


CLOSE-UP: X Marks the Spot

Poly International Plaza's Tower One evolved from a close collaboration between SOM's design and engineering divisions. It moves diagrid building technology forward, adapting it to Beijing's specific climatic and seismic conditions. SOM's Mark Sarkisian, who led structural engineering work on the project, says the team referenced San Francisco's Alcoa Building (1967) and Chicago's John Hancock Center (1970), two SOM buildings that heralded innovations in diagrid construction and earthquake resistance.

"The exoskeleton and the internal core serve as the complete structural system for the building," says SOM partner Leo Chow. "This allowed the gravity and lateral-load system to be one and the same and provide a completely column-free space." This strategy was essential to the scheme, he explains, "because it created the opportunity for us to introduce the atria by carrying lateral loads around the perimeter rather than through the middle."

The members themselves are steel tubes, filled with concrete. The approximately 43-foot-long sections were fabricated in a shop, then assembled and filled with concrete on-site. Despite the building's curving form, all the structural elements (as well as the curtain wall) are composed entirely of straight sections. By employing diagrid nodes and hanging floors from alternate stories, the engineers distributed stress to the exoskeleton and created the distinctive folded facade. *A.A.S.*



EXPLODED AXONOMETRIC DIAGRAM

the end, they settled on an elliptical form that responds to the curving highway adjacent to the site and sets it apart from the blocky residential towers nearby. Chow also recognized the "symbolic significance of a lantern hung outside a door as a sign of welcome and an object that attracts good fortune."

Inside the building, white-gloved attendants man the spare lobby, covered in Calacatta marble specially quarried for Poly from Carrara in Italy. The main entry at the north end of the lozenge-shaped building leads to an impressive 410-foot-tall, skylit atrium that draws the eye up the tower's curtain wall and to the office floors above. A secondary atrium on the south end is primarily visible from upper floors, where one of the elevator cores drops off to reveal the space. Three banks of elevators take visitors to office floors, while a separate elevator bank goes down to cafeterias in the first basement level and parking below that.

Each elliptical floor plate provides about 21,200 square feet of column-free space. Floor-to-ceiling glass allows sweeping vistas of the emerging neighborhood and delivers a sense of expansiveness to the offices. Last autumn, the headquarters of Hyundai Capital, a Korean investment firm, moved into floors 19 to 26, becoming Poly's main tenant. Other levels have attracted single and multiple tenants. Poly has reserved the double-height top floor (31)—designed to feature vertical gardens—for its own use in the future.

The building also had to cater to Beijing's particular environmental requirements: air-quality concerns, energy efficiency, extreme climate, and seismic activity. In pleasant weather, external vents in the glass facade open to assist air circulation. Behind the exterior skin, a second glass envelope reduces noise from the busy street and mitigates Beijing's high summer temperatures and sub-freezing winter weather. According to SOM, the tower's design lowers carbon emissions by 18 percent and energy use by 23 percent.

Instead of competing with other buildings in terms of superlatives—height, price, or spectacle—Poly and SOM created a tower that stands out as a technological achievement and a distinctive landmark in a booming new district of the city. ■

credits

ARCHITECT AND ENGINEER: Skidmore, Owings & Merrill – Leo Chow, design partner; Gene Schnair, consulting partner; Keith Boswell, technical partner; Larry Chien, project managing director; Mark Sarkisian, structural engineering partner

ARCHITECT OF RECORD: Beijing Institute of Architectural Design (BIAD)

CONSULTANTS: Skidmore, Owings & Merrill (structure); WSP Engineering Services (m/e/p); SWA Group (landscape); Francis Krahe & Associates (Lighting)

GENERAL CONTRACTOR: China Construction Third Engineering Bureau Company

CLIENT: China Poly Real Estate Company

SIZE: 1.25 million square feet

COMPLETION DATE: July 2016

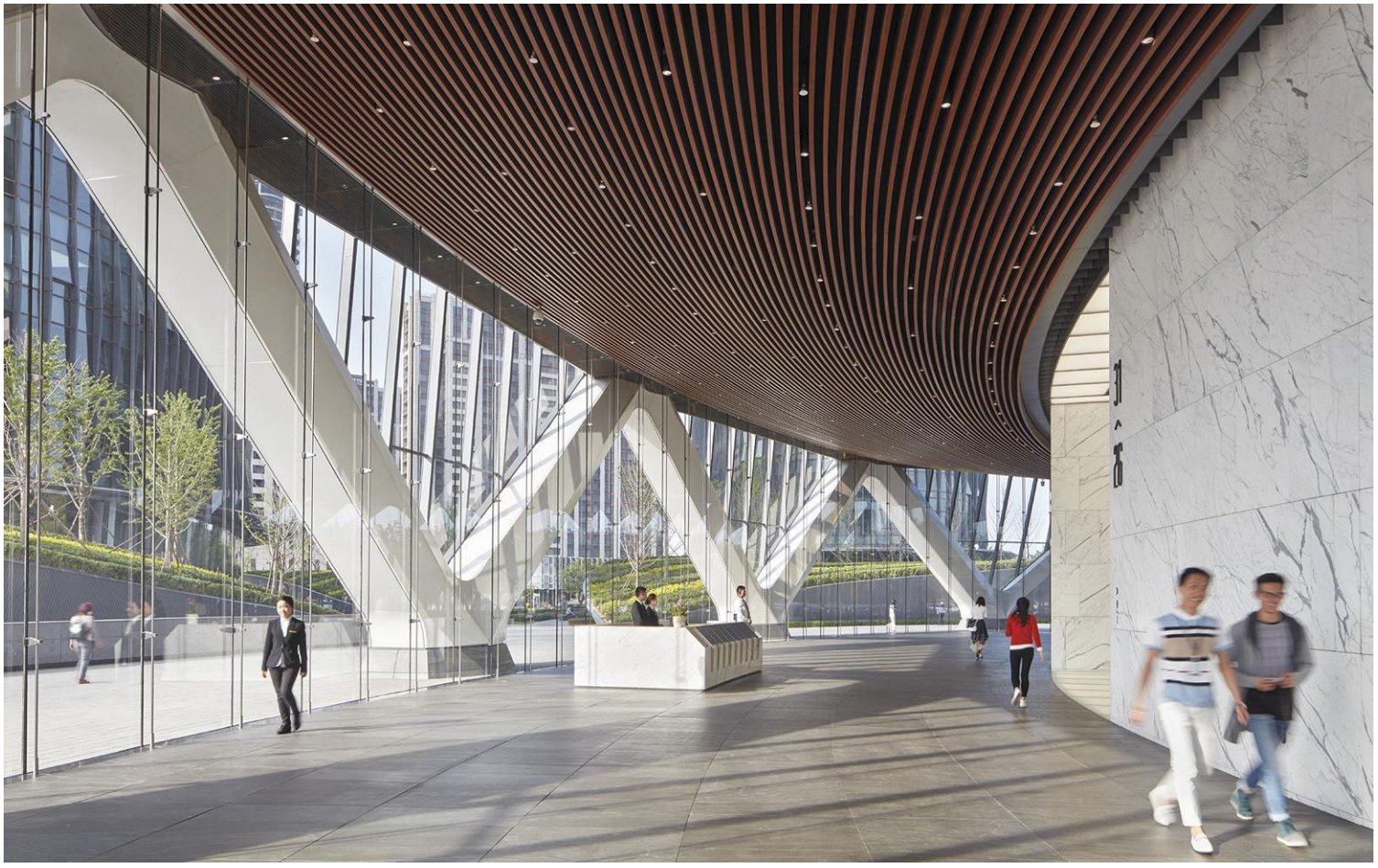
SOURCES

METAL PANELS: Shandong Dahua Rixin Aluminum

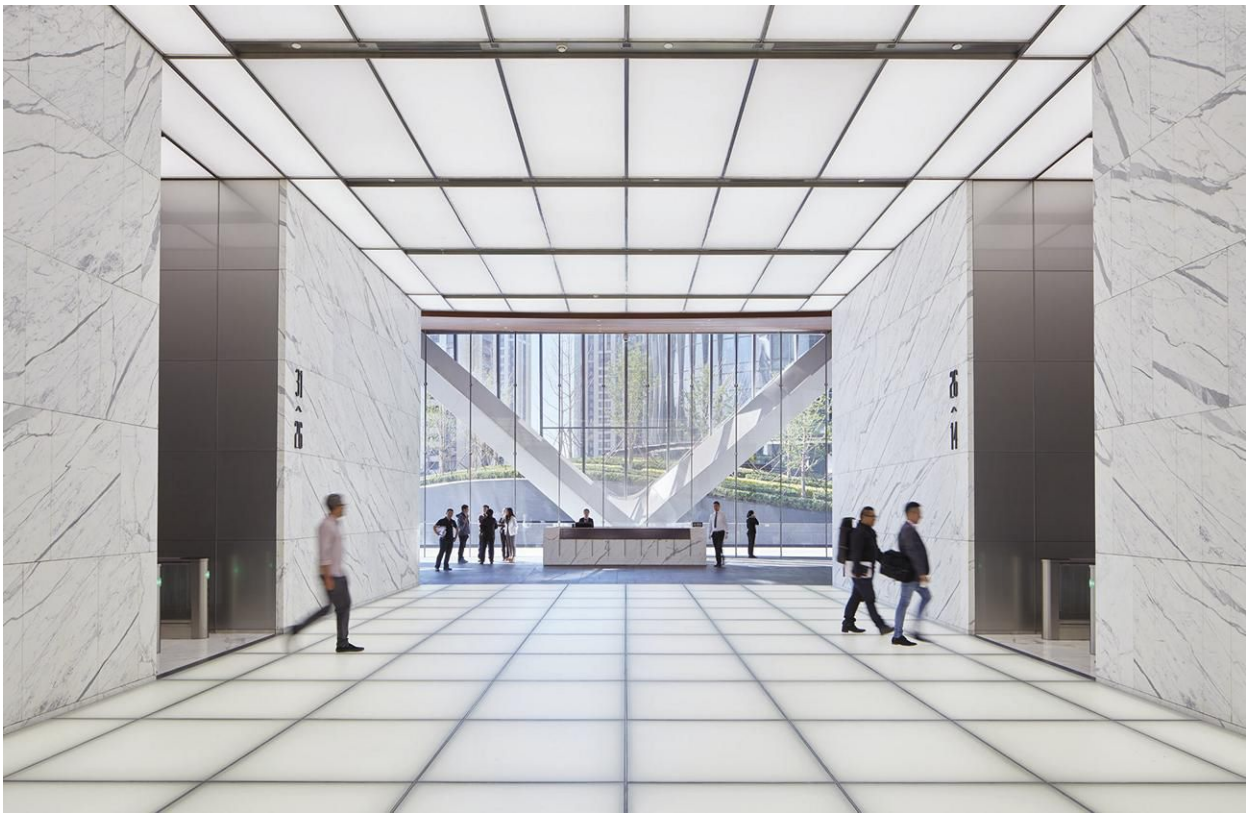
CURTAIN WALL: Jiangho Group

GLASS: Xinyi Glass; North Glass

CARPET: Interface



ROUNDING UP
Although the building's plan is an ellipse, all of its structural elements and curtain wall are straight (above and opposite). Inside the lobby, walls are clad with Carrara marble from Italy (right).



10 Hudson Yards | New York | Kohn Pedersen Fox Associates

River Dance

A chiseled skyscraper anchors Manhattan's new west-side neighborhood.

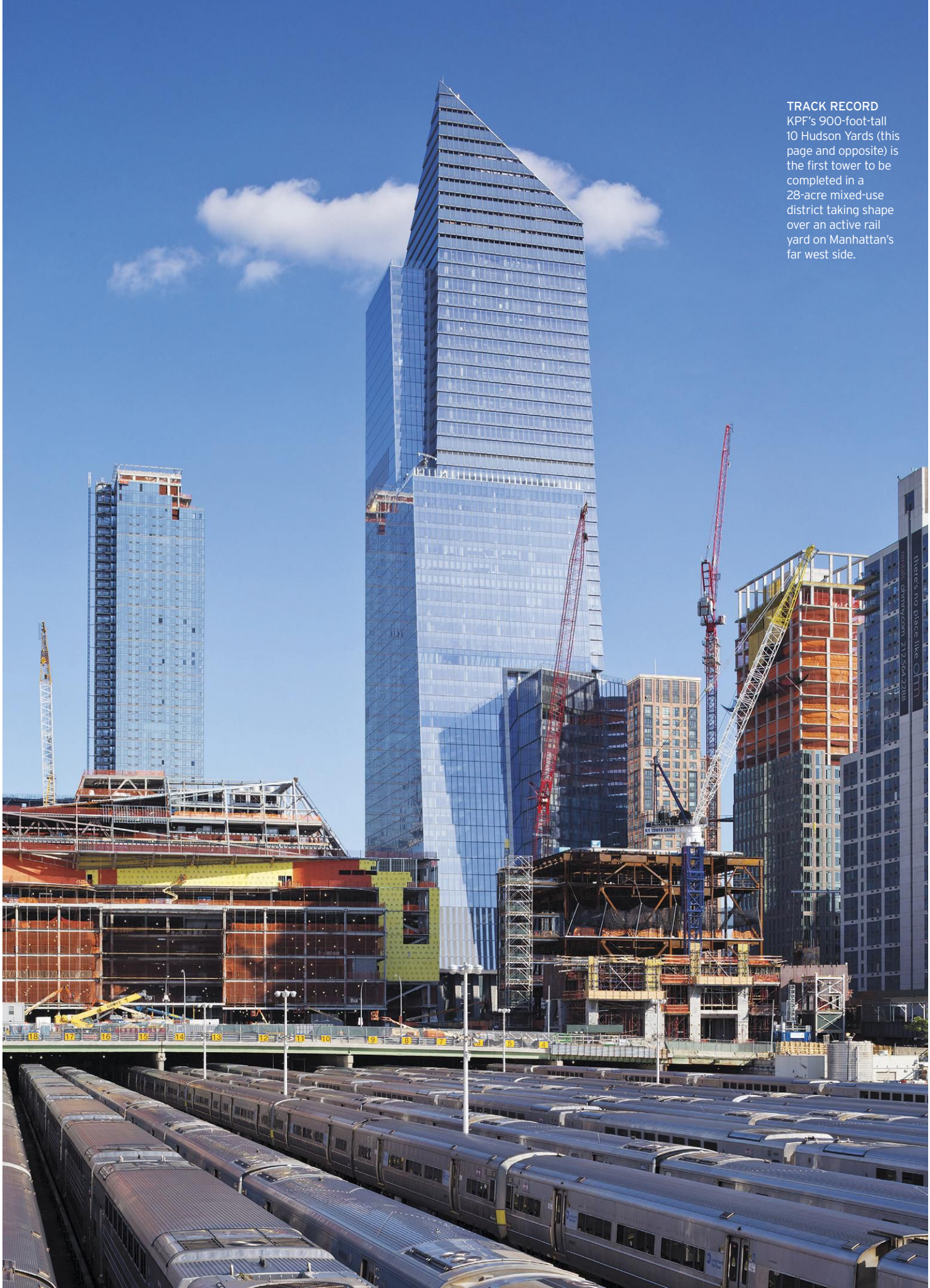
BY ALAN G. BRAKE

PHOTOGRAPHY BY MICHAEL MORAN

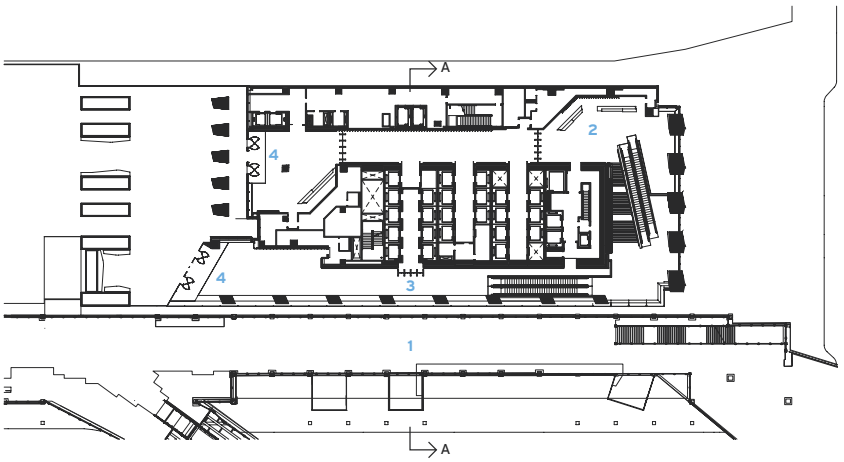
"Writing about 10 Hudson Yards now is a bit like writing about one hand clapping," says William Pedersen, a founding partner of Kohn Pedersen Fox Associates (KPF) and lead designer of the new skyscraper. He sees it as one-half of a grand urban gesture, with the other half being its future, taller neighbor, 30 Hudson Yards, currently only partially completed. Together, the two KPF towers, developed by the Related Companies with Oxford Properties, will radically alter the Manhattan skyline and help anchor Hudson Yards, the ambitious new 28-acre mixed-use district now being built over an active rail yard on the island's far west side, along the Hudson River.

Unlike Minoru Yamasaki's twin towers at the old World Trade Center, a pair of identical, emphatic objects at the tip of Manhattan, 10 and 30 Hudson Yards will have a more complex relationship to one another, as well as to the rest of the city. At 900 feet tall, 10 Hudson Yards slopes on its west elevation, facing the Hudson River—to meet the city's zoning setback requirements—while its 1,300-foot-tall companion will present a flat elevation to the river and a slanted facade toward the east, with a cantilevered skydeck offering dramatic city views. A large, eight-story retail podium will connect the buildings. Both towers will feature angled crowns that point to one another: their related but opposing profiles will create a "V" shape that will widen and narrow depending on one's vantage point, placing them, says Pedersen, "in a kind of dance."

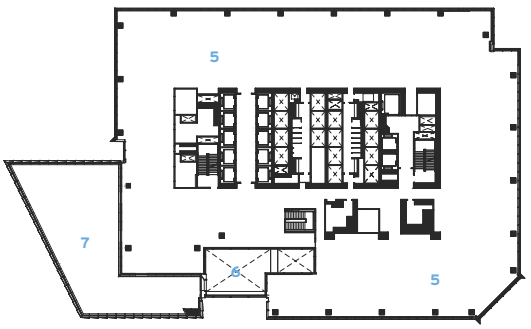
The entirety of this skyline gesture will not be evident until 30 Hudson Yards finishes construction and the rest of the development emerges, sometime in the 2020s. With a master plan by KPF, the neighborhood—larger than Rockefeller Center—will include 14 residential and



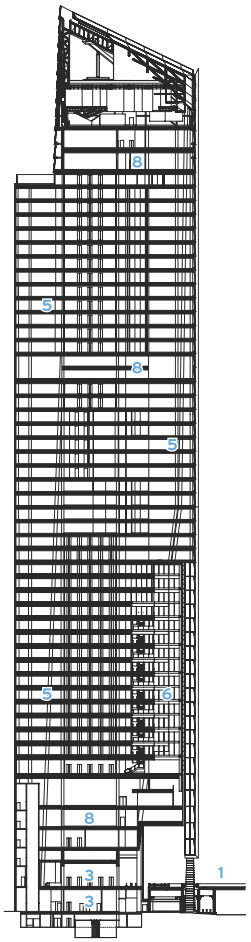
TRACK RECORD
KPF's 900-foot-tall 10 Hudson Yards (this page and opposite) is the first tower to be completed in a 28-acre mixed-use district taking shape over an active rail yard on Manhattan's far west side.



