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THIS
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See Page 16

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The new Adams Rite EX Series Exit Devices feature flexible, robust designs, with simple and adjustable installation, providing a superior user-experience, all wrapped up with beautiful aesthetics.

The new EX Series includes the **EX88 Interlocking Rim Exit Device**, with a robust and unique bolt design that interlocks the door to frame for enhanced strength and durability, the **EX89 Pullman Rim Exit Device** which is compatible with Adams Rite preload capable 74R1 Electric Strike, the **EX76 CVR Exit Device** with concealed adjustable rods and latching assemblies designed for easy installation, and the **EX80 Dummy Push Bar** whose flexible design comes standard with two monitoring switches and is field selectable for active or inactive configuration.

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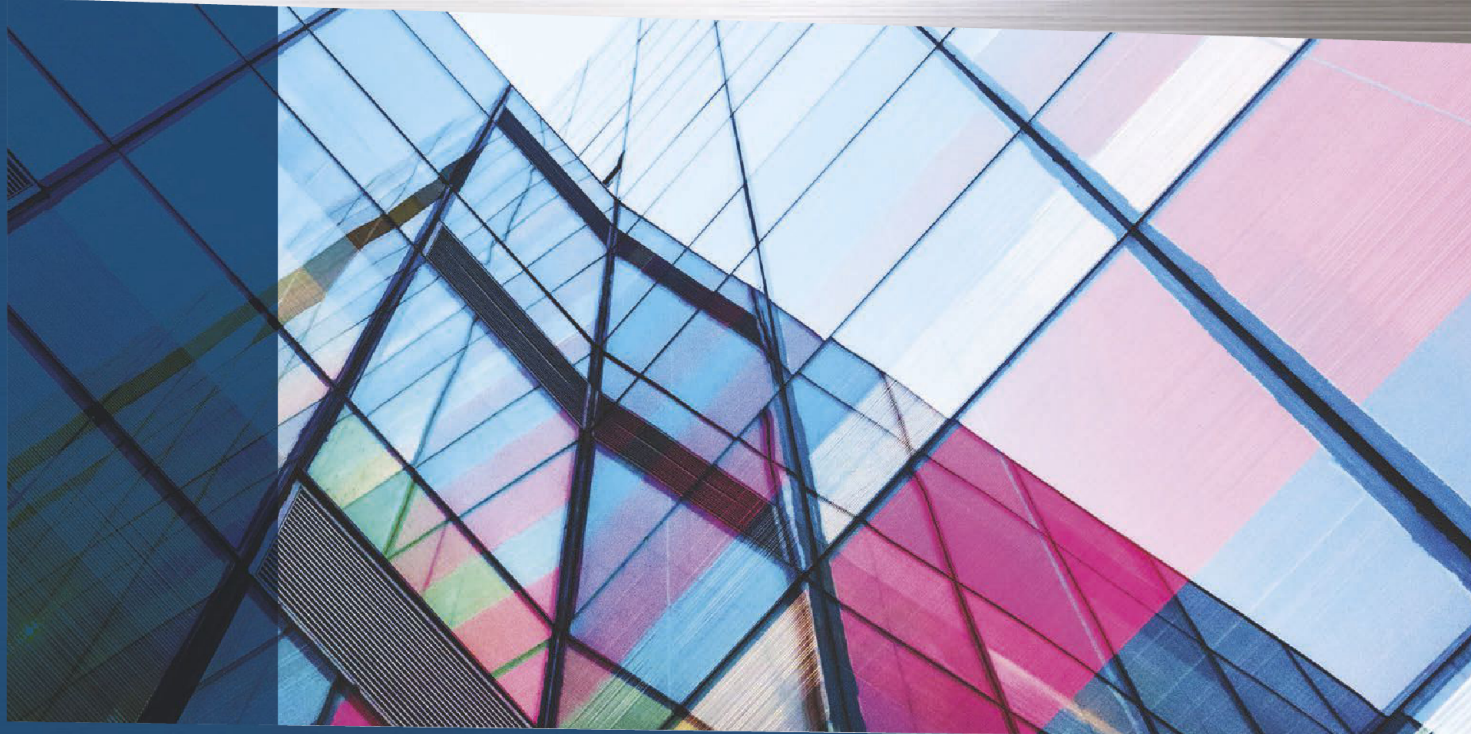


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Is It Time to Switch to

Are you tired of repairing your current street lighting system? Maybe it's time to upgrade your HID system to LED technology. It's easier than you think!

Here are 5 reasons why you need to consider utilizing LED Technology to replace your old HID lighting.

1. What's the Cost

LED (light emitting diode) luminaires have a longer life, with 70,000 hours and up to 100,000 or more, while the HID (high intensity discharge) lamps must be replaced generally between 16,000 to 24,000 hours. Replacing HID lamps usually require replacing the ballast as well, yet the major cost is that of a utility crew with a bucket truck. The cost of a crew could be as high as \$300 to \$500 to change out the HID lamp and ballast for each luminaire. We often forget the inconvenience and cost of closing down the roadway. Changing HID lamps could be three to five times during the lifetime of one LED luminaire. Is the cost worth the time and money?



2. Losing Brightness

The HID lamp is very unstable during its life. HID lamps begin to immediately lose its brightness and lose up to 50 percent in the first 8,000 to 15,000 hours of its life. The wattage does not decrease, just the light level. While the HID brightness dims, you still pay the same amount for the energy producing half the light. Over time, LEDs will lose brightness, but at a much slower rate. At 70,000 hours of the LED life the light out is maintained at 70 percent of the original light output. The life of the LED is calculated at 70 percent of its light out.

3. LED Lamps Last Longer

With the current LED technology, LEDs last much longer than HID lamps. An LED luminaire burning 12 hours a day may last up to 15 to 25 years while the HID luminaire will require a new lamp every 5 to 7 years.



4. Short Term vs. Long Term Costs

In considering the short-term cost of LED versus HID, the initial cost of the LED luminaire will be higher than that of the HID. However, in considering the long term cost of the HID with all the expenses of three to five lamp and ballast changes during the life to the LED, you quickly see the savings of LED is not just the 45 percent in energy savings.

Yes, the short-term cost of the kit is higher than a replacement lamp and ballast, but the long-term cost of HID maintenance, should outweigh the difference.



5. Solutions

LED retrofit kits are now available to upgrade existing decorative and other HID luminaires. Many retrofit kits offer quality and energy savings. When all is said and done, it makes economical as well as green sense to switch to LED for your lighting.

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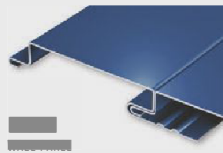
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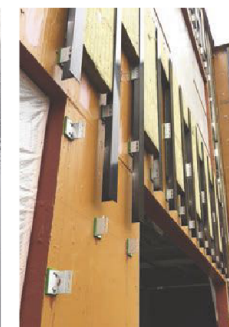
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- Carmel Medical Pavilion, Carmel, Ind.
- Ralph H. Johnson VA Medical Center, Charleston, S.C.
- Psychologist Office, Toronto
- Whidbey General Hospital, Coupeville, Wash.



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A NEW PERSPECTIVE



Before I joined the team at **retrofit**, I worked for a nationally circulated residential remodeling publication. I would attend Washington, D.C.-based National Association of Home Builders' Remodelers and Des Plaines, Ill.-based National Association of the Remodeling Industry meetings regularly. At these meetings, the remodelers were adamant about "working on your business rather than in your business". They often said that it wasn't until they joined industry associations that their businesses became successful. Before, they had been buried in the day-to-day requirements of their positions, but by taking a few days away to attend association meetings, they were suddenly learning from their peers and were able to use the ideas they gathered to improve their operations.

In September 2017, John Riester, **retrofit's** publisher, and I followed this advice and attended a digital publishing conference, called the NICHE Digital Summit. I had heard about these NICHE conferences from other publishers while at our printer's holiday party a few years ago. It finally worked with John's and my schedules to attend the digital summit and we both learned so much about online publishing for a niche industry not only from the speakers, but also from other attendees. I took copious notes and came back to my office with quite a few ideas that John and I thought would be easy to execute.

Among the ideas was to send a survey to learn what our readers like about **retrofit** (print and digital) and what we can improve upon. To encourage readers to answer the survey, we offered a \$200 American Express gift card to one respondent. The winner was Barbara Catlow. Congratulations! And thank you to everyone who responded; we know you are busy and receive a lot of emails per day, but your answers are helping us to better serve your needs.

In addition to learning from your peers at conferences, sometimes a change in your own life can help you execute your professional role in a new light, as demonstrated in our "Cover Story". Julie Robertson, interior design practice leader in HDR's Minneapolis office, happened to be pregnant when she led the design that integrated a Mother Baby Center and NICU at United Hospital, St. Paul, Minn. "I was pregnant during these projects, which allowed me to see through the eyes of the patient. It actually changed the way I thought about design," Robertson says in the article. Read about how Robertson and her team created cohesive and special spaces for mothers and babies on page 30.

Professionals at Elevate Energy, a non-profit organization in Chicago, recognized that a different perspective could better help them achieve their organization's mission. Elevate Energy designs and implements programs to help building owners and managers complete energy-efficiency upgrades for properties. Energy-efficiency programs rarely are created to meet the specific needs of multifamily buildings, so the organization completed an analysis of 143,000 multifamily properties in Chicago, segmenting them based on age, size and other traits to better understand the city's multifamily sector. Elevate Energy's goal is to help energy-efficiency program implementers to better grasp the market they serve and identify opportunities to customize energy-efficiency services to buildings' and owners' needs. Read about the analysis in "Business", page 24.

Hopefully reading **retrofit** offers some new ideas for you each issue, but if you need further inspiration to garner a new perspective and better your professional role, check out our events calendar at retrofitmagazine.com/events. Then, take a few days to get out of your business to help take it to the next level.

Christina Koch

CHRISTINA KOCH
Editorial Director

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THIS ISSUE FEATURES AUGMENTED REALITY!

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Approximately 25 percent of U.S. households reside in multifamily buildings, but utility- and government-run efficiency programs to date have had limited success serving this sector. Chicago-based Elevate Energy implemented a segmentation analysis to better understand the Chicago multifamily market and identify opportunities to align and customize energy-efficiency services to buildings' and owners' needs. **Kimberly Loewen**, Elevate Energy's associate director of Technical Services and Building Technology, explains the analysis and the organization's success in "Business", page 24.



Jeremy Bartlett, CxA, a commissioning specialist with the Field Services Division of Baltimore-based RMF Engineering, explains Oberlin College's first re-commissioning project on campus in "Energy", page 50. The Oberlin, Ohio, project included a nearly yearlong investigation, implementation and remediation process at the school's 229,000-square-foot Science Center. The team's largest hurdle was determining how to functionally test systems while the building was fully occupied.



Alex Abarbanel-Grossman is an associate with New York-based C.C. Sullivan, which focuses on communications for the AEC industry. In "Transformation", page 62, Abarbanel-Grossman writes about New York-based Murphy Burnham & Buttrick Architects' improvements to the Billie Holiday Theatre's performance and support spaces. New technology and crucial life-safety upgrades bring this beloved space in Brooklyn's Bedford-Stuyvesant neighborhood into the present.



Allen Barry, who writes about architecture and sustainability from Chicago, shares the story of the abandoned Strathmore Hotel, which once housed Detroit's automotive workers, as well as travelers. Today it has been restored by Detroit-based Hamilton Anderson as apartments, once again serving the community. Read the article in "Multifamily", page 76.



KJ Fields, a Portland, Ore.-based **retrofit** contributor, writes about United Hospital, St. Paul, Minn., in our "Cover Story", page 30. The hospital sought to create a more modern, welcoming atmosphere and a stronger sense of connection between the Mother Baby Center and the NICU. Julie Robertson, interior design practice leader in HDR's Minneapolis office, was pregnant while working on the project, which allowed her "to see through the eyes of the patient. It actually changed the way I thought about design," Robertson told Fields.



Tunable lighting is increasingly chosen to address some of the factors that affect the human biological response to light. In "Component", page 56, **Andrea Wilkerson**, Ph.D., LC, a lighting research engineer at the Pacific Northwest National Laboratory, Richland, Wash., writes about two of the Washington, D.C.-based U.S. Department of Energy's Solid-State Lighting Program's recent evaluations of tunable lighting technology in the field.



Portland, Ore.-based freelance design journalist, critic and architectural photographer **Brian Libby** writes about the unbelievable redevelopment of a defunct 1.5-million-square-foot Sears, Roebuck & Co. distribution center and retail store in Memphis. A history teacher and artist launched the renovation idea, eventually garnering the support of the community to create Crosstown Concourse, which today contains retail stores, restaurants, a fitness center, school, arts spaces, offices and apartments. Read the story in "Mixed Use", page 68.



Fombell, Pa.-based freelance writer **Laurie Cowin** shares how parking garages can undergo lighting retrofits to improve their appearances and realize substantial energy savings in "Inspiration", page 98.

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Community exchange has always been at the heart of the Pike Place Market's ethics and ideals. Now the market benefits from high-efficiency district energy systems that share and exchange energy between building partners, saving energy, money and maintenance costs while providing more reliable power. Energy and water systems are tied together throughout the market's hydronic loop, allowing vendors to share heating and cooling infrastructure that keeps shops and common areas comfortable and customers and tour groups happy.

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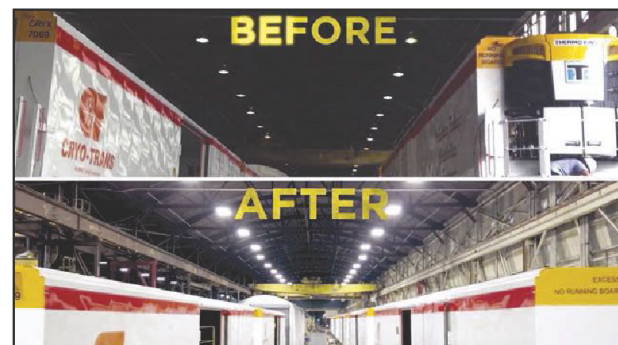
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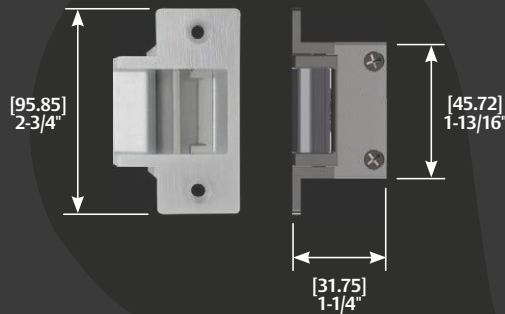
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GBI Completes Acquisition of Global Rights to Green Globes

The non-profit Green Building Initiative (GBI), Portland, Ore., has completed the acquisition of the global rights to the Green Globes sustainability rating system for commercial and multifamily buildings. The acquisition from Chicago-based JLL, which purchased the global rights to Green Globes in 2008, will allow GBI to support existing Green Globes users in Canada, in addition to the U.S., as well as globally expand the rating system's reach. GBI first licensed the U.S. rights to Green Globes in 2004 from ECD Energy and Environment Canada, Toronto. ¶ "This acquisition is a clear win for GBI and our growing base of



Green Globes users," says Vicki Worden, president and CEO of GBI. "Consolidating

Green Globes under GBI was a logical and natural next step to further our mission to accelerate the adoption of green-building best practices in the built environment."

