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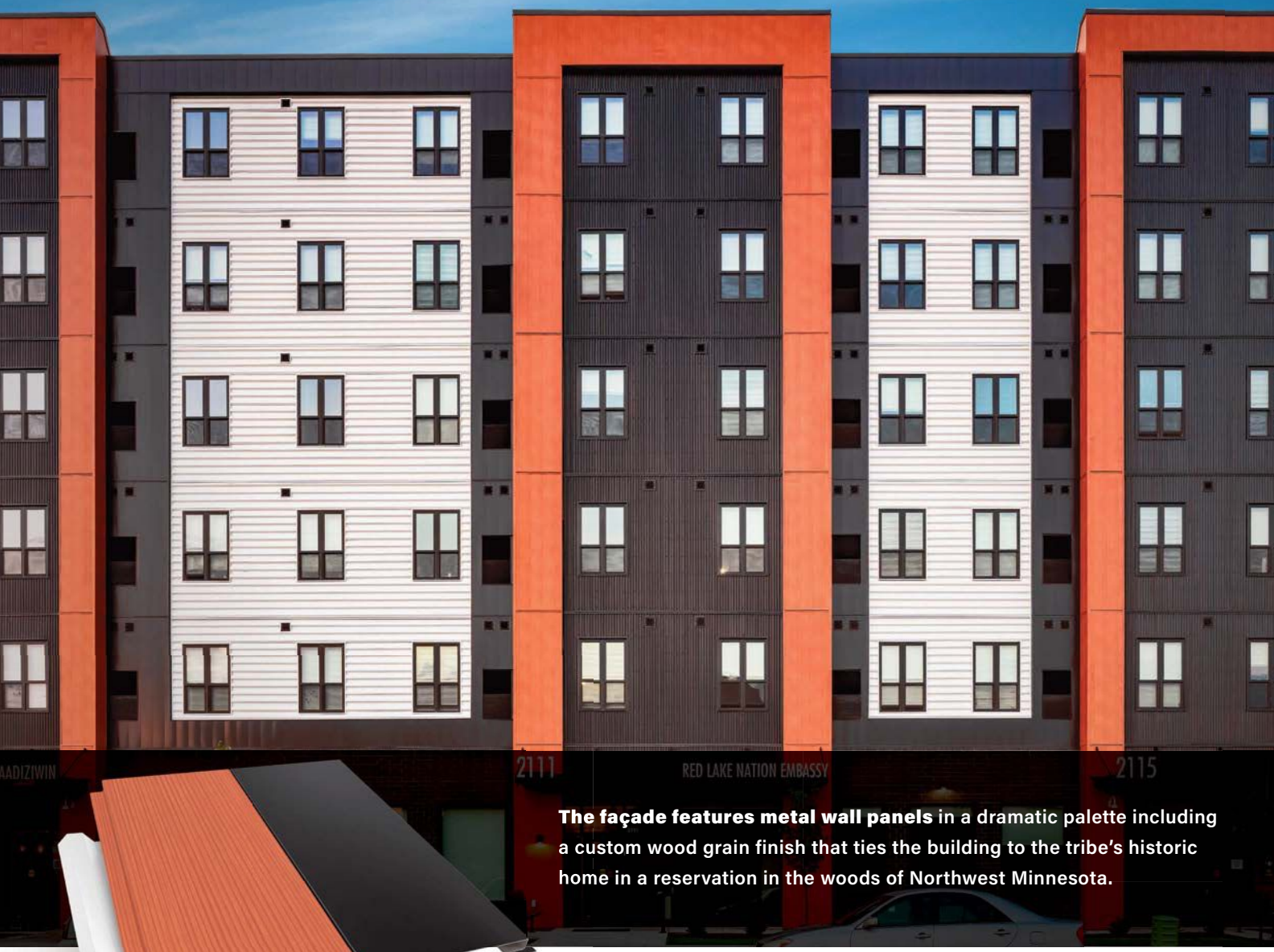
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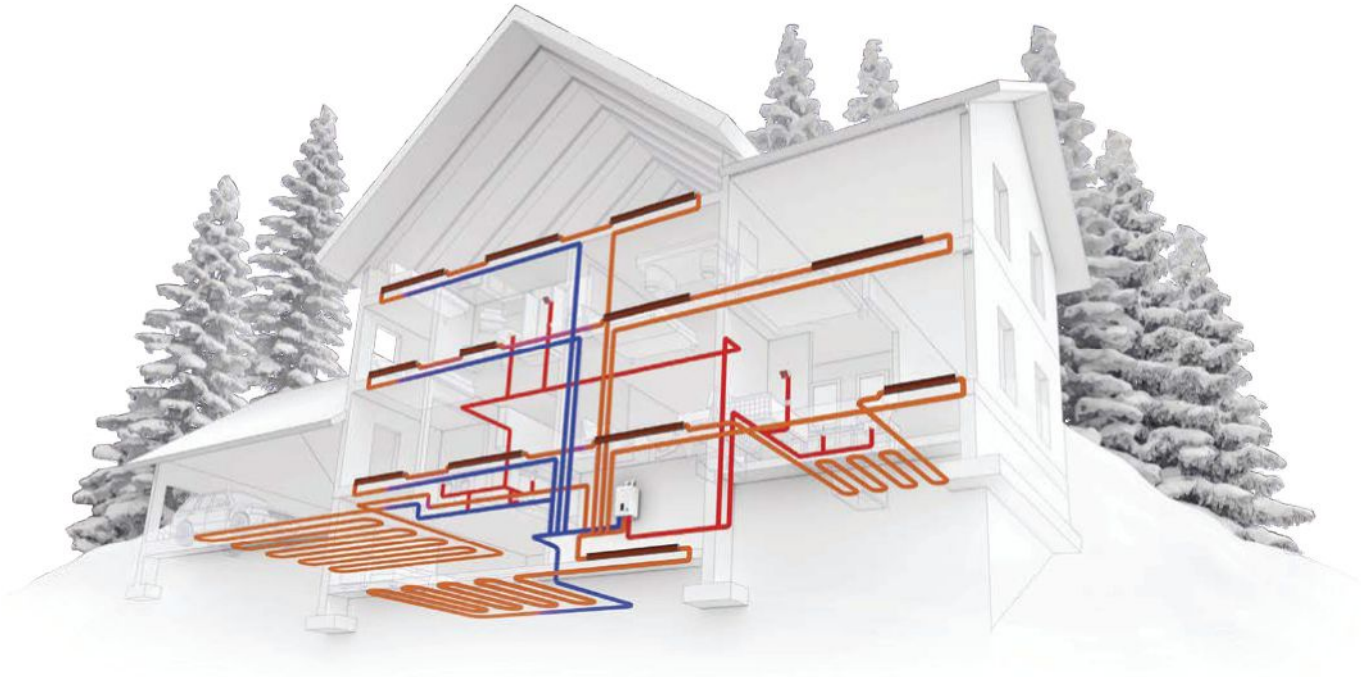
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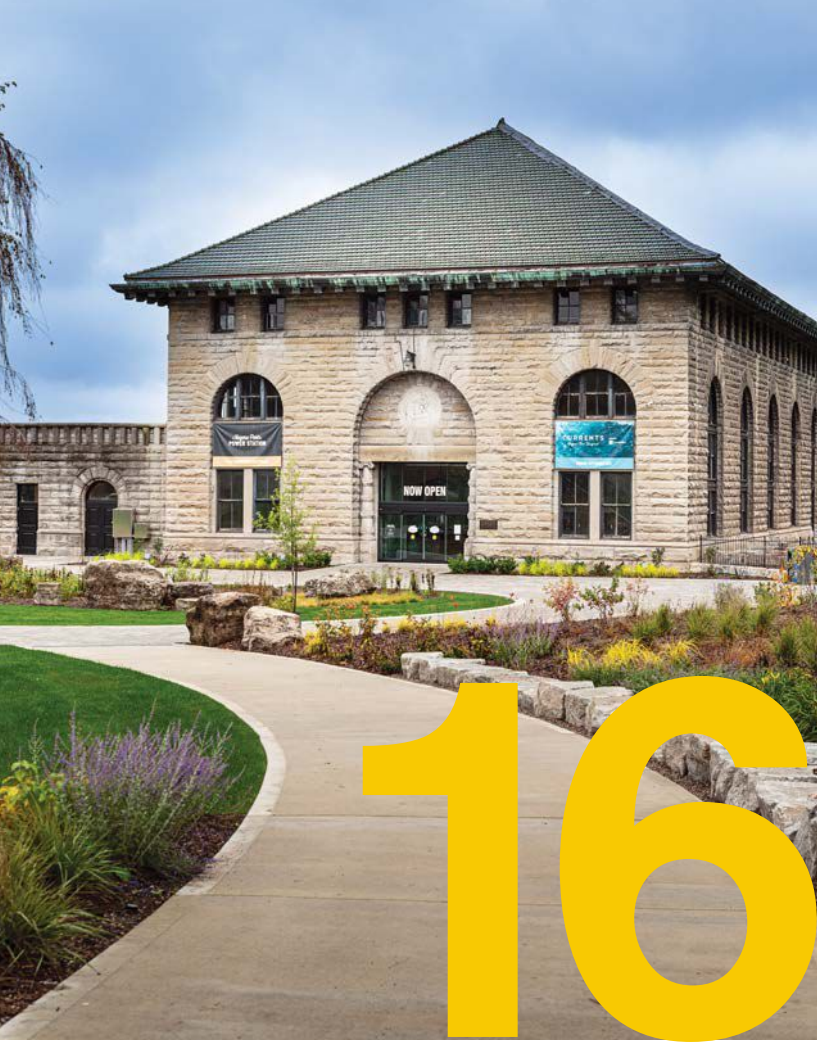
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- UPMC Cooper Fieldhouse, Duquesne University, Pittsburgh
- Broward County School District, Fla.



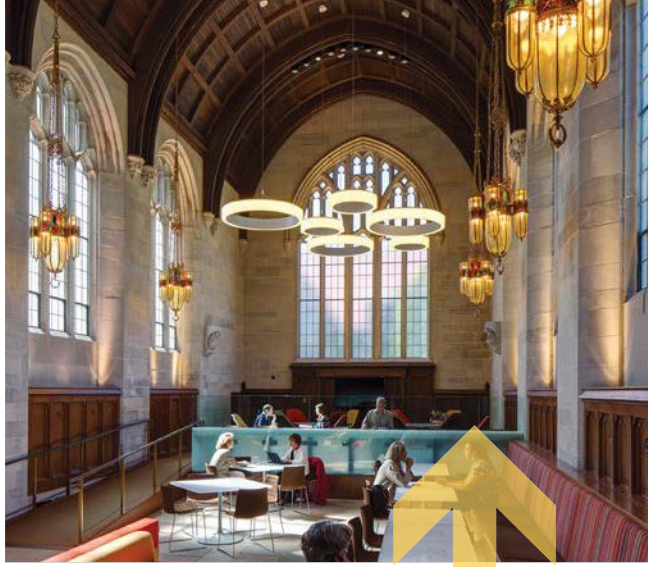
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COVER PHOTO: **DAVID LASKER PHOTOGRAPHY**

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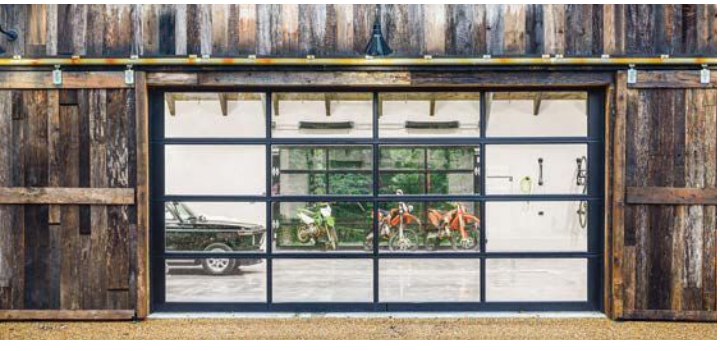
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SCHOOL SECURITY

When I was a kid, growing up in the 1980s and '90s, I never feared going to school. There were days when I didn't want to deal with the resident bully or dreaded the likelihood of a pop quiz in a particular class, but I never, ever, not even once, feared for my life at school.

I am about to send my 4-year-old daughter Clare to preschool and I will admit I am experiencing some trepidation.

After the school shooting in Uvalde, Texas, in May, my husband Bart and I had a heated disagreement about whether to introduce the subject of school shootings to Clare. Bart wanted her to see Uvalde play out on the news because "it's life" and "she'll experience active-shooter drills at school". I was dead-set against introducing this reality to our innocent child. She has been putting on a backpack since she was just more than 2-years old, asking when she can go to school. Clare knows she finally will start school this month and she is giddy about it; she practically asks every day whether it's the first day of school.

If we introduce school shootings to her now, it will be I, not Bart, who will be dragging Clare kicking and screaming onto the bus if she thinks there's a chance she could be shot and killed at school.

Fortunately, Clare remains unaware that school shootings exist. Bart is right in some respects, however. As awful as it is to admit, mass shootings are the reality of our world today. Clare will be exposed to active-shooter drills at her school, and I am prepared for the school to introduce these to her and ready to talk about them with her after the fact. I'm not typically a reactive—rather than proactive—parent but, in this case, I refuse to create fear in my child's innocent heart.

When I was in elementary school, during the Cold War, we had drills designed to prepare us for a bombing. We grabbed the heaviest book available, put it over our heads and scurried under our desks until the drill's siren ended. I don't recall how these drills were introduced to us but I never actually feared that we would be bombed while I was at school—just like I didn't actually fear a tornado would strike my school or fire would break out, even though we practiced for these events, too. I want Clare to remain a child in all its glorious naiveté for as long as possible.

In this issue of ***retrofit***, our "Trend Alert" writer Jim Schneider tackles the topic of school security, underscoring that, in this day and age, every school must have security and a worst-case scenario plan in place. The experts in Schneider's article point out effective school security requires a multi-pronged approach: technology (devices, like cameras, alarms and locks), procedures (an emergency response plan) and people (training and drills for teachers, staff and students). In addition, the experts recommend building assessments as a starting point to identify and recommend solutions for vulnerable areas of a facility. Schneider provides a list of organizations who can help schools and other facilities gauge their security and implement improvements, emergency response plans and training.

Despite my anxiety, I still am excited for Clare to begin school. I can't wait to see which subjects are her favorites, whether she will participate in sports and/or music, who her friends will be, and watch her grow and mature. However, I intend to be a proactive parent when it comes to my child's safety at school and will give a copy of this issue—open to "Trend Alert", page 72—to Clare's school administrators the moment the issue comes off the press.

CHRISTINA KOCH
Associate Publisher/Editorial Director
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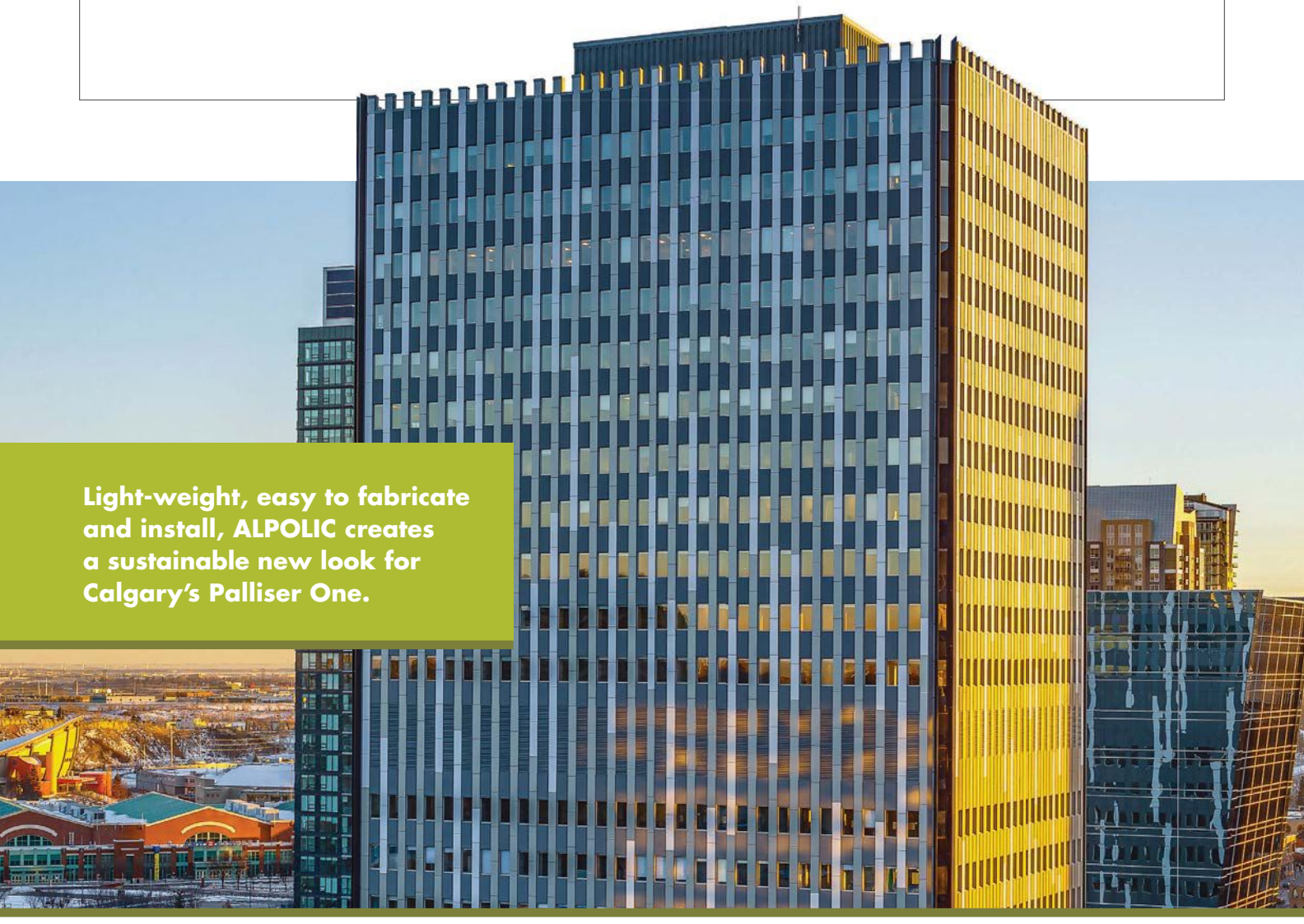
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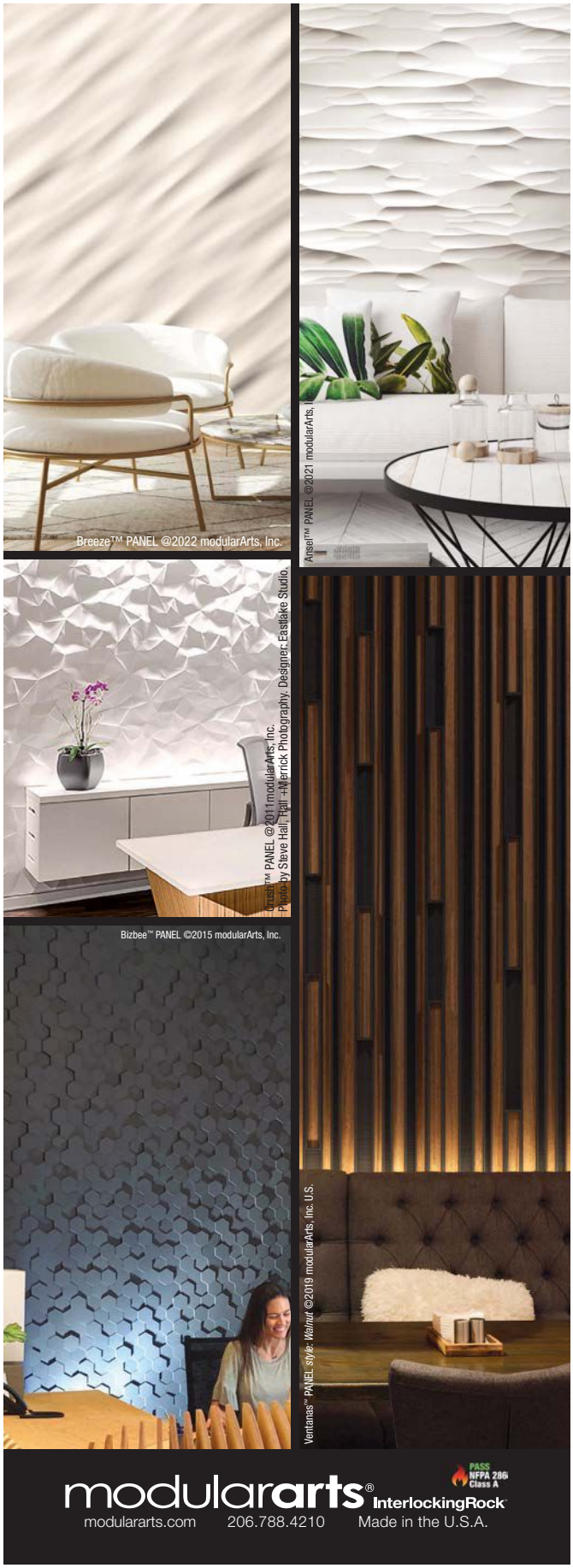


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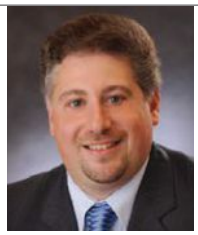
CONTRIBUTING WRITERS



Paul Sapounzi, managing principal at +VG Architects Ltd., takes us inside the retrofit of Niagara Parks Power Station, a decommissioned hydroelectric power plant that opened in 1905 in Niagara Falls, Ontario, Canada. Sapounzi and his team preserved all interior artifacts and features in situ in areas of high heritage and architectural value to make it one of the region's greatest tourist attractions, celebrating the story of hydroelectric power. Read about the unique project in our "Cover Story", page 16.



KJ Fields, a Portland, Ore.-based ***retrofit*** contributor, describes in "Component", page 42, how sound impacts student learning and development. Via expert interviews and two project examples, Fields illustrates how classrooms can be improved to achieve better student performance.

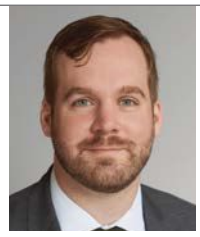


David M. Newman, P.E., CEM, LEED AP, CEA, is vice president of Engineering for Energia, which is an advisor and advocate for understanding, explaining and managing complex energy-savings initiatives, energy retrofits and Energy Performance Contract (EPC) programs. Newman writes in "Energy", page 46, how EPCs help school districts make capital improvements that address air quality, lighting, heating, cooling and energy-production improvements without requiring out-of-pocket expenses.

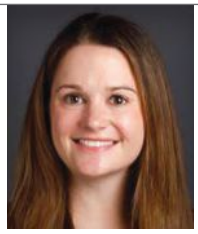


Tim Fish, AIA, LEED AP, is a principal in Cooper Carry's Higher Education Studio. In "Historic", page 52, Fish illustrates how Cooper Carry, along with associate firm Vines Architecture, answered calls to modernize Atlanta's Central Library, which was Marcel Breuer's last architectural work before his death in 1981. The retrofitted facility prioritizes the library as a place for the community to meet and connect virtually and in-person, as well as a venue for lending and borrowing, while featuring Breuer's iconic design elements that had gotten lost in plain sight over the years.





Anna Orlando and **Leopoldo Villardi** are associates at Robert A.M. Stern Architects (RAMSA). Orlando is an architectural designer with a focus on historic preservation while Villardi writes about architecture and history. The duo contributes the story of RAMSA's remarkable transformation of the north wing of Yale University's Bicentennial Buildings into the Schwarzman Center, a social hub for undergraduate, graduate and professional students, as well as faculty, staff and alumni. Read the story in "Historic", page 58.



Kathleen Gerner, AIA, LEED AP, is an associate principal at Annum Architects (formerly Ann Beha Architects), who has managed complex academic and civic projects from planning and conceptual design through project completion. Gerner was the project manager for Saieh Hall for Economics at the University of Chicago, winner of multiple design awards, including the Frank Lloyd Wright Honor Award from AIA Illinois. Read about the project in "Transformation", page 64.