UPPER-LOBBY PLAN

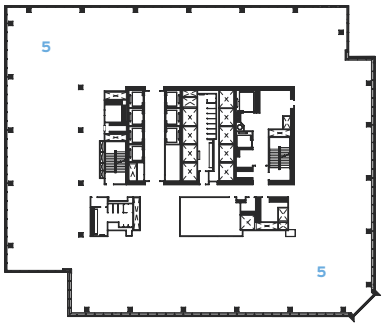


LOW-RISE PLAN

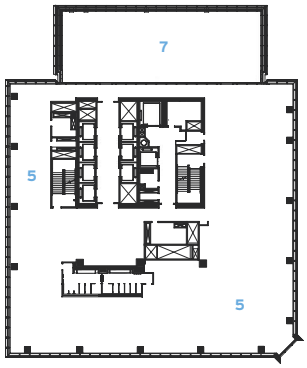


SECTION A - A

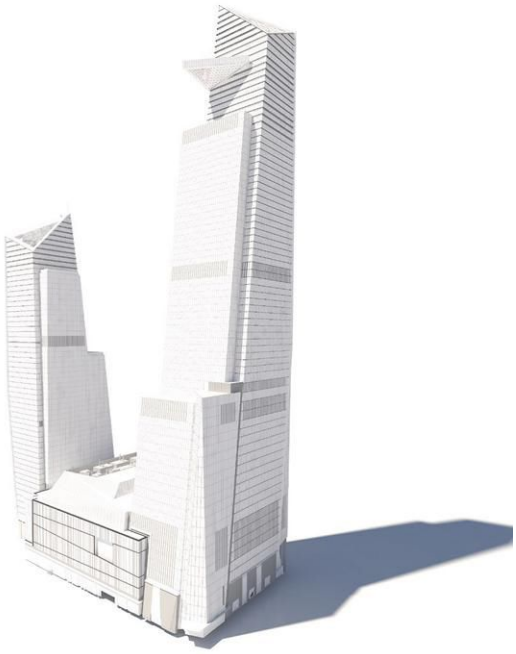
1 HIGH LINE
2 MULTITENANT LOBBY
3 ANCHOR-TENANT LOBBY
4 UPPER ENTRY
5 OFFICE SPACE
6 ATRIUM
7 TERRACE
8 MECHANICAL



MID-RISE PLAN

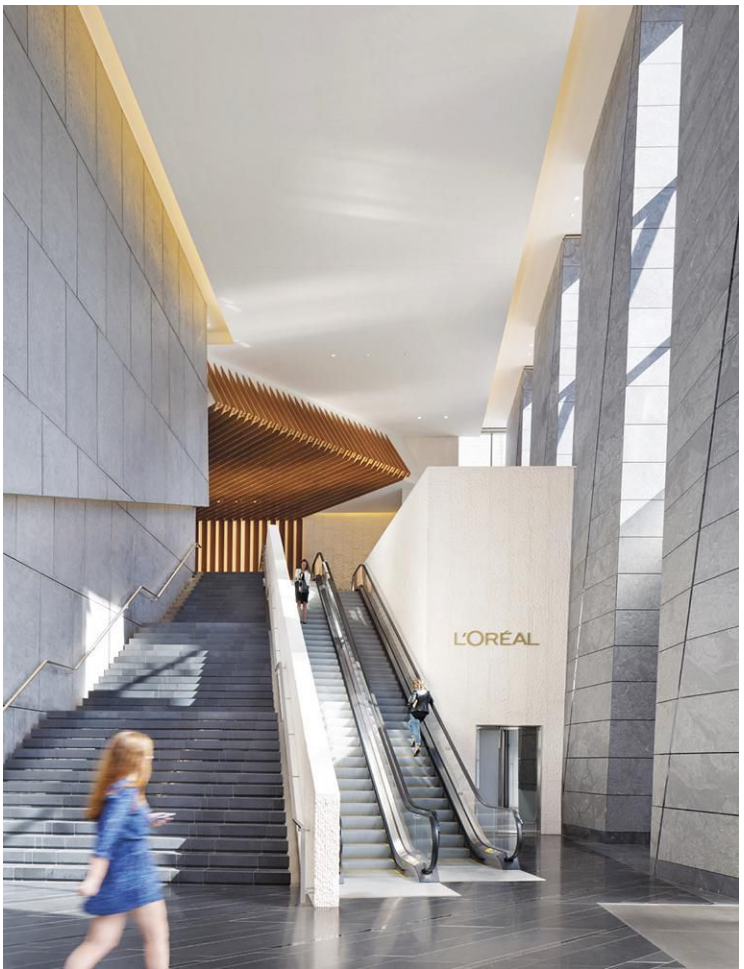


HIGH-RISE PLAN



AXONOMETRIC DIAGRAM–
10 AND 30 HUDSON YARDS

HANDBAG HEAVEN The building has a dedicated lobby for its anchor tenant, Coach, which features a giant vitrine displaying vintage leather goods (above). A shared lobby for the other tenants (right) has walls clad in textured aluminum panels.



commercial skyscrapers, by Skidmore, Owings & Merrill and Foster + Partners, among others, as well as parkland designed by such landscape architects as Michael Van Valkenburgh Associates. But No. 10's impact on the multilevel site and its surroundings is already apparent. At its southeast corner, a lobby is tucked under the north end of the High Line elevated park. The space houses three banks of escalators, one of which leads to an individual lobby for the apparel brand Coach, the building's anchor tenant, while the other two lead to a shared lobby for the additional tenants, including L'Oreal and the technology company SAP. The Coach lobby is lined with pale wood paneling, while the shared-lobby walls are clad in textured cast-aluminum panels, which KPF chose to allude to the area's industrial past. Stretching along 30th Street under the High Line, a new food hall will activate the street below.

At the High Line level, two stories above grade, park visitors will be able to walk seamlessly onto a new plaza, designed by Nelson Byrd Woltz Landscape Architects. The Coach lobby is flanked by the plaza entrance to the east and Diller Scofidio + Renfro and Rockwell Group's multidisciplinary arts venue, the Shed, rising to the west (RECORD, October 2016, page 119). A pair of giant legs, clad in translucent gray glass, supports the building over "the spur," a branch of the High Line not yet opened to the public. From here, you can see the vast Coach lobby, with a huge electronic billboard of Coach ads and a multistory vitrine showcasing vintage handbags.

At 1.8 million square feet, 10 Hudson Yards packs a lot of rentable space into 52 stories (the structure rises to 54 stories, including me-

CLOSE-UP: Weathering the Storm

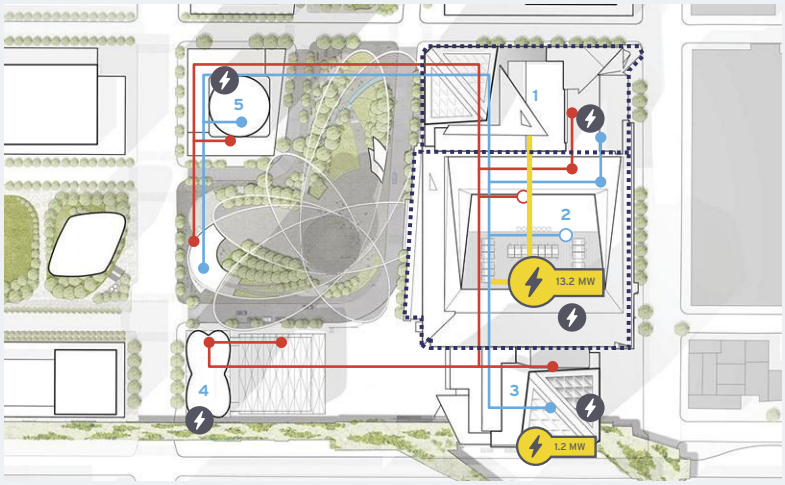
Rising 72 feet above the eight-story retail podium at 20 Hudson Yards, a co-generation plant will generate 13.2 megawatts of electricity and use the heat produced as a byproduct to provide hot water and chilled water for cooling. According to KPF, 13.2 megawatts is enough to power 2 million LED lightbulbs.

The plant will serve 10, 20, and 30 Hudson Yards, all designed by KPF; 35 Hudson Yards by Skidmore, Owings & Merrill; 15 Hudson Yards and the Culture Shed, both by Diller Scofidio + Renfro with Rockwell Group. All will be linked by a microgrid that ties into the New York City electric grid, but can also function independently from it during a blackout, in so-called "island mode."

After Hurricane Sandy, which flooded the site with several feet of water, the developer Related decided co-generation would be a part of Hudson Yards, says David Cunningham, the KPF project manager for 20 Hudson Yards.

If power goes out across the city, the plant will still operate because it will generate electricity from natural gas. If the natural gas link is severed or turned off, it can run in "black start mode," meaning it can function for a time with stored energy.

While KPF and their consultants, including R.G. Vanderweil Engineers, Source One, and JB&B, spent a lot of time on the technical and performance capabilities of the plant, the architects also wanted to make sure that it will be appealing to the thousands of workers and residents looking down on it from the surrounding towers. Perforated metal screens will conceal cooling towers and flues. "We wanted it to be a good neighbor," says Cunningham. *A.G.B.*



CO-GENERATION DIAGRAM

1 30 HUDSON YARDS
2 RETAIL PODIUM
3 10 HUDSON YARDS
4 15 HUDSON YARDS/CULTURE SHED
5 35 HUDSON YARDS
MICROGRID
SITEWIDE THERMAL LOOP
SITEWIDE CHILLED WATER LOOP
COGEN
DIESEL GENERATOR

IMAGE: COURTESY KOHN PEDERSEN FOX ASSOCIATES

credits

ARCHITECT: Kohn Pedersen Fox Associates – William Pedersen, Paul Katz, Anthony Mosellie, Marianne Kwok, Mark Townsend, Robert Scymanski, Justin Whiteford, Gregory Mell, Terri Lee, Joe Michael, Devon Loweth, Heather Ross, Andrew Werner, Sameer Kumar, John Oliver, Courtney Higgins, Christina Ladd, Josh Treiber, Keith Johns, Steve Wang, Frank Lindemann, Russell Patterson, Sonal Patel

COACH INTERIORS ARCHITECT: Studios Architecture

CONSULTANTS: Thornton Tomasetti (structure); JB&B (m/e/p); Philip Habib and Associates (civil); Nelson Byrd Woltz (landscape); L'Observatoire International (lighting)

CONSTRUCTION MANAGER: Tutor Perini

CLIENT: Related Companies

SIZE: 1.8 million square feet

COST: withheld

COMPLETION DATE: May 2016

SOURCES

CURTAIN WALL: Enclos

CABLE WALL: W&W Glass

GLASS: Interpane, Viracon

STOREFRONT: Coordinated Metals

EXTERIOR STONE: Port Morris

EXTERIOR METAL PANELS: M. Cohen and Sons

CAST ALUMINUM PANELS: UAP

STONE FLOOR: Wilkstone

chanical floors). Though the building appears quite bulky from 10th Avenue, it is more modulated when viewed from the High Line and the new plaza. Several different facade treatments and setbacks break up the bulk and subtly define different tenant zones within the building. The lower level features a "shingled" facade of layered and angled glass panels, the result of a collaboration with Reed Krakoff, former creative director of Coach, according to Marianne Kwok, a director at KPF. "He felt it was a very American design idea, the notion of the shingle," she says. "He thought it fit very well with the Coach brand."

Inside the building, a 15-story atrium in the Coach offices looks out over the plaza and provides floor-to-floor connections. Informal meeting areas and double-height conference rooms are inserted within the atrium, animating the space throughout the day (Studios Architecture designed the office interiors). On the 23rd floor, an outdoor terrace tops the setback.

The building's all-concrete structure, rather than the typical concrete and steel for New York office buildings, shortened the construction schedule, according to Kwok. This extended the time KPF could work on design, allowing elements like two more sky terraces to be added to the upper setbacks in response to tenant

INSIDE OUT
Within Coach's portion of the building, a 15-story atrium (left) provides visual connections between floors and affords views over the High Line (below) through a large, glazed cable wall set into a "shingled" portion of the facade.

feedback. "It's a spec building that feels like a building that was custom-designed for its tenants," Kwok says.

Ten Hudson Yards is 100 percent leased, and Pedersen and Kwok believe the entire development is drawing strong interest from tenants (CNN and HBO are among those that have already signed to move into No. 30) because of the location, open space, and mix of uses. "People want access to parks, to dining and shopping, as well as hotels and residences. Hudson Yards will have all of that."

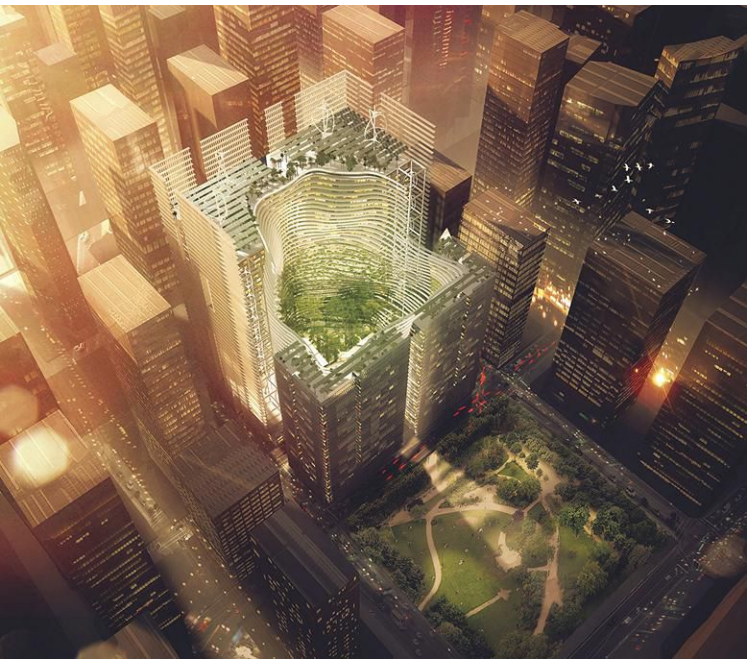
Looking out from the upper floors of 10 Hudson Yards, it is easy to understand their vision. "We are stitching the city together with the river," Pedersen says. It's a grand urban gesture, to say the least. ■

Alan G. Brake is the editor of Oculus *and a columnist for* Dezeen.

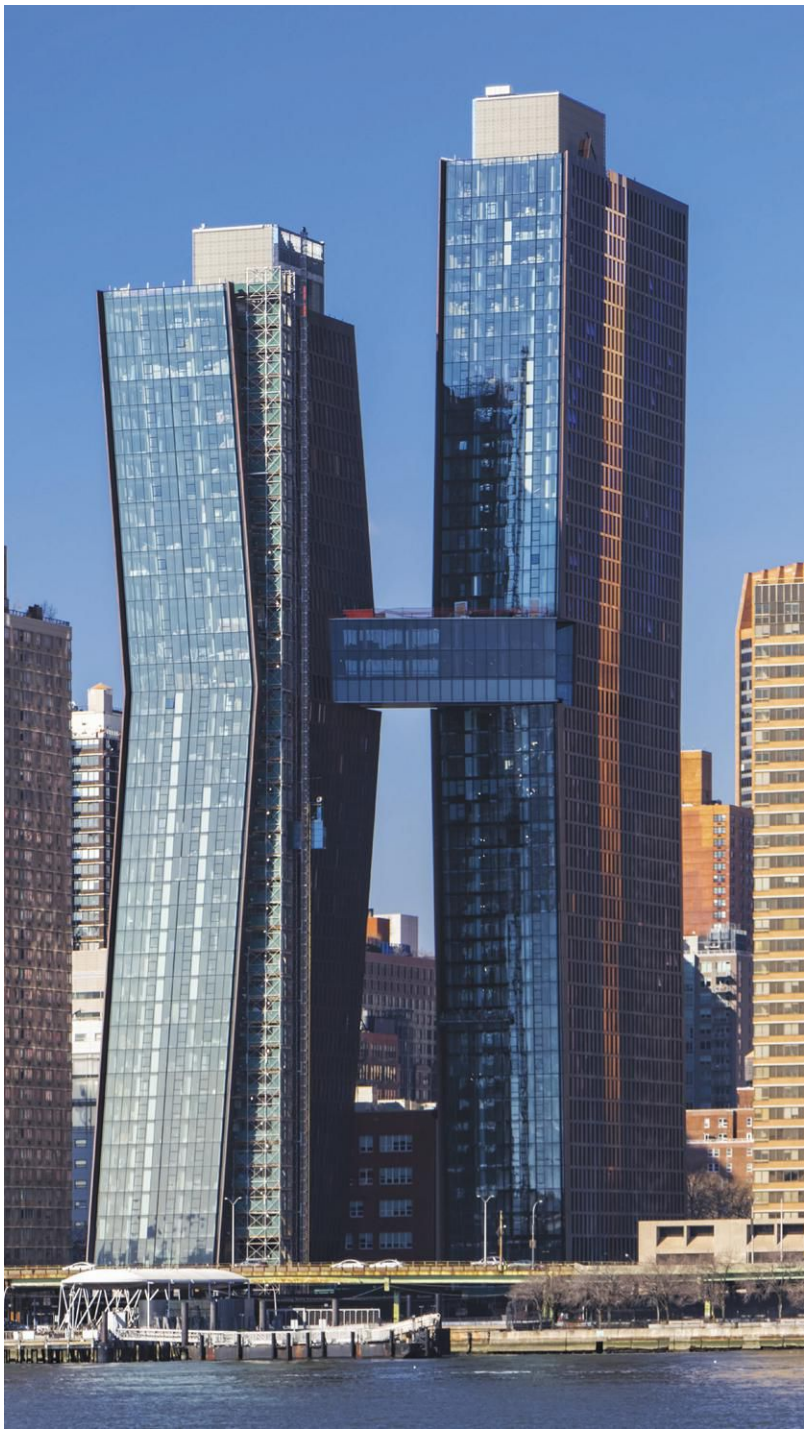
Up and Coming

These eight towers around the world, some in planning and others approaching completion, project ambition in scale and form.

BY MIRIAM SITZ



▲ **MARINA ONE, SINGAPORE** A large urban park surrounds the high-density, mixed-use Marina One towers by **Ingenhoven Architects**. Located in Singapore's Marina Bay financial district and opening later this year, the project comprises four towers—two residential, two office, of 34 and 30 stories respectively. The volumes converge in a lush public garden space at the buildings' core. The residential towers contain more than 1,000 units, ranging from one-bedrooms to family penthouses. The entire complex incorporates natural ventilation, water catchment and reuse, and photovoltaic systems; the office towers have achieved LEED Platinum precertification.



▶ **AMERICAN COPPER, NEW YORK** Connecting the two glass-and-copper-clad towers of **SHoP Architect**'s new residential high-rise in Manhattan, a 100-foot-long glass sky bridge—complete with a 75-foot-long indoor lap pool—floats 300 feet above the ground. The 41- and 48-story volumes of the K-shaped building, which is slated for completion by fall 2017, contain more than 760 rental units with up to three bedrooms. Residents will have access to such amenities as a double-height fitness center with a rock-climbing wall, Turkish bath, spa, juice bar, and an infinity pool on the roof deck.

IMAGES: COURTESY INGENHOVEN ARCHITECTS (LEFT); © JEFF GOLDBERG/ESTO (RIGHT)

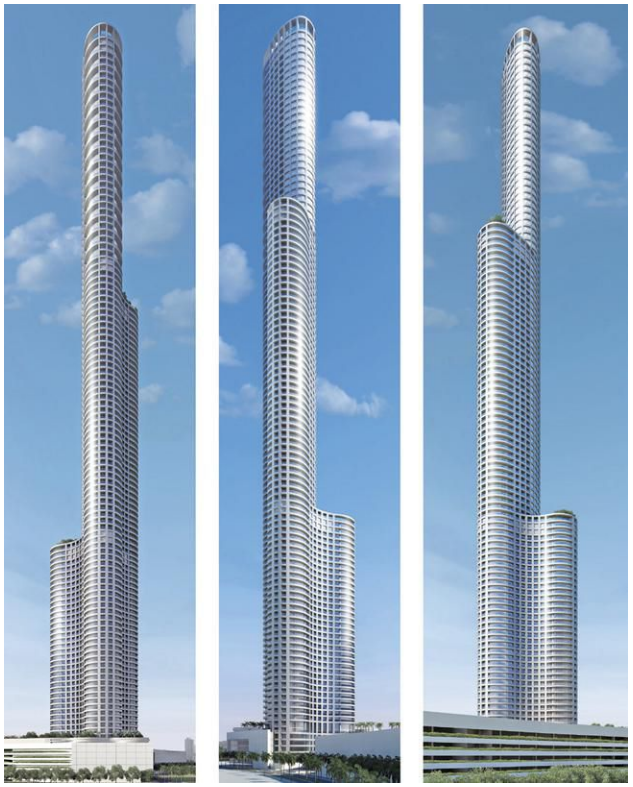
▲ **MAHANAKHON, BANGKOK** A three-dimensional ribbon of glass "pixels" wraps around the facade of **Büro Ole Scheeren**'s new 77-story tower. The building, which broke ground in the summer of 2011 and is almost complete, will contain more than 200 luxury residential units in addition to a boutique hotel, seven floors of retail space, and an observation deck. With a height of 1,031 feet, it is the tallest building in Thailand.

◀ **LEEZA SOHO, BEIJING** In the new Fengtai Financial District of China's capital city, a 46-story tower by **Zaha Hadid Architects** is rising. The mixed-use building straddles a subway tunnel dividing the site and gently twists around the 623-foot atrium—said to be the world's tallest—at its core. Slated for completion in December 2018, the almost 2 million-square-foot building is aiming for LEED Gold certification and is the firm's fourth project for the developer, SOHO China, to date.