¶ "As a non-profit, GBI is in a better position to grow the sustainability movement as the sole owner and promoter of Green Globes, and we have every confidence in GBI's ability to do so," says Bob Best, executive vice president of JLL. "We value Green Globes as a tool we use with

our clients and property managers and, because of this acquisition, GBI can continue to grow Green Globes as a global assessment program." ¶ According to Worden, GBI has experienced significant growth during the past two years and has certified 1,594 buildings, or almost 300 million square feet of real estate since its founding in 2004. Of those, 1,328 buildings are certified through its Green Globes program and 266 buildings through its Guiding Principles Compliance program for U.S. government buildings. ¶ "Green Globes is filling a gap in the market," explains Rich Mitchell, managing principal at Portland-based Mackenzie and elected chair of the GBI board of directors. "It's comprehensive and flexible, as well as time- and cost-effective. Design and operations teams are finding it a beneficial tool for their sustainability-minded owners." ¶ GBI has established a Canadian non-profit subsidiary, GB Initiative Canada, to support the growth and previously established use of Green Globes in the Canadian marketplace. ¶ For more information about GBI or Green Globes, visit www.thegbi.org and www.thegbi.org/Canada.

REPORT EXAMINES BUILDING INDUSTRY CHALLENGES, SUGGESTS IMPROVEMENTS

The Washington, D.C.-based National Institute of Building Sciences (NIBS) Consultative Council has released its 2017 report, "Moving Forward: Findings and Recommendations from the Consultative Council". The council unites representatives from organizations that represent design, construction, operation and regulation to examine important industry issues.

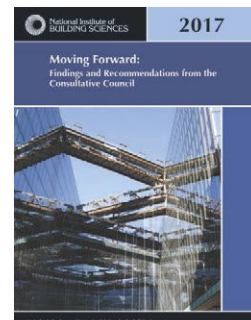
This annual report examines industry challenges and offers findings and recommendations about how to overcome them. The summarized report then becomes part of NIBS' Annual Report, which it sends to the U.S. president and Congress.

The 2017 report revolves around the future, such as how the building industry can and should evolve to meet society's changing needs and how new technology can attract a modern workforce. One key question the council posed was if the building industry will be ready as the pace of technology and commerce accelerates and communities face new resiliency and sustainability challenges.

The council focused on four areas to facilitate progress: design, construction and operations, technology, workforce and research. The report then goes on to offer 10 recommendations, which include:

- The White House should establish a cross-agency program that focuses on providing scientific and economic data associated with the effectiveness of building codes and their impacts on communities, education and training for code professionals, technical assistance and evaluation tools for code department effectiveness.
- The building industry, with involvement of representatives from the legal, finance and insurance sectors, should conduct a dialogue about how to evolve the current state of fees, timelines and risk in furtherance of a systems-based approach to realize actual, measured performance results.
- The codes and standards development community should work collaboratively to develop protocols and best practices that support the utilization of current and future standards within digital environments, including BIM, additive manufacturing, building automation and robotics.
- The building industry along with federal agencies should develop and fund a national high-performance building research and development strategy that reflects the value of the industry to the U.S. economy, mirroring the 2.7 percent economy-wide investment in R&D.

For more information and to download the report, visit www.nibs.org.



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WRITTEN BY | **KIMBERLY LOEWEN**

A Segmentation Analysis Strives to Improve Energy-efficiency Programs that Serve a Huge but Hard-to-Reach Multifamily Market

There is a clear connection between our environment and our buildings. Efforts to mitigate climate change in the U.S. must focus on the built environment, which uses the most energy and produces the most carbon emissions of any sector, including transportation. In particular, multifamily buildings—defined as residential buildings with two or more units—need attention.

Approximately 25 percent of U.S. households reside in a multifamily building, but utility- and government-run efficiency programs to date have had limited success serving this sector. As a result, more than 16 million households pay more to heat and cool their homes than necessary.

The Challenges of Serving the Multifamily Sector

Elevate Energy, a non-profit organization based in Chicago, designs and implements pro-

grams to help building owners and managers navigate the complex process of completing energy-efficiency upgrades that reduce energy use and

ensure long-term savings for properties. To date, the organization has improved almost 35,000 multifamily units.

“We’re no strangers to the unique set of challenges that

within the same building. There are numerous ownership models. And many cities don’t have data about what their multifamily housing stock is like.”

Because multifamily properties have qualities that are similar to commercial and residential facilities, energy-efficiency programs in the past have rarely been tailored to the specific needs of a multifamily building. Programs are often designed to serve a different type of building altogether.

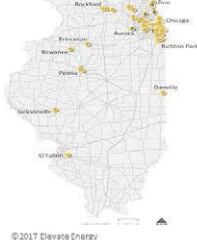
Additionally, multifamily ownership structures vary widely. Whereas single-family energy-efficiency programs target individuals who own and occupy one property,

(continues on page 26)

Elevate Energy’s Impact to Date

Elevate Energy Multifamily Upgrades from 2008 – Present

Multifamily \$+ Upgrades n=580



Multifamily Retrofits	35,000 units
Energy Savings	8.3 million therms 22.5 million kWh Typical savings 15-30%
Loans (Community Investment Corporation)	Over \$15 million
Incentives	\$15,000,000

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grams to help building owners and managers navigate the complex process of completing energy-efficiency upgrades that reduce energy use and

multifamily buildings present,” says Anne Evens, CEO of Elevate Energy. “A multifamily building can have several different types of utility service



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“THE UNSUBSIDIZED LOWER-COST MULTIFAMILY MARKET NEEDS TAILORED EFFICIENCY PROGRAMS”

multifamily programs must target decision-makers who may be owner-occupants, investor-owners, or building managers with very different motivations and resources.

One such case study in Chicago exemplifies many of the challenges in serving multifamily buildings. In 2013, Monica Chadha, LEED AP and founder of Civic Projects LLC, Chicago, contacted Elevate Energy to perform an energy assessment of a multifamily building in the city. Energy experts from Elevate Energy assessed her property, provided recommendations, connected Chadha with qualified contractors and helped her apply for

a low-cost loan from Chicago-based Community Investment Corporation (CIC) to finance the improvements.

But three years later, in 2016, Chadha reached out to Elevate Energy once again with a significant problem. Her gas bills for heating the building were escalating each month, culminating at \$10,000 for the month of January—roughly 10 times the typical bill for a building its size. Chadha suspected the gas meter was providing inaccurate readings, but when she called the utility to request an inspection, the gas provider told her no crews were available and she should call back in a month.



Elevate Energy staff inspected the building several times and determined there were two issues causing the high gas bill. First, analysis of remote readings on the gas bill

compared with actual readings taken by Elevate Energy staff showed that the remote reading device on the gas meter was malfunctioning. Team members communicated

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this to the gas company and were able to schedule a meter change for the following day.

Additionally, the power burner on the steam boiler was severely out of adjustment because a contractor Chadha had contacted herself had been unable to correct the condition following repeated service calls. The Elevate Energy team recommended a boiler clean-and-tune by one of its vetted contractors, who discovered that a missing burner component was creating a dangerous carbon-monoxide condition, in addition to causing the boiler to burn 20 percent more than the rated amount of gas.

First Step: Segmentation Analysis


Improving the efficiency of multifamily housing, such as

Multifamily Building Segments and Potential Savings			
	 2-4 unit building, pre-war, masonry	 5+ building, low-rise, pre-war	 2-4 unit building, pre-war, frame
Number of Buildings	79,903 (54%)	15,595 (10%)	41,159 (28%)
Number of Units	202,924 (30%)	199,294 (29%)	97,892 (14%)
Emissions Avoided Given 20% Reduction	3,632,967	1,160,168	1,871,385

Chadha's building, requires stakeholders to understand the characteristics of the market. Elevate Energy, in partnership with the national Energy Efficiency for All (energyefficiencyforall.org) initiative, constructed a database of 143,000 multifamily buildings in Chicago and segmented them based on age, size and other traits to better understand the city's multifamily

sector. (Download the report at bit.ly/2G5J5B.)

The Chicago segmentation analysis was the first of its kind. It found that 75 percent of Chicago residents reside in a multifamily building. Of the city's 1 million multifamily units, only 91,000 were subsidized; more than 440,000 units were lower cost but unsubsidized. The analysis showed


RETROFIT CONFERENCE

This article is based on a presentation that was given at **retrofit's** inaugural conference, which was held in Chicago in October 2017. Download Loewen's presentation and learn about **retrofit's** second annual conference to be held in Charlotte, N.C., Oct. 9, 2018, at www.retrofitconference.com.

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that more than 75 percent of Chicago's multifamily buildings were constructed before 1942 and most likely lacked basic energy-efficiency improvements. Of the 15 types of Chicago's multifamily housing, just three segments account for 92 percent of the city's building stock. The three segments represent nearly 500,000 units and the potential to avoid 6.5 million metric tons of carbon-dioxide emissions through energy-efficiency improvements.

"The takeaway from the segmentation analysis is that program implementers have to really understand the market they serve to be able to identify opportunities to better align and customize energy-efficiency services to buildings' and owners' needs," Evens explains.

Motivating Building Owners

Most contractors and program implementers understand the benefits of energy-efficiency retrofits, including lower utility bills, lower maintenance costs and a more comfortable home. But it's important to consider the value from a building owner's perspective, as well. Owners have tight profit margins and are likely receiving constant offers from other providers for alarm systems, masonry work, landscaping and pest control. Even if an energy-efficiency program is free to a building owner, the program administrator still needs to establish a connection with the owner and explain the benefits to the customer.

"Owners are less likely to invest in upgrades if they don't see the benefits of energy savings, especially if there

is a concern that the cost savings go to the tenant," Evens notes. "Programs must clearly identify and communicate the benefits to owners."

Examples of benefits that have helped Elevate Energy get in the door include tenant retention and safety, reduced time and cost for proactive (versus reactive) maintenance issues, and positive cash flow. Additionally, Elevate Energy promotes some of the "non-energy benefits," which refer to the positive consequences of upgrades outside of the owner and their building. These include utility benefits, like reduced stress on the grid and avoided disconnections, as well as societal benefits, like job creation and improved air quality.

In Chadha's case, her motivation was related to health and safety. When Elevate Energy returned to her building in 2016, analysts again inspected the building and found numerous concerns, including an extraordinarily high reading of 2,000-parts-per-million carbon monoxide in the exhaust gases of the boiler, which previously had been worked on by a contractor hired by the building owner.

Optimizing a Retrofit Program for Greater Impact

Elevate Energy draws from its nearly 10 years serving the multifamily segment to design and implement effective programs. The results and learnings from the segmentation analysis have also helped the organization recognize its own service delivery model challenges and refine its process to overcome key obstacles, like an owner's lack of

capital or lack of interest.

"The multifamily research study confirms that we serve the most common, yet hard-to-reach type of Chicago multifamily building," says Elevate Energy Research Manager Margaret Garascia. "These buildings serve as the backbone of market-rate affordable housing in Chicago, and our program is designed to address a diverse set of

building types, as identified in the segmentation analysis. Elevate Energy uses trusted messengers to engage building owners and strives to make it easy for owners to complete the work.

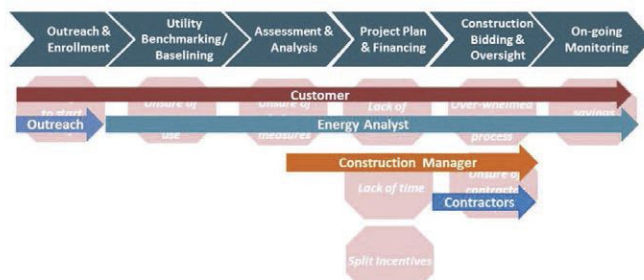
Strategies include providing a single point of contact for the owner from initial outreach through construction oversight and ongoing monitoring, as well as maintaining

The Service Delivery Model and Challenges



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The Service Delivery Model and Process



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needs related to heating, cooling, health and safety, and tenant comfort."

Elevate Energy's multifamily program addresses the motivators and challenges these building owners typically face. First, the program serves the unsubsidized lower-cost multifamily market. It follows a six-step service delivery model that begins with targeted outreach. Access to data is key at this stage to effectively target low-income areas with a high concentration of key

a focus on quality through consistent feedback and accessibility. Also, through the segmentation analysis and its own experiences, Elevate Energy has recognized a need to improve collaboration and leverage the influence of key market players.

What is the Segmentation Opportunity in Your City?

Segmentation analysis is a complex but valuable tool

“APPROXIMATELY 25 PERCENT OF U.S. HOUSEHOLDS RESIDE IN A MULTIFAMILY BUILDING, BUT UTILITY- AND GOVERNMENT-RUN EFFICIENCY PROGRAMS TO DATE HAVE HAD LIMITED SUCCESS SERVING THIS SECTOR.”

to understanding a city's housing stock. Case in point: Elevate Energy's analysis drew from 13 disparate data sources to create a composite representation of the multifamily market. While Elevate Energy's analysis focused exclusively on the Chicago area, many of the results and recommendations may be replicable and relevant to program designs in other geographies.

The unsubsidized lower-cost multifamily market needs tailored efficiency programs. In a given geography, market segmentation can reveal the most prevalent multifamily market segments and distinct retrofit approaches. Outreach should be targeted to low-income areas with a high concentration of key segments. Lastly, there is a significant opportunity to improve collaboration with other disciplines and utilities.

There are tools to help building owners and facility executives get started. As part of its segmentation analysis, Elevate Energy developed a companion “how-to” framework (bit.ly/2FlvJ23) to help researchers in other cities complete their own segmentation analysis. It includes tips, like how to understand privacy for energy and housing data,


how to engage experts outside of the field and how to assess affordability in different markets. A detailed description of the methods for constructing the database of buildings can also be found in Cityscape, the U.S. Department of Housing and Urban Development's journal on housing and community development issues. View it online at bit.ly/hud-elevate.

Other cities have undertaken multifamily segmentation analyses. For example, Building Energy Exchange in New York (bit.ly/bee-nyc-segment) completed a segmentation analysis of different aspects of the multifamily market in New York City and added energy-use data to understand the energy-efficiency opportunity. A segmentation analysis of the Los Angeles multifamily market also will be available in 2018.

As for Chadha, the 2016 upgrades to her building included roof cavity air sealing and insulation, domestic hot water heater replacement, steam boiler replacement and

steam-pipe insulation. The improvements are expected to save 40 percent annually on natural gas costs.

“Elevate went well above and beyond any support that we could have anticipated,” Chadha says. “We're confident that our building is now operating efficiently.”