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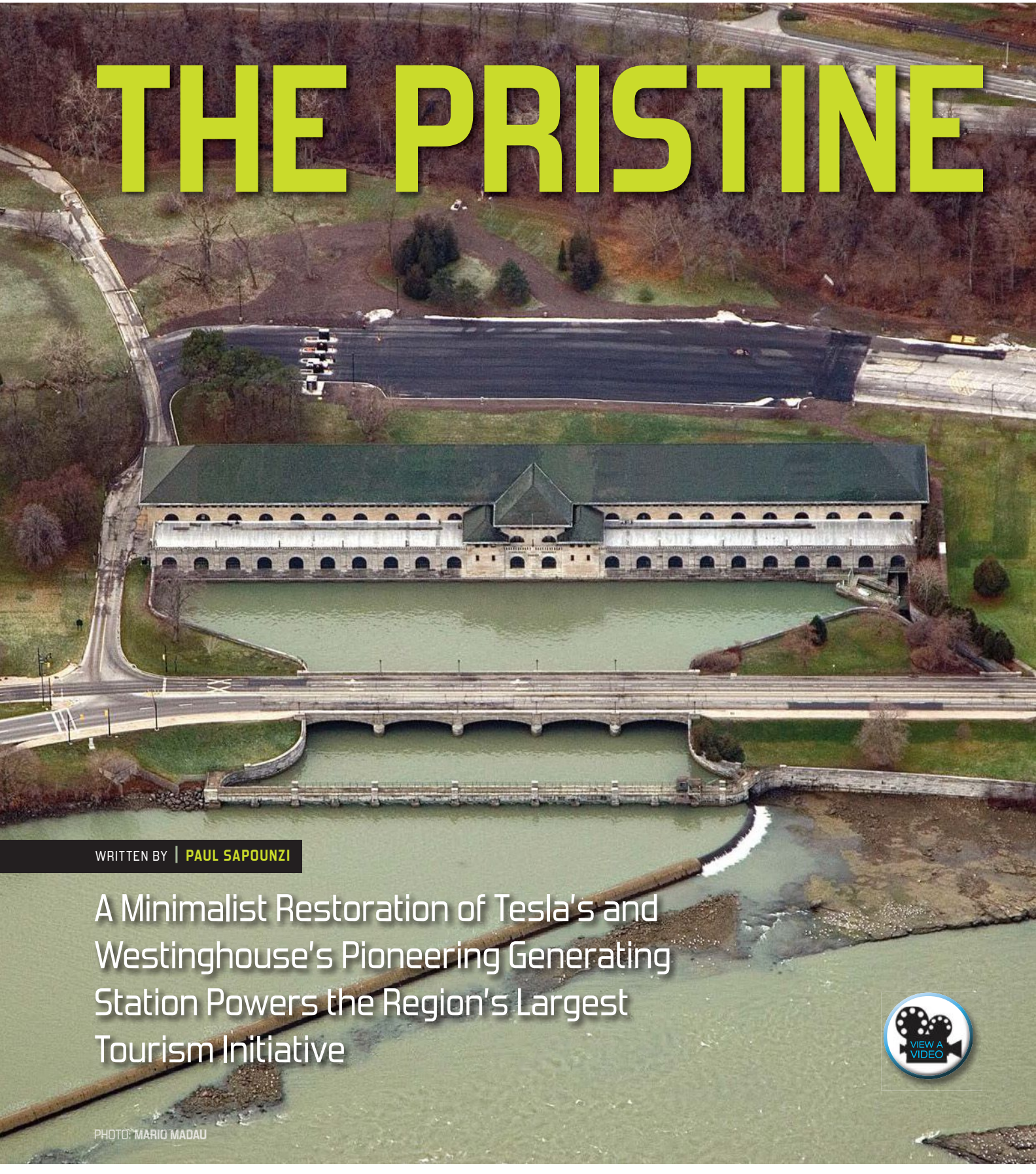
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THE PRISTINE



WRITTEN BY | PAUL SAPOUNZI

A Minimalist Restoration of Tesla's and Westinghouse's Pioneering Generating Station Powers the Region's Largest Tourism Initiative

VIEW A VIDEO

PHOTO: MARIO MADAU

POWER PLANT



BEFORE PHOTOS: **NIAGARA PARKS COMMISSION**

Niagara Parks Power Station (NPPS) is a decommissioned hydroelectric power plant designed in monumental Romanesque Revival style. It opened in 1905 in Niagara Falls, Ontario, Canada. It is the world's only existing power plant of its age that is still complete in its original form and with all its original equipment intact.

The Niagara Parks Commission (NPC), an agency of the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries, is responsible for preserving and enhancing the natural beauty and cultural heritage of Niagara Falls and the Niagara River corridor. NPC retained +VG Architects Ltd. as architect of record and contract administrator for the adaptive reuse of NPPS as an iconic, safe and accessible educational, entertainment and tourism attraction. The province provided a $25 million ($19 million U.S.) loan for the project. Construction began in 2019 and was completed in 2021. Work was done in accordance with Canadian Historic Places Standards and Guidelines for Historic Restoration. (Learn more about the guidelines at www.historicplaces.ca/media/18072/81468-parks-s+g-eng-web2.pdf.)

In pondering an approach to its historic reuse, +VG Architects took a "First, do no harm" Hippocratic-oath approach. The design team asked: "What are we restoring back to? A brand-new version of what we imagine the original structure looked like?" The



Just as Niagara Falls is Canada's signature, globally recognized natural attraction, the 587-foot-long Niagara Parks Power Station symbolizes Canada's contribution to the modern industrial era. Constructed between 1901 and 1905, the NPPS occupies a unique position in the history of the electrical and industrial revolutions, for it is here that George Westinghouse and his business partner Nikola Tesla used their generators and alternating current to supply electricity on an unprecedented scale. Financed by J.P. Morgan and other business titans who recognized the transformational impact of this power station, NPPS became the global model for the fledgling hydroelectric power industry.

PHOTOS: **DAVID LASKER PHOTOGRAPHY** unless otherwise noted



A section of the inner forebay's water-filled basin was retained to show how the space originally functioned. A concrete pour at the rear and sides created a dry basement for new infrastructure.

team wanted to preserve the building's cumulative history and its many layers of changes. They're all part of the building's heritage.

Consequently, the project won the 2021 Lieutenant Governor's Heritage Award for Excellence in Conservation. It helped that +VG Architects knew the venue well: In 2016, NPC engaged the firm to lead adaptive-reuse visioning exercises. In 2017, +VG Architects co-wrote the Niagara Parks Commission Generating Stations Strategic Conservation Plan.

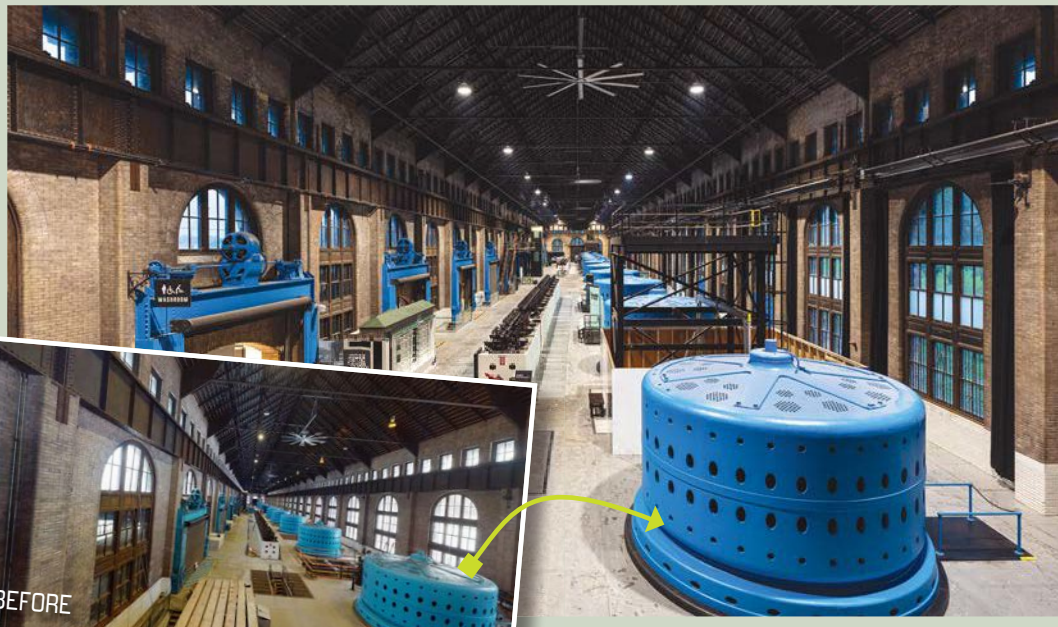
A BRIEF HISTORY OF THE POWER PLANT

In 1897, the Canadian Niagara Power Company (CNPC) selected the Westinghouse Company to supply alternating current (AC) generators for its new generating station. The choice of AC and Westinghouse as the project's supplier capped a struggle between Thomas Edison and William Kelvin (of color-temperature fame), who proposed using direct current (DC) as a safer method, and George Westinghouse and his partner Nikola Tesla, who developed an AC generator that could supply electricity over long distances to a vast geographic area. This technological breakthrough facilitated the electrical industrial revolution and remains the worldwide standard.

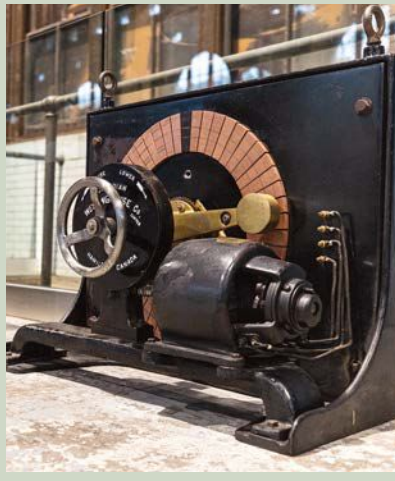
Entrepreneurs J.P. Morgan and John Jacob Astor IV (who would die in the sinking of RMS Titanic in 1912) led the consortium that financed NPPS' initial construction. Algernon S. Bell and the firm of Copeland & Dole, both based in New York, have been attributed as architects.

In 1905, CNPC was the most advanced hydroelectric generating station in the world, allowing for greater output for less cost than previously possible. The station featured advances in oil reclaim, transmission towers, remote transformers, cable and switchboard design, and fire and safety practices. CNPC's development led to the establishment of international protocols for the sharing of water rights between Canada and the U.S.

CNPC, also known as the William









The view of the generator hall from the entrance balcony shows the construction hoarding, right, covering the conversion of the shaft to a glass-elevator ride to the tailrace tunnel. Westinghouse rheostat selector switches (middle right) were repurposed as exhibits in the generator hall. The long rows of white cabinets in the generator hall (bottom) hold oil-resistance switches, the oldest type of circuit breaker.







Top: The Power Station Shop's cash wrap restates the wave motif of the ticket desk in the adjoining generator hall (bottom right). The wave motif evokes the water powering the plant while inconspicuously accommodating accessibility requirements with standing- and wheelchair-height counters.

Birch Rankine Hydroelectric Power Station, is located on the western side of the Niagara River above Horseshoe Falls, the biggest and most picturesque of Niagara's three cataracts, thanks to its 2,600-foot-wide curve. Horseshoe Falls also boasts the highest average annual flow rate, according to Wikipedia, of any North American waterfall: 634,000 gallons per second. The power plant was set well back from the Niagara River to minimize visual interference with views of the falls.

It opened with two 10,000-horsepower generators; by 1927, it had expanded to 11 generators supplying a total of 120,500 horsepower. The station ceased operation in 2006. Ownership was transferred to NPC in 2009 with the proviso that it never be used again to generate electricity.

STABILIZED CONSERVATION

The powerhouse's excellent condition permitted +VG Architects to focus its approach on stabilized conservation instead of restoration or renovation. The design team preserved all interior artifacts and features in situ in areas of high heritage and architectural value.

In rehabilitating the building, +VG Architects was tasked with changing the building's use from light industrial to public assembly, a challenge that required adherence to code and safety regulations while preserving the building's historical integrity and as much as possible of the public's view of the powerhouse's original operation areas and equipment.

The power station, divided longitudinally into a generator hall and inner forebay, measures 587-feet long and 102-feet wide, totaling 59,874 square feet. The 1-story, symmetrical, rectilinear structure is clad with Queenston blue dolomite limestone rusticated blocks, voussoirs and keystones. Its hip roofs feature green tiles with copper-clad brackets, eaves and soffits.

The vast generator hall is the power station's principal space, soaring 64 feet from the floor to the underside of the roof. The hall's character-defining elements are the 11 generators; the long rows of white cabinets holding oil-resistance switches, the oldest type of circuit breaker; the traveling

(continues on page 22)



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RETROFIT TEAM

ARCHITECT OF RECORD AND CONTRACT ADMINISTRATOR // +VG Architects Ltd., www.plusvg.com
- Paul Sapounzi, principal in charge
- Kevin Church, contract administrator
- Rodrigo Morales, project architect
- Jennifer Warren, interior design
- Deb Westman, heritage strategy

STRUCTURAL ENGINEERS // Truax Engineering Ltd., (519) 570-9035, and Hallex Engineering Ltd., hallex.ca

ELECTRICAL ENGINEERS // Hallex Engineering, hallex.ca, and Vanderwesten & Rutherford Associates Inc., www.vreng.ca

MECHANICAL ENGINEER // Vanderwesten & Rutherford Associates, www.vreng.ca

FIRE ALARM AND LIGHTING // Ecco Electric Ltd., eccoelectric.com

SPRINKLER SYSTEM // Advanced Fire & Life Safety Inc., (905) 380-5883

GENERAL CONTRACTOR // Merit Contractors Niagara Ltd., www.meritcontractors.com

HERITAGE MASONRY RESTORATION // Krawczyk Construction and Maintenance, www.kcmniagara.com

STONECUTTING // Ferrell Builders' Supply Ltd., (905) 387-1948

LANDSCAPING AND WALKWAYS // Brook Restoration, www.brookrestoration.ca

overhead crane that lifted the generators to facilitate removal for maintenance and repairs; and the hall's unobstructed sightlines of these artifacts.

A visitor galley and viewing deck along the north wall hosted a stream of visitors, testament to the public's interest in engineering technology during the early 20th century and CNPC's pride in its groundbreaking setting.

Water entered the powerhouse through the inner forebay on the building's east side. The inner forebay contained the fine ice-rack screen that strained debris and ice before the water flowed into the mouths of the penstocks, the large intake pipes that delivered the water to the turbines.

Other components include the gathering weir and outer forebay, which channeled water from the river into the power station, and the wheel pit, which descends 165 feet to a narrow cut into bedrock running the length of the generator hall that contains the turbines.

SPACE PLANNING

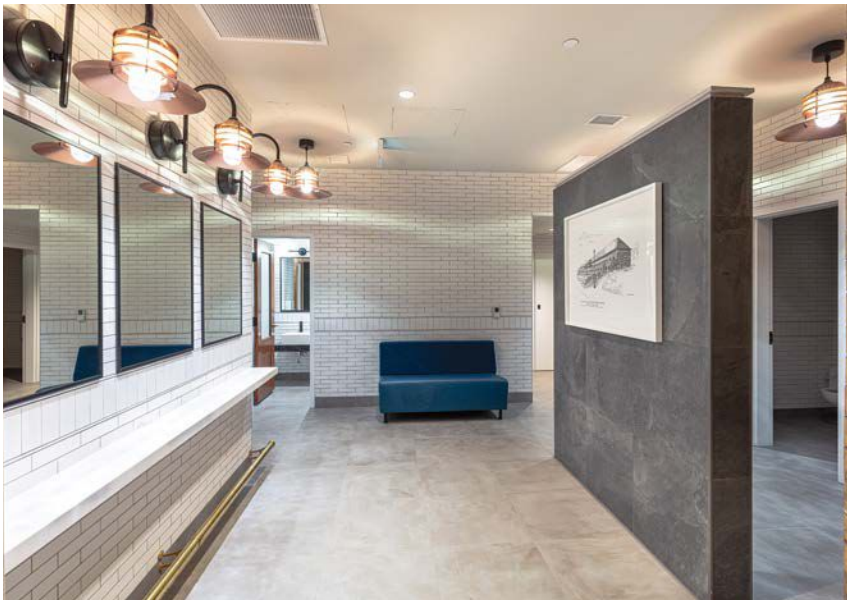
Thanks to the excellent condition of the station's interiors, the interior design team was able to focus on the planning of the space and circulation in the generator hall and inner forebay for their conversion into exhibit, entertainment, retail and food-service areas.

Today, visitors enter the building through the north entrance's monumental bronze double doors and proceed through a new vestibule and ticketing area into the generator hall. From there, the original portals with rolldown doors that separate the inner forebay and generator hall lead visitors into the inner forebay, now a retail store with capacity for future dining and entertainment additions.

At the project's outset, a cofferdam was built between the outer forebay and the Niagara River to dewater the forebay. This was done to ascertain the condition of the building's foundation and submerged stonework, to undertake necessary repairs and to build the inner forebay's new dry basement.

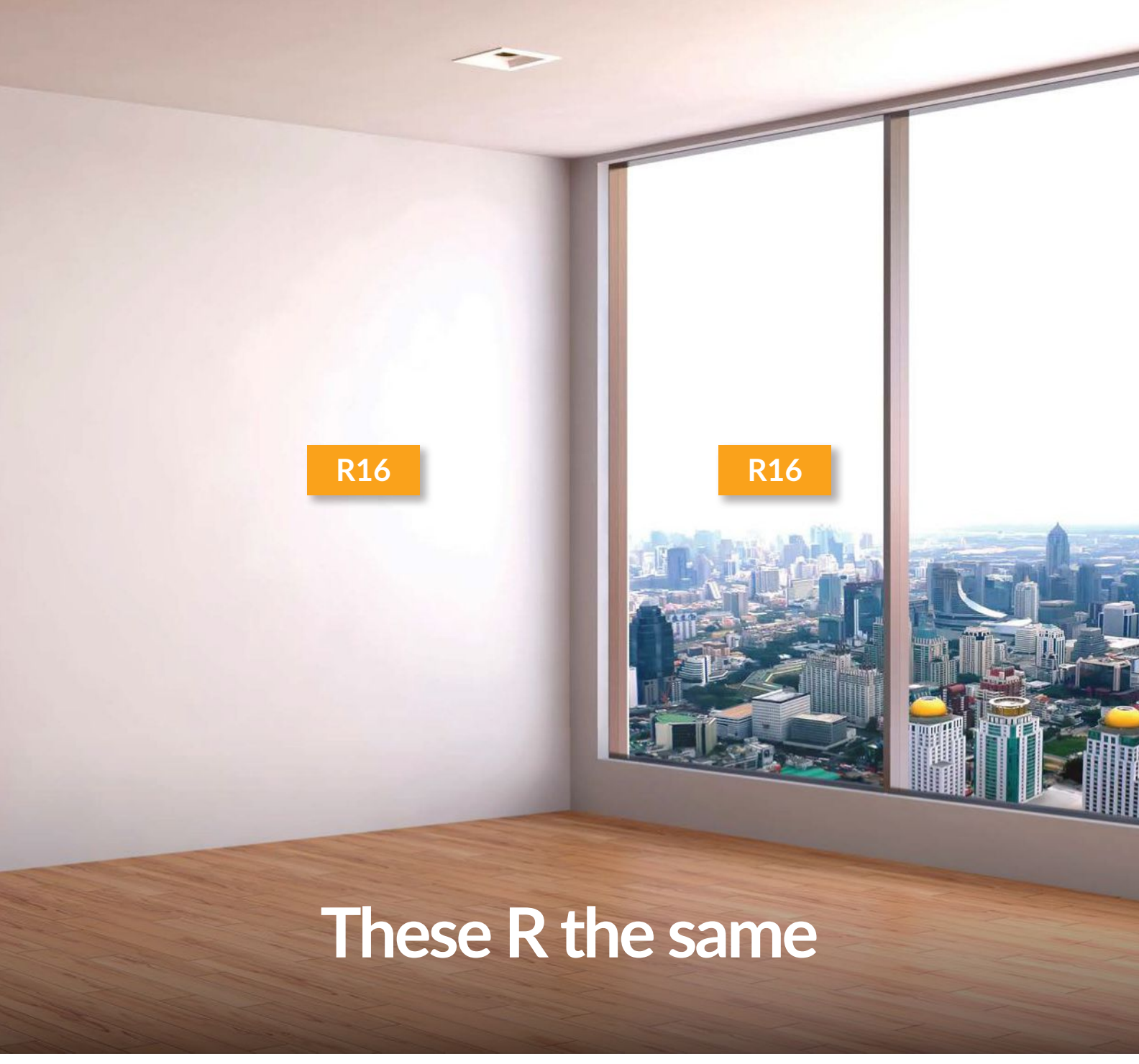
Indeed, the water-filled inner forebay underwent the most significant intervention. Originally, the basin extended the length of the powerhouse. Now, only a central section, 98-feet-wide, was retained to show how the semi-exterior space functioned: Water entered under the submerged arches of the inner forebay's outer wall and flowed up to the fine ice rack. Around this open section, the team poured concrete walls at the rear and the sides to create a dry basement for new building infrastructure, including HVAC, plumbing, electrical rooms, and fire safety and emergency escape routes. Above the

(continues on page 24)





In the public areas, finishes, furnishings and fixtures recreate the building's industrial look and feel. The new washrooms, for instance, continue the use of the original washroom walls' subway tile.



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THE POWERHOUSE'S EXCELLENT CONDITION PERMITTED +VG ARCHITECTS TO FOCUS ITS APPROACH ON STABILIZED CONSERVATION INSTEAD OF RESTORATION OR RENOVATION.

MATERIALS

FLOORING BEHIND SERVICE COUNTERS, OFFICES // Forbo, www.forbo.com

PORCELAIN TILE IN WASHROOMS // Daltile, www.daltile.com

PAINT IN RETAIL AREA // Benjamin Moore, www.benjaminmoore.com

PLASTIC LAMINATE IN BASE AND UPPER MILLWORK // Tafisa, tafisa.ca

SOLID SURFACE IN PARTIAL-HEIGHT WALLS AND COUNTERTOPS // Wilsonart, www.wilsonart.com

PULLS AND WASHROOM COAT HOOKS // Richelieu, www.richelieu.com

HINGES // Blum, www.blum.com

WASHROOM WASTE RECEPTACLE // American Specialties Inc., americanspecialties.com

HAND DRYER // Dyson, www.dyson.com

WASHROOM ACCESSIBILITY // Frost, www.frostproductsltd.com

BABY CHANGING TABLE // Koala Kare, www.koalabear.com

TOILETS, BARRIER-FREE SINK AND BAR SINK FAUCET // Kohler, www.us.kohler.com

FLUSH VALVE // Delta, www.deltafaucet.com, and Moen, www.moen.com

WASHROOM FAUCETS // Fontana, www.fontanasensorfaucets.com

DOORS THROUGHOUT // Regional Doors & Hardware, www.regionaldoors.com

ENTRANCE ALUMINUM DOORS // Niagara Glass, www.niagaraglass.com

FIELD LIGHTING THROUGHOUT // Lithonia Lighting, lithonia.acuitybrands.com

RETAIL LINEAR LIGHTING // Mark Architectural Lighting, marklighting.acuitybrands.com

PENDANT, WALL SCONCE // TMS Lighting, tmslighting.com

VANITY ACCENT LIGHTING // Armstrong's Lighting, www.armstrongslighting.com

RETAIL TRACK LIGHTS // Juno, juno.acuitybrands.com

EXIT SIGNS THROUGHOUT // Stanpro, www.standardpro.com



basement, a new floor slab was poured for the retail and presentation areas. By burying the infrastructure, the inner forebay's open sightlines were preserved.