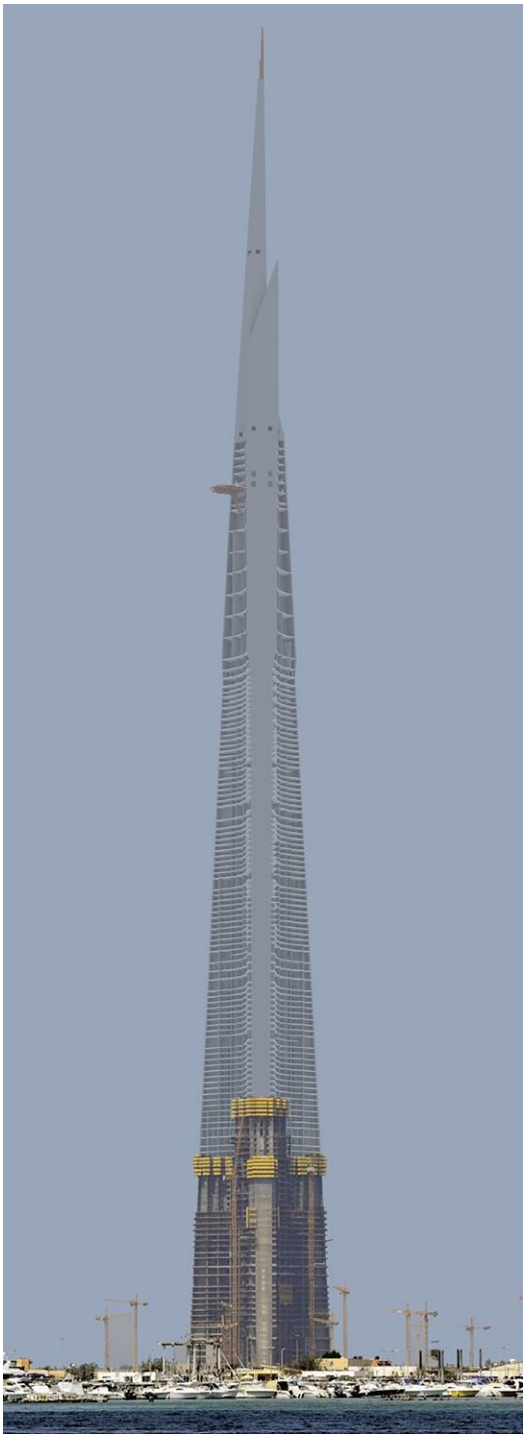
▲ **LOTTE WORLD TOWER, SEOUL** Just last month, a 123-story tower by **Kohn Pedersen Fox Associates** opened in South Korea, becoming the tallest building in the country and fifth-tallest in the world. The 1,823-foot-tall tower is the firm's first for Lotte and is slated for LEED Gold certification. Clad in silvery glass, the sleek, tapered building contains office, hotel, and retail space, as well as high-end residential units. The top 10 floors will house public facilities, including an observation deck and rooftop café.

IMAGES: COURTESY PACE (TOP); © MIR (BOTTOM); TIM GRIFFITH (RIGHT)

▲ **CAPITAL MARKET AUTHORITY, RIYADH, SAUDI ARABIA** Rising from a jumble of cranes crisscrossing the skyline of the Saudi capital, an 80-story tower by **HOK** and local firm **Omrania** is slated for completion by 2018. The 1,260-foot-tall building is the tallest of its peers in the new King Abdullah Financial District. With a master plan by Henning Larsen Architects, the ambitious development has projects under way by such firms as Gensler, Nikken Sekkei, Foster + Partners, Goettsch Partners, and Skidmore, Owings & Merrill. The tower is aiming for LEED Gold certification and will have an observation deck, double-height sky lobbies, a two-story auditorium, and amenities like a fitness center, pool, and cafeteria within its folded geometric facade.



◀ **WORLD ONE, MUMBAI**
When it tops out at 120 stories and 1,450 feet, a tower in India by **Pei Cobb Freed & Partners** will earn the distinction of being both the country's tallest building and the tallest residential high-rise in the world. The project incorporates sustainable features like green roofs, rainwater harvesting systems, and Dark Sky–compliant exterior lighting. With 280 units and amenities such as a full-sized cricket pitch, the curvilinear concrete structure will open in 2018 as the first of three luxury residential towers planned for the 17-acre mixed-use Lodha Place development.



▲ **JEDDAH TOWER, JEDDAH, SAUDI ARABIA**
Set to open in 2020 and planned to be the tallest building in the world, the Jeddah Tower is currently 51 stories off the ground—about 25 percent complete. The 3,280-foot-tall reinforced concrete building designed by Chicago-based **Adrian Smith + Gordon Gill Architecture** is expected to cost $1.2 billion to construct and will include a hotel, offices, residential units, and a sky terrace. The building will anchor the $20 billion mixed-use Kingdom City development.

IMAGES: © PETER BOGACZEWICZ/OMRANIA (TOP); PEI COBB FREED & PARTNERS (BOTTOM); THORNTON TOMASETTI (RIGHT)

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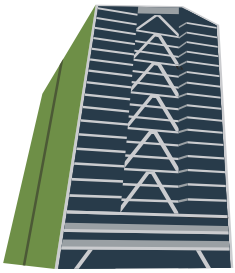
CIRCLE 323

LOOKING UP

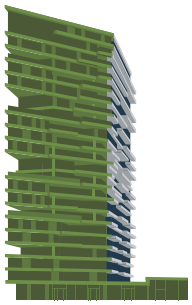
TALL WOOD BUILDINGS AROUND THE WORLD

Hypérion
Bordeaux, France
18 Stories
2020

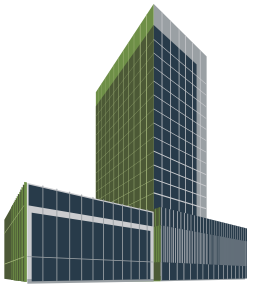


Silva
Bordeaux, France
18 Stories
2020

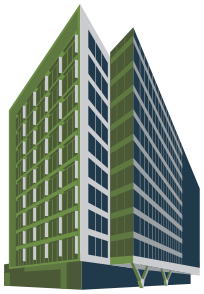
Framework
Portland, United States
12 Stories
2019



Haut
Amsterdam, Netherlands
21 Stories
2019



Sida Vid Sida
Skellefteå, Sweden
19 Stories
2019



5 King
Brisbane, Australia
10 Stories
2018

HoHo Vienna
Vienna, Austria
24 Stories
2018

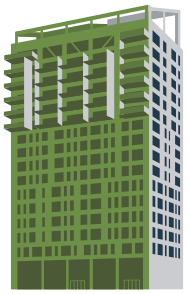
reTHINK WOOD®

13

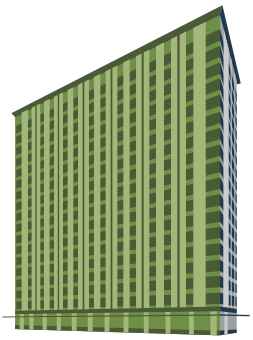
TALL WOOD BUILDINGS

7 STORIES OR TALLER

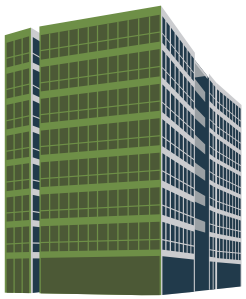
ARE UNDERWAY



Mjøstårnet
Brumunddal, Norway
18 Stories
2018



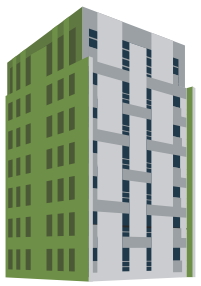
Brock Commons Tallwood House
Vancouver, Canada
18 Stories
2017



Carbon 12
Portland, United States
8 Stories
2017

Dalston Lane
London, UK
9 Stories
2017

Origine Condos
Quebec City, Canada
13 Stories
2017



Sanctuary
Yoker, Scotland
7 Stories
2017

AND 19 COMPLETED IN THE LAST 5 YEARS

CIRCLE 145

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Enlightened Workplaces

Illuminated ceilings are at the heart of the design strategies for two corporate office projects—the National Bank of Canada Trading Floor by Architecture49 and Osram Americas Headquarters by Sasaki—resulting in functional lighting schemes that also create brilliant focal points.

By David Sokol

PHOTOGRAPHY: © STÉPHANE BRÜGGER

THE NEWLY RENOVATED NATIONAL BANK OF CANADA TRADING FLOOR IN MONTREAL

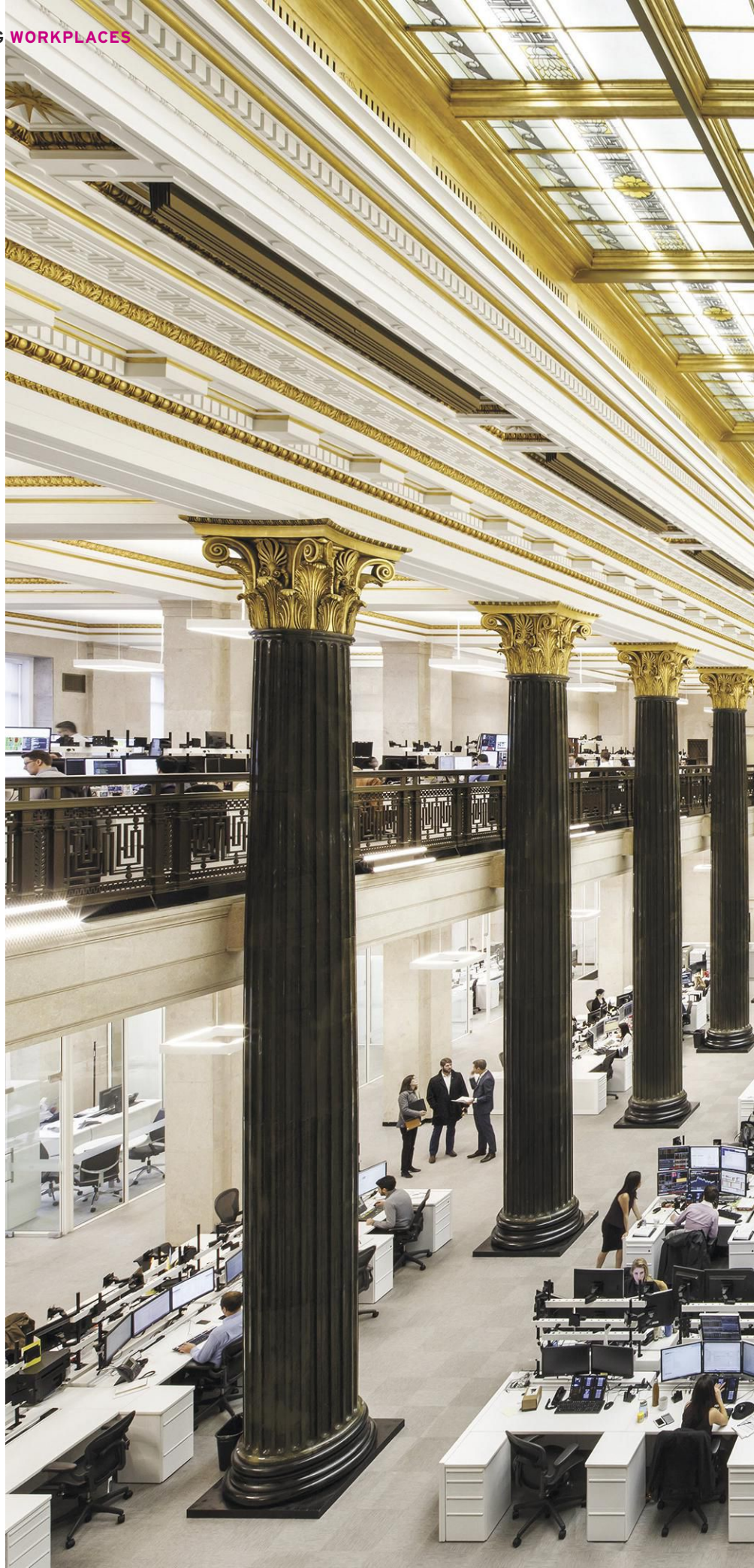
Across centuries, great buildings have had great ceilings, from Filippo Brunelleschi's frescoed Duomo in Florence to the triangular coffers sweeping across the Louis Kahn–designed Yale University Art Gallery. Whereas techniques like trompe l'oeil come and go, many architects over time have achieved weightlessness and uplift by illuminating ceilings—with daylight and/or electric lighting systems. For two recently completed renovation projects—a trading floor for the National Bank of Canada and the new Americas R&D headquarters of the German manufacturer Osram—designers have interpreted this longstanding device for the 21st century.

National Bank of Canada
Architecture49

The National Bank of Canada's 31,000-square-foot trading floor in Montreal, newly renovated by the local office of Architecture49, originally served as the banking hall of the Sun Life Assurance Company in its 1917 headquarters building. At the time, the Toronto architect Darling & Pearson had capped the space with an expansive skylight, and specified rose Tavernelle marble walls, midnight Syenite stone columns, and other grand materials to reflect the incoming sunshine and provide a counterpoint to it. Over the two decades following its opening, however, the historic building was expanded twice, cutting off the banking hall from a western exposure. Since then, too, a roof was constructed over the skylight and a dim, uneven lighting scheme had been inserted behind its glass. Opaque workplace dividers further blocked whatever light was available to the banking hall, which the National Bank began using for trading after it launched a securities division in 1987.

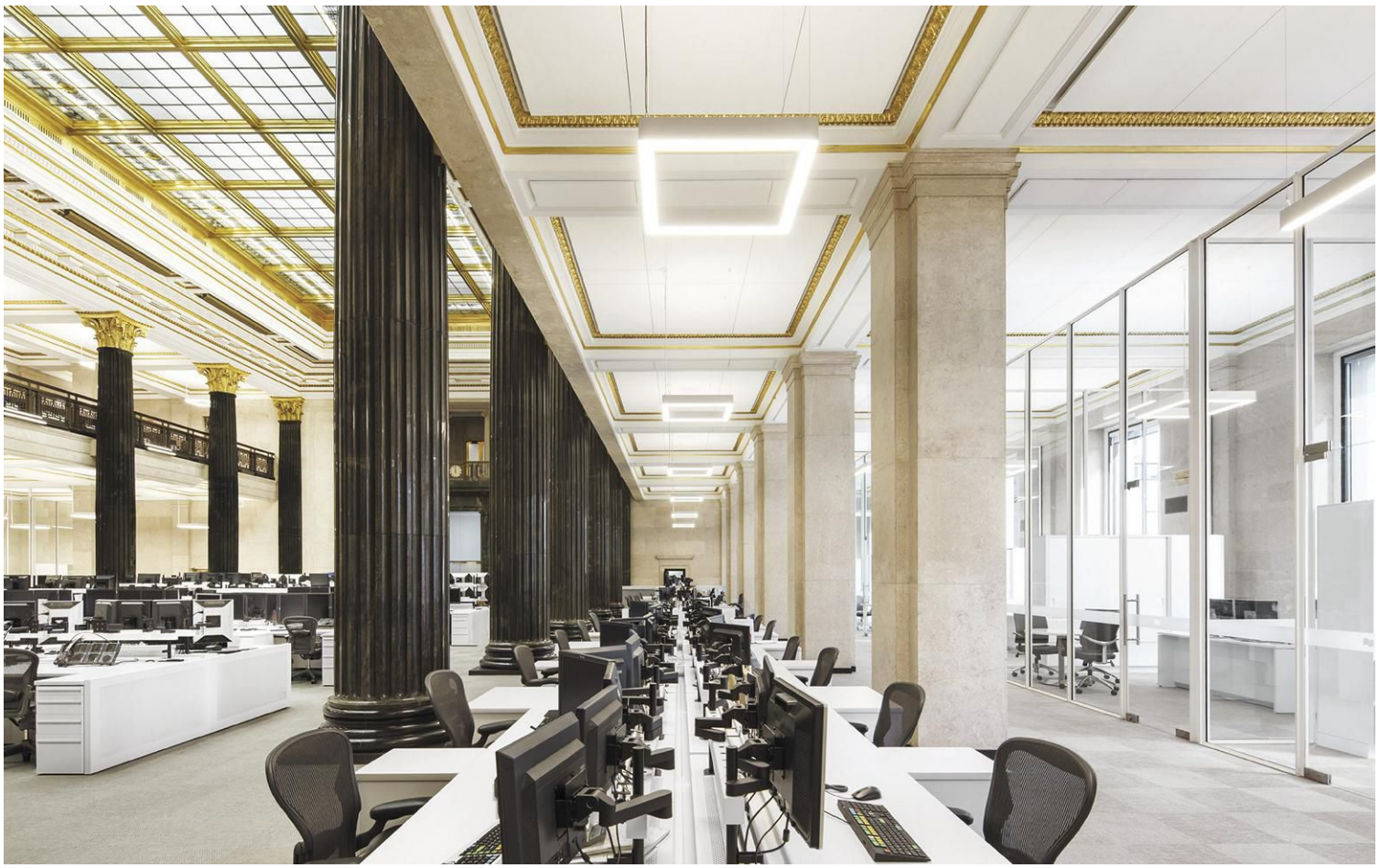
According to Architecture49 senior principal Alexandre Sauvé, "The space was so gloomy that the National Bank was not even sure it could be transformed into a modern workspace. Most people wanted to move out." Instead, in 2014, executives invited the firm to give them a reason to stay.

Sauvé says his design team carried out "a subtle intervention" that combines straightforward conservation of protected surfaces with historically respectful solutions. The skylight, which remains covered by a roof, received both treatments in this process. After it was cleaned and restored, Montreal-based lighting design studio Éclairage Public (now Ombrages) worked with manufacturer Lumenpulse Group to embed 4000K LED floodlights behind the skylight and point them at the underside of

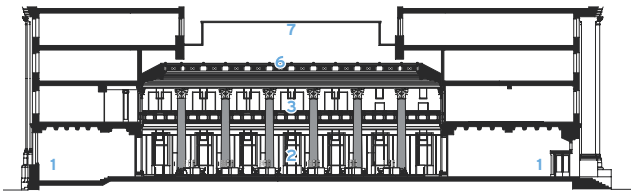


PHOTOGRAPHY: © STÉPHANE BRÜGGER

OPEN PLAN Architecture49 modernized the Sun Life Assurance Company building's landmarked banking hall, which has served as the trading floor of the National Bank of Canada for more than two decades. Currently, 256 traders and managers occupy the space.

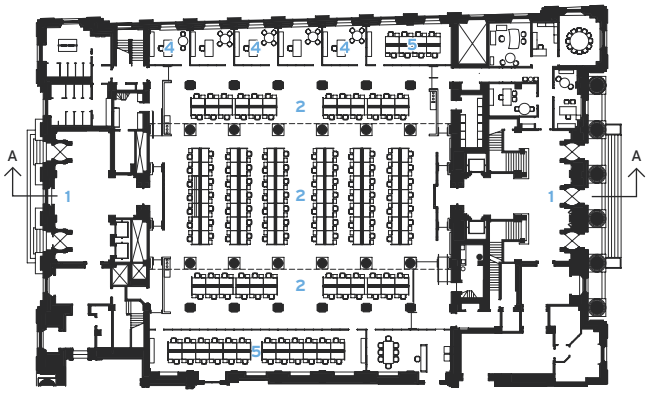


BALANCED BEAMS Éclairage Public and Lumenpulse integrated LED uplights and downlights within the hall's enclosed skylight; the designers suspended LED pendants in adjacent workspaces (above).