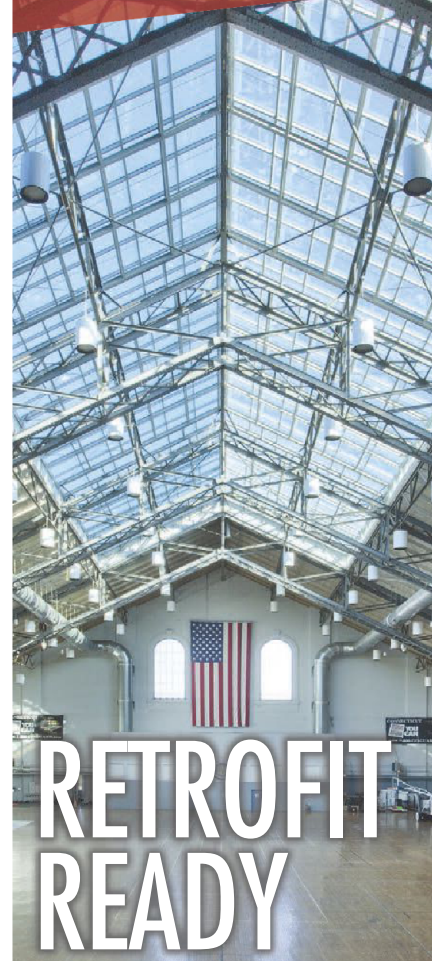
Most importantly, her building is now more stable and viable, which serves as a beacon of quality, affordable housing in a neighborhood traditionally plagued with disinvestment. 



More Information

- Energy Efficiency For All Initiative: energyefficiencyforall.org
- Elevate Energy, “Segmenting Chicago Multifamily Housing to Improve Energy Efficiency Programs”: bit.ly/2GS5J5B
- Elevate Energy, “Making Sense of Your Multifamily Housing Stock”: bit.ly/2FlvJ23
- Cityscape, “Chicago Multifamily Market Characterization: Developing a Comprehensive Picture of the Multifamily Housing Landscape”: bit.ly/hud-elevate
- Building Energy Exchange, “Retrofitting Affordability: Evaluating New York City's Multifamily Building Energy Data for Savings Opportunities”: bit.ly/bee-nyc-segment

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[WRITTEN BY | KJ FIELDS]

SPECIAL SPACES EMBRACE MOTHERS AND BABIES IN A MINNESOTA HOSPITAL PROJECT

The birth of a child should be a blissful occasion, but it is also a tumultuous time. The right surroundings can help set new mothers at ease, which becomes increasingly important if medical issues arise. At United Hospital in St. Paul, Minn., however, there was a divide between its former 42-bed birthing center and its 50-bed neonatal intensive care unit (NICU)—both in ambience and in operations. Each facility was managed by a different entity: Allina Health ran the labor and delivery center, and Children's Hospitals and Clinics of Minnesota was responsible for the NICU.

Recognizing the need for a more cohesive patient experience in their service locations, the two systems partnered to form a joint venture that affected Mother Baby Centers and associated NICUs at three different facilities in the Twin Cities region. While the other two locations utilized new construction to cultivate a stronger cross-service identity, the United Hospital project retrofitted its existing facilities. The partnership's motto is, "Great place to have a baby. Great place to be a baby."

"This new service line brings the care for mothers and their babies closer together," asserts Julie Robertson, interior design practice leader in HDR's Minneapolis office, who led the charge for the United Hospital project. "People will spend a great deal of time here healing, grieving and in joy, and we wanted to create spaces that support them through all these emotions."

Creating a more modern, welcoming atmosphere and a stronger sense of connection between the Mother Baby Center and the NICU at United Hospital were primary goals.



NEW CONNECTIONS

Creating a more modern, welcoming atmosphere and a stronger sense of connection between the Mother Baby Center and the NICU at United Hospital were primary goals. When the NICU was built in the 1990s, it was one of the first facilities of its kind to offer all private rooms. During the renovation, HDR refreshed the NICU's outdated rooms and reconfigured the ward's entry sequence.

In the original Mother Baby Center, 90 percent of the rooms were a meager 141 square feet with labor, birth and recovery all occurring in the tiny space. "Accommodating updated equipment, medical gas systems and proper lighting all within single labor/delivery/postpartum rooms would have required building out a larger space, which was cost prohibitive," Robertson explains. "Our solution was to utilize adjacent areas."

The Mother Baby Center now encompasses 96,000 square feet, using a new care model that provides various services in distinct areas. The existing space became a dedicated postpartum area. A nearby administration area was turned into the antepartum (before birth) wing. Designers tucked the labor and delivery department into a vacant shelled-out space that HDR purposefully created in a new adjacent building several years ago in anticipation of this expansion. Families can access each department from the existing parking garage and enter the





Retrofit Team

ARCHITECT AND INTERIOR DESIGN //

HDR (Minneapolis Design Studio), Minneapolis, www.hdrinc.com

- Michael Nelson, project architect and manager
- Julie Robertson, interior design practice leader
- Cyndi McCullough, director of evidence-based design
- Trevor Hollins, lighting design studio lead
- Kyle Lacek, designer
- Carolyn Hagmann, architectural coordinator

STRUCTURAL AND MEP CONSULTANT //

- HDR
- MECHANICAL ENGINEER: Tim Willoughby, John Martin
 - ELECTRICAL ENGINEER: Andrew Roche, Chad Harrill

CONSTRUCTION MANAGER //

McGough Construction, St. Paul, Minn., www.mcgough.com

OWNER // The Mother Baby Center at United Hospital and Children's Minnesota, St. Paul, www.themotherbabycenter.org

OWNER'S REPRESENTATIVE // Parsons, Pasadena, Calif., www.parsons.com

Materials

CEILINGS // Armstrong Ceiling and Wall Solutions, www.armstrongceilings.com

CARPET // Interface, www.interface.com, and Mohawk, www.mohawkgroup.com

ENGINEERED QUARTZ FABRICATION // Cambria, www.cambriausa.com

SPECIALTY GLASS // Nathan Allan Glass, www.nathanallan.com

LINOLEUM // Forbo, www.forbo.com

PAINT // Sherwin-Williams, www.sherwin-williams.com

LAMINATE // Formica, www.formica.com

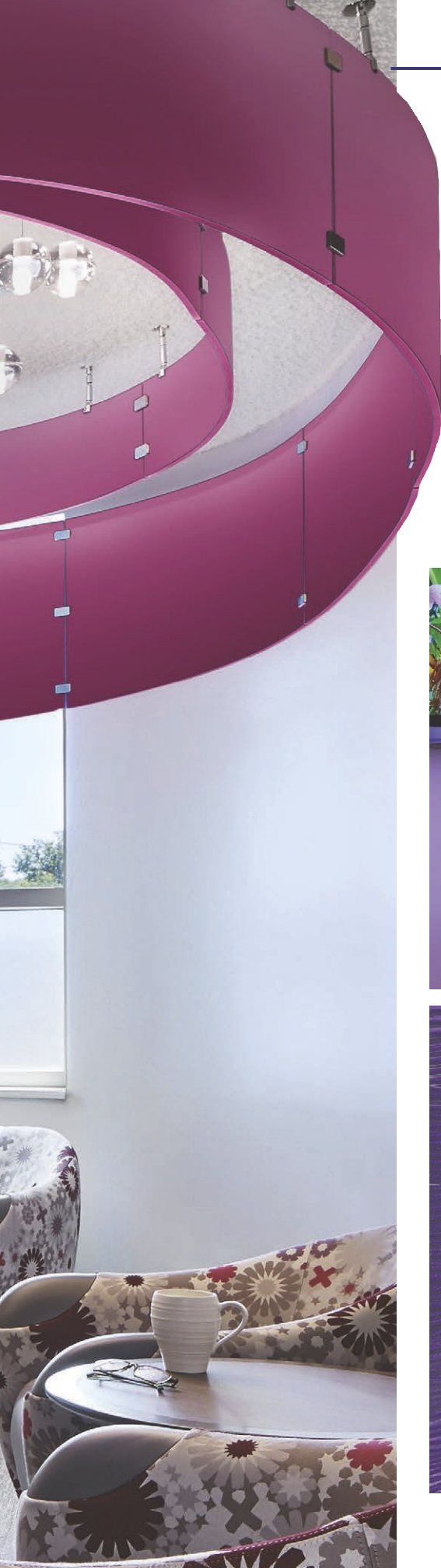
TERRAZZO // Twin City Tile & Marble, www.tctm.com

TILE // RBC Tile and Stone, www.rbctile.com

CUSTOM WALL GRAPHICS // Designtex, www.designtex.com

CUSTOM WALL COVERING // D.L. Couch, www.dlcouch.com

WALL PROTECTION // CS Group, Acrovyn, www.c-sgroup.com/acrovyn



NICU across the hall from the renovated Mother Baby Center.

TOP CAPACITY

Trying to keep the labor and delivery area operational at maximum capacity was the project's biggest challenge. The plan gutted the former space, and build-out took place in three phases. During the intense internal construction, the contractor created a rigorous plan of partitions to minimize disruptions and retooled the mechanical systems' air intake and outflow to eliminate dust.

Robertson discovered that flexibility was imperative. "We ran into unforeseen mechanical, structural and electrical con-

ditions that couldn't be changed," she says. "In order to accommodate these, we had to lower the postpartum ceiling by 4 inches. The only way to ensure the spaces still met the client's vision was to maintain an open collaboration between the contractor, subcontractors and our design team."

The labor and delivery department now features 11 generously sized, 350-square-foot rooms, thanks to the project team's thoughtful approach to space planning. The postpartum recovery area contains 30 rooms of 235 square feet each, and the antepartum area has nine 250-square-foot rooms.

STRONG SYMBOLS

The Allina Health and Children's Minnesota joint brand for the new service line had to be





carried through all three Twin Cities locations, but each project needed to relate to its specific surroundings. St. Paul is renowned for its tree gardens, and Robertson used the images of flowering trees to engender a sense of beauty and comfort in United Hospital's Mother Baby Center and to define entrances into the patient rooms.

In the NICU's waiting lobby, a custom tree form greets visitors as a symbol of strength, growth and hope. Robertson worked with an artist to bring whimsy into the NICU, using playful creatures (a fish, bird, bunny and ladybug) as wayfinding elements. "I was pregnant during these projects, which allowed me to see through the eyes of the patient. It actually changed the way I thought about design," Robertson recalls. "Health care is typically modeled around disease, but being pregnant is not a disease. These spaces purposefully aren't sterile, yet they showcase the top-notch care that this facility offers."

ART INTO ARCHITECTURE

Sculptural ceiling ribbons fan out from the nurses' stations to direct patients to points of care. A soft, flowing ribbon carved into the floor guides families to the Mother Baby Center, and whimsical star cutouts align with the ribbon to lead visitors to the NICU entry. The ribbons' organic shapes are abstract forms that mimic the opening of flowers and, in turn, represent the Mother Baby Center's logo. "We wanted to incorporate art into the architecture rather than have it be applied after the fact," Robertson says.

Although the original labor and delivery corridor was an awkward angular space, the remodel retained the walls in the new postpartum area. A creative solution at two corridor intersections was needed, so HDR fashioned respite spaces for families out of beautifully curved sculptural glass. Designers used the same sculptural glass in a flat application as family bistro area dividers in the labor and delivery department.

Large, oval sculptural ceiling features call attention to specific spaces in the corridors and mirror the crescent moon form in the brand's logo. Additional colorful ceiling ovals in the patient rooms offer the added benefit of creating a positive distraction over patient beds. "The ovals are also an abstract representation of a flower's center," Robertson explains. "They give mothers something colorful to look at and seem to tenderly embrace the patient."

(continues on page 38)



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COLOR AND LIGHT

Robertson strategically placed color throughout the project. “We wanted to make it feminine, inviting and calming,” she says. “We used vibrant colors paired with soft, warm wood tones to balance color, texture and light.” In the Mother Baby Center, specific colors define each area: raspberry marks labor and delivery; the postpartum area is detailed in deep, sapphire blue; and violet delineates the antepartum area. Yellow, the joint venture’s brand color, characterizes the entryway and public waiting space. A pop of color on the patient-room walls is lit from within to frame each bed.

All of the lighting is soft, defining the mood for the facility and reflecting Robertson’s vision for the patient experience. “We want the patients to have control and be comforted along their journey. For example, there are no direct lights in the ceiling, so patients on a gurney won’t have to stare into harsh lights above,” she says.

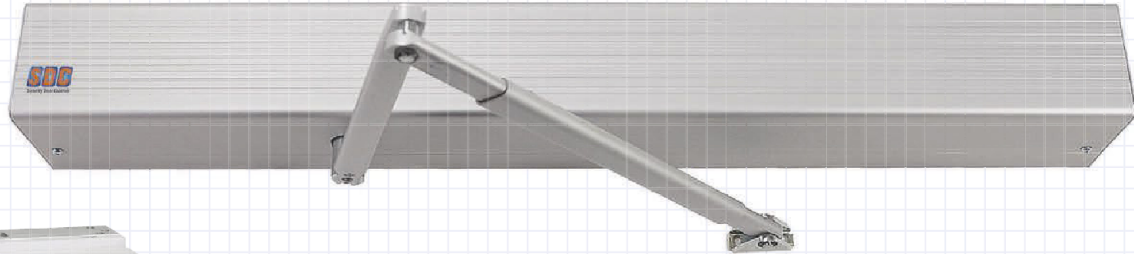
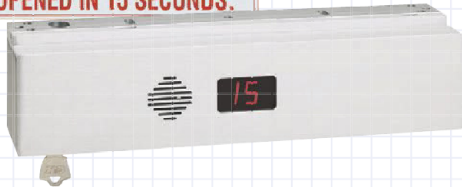
The control panel in the patient bed allows the mother to operate numerous systems, including the dimmable accent light, the over-the-bed exam light and the window’s motorized roller shades. Family members can control the lighting directly above the sofa in the room’s family zone, as well. Custom-lit elements in the main areas provide indirect lighting at the desk and ceilings to reinforce the sense of a tree canopy.

Robertson infused the design with elements she thought every mother deserves. “I’m so pleased this project provides a sophisticated environment with all of the comforts of home, the amenities of a five-star hotel and access to state-of-the-art technology and world-class health care for both mother and child.” 



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RETROFIT TEAM »

ARCHITECT: Oculus Inc., St. Louis, oculusinc.com

INTERIOR DESIGNER: Standing Design, St. Louis, (314) 579-0878

MEP/FP ENGINEER: Webb Engineering Services Inc., St. Louis, webb-engineering.com

STRUCTURAL ENGINEER: Optimal Engineering Solutions Inc., St. Louis, oes48.com

GENERAL CONTRACTOR AND CONSTRUCTION MANAGER: Kadean Construction, Fenton, Mo., kadean.com

LIGHTING: Lighting Associates, Webster Groves, Mo., laiweb.net

FURNISHINGS, TEXTILE DEALER: Color Art, St. Louis, color-art.com

MATERIALS »

The following materials were used in the renovation:

ACOUSTICAL CEILING TILE: Armstrong Ceiling and Wall Solutions, www.armstrongceilings.com

CERAMIC TILE: Sonoma Tilemakers, sonomatilemakers.com, and Daltile, www.daltile.com

EPOXY FLOORING WITH CLEAR EPOXY FINISH IN CUSTOM COLORS: Desco Quartz Cremona Db from Desco, www.descocoatings.com

PAINTS: Sherwin-Williams, www.sherwin-williams.com

SOLID SURFACE: Samsung Staron, www.staron.com

HEAT-WELDED SHEET VINYL: Altro (0.080 gauge; 6 feet, 7 inches wide), www.altrofloors.com, and Armstrong Flooring (0.080 gauge, 6 feet wide), www.armstrongflooring.com

IPC HIGH-IMPACT WALLCOVERING, CORNER GUARDS, BUMPER GUARDS AND TRIM: Inpro Corp., www.inprocorp.com

RUBBER BASE MOLDING AND VINYL BASE AND PLANK: Mannington Commercial, www.manningtoncommercial.com

BATHTUBS: Labor and Birth Tub Co. LLC, (206) 618-7433

THE RETROFIT »

Renovations to the childbirth center were intended to support increased patient flow, patient load and provide a patient-centered and staff-supportive environment. Wood tones, paired with existing natural textures and finishes, add warmth to the space. This is all enhanced by oversized flower photos, each of which was selected for its color, meaning and sense of renewal. Headwalls made from sliding acrylic panels allow for easy access to electrical and medical gas service while reducing a clinical atmosphere in patient rooms. Wall sconces adorn the light-green and -blue color palette corridors, as well as frame patient beds. Oval mirror lighting in patient rooms also helps create a calm ambience.