A holding area was created where guests seeing the evening lightshow attend the pre-show talk. New glass gates were installed in the portals between the inner forebay and the generator hall to prevent bottlenecks as groups of up to 147 guests viewing successive shows simultaneously enter and exit the generator hall.

+VG Architects unobtrusively added four new code-mandated emergency exit doors along the west façade by extending existing windows to the floor to create additional door openings, then replicated the single existing heritage door.

Many of the powerhouse's smaller original artifacts were cleaned, degreased and relocated to function as museum exhibits, furnishings and retail display fixtures. These include governors, which regulated the speed of the generators; a Francis turbine; and massive timbers that were stacked in front of the penstock mouths to stop water from flowing into the turbines during maintenance.

Newly designed furnishings, such as the ticket desk in the generator hall and the cash wrap in the inner forebay's retail store, reflect the plant's primary natural resource—water—in their sculptural, undulating wave motif, which inconspicuously accommodates accessibility requirements. The taller section of the ticket desk's wave surface incorporates a standing-height counter; the lower section is at wheelchair height.

Elsewhere in the public areas, finishes, furnishings and fixtures recreate the building's industrial look and feel. The new washrooms, for instance, continue the use of the original washroom walls' subway tile.

The Tunnel, a major new attraction, opened in the generator hall in July 2022. A new glass-walled elevator descends 180 feet through the station's eight underground levels to the wheel-pit floor, where visitors enter the 2,200-foot-long tailrace tunnel that returned wastewater from the turbines to the lower Niagara River. Visitors walk past interpretive exhibits and step out to a new viewing platform, extending into the river where they enjoy a unique panorama at the base of the falls—Horseshoe Falls thundering to their right and the American Falls to the left.

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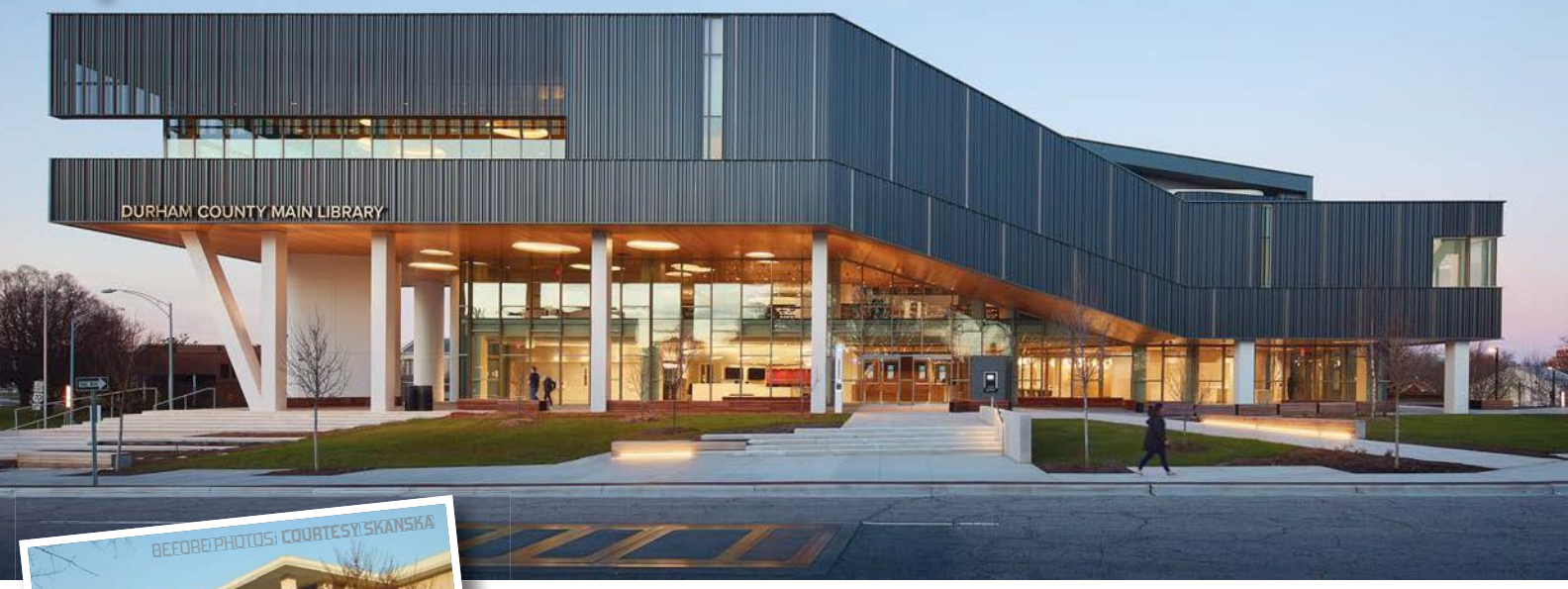
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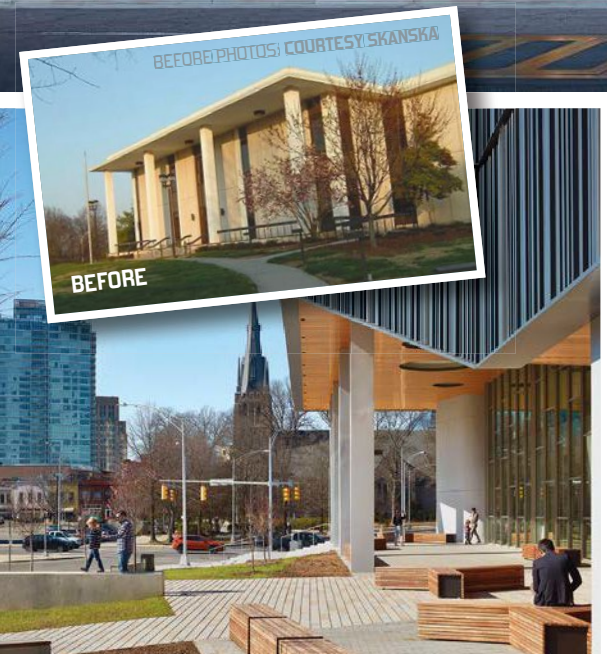
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DURHAM COUNTY MAIN LIBRARY

Durham, N.C.







PHOTOS: **MARK HERBOTH PHOTOGRAPHY LLC**
unless otherwise noted

RETROFIT TEAM

ARCHITECT: Vines Architecture, www.vinesarc.com
GENERAL CONTRACTORS: Skanska, www.usa.skanska.com, and Holt Brothers Construction, holtbrothersconstruction.com
MEP/FP ENGINEER: Stanford White, salasobrien.com

MATERIALS

Having achieved LEED Gold, the redesigned library is a sleek and modern building designed for the future. The project scope included the complete removal and replacement of the exterior skin, roofing, interior partitions, finishes and building systems.

The monumental staircase is one of the first things visitors see when they walk into the library. The wide, oak-stained steps and elevator shafts are reinforced with steel to support substantial shelves of books while allowing for glass partitions, curved walls and more modern open floorplans.

It was feasible only through careful engineering to thread the upgraded HVAC, plumbing and electrical systems into the tight spaces between floors, which were built with waffle-like slabs to support the weight of the heavy book collection.

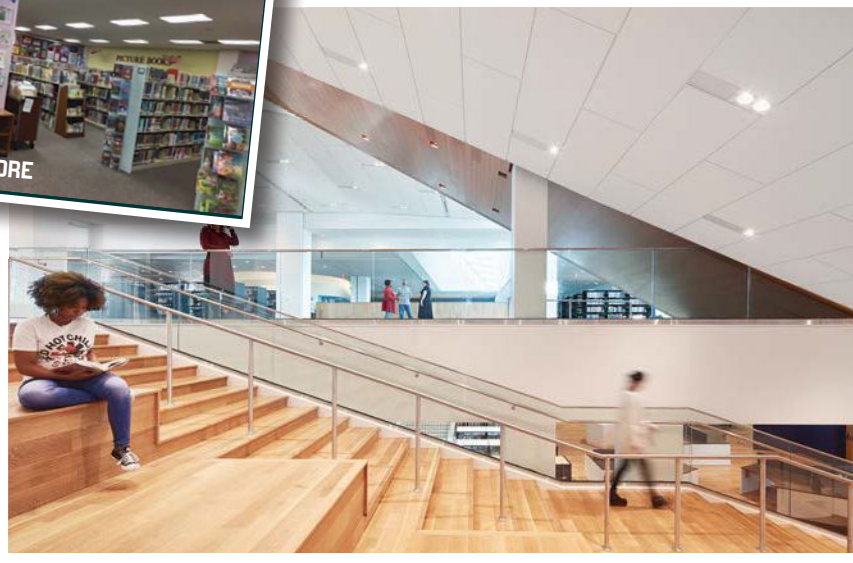
THE RETROFIT

At the end of 2020, the Durham County Main Library $40.8 million renovation/addition project was completed. Opened in 1980, the institution's requirements began to outstrip the capacity of its concrete structure. Its solid walls allowed very little natural light into library spaces and the enclosed central staircase blocked sightlines, making the interior seem darker and more









confined. The design also left no room for the library collection and programming to grow.

The building was enlarged from approximately 65,000 square feet to 85,000 square feet by adding a fourth floor. Rather than sequestering new science, technology, engineering, arts and math (STEAM) education spaces into a separate wing, these programs were woven through the interior of the building, gathered around a new collaborative central zone tied together by the monumental staircase, which is flooded with light from an enormous skylight overhead.

A glass-enclosed 2-story auditorium for teaching and events opens to an outdoor amphitheater where additional programming can be held. Two distinct makerspaces were built on the first and third floors, wired for technology and equipped with 3D printers. The fourth-floor addition is topped with a green roof that contributes to programming possibilities and the building's ambitious sustainability metrics while creating outdoor terraces where library patrons can meet or relax on temperate days. The addition's overhang creates a covered walkway outside the main entrance that serves as additional gathering space.

The demolition was a delicate process, requiring strategic planning to eliminate unwanted building sections without undermining the structural integrity of the remainder. This decision to retain the bones of the existing structure allowed the library to save millions of dollars that could be redirected to other priorities. The whole team can take pride in the satisfaction of a rewarding collaborative design and construction relationship, tremendous public support, and the promise of civic pride and community-building inherent in a structure that is well-tailored to meet the needs of its population for decades to come.

PEABODY COLLEGE FOR EDUCATION, VANDERBILT UNIVERSITY | Nashville, Tenn.

PHOTOS: COURTESY SGA











RETROFIT TEAM

ARCHITECT OF RECORD: Centric Architecture, www.centricarchitecture.com
DESIGN ARCHITECT: SGA, www.sga-arch.com
GENERAL CONTRACTOR: Messer Construction, www.messer.com

MATERIALS

The renovation scope included all new MEP systems, new exterior doors and windows, all new finishes, lighting, security, egress and other improvements. The connector's glass façade looks over the Peabody Esplanade and utilizes energy-efficient glass, vertical fins and natural foliage shading for enhanced efficiency.

THE RETROFIT

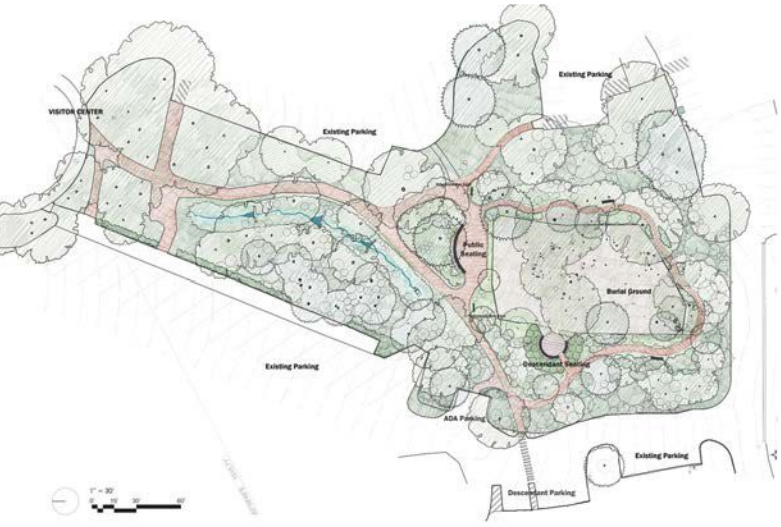
The project, completed in 2020, features historic exterior restorations on two existing 1912-era Beaux Arts buildings while transforming existing spaces into active learning classrooms, collaboration areas and a new campus café.

The 71,000-square-foot renovation project fulfills Peabody College's wish to create a new graduate student center, which is housed within a 16,000-square-foot "jewel box" connector addition that splits the pre-existing structure in two. Where concrete walls once stood, a 3-story glass façade now adds depth, flooding the new atrium with natural light. The façade's vertical patterning reinterprets the neoclassical columns on the now-conjoining buildings and creates an ideal area for students to study, learn and socialize.

Winner of the AIA Tennessee Design Award—and seeking LEED Gold certification and the Materials Petal of the Living Building Challenge—this reimagined teaching and learning environment now features open floor plans, integrated technology and ultra-flexibility, offering premier instructional facilities for tomorrow's teachers.















PHOTOS: THOMAS JEFFERSON'S MONTICELLO

THE BURIAL GROUND FOR ENSLAVED PEOPLE, MONTICELLO

Charlottesville, Va.

RETROFIT TEAM

ARCHITECT: HGA, hga.com
LANDSCAPE ARCHITECT: Nelson Byrd Woltz (NBW) Landscape Architects, www.nbwla.com

THE RETROFIT

The Burial Ground for Enslaved People, which is the final resting place for an estimated 40 enslaved people who lived and labored at Monticello, is the result of an intensive process that included researching historic site conditions, listening sessions with the descendant community, intensive historic research, and site and spatial analysis.

"From the very beginning of this project, HGA and Nelson Byrd Woltz Landscape Architects understood how important it was to collaborate with members of Monticello's descendant community and to prioritize their voices," explains Andrew Davenport, director of the Getting Word African American Oral History Project at Monticello. "The results of that close collaboration are improvements that better honor and protect the solemnity of the site. We look forward to rededicating the Burial Ground and sharing its history with all who visit Monticello."

The Burial Ground features:

- A new pathway and landscape, offering places for introspection.
- Physical markers to and from the burial site and the nearby David M. Rubenstein Visitor Center that encourage visitors to explore the space as they begin or conclude their journey at Monticello.
- Private outdoor spaces for descendants to pay their respects.
- An enlarged landscaped, sensory buffer made possible through the removal of a minor road adjacent to the Burial Ground.

"Four decades after my first visit to Monticello as a teenager, I found myself part of a design team challenged by visionaries at the Thomas Jefferson Foundation to honor the enslaved people who had remained largely invisible over the centuries," says Peter Cook, FAIA, design principal at HGA. "Our team's immersive design process led to a design that pays respect to the enslaved and their descendants, provides greater visibility to the Burial Ground and helps make the Burial Ground central to the understanding of Monticello."

"So much of our work is about daylighting the cultural history of the land," explains Thomas Woltz, principal and owner of NBW. "I can't imagine a better or more important example of this work than the Burial Ground at Monticello, which for too long has been obscured. This project is an example of how design can make a place feel intentional, dignified, beautiful and cared-for and can help bring daylight to this critical history of our nation."

HGA and NBW are currently completing the design for the Contemplative Site at Monticello, which will offer a quiet place of reflection; afford an opportunity for healing; and honor the 607 enslaved men, women and children who lived and worked at Monticello.



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RETROFIT TEAM

ARCHITECTURE AND INTERIORS: Hacker Architects, www.hackerarchitects.com
GENERAL CONTRACTOR: Fortis Construction Inc., fortisconstruction.com
LANDSCAPE ARCHITECT: Mayer/Reed, www.mayerreed.com
CIVIL ENGINEER: KPFF, www.kpff.com
STRUCTURAL ENGINEER: ABHT Structural Engineers, www.abht-structural.com
MECHANICAL AND PLUMBING ENGINEER: PAE, www.pae-engineers.com
GEOTECHNICAL ENGINEER: GRI, gri.com
LIGHTING DESIGN: Biella Lighting Design, www.biellalighting.com
ACOUSTICAL ENGINEER: Stantec, www.stantec.com
FAÇADE, BUILDING SCIENTIST: RDH, www.rdh.com
HISTORIC/SHPO: Architectural Resources Group, www.argcreate.com

THE RETROFIT

The design team was tasked with transforming the outdated 1960s Neuberger Hall into a modern, interactive, light-filled academic hub, now known as Fariborz Maseeh Hall.

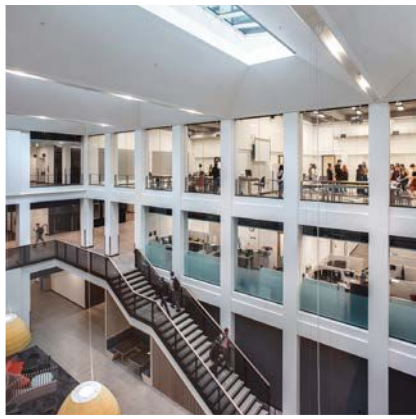
The 5-story building was built in the Brutalist style, a common campus aesthetic, which reflected the pragmatic and inwardly focused buildings of that era. The design concept repositions the building—which functions as a central student hub with classrooms, lecture halls, student services and faculty offices—through a series of interventions, renovations and expansions. The result is an engaging, open and humane experience. With an emphasis on access to daylight and connections between indoor and outdoor spaces, the 250,000-square-foot building now enhances campus function while better connecting and responding to its urban setting.

The original building was completed in two phases, 1961 and 1969. The two elements are now joined by a common floorplan while their distinct exterior appearances are preserved. Through a rigorous programming exercise, the removal of 20,000 square feet of floor area for a lightwell reduced only 3,000 square feet of assignable space while improving program efficiency and flexibility with the additional floor area at the interior with access to daylight. Exterior façades were upgraded through new curtainwall systems, which increased visibility while enhancing energy performance.

The new central lightwell brings daylight into the heart of the building, and a more transparent façade provides visual connectivity to the outdoors. The new floorplan now provides students, faculty and staff with enhanced opportunities for cross-pollination. Improved ground-floor program distribution also provides visual and physical connections between the plaza and park amenity spaces and expands opportunities for more student activity and interaction outside of the classroom. The physical connections are improved through a continuous accessible floorplan with full ADA access and enhanced wayfinding. Previously closed-in hallways and circulations now have unobstructed lines of sight between the building's eastern and western perimeter.

Together, the combination of replacing all windows with high-performing substitutes and the increased daylight into the building reduces the building's energy demand by 25 percent from the Commercial Buildings Energy Consumption Survey baseline model of buildings of similar size and use.









PHOTOS: PETE ECKERT











WASHINGTON HOUSES COMMUNITY CENTER | New York





PHOTOS: **ALBERT VECERKA/ESTO, COURTESY ANDREW FRANZ ARCHITECT** unless otherwise noted





RETROFIT TEAM

ARCHITECT: Andrew Franz Architect, andrewfranz.com
GENERAL CONTRACTOR: SPK I Lewis, www.spklewis.com
MEP ENGINEER: Plus Group Consulting Engineers, www.plusgroupce.com
LIGHTING CONSULTANT: Design One Lighting Design, www.d1ny.com
MURALIST: Alice Mizrachi, www.alicemizrachi.com
INSTALLATION ARTIST: Kristy McCarthy, www.kristymccarthy.com
ART CONSULTANT: Angel Bellaran, www.angelbellaran.com



MATERIALS

Established in 1895, Union Settlement is an on-the-ground resource for East Harlem residents of all ages and a passionate advocate for the needs of underserved communities. Its Washington Houses Community Center was built in the 1950s and Union Settlement has inhabited the facility since it was completed. Today, however, the facility is much more open and welcoming. For example, an enlarged glass-clad entry and expanded reception area, full of natural light from new skylights, opens to a multiuse space with stepped bleacher-style wood seating and pops of brightly colored art and finish accents.

This fresh, positive start then extends to various function rooms: There is a library, education center, classrooms, computer lab and senior center by the entry lounge, as well as offices and services with varied opportunities for non-profit Union Settlement to serve its different constituencies. Colorful and exuberant, the community center presents work by local artists.

Throughout the building, glass-partition hallways offer ample openness and views between staff members and visitors, improving Union Settlement's team communications and client safety while encouraging friendly interactions.

Welcoming new designs for the facility's classrooms, conference areas, and workrooms transformed the spaces from cramped quarters into spacious, bright and modern learning zones. Furnished with new light-toned wood tables and desks, along with colorful chairs—and new electrical and mechanical systems—the stage is set for community and staff engagement, comfort and productivity.

THE RETROFIT

Completely transformed from the original structure, the 11,000-square-foot youth and senior center brings together the East Harlem community it serves in a state-of the-art, visually impactful and gracious setting. The enhanced experience epitomizes Union Settlement's engaging learning atmosphere and the creativity and warmth essential to its service mission. Funded by the Criminal Justice Investment Initiative of the Manhattan District Attorney's Office, the 1-story center delivers on its mission to serve as a powerful magnet for area teens and seniors.

"Union Settlement is thrilled to see the Washington Houses Community Center transformed into such an amazing space, and we are delighted to now welcome children, youth, adults and seniors back into this wonderful new space," says David Nocenti, Union Settlement's executive director. "We are grateful to Andrew Franz Architect for the firm's innovative design that will provide an open and airy space for the East Harlem community to enjoy for years to come."

SACRED HEART CATHEDRAL PREPARATORY | San Francisco



PHOTOS: CESAR RUBIO PHOTOGRAPHY unless otherwise noted









RETROFIT TEAM

ARCHITECTS: INTERSTICE Architects, www.intersticearchitects.com, and Case+Abst Architects, (415) 351-3900
GENERAL CONTRACTOR: Guzman Construction Group, www.guzmangc.com
MEP ENGINEERS: Glumac, glumac.com, and Interface Engineering Inc., interfaceengineering.com
ACOUSTICAL ENGINEER: Salter, salter-inc.com
STRUCTURAL ENGINEER: FTF Engineering, www.ftfengineering.com
FIRE/CODE CONSULTANT: Holmes, holmesanz.com
MILLWORK IN LOBBY: Architectural Wood Design Inc., awdfresno.com

MATERIALS

The main room in the new suite of voice/instrumentation-specialized rooms features a curved seating arrangement on stepped dynamic roll-out platforms, each equipped with foldable/collapsible seats. This allows for the entire room to be an unencumbered open rehearsal room, once the 120 seats are telescoped away to form a 6-foot curved wall against the windowed street façade.

It was important that although it would function most days as a large classroom, it would not look like one. For this reason, wood was chosen to impart an instrumental feel to the room. This resonated with the room's ability to be finely tuned to the acoustic and programmatic needs of the occupants and connected it thematically to other performance spaces within the school. Along its walls and vertical surfaces straight-grain Douglas fir was used in panels and strips, depending on whether it needed to deflect and disperse sound, conceal acoustic treatments, or capture acoustical curtains or lighting-control mechanisms throughout the space.

As a theater-ready space, the finely tuned acoustical layout of this space is hidden from view, protected behind the clear, straight-grain slats that run continually floor to ceiling around the room. At the front of the room, the strips travel in grouped ribbons of pre-curved sine-waves like musical staffs, reminiscent of the way sound is produced and propagates, to create a more reflective and dispersive "wetter" environment to sound. They protrude to allow for AV hook-ups and then retract to allow concealed connectors for microphones and amplification equipment.

The existing coffered concrete ceilings were exposed to take advantage of the deep dispersal texture with absorptive acoustic materials added to the upper recessed slab areas to cancel flutter and absorb sound parallel to the floor. Further special tunable elements include motorized retractable acoustic veils along with blackout-control roll shades for lighting and glare control for performances, film presentations or private receptions. Additional drop-down acoustical shades, which absorb the reflective quality of hard surfaces for choral recording sessions, were placed at the front of the room to cover and conceal the teaching whiteboards and AV display screen while acting as projection screens in a classroom setting.