SECTION A - A

1 ENTRANCE
2 OPEN TRADING FLOOR
3 MEZZANINE
4 GLASS-ENCLOSED OFFICE
5 GLASS-ENCLOSED WORK AREA
6 SKYLIGHT
7 ROOF



FIRST-FLOOR PLAN

the roof to create an aura of daylight. Linear LED downlights also sandwiched between the glass and ceiling direct 3000K into the workspace. Together, Sauvé says, the luminaires produce all necessary functional lighting for the volume underneath. The architect adds that the installation's cooler colors provide some contrast to the warm historic materials and gilded finishes, and that all replacement partitions are glazed. In this way, he explains, "We were able to diffuse the skylight illumination as well as the daylight from the east facade, and the space is full of energy now."

credits

ARCHITECT: Architecture49 – Alexandre Sauvé, principal; Alexandre Landry, design architect; Nicoleta Dan-Ferenta, project manager; Pierre Baillargeon, supervising architect; Louis-Pierre Hubert, site supervisor

ASSOCIATE ARCHITECT: Robert LaPierre

LIGHTING DESIGNER: Ombrages (formerly Éclairage Public)

ENGINEERS: Bouthillette Parizeau (m/e); NCK (structural)

CLIENT: National Bank of Canada

SIZE: 31,000 square feet

COST: $9 million

COMPLETION DATE: October 2016

SOURCES

LIGHTING: Lumenpulse (fixtures); Lutron (controls)

GLASS PARTITIONS: Muraflex

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OSRAM

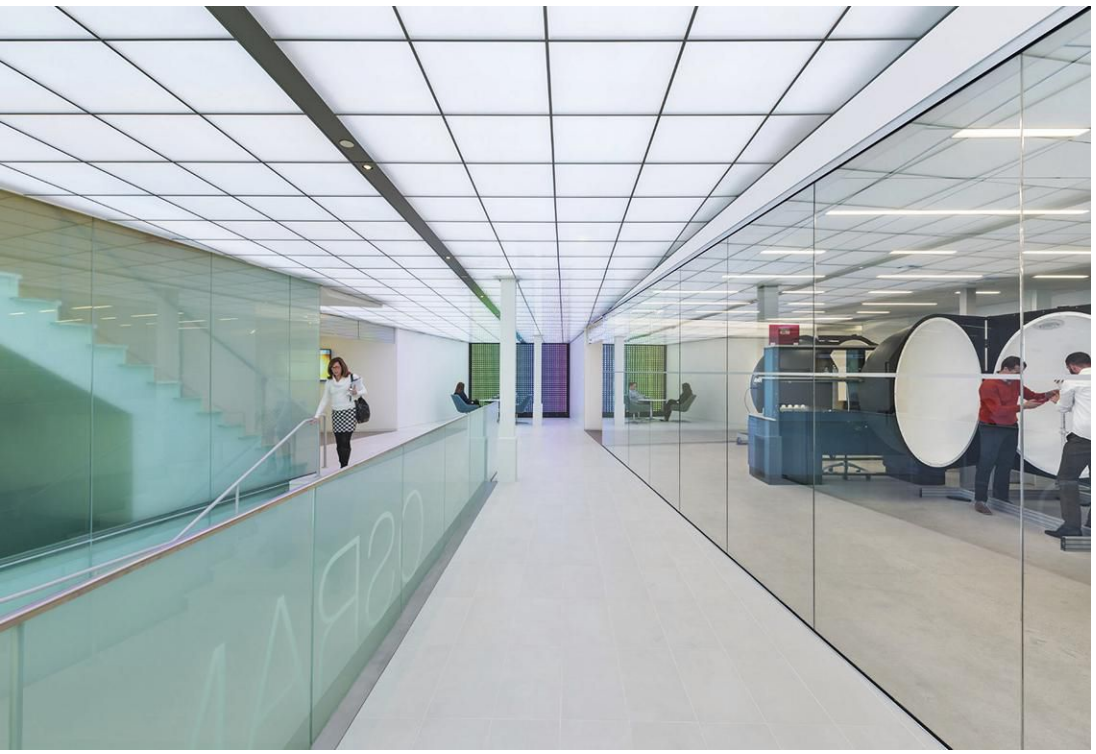
PHOTOGRAPHY: © ANTON GRASSL/ESTO

TOP JOB Sasaki and HLB Lighting Design created an illuminated ceiling, (or "super-ray") for the lobby of Osram Americas' new R&D headquarters (left), continuing it above an adjacent pre-function space and stair (above).

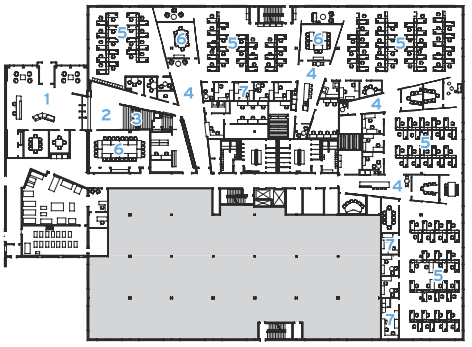
Osram Americas Headquarters
Sasaki

MORE DYNAMIC interaction among colleagues is what lighting manufacturer Osram had in mind for its new 130,000-square-foot headquarters inside a 1980s-era speculative office building in Wilmington, Massachusetts. For the first time, researchers, business units, sales, administration, and customer operations are occupying the same location. When the company tapped Sasaki and HLB Lighting Design to ready the leased space, its brief paired companywide collaboration with "the challenge to build with light," says Boston-based Sasaki principal Victor Vizgaitis. "You were to know who Osram was and what it did from the moment you walked into the building." The project largely employs products from Osram's Sylvania Lighting Solutions group.

Sasaki aimed to foster awareness of the brand and its multiple departments with an illuminated double-height entry sequence, which comprises a lobby and adjacent two-story pre-function area and includes a gracious central stairway. Here the ceiling is called a "super-ray," in which 9-by-9-inch tiles of programmable LEDs are mounted behind acrylic panels. "This is a person's first impression of what Osram can do," Vizgaitis says, and, accordingly, the super-ray is as dynamic as it is immersive. The entire surface measures 2,637 square feet, bathing visitors in bright light or treating them to a show of colors or video sequences. Select Osram facility managers program the super-ray by smartphone app. The architects



BRIGHT PATHS The super-ray is faced with acrylic panels and illuminated by programmable LEDs (left). The office features wedge-shaped, collaborative "ray" areas, with uplit white ceilings (bottom) that border more expansive open workspaces identified by exposed ceilings.



FIRST-FLOOR PLAN 0 30 FT. 10 M.

1 LOBBY
2 PRE-FUNCTION AREA
3 CENTRAL STAIR
4 "RAY"
5 OPEN OFFICE
6 CONFERENCE ROOM
7 PRIVATE OFFICE

then placed labs, meeting rooms, and other enclosed spaces at the core of the office, making them visible from the entrance. That move also kept the perimeter open for more general office spaces, maximizing occupant exposure to daylight and views in a floor plate that exceeds 200 feet on each side.

On the upper floors, the perimeter space is divided into neighborhoods by more modest "rays" of light: spaces for wayfinding and collaboration that are wedge-shaped in plan, where knife-edge LED-embedded pendants uplight dropped white ceilings at a 3000K color temperature. "The rays needed to be bright and airy, without making the adjacent workspaces appear dim," HLB senior associate Robyn Goldstein says of tuning the light to produce an even wash that cues wayfinding and social interaction. In the adjacent office zones, exposed ceilings and a color palette of grays create distinction from the more social spaces located beneath the rays, and rows of bidirectional LED pendants mounted 12 feet on center provide a mix of direct and indirect 3000K illumination.

Vizgaitis does not compare Osram's rays and super-ray to a cathedral dome or Yale's coffers, but he does think that landmarked ceilings offer a lesson to the humbler makers of commercial workspaces. "Ceilings are in our direct line of sight, but they're often overlooked," he says. "Designers have to treat them with as much importance as any of the four walls." ■

credits

ARCHITECT: Sasaki – Victor Vizgaitis, principal in charge; Eric Lambiaso, project architect; Colleen Barrett, Jessica Korthuis, Mary Zambello, Alex Desaulniers, designers; Brigitte Beltran, business development

LIGHTING DESIGNER: HLB Lighting Design

ENGINEERS: McNamara/Salvia (structural); RW Sullivan (m/e /p/fp); Cosentini (IT/security); Howe (code)

GENERAL CONTRACTOR: Commodore Builders

CLIENT: Osram

SIZE: 130,000 square feet

COST: withheld

COMPLETION DATE: September 2015

SOURCES

LIGHTING: Osram, Traxon, FLOS, Axis (ambient); Encelium (controls)

ACOUSTICAL CEILINGS: USG Translucents; Armstrong

SURFACE TREATMENTS: Sherwin-Williams (paint); Carnegie (wallcovering); Rein Ceramiche (tile)

FURNITURE: Teknion (office); Bernhardt (reception)

PHOTOGRAPHY: © ANTON GRASSL/ESTO

Radiant Materials

Whether made of concrete or handcrafted glass, these new fixtures are more than just sources of illumination.

By Rita Catinella Orrell

Fizz Mini Pendant

This adjustable mini-pendant from Hubbardton Forge features a hand-blown clear bubble-glass shade crafted by artisans at AO Glass in Burlington, Vermont. A spun brass collar surrounding the glass gives the pendant an industrial feel. The incandescent lamp measures 5¾" high and comes with a choice of eight standard finishes.

hubbardtonforge.com

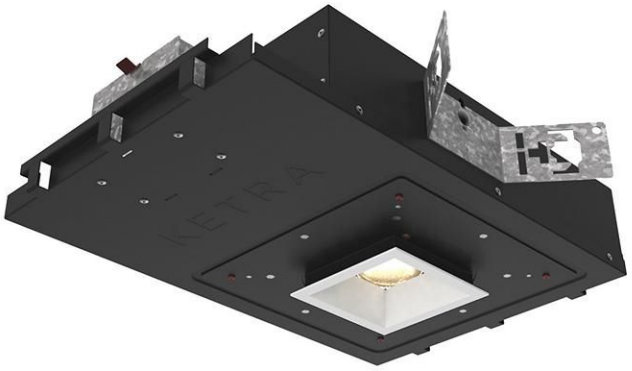
CIRCLE 115

Aplomb Large Pendant

Made by Italian artisans, Foscarini's Aplomb Large pendant features a wide, flattened, concrete top fitted with an LED light source that casts a broad beam. To create the lamp's slim form and softly textured appearance, the artisans focused on the raw material, crafting a perfectly balanced slurry to be poured into the mold. Available in white, gray, or brown.

foscarini.com

CIRCLE 116



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Ketra's D3 downlights for homes, offices, and other interior spaces offer a fully tunable spectrum of white (from 1,400K to 10,000K), saturated color, and pastel light for fixed, adjustable, and wall-wash applications within a low-profile 3½" housing. The D3 line features Ketra's exclusive natural light system that automatically tunes the lighting, so that it is crisp and bright during the day, and soft and warm in the evening.

ketra.com

CIRCLE 117

Torres Lighting

Torres, by industrial designer Rodrigo Torres and lighting designer Chip Israel, is the newest family of lighting from Landscape Forms, comprised of wall-mount, pedestrian, path, and catenary fixtures for urban architecture and streetscapes. The design of the Torres pedestrian light achieves an extremely thin cross-section by utilizing the latest in highly efficient multi-die LED technology.

landscapeforms.com

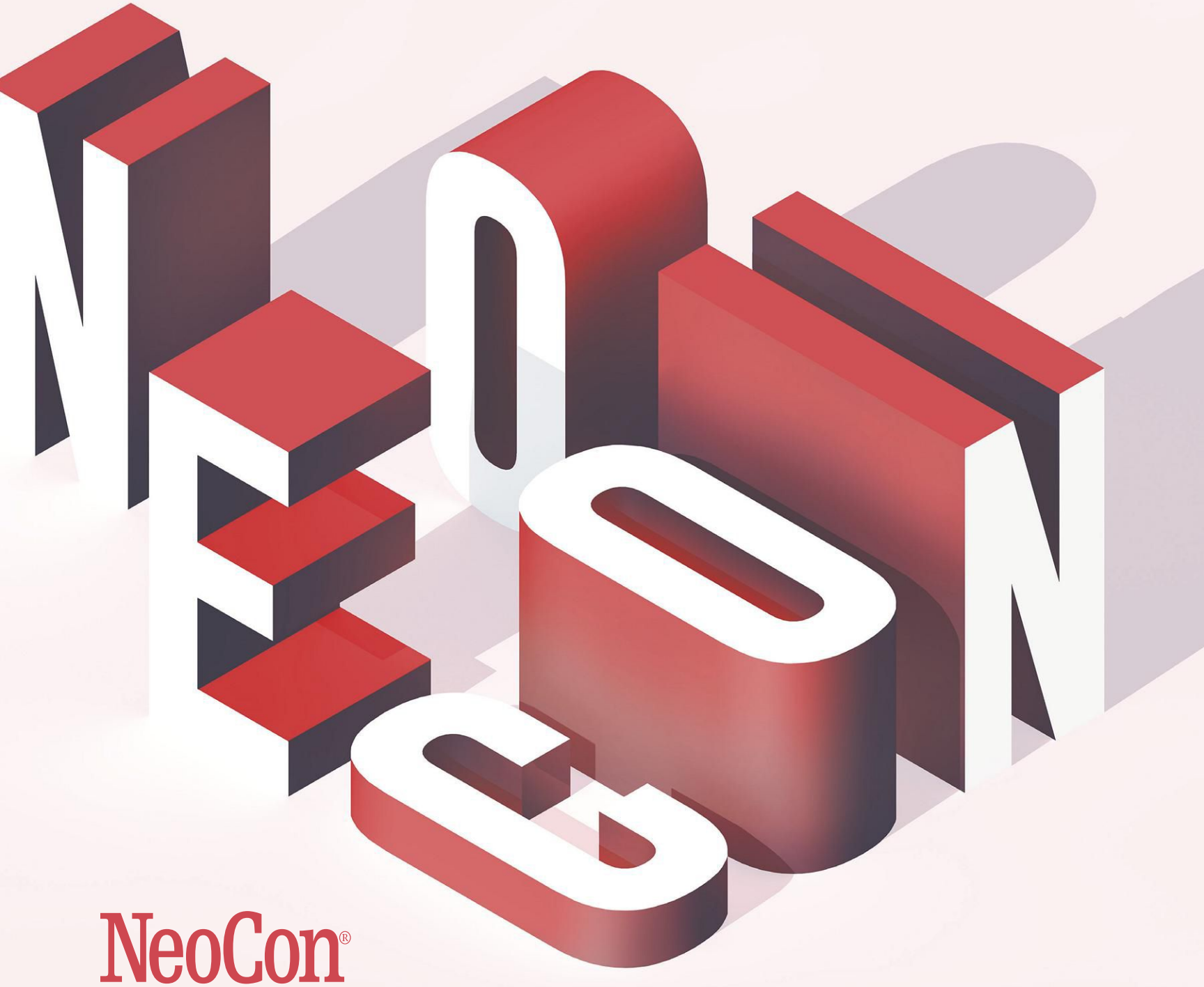
CIRCLE 118

Parscan

This Erco product family provides high-quality light for museums, exhibitions, stores, and all applications that require accent lighting of objects and details. Its spotlights, floodlights, and wall washers feature a cylindrical cast-aluminum luminaire head with optimum thermal conditions for the LED modules and control gear. A compact pivoting mechanism keeps the fixture adjustable, even in ceiling channel installations.

erco.com

CIRCLE 119



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Euroluce

The biennial lighting trade show, which took place alongside the *Salone del Mobile* last month, spanned four large pavilions at Milan's sprawling fairgrounds. Additional exhibitors showcased their introductions at off-site venues throughout the city. Collected here are some of the most innovative and alluring new fixtures that were on display.

By Josephine Minutillo

Filo

Foscarini was established on the island of Murano in Venice just over 35 years ago. Its latest fixture to feature the area's world-famous glass is its most playful. For Filo, designer Andrea Anastasio incorporates blown glass, porcelain, and varnished metal in a decorative table lamp that resembles a necklace but is also very functional. Users can string Filo's colorful, fabric-wrapped electrical wire in whatever loop pattern they choose.

foscarini.com

CIRCLE 121

Arrangements and WireRing

Flos is undoubtedly the star of the show at every Euroluce, but its booth was particularly stunning this year, with works by Nendo, Konstantin Grcic, Philippe Starck, and the Bouroullec brothers. London-based Michael Anastassiades's Arrangements (above) is a modular system of aluminum geometric light elements with flex strip LED's that could be combined in different ways. Each unit simply attaches to the previous one as if resting, to create a glowing chain. Young design duo Formafantasma triumphed in its first collaboration with Flos, showing two equally subtle fixtures. An exercise in reduction, WireRing (below) is composed of a belt-like electric cable and a ring that contains an LED strip.

flos.com

CIRCLE 120

Yuh

Classic Danish lighting brand Louis Poulsen has collaborated with one of the best emerging talents worldwide, Copenhagen-based studio GamFratesi. In addition to creating its booth for the fair, designers Stine Gam and Enrico Fratesi introduced their first product for the company, which was inspired by Arne Jacobsen's AJ lamp for Louis Poulsen. Available later this year, Yuh comes in white or black. The flexible fixture rotates, rises, and drops, illuminating where desired. The shape of the shade was determined geometrically from the functional movement of the screen on the vertical pipe. The collection comprises a table, wall, and floor lamp.

louispoulsen.com

CIRCLE 122

products **trade show**

Boom

Stickbulb was founded in 2012 by Yale School of Architecture graduates Russell Greenberg and Christopher Beardsley as a way to combine their mutual love of architecture, modular systems, and sustainable manufacturing. Its latest introduction is Boom, inspired by and made from destroyed buildings. At the center of the LED chandelier is a mulitfaceted cast-brass joint from which linear wood strips housing the lamping in varying lengths—the essence of all Stickbulb designs—cantilever. In this case, the sticks are made of redwood sourced from dismantled water towers in New York City.

stickbulb.com

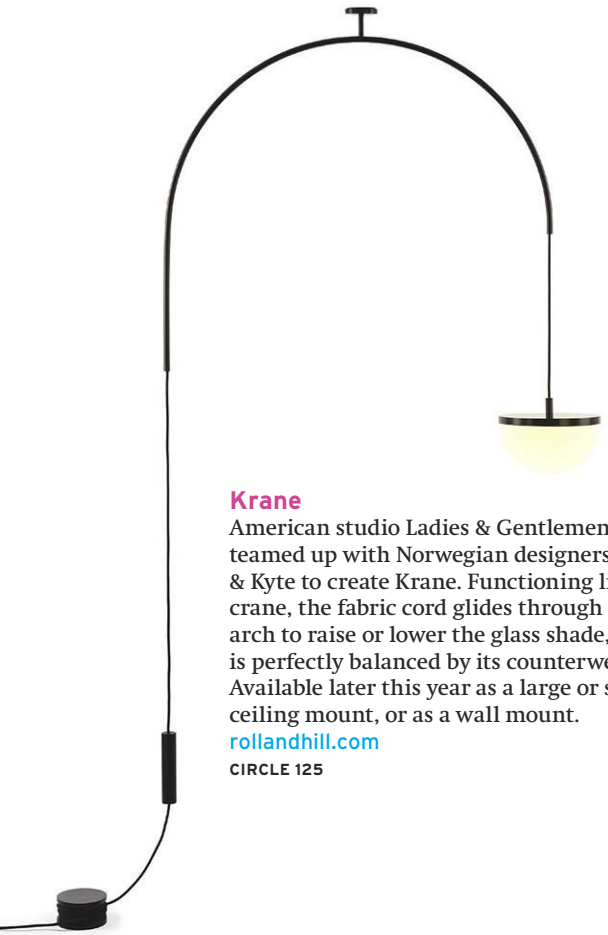
CIRCLE 124

Alzabile

Tato is a young company that is drawing on a rich past. It reintroduced several fixtures by Italian modernists, including Gio Ponti. Alzabile was designed in 1947 by leading 20th-century Milanese architect Ignazio Gardella. The floor lamp features a shade that rotates 180°. It is available in brass or chrome, with a marble base in white, black, or gray.

tatoitalia.com

CIRCLE 123



Krane

American studio Ladies & Gentlemen teamed up with Norwegian designers Vera & Kyte to create Krane. Functioning like a crane, the fabric cord glides through the arch to raise or lower the glass shade, which is perfectly balanced by its counterweight. Available later this year as a large or small ceiling mount, or as a wall mount.

rollandhill.com

CIRCLE 125

Meshmatics

Made of galvanized steel and brass, Meshmatics is a delicate chandelier designed by Rick Tegelaar for Dutch furniture, lighting, and accessories brand moooi. The three layers of wire mesh reflect and diffuse light from the integrated LED source.

moooi.com

CIRCLE 126

CONTINUING EDUCATION

In this section, you'll find five compelling courses* highlighting creative solutions for tomorrow's buildings brought to you by industry leaders. Read the course, and then visit our online Continuing Education Center at ce.architecturalrecord.com to take the test free of charge to earn credits.

Photo courtesy of TAMLYN


p140

The Modernization of Multifamily Housing

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System Solutions for Stadiums

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Shelter from the Storm

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Photo courtesy of CENTRIA


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Insulated Metal Panels

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BE PM SU

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Photo courtesy of Daniel Weinbach & Partners Ltd.


p165

Trends in Urban Outdoor Amenity Spaces

Sponsored by Unilock

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CATEGORIES

BE BUILDING ENVELOPE DESIGN
LS LIFE SAFETY AND CODES
PM PRODUCTS AND MATERIALS
RE RESIDENTIAL
RR RENOVATION AND RESTORATION
ST STRUCTURAL
SU SUSTAINABILITY

*Courses may qualify for learning hours through most Canadian provincial architectural associations.