Former triage rooms have been retrofitted into hydrotherapy labor and delivery rooms with soaking labor tubs; large seated showers with handheld showerheads; and seamless, anti-slip floor coverings. A reconfigured C-section suite added a third C-section room with HVAC system upgrades to enhance functionality and comfort for medical staff and patients.

The center staff's review of new and existing casework and equipment layout helped maximize the layouts and design to support increased productivity. Staff experience helped to enrich renovations to the patient-care stations, also resulting in increased overall functionality for the center.





CARMEL MEDICAL PAVILION | Carmel, Ind.

RETROFIT TEAM »

ARCHITECT: Architects Forum LLC, Indianapolis, architectsforum.com

METAL-PANEL INSTALLER: Reflections Glass & Mirror, Indianapolis, reflectionsglassindy.com

DISTRIBUTOR: Spohn Associates, Indianapolis, spohnassociates.com

MATERIALS »

Formerly composed of mostly brick, a 2-story wing wall feature now is clad with Envelope 2000 silver metal panels. Approximately 2,500 square feet of the composite panel, which consists of two aluminum skins bonded to a thermoset phenolic resin core, was installed.

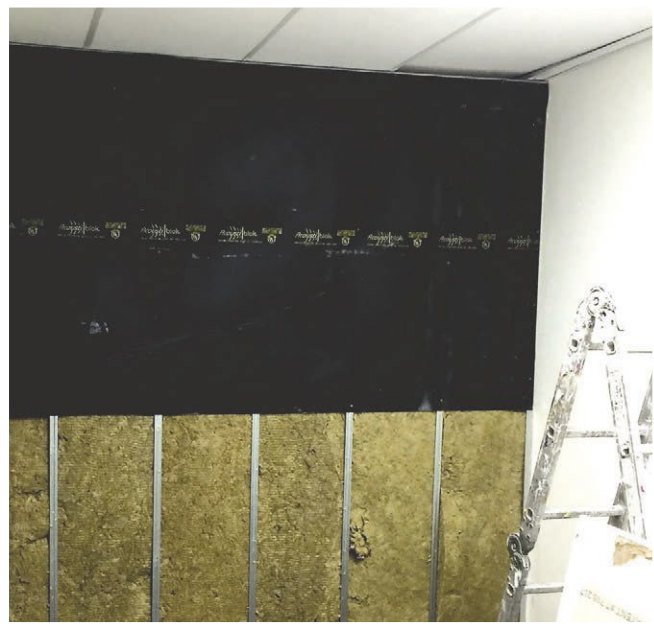
METAL PANEL MANUFACTURER: Citadel Architectural Products, citadelap.com

THE RETROFIT »

While working on an extensive interior renovation, the facility opted to update the exterior, too. The metal panels, which lend a more modern look to the building entrance, face a busy vehicular roundabout. The installer had to work on the substrate to tighten up some corners, ensuring the plywood had no gaps. With the ability to fabricate the metal onsite, the installer could be sure the pieces fit together well and were watertight.



PSYCHOLOGIST OFFICE | Toronto



PHOTOS: ACOUSTIBLOK

RETROFIT TEAM »

CONTRACTOR: Angelo Papadimitriou of Pro-Tech Solutions, Ajax, Ontario, Canada, protech-solutions.ca

MATERIALS »

Three walls were treated with Acoustiblok sound abatement material to keep the sound of voices inside the office. The material was applied to the walls past the drop ceiling and to the upper deck. Caulking and tape, also manufactured by Acoustiblok, formed a permanent bond to all joints and penetrations to reduce sound. Using as few screws as possible and treating electrical outlets also created optimal sound control.

ACOUSTIC PANEL MANUFACTURER:

Acoustiblok, acoustiblok.com

THE RETROFIT »

Soundproofing in a psychologist's office is essential, especially in the face of laws in Canada similar to U.S. HIPAA laws. These heightened patient privacy protections prompted a practicing Toronto psychologist to undergo an office renovation for the express purpose of reducing sound transmission. After the installation, there is no voice transfer between the walls; the psychologist is happy with the finished results.





PHOTOS: ROOF RESTORATION INC.

CENTRE AVENUE HEALTH & REHAB

Fort Collins, Colo.

RETROFIT TEAM »

ROOFING CONTRACTOR: Roof Restoration Inc., Frederick, Colo., roofrestorationinc.com

MATERIALS »

On the low-slope sections between the standing-seam metal roofs, the existing black EPDM membrane was covered with a white silicone reflective coating, which was applied with rollers to the wall flashings and around penetrations prior to the field membrane being restored. All metal coping was masked off prior to the application.

SILICONE COATING MANUFACTURER: GE Silicones, Siliconeforbuilding.com

THE RETROFIT »

After a rain shower resulted in leaking, the contractor saw the fully adhered EPDM roof system on the roof's flat sections was exhibiting signs of oxidation. Several stress fractures were

visible, too. Rather than replace, the facility opted to restore the roof with a high-solids silicone coating. This project encompassed 21,863 square feet of low-slope roof on 10 separate roof levels. The restoration process protects the membrane from further UV degradation. It also substantially lowers the roof's surface temperature; the white roof surface temperature has never exceeded 105 F.

Because the application has no fumes or toxic chemicals, the site could remain open to patients during the project. Logistics were complicated, however. Cranes brought materials to the roof and hauled away trash and debris. The crew staged material in three different areas so the roof was not overloaded and to optimize efficiency. Workers temporarily moved more than 300 2- by 2-foot concrete pavers (each about 90 pounds) out of the way to complete the walkway areas.



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RALPH H. JOHNSON VA MEDICAL CENTER | Charleston, S.C.

PHOTOS: GREEN ROOF OUTFITTERS



RETROFIT TEAM »

GREEN ROOF INSTALLER: Green Roof Outfitters Inc., Charleston, greenroofoutfitters.com

MATERIALS »

The 3,000-square-foot existing roof was covered with a modular green roof system. Pre-grown mats hold varieties of sedum. Chives, prickly-pear cactus and other perennials were added later.

GREEN ROOF MANUFACTURER: Green Roof Outfitters

THE RETROFIT »

Construction took place on a weekend when traffic was lighter. A crane was used to load the material on the roof, including 4-inch-deep trays for the extensive modular green roof system and 2-inch-thick rubber pavers that were placed

around the perimeter. For this project, a layer of 40-mil EPDM was placed on top of the existing TPO roof, upon which the modules were laid. Rubber paver walk pads, which are located along the outside to provide an attractive barrier and walking area for maintenance, have feet on the bottom for drainage.

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PHOTOS: PROSOCO



WHIDBEY GENERAL HOSPITAL | Coupeville, Wash.

RETROFIT TEAM »

ARCHITECT: HDR, Seattle, hdrinc.com

GENERAL CONTRACTOR:
Andersen Construction, Seattle,
www.andersen-const.com

AIR and WATER BARRIER APPLICATOR:
Axiom Construction & Consulting,
Lynden, Wash., axiomconstruction.net

MATERIALS »

Approximately 37,800 square feet of this project was covered with PROSOCO's R-Guard Cat 5 air and water barrier, as well as the company's Joint & Seam Filler, a fiber-reinforced fill coat and seam treatment; FastFlash liquid flashing membrane; and PorousPrep, a water-based sealer for raw gypsum board edges.

MANUFACTURER: Prosoco, prosoco.com

THE RETROFIT »

Completed last year, this hospital was 10 percent retrofit. The retrofitting occurred where the new build portion ties into the existing building. Some of that area was brick veneer and liquid-applied product was the only option. All work was completed during winter, which is especially rainy in Washington state. Installation was completed without having to tent the building.



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WRITTEN BY | JEREMY BARTLETT, CxA



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Baltimore-based RMF Engineering will be presenting "Lab Retro-Cx: The Rebirth of a Research Facility" at CxEnergy 2018, a building-commissioning and energy-management event. CxEnergy includes educational sessions on a wide range of topics relating to commissioning and energy management of the total building enclosure, an exhibit hall featuring the latest in energy-management technologies, and certification opportunities for the Washington, D.C.-based AABC Commissioning Group's Certified Commissioning Authority (CxA) and the Washington-based Energy Management Association's Energy Management Professional (EMP). CxEnergy is being held April 23-26 in Las Vegas. Register at www.CxEnergy.com.

Oberlin College Successfully Re-commissions Four-building Fusion Project During Occupancy

Re-commissioning of an existing building presents unique challenges. When the building is an occupied laboratory the complications are compounded. Occupied laboratory commissioning can only be successful with extensive upfront document review and field verification. Extensive site access and room-by-room scheduling, as well as schedule shift and delays, must be anticipated. If the building being commissioned is part of a campus district energy system, the project scope needs to include discussions with central plant staff and may even need to include some review of related utility systems on campus.

Such was the case with Oberlin College in Oberlin, Ohio, which recently conducted its first re-commissioning project on campus, including a nearly yearlong investigation, implementation and remediation process at its 229,000-square-foot Science Center. As the commissioning authority on the project, Baltimore-based RMF Engineering determined that holistic views of building-level and district-utility-level energy-conservation measures (ECMs) were key to meeting campus energy goals. Coordinating discussions between the staff responsible for the buildings and district energy systems while conducting the re-commissioning work with a concurrent energy neutrality project helped to ensure that the overall energy savings goal was achieved.

EXISTING BUILDING commissioning, as defined by the AABC Commissioning Group, Washington, D.C., may be classified as either re-commissioning or retro-commissioning when the re-commissioning is conducted on a building whose HVAC systems have been commissioned previously during either construction or at a point in time after initial occupancy. Retro-commissioning is the term used when commissioning is conducted on a building whose systems have never been commissioned. (For more information, visit www.commissioning.org.)

The Science Center underwent a construction renovation project in 2000 that fused three separate buildings of different maturities under a single roof, along with a new chemistry wing. This presented unique challenges to the re-commissioning and project teams. A critical component to any re-commissioning project is conducting a thorough review of any existing documents, including as-built drawings, commissioning reports, maintenance records, etc. Because of the nature of the 2000 renovation, there was not a single set of documents that allowed for review of the HVAC systems. This meant that four separate sets of drawings, ranging from original design documents to renovation plans from 1993 until 2000, had to be reviewed and interpreted.

(continues on page 52)



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Three existing buildings fused and connected by a new chemistry wing at Oberlin College were the subjects of a re-commissioning project by RMF Engineering.

The fact that there were multiple utility-service entrances to the building and an undetermined electrical feed from one wing of the building out to student housing presented additional complications. A vital component to the success of this re-commissioning project was the assurance that campus energy goals were being met. This meant there was a need for more utility metering than was initially anticipated. Upon this discovery, the project team worked together with a concurrent campus metering project to budget for and identify locations for 12 new utility meters in the Science Center.

ONE OF THE LARGEST HURDLES on a project such as this is determining how to functionally test systems while the building is fully occupied. An essential component to the functional testing is to ensure proper equipment failure sequences while maintaining proper laboratory pressurization. Many of the tasks RMF Engineering was asked to perform needed to be carried out during occupied hours while laboratories were being used for research and education.

The project team determined the as-built drawings on hand were an adequate guide for mechanical systems but were certainly not perfect. This is standard feedback; however, it drove a need for an up-front as-built verification process. All HVAC ductwork had to be followed out and new air-handling unit (AHU) zoning plans needed to be created so equipment shutdown effects could be understood. Through this process, the project team learned that its understanding of the areas of the older, existing wings where the AHUs and exhaust

systems were thought to have served a purpose were incorrect. This reinforced the need to generate these AHU zoning plans, which is a process RMF Engineering is now rolling out to all of its re-commissioning and retro-commissioning projects.

As with any laboratory re-commissioning or retro-commissioning project, extensive site access must be scheduled. Weekly site access and room-by-room scheduling needed to be conducted to ensure no functional testing would impact student and occupant safety or any ongoing research. Much of the work on the centralized systems—such as the AHUs, chillers, boilers, etc.—had to be conducted during off-hours, weekends, school closings and holidays.

One of the few tests that RMF Engineering was able to execute with an empty building was an emergency power test. The testing was coordinated with four different teams on campus so that during the power outage electrical metering could be installed concurrently with the outage. The test was conducted during a vacation week for students to allow for multiple attempts in the event that any tests weren't executed as planned.

During the emergency power test, RMF Engineering walked the building to ensure the emergency lighting and mechanical systems on the emergency power were operating as intended. During the walk-through, RMF Engineering found that 43 of the 99 fume hoods in the building had sashes in full-open position. Many of the fume hoods that were open were used in teaching laboratories and no hazardous materials were stored in them. The fact that the sashes were open was causing over-

ventilation of the laboratory spaces and led to energy waste during unoccupied periods. Therefore, one of the ECMs put forward was renovated fume-hood controls. After evaluating multiple options for renovation, a final ECM was proposed to renovate fume-hood controls to include automatic sash closers and hibernation modes and to reduce face velocities to 100 feet per minute. RMF Engineering evaluated fume hoods to ensure retrofit kits could be accepted without needing to replace the hoods. The project recommendation was put forward at an annual savings of \$126,794 and a simple payback time of six years.