The following is a sampling of materials used in the project:
TELESCOPIC SEATING: SEDA, sedasport.com
FLOORING: Marmoleum from Forbo, www.forbo.com, and Oak Noir Wood in Choral Room from Boen, boen.com
WOOD WALL PANELS AND CEILINGS: Grille Wood from Madrid, madridinc.com
LINEAR SUSPENDED LIGHTS: Finelite, www.finelite.com
CYLINDER THEATRICAL LIGHTS: Lucifer Lighting Co., www.luciferlighting.com

THE RETROFIT

Sacred Heart Cathedral Preparatory is known for its performing-arts curriculum. The designers were asked to renovate a raw 2,300-square-foot rectangular space to create a four-studio suite of voice/instrumentation-specialized rooms to enhance and connect the choral performance to the school's recently completed main theater. The program aspiration was intensified by requiring the largest of this suite of spaces to accommodate small impromptu performances, choreography rehearsals, and special event dinners and receptions when not serving as a 120-seat auditorium classroom for the entire school chorus to practice in or record together.

From this new main choral rehearsal room, the designers worked to squeeze in three associated but acoustically isolated rooms: a recording studio control room, smaller practice room for instrumental ensembles and single-artist voice recording booth. These separate studio rooms were designed to be used in conjunction with, or in isolation from, the larger choral rehearsal space and all are connected fiber optically as a choral "green room" to the larger theater. This technically allows the choral studio rooms to participate in real-time performances that take place on stage or record directly over tracks from the on-stage recordings.



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THE CHEECH | Riverside, Calif.

PHOTOS: RIVERSIDE ART MUSEUM







RETROFIT TEAM

ARCHITECT: Page & Turnbull, www.page-turnbull.com
- John Lesak, AIA, FAPT, LEED AP, principal
- Elisa Hernandez Skaggs, AIA, project manager
- James Mallery, AIA, project architect

DESIGN ARCHITECT: WHY, why-site.com
- Kulapat Yantrasast, principal
- Paulina Bouyer-Magña, project manager

LIGHTING DESIGNER: HLB, hlblighting.com
GENERAL CONTRACTOR: Hamel Contracting Inc., hamelinc.com
CIVIL ENGINEER: Epic Engineers, epicrce.com
STRUCTURAL ENGINEER: Structural Focus, structuralfocus.com
MECHANICAL/ELECTRICAL ENGINEER: Design West, www.designwesteng.com

MATERIALS

A 1964 New Formalist library, designed by Moise, Harbach and Hewlett, has been transformed into a modern museum and cultural center while preserving the historic and vintage aspects of the original building, such as the exposed brick walls, stainless-steel framework and aluminum stair railings with restored decorative polyester panels.

"Interventions are thoughtfully integrated to celebrate the building's historic character and its transformation to a world-class art center," says Page & Turnbull Principal Architect John Lesak. "It's an inspiring idea and a model for other cities and cultural groups to revive underused architectural gems."

One of the most striking features of the space is the visual connection between the galleries, which are centered around a permanent installation of a 26-foot-tall lenticular piece by brothers Einar and Jamex de la Torre. The installation, which changes as the viewer moves from side to side, is designed to generate a central source of energy for The Cheech, encouraging visitors to explore the different galleries above and below. Accessed by a restored mid-century stairway, the second-floor features exhibition art galleries, a multipurpose space, film screening room, staff offices, and an artist-in-residency studio/education center where visitors can witness the next generation of Chicano art as it emerges.

The following is a sampling of materials used in the project:
VESTIBULE STOREFRONT: Kawneer, www.kawneer.com
TRACK LIGHTING: Targetti, targettiusa.com
ENTRANCE TOPPING SLAB: ARDEX, www.ardexamericas.com
INTERIOR BRICK SEALANT: Prosoco, prosoco.com
FLOORING AT ELEVATOR AND STAIRS, FINISH ON MILLWORK: Marmoleum from Forbo, www.forbo.com
ART HANGING TRACK: Takiya, takiya.com.e.aiy.hp.transer.com
CEILING ACOUSTICAL TREATMENT: Acoustement by PYROK, www.acoustement.com

THE RETROFIT

The Cheech is the result of a public-private partnership between the Riverside Art Museum (RAM); city of Riverside; and Cheech Marin, who has spent the last 40 years collecting the work of notable Chicano artists, like Carlos Almaraz, Margaret Garcia, Wayne Alaniz Healy, Judithe Hernández, Frank Romero and Patssi Valdez.

Marin's collection was part of a RAM traveling exhibition in 2017, and he liked what he saw. When the time came to find a permanent home for his collection, along with other pieces of art that deserve to be seen, RAM and Riverside's city leaders rose to the occasion. To start, the city offered the 61,420-square-foot, 2-story former Riverside Public Library to house the facility. RAM then leveraged its 60-plus years of experience as a cultural arts institution to run the center and work with the community to raise the millions of dollars necessary to renovate the building.

"My motto has always been that you can't love or hate Chicano art unless you see it," Marin said during the dedication ceremony. "And now people will have a place to always see it. This is such a happy and humbling moment for me."

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PHOTOS: LAURA KINGSBURY JONES







RETROFIT TEAM

ARCHITECT: Design Intent Architects, designintentarchitects.com
TUBULAR DAYLIGHTING DEVICE DISTRIBUTOR/ INSTALLER: Designer Specialty Products, dsp-llc.com

MATERIALS

Eighteen Solatube SolaMaster Series 300DS-C units and 31 Solatube SolaMaster Series 750DS-C units were installed in the facility to provide more natural light in the space.

DAYLIGHTING DEVICE MANUFACTURER: Solatube, solatube.com

THE RETROFIT

This 90,000-square-foot former Target retail location, which was nearly windowless, has been converted into a bright, welcoming education facility. The campus provides the community with a new early childhood education facility and home to the Otter Preschool and Children's Corner, together employing nearly 40 staff and educators and supporting more than 300 students.

There were several challenges in this project of transitioning a retail store into a functioning educational facility, including different building and fire codes, as well as the lack of windows. Data from multiple studies show that daylight improves student performance.

Lead architect on the project, Scott DeMartelaere, AIA, of Design Intent Architects, comments: "The teachers wanted natural light in all of the classrooms. Because this is a big box, the inner classrooms would not have exterior walls and windows that would allow the introduction of natural light."

The 49 Solatube SolaMaster units were used to capture daylight at the rooftop and transfer natural light deep into the interior of the building on sunny and cloudy days. Eighteen SolaMaster 300DS systems were installed in smaller classrooms with lower ceilings that have a hard or suspended ceiling system. All Solatube products were equipped with a solar-powered daylight dimmer, which allows staff members to fully control the amount of daylight in the room. The SolaMaster 300DS units were also fitted with Thermal Insulation Panels to provide additional thermal performance with a lower U-factor against the central Minnesota climate.

The other 31 SolaMaster 750DS systems were utilized in larger classrooms, kitchen spaces and open offices. The SolaMaster 750DS is designed to deliver consistent light output throughout the day by effectively capturing low-angle rays of light in the morning and late afternoon but rejecting high-angle rays at midday to prevent glare and over-lighting.

The adaptable tube design will allow for future interior layout flexibility. If the building needs change, the tubular daylighting system's light distribution lens and tubing can easily be realigned to new locations. Fixtures can be updated by swapping out or adding new accessories to customize the new space.

Upon entry of the new school, staff and students report positive effects of the natural light in the classrooms, including improved performance, productivity and attitudes. Plus, the ability of the Solatubes to dim allows for seamless transitions to media presentations or naptime for the younger grades.

"People who tour the school and are shown the tubes are impressed by the way they dim and the ability for them to light rooms completely on their own," says Melissa Amundson, Fergus Falls District early childhood education administrator.

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PHOTOS: JIM CUNNINGHAM PHOTOGRAPHY



UPMC COOPER FIELDHOUSE, DUQUESNE UNIVERSITY | Pittsburgh

RETROFIT TEAM

ARCHITECT: DRS Architects Inc., www.drsarchitects.com
GLAZING FABRICATOR: Trulite Glass & Aluminum Solutions, www.trulite.com
GLAZING CONTRACTOR: Gurtner & Sons Glazing, (412) 921-8074

MATERIALS

As part of a dynamic renovation of this historic athletic facility, developers selected Solarban 67 Starphire glass to create a curved façade that brings new life—and more light—to the newly named UPMC Cooper Fieldhouse.

DRS Architects designed a bright, inviting street-facing façade that provides optimal daylighting for the inside of the facility and also aligns aesthetically with Duquesne University's recent campus upgrades along Pittsburgh's Forbes Avenue.

With a solar heat gain coefficient of 0.30 in a standard 1-inch IGU, Solarban 67 Starphire glass offers solar-control performance that improves the overall energy efficiency of the building. Its visible light transmittance of 57 percent indicates the glass delivers abundant daylight to the building's interior, especially along the northern façade leading to the Clearway Community Energy Gate.

GLASS MANUFACTURER: Vitro Architectural Glass, www.vitroglazings.com

THE RETROFIT

Formerly known as the A.J. Palumbo Center, the UPMC Cooper Fieldhouse is home to the men's and women's basketball and volleyball teams at Duquesne University. In addition to the primary arena, the building houses the Folino Sports Performance Center, which features nearly 10,000 square feet of athletic training equipment, performance labs and a nutritional center for the university's student-athletes, as well as the Joe and Kathy Guyaux Player Development Center, which contains two regulation-sized basketball courts.

The renaming of Duquesne University's primary athletic facility honors Naismith Memorial Basketball Hall of Famer and Duquesne alumnus Chuck Cooper, a Pittsburgh native and one of the first African American athletes to be drafted by the National Basketball Association in 1950. The renovation of the UPMC Cooper Fieldhouse began in March 2019 and was completed over the course of 22 months, culminating in an opening event on Feb. 2, 2021.

BROWARD COUNTY SCHOOL DISTRICT | Fla.

RETROFIT TEAM

FIRE-SPRINKLER INSTALLER: Sprinklermatic Inc., sprinklermatic.com
CPVC DISTRIBUTOR: Viking Supply, www.vikinggroupinc.com

MATERIALS

Sprinklermatic Inc. has made a showcase of the Broward County School District, having outfitted the majority of the district's buildings with new fire-protection systems over the last decade; approximately 22,000 feet of pipe and 1,300 sprinkler heads have been installed districtwide. Sprinklermatic Vice President Tim O'Brien has worked with BlazeMaster systems for years and was excited to bring the product to a new project.

"The Broward County school board needed to upgrade their fire protection systems," O'Brien says. "That's where the opportunity presented itself on the project. It became a question of, 'How do you sprinkler a building that is in essence open all the time?'"

Updates to the school district's fire protection began in 2003 when the administration learned one of its oldest buildings, Northside Elementary, required a new fire sprinkler system to meet new codes and regulations. The age and structure of the building would require delicate work; something that would become incredibly difficult with a steel system.

Initially, the Broward County school board balked at the prospect of a CPVC system installation. Sprinklermatic brought in one of Lubrizol's expert piping systems consultants to present the benefits of a CPVC, or chlorinated polyvinyl chloride, system to the school board.

"The school board only knew steel pipe," O'Brien recalls. "We had to teach them the benefits of CPVC. The cost benefits and ease of installation sold them. We showed them we could install the product without tearing apart ceilings, and that it could be done quickly."

The flexibility of BlazeMaster systems worked well with the unpredictability of installations in buildings greater than 50 years old, where architectural and structural changes may not have remained consistent over the years. With BlazeMaster pipe and fittings, contractors don't need to worry about starting and stopping pipes at specific points during the installation; the flexibility of the product allows contractors to pick up and leave off where necessary throughout the process.

This was particularly important considering the time crunch involved on some of the Broward County installations. One building needed the job completed in under two weeks, which was possible with CPVC; a comparative system using steel would have involved hours of setup and cleanup, not to mention prefabrication and design that would have been impossible to install in the same amount of time. The district's Coconut Creek High School was similarly sprinklered in just 28 days in 2013.

Across the Broward County School District, Sprinklermatic received the opportunity to sprinkler several other buildings—totaling 13 campuses districtwide, each with around 10 buildings. And Lubrizol offered its full support each step of the way, offering its comprehensive training to Sprinklermatic. Thus far, the district has experienced no issues with its new fire-protection systems, and Sprinklermatic continues to utilize BlazeMaster CPVC successfully.

CPVC MANUFACTURER: Lubrizol, www.lubrizol.com
FIRE-PROTECTION SYSTEM: Blazemaster, www.blazemaster.com



PHOTOS: BLAZEMASTER









CLASSROOM ACOUSTICS



SOUND IMPACTS STUDENT LEARNING AND DEVELOPMENT

WRITTEN BY | KJ FIELDS

When most people think of students' wellbeing and achievement, thermal comfort, lighting and air quality come to mind. Another, perhaps less obvious, factor affecting student wellbeing is acoustics, and research shows clear correlations between excessive classroom noise and impaired student performance.

"The brain has a hard time focusing on what it needs to when there are poor acoustics, and that causes cognitive dissonance, or mental discomfort," says Sue Ann Highland, Ph.D., industrial/organizational psychologist and national education strategist for School Specialty, a Greenville, Wis.-based organization whose mission is to engage and inspire classrooms with everything from crayons to curriculum. "Improving acoustics in the classroom can truly help students achieve."

Learning is a significant part of the educational experience, but classrooms also offer students the opportunity for personal growth, socialization, creative outlet and emotional relief—all of which affect mental health. Sound can impact these areas of student development, as well, which is increasingly critical in times of trauma.

Lingering Effects

Noise is distracting, and sounds affecting students originate from two main sources. Environmental sounds are those outside the classroom, such as noise from transportation (cars, trains or airplanes), landscaping equipment, playground commotion, and sounds from school hallways and adjacent classrooms. Other sources of sound are found within the classroom, like the noise from the ventilation system and students' voices.

Soundwaves reflect off hard surfaces and bounce back, lingering in a space. This process is called reverberation. Schools are commonly built with hard-surface materials able to withstand wear and tear, like brick, glass, tile, linoleum and gypsum walls. With most hard surfaces, nearly 90 percent of soundwaves bounce back into the space, making for long-lasting reverberations that can be difficult for the brain to interpret. This is especially challenging when the reverberations mix with soundwave reverberations produced by other sources, like environmental noise or speech.

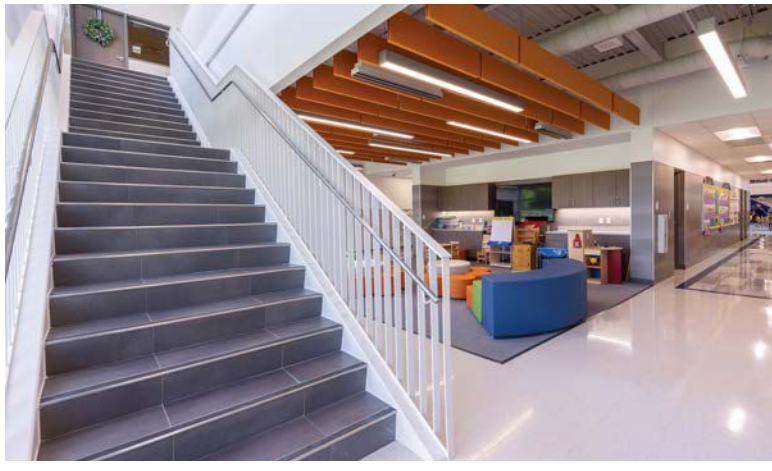
The World Health Organization guidelines for reverberation times in classrooms is 0.6 seconds. On average, the typical classroom of 960 square feet has a reverberation time of 1.9 seconds, three times longer than recommended.

Research reveals excessive noise and reverberation can negatively affect a child's behavior and students' ability to learn. Chronic noise exposure affects children's performance in multiple ways, from deficits in attention and memory for certain tasks to reduced reading ability and performance on standardized tests. For students with speech, hearing or attention problems, or those who are concurrently learning English as a second language, the effects of poor classroom acoustics become even more challenging.

The younger the child, the lower the reverberation time needs to be. Auditory systems of young children aren't fully developed. When learning a new subject, like math, and trying to grasp unfamiliar terms in a noisy classroom environment, young children tend to disengage and essentially "shut down."

Reverberating sound or excessive environmental noise can also prevent students from properly understanding the teacher. Distance from the source of sound plays a role too. In noisy classrooms, students seated in the fifth row have 50 percent less speech intelligibility than those who sit in the front row.

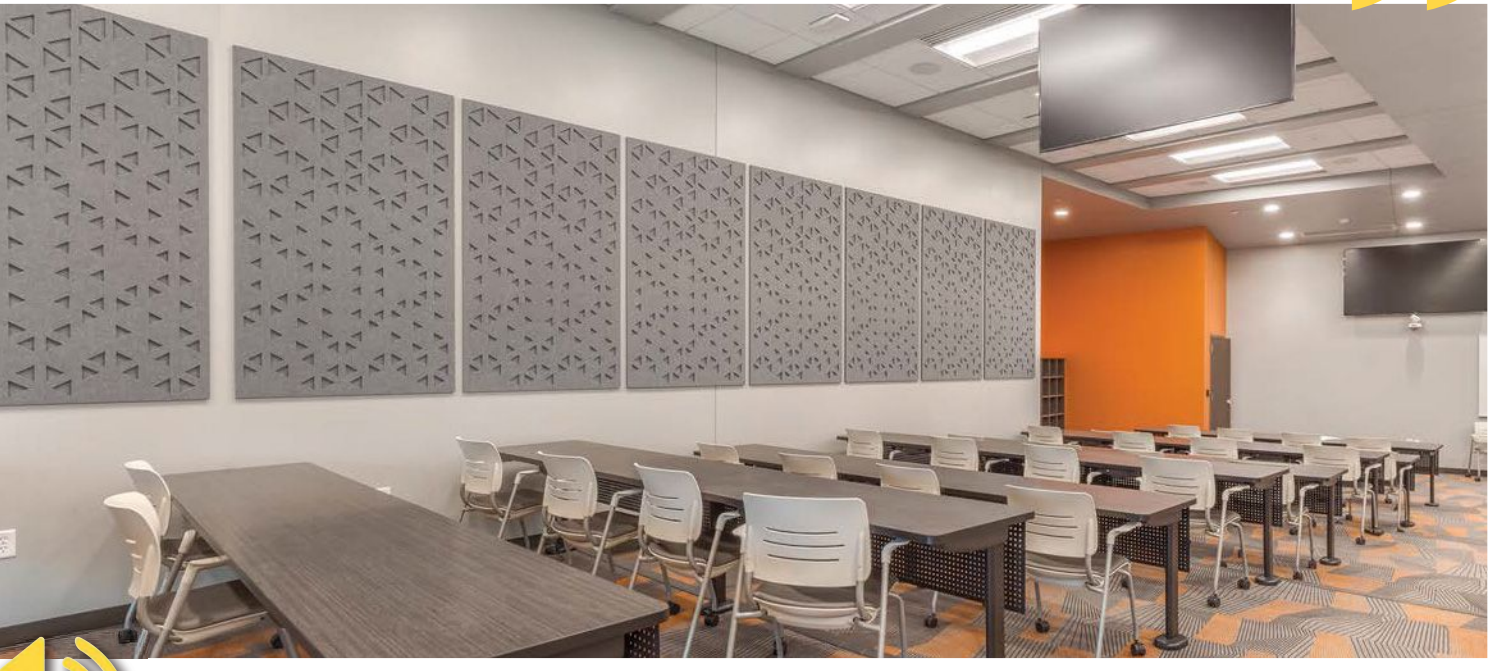
"When you're in a classroom with hard surfaces and students are spread out, some students can't even hear what the teacher is saying," Highland says. "Cognitive tasks requiring high levels of concentration are very sensitive to noise, and constant





At Keller Independent School District's Florence Elementary School in Southlake, Texas, VLK Architects specified suspended acoustic baffles for the hallway ceilings to help control noise in adjacent classrooms. Plus Bafl and Round Clouds with Light Fixtures from Fräsch were added in large open spaces where many students assemble at one time. These acoustical treatments help reduce reverberation and control sound accumulation, which makes the spaces more suitable for conversations without creating echo chambers.

> Cognitive tasks requiring high levels of concentration are very sensitive to noise, and constant interruption from sound disturbs one's ability to think. This is something educators don't even consider because we aren't taught to recognize the impacts of poor acoustics. *—Sue Ann Highland, Ph.D., industrial/organizational psychologist and national education strategist, School Specialty*



Inside Oklahoma State University College of Osteopathic Medicine at the Cherokee Nation, Childers Architect created quiet classroom and study spaces adjacent to noisy simulation suites that expose students to environments similar to those they will encounter in real-life hospital settings. To ensure noise from the simulation suites doesn't impact quiet areas, the firm incorporated PANL acoustic paneling from Fräsch with wall-mounted installation.

interruption from sound disturbs one's ability to think. This is something educators don't even consider because we aren't taught to recognize the impacts of poor acoustics."

Students aren't the only ones affected by this issue. Intuitively, people talk louder over accumulated noise to be heard. Teachers must speak at least 15 decibels over the ambient noise for students to hear and understand them. The result is vocal strain.

"Eighty percent of teachers say they have experienced vocal fatigue because they have to speak up so loud to be heard," explains Slavi Younger Nightingale, co-founder and vice president of Marketing at Fräsch, a manufacturer of acoustical solutions. "Our hearing developed as a survival tool, and we pay special attention to sound changes in our environment. Unfortunately, our systems aren't very good at filtering out dynamic sounds or at choosing to focus on one specific human voice."

In addition to learning issues, poor soundscapes in educational facilities affect health and mood. Humans associate loud noises with stress, making cortisol levels rise and blood pressure increase. For students already suffering from stressful situations, creating a calming environment can be pivotal.

Trauma Recovery

For many students, school is their safe place: a place where they count on normalcy. During the coronavirus pandemic, students were removed from the routine of school and their social circles, and others lacked access to resources, the internet, and free or reduced-fee lunches.

"Dealing with all of these external things creates mental noise that children need to psychologically process," Highland says. "Because of COVID-19, many students experienced trauma. Calming one environment in their world can help relieve the parasympathetic nervous system and have huge impacts on their social and emotional wellbeing, as well as their ability to academically achieve."

Lower sound levels are key to fostering calmness. Quiet spaces help people slow down, calm down and talk softly yet still be heard. Creating acoustics that promote an environment of healing in the classroom can help students—and teachers—work through accumulated trauma.

In response to the pandemic, however, many schools desire large-volume spaces to permit social distancing and airflow, as well as hard surfaces for easy cleaning. But when 60 children are in a large, hard-surfaced area, even a few whispers create loud reverberations.

"We aren't going to change how we hear and listen; it is a hardwired function after 200,000-plus years of human development," Younger Nightingale points out.

"Instead, we need to change the space to fit us better, so we can be healthy, happy and our best self."

Sound Solutions

Controlling reverberations is dependent on the size of the room and the amount of hard surfaces reflecting soundwaves back into the space. Different surfaces reflect sound differently, and each absorbs some energy from soundwaves. Acoustically absorptive materials contain small areas where soundwaves become trapped, preventing their re-entry into the room. The amount of absorption depends on the material itself and the frequency of the sound. Creating better acoustics in educational facilities requires changing the ratio between hard surfaces and absorptive surfaces.