Project: The Aster Conservatory
Location: Denver
Architect: KTGY

Multifamily housing continues to be a strong market, but incorporating more luxury features while still controlling costs creates design challenges, and opportunities, for architects.

Photo courtesy of TAMLYN

The Modernization of Multifamily Housing

Providing luxury living without sacrificing affordability

Sponsored by Glen-Gery, Hager Companies, New Millennium Building Systems, Quest Windows, and XtremeTrim® by TAMLYN

By Peter J. Arsenault, FAIA, NCARB, LEED AP

According to data from the federal government, the number and type of multifamily projects completed annually has changed between 2012 and 2016. The Survey of Market Absorption of New Multifamily Units (SOMA), sponsored by the Department of Housing and Urban Development (HUD), is a free and regularly updated reporting source that uses the U.S. Census Bureau's Survey of Construction (SOC) as its sampling base. Each month, a sample of residential buildings containing five or more units is selected for SOMA. Its data for the years 2012 through 2015 shows that the number of completed multifamily housing units increased notably in each of those years. In 2016, the total number dipped a bit lower than 2015 but was still higher than all of the years between 2012 and 2014. During this same time period, the mix of different types of multifamily housing also showed notable changes each year, particularly with fewer subsidized or tax-credit units being constructed.

The SOMA is based on an initial three-month interview that collects information on amenities, rent or sales price levels, number of units, and type of building, including senior housing. It also tracks the number of units taken off the market (i.e., absorbed) by virtue of being rented or otherwise occupied. Hence, it can track the rate of absorption of new apartments as an indicator of supply and demand of multifamily housing in areas around the United States. Reports of this data for the entire country are broken down for specific metropolitan areas, published quarterly, and released on the Internet (www.census.gov/housing/soma). The latest data is generally available in early March, June, September, and December. There are also two annual online publications, the H-130 Annual, which provides 12-month absorption data for the previous year and is released the first week April, and the H-131 Characteristics of Apartments Report, which provides annual three-month absorption rates, released the first week of July. In reviewing the annual data between 2012 and 2016, it is clear that there are regular cycles of units becoming available and being absorbed. While the general numbers may be up, the rate of absorption appears to have slowed such that more units are still available 90 days after first coming on the market than previously.

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Identify the significance of selecting structural systems for multifamily housing buildings in regards to fire safety, cost, and comfort.
2. Assess the choices in exterior cladding to create multifamily buildings that have well-designed facades while assuring durability and cost effectiveness.
3. Explain the importance of proper fenestration choices, particularly when using window wall designs in multifamily housing.
4. Determine ways to select appropriate hardware systems for multifamily settings that assure security and proper access.

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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Levy Design Partners, 3900 Adeline, Emeryville, CA
Photo Credit: Russell Abraham

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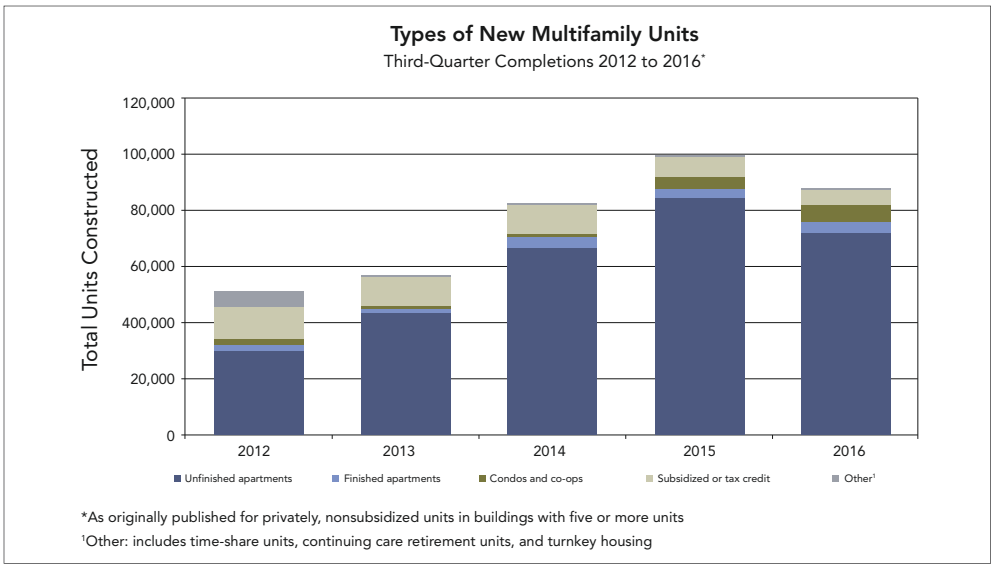
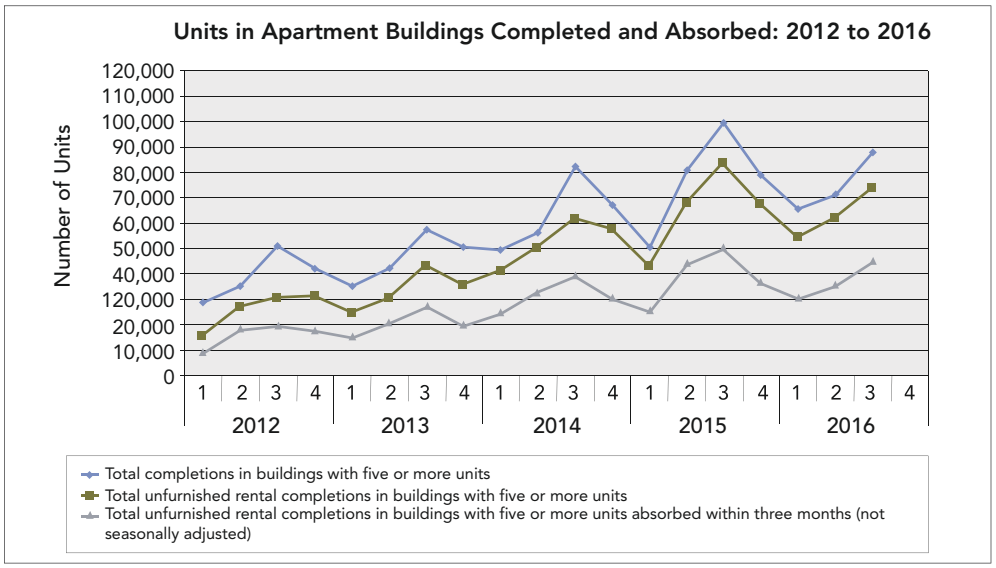
Source: Survey of Market Absorption of New Multifamily Units, U.S. Census Bureau



The U.S. Census Bureau tracks the construction of multifamily units by type and by total number of units completed.

Source: Survey of Market Absorption of New Multifamily Units, U.S. Census Bureau



The absorption rate of multifamily housing units is tracked by the U.S. Census Bureau as a means to determine market conditions on a local and national basis.

The trends observed from this SOMA data suggest a few things. While the current number of new units may be slowing a bit to let the absorption rate catch up, the market overall is still strong. The availability of units also suggests that competition is strong, meaning that owners and developers are looking for ways to differentiate themselves from other available options in any given market. That is evident in the many projects that offer more attractive designs and luxury options to lure new residents, all while keeping costs under control, of course.

With all of the above in mind, we will look at five different but significant architectural building systems related to the design and construction of multifamily housing. Each one will be examined based on the ways it can be used to provide better design, control construction costs, and provide residents with an attractive, comfortable, and desirable housing option.

STRUCTURAL SYSTEM CHOICES

Every multistory project brings unique structural design challenges, and that is quite true for multifamily buildings too. Yet they all share the need to balance architectural design intent with cost-effective construction systems. Visual issues come into play by deciding to use a building system that is either covered over or is left exposed as part of the design aesthetic. Space planning and optimization can be impacted directly based on the cost-effective spans of structural systems that can limit locations of structural walls and columns. Cost control is always on the mind of the building owners or developers, meaning that they need to rely on the design team to justify the structural system in terms of cost effectiveness when compared to other systems. Clearly, the structural system, architectural design, and overall cost are all intertwined and related to each other. The ideal situation is to select a system that allows for structural synergies and economies of construction to enhance the architectural design.

The common structural systems used in multistory construction are based on either concrete or steel, a combination of the two, or even combinations with wood in some cases. The selection is typically determined by the specific criteria and needs of a given project not only for structural strength but also for fire safety, sound separation, and coordination with other building systems and finishes. One approach that seems to meet all of these needs fairly economically is a "thin-slab" composite floor system. Fundamentally, this hybrid system is based on using steel decks and poured concrete acting together to create a long-span floor that requires fewer intermediate supports. As such, it can also mean that the floor-to-floor heights may be able to be reduced since the structure spanning between load-bearing walls or beams is only comprised of the composite slab without the use of additional joists, trusses, or girders. For example, a long-span composite floor system can achieve open bays up to 1,200 square feet, with clear wall-to-wall spans up to 36 feet without support columns. For longer spans, a support column can be thinned to half the size of equivalent reinforced-concrete columns.

In some cases, thin-slab construction may mean an additional story can be achieved using a long-span composite floor system compared to a conventional steel or reinforced concrete structure. An added story means more income for a building owner and may improve the overall project financial picture considerably. Thin-slab floor and roof designs also align with LEED v4 because they support a holistic, long-term view of project performance and costs, both to the building owner and to the environment.

Of course, there is no single solution for all buildings or even throughout a single building. For example, the most cost-effective and best-performing design solution may be a mix of structural systems, such as a roof made up of a traditional steel joist and deck system, occupied floors constructed from a long-span composite floor system, and outdoor canopies and sun screens made from exposed architectural steel deck. The best way for an architectural and engineering design team to get up-to-date information on capabilities and cost is to work with a steel system supplier in the earliest

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Photos courtesy of New Millennium Building Systems

Optimized floor-to-ceiling spaces and heights are a distinct advantage of a thin-slab, long-span composite floor system used in many modern multifamily buildings.

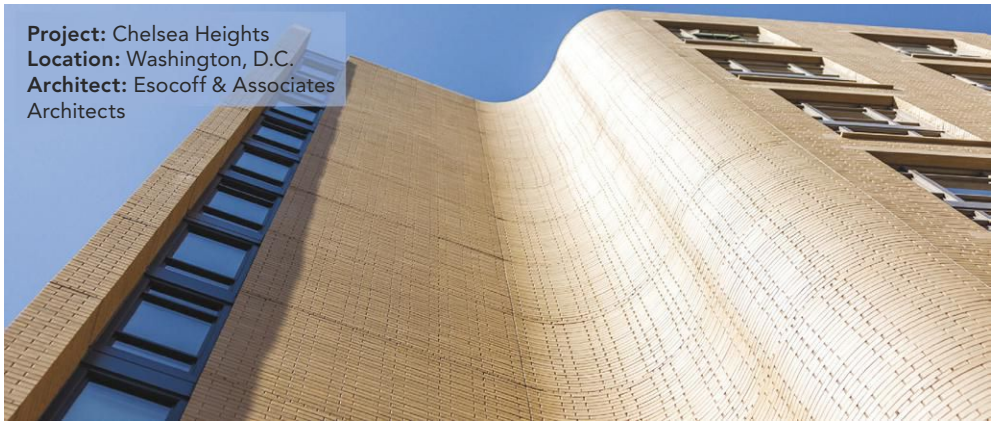
design stages. By using their assistance, more informed design and budget decisions can be made in the selection of a steel building system that will not only excel in the area of design intent but also holistically take into account a set of related material costs, erection costs, and effects on project timelines. Therefore, getting the right information early on allows design teams to quickly and effectively determine which system or systems make the most sense for any particular project.

David Abernethy, MSR market development manager at New Millennium Building Systems, sums it up this way: "New design ideas require a knowledge of steel building system options and the ways you can integrate them into specific projects. As design teams are challenged to be ever more mindful of the 'embedded' costs that can come with more traditional building systems, they will look for ways to overcome those costs by taking advantage of a given building's structural synergies."

BRICK MASONRY

Many multifamily housing projects incorporate brick masonry into the design of exterior and interior walls. The reasons for its use often include durability, aesthetic appeal, and marketability of the project. From a design standpoint, it also offers a wide and diversified variety of types, colors, and shapes that provide architects with a lot of choices and design flexibility. Some of the commonly available choices include the following:

- **Extruded brick:** Many building materials are created using the process of extrusion, and that technology has become a part of brick masonry production too. This means that brick can be produced efficiently and economically, while still providing the requisite versatility, strength, and value for multifamily projects. Extruded brick technology has been advanced by brick manufacturers, making it available in a wide spectrum of colors, a multitude of shapes, and even different textures.
- **Glazed brick:** While brick has been traditionally thought of in terms of natural, earthen colors, modern brick-making technology allows new options that go beyond conventional color choices. Glazed brick is created by applying a glaze to the outer surface of extruded clay that is carefully fired. Since glazes are available in a virtually unlimited range of colors, the finished, colored look of the brick is equally unlimited. Further, variations in textures are possible with glazed brick from a glossy, glass smooth finish to a mottled, speckled, and rough texture. This range of choices allows brick to be used in dramatic fashion in places where other materials might have been thought of as the only option.
- **Clay-coated brick:** In some cases, a matte surface in a defined color spectrum is the preferred choice. Manufacturers can provide this option with a selection of clay-coated brick. From a building performance perspective, the surface of clay-coated brick remains breathable, which can be an important consideration in some wall assemblies. This characteristic allows liquids and vapors to pass in and out without damaging the permeable surface, thus maintaining the classic look of the brick.
- **Molded brick:** This traditional method of brick production remains in use to provide individualized brick options. The bricks are typically formed in molds, producing intentionally irregular shapes to provide a different character and appearance to a finished wall. As such, it delivers both large-scale design features



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Brick masonry is a durable and attractive choice for both exterior and interior walls in multifamily housing, with a wide range of types, colors, shapes, and sizes available.

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and smaller, more intimate touches. Custom molded shapes to achieve unique design details are also available from some manufacturers.

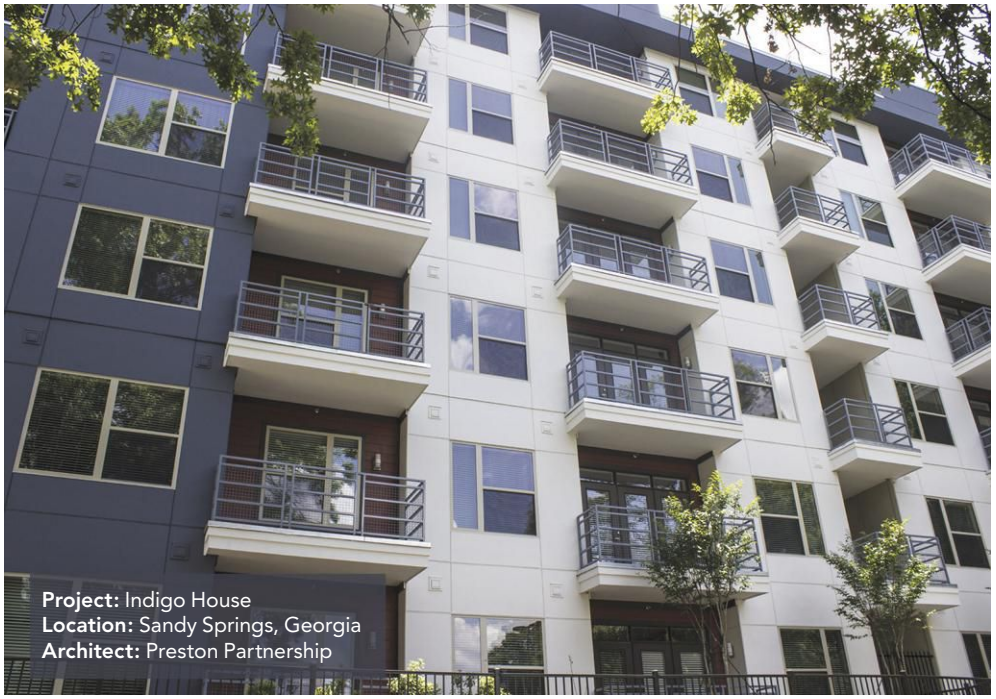
- **Handmade brick:** Replicating the centuries-old tradition of brick making craftsmanship, some manufacturers can still provide bricks made by hand to match or create a unique brick character or profile. Such handmade brick is completely customizable using a spectrum of rich colors and shades. The result is a classic style of brickwork that takes advantage of contemporary masonry knowledge and understanding.
- **Thin-brick veneer:** Recognizing that there are situations where the look and character of brick masonry is desired but the thickness of conventional brick is problematic, manufacturers have introduced a thin-brick alternative. By providing a thinner and lighter product, sometimes with a coordinated mounting system, manufacturers are providing architects with a modern choice that overcomes other restrictions for interior or exterior walls and design elements. The space-saving and affordability aspects of thin-brick systems mean that real brick surfaces are possible in projects where it previously might not have been considered.

Regardless of the type of brick selected, all of them are available in a variety of sizes, including standard, jumbo, economy, and even custom sizes. Similarly, numerous shapes are readily available for typical building conditions, such as corners, sills, treads, coping, water tables, and others. Color selection and, more typically, blends of colors will vary by manufacturer, so it is important to review availability before finalizing a choice. In that regard, most brick suppliers are quite willing to collaborate with architects on building concepts by providing technical and design support from the earliest stages of design. Ultimately, the selections can be optimized to produce the intended look, meet performance demands, and control costs.

PANELIZED CLADDING SYSTEMS

Some multifamily building designs are based on an exterior design aesthetic that uses a lightweight cladding over a framed wall assembly. Commonly, this cladding is used in standard-size panels made from fiber cement, engineered wood, or even thin composite aluminum panels. It might also include siding of different types made from some of the same materials. Designing with such materials is fairly straightforward, but attention needs to be paid to detailing the way the panels are secured to the building and how the edges of the panels are addressed. Typically, some sort of trim has been applied to accomplish this using wood, composite, or plastic-based materials. While those are effective and can be good for some buildings, their width, bulk, and ongoing maintenance can make them less desirable for other designs.

Photos courtesy of TAMLYN



Exterior cladding panels can be held in place along their edges using extruded aluminum trim that also contributes directly to the facade design.

As an alternative to traditional trim, many architects are turning to the use of thin, extruded aluminum trim systems. The use of extruded aluminum in buildings is common due to the versatile nature of the material and its durability in both exterior and interior applications. When used to hold the edges of wall panels, it provides architects with a unique means to detail corners, vertical and horizontal joints, and material transitions. Further, it can be specified in common thicknesses and profiles to suit any of the lightweight cladding materials already mentioned, or even for gypsum board and other exterior or interior panel products.

Used on the exterior, aluminum trim aids architects in creating modern, panel-based facade designs that have become more common across the country, particularly for multifamily projects. It is available in a variety of profiles, some of which create a recessed reveal between cladding panels and others that project outward to accentuate the lines of the design. Used in any of these ways, it has typically been shown to be less expensive with a more elegant look than other options. On building interiors, such as communal spaces in multifamily developments, aluminum trim can be used to create bold corners or wall bases in addition to delineating wall panel patterns.

Of course, the color of the trim is an important design consideration, regardless of the location. There is great flexibility available in this regard too. The trim can be specified as primed only ready to be painted in the field or as prefinished in the factory. The prefinished choices vary by manufacturer but typically include durable powder-coat paint, conventional wet paint coatings, or anodized aluminum in standard colors. In this regard, the trim can appear to blend in with the adjacent panels or cladding, or it can be used to highlight all or some of the visual lines it creates. This flexibility using familiar and long-lasting finish options means that both the design and the performance level can be controlled.