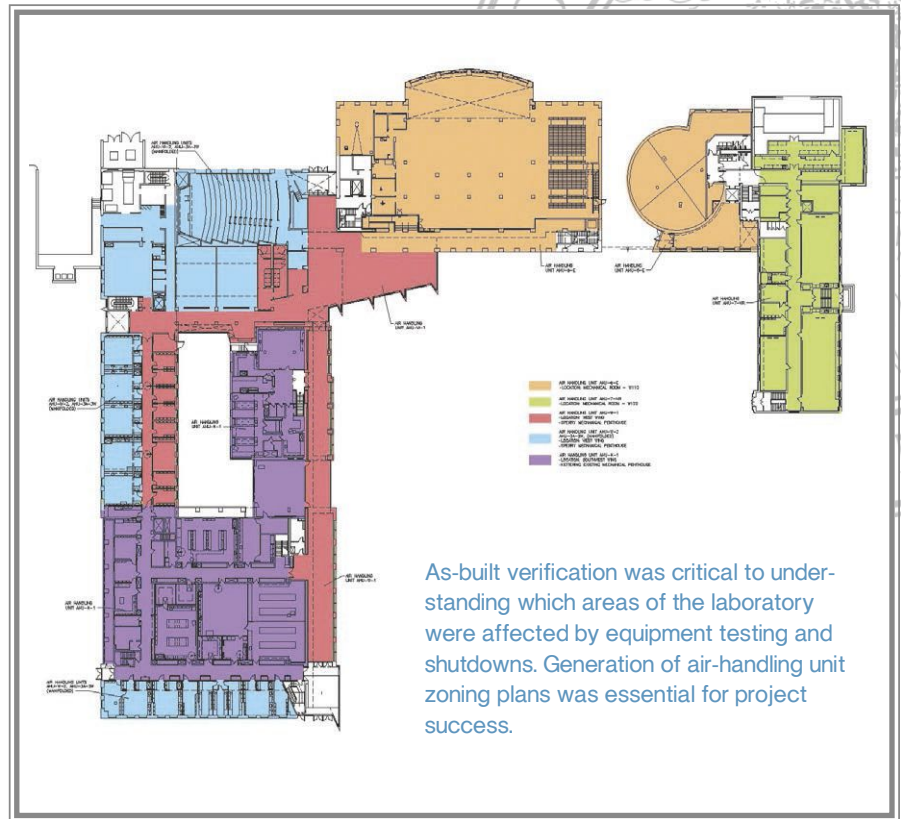
Another unforeseen benefit of re-commissioning an occupied building was that it facilitated student learning activities. Oberlin College was unique in its scope of work for re-commissioning in that there was a requirement to include student involvement and educational opportunities. RMF Engineering worked with students and interns from the college's sustainability programs to educate them about commissioning processes. Students also received safety training and were provided the proper safety equipment and personal protective equipment to follow along on building walk-throughs and commissioning activities.

ONE OF THE UNEXPECTED OUTCOMES of the re-commissioning project was the coordination challenge of balancing the building needs and the needs of the district energy systems, as well as the needs of other buildings on campus. The chilled water system for the building was district-chilled water when the campus chiller plant was enabled and was supplemented by a local air-cooled chiller in the winter and swing seasons. The team discovered that the chilled-water system operation and capacity occurred during outside air-temperature swings. The standard operating procedure for the campus was to enable the campus-chilled water plan after there were two consecutive weeks of outdoor temperature above 60 F. This led to instances where high outdoor air conditions occurred and no plant-chilled water was available.

Upon evaluating the local air-cooled chiller capacity and the connected cooling

loads, RMF Engineering found the local chiller and pump capacities were 247 tons at 575 gallons per minute (GPM) while the connected load was 888 tons at 1,538 GPM, plus some additional unknown load from unscheduled and customized air handlers. This equates to the local chillers and pumps only capable of accommodating 24 to 27 percent of the cooling load of the building. The team witnessed ambient conditions inside the building of 80 F and 70 percent relative humidity. This affected occupant comfort and the accuracy of laboratory research projects.

The heating system for the building was comprised of district steam serving heat exchangers within the building with local boilers used in the summer months for terminal equipment re-heat purposes. The team discovered that all heating equipment renovated in 2000 was sized for medium pressure steam at 25 pounds per square inch (PSI). During heating system evaluations, RMF Engineering discovered that district steam from the Central Steam Plant varied but was typically between



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The Science Center heating capacity was limited because of mechanical issues and aging equipment located elsewhere on campus.

eight and nine PSI with occasional drops to six PSI in the main 10-inch incoming steam line. Because of the reduced district steam delivery pressure, the Science Center was starving for heat and was typically cold in the winter months, rendering some areas, such as the greenhouse, nearly unusable. Additionally, nearly all the heating system components were operating at full capacity

24 hours a day throughout the winter, and all steam metering was unreliable as the meters installed were not sized for low-pressure steam.

Both the cooling and heating system operation needed to be addressed with central plant personnel. Through discussions with the appropriate personnel, RMF was able to learn more about why the cooling and heating systems were manipulated to work as they currently were. In particular, the team was informed that the steam delivery pressure was reduced significantly and intentionally because of undersized and failing pressure-reducing valve stations elsewhere on campus. RMF was able to work with the central plant personnel to identify these locations that were originally outside the scope of the re-commissioning project to include them in capital project recommendations put forward to the project team.

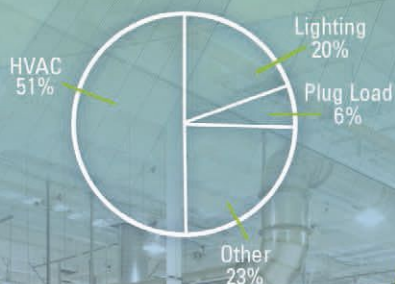
Although the challenges were extensive, the Science Center at Oberlin College is proof that successful re-commissioning of occupied, existing buildings can take place through thoughtful planning, coordination and communication across the project team. 

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TUNABLE



Research Demonstrates Tunable Lighting Technology Offers Benefits Beyond Biology in the Built Environment



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Andrea Wilkerson will be co-presenting “How to Do Tunable WELL: Points, Pitfalls, and Potential” at Lightfair International 2018, an annual architectural and commercial lighting trade show and conference. This session will review the lighting requirements of the WELL Building Standard and describe how a tunable white lighting system can meet these requirements. Lightfair is being held May 8-10 at McCormick Place in Chicago. Learn more and register at www.lightfair.com.

The renewed focus on human health in the built environment is leading building owners and occupants to request healthier working, learning and living spaces. In architectural lighting, the increasing demand for healthier buildings has aligned with advances in LED technology, controls and research exploring human biological response to light. This alignment has led to a rise in health claims related to lighting, yet there is still much to learn regarding the relationship between light and human biology.

The first published research documenting the treatment of a patient with winter depression using light occurred in 1980. The article, “Light Suppresses Melatonin Secretion in Humans”, was published by the National Center for Biotechnology Information (NCBI), Bethesda, Md. It was not until 2002 that research was published identifying a new photoreceptor responsible for regulating the human biological clock. The article, “Phototransduction by Retinal Ganglion Cells That

Set the Circadian Clock”, also was published by NCBI. Much of the research related to light and human biology has been completed in very controlled environments, which presents a challenge when trying to apply scientific data to the built environment where an unending supply of variables are present.

When designing an architectural lighting system to account for possible health benefits, there are many considerations, such as which metric to use, how and where to measure the light, and the multiple factors that affect circadian response to light. These factors include timing, duration of exposure, the wavelengths of the light (known as the spectral power distribution, or SPD), intensity (amount of light) and physiological dynamics. Tunable lighting allows for the variation of the SPD and intensity, so it is increasingly chosen to address some of the factors that affect the human biological response to light. Tunable lighting also increasingly is considered as costs decline and the number of products to choose from rises.

LIGHTING



There is clear interest in tunable lighting technology for biological benefits, as well as other reasons, including curiosity. Over the past several years there has been an observable growth in the number of products available, the number of manufacturers developing products and the number of installations. The Washington, D.C.-based U.S. Department of Energy's Solid-State Lighting Program (SSL) continues to evaluate tunable lighting technology, from the testing of products in a laboratory to evaluations of performance in the field with the goal of increasing the understanding of the limitations and benefits associated with this technology. (Read "Report 23: Photometric Testing of White Tunable LED Luminaires" at bit.ly/2E8FhH2.)

The DOE SSL GATEWAY program recently evaluated a tunable lighting system installed in a behavioral health unit (BHU) in Seattle. (Read a report about it at bit.ly/2E7NA1Q.) The tunable lighting varied in hue, ranging from cool white to warm white, known as white-tunable lighting. It was installed in the main gathering area where dining and activities took place and in the hallways that led from the main gathering area to the patient rooms.

Another recent evaluation was of a tun-

able lighting system installed in three K-12 classrooms near Dallas. (The report can be found at bit.ly/2nGoHnH.) The incumbent fluorescent troffers were replaced with white-tunable LED troffers with the goal of learning about the benefits of this new technology in addition to energy savings. In both projects, benefits beyond biology were realized, which are explained in greater detail in the sections that follow.

Cues to Nature, Biology

Hospital patients, residents in senior care facilities, as well as other building occupants who spend a significant portion of the day inside with limited access to daylight may lose track of the time of day, particularly in populations that are restricted from leaving a building. Tunable lighting allows for electric lighting to provide a similar cue to the time of day as the sun in indoor environments where there is often a lack of access to daylight for many occupants.

The tunable lighting system in the BHU was designed to establish a sense of time by creating a marker of the routine passage of the day/night cycle with a consistent, warm sunrise, a brightening and cooling of light

Teachers are finding benefits in using tunable lighting. For example, a K-12 teacher lowers the intensity of the lighting to signal to her classroom that they are transitioning back to activities after recess. Meanwhile, a middle-school teacher lowers the lighting intensity when he suffers a migraine.



PHOTOS: COURTESY OF PACIFIC NORTHWEST NATIONAL LABORATORY

In health-care facilities, tunable lighting helps establish a sense of time throughout the day for patients who spend most of their time indoors. The lighting mimics daylight and the passage of time throughout the day. It can be tuned for a warm sunrise, then brighter, cooler colors throughout the morning and into noon, cooling down again and lowering intensity during nighttime hours.



throughout the early morning, peaking by noon, and a sunset in the evening. This effect was achieved by delivering light lower in intensity and correlated color temperature (CCT) during the night with light increasing in both CCT and intensity throughout the morning and then decreasing again in the late-afternoon and evening hours, returning to night settings. This pattern established by the architect was intended to support a connection to nature, as well as a biological response to help prepare the patients for bedtime. One BHU nurse commented a year after the white-tunable lighting installation that she thought the residents in the BHU went to bed earlier than in a similar facility where she also worked that did not have tunable lighting. Although the bedtime of patients was not tracked for this project, this is a potential benefit worth considering and tracking in future projects.

In the K-12 classroom evaluation, one of the teachers used the ability to lower the intensity of the lighting and switch to a lower CCT as a signal to her elementary stu-

TUNABLE LIGHTING allows for electric lighting to provide a similar cue to the time of day as the sun in indoor environments where there is often a lack of access to daylight for many occupants.

dents after recess that it was time to transition back to activities in the classroom. Another teacher lowered the intensity of the lights when he had a migraine and when his middle-school students arrived to his classroom some assumed that he had a migraine because of the dimmed lights.

Ease of Flexibility

The opportunity to change the look of a space with lighting has never been easier. With the push of a button, a voice command, an automatic schedule or simply by walking into a space, the lighting can

transition in color and intensity. In the future, it may even be common for the distribution of the light exiting a fixture to change. This flexibility allows spaces to adapt to changing needs, such as providing more or less light depending on the age of the occupants.

The initial commissioning of the BHU control system did not result in the desired change specified by the architect. Because of a variety of reasons, the intensity was too high, the change in CCT was not as specified, and the transition between CCT and intensity throughout the day was too abrupt. To address these issues, a control system allowed for adjustments to easily be made to the CCT and intensity throughout the day to further improve the space for the staff and patients without causing disruption to the BHU.

In the K-12 classrooms, the incumbent fluorescent system included the ability to switch off the lights closest to the projector screen. With advances in technology, the projector screens in the classrooms were replaced with interactive boards; however,

(continues on page 60)

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in one of the classrooms documented, the interactive board was placed on a different wall so the lights could no longer be switched off just in the area near the interactive board. With a tunable lighting system, this problem can be solved without any rewiring of fixtures. The change in screen location doesn't necessarily warrant a change in the color of the light, but if there were a considerable change in the

color of the furniture and walls in a space, then a change in the color of the light might be considered appropriate in this and other applications.

Design and Manufacturing


The DOE SSL program also recently supported the development of an advanced patient room lighting system that changed the color and intensity of the light through-

out the patient room; however, for this project the changes in color went beyond white hues to saturated oranges, pinks and blues. The ability to tune lighting fixtures to different colors opens up new opportunities and challenges to those that design spaces and also new areas of research. Learning what colors and changes over time occupants find acceptable and how this translates to different applications, regions and cultures will be an important part of the transition to tunable lighting. It may also provide an opportunity for designers to select the color of the light after the interior of a space is complete, instead of during the design when the color of finishes and furniture can change. Manufacturers also may be able to reduce the number of product variations they manufacture as the technology matures for tuning color, intensity and other attributes, such as distribution.

Energy Savings

The energy implications of tunable lighting are dependent on the product and application. A given tunable fixture may be less efficacious than a similar non-tunable model, yet tunable lighting may allow the occupant to dim or turn off lighting when not needed. The BHU nurses observed that the majority of the lighting fixtures in the main gathering area could be turned off during the nighttime hours, so this change was implemented as part of the automatic programming of the control system. The nurses also often chose to decrease the light levels further in the evening hours, increasing energy savings.

There are many other possible uses for tunable lighting, and as with many other pieces of technology, we may soon find that lighting fixtures with the addition of sensors, networking capability and other devices will serve many more purposes than simply delivering light. Additionally, the increasing availability of tunable lighting will hopefully expand what is known about the benefits it may provide to human biology. In turn, tunable lighting can then be modified to account for the latest research and best practices, increasing the benefit to occupants of the built environment.

For more information on tunable lighting, visit the Department of Energy's SSL website, bit.ly/2BekIGP. 



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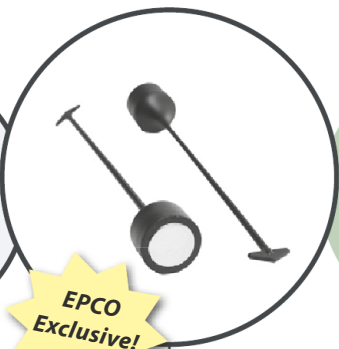
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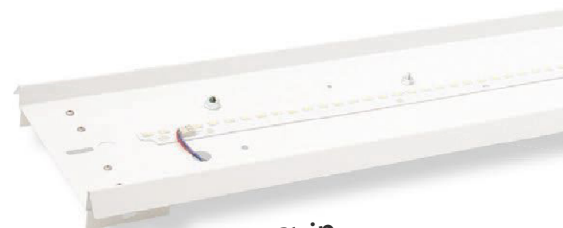


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Circle No. 33

AN ICON'S SECOND ACT

WRITTEN BY | ALEX ABARBANEL-GROSSMAN

A Theater Restoration
Updates Critical Systems
While Strengthening
Community Ties and
Improving the Relationship
Between Audience
and Performer

PHOTOS: FRANCIS DZIKOWSKI/OTTO (unless otherwise noted)



Known as the birthplace of renowned performers like Richie Havens, Jay-Z and Chris Rock, Brooklyn's Bedford-Stuyvesant neighborhood has long been a focus of cosmopolitan African-American culture in New York City. Standing at the intersection of the community's geographic edge and artistic heart, the Billie Holiday Theatre has served as a focal point of this cultural expression for more than 45 years. Thanks to a recent and long-overdue renovation designed by New York City-based Murphy Burnham & Buttrick Architects (MBB), improvements to the theater's performance and support spaces, as well as new technology and crucial life-

safety upgrades, bring this beloved space into the present.