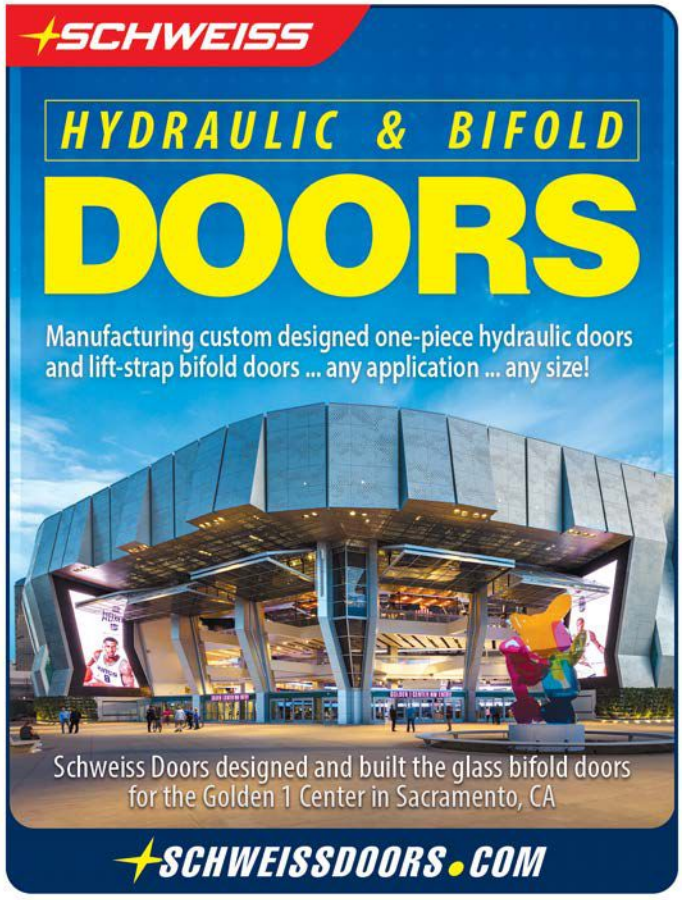
In existing educational facilities' learning spaces, the use of sound meters can provide specific information about noise levels. The addition of high-performing, sound-absorbing applications will reduce reverberations. Sound-absorption treatments should be located close to the source of the sound. Acoustic ceiling tiles or installations that suspend acoustic materials from the ceiling, as well as wall panels or classroom dividers made of absorptive materials, carpet and baffling, are all treatments designed for acoustic comfort in learning environments and public spaces, like cafeterias.

It's critical to examine the use of the space. For example, at the Oklahoma State University College of Osteopathic Medicine at the Cherokee Nation, noisy simulation suites expose students to environments similar to those they will encounter in real-life hospital settings. Inside the same building, however, students needed high-functioning classrooms and quiet study spaces. Acoustical wall applications provide the solution to dampen the clamor from the simulation suites and improve speech intelligibility in classrooms.

Mitigating environmental factors wherever possible (such as adequately housing HVAC systems) is another smart strategy. In some cases, controlling external spaces may be all that's needed. At Keller Independent School District's Florence Elementary School in Southlake, Texas, suspending acoustic baffles from the hallway ceilings helps control noise in adjacent classrooms. Adding acoustical ceiling baffles in large open spaces where many students assemble at one time (such as the cafeteria, library and labs), also helps reduce reverberation and control sound accumulation. This made the spaces more suitable for conversations without creating echo chambers.

For new construction, current classroom design favors open, flexible spaces to accommodate non-traditional learning. Sound-absorbing ceiling treatments and moveable acoustic partitions can help control reverberations in these open floorplans.

"Acoustics is part of a multi-tiered approach," Highland explains. "As we look at how the classroom environment can support students' comfort, wellbeing and academic achievement, good acoustics can become one of the unspoken heroes of this equation."





ULTIMATE SCHOOL DISTRICT ENERGY MAKEOVER

Long Island Public School District Retrofit Receives A+ for Results, Creates Bright Energy Future for Students and Educators

WRITTEN BY | DAVID M. NEWMAN, P.E., CEM, LEED AP, CEA

PHOTOS: ENERGIA

Do you remember your school building growing up? The dim gymnasium lighting? The classrooms that were alternatively too hot or too cold? Maybe a leaking roof in one of your classrooms? There's a good chance your old school building is still standing. And, unfortunately, some of those environmental problems are the same.

This is because the average age of a public-school building in the U.S. is 42 years. With close to 100,000 public K-12 schools in the U.S., most are in need of maintenance, and many are in need of a solid retrofit.

If these were commercial properties, restaurants, banks or other private buildings, the property owner might obtain a building loan to make the necessary upgrades and then pass this along to the tenants through higher rents. However, most public-school buildings are owned by the municipality or county where they are located and obtaining a loan isn't a straightforward process. In fact, it's often hard to get capital infrastructure money.

Instead, school districts that operate and maintain the school buildings and other facilities within their district operate under a strict budget that often requires a public referendum to increase. School districts are often the largest single line item on homeowner property taxes and when school districts ask to "float a bond" for maintenance or expansion projects—often into the millions of dollars—taxpayers aren't always happy to comply. Instead, property owners view the school districts as a tax burden. This can especially be the case when the necessary retrofits aren't typically seen by the public—like improved LED lighting, districtwide digital temperature control systems, replacement boilers and new roofs. Although all these items clearly improve the educational learning environment for the students, they aren't the "sexiest" upgrades in the eyes of the paying public.

Energy Performance Contracts for the Win

This is exactly why many schools have opted to engage in an Energy Performance Contract (EPC) that enables them to leverage their trapped energy costs to finance much-needed retrofits in their facilities. The EPC process can be complex, but it results in healthier buildings, energy savings and reduced operating costs—with the strategic financial benefit of no upfront investment. In fact, EPCs don't require additional taxes or a public vote.

At its core, an EPC is an agreement the school district makes with an energy services company (ESCO) to perform energy-efficient building upgrades and retrofits using guaranteed energy savings as the funding source. In effect, future energy savings pay for the present day retrofit.

EPCs help school districts make capital improvements that address air quality, lighting, heating, cooling and energy-production improvements, like rooftop and parking lot solar photovoltaic (PV) and power co-generation that further reduce energy consumption, without requiring out-of-pocket expenses. All of this results in healthier learning environments with lower operation and maintenance costs, more centralized building systems and a smaller carbon footprint.

Repairing the Sins of the Past

Energia, for example, drives successful school EPC projects using a seven-step process that includes the following:

1. Site discovery
2. Financial assessment
3. A project proposal competition (making different ESCOs bid for project work rather than the traditional "lowest bidder wins" model)
4. Final scope and savings agreement
5. No-risk funding
6. District physical transformation
7. Actual savings proven

Energia has a long history acting as the advisor and advocate for school districts as they implement complex energy-savings initiatives, energy retrofits and EPC programs.

Often, when Energia has managed an EPC for a school district, its representatives find themselves revisiting and repairing some of the "sins of the past." For example, at one school building, the HVAC system had been upgraded; however, the technicians took a shortcut and located the thermostats inside the wall registers. This resulted in heating and cooling systems



Commack Union Free School District's Indian Hollow Primary School received solar panels as part of the district's Energy Performance Contract. The solar installations within the district provide electrical generation of approximately 2.5 megawatts.



New InVerde e+ co-generation, or combined heat and power, modules from Tecogen Inc. were installed at Burr Elementary School and Sawmill Intermediate School for increased efficiency and to recapture heat waste, putting it to use for the buildings' heating instead.



fighting each other and operating simultaneously—alternatively heating and cooling the hallways and classrooms. This was a relatively inexpensive fix under an EPC to relocate the existing hardware and reprogram the building environmental systems to operate correctly. The changes more than paid for themselves, saving thousands in energy savings over the course of a single year.

Long Island School District Gets a Makeover

The Commack Union Free School District is a public-school system located in Suffolk County, N.Y., on Long Island. The school district serves approximately 6,000 students from a number of communities, including Commack, Dix Hills, Smithtown and East Northport. The district engaged Energia in 2018 to begin exploring ways an EPC could help it achieve its energy-efficiency and capital-improvement goals.

The district's buildings needed many of the typical upgrades facing schools across the nation. Some of the challenges facing the district were:

- Older roofs in need of replacement
- Older boilers in need of replacement
- Outdated, expensive fluorescent and incandescent lighting
- Older pneumatic temperature control systems

In addition, the district managers wanted to explore two power-generation opportunities:

- Co-generation systems
- Solar PV systems

To accomplish Commack Union Free School District's goals, Energia selected Johnson Controls as the ESCO contractor and oversaw the upgrades and installation of all the new environmental systems and controls, including:

- Occupancy sensors capable of detecting when rooms were in use and turning off lighting systems

(continues on page 50)

ENERGY PERFORMANCE CONTRACTS HELP SCHOOL DISTRICTS MAKE CAPITAL IMPROVEMENTS THAT ADDRESS AIR QUALITY, LIGHTING, HEATING, COOLING AND ENERGY-PRODUCTION IMPROVEMENTS . . . WITHOUT REQUIRING OUT-OF-POCKET EXPENSES.


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- Centralized temperature control systems and conversion to digital controls to allow facilities managers to manage all building environmental controls from a single location.
- Rooftop and carport solar, providing electrical generation of approximately 2.5 megawatts.
- Co-generation, or combined heat and power, plants were installed for increased efficiency and to recapture heat waste, putting it to use for building heating instead.

By the end of 2021, the retrofit had resulted in school district buildings that were cleaner and more environmentally improved learning environments. The retrofits and upgrades to the classrooms and community rooms, including gyms and auditoriums, provided a significant improvement to the learning environment with better heating, cooling and lighting.

The school district has been pleased with the results and the efforts of the Energia team in working with the district.

"The Energia team members are independent experts in their field. This is all that they do—Energy Performance Contracts," says Laura Newman, assistant superintendent for Business and Operations, Commack Union Free School District. "It is highly technical; it has many moving parts; and they're the ones who make sure that the district gets these types of capital projects done—done timely, done effectively and done efficiently so that there are utility savings that the district will save in the future."

The entire project for Commack Union Free School District resulted in a $25 million annual savings over an 18-year term with $6.3 million in additional cash flow. Now that's an A+ investment!

Learn More

If you'd like to learn more about Energia and its work helping schools execute Energy Performance Contracts, visit www.energiasaves.com.

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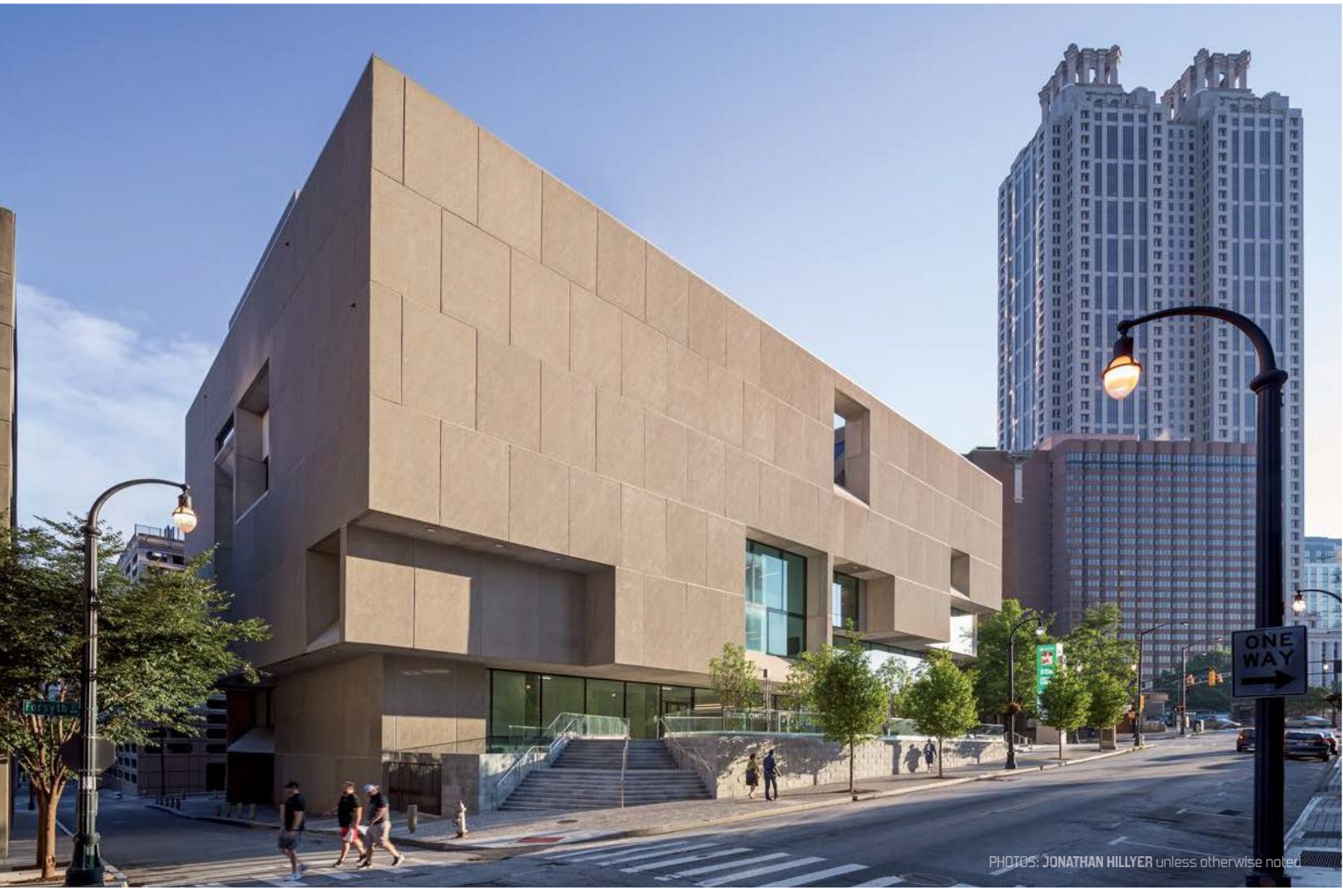
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A NEW CHAPTER



PHOTOS: **JONATHAN HILLYER** unless otherwise noted





ICONIC, MARCEL BREUER-DESIGNED ATLANTA CENTRAL LIBRARY IS REIMAGINED WHILE UNCOVERING BREUER'S DESIGN INTENTION

When Atlanta's Central Library opened in 1980 as an architectural treasure on the site of the former Carnegie Library, city officials, librarians, staff and patrons could not have imagined the advances to come in library science and information gathering. As methods for attaining information have dramatically changed in the last 30-plus years, the library experience has had to evolve to stay relevant and valuable for the community.

Answering calls for a modern library experience that prioritized the facility as a place for the community to meet and connect virtually and in-person, as well as a venue for lending and borrowing, design firm Cooper Carry with associate firm Vines Architecture completed a $44 million renovation of the Central Library in 2021. Moody Nolan served as the architect of record. By featuring iconic design elements while adding in-demand features, such as natural light, group meeting areas and event space, the renovation has brought new life to this storied Atlanta landmark.

THE PROLOGUE

Designed by renowned architect Marcel Breuer, known for his Brutalist style, the original design was in itself a response to the need for a revamped library environment.

WRITTEN BY | TIM FISH, AIA, LEED AP

The building was commissioned by the city of Atlanta to replace the preexisting Carnegie Library. A 1975 bond referendum gave way to the new $19-million structure designed by Breuer and his associate Hamilton Smith. As the last architectural work Breuer completed before his death in 1981, Atlanta Central Library remains an important piece of Atlanta's cultural fabric, as well as the international design community.

Yet, the passage of time and advent of the digital revolution brought about extreme change. Not only was the building in need of basic functional improvements to maintain operations by today's standards, but the community's relationship with the public library had evolved.

Bordered by downtown Atlanta's dense blocks of office buildings, numerous hotels, and a variety of retail and dining establishments, the library's façade provided limited windows to reveal its offerings. Inside, much of the 8-story building was underutilized, windowless and difficult to navigate, leaving many of Breuer's design features undiscovered.

With a drop-off in foot traffic and requests for updated programming, city officials floated the idea of demolishing the building to construct something entirely new, but concerned design advocates opposed the idea and were fortunately successful in the library's preservation.

Consequently, the Fulton Public Library System and Cooper Carry embarked on a plan to rehabilitate the building into a place that balanced Breuer's original vision while reimagining the space for Atlanta's next generation of library users.

THE PROGRAM

To gauge a better understanding of public needs, the Fulton Public Library System held a series of community meetings and business roundtables that invited local stakeholders to voice their suggestions for the library's future.

From these conversations, several common themes emerged that guided the renovation plan. The first overarching principle was that the library should be what the community needs without a preconceived agenda. Others included but were not limited to:

- The desire for an abundance of natural light to transform the existing interior from darkness to light.
- A building of distinction that is a showcase of where people want to be.
- Flexibility to support rapidly changing programs.







DESIGN ELEMENTS ONCE LOST TO TIME, INCLUDING THE CENTRAL STAIRCASE, ROOF TERRACE AND ROUND SKYLIGHTS, ARE NO LONGER RELICS OF THE PAST BUT DESIGN-DOMINATING FEATURES THAT ADD INTEREST TO THE SPACE.

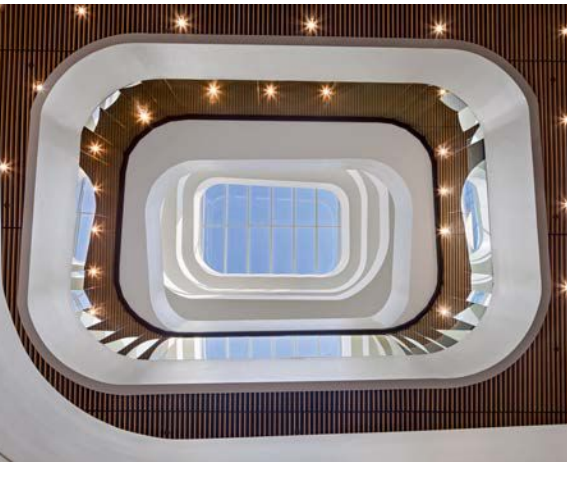


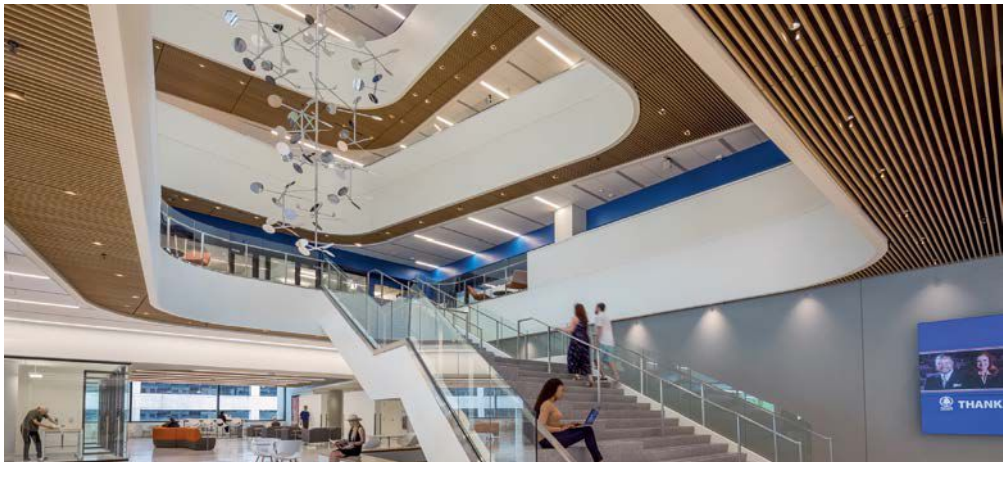
BEFORE

BEFORE PHOTOS: **CHRISTOPHER BIVENS**



BEFORE





- Sustainability and environmental consciousness.
- Improved street-level engagement.

With this guiding framework in mind, Cooper Carry conceived a design strategy to utilize technology; introduce windows; reallocate space; improve wayfinding; bring mechanical systems up to code; and activate the exterior plaza to create a more comfortable, safe, accessible and functional building from the outside in—all while taking care to honor the integrity of the historically significant design.

PROGRAM RESOLUTION

The composition of windows in the original design caused the building to appear stark and uninviting to some while, to others, it was a compelling sculpture of depth and shadow. To balance these differing perceptions, Cooper Carry worked with Pattern r+d to conduct an in-depth daylight analysis to determine the appropriate percentage of Spatial Daylight Autonomy (sDA) to increase natural light and control glare while respecting the iconic form of the building. The team found that the introduction of windows to existing recessed planes significantly improved daylight access, helping to create a brighter interior and a more welcoming presence.

Another challenge of the library's interior was that it was underutilized and difficult to navigate, leaving many of Breuer's design signatures hiding in plain sight. The design team opened space to put these elements, including a distinct sculptural staircase and waffle slab ceiling and skylights that occupy the center of the building, on display by relocating the original central service elevator that was in the way. As an integral piece of the reimagination, Breuer's preserved stairwell is better connected to the main entry through the addition of a new grand stairwell. Opening up the core of the building also had the effect of bringing in natural light to the atrium while serving as a smoke exhaust pathway, which was a necessary mechanical change to the building's life-safety systems.

Lbrarians also advocated for a more flexible and efficient design that would enhance programming. In response, Cooper Carry integrated a variety of new seating and meeting spaces working with Hillsman, the furniture, fixtures and equipment selection consultant. The plan included colorful, reconfigurable seating and table arrangements, as well as an elevated wayfinding program. The team also introduced artist studios/makerspaces as an onsite, public resource for patrons. Excess library space following the renovation is being allocated to future ventures, businesses and services that meet the needs of Fulton County and the community.

To better welcome pedestrians and improve universal access and safety, the library's revamped exterior plaza is activated with more lighting, video information display, and spaces to meet and gather. The goal is to extend the library's footprint into

Cooper Carry worked with Pattern r+d to conduct an in-depth daylight analysis to determine the appropriate percentage of Spatial Daylight Autonomy (sDA) to increase natural light and control glare while respecting the iconic form of the building.

RETROFIT TEAM

ARCHITECT OF RECORD // Moody Nolan, moodynolan.com

DESIGN ARCHITECT AND LANDSCAPE ARCHITECT // Cooper Carry, www.coopercarry.com

ASSOCIATE ARCHITECT // Vines Architecture, www.vinesarc.com

CIVIL ENGINEER // Long Engineering, www.longeng.com

MEP/FP ENGINEER // Newcomb & Boyd, www.newcomb-boyd.com

STRUCTURAL ENGINEER // Sykes Consulting, sykes-consulting.com

GENERAL CONTRACTOR // Winter Johnson Group, winterjohnsongroup.com

DAYLIGHTING CONSULTANT // Pattern r+d, patternrd.com

METAL PANEL INSTALLER // Bristol Engineered Metals, bristol-eng-metals.com

ELEVATOR CONSULTANT // Lerch Bates, www.lerchbates.com

FURNITURE, FIXTURES AND EQUIPMENT SELECTION CONSULTANT // Hillsman, hillsmaninc.com

ACOUSTICAL CONSULTANT // Thorburn Associates, ta-inc.com

WATERPROOFING CONSULTANT // Raymond Engineering, raymond.global

SUSTAINABILITY CONSULTANT // Epsten Group, epstengroup.com

WAYFINDING AND SIGNAGE CONSULTANT // EYP, www.eypae.com





MATERIALS

METAL WALL PANELS // IMETCO, www.imetco.com

GLASS // Viracon, www.viracon.com, and Trulite, www.trulite.com

WINDOWS // EFCO, www.efcocorp.com

BIFOLD DOOR // Kawneer, www.kawneer.com

SKYLIGHT // Kingspan Light + Air, www.kingspan.com

DOORS // Oshkosh Door Co., oshkoshdoor.com

FIRE PROTECTION // Reliable, www.reliablesprinkler.com; Victaulic, www.victaulic.com; Anvil International, www.asc-es.com; and Viking, www.vikinggroupinc.com

CEILINGS // USG, www.usg.com, and Tectum, www.tectum.com

PARTITIONS // ASI Accurate Partitions, asi-accuratepartitions.com

FLOORING // Stonhard, www.stonhard.com; Mannington Commercial, www.manningtoncommercial.com; Ceramic Technics LTD, ceramictechnics.com; Tandus, commercial.tarkett.com/en_US/brand/tandus-centiva; Armstrong Flooring Inc., www.armstrongflooring.com; and Doyle Dickerson Terrazzo Inc., doyledickersonterrazzo.com

FABRIC WALL PANELS // Designtex, www.designtex.com, and Carnegie Xorel, carnegiefabrics.com

THEATER SEATS // KI, www.ki.com

TELESCOPIC SEATING // Audience Systems, www.audiencesystems.com

LIGHTING (INTERIOR AND EXTERIOR) // Focal Point, www.focalpointlights.com; Beta-Calco, betacalco.com; Corelite, www.cooperlighting.com/global/brands/corelite; Portfolio, www.portfoliolighting.net; Neo-Ray, www.cooperlighting.com/global/brands/neo-ray; LUMU, lumu.io; McGraw Edison, www.cooperlighting.com/global/brands/mcgraw-edison; Spectrum Lighting, www.speclight.com; Tivoli, tivolilighting.com; Acclaim Lighting, acclaimlighting.com; BEGA, www.bega-us.com; and Teron Lighting, teronlighting.com

BIFOLD DOOR FRAME/MECHANISM // Schweiss, www.bifold.com

ROLLER SHADES // Draper, www.draperinc.com

LANDSCAPE FURNISHINGS // Dero, www.dero.com

ANCHORING SYSTEMS // Platipus Earth Anchoring Systems, platipus.us

METAL CASTINGS // Iron Age Designs, www.ironagegrates.com

PAVERS // Belgard, www.belgard.com





On the previously underutilized fifth-floor outdoor terrace and surrounding event space, visitors will now discover the addition of comfortable gathering hubs that encourage library patrons to move outside the confines of the traditional library and interact with the world around them.

the urban fabric and draw outsiders into the building.