Architects who have used this approach include Russell A. Hruska, AIA, principal and cofounder of Intexure Architects in Houston. He points out that "using extruded aluminum trim between panel joints becomes an architectural element and is a way of expressing the joints and defining their deliberate placement. It adds a level of architectural refinement." From a performance perspective, he adds, "Aluminum trim, when used with fiber cement panels

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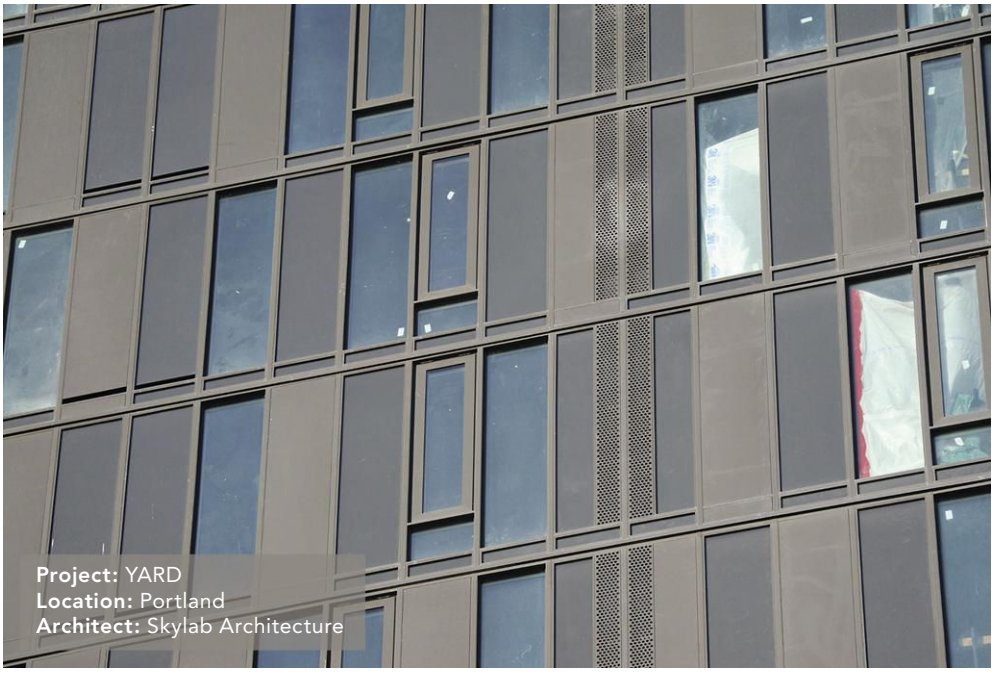

A custom designed and fabricated window wall system can provide multifamily buildings with a high-performance, fully coordinated solution to the exterior walls.

or lapped siding, is more cost effective than stucco and provides long-term durability while achieving our design aesthetic." Val Glitsch, FAIA, confirms this experience, indicating, "The alternative to premanufactured aluminum trim is wood, which gives a very different aesthetic, is bulkier, and, for water infiltration concerns, can only be used for vertical joints. The best way to get a quality, consistent, properly installed, and cost-effective result is to use extruded aluminum trim designed for that purpose."

FENESTRATION WITH WINDOW WALL SYSTEMS

All multifamily buildings require some type of fenestration in the form of windows or other glazed openings. Operable windows in particular are usually required or desired and worked into framed or masonry openings. An alternative for multistory, multifamily buildings can be the use of a window wall system that combines opaque, insulated wall areas with glazed window areas. A window wall differs from a curtain wall in the method of attachment to the structure. Curtain walls typically attach to the building structure and run vertically past the floor plates. Window wall systems can be installed between floor plates, and then additional "slab covers" are installed to create a continuous look along the facade over the edges of the floor slabs. At least one manufacturer has developed a system that provides spandrel glazing as part of the overall height of the system as a "bypass window" that covers the floor slabs and creates continuity between floors.

The primary benefit of a window wall system is that fenestration and opaque framed areas can be designed and produced together, typically all from the same manufacturer. That means there is no guess work in the coordination of details between different trades since the whole system can be fabricated together under controlled factory conditions with improved quality control. A basic window wall system of this type could include unitized wall system framing, insulated and tempered glass, spandrel glass, metal panels, porcelain panels, and a variety of operable windows and doors, all mounted in the factory ready for shipping and quick erection on the job site. All of the typical design aspects of a building facade can be controlled and specified as well as the performance requirements. High-performance insulated glazing with state-of-the-art thermal breaks are all available to achieve overall glazing U-factors of 0.31 BTU/hr/SqFt/F or better. Acoustics and sound transfer can be addressed with sound ratings of STC 38 or better depending on the type of glass specified.

When considering a window wall system for a multifamily project, it is crucial to identify and work with a manufacturer or fabricator very early in the design process. This way, the design team can retain overall design control but understand and use the most appropriate array of products and services currently available. Since everything is custom fabricated, it is easy to be creative and inventive with the window wall design. However, with some understanding of the fabrication and construction process and details, systems can be optimized, performance criteria can be met, and costs can be properly controlled. This is particularly important when dealing with the inevitable variable conditions across a building facade, such as transitions on to balcony decks, ADA access compliance, penetrations from mechanical and electrical lines or equipment, and window-washing equipment.

Working with a manufacturer/fabricator from the beginning can also bring some specialized design tools to the table in the form of customized computer files that can be incorporated into a CAD- or BIM-based design. That means 3-D renderings and other visual presentations can be more accurate and help identify any design issues or opportunities. It can also provide specific and detailed information related to performance, such as data for an energy model, seismic analysis, or acoustic requirements. It also allows for very accurate cost information to be obtained so that cost estimates can be more accurate and reliable. And in cases where it is needed, it will be fairly straightforward to have full-size mockups or samples readily reviewed during design, rather than waiting until construction.

DOOR AND ACCESS HARDWARE

Safety and security are fundamental aspects of any building but are particular considerations in multifamily housing situations where a lot of people can be coming and going. Residents want to be able to freely access their buildings and living units but also want to be sure that access is controlled when it comes to non-residents or security in their own dwelling units. These needs usually get translated in terms of door and access hardware that is selected based on the variety of doors and access conditions encountered throughout a building or development.

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Safety and security in multifamily housing buildings often relies on quality hardware systems that are fully coordinated and appropriately selected to meet the needs of the design team, the building owner, and the residents.

The range of hardware and access control used in a multifamily facility can be extensive. Common areas may be best served not only by conventional key-and-lock systems but also by electric systems that require a resident to act and give permission before a visitor can enter. Or the resident may use an electronic system tied in with a larger security and surveillance system. Identification of a hierarchy of spaces that different people have access to or are restricted from is also important. Management staff, for example, likely needs access to certain areas that are not intended for residents, such as mechanical or electrical rooms or offices. Residents should have access to places that visitors may be excluded from. Service personnel and delivery services need to be able to access appropriate spaces to carry out their duties but then be excluded from other areas. Individual dwelling units need lockable hardware that is most commonly based on conventional keys, but electronic systems are also possible here. Determining the access control needs becomes a first but critical step before considering what specific hardware and control system is best.

Beyond access control, there is a need for general door hardware too. For example, hinges need to be selected based on commercial or residential door locations, including specialty versions such as continuous stainless steel hinges. In some cases, the hinges may need to be self-closing or the doors need to be equipped with door-closer devices to comply not only with security concerns but also code-based fire containment requirements. Exterior doors will need thresholds and weather stripping to control air infiltration but may also need to be selected to comply with handicapped accessibility requirements. Sliding doors, whether interior or exterior, will require specific hardware suited to their operation. Other miscellaneous or auxiliary hardware and trim also need to be assessed and appropriately selected.

Given the range and intricacies of the different required hardware in a project, it is not surprising to find that architects will rely on a hardware specialist or work directly with a manufacturer or supplier to determine the best choices. In some cases, a multifamily building owner or manager may have a selected manufacturer that they prefer to work with in the interest of standardizing the hardware systems used across one or multiple properties. Most national hardware companies are poised to meet these needs with a full line of architectural door hardware focused on security, functionality, and quality of their products, whether the properties will be turned over to individual ownership or commonly managed and maintained for a prolonged period of time. They can routinely provide not only the design and aesthetic needs envisioned by the architect but also the safety and security desired by the tenant and residents. They also can provide either specification consultation or full specification writing services to ensure full coordination across all hardware choices. This has the added advantage for the owner of a single source of hardware that eliminates any confusion or delays if something needs to be addressed during construction or after the building is occupied.

Josh Hager, president and COO of Hager Companies, comments on the hardware selection process by noting, "Hardware manufacturers appreciate the opportunity to collaborate with architects and other industry professionals to provide a full line of architectural door hardware to meet the aesthetic needs of the project as well as the form, fit, function, and ever important building and life safety codes." Full collaboration in this regard seems to be most appropriate for multifamily projects.

CONCLUSION

Multifamily housing remains a big part of the construction market, even though it experiences some ebbs and flows in production and some regional variations. Building owners and residents continue to require quality and even luxury features but at a reasonable cost. Architects and other design team members who can identify the best ways to provide such amenities while controlling costs, including some of the techniques discussed in this course, increase the likelihood for successful projects and repeat work with building owners or developers.

Continues at ce.architecturalrecord.com

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

PRODUCT REVIEW

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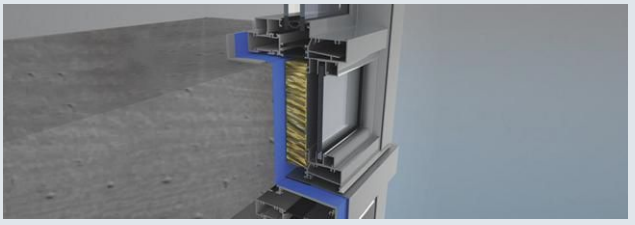

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Stadiums and arenas, such as the Virginia Tech, Lane Stadium pictured here, have become larger and more diverse in their use and functionality in recent years.

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System Solutions for Stadiums

More sophisticated structures call for high design with durable and safe performance

Sponsored by ASI Group, Inpro, and NanaWall Systems | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

Between the years 1995 and 2015, a span of only 20 years, a recent research study documented the construction of 70 major stadiums around the United States—56 between 1995 and 2009, plus another 14 between 2009 and 2015.[1] On average, that is 3.5 major league sports venues being built and opened per year, which is a notably higher rate of construction compared to any previous time in the United States dating all the way back to the 1920s. In addition, there have been numerous minor league, college, or municipal stadiums and arenas built, not to mention the renovation of existing facilities or sports venues located both inside and outside of the United States. By all accounts, the appetite for sports and entertainment venues is strong.

What's driving all of this activity? It would appear to be multiple things. In some cases, it's the availability of funding. In others, it's the recognition that stadiums are helping to drive economic development or urban revitalization. In still others, it can simply be the appeal of a sport or a favorite team to support. Whatever the reason, it all spells opportunities for design and construction professionals, particularly since the average cost of these facilities can reach into hundreds of millions of dollars. In this course, we will look at several important but sometimes overlooked aspects of stadium design. As these facilities get larger and more sophisticated, the ability to create unique spectator experiences, improve durability, and provide clean, safe, comfortable amenities all become critical to good design.

STADIUM DESIGN CONSIDERATIONS

The internationally known design firm HO+K has focused a significant part of its work on stadium (i.e., open to the sky) and arena (enclosed with a roof) designs. John Rhodes, a director of the firm's Sports + Recreation + Entertainment group, is a recognized thought leader in this area. He has been interviewed and published based on his own experience and that of the firm about some of the changes and trends in stadium and arena work in the past decade or more.[2] He notes that there has been a "clear shift away from single-purpose functional venues toward spaces that cater to a much more diverse event calendar, focused on live entertainment rather than purely

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Learning Objectives

After reading this article, you should be able to:

1. Identify the trends behind the growth and evolution of stadium and arena design as multi-use public places.
2. Assess the health and safety aspects of "back-of-house" and restroom areas as part of an overall high-performance design.
3. Explain the importance of proper attention to details for the performance of critical design components, such as operable glass walls.
4. Determine ways to apply the principles as presented into building projects demonstrated through case study or project examples.

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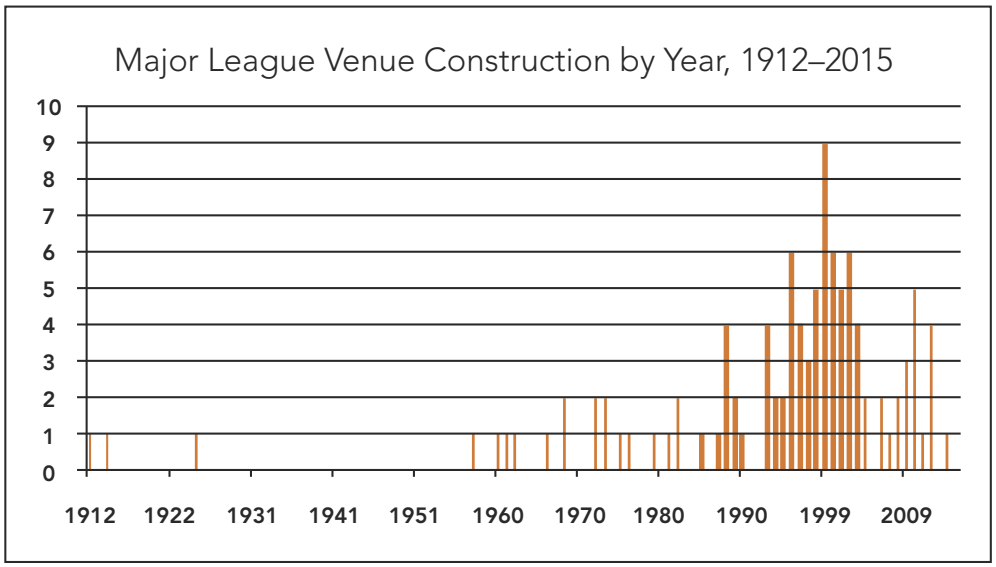
Source: "Trends in Stadium and Arena Construction, 1995–2015"



The construction of new stadiums and arenas saw a significant growth spurt between 1995 and 2015, and indications are that there is more work to come.

sport." This multi-use capability clearly adds to the design complexity but it also means that the facility can be used for more types and sizes of events and attract more people. He sees this trend continuing, as arenas and stadiums are being more integrated with city centers and becoming anchors of activity for urban areas. "Over the next decade, arenas will start to combine with other community components like education, science and technology, hotels, and parks," Rhodes says. "To facilitate this, clients will want a team with specialties in all of these areas." Clearly, the dynamics of the design and the types of criteria are expanding, requiring more professional input and synthesis into a much more complex outcome.

The design professionals at HO+K and others have noted that not only is the multipurpose nature of these facilities impacting the design, but consumer preferences are also coming into play with an expectation of a higher-quality overall experience. Rhodes again notes, "The experience of going to an event needs to exceed the convenience factor of watching online or at home. Venue designers need a better understanding of how people want to use spaces and engage in an event." With this in mind, let's look at some specific design considerations.

Enhanced User Experiences with Operable Glass Walls

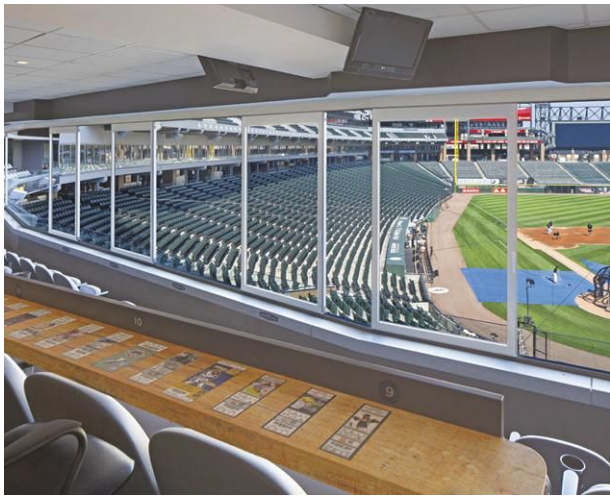
As fans and event attendees expect more from their surroundings, designers are starting to recognize that the in-game experience can be more important than the game or event itself. Hence, it is no longer appealing to many people to sit outside during inclement weather on a bleacher seat or in other unprotected areas. In fact, it has become more common to expect a level of experience equivalent to deluxe hotels, clubs, and restaurants with private boxes, suites, and party salons increasingly common at all levels of venues. It seems that the seating and space itself must be as competitive as the game and provide the fan or attendee with a unique and comfortable social experience. The willingness of companies and other organizations to pay for and reserve such spaces for employees, clients, friends, and family to gather in a controlled space to experience a game or event appears to be fueling the growth in the design of such spaces.

One means to achieve these separated seating areas is to use operable glass walls. Using such opening glass walls in stadiums enables two key benefits. First, the flexible operability of the glass wall enables suites, gathering areas, and in-stadium restaurants or bars all to have the ability to configure the space based on the needs of the occupants or the event. For instance, when the glass wall is open, the fans experience the crowd directly, but when closed, the operable glass wall provides a transparent barrier with unobstructed viewing. In cases where the playing field is outdoors, the closed wall also provides greater human comfort with protection from wind, cold air, and noise. Secondly, when there are no events taking place, the weather-resistant opening glass walls protect interior spaces and furnishings from exposure and/or unauthorized entry.

This flexibility and controllability creates a number of benefits for everyone involved, such as the stadium operator, the owner, and the attendees. For those buying tickets, the variety of choice in having separate interior spaces or the ability to create flexible suites from standard luxury boxes can be appealing. The overall design approach of providing suites that offer a unique experience for the sports fan or event attendee is enhanced by allowing the occupant the choice to easily open or close operable glass wall panels based on weather, preferences, or size of group. From a revenue standpoint, it allows a basis for different ticket prices based on the level of comfort provided, creating a higher ticket revenue than facilities without the operable wall option. Further, since the operable glass walls can create different size spaces for different events at different times, the facility has the opportunity to serve more groups with more choices in the types and sizes of events—that equates to a more continuous source of revenue between larger events.

Tyson Godfrey, principal with Hubbard Godfrey Architects, worked on San Francisco's AT&T Park. The design is a "classic urban ballpark" with an old-time feel but with all of the modern amenities. The architect's use of operable glass walls in the design received recognition when it

Photos courtesy of NanaWall Systems



Operable glass walls are used to effectively create enhanced guest experiences at the San Francisco Giants Stadium (left) and the Chicago White Sox Stadium (right).

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was named "Sports Facility of the Year" in 2008 by *Sports Business Journal*. According to Tyson Godfrey, "Configuring the suites with opening glass walls defines a new standard of luxury at AT&T Park. While sightlines to game-day action were a priority, the suite was also conceived as a social and event space with maximum flexibility for one large group or two smaller ones in a variety of seating configurations."

Expansion Joint System Durability

With their sheer size and surface area, stadiums are subject to significant movement of floors, walls, and roof areas from thermal or other environmental forces. Expansion joint systems are a necessary component then, but they must be engineered to handle several other factors too. First is the need for high durability of the joint materials and covers to withstand pedestrian traffic, push carts, scissor lifts, etc. Another factor is the ability to act as a moisture barrier since expansion joints in exterior walls or roofs must prevent rainwater infiltration or help channel rainwater to drainage points. Finally, if the expansion joint is in a fire-rated assembly, then the joint needs to be fire rated as well. Since wet fire barriers are worthless, preventing water from entering a fire barrier is critical to life safety. In that regard, choosing a supplier for expansion joint systems and fire barriers that are truly effective cannot be overstressed. Stadium projects often involve large concrete pours over long concourses with multiple expansion joints being typical. The ability of the supplier's representative to provide alternatives and approved adjustments when the pour "doesn't go quite right" can be critical to achieving fire ratings, not to mention keeping the construction on schedule.

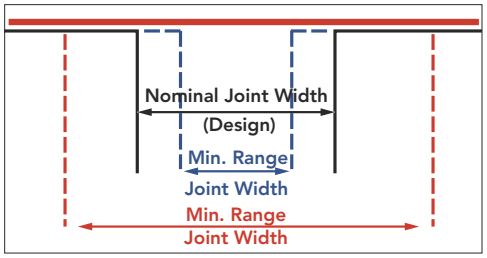
When looking at expansion joint system selection and specification for stadiums and arenas, the following should be considered.