Opened in 1972 by the Bedford-Stuyvesant Restoration Corp., New York, "The Billie," as it is fondly referred to—named for famed jazz singer Billie Holiday—was seen as a platform for homegrown talent. It also aimed to expose the nation's second-largest black community to the arts and to enhance local pride. Playing host to performers like Samuel L. Jackson and Debbie Allen, the 200-seat

theater quickly grew into a hub of African-American performing arts and culture. Over time, the theater also became a focal point for the community at large, serving as the anchor for a superblock called Restoration Plaza. By the 2000s, though, the facility itself struggled to keep up.

"The structure originally had been a bottling plant for the Sheffield Farms dairy company, so the building was not designed to support a performing arts program," says Jeffrey Murphy, FAIA, MBB partner and project lead. "Out of necessity, the building structure was modified to accommodate the theater functions into an existing space and, as a result, we encountered a number of overlapping programmatic challenges."



“With a limited budget, we had to prioritize needs. We focused on providing state-of-the-art performance infrastructure and strengthening the features that make ‘The Billie’ an ideal community theater. —Jeffrey Murphy, FAIA, partner and project lead, Murphy Burnham & Buttrick Architects”



↓ Retrofit Team

ARCHITECTURE AND INTERIOR DESIGN // Murphy Burnham & Buttrick Architects, New York, www.mbbarch.com
 ■ Jeffrey Murphy, FAIA, partner in charge
 ■ Jose Miranda, AIA, project manager

PROJECT OWNER // Bedford Stuyvesant Restoration Corp., New York, restorationplaza.org

CLIENT'S REPRESENTATIVE // New York City Department of Design & Construction, www.1.nyc.gov

STRUCTURAL ENGINEERING // CRAFT Engineering Studio, New York, craftengin.com

MECHANICAL AND ELECTRICAL ENGINEERING // Plus Group Consulting Engineering, New York, www.plusgroupce.com

ACOUSTICS // Lally Acoustical Consulting, New York, www.lallyacoustics.com

THEATER DESIGN // Auerbach Pollock Friedlander, New York, www.auerbachconsultants.com

COST CONSULTANT // Pavilion Financial Corp. (formerly Slocum Consulting), New York, www.pavilioncorp.com

CODE CONSULTANT // William Vitacco Associates, New York, www.vitacco.com

↓ Materials

ACOUSTIC CEILING TILES // Armstrong Ceiling and Wall Solutions, www.armstrongceilings.com

CARPET // Tandus-Centiva, bit.ly/2E0wGWW, and Interface, www.interface.com

FABRIC CURTAINS // KM Fabrics, www.kmfabrics.com, and Rose Brand, www.rosebrand.com

GLAZED CERAMIC WALL TILE // Daltile, www.daltile.com

HANDRAILS // Julius Blum, www.juliusblum.com, and McMaster Carr, www.mcmaster.com

LAMINATE // Formica, www.formica.com

PAINT // Benjamin Moore, www.benjaminmoore.com

PORCELAIN FLOOR TILE // Casalgrande Padana, www.casalgrandepadana.com

WOOD FLOORING // Maple plank flooring

VINYL FLOOR TILE // Azrock from Tarkett, commercial.tarkett.com

WOOD PANELS // Rulon International, rulonco.com

Constraints presented by the former factory building, for example, required the stage to be asymmetrical and located far above the seating area, which compromised sightlines for much of the audience. “The theater also had limited wing area and fly space,” Murphy says. “Equally limiting, the stage’s construction precluded dynamic, high-impact dance performances.”

The project team faced another issue: Because the theater had never received a major renovation, the updated facility needed to address legacy issues relating to accessibility and life safety. “Other than a few isolated mezzanine seats reserved for persons with disabilities, the theater, its stage and its support spaces were not fully accessible,” Murphy explains. Additionally, despite basic upgrades over the life of the theater, major systems were beyond their useful life, and new upgrades to lighting, fire- and life-safety systems, as well as stage infrastructure, were needed for the theater to function as a top performance venue.

Improving the Theater's Features

Despite previous challenges to finance repairs to the facility, the Billie Holiday Theatre benefited from city funding through the New York City Department of Design and Construction Design Excellence Program, initiated by the Bloomberg administration. Introduced in 2004, this initiative matched cultural institutions and design-focused architecture firms to undertake municipal or publicly funded projects. By connecting top-level firms with important cultural commissions at a reasonable fee, the Design Excellence program ensured millions of dollars of work and opened the door for mid-size firms, like MBB, to get involved in a sector previously dominated by larger offices.

On the other hand, the project’s budget and schedule demanded a cost-effective and highly creative approach to problem-solving—while capitalizing on facility opportunities. Murphy and the project team had a relatively modest outlay of \$4.1 million for the entire gut renovation and expansion of this major performing arts space. With founding Executive Director Marjorie Moon and later Executive Director Dr. Indira Etwaroo’s visions of strengthening the theater’s bond with the community, enhancing its well-established identity and



“The structure originally had been a bottling plant for the Sheffield Farms dairy company, so the building was not designed to support a performing arts program. —Jeffrey Murphy, FAIA, partner and project lead, Murphy Burnham & Buttrick Architects”

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improving the relationship between audience and performer, the process could have been daunting. "With a limited budget, we had to prioritize needs," Murphy notes. "We focused on providing state-of-the-art performance infrastructure and strengthening the features that make 'The Billie' an ideal community theater."

With the joint goals of supporting performers and improving the overall audience experience, the project team undertook a series of upgrades to the 3,200-square-foot theater space itself. Redesigning the stage with a symmetrical thrust and reconfiguring the seating riser slope brought the performing surface into closer alignment with the seating area, creating improved sightlines. By expanding the stage area with new, sprung-maple flooring, the project team also opened the door for dance performances and other types of dynamic programming that the Billie Holiday Theatre hoped to bring the community.

Upgrades to outdated theatrical equipment—such as the addition of new catwalks and a control panel with a fully motorized lighting and rigging system—freed up floor space and provided increased wing room to facilitate a wider range of productions. Improvements to the theater space also addressed auditory issues. Acoustical sealing at all doors helped eliminate excessive noise from adjacent spaces and the street. By symmetrically reshaping the interior walls and adding acoustic panels to the ceiling, the redesign also ensured better sound projection from stage to audiences. The project team isolated the control booth from the theater and equipped it with the best technology available. These improvements allow the sound crews to more effectively communicate with performers, support stage activities with video projections and enhance the viewer experience.

Creating better accommodations for audiences—a longstanding, limiting factor for the Billie Holiday Theatre—included the removal and replacement of old, too-narrow seats, the addition of accessible, comfortable new seating and improvements to circulation. The more-efficient theater layout meant the seat count could be increased from 191 to 200 while a ramp now connects the lobby, backstage area and the stage. Reconstruction of the

theater also extended from the backstage to the basement with the creation of new support facilities like an enhanced green room and additional, shower-equipped dressing rooms. The new dressing rooms are accessible, more spacious and bright. Better access to the stage is now possible with the addition of a wheelchair lift.

Theater as Gift

The renovation work improved support spaces and vital infrastructure throughout the building, too. A new sprinkler deluge system and fire alarm that communicates with the base building alarm “dramatically improve life-safety,” according to MBB Project Manager Jose Miranda, who also notes that lighting was brought up to code to facilitate safe circulation and egress.

Other extensive improvements made to the theater’s infrastructure include new boilers and several new air-conditioning units that work with the building’s existing geothermal system, reducing energy consumption by 25 percent and significantly improving sustainability for the organization. The project team also installed a new connection to the municipal water main for the advanced, standalone fire suppression system.

Throughout the renovation process, the project team sought small but meaningful ways to highlight the venue’s history and importance to the community, says Murphy. “During early reconstruction, the contractor uncovered a wall blanketed in original, faded performance posters,” Murphy recalls. “It was such a perfect expression of how history is layered into the theater, so the project team proposed scanning the posters and printed them as a custom wallcovering.” Now lining a hallway that leads to the green room, this thoughtful touch helps bridge the past to the present and cements the theater’s role in the community.

After an official grand reopening in spring 2017, the newly revived Billie Holiday Theatre hosted its first full-run performance later that year. The verdict is clear, and it reflects the value of a sensitive approach to restoring important community spaces: “The beauty of the theater is a gift to the audience,” Etwaroo says. “But in many ways, it’s also a gift to the artists who can now expand the worlds that they’re building.”

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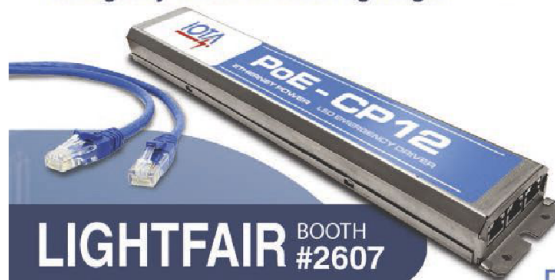
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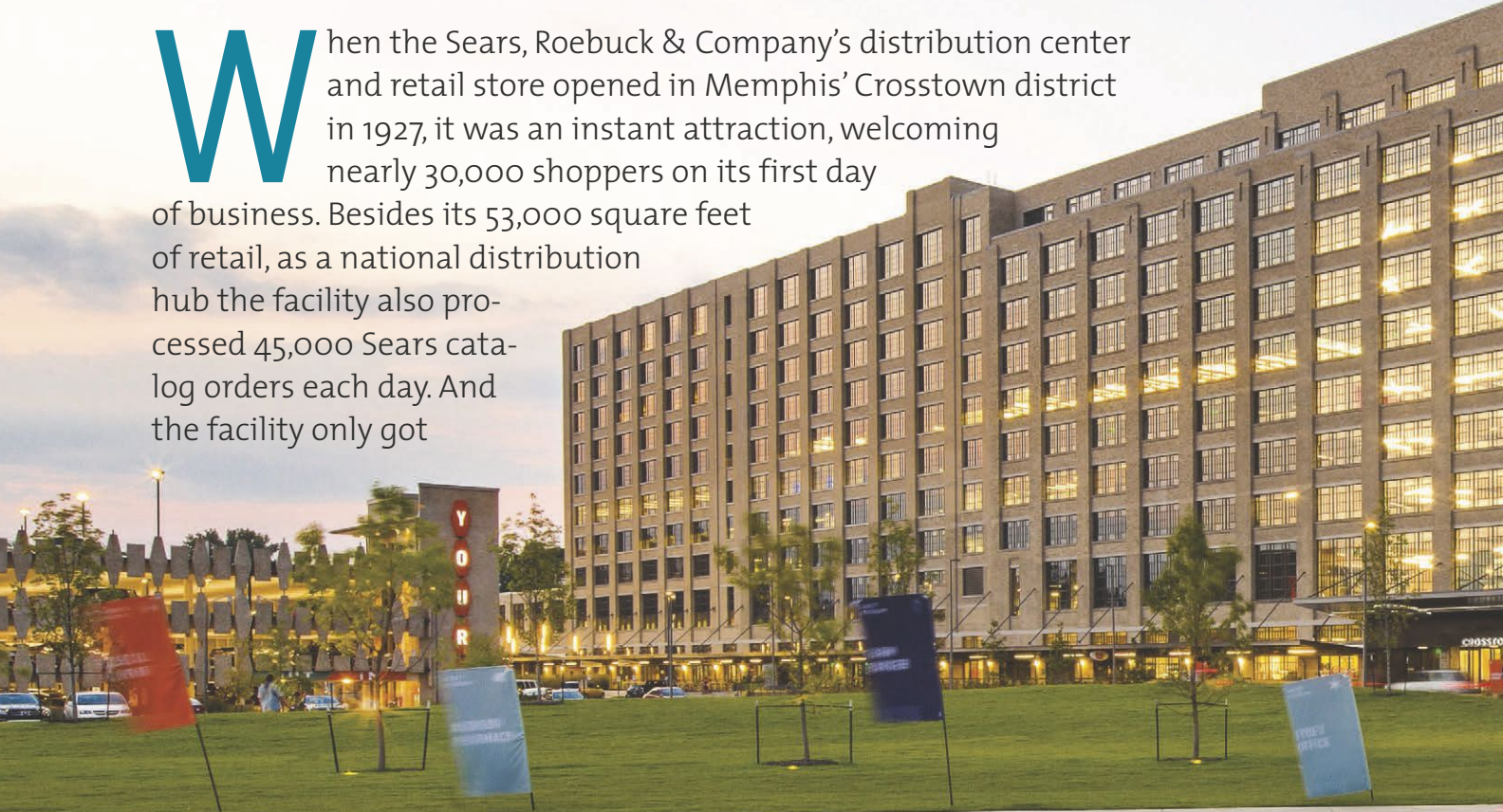


[WRITTEN BY | BRIAN LIBBY]

Memphis' Crosstown
Concourse Transforms
a 10-story Sears
Distribution Center into
a Vibrant Urban Village

VERTICAL COMMUNITY

When the Sears, Roebuck & Company's distribution center and retail store opened in Memphis' Crosstown district in 1927, it was an instant attraction, welcoming nearly 30,000 shoppers on its first day of business. Besides its 53,000 square feet of retail, as a national distribution hub the facility also processed 45,000 Sears catalog orders each day. And the facility only got



PHOTOS: CHAD MELLON



VIEW THE
STORY OF HOW
THE CROSTOWN
CONCOURSE PROJECT
UNFOLDED VIA
VIDEO.



Crosstown Concourse is the largest adaptive-reuse project in the nation to earn a top-level Platinum LEED rating from the U.S. Green Building Council, Washington, D.C.



bigger: From 1927 to 1965, five different additions expanded its capacity to a whopping 1.5 million square feet.

"Anyone who lived in the city from the '20s until the late '60s or the '80s, they have some story," recalls Brett Grinder, a vice president for Memphis general contractor Grinder, Taber & Grinder Inc., which was integral in the project's rebirth. "As a kid, I remember the peanuts you could smell cooking. I got my first bicycle there."

By 1993, however, with its catalog business in decline and preferring to focus retail efforts in suburban malls, Sears closed the center. It remained vacant for 20 years. "For so long it was this sort of dark, hulking building on a major thoroughfare on the way to downtown," Grinder says. Local developers seemed intimidated by the scale of the building and the potential cost of a restoration.

Perhaps that's why the building's rebirth as the rebranded Crosstown Concourse was instigated not by traditional developers but by a University of Memphis art history professor, Todd Richardson, and artist, Christopher Minor.