On the previously underutilized fifth-floor outdoor terrace and surrounding event space, visitors will now discover the addition of comfortable gathering hubs that encourage library patrons to move outside the confines of the traditional library and interact with the world around them. Looking ahead, flex spaces, like the terrace and adjacent auditorium with telescoping seating and a large operable glass door, could be used as an income-generating venue for events—further helping the library to sustain its mission.

EPILOGUE

The Central Library officially reopened to the public last fall, reclaiming its place as a crucial fixture for downtown Atlanta. Serving as a "third place" for Atlantans, people from all walks of life are able to come together and experience the joys of discovering something new. As a critical community resource, the library is now a reflection of downtown's changing urban landscape and a harbinger of a positive shift from a business district into a thriving destination for locals and visitors alike.

Strategic interventions—from facilitating more daylight access for library staff and patrons to enlivening the streetscape to encourage activity at the base of the building—have given the library a new lease on life while honoring Breuer's last work. Design elements once lost to time, including the central staircase, roof terrace and round skylights, are no longer relics of the past but design-dominating features that add interest to the space.

As the Central Library enters a new chapter, its past will continue to inform its future.



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MODERNIZED FOR THE NEXT CENTURY



WRITTEN BY | ANNA ORLANDO AND LEOPOLDO VILLARDI

Last autumn as Yale University students returned to campus in New Haven Conn., the Schwarzman Center opened its doors. The timing couldn't have been better: This new student center created a social hub for an expansive community of undergraduate, graduate and professional students, as well as faculty, staff and alumni, many of whom were reuniting in person for the first time in more than a year. The project is the result of Robert A.M. Stern Architects' (RAMSA's) remarkable transformation of the north wing of the Bicentennial Buildings, an L-shaped structure comprised of the adjoining Commons (along Grove Street), Woosley Hall (along College Street) and Memorial Hall (connecting the two buildings at the corner). As the name suggests, the buildings were built in 1901, honoring the 200th anniversary of Yale's founding, but the buildings did far more than just celebrate a moment.

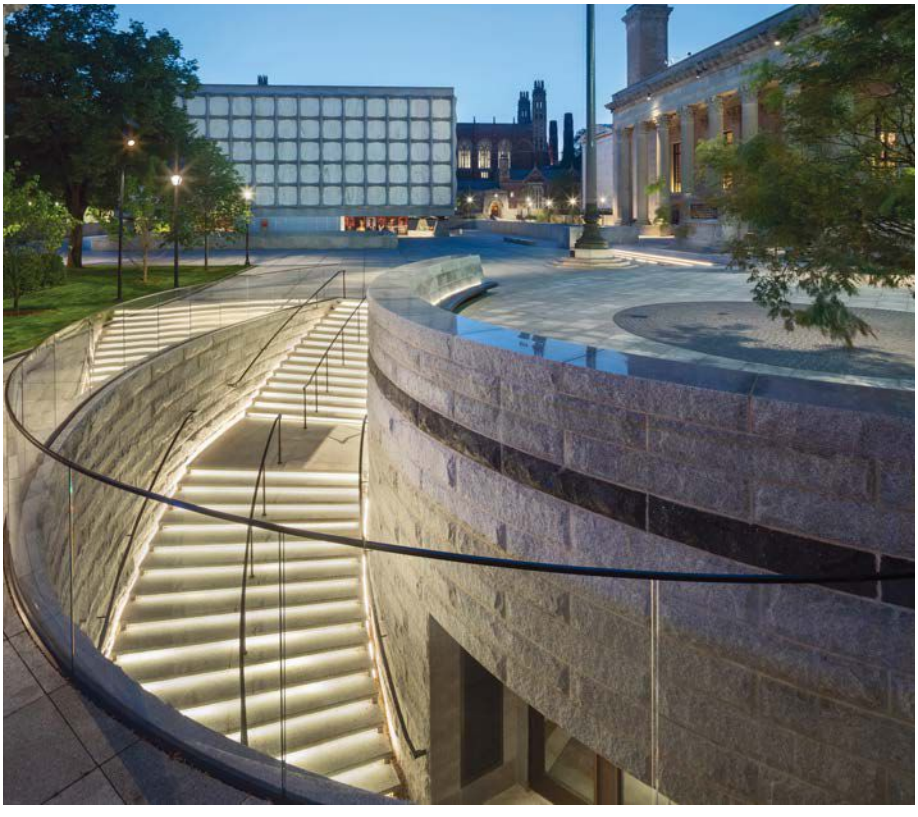
"Historically, this is a very significant location," says RAMSA Partner and Design Lead Melissa DelVecchio. "Not only are the Bicentennial Buildings at the geographic heart of Yale's campus, but they have always been symbolic of a unified academic community. They were the first new facilities built after Yale College merged with the Sheffield Scientific School, helping to bring together different groups of students—and our renovation advances that original purpose even more."

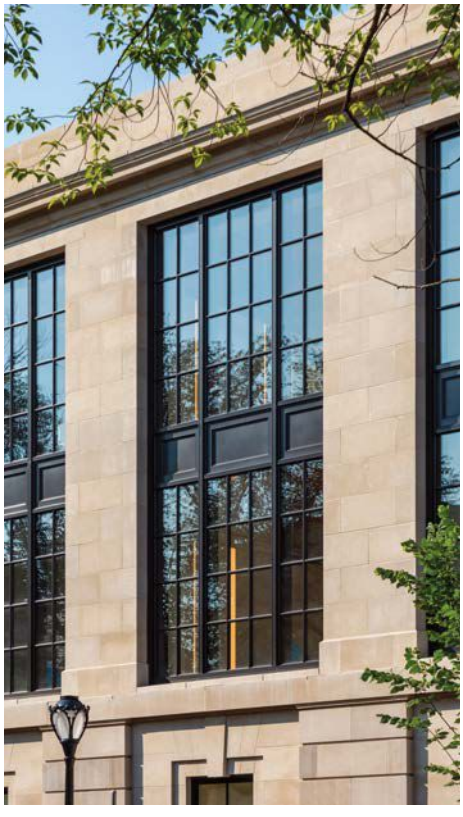
The subtle and inventive rehabilitation by RAMSA preserves the historic character of the Bicentennial Buildings, revitalizes underused areas and introduces sensitively designed new spaces (underground and within an annex), ensuring that the new Schwarzman Center will continue to serve the Yale community through its next centennial.

MAGIC IN THE DETAILS

For generations, the historic rooms in the Bicentennial Buildings played important roles during commencement exercises and class reunions, making them a beloved part of the Yale experience. Of the many

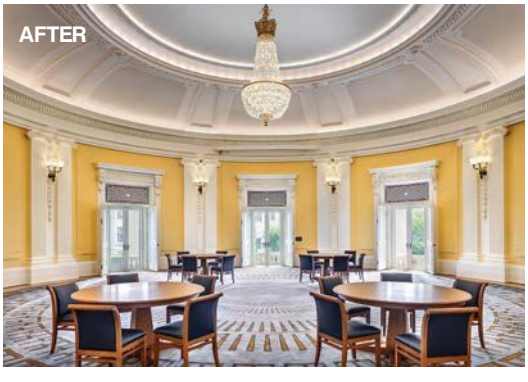
YALE'S NEW STUDENT CENTER FOR CULTURAL PROGRAMMING AND STUDENT LIFE IS BUILT UPON A HISTORIC LEGACY

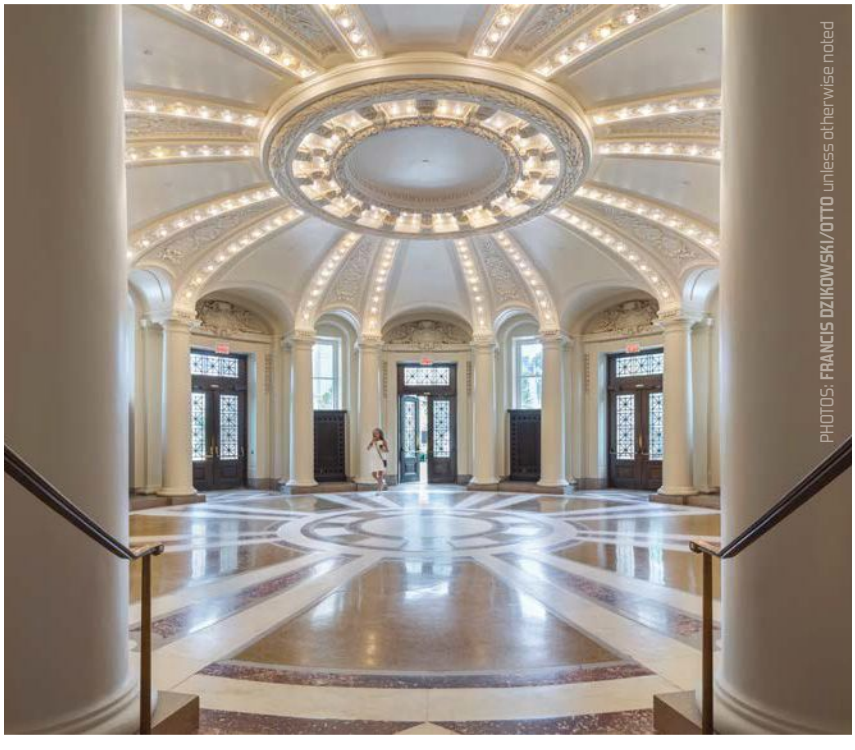






BEFORE PHOTOS: ROBERT A.M. STERN ARCHITECTS STAFF





PHOTOS: FRANCIS DZIKOWSKI/OTTO unless otherwise noted

FOR GENERATIONS, the historic rooms in the Bicentennial Buildings played important roles during commencement exercises and class reunions, making them a beloved part of the Yale experience. Therefore, designers paid special attention to ensure that modern interventions would largely go unseen and to carefully preserve historic elements—in essence creating a time-tested yet well-maintained appearance.

RETROFIT TEAM

ARCHITECT // Robert A.M. Stern Architects, www.ramsa.com
- Robert A. M. Stern, senior partner
- Melissa DelVecchio, partner in charge
- Graham S. Wyatt, partner
- Jennifer L. Stone, partner
- Kurt Glauber, associate partner/manager
- Ken Frank, senior associate
- Marianna Monfeld, preservation specialist
- Shawn McCormick, interior designer

STRUCTURAL ENGINEER // Robert Silman Associates, www.silman.com

CIVIL ENGINEER // Langan, www.langan.com

MEP ENGINEER // AKF Group, www.akfgroup.com

GENERAL CONTRACTOR // Dimeo Construction Co., www.dimeo.com

LIGHTING CONSULTANT // L'Observatoire International, lobsintl.com

ACOUSTIC CONSULTANT // Jaffe Holden, www.jaffeholden.com

THEATER DESIGN CONSULTANT // Fisher Dachs Associates, fda-online.com

SUSTAINABILITY CONSULTANT // Atelier Ten, www.atelierten.com

FOOD SERVICE CONSULTANT // Ricca Design Studios, www.ricca.com

CABINETWORK AND CUSTOM WOODWORK // Millwork One Inc., www.millworkone.com

MILLWORK RESTORATION AND MODIFICATION // Whitehawk Construction Services Inc., www.whitehawkconstruct.com

WOOD TRUSS, PLASTER AND BRICK HISTORIC PRESERVATION AND RESTORATION // John Canning, johncanningco.com

GRG PLASTER REPLICATIONS // Century Drywall Inc., www.centurydrywallinc.com

components that collectively comprise the Schwarzman Center project, perhaps the restoration of the ornate dining hall known as the Commons is the crowning achievement. RAMSA returned this timber-trussed refectory with 66-foot-tall ceilings, which was in urgent need of repair, including complete replacement of its floor structure, to its former grandeur while bringing it into the 21st century. But one needs to look closely to fully appreciate the team's work; the magic is in the details.

Designers paid special attention to ensure that modern interventions would largely go unseen and to carefully preserve historic elements—in essence creating a time-tested yet well-maintained appearance. "We restored spaces with the lightest touch possible to retain their historic patina and character," DelVecchio says. Gentle cleaning of walls and ornamentation removed a century of soot, and similar treatment of the ceiling trusses revealed long-forgotten decorative paintings. Thoughtfully integrated lighting and audiovisual equipment make it possible for the first time to convert the dining hall into a state-of-the-art, broadcast-ready concert venue. But the biggest (and perhaps most welcome change) to the Commons is invisible: the addition of heating and air-conditioning systems.

Integrating modern HVAC systems into the more than 100-year-old building without disrupting architectural character was no easy feat. RAMSA carefully removed, restored, reconfigured (to add hidden access points), and reinstalled original millwork to conceal new HVAC equipment, which was installed by carving ductwork paths into the 30-inch masonry bearing walls while the wood panels were in the shop.

The Commons was also optimized for performance. Acoustic panels, made of a microperforated wood that looked nearly identical to the original ceiling, were installed between purlins. A new theatrical catwalk, intended for the installation of performance lighting and other theatrical rigs, is camouflaged among the ceiling trusses. Historic light fixtures were updated with LED lamps; additional light sources were added to accentuate architectural details; and the original chandeliers were retrofitted with the ability to be raised and lowered accordingly.

And the floor structure in need of complete replacement? The RAMSA team turned this obstacle into an opportunity to recuperate valuable square footage underground.

GIVING OLD SPACES NEW LIFE

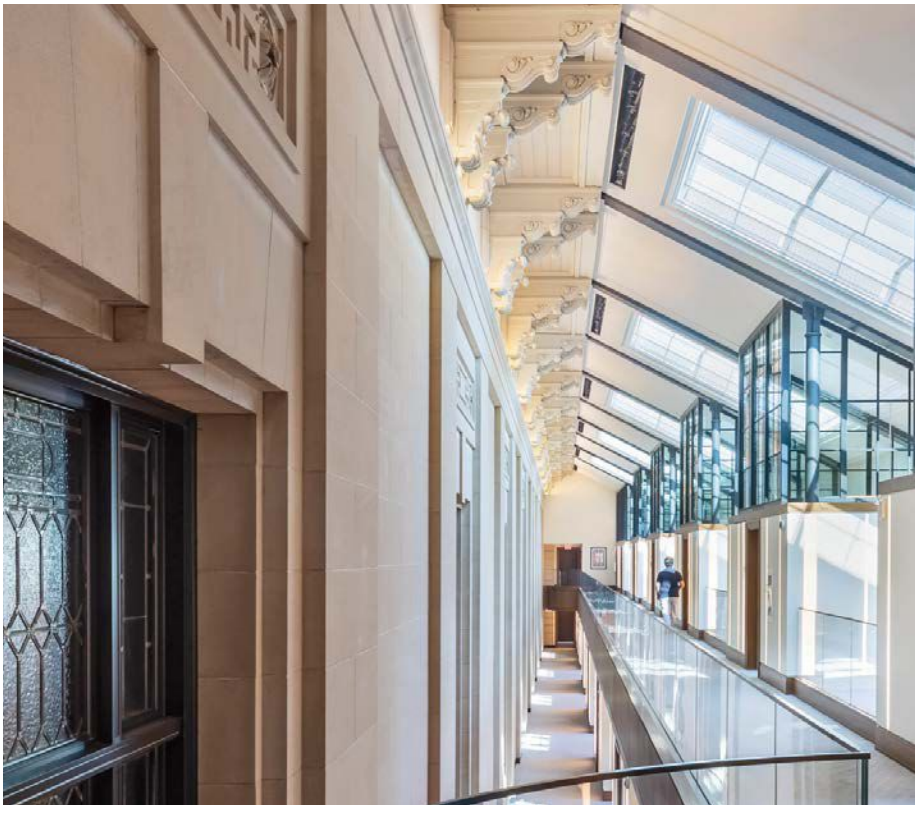
Imaginative design thinking and strategic phasing makes the Schwarzman Center a great example of contemporary building rehabilitation. While the floor of the Commons was removed, the basement level below it was dug 30-inches deeper—a delicate and complex affair. "Every time a wall was opened or a floor was removed, a new challenge emerged," DelVecchio points out. But the excavation effort was worth helping Yale make full use of the building; RAMSA was able to reuse the basement level for new food service and performances.

Below the Commons, service areas were reclaimed to create a sophisticated rathskeller for more casual dining with flexible seating, nooks, working fireplaces and a stage. Underneath Memorial Hall's rotunda, the original Stony Creek granite foundation walls were exposed to form a circular room that now serves as an on-campus pub. Adjacent to these spaces, underground additions were built to accommodate dance, art installations and a food market called The Bow-Wow—named after Yale's mascot, a bulldog. These areas can be accessed through the building or directly from a new sweeping exterior stair in Hewitt Plaza, a historically significant civic space on Yale's campus that also features artwork by Alexander Calder and Isamu Noguchi.

On the ground level, RAMSA restored Memorial Hall's rotunda and its alumni war memorial (the ceiling of which had been painted a dark midnight blue), but the team found restorative opportunities on the upper floors, as well. Over the years, many of these spaces had fallen into a state of disrepair, warranting painstaking preservation techniques but also making them ripe for programmatic reinvention. For example, lost plasterwork in the President's Room was reconstructed while adjacent curving corridors were given new life as exhibition galleries. The once-grand space beneath Memorial Hall's signature dome, which had been broken up into small offices and used by Yale's yearbook staff for about 40 years, was cleared and repurposed as a flexible experimental performance space, offering up the ability to watch productions in the round.

SENSIBLE ADDITIONS TO HISTORIC BUILDINGS

Along Grove Street, a subtle new annex blends in with the existing building—quite intentionally. This addition, inspired by an unbuilt proposal designed by Carrère & Hastings (the

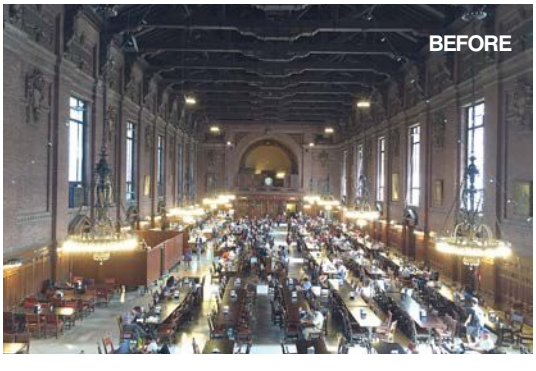


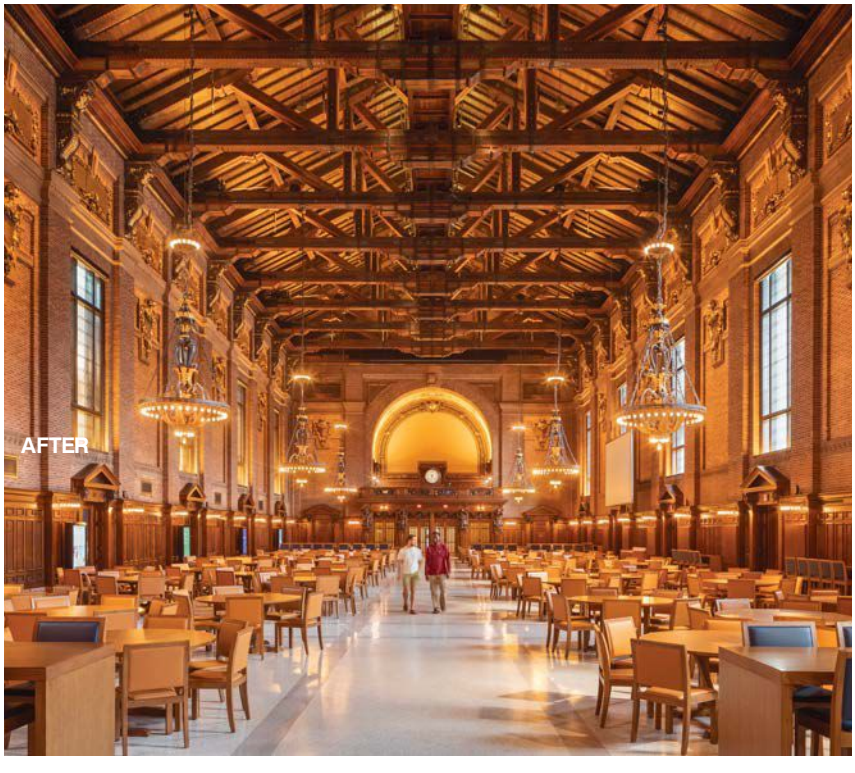


ALONG GROVE STREET, a subtle new annex blends in with the existing building—quite intentionally. This addition, inspired by an unbuilt proposal designed by Carrère & Hastings (the Bicentennial Buildings' original architect), replaced a 1-story kitchen and takes advantage of narrow proportions by punctuating two floors of offices and meeting rooms with a mezzanine level and double-height student lounges.









RAMSA'S CROWNING ACHIEVEMENT may very well be the restoration of the ornate dining hall known as the Commons. The timber-trussed refectory with 66-foot-tall ceilings, which was in urgent need of repair, including complete replacement of its floor structure, was returned to its former grandeur while bringing it into the 21st century.

MATERIALS

CRUCIFORM COLUMNS AT GROVE ADDITION // Shepard Steel Co. Inc., shepardsteel.com
INDIANA LIMESTONE AND MILFORD PINK GRANITE // Quarra Stone Co. LLC, www.quarrastone.com
AIR VAPOR BARRIER // BlueSkin from Henry Co., henry.com
BATTEN-SEAM METAL ROOFING // Freedom Gray Copper from Revere Copper Products Inc., reverecopper.com
ALUMINUM FRAME REPLICA WINDOWS // Apogee Enterprises Inc., www.apog.com/wausau
LEAD CAMING FOR WINDOWS // Rohlf's Stained & Leaded Glass Studio, rohlfstudio.com
GLASS // Solarban 60 from Vitro Architectural Glass, vitroglazings.com, fabricated by Oldcastle BuildingEnvelope, obe.com
ELECTROCHROMIC GLASS // SageGlass, www.sageglass.com
SKYLIGHTS // Acurlite Structural Skylights Inc., acurlite.com
BRONZE DOORS // Ellison Bronze Inc., www.ellisonbronze.com
WOOD DOORS // Stile & Rail Doors from The Maiman Co., architectural.masonite.com
STC DOORS // QuietStar Industries, www.quietstarindustries.com
DOOR HARDWARE // ASSA ABLOY, www.assaabloy.com
CUSTOM REPLICA DOOR PULLS // Rockwood Architectural Pulls from ASSA ABLOY, www.assaabloydooraccessories.us/en/products/architectural-pulls
CUSTOM REPLICA DOOR LEVERS // Sargent Manufacturing Co., ASSA ABLOY, www.sargentlock.com
WOOD ACOUSTICAL CEILING PANELS // SoundPly from Navy Island Inc., navyisland.com
ACOUSTICAL CEILINGS // BASWA Phon from BASWA Acoustic, www.baswana.com
SPECIAL SURFACING // StarSilent Acoustic Plaster from Pyrok Inc., www.starsilent.com
GRG PLASTER REPLICATIONS // Plasterform, www.plasterform.com
OPERABLE ACOUSTIC WALL // Skyfold Classic 60 from SkyFold Inc., skyfold.com
GLASS PARTITIONS // LAMA Aluminum Frames from Modernus, modernus.com/lama
CUSTOM DINING FURNITURE // Eric Brand Furniture, www.ericbrand.com
LOUNGE FURNITURE // Bernhardt Design, bernhardtdesign.com
HISTORIC RESTORATION, REPLICATION AND CUSTOM LIGHTING // Grand Light LLC, grandlight.com
ELEVATORS // KONE, www.kone.us







WHILE THE FLOOR of the Commons was removed, the basement level below it was dug 30-inches deeper to create a sophisticated rathskeller for more casual dining with flexible seating, nooks, working fireplaces and a stage. Underneath Memorial Hall's rotunda, the original Stony Creek granite foundation walls were exposed to form a circular room that now serves as an on-campus pub.