- **Nominal joint size:** The designed width of an expansion joint at a median temperature is usually determined by a structural engineer and referred to as the nominal joint width. The selection of all expansion joint systems, whether caulking, cover, or concealing systems, starts with understanding the nominal joint size and the range of movement between the minimum fully contracted size and the maximum fully expanded size. The expansion joint system selected needs to accommodate this full movement range.
- **Type of movement:** Building sections can move due to several common reasons. Thermal movements are most typical and caused by daily environmental temperature changes in and around the structure. Thermal movement is primarily "one directional" in nature and is the result of the expansion and contraction of structural elements as affected by heat, cold, and humidity levels. The amount of thermal movement is typically approximately 10 to 25 percent of the nominal joint size. Seismic activity can also be a source of movement, which may be horizontal, vertical, in shear, or a combination of all three. Seismic joint widths may need to increase with higher floor levels to protect a structure during earthquakes or other seismic events. These joints must have the capacity for movement of approximately 50 to 100 percent of the nominal width. Finally, wind-load induced movement, caused by high winds, can cause a structure to sway back and forth. Such wind-load induced movement can be perpendicular or parallel to the joint.
- **Loading requirements:** In this case, loading refers to the type of weight and actions that will be induced onto the joint system, including its cover during building occupancy. This could include pedestrians walking over an expansion joint system or small equipment to heavy-duty vehicles driving over or adjacent to the joints. To optimize the design, consider whether the loads applied will be uniform, irregular, or concentrated under the footprint of wheels.
- **Applications and location:** The project scope could include interior and exterior joints or both. Typically, the joints need to run continuously through all adjacent planes to fully separate building sections and allow independent movement in things like building veneers, soffits, parking decks, patios, and roofing systems.
- **Form and appearance:** This item usually depends on the adjacent finishes. There may be different design criteria for back-of-house conditions, public corridors, or high-end spaces. Depending on the aesthetic, there are options for incorporating interior finishes into the joint system, such as applying anodized finishes or coatings, or using foam seal colors to complement the décor, provide an accent, or minimize sightlines.
- **Fire-resistance and moisture control:** Vapor barriers are generally specified in floor, wall, and roof joints to maintain continuity with adjacent vapor-barrier systems. Sound and thermal barriers are becoming increasingly more important, especially with expansion joint systems in buildings with tight, energy-efficient envelopes. Fire-barrier systems are specified in floor and wall joints in fire-rated locations as dictated by codes. Fire-rated joint systems should be tested to meet ASTM Standard E1966 based on fire exposure and ASTM E1399 which tests the ability of the joint to remain intact and perform to the minimum and maximum extents under cyclic movement.

With the above considerations taken into account, the selection of expansion joint systems can be worked into specifications and construction drawings to help assure the stadium or arena is properly allowed to move, remains weather and moisture tight, and protects life safety.

Images courtesy of Inpro

Large buildings such as stadiums need expansion joints for the integrity of the building. But strength and durability can also be coupled with aesthetics and décor, as shown here at the Citrus Bowl stadium in Orlando, Florida. The joint pan incorporates the floor finish, and coordinated seal colors allow the joint to blend right in, which reduces sightline disruption.



Durable expansion joint systems in stadiums and arenas need to be sized properly to allow for the nominal, minimum, and maximum openings due to thermal expansion and contraction.

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Images courtesy of ASI Group

Restroom and locker room design in stadiums must address a wide variety of needs and criteria. Working with manufacturers who can provide the necessary accessories and products to meet those needs is a good design strategy.

Restroom and Locker Room Design

Restrooms in a stadium/arena play an increasingly important role in the individual user experience. What may have worked well 20 or 30 years ago may not work today so it is important to view design, as well as product and material choices, with a fresh perspective.

A well-designed restroom can accentuate great memories of a visit by providing a trouble-free or even positive user experience. However, as documented in a variety of instances, a bad restroom experience, particularly on opening day, can prove disastrous for the reputation of the stadium, its owners, and also the design team.

This disproportionate impact restrooms have in the overall user experience of any building comes about for a variety of reasons, but in stadiums, three specific ones stand out: 1) stadium restrooms have a higher frequency of use in a short amount of time compared to most other buildings; 2) using a bathroom by definition is a very personal experience and, in stadiums or arenas, privacy is often hard to achieve; 3) stadium bathrooms must meet a variety of programmatic needs, the needs of a very wide cross section of people, and some fundamental needs, such as safety, hygiene, and speed of use. Satisfying those needs can be achieved as long as the design details are given their requisite attention.

The first response of a design team to meet the needs of stadium restroom users is to locate an appropriate number of restrooms within close physical intervals to accommodate crowds. Within each of the restrooms, there should be an appropriate number of toilet and hand wash stations, and there must be the proper amount of consumables, such as soap, paper hand towels, and toilet tissue rolls, to avoid users being inconvenienced. Of course, there are other variables to address too, based on differences between individual stadiums, their geographic locations, and the varied cross section of visitors.

Cyrus Boatwalla, head of marketing with ASI Group, has noted, "Restrooms in a stadium are typically used in short bursts with a high volume of users. Whether during a seventh-inning stretch, half-time of a basketball game, television timeout in football, or between sets at a music concert, the facility better be ready for an onslaught of people who want to use the restroom quickly and get back to their seat/spot as fast as they can so they don't miss any of the action." It is easy to see that restroom maintenance between these short bursts plays a big factor in the user experience. But the design capacity and path of travel to, from, and within the restrooms are significant too. Therefore, factors that can negatively impact the user experience can be mitigated by some well-thought-out designs and layout.

When designing stadium restrooms, it is important to recognize the variety of design criteria that are important to end users (customers), building owners, code officials, and facility maintenance staff. The design team must take the factors below, among others, into account.

- Mitigating safety risks from hazards, such as wet floors. Wet floors are often a function of the location and number of drying stations in respect to sinks since water will drip from wet hands on the way to get them dry. Compounding this issue, some automatic hand dryers push water to the floor or have areas in the dryer where water can collect. Without a proper moisture management or drainage system, that water will overflow onto the floor or be a breeding ground for bacteria if it stays stagnant.
- Allowing for a higher frequency of use than in other buildings during a shorter occupancy time because of how much people drink or eat during their visit.
- Creating efficiently designed restrooms to limit lines, thus allowing customers to quickly use and exit a bathroom so they don't miss what they came to the stadium for in the first place—the game, a concert, or a professional conference.
- Allowing for accessibility (ADA) compliance with the appropriate number of accessible stalls and stations. Making restrooms accessible in all respects ensures that everyone can have an equally pleasant stadium experience.

Continues at ce.architecturalrecord.com

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

PRODUCT REVIEW

System Solutions for Stadiums

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www.americanspecialties.com *Circle 505*

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Photo courtesy of Inpro Corporation

Endurant® Washroom Systems

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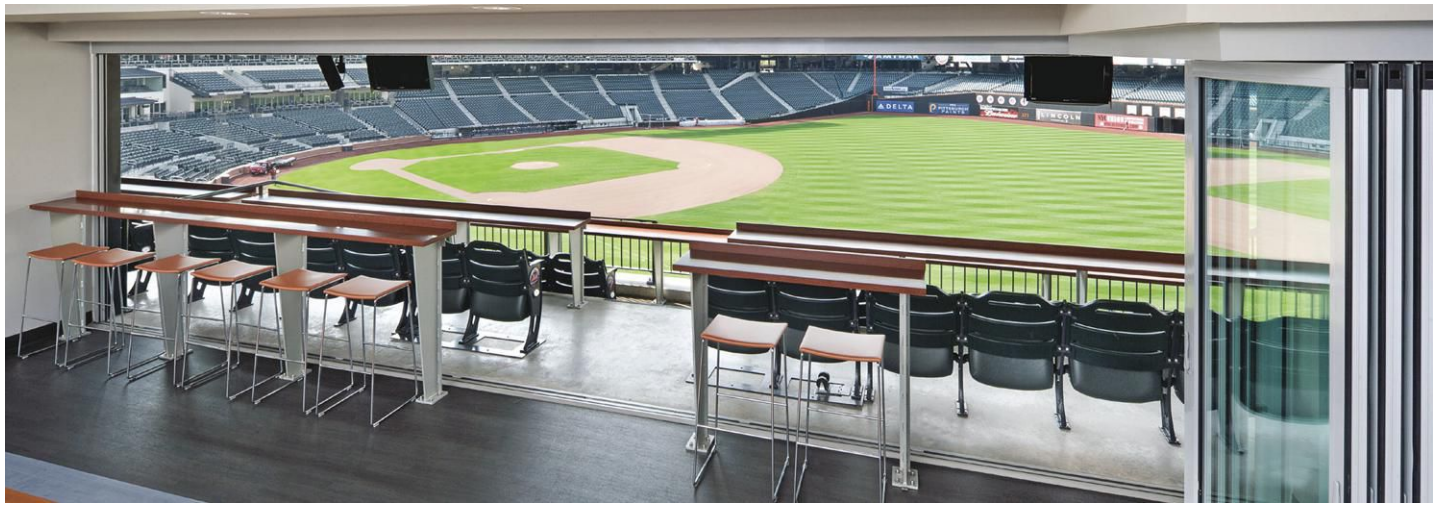
inprocorp.com/shower-systems *Circle 506*

NanaWall Systems

Photo courtesy of NanaWall Systems



NanaWall Opening Glass Walls

NanaWall Systems provides a wide range of opening glass walls for commercial environments that stand up to the daily commercial grind as well as the challenges of wind, water, extreme temperatures, forced entry, impact, and structural load.

www.nanawall.com *Circle 507*

Photo courtesy of Graham Architectural Products

Project: The Conservatory at Hammock Beach

Projects requiring hurricane-resistant windows and doors no longer have to compromise on aesthetics.

Shelter from the Storm

Hurricane-resistant windows and doors

Sponsored by Graham Architectural Products | *By Amanda C. Voss, MPP*

It struck with unexpected intensity the morning of August 24, 1992. Elliott Key was the first to feel its wrath; some 25 minutes later, Homestead, Florida, was in the bull's-eye.

Hurricane Andrew's August rampage in 1992 would become the costliest natural disaster in United States history to that date, and today it's surpassed only by totals from Hurricane Katrina (2005), Hurricane Sandy (2012), and Hurricane Ike (2008). In all, the damage caused by Andrew in South Florida and Louisiana totaled $26 billion. Sixty-five deaths were attributed to the storm, while around 150,000 to 250,000 people in South Florida were left homeless. Approximately 600,000 homes and businesses were destroyed or severely impaired by the winds, waves, and rain. Communications and transportation infrastructures were significantly impaired, and there was tremendous loss of power and utilities, water, and other essentials.

THE FALLOUT FROM HURRICANE ANDREW

The lives lost and billions of dollars in damages served as a wake-up call for the construction industry.

Wind zone levels were not adequate, the existing standards were not being adhered to, and codes were not being enforced. As a result, missile impact test standards were developed and more stringent building codes have been put in place that are now enforced.

The damage and devastation brought by Hurricane Andrew in 1992, both physically and financially, spurred the industry to re-evaluate building codes. In the many areas of the United States impacted by tropical storms and hurricanes, revised codes and standards became the key to better emergency preparedness.

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Explain the more stringent standards criteria that hurricane-resistant windows and doors must satisfy.
2. Identify the regions across the United States where hurricane-resistant products are required.
3. Discuss the components that go into a hurricane-resistant window and help it to meet safety requirements.
4. Specify hurricane-resistant windows and doors, and understand the types of hurricane-resistant window ratings driven by building design.
5. Incorporate special design and aesthetics into hurricane-resistant windows, including historical replication.

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ANATOMY OF A DISASTER

"Hurricanes form both in the Atlantic basin to the east of the continental United States (that is, in the Atlantic Ocean, the Gulf of Mexico, and the Caribbean Sea) and in the Northeast Pacific basin to the west of the United States," writes Chris W. Landsea, researcher at the Atlantic Oceanographic and Meteorological Laboratory in Miami. "The hurricanes in the Northeast Pacific almost never hit the United States, however, whereas the ones in the Atlantic basin strike the U.S. mainland just less than twice a year on average."

Close to seven hurricanes every four years strike the United States, while about three major hurricanes cross the U.S. coast every five years, according to the National Oceanic and Atmospheric Administration (NOAA).

The top 10 costliest hurricanes have all occurred since 1992, with the top three occurring within the past 12 years. Hurricane Katrina in 2005 was the costliest natural disaster as well as one of the five deadliest hurricanes in the history of the United States, with damages over $108 billion. Hurricane Sandy in 2012 ranks second with $65 billion, and Hurricane Ike in 2008 narrowly surpassed the damages from Hurricane Andrew in 1992, with total losses at $29.5 billion.

While 40 percent of all U.S. hurricanes hit Florida and 88 percent of major hurricane strikes hit either Florida or Texas, hurricanes have impacted states as far north as Maine, New Hampshire, and Massachusetts (NOAA).

Hurricanes are classified on the Saffir-Simpson Scale, based on sustained wind speeds and damage caused. Categories begin at One, the least severe event, and go up to Five, the most severe.

- **Category One:** 74 to 95 mph
- **Category Two:** 96 to 110 mph
- **Category Three:** 111 to 130 mph
- **Category Four:** 131 to 155 mph
- **Category Five:** Greater than 155 mph

Understanding Potential Damages from Hurricanes

Category One: Very dangerous winds will produce some damage. Well-constructed frame homes could have damage to roofs, shingles, vinyl siding, and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.

Category Two: Extremely dangerous winds will cause extensive damage. Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected, with outages that could last from several days to weeks.

Category Three: Devastating damage will occur. Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.

Category Four: Catastrophic damage will occur. Well-built framed homes can sustain severe damage with loss of most of the roof structures and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Category Five: Catastrophic damage will occur. A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Why Windows Fail

Windows and doors play a vital role in any structure. They act as centerpieces for design and architectural style, while also capturing natural daylight, allowing ventilation, and providing views.

Continues at ce.architecturalrecord.com

Amanda Voss, MPP, *is an author, editor, and policy analyst. Writing for multiple publications, she also serves as the managing editor for* Energy Design Update.

Photos courtesy of the National Renewable Energy Laboratory/Solar Outdoor Lighting

These photos were taken before and after Hurricane Andrew. The destruction caused by Hurricane Andrew ushered in major changes to building codes all along the U.S. eastern seaboard and set the performance bar for hurricane-resistant products.

Photo courtesy of CENTRIA

Architectural IMPs not only deliver high insulation values, speed of build, vertical and horizontal applications, but they also offer custom shapes and widths, colors and finishes, and fabrication, including but not limited to bent corners, curved panels, and trimless ends.

Insulated Metal Panels

Ideal for both retrofits and new construction as an all-in-one air and water barrier with continuous insulation, roof and wall insulated metal panels deliver a plethora of performance, erection, durability, and aesthetic benefits

Sponsored by Metal Construction Association, Insulated Metal Panel Funders Group

As an all-in-one prefabricated building enclosure, delivering full water and air protection, with continuous insulation to boot, insulated metal panels are a great option for most commercial and industrial buildings.

Whether it's office, health care, schools/higher education, retail, convention centers, stadiums, airports, light manufacturing, warehouses, food processing facilities, freezer buildings, and others, IMPs deliver a plethora of energy efficiency, durability, and aesthetic advantages.

Thanks to its insulating foam core sandwiched inside two sheets of coated metal, with no metal conductance from the exterior to interior skin, IMPs register the highest insulating value of any cladding material on the market. Delivering an aged R-value of 6.2 to 6.7 per inch vs. the 4.5 per inch for batt insulation, performance is essentially doubled, enabling projects to meet prescriptive insulation code requirements and those mandated by ASHRAE 90.1. (Note: ASHRAE is not a code, it is a standard that can be adopted by codes).

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Identify the role of prefabricated insulated metal panels (IMPs) as an all-in-one water and air barrier enclosure with continuous insulation.
2. Compare the construction benefits that IMPs deliver via a more simplified, cost-effective, and time-efficient erection process in addition to enhanced safety and less required manpower in the field.
3. Describe the key full building enclosure, structural, and fire-performance attributes of IMPs.
4. Explore the versatility and performance attributes of IMPs for retrofits and recladding.

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"These high-performing wall and roof systems increase overall thermal comfort for building occupants, while reducing energy consumption and wear and tear on mechanical HVAC equipment," reports R.C. Antal, insulated panel manager, ATAS International Inc., Allentown, Pennsylvania, and Metal Construction Association (MCA) IMP council member.

Furthermore, most polyisocyanurate and polyurethane foam cores used in today's panels have zero ozone-depleting potential and offer enhanced physical performance.

"Separate materials installed individually have greater potential for failure points," says Tim Keil, RA, associate principal with the Phoenix-based architectural and environmental design firm Studio Ma. "As a single system, IMPs can improve weather and airtightness, which are key for high-performance buildings."

But beyond its role as a sealed air, water, and vapor enclosure with excellent thermal properties, building teams can also cash in on multiple construction benefits with IMPs.

For starters, IMPs install in one step—as a finished wall, insulation, and liner—allowing the construction team to dry-in the building faster than conventional construction methods, according to Kim Harrell, vice president of sales, All Weather Insulated Panels, Vacaville, California, and an MCA IMP council member.

As opposed to conventional stud construction, for example, which requires contractors to wait for the sheathing, building wrap and insulation from multiple trades to be installed prior to interior finishing, IMPs are a one-shot building enclosure installation, significantly shortening project schedules and construction expenses, states Don Olsen, vice president of operations with the Hartland, Wisconsin-based A/E firm ESI Design Services.

Photo courtesy of CENTRIA

IMPs are ideal for all types of commercial and industrial buildings, including institutional, recreational, governmental, and manufacturing facilities.

Photo courtesy of Metl-Span

Based on its thermal insulation properties and speed of erection, Newman Marchive Carlisle architects specified more than 130,000 square feet of insulated metal panels to reroof Haughton Middle School's eight-building campus in Haughton, Louisiana.

As spelled out in MCA's *Selection Guide for Insulated Metal Panels*, IMPs can be erected at a rate of up to 5,000 square feet per 8-hour shift by a four-man crew on an industrial project, and up to 1,100 square feet per 8-hour shift by a four-man crew on an architectural project.

And unlike some cladding materials, IMPs can be installed year round, even in adverse weather conditions.

"One of the major advantages of IMPs is that they typically do not need extensive backup walls or support system assemblies, while still meeting code requirements," adds Deniz Ferendeci, AIA, LEED AP BD+C, director of building services, Dyer Brown, Boston. "The majority of these products are self-supporting, which means installation is faster and less complicated."

In terms of aesthetics, IMPs are a far cry from the technology's original origins dating back to the 1960s, when IMPs were considered purely utilitarian and used to clad mechanical penthouses and other less-visible applications, according to Ferendeci.

On the contrary, today's IMPs come in stucco, woodgrain, and metallic finishes, with a wide variety of panel profiles from flush to deep ribbed to curved. With the fairly recent inclusion of polyvinylidene fluoride (PVDF) resin-based paint coatings, IMPs now benefit from exceptional color, durability, and chalk and fade resistance.

"The ability to be customized in color, size, and pattern makes IMPs an economical method of providing a unique design expression, while satisfying the need for continuous insulation and exterior finish, all in one system," summarizes Robin Edward Whitehurst, AIA, NCARB, LEED AP, technical principal, Bailey Edward, Chicago.

Recognizing IMP's aesthetic benefits on a deeper level, Saul Jabbawy, principal, director of design, EwingCole, Philadelphia, acknowledges breakthroughs in manipulating the metal's surface to create a 3-D design, a wide variety of micro textures and colors, applying printed, films, or paints to mimic a variety of appearances, and the ability to create complex patterns and surface textures.

While non-insulated metal panels provide even more flexibility, their added cost as part of a rainscreen makes them an easy candidate for value engineering, whereas IMPs play triple duty as air and water barriers with insulation, helping them survive the VE process.

Furthermore, a good number of quality IMP manufacturers in the marketplace have created a healthy competition, providing architects and building owners with a greater opportunity to explore custom colors and finishes at a competitive price point.

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This aerial view shows the eighth-floor amenity deck and gardens at Hubbard Place, Chicago.

Photo courtesy of Daniel Weinbach & Partners Ltd.

Trends in Urban Outdoor Amenity Spaces

In-demand roof deck systems add value to today's buildings

Sponsored by Unilock | *By Elena M. Pascarella, RLA, ASLA*

Real estate studies show that urban housing demands are on the rise. Members of the baby boomer generation looking to retire seek smaller residences that are easier to maintain and desire being in urban areas where they can readily access public transit, quality medical care, and other lifestyle preferences. Members of the millennial generation want the convenience of living and working in urban areas that offers a wealth of amenities and a variety of transportation or walkable options.

As the demand for urban housing increases, developers are expected to provide more and better amenities that add value to housing properties and entice potential renters and urban home/condo buyers.

Roof decks and terraces are now a must-have amenity space in urban environments and are easily added without increasing the building footprint by building out underutilized roof space. Roof decks provide outdoor spaces that are easily accessible to residents and can be designed to accommodate social and recreational needs. New outdoor roofs incorporate a wide variety of site amenities, including patios, dining and bar areas, putting greens, pools, garden spaces, and grilling areas.

Business owners are also looking for office spaces that offer amenities, as they help to increase usable office space, contribute to employee well-being by providing the opportunity for employees to get outside and walk or stretch, and reinforce the corporate brand identity of the integration of work and life, such as with large tech companies, all while creating a professional, creative, and collaborative environment conducive to better business. Commercial building owners now understand the importance of shared amenities as an attraction for high-quality office tenants, improving their tenant retention and increasing the overall building value.