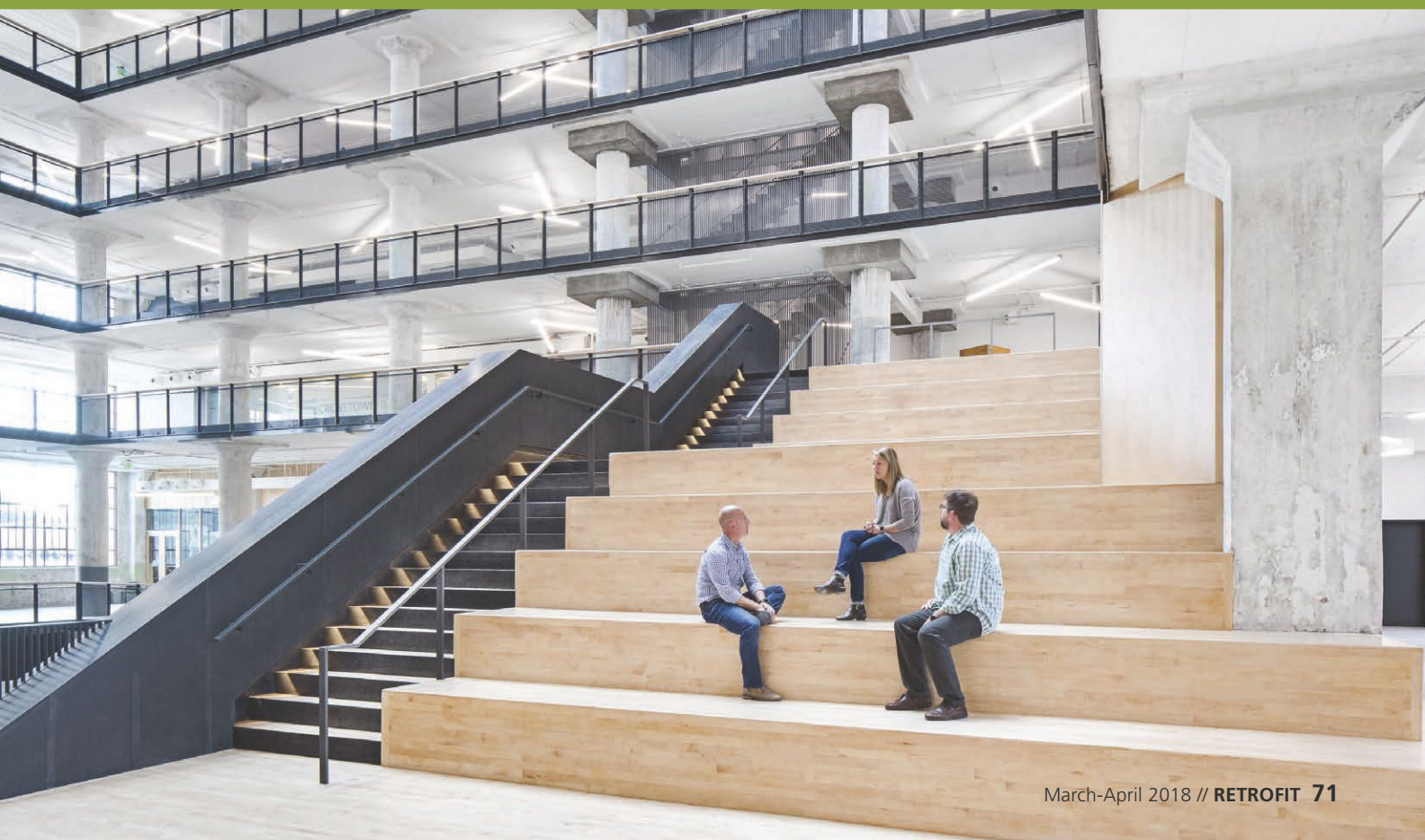
"You had an academic and an artist leading a feasibility study on a 1.5-million-square-foot building in the middle of the recession. Clearly this is not going to work," Richardson says today with a chuckle. "We gave ourselves a 2 percent chance of success, so we decided we were going to have a good time doing it."

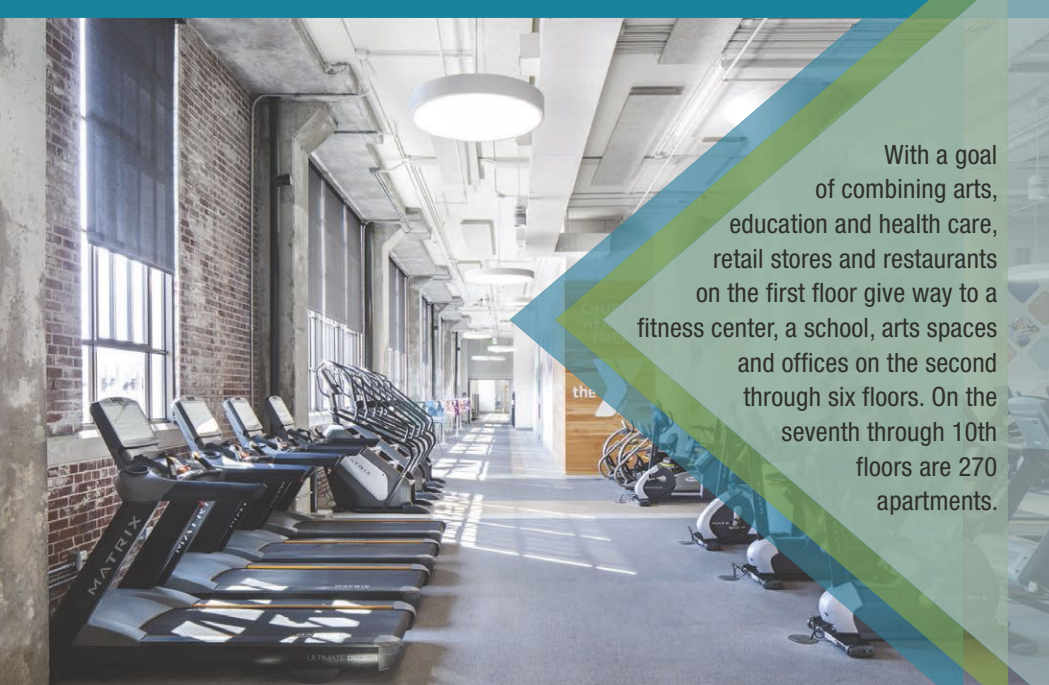
A New Neighborhood

Richardson and Minor were inspired by the old Sears building's Art Deco architecture; Crosstown Concourse is one of several former Sears buildings around the nation designed by Chicago architect George Nimmons that have been repurposed, such as the Midtown Exchange in Minneapolis, the Ponce City Market in Atlanta and the Landmark Center in Boston. (Read **retrofit's** article about the Ponce City Market in the May-June 2015 issue, page 66, or bit.ly/2HtCerg.) The pair also was inspired by the building's



Once the decision was made to replace the original windows, the project team produced five different mockups with Quaker Window Co. to ensure the profiles were exactly the same shape and depth.





With a goal of combining arts, education and health care, retail stores and restaurants on the first floor give way to a fitness center, a school, arts spaces and offices on the second through six floors. On the seventh through 10th floors are 270 apartments.



role in the city's history. "Memphis is America's distribution center with FedEx and the Mississippi River," Richardson adds. "This building had a lot to do with defining that identity."

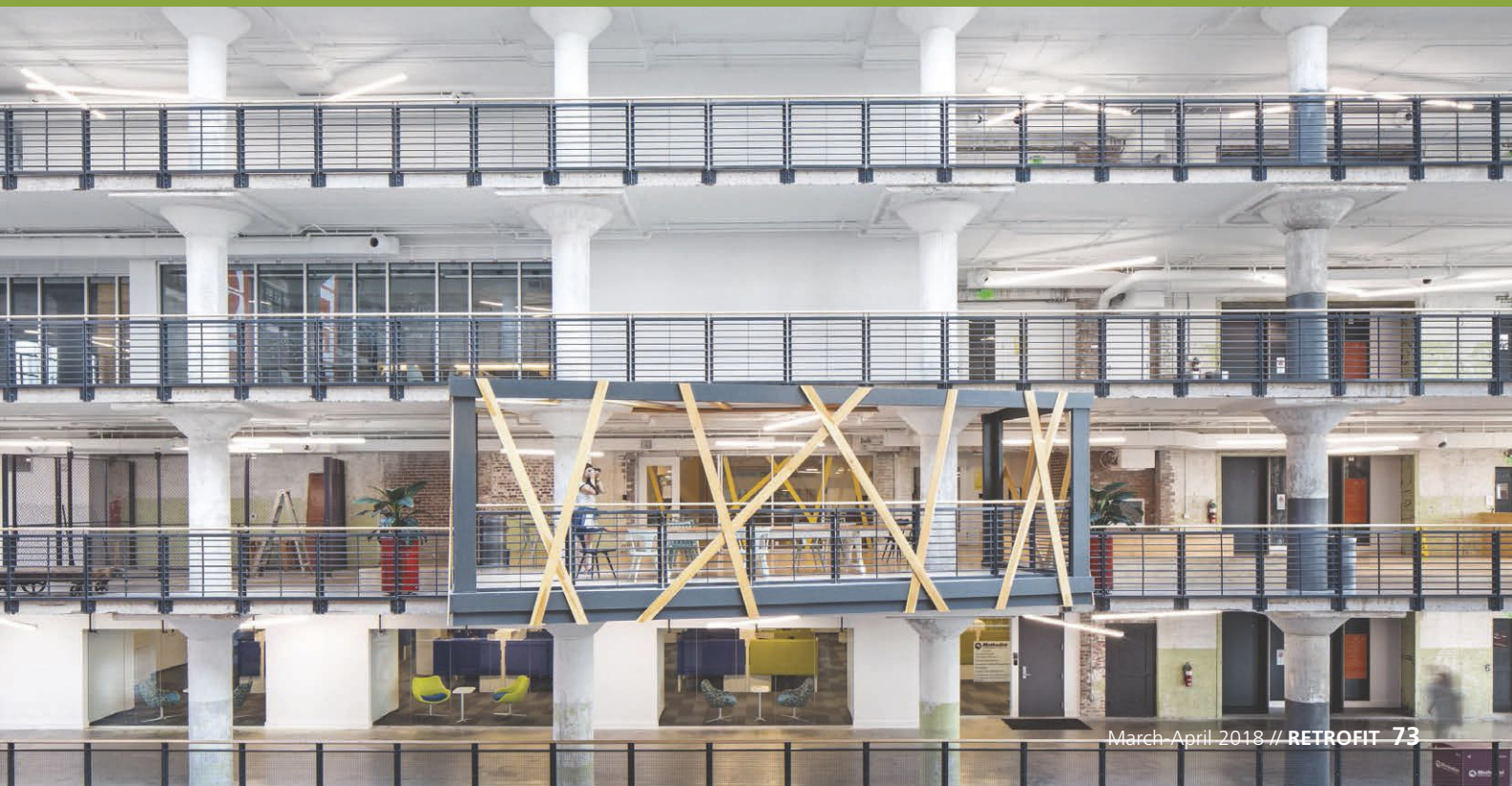
As its name indicates, the building has always sat at a crossroads with the historic Evergreen neighborhood to the east, the poorer North Memphis to the northwest and the burgeoning Medical District to the southwest. Richardson and Minor believed the former distribution center had enough scale to create what they refer to as a vertical community that mixed a variety of uses—from corporate offices and medical facilities to a school, restaurants and retail establishments. "That was really the vision: this vertical urban village on 10 floors," Richardson says. "We weren't going to take a typical development approach that said, 'Let's try to recruit a 400- or 500-square-foot anchor tenant, some residential [spaces] and be done with it.' We wanted to look at the opportunity to create a whole new neighborhood."

For all the challenges of rehabbing a 90-year-old building that sat empty for two decades, Richardson believes the biggest challenge "was believability: that the largest community building in the state of Tennessee could be redeveloped in the middle of the recession. It's a healthy skepticism. Why should anyone invest their money or support a project they couldn't get off the ground?" But by 2013, these neophyte developers had eight founding tenants committed. "That's when everything got real," he adds. Construction began shortly thereafter in 2015.

"It wasn't like a conventional demo and construction project," Grinder says. "You weren't tearing out miles and miles of sheetrock. There weren't very many walls to knock down because the majority of the space at Sears was rows and rows of shelves. It was peeling and sandblasting paint and then this



For all the challenges of rehabbing a 90-year-old building that sat empty for two decades, Richardson believes the biggest challenge "was believability" . . .





nice robust, concrete structure. The building is solid concrete designed to hold 250 pounds per square foot. Most buildings hold 150. We knew converting it from an empty shell to a fully heated and air-conditioned space was going to be the challenge: getting the miles of pipes in and taking out a massive amount of concrete to make these atria.”

A major obstacle was determining what to do with the approximately 3,200 windows. “They were all original steel, single-pane windows, which the National Park Service wants you to save, rehab and reuse because the building’s on the National Register,” Grinder notes. “But we were trying to get LEED credits and get modern energy savings, so that was a big challenge.”

The team ultimately found the windows were “so damaged that if we tried to remove and rehab them—including the asbestos in the glazing putties—they would have disintegrated.” Once the decision was made to replace the windows, the project team produced five different mockups to ensure the profiles were exactly the same shape and depth. It took an entire year for the new windows to be installed.

A Place to Come Together

These highly efficient windows are part of an overall


FAST FACT

In three years, about 4,500 workers installed 28 miles of HVAC piping and duct, 75 miles of sprinkler piping, 3,200 windows, 2,000 doors, 6,000 new light fixtures, 3,000 fire alarms and 2,500 tons of new concrete, as well as created 265 apartments, 700 additional parking spaces and two new streets.

commitment to sustainability that has seen Crosstown Concourse become the largest adaptive-reuse project in the nation to earn a top-level Platinum LEED rating from the U.S. Green Building Council, Washington, D.C. The project scored points for the removal of 54 million pounds of concrete and 10 million pounds of metal, as well as for installing a highly efficient central heating and cooling system.

Now complete after its \$200 million rehab, Crosstown Concourse is a kind of neighborhood unto itself. With a goal of combining arts, education and health care, retail stores and restaurants on the first floor give way to a fitness center, a school, arts spaces and offices on the second through six floors. On the seventh through 10th floors are 270 apartments. "If you're looking at the bottom line, there's a reason residential is normally in one area [of a project], retail in another and commercial in another," Richardson says. "It's difficult to have different people coming for different reasons."

A key component in that coming together is the atriums, which Crosstown Concourse has endeavored to program with a variety of performances and events. "If you think about our tenants, from health care to education to arts and everything in between, these are wonderful local organizations that everybody has lots of respect for. Wouldn't it be a shame if they all came and just co-located? We knew left to their own devices that would happen," Richardson explains. "We created these atria and light wells and plazas as places that can be programmed in a meaningful way."

Though Crosstown Concourse has been open less than a year, Richardson believes he is starting to see that desired mingling. "Over the holidays, you could tell Memphis residents were showing people from out of town around Concourse," he says. "For this building to even play some small part to help and enhance civic pride has been wonderful. But at the same time, it's new, it's an experiment. Success for us is not opening day but 10 years from now. Six months in, so far so good, but we've still got a lot of work to do." 



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WRITTEN BY | ALLEN BARRY



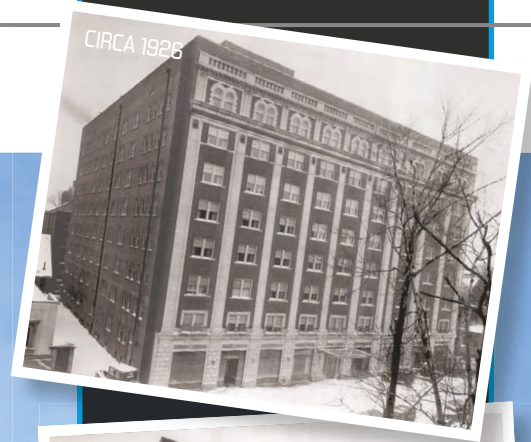
The city of Detroit is in the midst of a rebirth. After decades of harsh economic conditions, businesses and people are moving back to the city, neighborhoods are coming back to life and the vibrancy that has so long defined the Motor City is in the air.