Bicentennial Buildings' original architect), replaced a 1-story kitchen and takes advantage of narrow proportions by punctuating two floors of offices and meeting rooms with a mezzanine level and double-height student lounges. Large clerestory windows and streamlined details provide a visual contrast with the existing neoclassical limestone façade that now doubles as an interior wall, and skylights throughout the annex ensure the Commons still receives natural light from the north (while emitting a gentle glow in the evening).

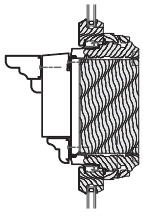
As in much of the Schwarzman Center, the annex is outfitted with state-of-the-art technology that enables virtual connection to extend the reach of the Schwarzman Center's programming beyond campus to alumni, students abroad and the broader public. The annex and historic buildings are also fully accessible for the first time; two sets of public elevators have been added, along with ramps that connect Hewitt Plaza with the surrounding sidewalks.

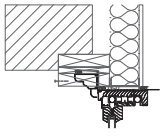
ONE YALE

The Schwarzman Center is an expert and welcome addition to Yale's campus, which comes as no surprise given that it is RAMSA's third project for the university. Like the firm's designs for the Greenberg Conference Center and Paul Murray and Benjamin Franklin Colleges, the center preserves the integrity of Yale's campus traditions while meeting the needs of a modern institution and its students.

The project embodies what Yale President Peter Salovey has called his "One Yale" vision, which aims to foster interdisciplinary collaborations between schools, departments and programs. "It's been an honor to work with my alma mater to restore and reinvent Yale's Bicentennial Buildings," DelVecchio says. The project will importantly "enrich student life and build lasting new bridges across Yale's community for generations to come."







Preserving the past, building the future.

As Public School 186 in Harlem, New York, eclipsed 30 years of abandonment, its iconic architecture was in serious jeopardy. Dattner Architects and the Pella Architectural Solutions team worked together to bring new life to the building with custom solutions for complicated needs. Using old photos and architectural remnants found inside, Pella preserved the historical accuracy while adding modern innovations and durability.

FROM REMNANTS TO RESTORATION.

VIEW A VIDEO

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pella.com/historicalsolutions

Saieh Hall for Economics creates a bold new environment for interdisciplinary economics research, teaching, collaboration and global outreach at the University of Chicago. This project establishes a new four-building academic precinct while minimizing new footprint, repurposing historic resources and reclaiming underutilized property. The design by Ann Beha Architects, now Annum Architects, extends the historic quad, renewing and transforming existing buildings in an expanded landscape, and revives a once-neglected and isolated city street, knitting the complex into the campus fabric.

Located in the Hyde Park-Kenwood Historic District, which is on the National Register of Historic Places, this project transformed the former Chicago Theological Seminary and the full city block in which it is embedded into an exceptional setting for learning and teaching. The design preserves and reconsiders the most historically significant spaces as unique academic resources. The project integrates a range of building typologies connecting its focal point, the historic block-long Theological Seminary, to a new 38,000-square-foot research pavilion and two renewed early 20th century historic houses. The transformation illustrates respect for neighborhood scale and texture, opening the site to improve safety and create new pedestrian-friendly outdoor spaces.

INTEGRATED PLANNING

The university acquired the seminary in 2008, and it was in dire need of renewal and revival with an extensive amount of deferred maintenance needs. With its liturgical and dormitory spaces, the full-block building was adjacent to but set apart from the university—walled off from the street and campus. The project commenced with an integrated planning process to determine university needs, define project goals and establish a program that would fit on the site.

The design addressed a broad constituency—students, faculty, administrators, and the local community and neighborhood. The team analyzed needs and future growth, preservation requirements, technical conditions, budgets, regulatory implications and creative possibilities.

Following months of collaborative workshops, a 150,500-square-foot program was established, accommodating 130 faculty and staff members, 200 graduate and 1,200-1,400 undergraduate students. Bringing students that were previously dispersed in several buildings back to a central location on campus was a clear goal, as was creating opportunities for interdisciplinary interaction and joint program uses.

With an established program, the planning and design challenge became how to accommodate 150,500 square feet of program with the existing 90,000-square-foot seminary building. The areas surrounding the seminary



PHOTOS: **TOM ROSSITER** unless otherwise noted

THE PROJECT INTEGRATES A RANGE OF BUILDING TYPOLOGIES CONNECTING ITS FOCAL POINT, THE HISTORIC BLOCK-LONG THEOLOGICAL SEMINARY, TO A NEW 38,000-SQUARE-FOOT RESEARCH PAVILION AND TWO RENEWED EARLY 20TH CENTURY HISTORIC HOUSES.



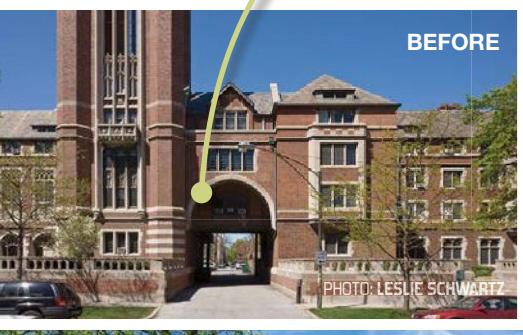
FOUND SPACE

A FORMER SEMINARY IS INTEGRATED INTO THE UNIVERSITY OF CHICAGO AS A DISTINCTIVE DEPARTMENT OF ECONOMICS

WRITTEN BY | **KATHLEEN GERNER, AIA, LEED AP**













building—the "shoulders" of the site—were studied to find the space needed to fit the entire program.

To accommodate the full desired program, expansion was necessary but, with a constrained site, options were limited. Below-grade construction served as an effective and sustainable expansion strategy—resulting in a 90-seat classroom with natural light without new footprint. Excavated mechanical areas relieve the seminary building of extensive renovations for infrastructure, giving space back to programs and preserving the original building. At the former attic level of the seminary building, underutilized storage space was repurposed to accommodate dedicated workspace for more than 75 graduate students, allowing them to work and research collectively in the same building as faculty.

With the support of the city and neighborhood, the final design, which emerged from months of interface and dialogue, addressed additional project goals: sustainability, alignment with the neighborhood scale and its circulation routes and passages, safety and connectivity to the larger campus. The combined initiatives explored in this project—the adaptive reuse of the seminary, strategic expansion, renovation of two historic houses, the closure of a city street and alley to through traffic, and development of the surrounding landscape and streets—work in concert to create a full new academic precinct on the site.

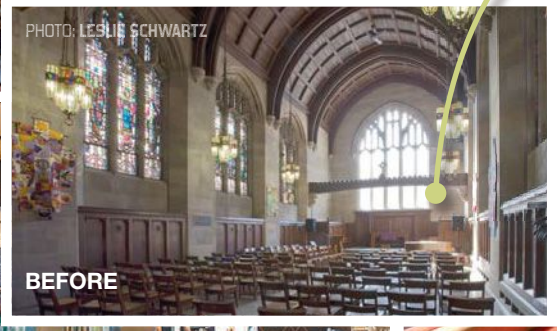
IMPLEMENTATION

The Chicago Theological Seminary building, constructed between 1923 and 1928, was included in the Hyde Park-Kenwood Historic District, which was added to the National Register of Historic Places on Feb. 14, 1979. In the historic district nomination,

HISTORICALLY, THE SEMINARY STOOD APART. NOW IT IS KNITTED INTO THE CAMPUS AND NEIGHBORHOOD, OPEN AND ACCESSIBLE. THE CITY STREET HAS BEEN TRANSFORMED FOR PEDESTRIANS. DESIGNED BY LANDSCAPE ARCHITECTURE FIRM OLIN PARTNERSHIP, MORE THAN 36,000 SQUARE FEET OF OPEN SPACE AND 50 NEW TREES WERE ADDED, ALONG WITH SMALL GARDENS SITED ALONG THE FORMER ALLEY.













THE FOUR-BUILDING COMPLEX INCLUDES A CAFÉ, LOUNGES, SEMINAR AND CLASSROOMS, OFFICES, RESEARCH AREAS AND STUDENT SPACES. THE RENOVATED HOUSES OFFER SMALL RESEARCH SETTINGS, AND NEW CONSTRUCTION IS FOLDED INTO THE COMPLEX, OFFERING RECONFIGURABLE OPEN SPACE AND HIGH-PERFORMANCE DESIGN.

Awards

Environmental sustainability is a top priority for Annum Architects and the University of Chicago. The seminary building, which was completed as the first phase of a multi-phase project, achieved LEED Gold. The second phase, the new research pavilion and houses, achieved LEED Silver. The project's core sustainability values are its retention of historic materials and its control of footprint—using excavation as a strategy for larger programs, maintaining greenspace for the campus.

Winner of the Honor Award for Excellence in Planning from the Society for College and University Planning and the Frank Lloyd Wright Honor Award from AIA Illinois, this project establishes an innovative model for campus planning, growth, sustainability, stewardship and design.

the seminary is listed as one of 222 "sites and structures of special significance". The building functioned as an active seminary until it was acquired by the university; the seminary then was relocated to a new facility.

The successful implementation of this significant project can be credited to many collaborative initiatives by the team. These included a preservation assessment; a collaborative and robust approvals process; onsite mockups during the design phase; and a partnering approach between the university, architect and construction manager. Each of these initiatives established mutual goals for a successful project.

The preservation assessment—the university's first—was developed by the design/conservator team, addressing care and mitigation for liturgical and historic elements. With the Commission on Chicago Landmarks and The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings as guidance, the assessment identified significant historic features and requirements. For example, masonry was conserved; stained-glass was repaired; and specialty wood paneling, terra-cotta tiling, historic lighting, specialty crafted flooring and limestone were renewed, adhering to set guidelines for preservation treatments. In select instances, religious elements—the organ and some liturgical stained-glass windows—were rehomed. Preservation and mitigations reflect care in reconsidering a religious building as a secular one.

Field mockups confirmed the approach for masonry repair and cleaning, replacement and improved energy performance of 307 windows, and conservation of woodwork and decorative inpainting (work performed by a conservator to reinstate damaged areas of colored/painted stone) within Guastavino vaulted spaces. Mockups were also performed for new design elements to refine detailing, differentiating new construction as distinct from existing but integrating it in a sensitive, decidedly contemporary way. For example, glass and metal respond to the masonry construction, and metal and terra-cotta cladding offset historic brick.

A partnering approach, initiated during the design phase, set mutual goals and opened communications among the university, architects and construction manager. Goals were revisited throughout the project, and

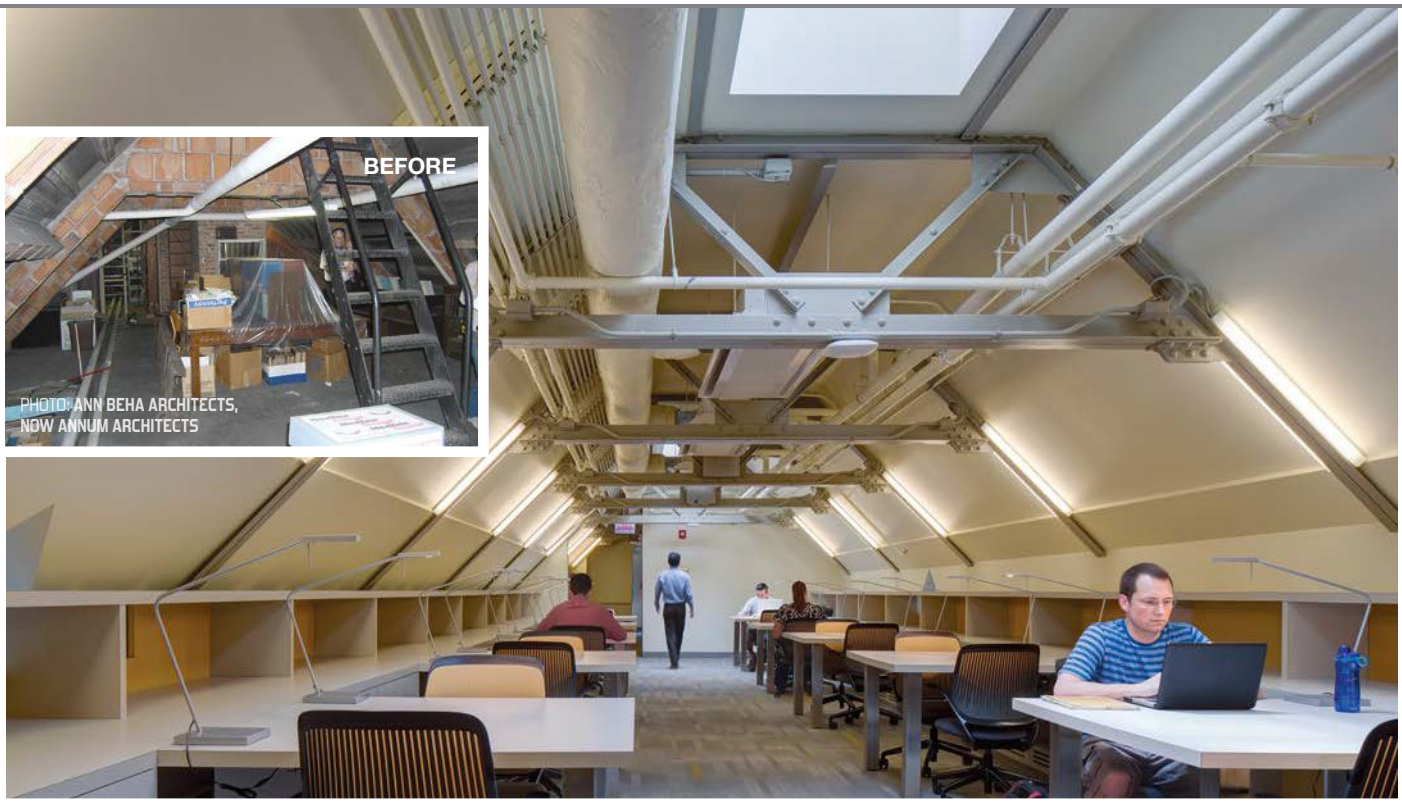
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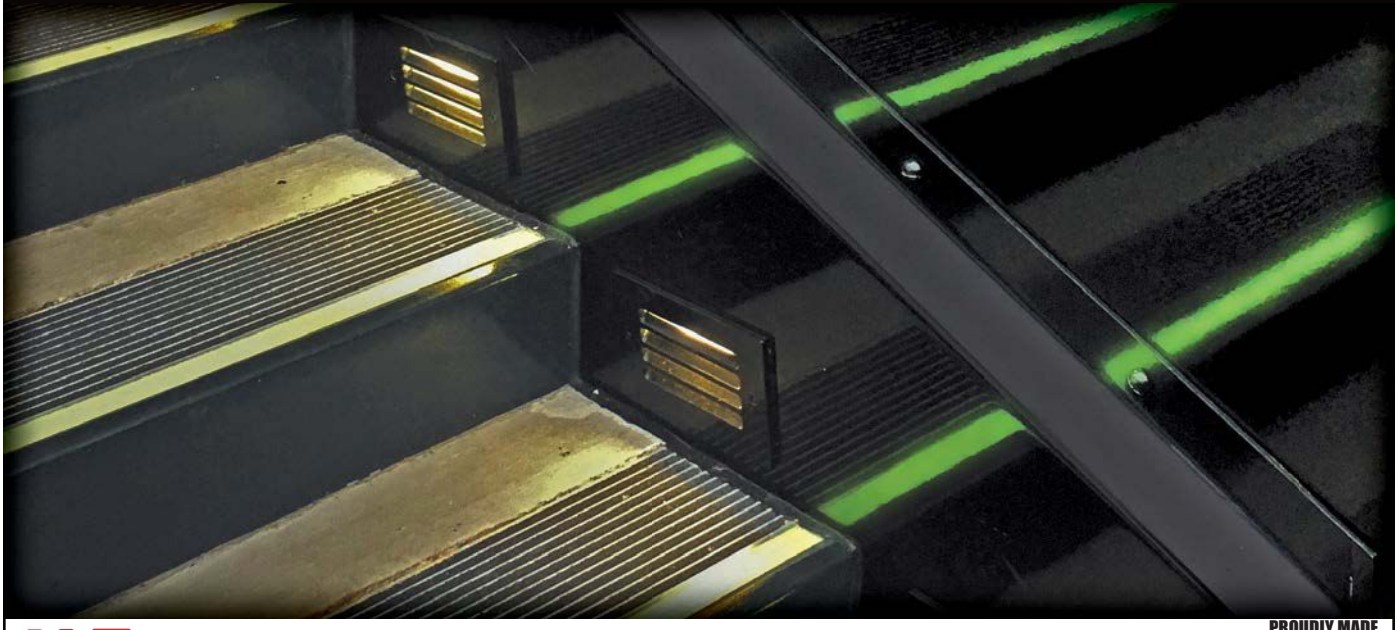
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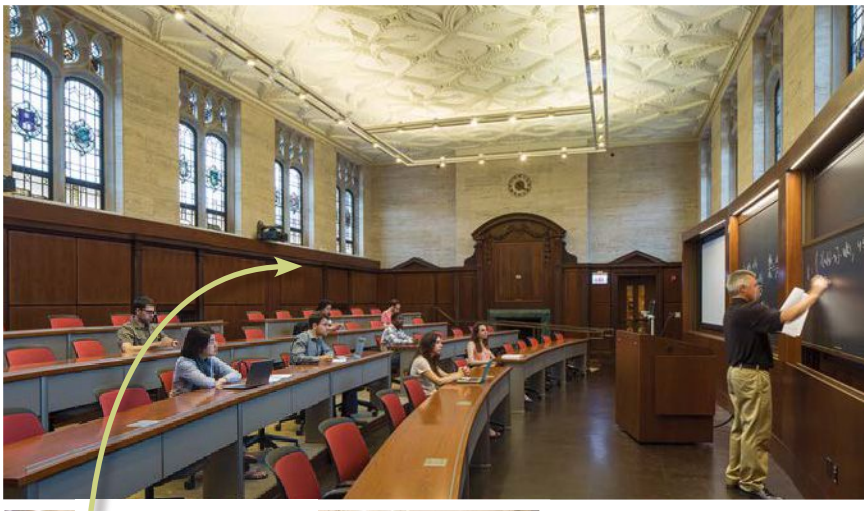
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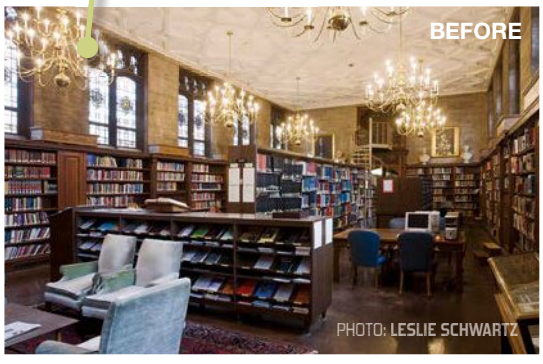
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THROUGHOUT THE PROJECT, MASONRY WAS CONSERVED; STAINED-GLASS WAS REPAIRED; AND SPECIALTY WOOD PANELING, TERRA-COTTA TILING, HISTORIC LIGHTING, SPECIALTY CRAFTED FLOORING AND LIMESTONE WERE RENEWED, ADHERING TO SET GUIDELINES FOR PRESERVATION TREATMENTS.

communications managed field issues and unforeseen conditions to maintain project schedule and budget. Constructed in two continuous phases, the project set a precedent for future campus development, balancing stewardship with optimization.

RESULTS

Historically, the seminary stood apart. Now it is knitted into the campus and neighborhood, open and accessible, creating a new identity and sense of place for its occupants within the larger campus. The city street has been transformed for pedestrians. Landscaped terraces integrate universal access. Designed by landscape architecture firm OLIN Partnership, more than 36,000 square feet of open space and 50 new trees were added, along with small gardens sited along the former alley.

The four-building complex includes a café, lounges, seminar and classrooms, offices, research areas and student spaces. The renovated houses offer small research settings, and new construction is folded into the complex, offering reconfigurable open space and high-performance design.

This campus precinct can be considered "found space". Previously an outlier, it is now open, welcoming and active and serves as a connector from the main historic campus quad and the Booth School of Business. A dispersed academic community is unified in this setting for interdisciplinary research, teaching and programs. As a model for sustainability and adaptive reuse, the project explores the interface between historic and contemporary design.

"In the clever design mix of old and new, Saieh Hall supports our needs for work and lecture space and also nurtures important spontaneous interactions between faculty, students and the leading scholars who visit us from around the world," says Lars Peter Hansen, David Rockefeller Distinguished Service Professor in economics, statistics and the college. "Our first year in the building shows that it is well suited to meet the demands of an elite research institute and a premier department of economics."



Columbus Fire Department – Training Academy
Columbus, OH
Architect: HKI Associates
ARRIS-clip Custom
Photo: Amy Carruthers

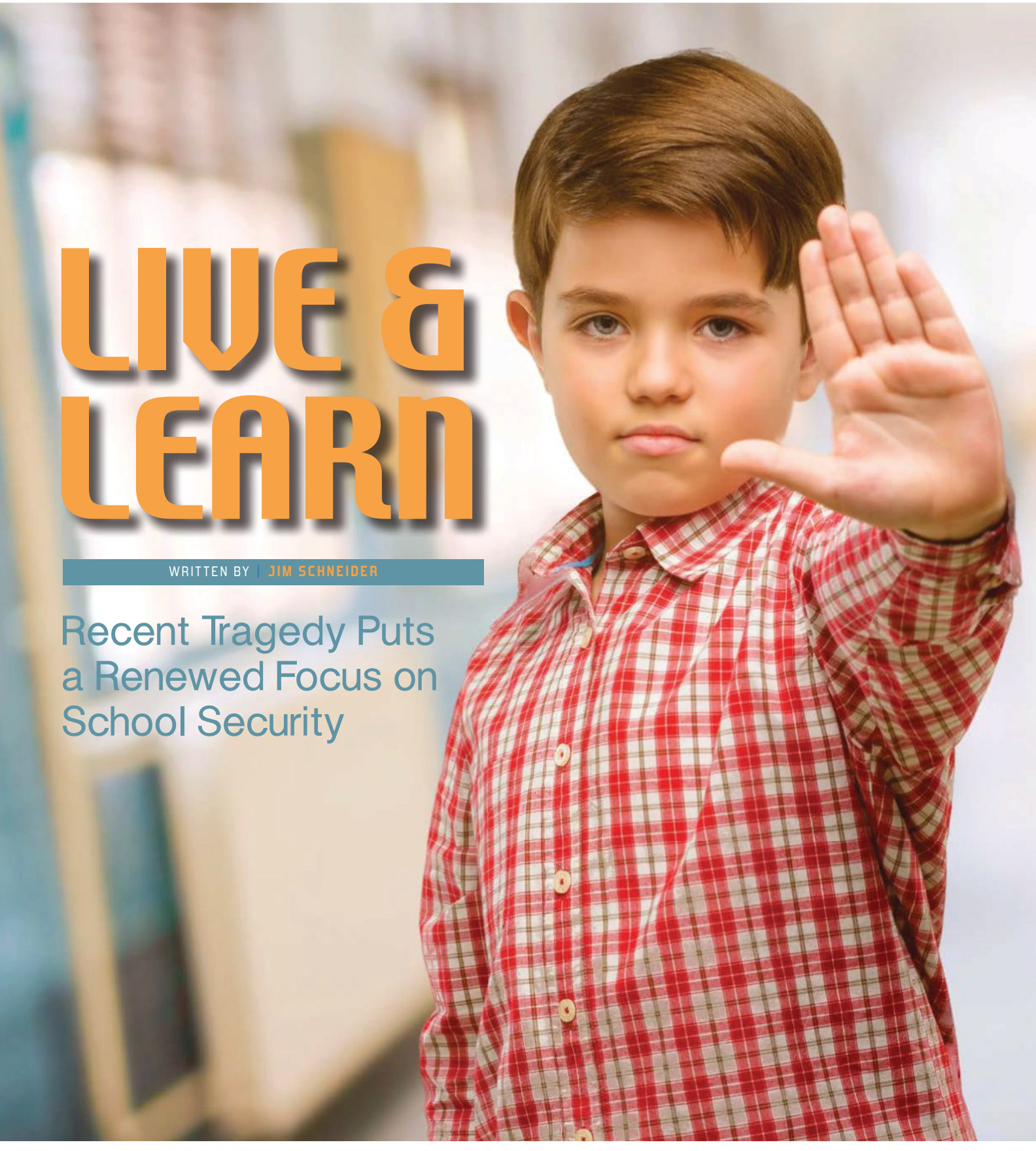
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LIVE & LEARN

WRITTEN BY | JIM SCHNEIDER

Recent Tragedy Puts a Renewed Focus on School Security

On May 24, 2022, in the small town of Uvalde, Texas, the unspeakable ocurred. A gunman armed with a powerful assault rifle walked into an elementary school and took the lives of 19 students and two teachers.