CONTINUING EDUCATION

1 AIA LU/HSW

1 PDH, LA CES/HSW

Learning Objectives

After reading this article, you should be able to:

1. Identify key sustainability criteria (LEED and SITESv2) that can be applicable to outdoor amenity spaces on roofs.
2. Discuss the considerations for evaluating the most appropriate materials for a roof deck project in terms of their structural performance, durability, and meeting LEED and SITES criteria.
3. Explore possible options for achieving higher solar reflective index (SRI) values on roof decks.
4. Understand the various ways of customizing roof deck designs through material selection and roof system design.

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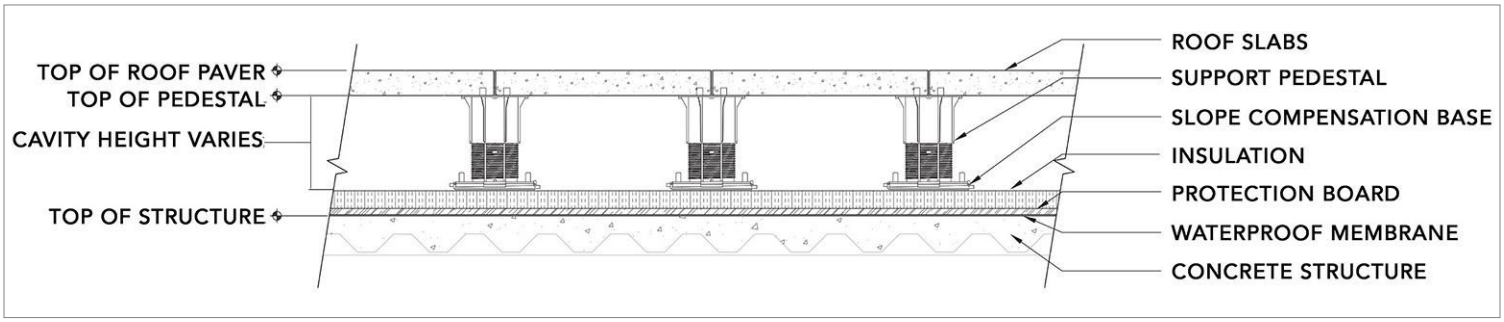

Shown is a section of a pedestal roof system.

There are a variety of products and materials that are utilized in the design and construction of roof gardens and decks. This course will review the basic types of roof systems as well as the range of hardscaping products that are available to designers.

The actual roof deck surface can be comprised of both hardscape materials and green planting areas. Roof deck areas can benefit the environment and human health and well-being by meeting certain Sustainable SITES and LEED criteria. In large part, they can help to reduce the effects from urban heat through the use of light-colored pavement surfaces and planting areas rather than the traditional roof surfaces of dark gravel and asphalt materials.

Some of the possible Sustainable SITES criteria that are applicable to roof deck systems include:

1. Site Context
   a. 1.6: Project located in an existing developed area
   b. 1.7: Project connects to multimodal transit networks
2. Site Design: Soils and Vegetation
   a. 4.9: Reduce urban heat island effect with lighter colors on roof
3. Site Design: Materials Selection
   a. 5.3: Design for adaptability and disassembly
   b. 5.5: Use recycled content materials
   c. 5.8: Support transparency and safer chemistry
   d. 5.9: Support sustainability in materials manufacturing
   e. 5.10: Support sustainability in plant production
4. Site Design: Human Health and Well-Being
   a. 6.4: Support mental restoration
   b. 6.5: Support physical activity
   c. 6.6: Support social connection

And the potential LEED criteria that are applicable to roof deck systems include:

1. Sustainable Sites
   a 5.2: Maximize open space
   b 7.2: Heat island effect
2. Energy and Optimization: Optimize energy performance through reduction of energy demand
3. Materials and Resources
   a Recycled content
   b Regional material

AN EVOLUTION OF ROOF DECK SYSTEMS

Over the past few decades, exterior building spaces and roofs have significantly transformed from utilitarian ballasted roof systems to roof systems with highly programmed, environmentally conscious, people-friendly amenities that promote healthier lifestyles. In the evolution of roofing systems, there are about five common types of systems currently used on commercial and large residential buildings. These include:

Conventional ballasted roof systems. These are the earliest types of flat roof systems, and they are still being used. They require flat roofs with slopes of no more than 2 inches height over 12 inches length (1:6). These systems consist of a membrane or a membrane and a substrate material that is loose laid over a deck using ballast to hold the system in place. The ballast is usually a crushed stone meeting ASTM D448 sizing. ASTM D448 stone ranges between 1.5 inches to 2 inches. Lightweight interlocking pavers with integral cementitious coating can also be used as the ballast material. The interlocking pavers provide a smoother walking surface and are more aesthetic than the crushed stone, but in general, these ballast systems are not intended for use other than for servicing of buildings.

Extensive roof gardens. These are green roofs that have plants growing in low-profile planting mediums placed over almost the entire roof. Plantings are usually comprised of various types of sedums and hardy wild flowers that are self-sustaining, have shallow root systems, and do not require artificial irrigation. The plants are grown in prepared, shallow soil medium within modular trays that are placed on top of a waterproof roof membrane. Access to and around the roof is provided through small walking paths so these roofs are not designed for extensive foot traffic. They do provide an energy savings as they help to insulate the building. They also reduce the heat effect of traditional dark asphalt or ballasted roof systems.

Intensive green roofs. These roofs are similar to extensive green roofs in that they are comprised of both hardscape and plantings. However, soil depths for plantings on intensive green roofs can range from 8 inches up to several feet. The greater soil medium depth allows intensive green roofs to accommodate a wider variety of plant types and species, including large trees. As these buildings and roof systems are usually designed to accommodate more weight, larger hardscape areas can also be included in the design. With the combination of larger hardscape surface areas and deeper planting areas, intensive green roofs have the potential to provide more outdoor amenities and additional living space on the roof deck.

Pedestal roof systems. These roof systems provide a means of creating a level deck space on top of pitched or uneven roof surfaces that would otherwise not be usable. The pedestal deck systems can also conceal roof extrusions and other obstructions, such as pipes, vents, and anchor points. Pedestal systems allow wood units, stone units, porcelain tiles, natural stone slabs, or concrete slab tiles to be placed on top of a grid of pedestals. For lighter products susceptible to wind uplift, additional fasteners are required to ensure the units stay in place.

Continues at ce.architecturalrecord.com

Elena M. Pascarella, RLA, ASLA, *is a practicing landscape architect, continuing education presenter, and consultant engaged in a private practice based in Rhode Island. The firm's portfolio can be viewed at* ***www.landscapeelementsllc.com.***

Photo: Peter Williams

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ONSTAGE

Sir David Adjaye is a world-renowned architect. His most recent work includes the Smithsonian Institute National Museum of African American History and Culture in Washington, DC.

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Christiane Lemieux is an interior and product designer, founder of Cloth & Co., and author of *Undecorate* and *The Finer Things*.

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- Acrovyn material prepped for hardware & mitered for quick installation

www.c-sgroup.com/door | 1.800.416.6586 | acrovyndoors@c-sgroup.com

Circle 401

MATERIALS

STAINLESS STEEL TILE SYSTEM

$$$ | GREEN

Construction Specialties

Floormetry® is a permanent entrance flooring system comprised of stainless steel modular tiles. This product is installed at a building's main entrances and is available in four distinct models.

Product Application:
- Owego Elementary School - Owego, NY
- NCAA Headquarters - Indianapolis, IN
- San Francisco General Hospital - San Francisco, CA

Performance Data:
- Scrapes dirt and debris from incoming foot traffic to protect your interior from wear & tear
- Modular tile system made from type 304 or 316 stainless steel

www.c-sgroup.com/efs
800.233.8493 | Wade Brown wbrown@c-sgroup.com

Circle 402

MATERIALS

COLORTHROUGH LAMINATE

$$$ | GREEN | NEW

Wilsonart

A **new range** of Wilsonart® SOLICOR™ **colorthrough décors** from industrial plywood, linear woodgrains to fine velvet textured linens and stones, allows for effortless aesthetic continuity.

Product Application:
- Ideally suited for desks and countertops, backsplashes, cabinetry, cabinet doors and retail merchandising displays.

Performance Data:
- Eliminates the "brown line" associated with traditional HPL
- Available in SOLICOR™ Compact for high impact surfaces

wilsonart.com/solicor
800-433-3222 | smartline@wilsonart.com

NeoCon Booth 7-1022

Circle 403

MECHANICAL SYSTEMS, HVAC, PLUMBING

SAVE SPACE WITH TANKLESS

WR

Rinnai America Corporation

Rinnai's Wall-Mounted Rack System allows two or three C199 tankless units to be installed on the wall of a room as a replacement for medium-to-large commercial tanks or small boilers.

Product Application:
- Offers wall-mount design and zero floor footprint
- Ideal for applications where space is at a premium, like restaurants, laundries, school or hotel kitchens and breweries

Performance Data:
- Makes replacing an existing commercial system with two or three C199 tankless units simpler than ever
- Wall-hanging bracket saves time and materials

www.rinnai.us
1-800-621-9419 | Ansley Houston, ahouston@rinnai.us

Circle 404

MATERIALS

FIRE-RESISTIVE WOOD-VENEERED FRAMES

$$$

Technical Glass Products

Fireframes TimberLine™ Series fire-resistive frames pair a high-strength steel sub-frame with a real wood veneered cover cap.

Product Application
- La Crema Estate at Saralee's Vineyard, Windsor, CA
- MidMichigan Health, Mt. Pleasant, MI

Performance Data
- Barrier to radiant heat, with fire ratings up to 2 hours
- Patented system is UL classified and labeled

fireglass.com
800.426.0279 | sales@fireglass.com

Circle 405

ROOFING, SIDING, THERMAL & MOISTURE PROTECTION

ARCHITECTURAL PRECAST CONCRETE CLADDING

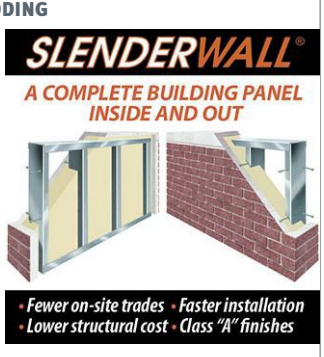
GREEN | WR

Easi-Set Worldwide

Ultra Hi-Performance SlenderWall is a 30 lb/sf award-winning architectural precast concrete and integral steel-stud building panel system. Wind load tested to 226 mph. Continuous foam insulation.

Product Application
- BioInnovation Center, New Orleans, LA
- Hilton Hotel, Montreal, Quebec, Canada
- Westin Luxury Hotel, Virginia Beach, VA
- US Army Legal Headquarters, Ft. Belvoir, VA

Performance Data
- Compliant with all IECC/ASHRAE energy codes



www.slenderwall.com
800.547.4045 | info@easiset.com

Circle 406

ROOFING, SIDING, THERMAL & MOISTURE PROTECTION

WALL PANELS

$$ | GREEN | NEW

Petersen Aluminum Corporation

PAC 1/2" and 7/8" corrugated panels offer unmatched flexibility for both walls and roofing. Panels can be perforated for a variety of exterior projects, as well as interior acoustical applications.

Product Application
- Sharpsburg Library, Sharpsburg, PA

Performance Data
- 30-year non-prorated finish warranty
- 70% full PVDF-finished metal
- Available in 45 colors

PAC-CLAD.com
800.722.2523 | Rob Heselbarth

Circle 407

PRODUCT SPOTLIGHTS

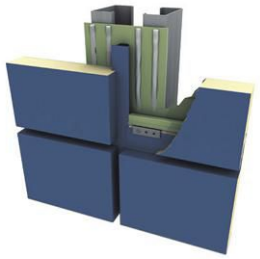
Advertisement

SPECIALTY PRODUCTS

CENTRIA FORMAWALL® INSULATED METAL VERTICAL JOINT

NEW

CENTRIA



By replacing exposed gaskets at end joints with metal joinery, CENTRIA's Formawall Insulated Metal Vertical Joint provides advanced protection from air and water penetration and maximum thermal performance.

Performance Data:
- Designed with CENTRIA's Advanced Thermal & Moisture Protection Technology
- Includes advanced metal joinery
- Provides a sleek, contemporary facade
- 5/8" reveal width standard

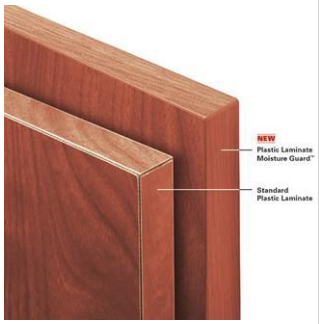
CENTRIAperformance.com/IMV
800.250.8675

Circle 412

PLASTIC LAMINATE WITH AN ELEGANT EDGE

NEW

ASI Accurate Partitions



Introducing Plastic Laminate Partitions with Moisture Guard™ Edge Banding. Our Moisture Guard™ Edge Banding fuses with the substrate creating a seamless beveled profile that eliminates any unsightly black lines.

Product Application:
- Hilton - Daytona Beach, FL.
- Wendy's - Virginia Beach, Va.

Performance Data:
- ASTM tests on Moisture Guard™ Edge Banding confirms 3X greater durability than standard Plastic Laminate
- Increased resistance to moisture and humidity than standard Plastic Laminate

www.asi-accuratepartitions.com
708.442.6800 | Dan Kavales | dkavales@asi-accuratepartitions.com

Circle 413

COMPLETE WATERPROOF SYSTEM FOR TILED SHOWERS

NEW

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One complete waterproof shower installation made easy. Pairs high-performance USG Durock™ Brand Shower System components with decorative linear drains from Infinity Drain.

- Easier and faster to install than traditional shower construction.
- Bonded waterproofing system with sloped floor made for tiled shower installations.

http://usgid.com
516.767.6786 | info@usgid.com Booth: 5469 HD Expo

Circle 414

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Clear Seas Research is an industry-focused market research company dedicated to providing clear insights to complex business questions. Capturing feedback via quantitative surveys (online, phone, mail or in-person) OR qualitative experiences (one-on-ones, focus groups or bulletin boards), we present results that are easily understood, insightful and actionable.

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(R) Regional AD

New and Upcoming Exhibitions

Frank Lloyd Wright at 150: Unpacking the Archive
New York City
June 12–October 1, 2017
Marking the 150th anniversary of the American architect's birth, this exhibition at the Museum of Modern Art will comprise approximately 450 works made from the 1890s through the 1950s, including architectural drawings, models, building fragments, films, television broadcasts, prints, furniture, tableware, textiles, paintings, photographs, and scrapbooks, a number of which have rarely or never been publicly exhibited. Visit moma.org.

Ongoing Exhibitions

Mies van der Rohe and James Stirling: Circling the Square
London
Through June 25, 2017
Comparing the design methods of two of the most highly recognized architects of the 20th century, this exhibit at RIBA offers a renewed look at their respectively iconic architectural schemes proposed for the same London site. The exhibition features newly restored models and materials and other items that provide insight into the workings of the Stirling office, from initial sketch ideas to Stirling's famous "worm-eye" axonometric views. For more information, visit riba.org.

Lectures, Conferences, and Symposia

Welcome to Your World: A Conversation
New York City
May 9, 2017
Author Sarah Williams Goldhagen and architect and educator Nader Tehrani discuss Goldhagen's new book, *Welcome to Your World: How the Built Environment Shapes Our Lives,* at Rizzoli Bookstore. In *Welcome to Your World*, Goldhagen utilizes recent research in cognitive neuroscience and psychology to examine how the built environment profoundly shapes our feelings, memories, and well-being, and argues that, moving forward, we must harness this knowledge to construct a world better suited to human experience. For more information, visit archleague.org.

Architectural Record Innovation Conference West
San Francisco
June 7, 2017
RECORD brings together architects, designers, and industry leaders who are generating a range of creative solutions for the built environment today and into the future. Keynote speakers include Elizabeth Diller, Craig W. Hartman, and Thom Mayne. At the Mission Bay Conference Center at UCSF. For more information, visit west.arinnovationconference.com.

NeoCon
Chicago
June 12–14, 2017
This three-day event features nearly 1 million square feet of exhibition space, three floors of showrooms, and one floor of temporary exhibitors. Thousands of new products, including contract accessories, floor coverings, furniture, lighting, technology, textiles, tile, stone, and other surfaces, will be launched. At the Mart. For more information, visit neocon.com.

Mundaneum 2017: re_Thinking Architecture and Cities in the Americas
San Jose, Costa Rica
July 5–7, 2017
This event at the School of Architecture of the Universidad Véritas offers critical observations concerning the current state of architecture and cities in the Americas and explores new visions of the built environment in the context of the clashing realities in the region. Speakers include Alejandro Echeverri, Michael Sorkin, Neil Brenner, Michael Rotondi, Juvenal Baracco, James Wines, Carlos Cubillos, and Patrick Dillon. For more information, visit facebook.com/MundaneumCostaRica2017.

Competitions

Driverless Future Challenge
Submission deadline: May 19, 2017
This global competition seeks to shape the impact of autonomous transportation on New York City, with a prize purse worth more than $60,000 for the four top teams. The focus of the challenge is not on the cars themselves but everything else, from parking solutions to mass transit, accessibility, shipping, logistics, software, services, and new uses of roadways, intersections, and sidewalks. For more information, visit bustler.net/competitions.

E-mail information two months in advance to recordevents@bnpmedia.com.

2017 CALL FOR ENTRIES
Record Kitchen & Bath

The editors of ARCHITECTURAL RECORD are currently accepting submissions for the **2017 Record Kitchen & Bath** competition. Entry is open to any registered architect, as well as any designer working in collaboration with architects, who has completed an innovative residential and/or commercial kitchen or bath project in the last year. We are looking for projects that feature unexpected materials, address unique client needs, or are designed in a manner that allows these utilitarian spaces to be functional, sustainable, and beautiful. Winning projects will be featured in the September 2017 issue.

The fee is US$75 per entry. To enter, visit: architecturalrecord.com/call4entries. E-mail questions to ARCallForEntries@bnpmedia.com. (Please indicate **Record Kitchen & Bath** as the subject of the e-mail.) **Submissions are due June 1, 2017.**

2017 CALL FOR ENTRIES Record Interiors

The editors of ARCHITECTURAL RECORD are currently inviting submissions for the **2017 Record Interiors** issue. All architects registered in the United States or abroad, as well as interior designers working in collaboration with architects, are welcome to submit interiors-only projects that have been completed in the last year. The projects may be new construction, renovation, or adaptive reuse; commercial or residential; domestic or international. Special consideration will be given to works that incorporate innovation in design, program, building technology, sustainability, and/or materials. The winning projects will be featured in the September 2017 issue.

The fee is US$75 per entry. To enter, visit: architecturalrecord.com/call4entries. E-mail questions to ARCallForEntries@bnpmedia.com. (Please indicate **Record Interiors** as the subject of the e-mail.) **Submissions are due June 1, 2017.**

snapshot

PROJECT THE TEA HOUSE BY KENGO KUMA
LOCATION VANCOUVER
ARCHITECT KENGO KUMA & ASSOCIATES

LAST SUMMER, when Tokyo-based Kengo Kuma & Associates received a commission for a 43-story skyscraper in downtown Vancouver, the firm also embarked on a much smaller project for its developer, Ian Gillespie: a teahouse. Instead of having the typical garden setting, the 140-square-foot structure sits on a 19th-floor terrace of a residential high-rise owned by Gillespie's company, Westbank. Gillespie, who has an affinity for Japanese culture, wanted a space where he could entertain while showcasing a cross-cultural collaboration. The design incorporates tradition into a contemporary scheme, says project architect Michael Sypkens: it maintains the conventional teahouse veranda, floor plan, and extended eaves—here framing views of the harbor and another Gillespie-owned tower—but features floor-to-ceiling glazing, full insulation, and a painted-aluminum roof. In lieu of customary Japanese cedar for the lattice screens, Kuma opted for local Douglas fir; the moss and stones used for landscaping are also native to the region. "The teahouse is a transition from a dense urban environment to this almost spiritual realm," says Sypkens. "It is a surreal hybridization." *Alex Klimoski*

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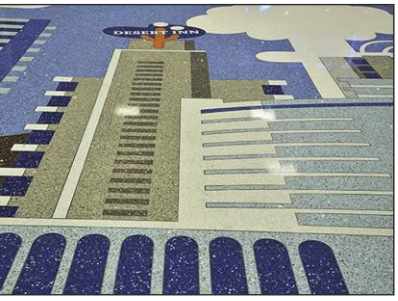

McCarran International Airport
Terminal 1 Baggage Claim & Ticketing
Las Vegas, NV

Architect: Doug Walton Architect

General Contractor: Sletten Construction of Nevada

Owner: Clark County Department of Aviation

Photographer: David Laudadio

CIRCLE 186