Although, sadly, these events are not unprecedented—mass shootings in public places of all kinds have become an almost daily event in the U.S.— there is always something particularly disturbing about this type of violence taking place at a school.

For parents and communities alike, schools are supposed to be sacrosanct. They are places where children go to learn and grow. Schools are supposed to be places of safety, support and positivity. They should not play host to fear and horror like the nation saw unfold in Uvalde, or in Parkland, Sandy Hook or other schools before these.

There are, of course, great debates in society at large about what to do about this issue. While there might be general agreement about the existence of the problem, there are vastly different ideas about how to tackle it. There is much work to be done on the policy level; issues of gun regulation, mental-health awareness and services, and school funding all need to be discussed and addressed to solve this problem.

While those debates churn on, what can schools do within their control to maximize the safety of their students and faculty? Every school needs to think about security and develop a plan.

People, Technology, Procedure

"The perception that 'it won't happen here' may leave facilities unprepared to manage an incident," explains Marc Donahue, director, Agency Partners Programs for EFCO and Wausau Window and Wall Systems. "Sixty-two percent of all shooter attack incidents between 1992 and 2012 happened in communities with populations under 100,000. To break that down further, 40 percent of all shootings in this timeframe were in communities with populations under 50,000 and 14 percent in communities with populations under 10,000. The sad truth is that it can happen anywhere."

"Schools are, by definition, vulnerable places," says Johnathan Tal, CEO of TAL Global Corp., an international investigative and risk-consulting firm. "Students, staff and parents have physical access, but safety resources are often limited. In public schools, the city is usually responsible for providing security, but smaller schools do not get a school resource officer (SRO). Private schools are often even more inadequate when it comes to security. Add to this the psychological impact of a school attack and the 'copy cat' syndrome and you have the perfect storm focused on a vulnerable focal point."

"In my opinion, it's a combination of issues," says Bill Herzog, CEO of Lionheart Security Services. "The fact that there is a lack of trained security or law enforcement at so many schools is a problem. In many cases it isn't so much about a lack of electronic monitoring systems. It has more to do with the fact that schools don't have a dedicated staff member who pays attention to it. If no one is monitoring the system, it does no good."

"Security is built as a three-legged stool, standing on people, technology and procedures," Tal says. "The building and security technology that comes with it, including things like access control, perimeter fences and cameras, make up one leg. But people are the key. When

RESOURCES

The following organizations provide resources and information to assist school administrators and building designers in security efforts. Several provide reports and publications that can be helpful to school administrators, and some offer guidance to schools looking for safety assessments and improvements to their security posture.

- **ASIS INTERNATIONAL**

With members in 155 countries, ASIS is an association dedicated to advancing security worldwide, promoting excellence and leadership within the profession. Visit www.asisonline.org.

- **ASSOCIATION OF THREAT ASSESSMENT PROFESSIONALS (ATAP)**

The purpose of ATAP is to afford its members a professional and educational environment to exchange ideas and strategies to address security issues. Visit www.atapworldwide.org.

- **NATIONAL ASSOCIATION OF SCHOOL RESOURCE OFFICERS (NASRO)**

This non-profit is dedicated to making schools and children safer by providing the highest quality training to school-based law enforcement officers. Visit www.nasro.org.

- **NATIONAL SAFETY SECURITY PROTECTION ASSOCIATION (NSSPA)**

This group offers technical resources that schools can reference to address security concerns. Free resources include "School Security Standard Details" and a section about active assailant measures. Visit nsspa.org.

- **PARTNER ALLIANCE FOR SAFER SCHOOLS (PASS)**

The mission of PASS is to provide school administrators, school boards, and public safety and security professionals with information, tools and insight needed to implement a tiered approach to securing and enhancing the safety of school environments based on their individual needs, nationwide best practices and making the most effective use of resources available. Visit passk12.org.

it comes to improving school security, teachers, students, staff and parents are all players that need to participate."

Assess the Situation

When it comes to building and occupant safety, every building and every environment is different. According to most experts, securing a school or most any space begins with first understanding the building and exactly what concerns need to be addressed and what risks need to be mitigated.

"There are resources available to schools and design professionals that offer building assessments by subject-matter experts," Donahue explains. "These assessments can identify and recommend solutions to address vulnerable areas of the facility and assist with developing an effective emergency response plan and provide training to administration, teachers and staff on how to properly respond when an incident happens. Assessing, implementing and training are all key areas to address to make school facilities safer."

"Schools should consider creating a threat-assessment team," Tal suggests. "These people will ensure the assessment is conducted, is complete, and will acquire resources to address the risks and hazards uncovered. From there, educate everyone, including students, staff and parents, on what to look for in terms of potential threats, what to do if one is detected and to whom to report. The policy of 'see something, say something' is critical and should apply when a threat is reported or perceived."

Assessments are often conducted by building security firms and can help schools develop appropriate strategies. (See "Resources", left, for a list of organizations that help administrators in this process.) Once these plans and policies are in place, it is important to practice them. Sadly, things like active-shooter drills have already joined fire drills and become part of the protocol most students experience, and it is important to conduct facility safety drills as part of an overarching strategy.

"I know schools are providing training and drills, but I do think it needs to be more focused on at this point," Herzog says. "There do need to be regular safety drills and conversations that take place in and out of school."

Balanced Approach

Oftentimes, following a tragic event, like Uvalde, the conversation can shift to "hardening" schools. This thinking tends to focus on more security equipment and systems at points of entry. Of course, this can be part of the solution, but it is not sufficient on its own. It works in much the same way that balanced fire design relies on multiple strategies to contain, control and prevent fires. Sprinklers alone aren't a complete solution. School security also requires a multilayered approach, and tougher doors and locks aren't enough.

"From my experience, the best electronic monitoring systems you can install or paying police officers to stand at the front doors will not solve the problem," Herzog says. "Without properly trained staff paying attention to those systems, they do no good. Staffing is extremely important, as is training."

Part of the issue in terms of people and equipment is funding. Schools are often struggling on just the basics, and security upgrades are no small expense.

"Historically, cost has been a limiting factor for many schools in addressing their security needs," Donahue says. "A building assessment can assist schools in prioritizing upgrades to address their specific needs, which can be implemented as budgets allow."

"The government is starting to finance school security following recent incidents, which should help," Tal says. "Physical security is essential, but without the other two legs mentioned earlier, the stool will not stand. We need to be putting some money into training, obtaining expertise in threat assessment and conducting drills, also."

Of course, there definitely are technologies and systems that, properly applied, can boost the security posture of a school.

"Having a camera on every possible access point and hallway is one thing," Herzog says. "Also, have alarms on doors that should not be left open. Even if the

door is locked, you can put a timer on it for a minute or two so someone can go out but the school knows if it is left open. Another thing I think can help is scanning student IDs as they come in. This could help with attendance and provide information of who is there and who is not in the event something does happen."

Standard Practice

At this point, each school and each district are essentially left to their own devices when trying to determine appropriate security measures for facilities. There is no official guidance or standardized approach.

"In response to active-shooter incidents, many states have attempted to address school safety by developing guidelines. Unfortunately, there is no consistent national standard for school security," Donahue says. "*The Whole Building Design Guide* resources on active-shooter protections cautions, 'The lack of guidance documents focusing specifically on active shooter designs will likely lead to varying levels of



NATIONAL STANDARDS COULD HELP SUPPLY SCHOOLS WITH A BLUEPRINT FOR SECURITY DESIGN, AS WELL AS PROCEDURES AND BEST PRACTICES TO FOLLOW TO BEST PROTECT THE LIVES AND HEALTH OF STUDENTS AND STAFF.

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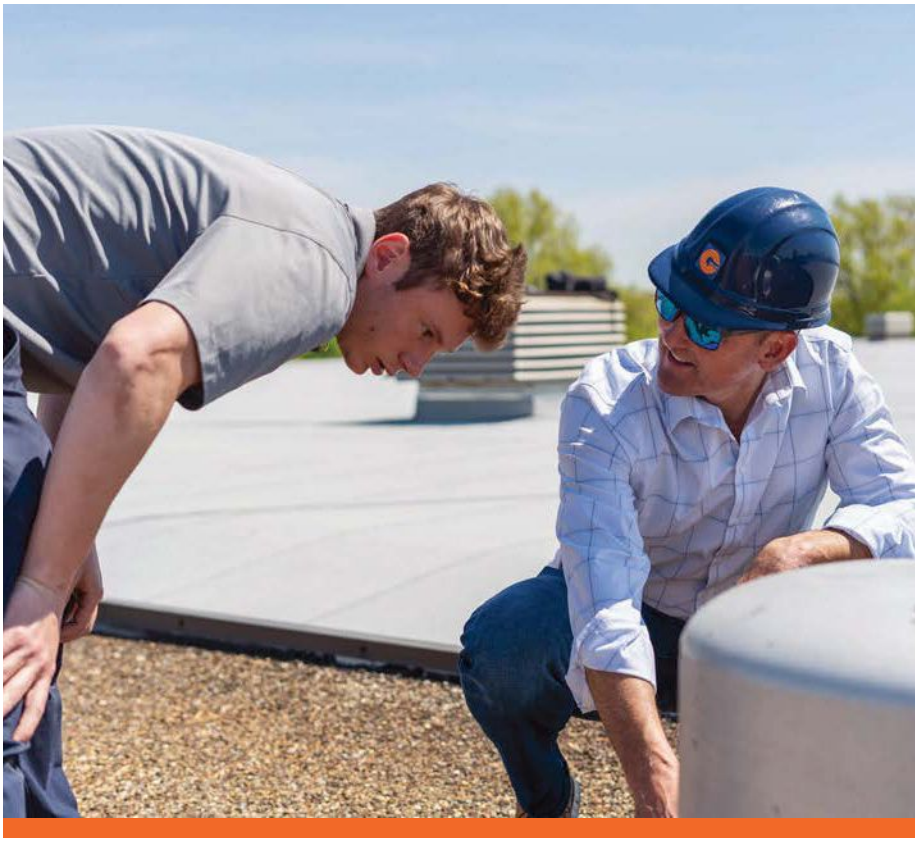
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implementing and reliance on methods and technologies which may not be as effective or cost efficient.' As national standards are developed and adopted, new standard products will become available that maximize performance, which should allow security upgrades to be more affordable."

National standards could help supply schools with a blueprint for security design, as well as procedures and best practices to follow to best protect the lives and health of students and staff.

"Organizations and manufacturers recognize the need to address school security concerns," Donahue continues. "They have been working to develop nationally recognized testing standards and developing new products to address those test standards. For example, the National Glass Association and ASTM International currently are finalizing the first national standard for addressing glazing and fenestrations for shooter attack applications. NGA recently endorsed the development of the ASTM 'Forced-Entry-Resistance of Fenestration Systems After Simulated Active Shooter Attack' test standard. This will provide the minimum industry-accepted standard for security glazing in schools."

Ultimately, all these measures, strategies and investments are necessary as long as weapons of extraordinary power are readily available to just about anyone, regardless of their record or mental state. While lawmakers and voters argue the merits of those issues and how to deal with them, schools and other public buildings are forced to prepare for the worst.

"If we are not ready to change our concepts about guns, we have no option but to take steps to protect the most vulnerable targets: schools, hospitals, shopping centers and theaters," Tal says. "This will cost us a lot, and not just in terms of money. Our way of life will change. Every entrance and every day will have us screened in ways similar to airports, government buildings and courts. Sadly, this is the tradeoff we face if we want safety when we go to school, work, to shop or seek entertainment."

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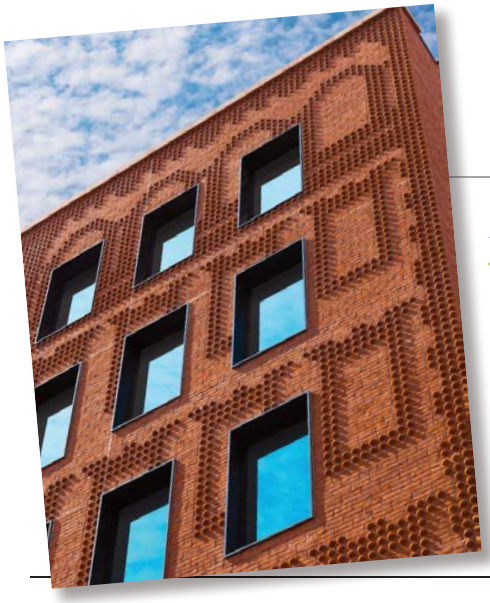
www.choosedaylight.com

ALL-ELECTRIC HOT-WATER HEATING SYSTEM IS FOR COMMERCIAL FACILITIES

Mitsubishi Electric Trane HVAC US (METUS) has released Heat$_2$O, an all-electric domestic hot-water heating system designed to improve sustainability and reduce energy consumption in multifamily buildings and large-scale commercial facilities. The Heat$_2$O heat pump water heater (QAHV-N136TAU-HPB(-BS)) reduces the environmental impact of domestic hot water through energy-efficient operation while using CO_2, a natural and environmentally friendly refrigerant with a global-warming potential of one and an ozone-depletion potential of zero. Able to produce high-volume domestic hot water without fossil fuels, Heat$_2$O can help large-scale facilities qualify for sustainability certifications or achieve zero-energy and Passive House status. Components include hot-water storage tanks, swing tanks, secondary heat exchangers and variable-speed secondary circuit pumps. Heat$_2$O transfers ambient thermal energy from outdoor air to potable water by cycling refrigerant. Natural CO_2 refrigerant enables Heat$_2$O to supply hot water up to 176 F even in low ambient conditions without burning fossil fuels.



Heat2O.com



CUSTOMIZE BRICK SHAPES FOR MODERN AND TIMELESS LOOKS

Glen-Gery, a brand of Brickworks, has made available Molded Brick and Custom Shapes. Design is in the details as Glen-Gery's molded brick offers irregularly softened edges to build character and a sense of timelessness. Depending on the needs of the project, customizable shapes are available to provide further specialization via the exterior corner, watertable, coping, bullnose, radial and custom-shape options. The collection reflects Glen-Gery's commitment to new technology that increases customizable design while honoring artisanal brickmaking methods of the past.

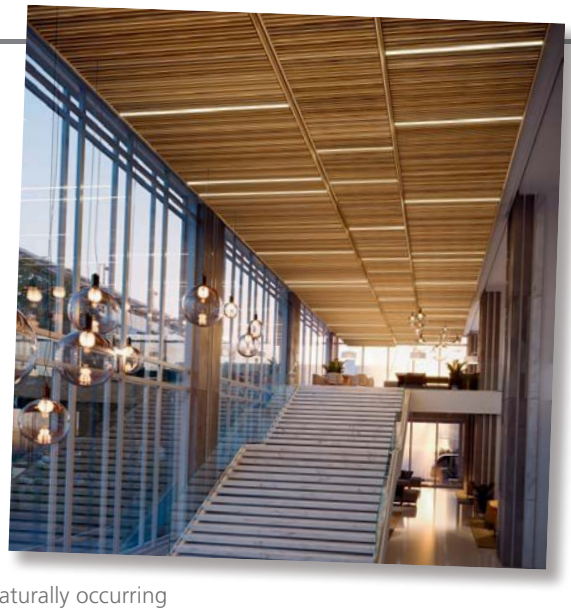
www.glengery.com



CREATE UNLIMITED PATTERNS WITH METAL WALL PANELS

The PAC-CLAD Modular AL wall panel system from Petersen empowers architects and designers to create unique metal cladding surfaces, using panels of various sizes and depths in multiple colors. Designers can choose standard panel dimensions or can define dimensions and depths to create unique, flexible and eye-catching patterns. Vertical or horizontal panels of varying sizes and depths can be combined on the same layout in cassette-style patterns. Modular AL panels can be finished in any combination of the 46 standard PAC-CLAD colors, as well as custom colors. Panels can be perforated, including in patterns that spell words and form logos, shapes or images. Installation of Modular AL panels can be performed on a variety of substrates, including plywood, insulation, purlins or any combination.

pac-clad.com



WOOD GRILLES OFFERED IN 33 STANDARD DESIGNS

With the introduction of WoodWorks Grille – Forté Ceiling and Wall Panels, Armstrong Ceiling & Wall Solutions offers the beauty of solid wood in 33 standard grille designs. Notched alignment backers improve the structure, minimizing the naturally occurring twist of solid wood. The panels, which can be installed in ceilings, walls or to create ceiling-to-wall transitions, are available in 4-, 6- and 8-foot lengths to minimize the need for customization. Coordinating solid wood trims are available in 4- and 6-inch depths. In addition, varying panel lengths and heights can be selected to create a dynamic installed visual. Five design configurations feature an open area of at least 70 percent to minimize sprinkler installation below a finished ceiling, achieving a less-cluttered visual and an open aesthetic with reduced materials cost. Custom options, including unique panel configurations and lengths and additional wood species and finishes, are also available.

armstrongceilings.com/grille



REFLECTIVE ROOF COATING STAYS CLEAN LONGER

Henry has introduced Pro-Grade 988 Silicone White Roof Coating with DPUR Technology, which helps keep roof surfaces cleaner longer. This next-generation formulation provides all the Pro-Grade 988 benefits roofing professionals have come to expect while helping prevent dirt and dust buildup to deliver long-lasting reflectivity and energy savings. Designed for professionals, Pro-Grade 988 Silicone White Roof Coating with DPUR Technology is part of a complete portfolio of Henry Pro-Grade Commercial Roof Restoration Solutions that enable cost-effective, eco-friendly alternatives to reroofing.

www.henry.com

ERGONOMIC OFFICE CHAIR IS SUITED FOR NEW WAYS OF WORKING

Herman Miller has partnered with design firm Studio 7.5 to unveil the Zeph Chair. As people across the globe settle into new ways of working, they will continue to need products in homes and office environments that are as aesthetically pleasing as they are purposeful. Zeph's sculpted monoshell seat delivers a playful nod to Herman Miller's classic Eames Shell chair. Under the seat lies hidden technology designed to deliver a seamless ergonomic experience that leverages human-centered motion. After many iterations of 3D printed prototypes, Studio 7.5 perfected a one-piece seat and back that moves with the person sitting in it. Zeph's kinematic plastic monoshell offers a natural recline that uses the sitter's pivot points to create the right counterbalance and change posture seamlessly. This allows Zeph to create a natural, fluid motion that works for all body types.

www.hermanmiller.com



HEAT PUMP REDUCES ELECTRICAL COSTS



Fujitsu General America has introduced its Split Terminal Heat Pump (STHP) HVAC series for use in multifamily housing properties. The innovative inverter-driven heat pump offers a more energy-efficient, reliable and quieter alternative to conventional Packaged Terminal Air Conditioner and Packaged Terminal Heat Pump units. STHP units boast up to a 58 percent reduction in electricity costs because they reach the set temperature fast and maintain the desired temperature for a long period of time. They provide up to a 21.3 SEER rating. Suitable for extreme weather, the systems are effective even with outdoor temperatures as low as 5 F. The systems are supported by a 10-year parts warranty. Compatible with Fujitsu's BACnet and Modbus gateways, STHP can be easily integrated into most centralized building management systems. Various remote-control options are available, including Fujitsu's free FGLair app that enables remote operation via smartphone or tablet.

www.fujitsugeneral.com

DIAPER-CHANGING TABLE SELF-SANITIZES



Pluie is the world's first and only self-sanitizing diaper-changing table for public restrooms. It is powered by a patented UV-C light system known to kill 99.9 percent of germs, including influenza, E. coli and coronavirus. The UV-C light system activates when the table is closed, sanitizing the changing surface in just 60 seconds after each use. The changing table also features a retractable safety strap that won't collect dirt when not in use, an attached diaper-bag handle to keep bags and purses from being placed on a contaminated surface, and a plush foam leak-proof cushion. The breakthrough design was named a Fast Company 2021 World Changing Idea and *TIME Magazine* Best Invention.

hellopluie.com

LVT COLLECTION IS CARBON NEUTRAL ACROSS ITS FULL LIFE CYCLE

Interface has launched its Fresco Valley collection, which integrates natural detail into three original 4.5-millimeter Sound Choice LVT styles: Cliff, Ridge and Great Heights. With designs that include rich woodgrain, rippling water and shimmering quartz looks, the collection showcases unique patterns born from nature and features sophisticated hues. Fresco Valley LVT is manufactured using processes and materials that deliver a low carbon footprint and uses 39 percent recycled content in its construction. In addition, Fresco Valley is carbon neutral across its full product life cycle through the company's third-party-verified Carbon Neutral Floors program. This means when designers select Interface flooring, they are choosing to reduce the carbon footprint of their spaces and improve the health of the planet.

www.interface.com





MATTE WASHBASINS WON'T SHOW FINGERPRINTS

Bradley Corp. has introduced Evero Matte, a quartz option with a stone-like appearance for commercial handwashing basins. With its natural matte finish, understated texture and selection of monochromatic colors, Evero Matte is suited for any modern washroom space. The washbasins are cast-formed so they are able to be specified in many seamless shapes and forms, providing versatility and style. An extension of Bradley's Evero Classic quartz material, which has a polished finish, Evero Matte has a pure organic appearance and fine suede feel that will not show fingerprints. The Evero Matte color palette, called the Mason Series, includes eight colors: Bedrock, Black Onyx, Cinder, Desert Clay, Limestone, Lunar Gray, Mesa White and Sandbar.

www.bradleycorp.com/evero-natural-quartz-surface

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SCHOOL'S OUT FOREVER





PHOTOS: ANN CHARTRAND

In the first decades of the 20th century, St. Louis embarked on an extensive public-school building campaign. Two architects served as commissioner of buildings for the Board of Education during this period: William B. Ittner from 1897 to 1915 and Rockwell M. Milligan from 1917 until his death in 1929. The buildings that Ittner and Milligan designed are among St. Louis' greatest physical assets, bringing a unified style of school design to neighborhoods across the city.

The Milligan-designed Scullin School was named after John Scullin, founder of Scullin Steel Co., which ultimately was a supplier for the Gateway Arch. The school was operated by St. Louis Public Schools from 1928 to 2003. The 31,735-square-foot school is located on more than 4 acres. Its gables are stone-coped, and its walls were built using masonry on top of a brick foundation. The school, which hosted kindergarten through fifth grade, has a basement and attic.

Scullin School currently is for sale and is listed as a prime location for mixed or commercial use because of its available land area and location on Kingshighway Boulevard, a high-traffic street.



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