While looking to a bright future, Detroit also is embracing its dynamic past. During

the height of the automotive boom of the 20th century, many incredible buildings were constructed, and neighborhoods with their own unique character flourished. A number of those buildings have fallen into disrepair over the years, but Detroit's renaissance has given designers and developers new opportunities to bring these classic structures back to life.

One example is the impressive restoration of the former Strathmore Hotel. Located in the historic Willis-Selden area of Detroit, the hotel was originally built as two separate hotels in 1924 and 1925. The two buildings came under the same ownership in 1930 and the joint property was named the Strathmore.

In its early days, the Strathmore was



THE STATE HISTORIC PRESERVATION OFFICER WAS PARTICULARLY SENSITIVE ABOUT ANY CHANGES TO THE EXTERIOR APPEARANCE OF THE BUILDING. THAT APPLIED NOT ONLY TO STRUCTURAL ELEMENTS AND PENETRATIONS, BUT ALSO TO LIGHTING.

HISTORIC PHOTOS: MANNING BROTHERS
HISTORIC PHOTOGRAPHIC COLLECTION

■ RETROFIT TEAM

ARCHITECT AND LANDSCAPE ARCHITECT //

Hamilton Anderson, Detroit,
www.hamilton-anderson.com

DESIGN //

REMIGER Design, St. Louis,
remigerdesign.com

DEVELOPER //

Midtown Detroit Inc.,
Detroit, midtowndetroitinc.org,
and McCormack Baron
Salazar, St. Louis,
www.mccormackbaron.com

GENERAL CONTRACTOR //

The Monahan Co., Eastpointe,
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STRUCTURAL ENGINEER //

SDI Structures, Ann Arbor, Mich.,
www.sdistructures.com

MECHANICAL/ELECTRICAL ENGINEER //

Strategic Energy Solutions Inc.,
Berkley, Mich., sesnet.com

CIVIL ENGINEER //

HH Engineering Ltd., Detroit,
www.hhengltd.com

MASONRY RESTORATION //

Akins Construction Inc., Detroit,
www.akersconstruction.net

PLASTER RESTORATION //

Russell Plastering Co., Ferndale,
Mich., (248) 543-6575

■ Materials

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Masa Architectural Canopies,
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surrounded by a flourishing working-class neighborhood that attracted scores of autoworkers. It was also part of an apartment hotel trend that began in the 1910s and '20s. These high-density structures could house many workers and provide a place for long-term residents and short-term travelers alike.

As times changed, however, the building fell out of favor and was eventually abandoned in 2004. The windows were even removed and sold for their aluminum, so many of the upper floors of the building were left exposed to the elements for nearly a decade before the team at Detroit-based architectural firm Hamilton Anderson started to examine the prospect of restoring the building as apartments in 2012.

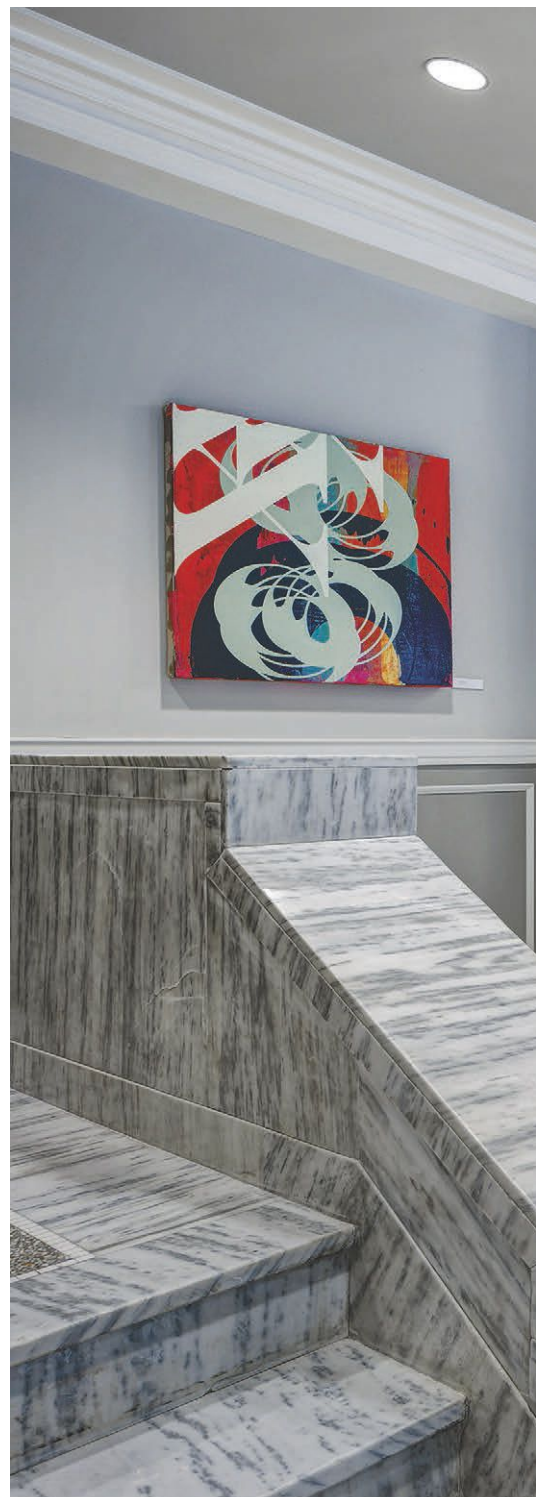
"Midtown Detroit Inc. partnered with St. Louis developer McCormack Baron Salazar to see if it was feasible to renovate the building," says Sandra Laux, FAIA, with Hamilton Anderson. "Our first step in 2012 was to come up with a concept plan, which would identify the number of units, the size of the units and a basic plan for the ground floor. This would enable us to create a financing document and to pursue historic tax credits and HUD development funds."

In surveying the building, the renovation team quickly discovered it had quite a challenge ahead of it. On the exterior, most of the windows were gone, graffiti marred the façade, the brick was in questionable shape, and the picture inside was even more grim.

"The building was covered with debris throughout the corridors and throughout every room," Laux recalls. "It was dark, we had flashlights and we were sometimes wading through water. We, at one point, thought there was green carpet, but it was actually moss. All kinds of life had been through the building."

Road to Recovery

Every building retrofit has its challenges because of the simple fact that an old design is being adapted to serve a contemporary intent. But in the case of the Strathmore, the design and construction team had to walk a narrow tightrope between often competing design goals.



On one hand, the building was in rough shape and needed a lot of work just to be habitable, much less attractive to potential tenants. Graffiti had to be cleaned up, the brick needed to be repaired in many places and debris had to be cleared out from the interior. Floor plans were



changed, and the living spaces basically needed to be reinvented.

But on the other hand, a very careful eye needed to be kept on the historic value of the building. Ultimately, the building needed a major overhaul but it couldn't change too much or it would risk

losing its historic status.

"Our big picture view was to try to live with the structure as opposed to fighting it," Laux says. "We wanted to allow the historic character to come through. When something is new and it's a new intervention, it still must speak to the history."

MUCH OF THE BUILDING'S HISTORIC CHARACTER REMAINS ON THE FIRST FLOOR IN WHAT ONCE WAS THE LOBBY AND MAIN DINING ROOM.

“The building complies with Enterprise Green Communities The program also requires the incorporation of universal design concepts, ensuring the units are designed for all people.”

—Sandra Laux, FAIA,
Hamilton Anderson

Respect for History

“The local historic district commission was very concerned about the window configurations and the profile of the windows,” explains Janet Ford, RA, with Hamilton Anderson. “There was still some evidence of the brickmold profile of the upper windows, so when we replaced the missing windows, we were required to match the original profile and were able to do so in aluminum. With historic photos, we were able to match the window-pane configuration for the hung windows. There were no color photos back then, so we didn’t know the color of the windows for certain, but we could tell the color was lighter than the brick so we chose a light window color, similar to the stone color.”

Closer to the ground, the building originally featured storefront windows that had long since been filled in with studs and EIFS. Those windows were restored and the storefronts brought back to life for ground-floor retail.

“Another example of speaking to the building’s history is the exterior canopy,” Laux adds. “Ford did an excellent job of working with the original shape and proportion but giving it detail and a more modern twist that speaks to something contemporary. Also, when choosing things like light fixtures, they needed to all be compatible with the building without necessarily fully recreating what was there before.”

The State Historic Preservation Officer was particularly sensitive about any changes to the exterior appearance of the building. That applied not only to structural elements and penetrations, but also to lighting.

“At night, you’ll see accent lighting on the building, and when we first submitted that, it was rejected because they told us they thought it looked too commercial,” Laux says. “We ended up doing mockups of the lighting so they could see the quality of the light. We were out there with extension cords and ladders, holding lights in place

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at night to show that this was something that was actually compatible with the structure. We submitted those photographs and ultimately had them approved.”

Interior Reclamation

On the inside, much of the building’s historic character was on the first floor in what was once the lobby and main dining room. The upper floors were basically gut rehabs, primarily because they were exposed to the elements for several years. But with the ground floor, the design team had to be very thoughtful and respectful of the building’s original look.

“The dining room originally had a skylight, which had been covered and roofed over,” Ford says. “Prior to the new skylight that was placed in the opening, there was a lot of leakage into that room, so we were slogging through a lot of wet carpet. It was pretty nasty.”

Stud walls had been added to the lobby and dining room at some point to divide the space into offices. These were removed,



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On the exterior, most of the windows were gone, graffiti marred the façade, the brick was in questionable shape, and the picture inside was even more grim.

and the carpet was torn out to expose the terrazzo below. Black and white marble was restored in the lobby, and the plaster and original woodwork was either restored or replaced to revive the interior's previous appearance.

Upstairs, newly refreshed living units were built around the existing circulation and elevator core. There were some

challenges related to the fact that the structure had formerly been built as two completely separate buildings.

"The two buildings were similar, but not exactly the same," Laux explains. "Typically, in a renovation there is going to be some repetition in structure and some repetition in bay spacing, but because we had two different buildings and they didn't have the same bay spacing, we needed to design units unique to each condition. Each floor plate has 18 distinct units on it."

Another curveball thrown to the design team as they melded the two buildings together was the fact that the floor levels didn't quite line up.


"While it might be perceived as a single floor level, we had sometimes as much as 3 inches of grade change between the two buildings on any given floor, and it was worse on the upper floors than on the lower floors," Laux explains. "We had already called for a leveler to even things out, but the way we made it accessible was to use a very low ramp in each corridor to get from the first building to the second. It's a very shallow ramp and when you walk in the corridors you don't really feel it, even though there is a grade change."

Clean and Green

The renovation was completed in 2015 and the transformation is stunning. The building's classic look was maintained while delivering on modern, sustainable, well-appointed living spaces.

"The building complies with Enterprise Green Communities," Laux says. "All the appliances are ENERGY STAR and all the light fixtures are ENERGY STAR-compliant, for example. The program also requires the incorporation of universal design concepts, ensuring the units are designed for all people."

"We were awarded the Governor's Award for Historic Preservation, which is a great honor," Laux adds. "The market rate units were rented immediately. The retail spaces are occupied, and they said they love the space."

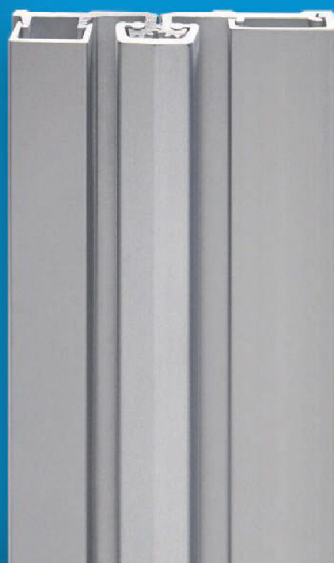
The Strathmore has taken its place in the vibrant new life of Detroit's Willis-Selden Historic District. It's home once again to families and workers and playing the role it was always destined to play. 

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WITH NEW TECHNOLOGIES BECOMING MORE AFFORDABLE, THE INDUSTRY IS INCHING ITS WAY TOWARD AN INCREASINGLY AUTOMATED FUTURE

CONSTRUCT

HIGH-TECH CONSTRUCTION

WRITTEN BY | ROBERT NIEMINEN

In the cinematic sci-fi trilogy, “The Matrix”, audiences are introduced to a dystopian future in which robots have seized control of the world and waged war on humanity. Although the depiction of a nefarious line of robots makes for great movie-making, the perils that artificial intelligence poses to the human race are obviously highly exaggerated.

However, that’s not to say technology doesn’t pose certain threats to people, even those working in the built environment. Case in point: Increasing automation in the construction industry could displace or replace as much as 49 percent of America’s blue-collar construction workforce (2.7 million workers) and eliminate nearly 500,000 non-construction jobs by 2057, according to a new study by the Midwest Economic Policy Institute, St. Paul, Minn., and the Project for Middle Class Renewal at the University of Illinois at Urbana-Champaign.

“Whether through the use of robotics, virtual reality or other technological innovations, automation has been increasing productivity, reducing costs and improving quality,” says study co-author Jill Manzo. “With capital growing, the industry struggling with skilled labor shortages and our nation facing growing infrastructure needs, it is fair to conclude that the pace of automation is likely to accelerate in the decades to come.”

Whatever dark cloud technological innovation may present on the one hand, on the other is a very bright, silver lining in terms

of the promise that high-tech construction tools and techniques offer the industry to help update the existing building stock. Although historically slow to adopt these innovations, the construction industry is on the precipice of realizing unparalleled efficiencies and safety as it continues to evolve—whether by choice or necessity.

Progress: Slowly but Surely

In a recent statement, Chad Hollingsworth, co-founder and CEO of IoT solutions provider Triax Technologies, Norwalk, Conn., said: “Few industries have as great an impact on our economy as construction, yet the industry has been slow to embrace the digital tools and real-time data that have transformed other industries. This past year, the reduction in skilled labor drove contractors to seek out new technologies, such as IoT-enabled wearables and cloud-based solutions, to unlock efficiencies, improve safety and achieve more with the same number of resources.”

Jono Millin, CPO and co-founder of DroneDeploy, San Francisco, agrees that the construction industry has been slow to adopt new technology, citing a conservative mindset among construction executives when it comes to such investments, in spite of the fact that the industry is well-positioned to benefit from technological disruption.

“Much of this [conservatism] stems from the cost and scale of their operations and the burden construction executives

face when implementing new solutions,” Millin explains.

“The construction industry doesn’t like changing at all—it’s definitely the rear guard,” says John Tocci Jr., director of virtual design for Tocci Building Corp., Woburn, Mass. He points to a widespread mentality in the industry best characterized as “the appeal to antiquity”—the thought process that suggests, “We’ve always done it this way in the past and it works, so why change?”

However, Tocci points out that the industry’s resistance to change isn’t necessarily universal. “The construction industry is interesting because it’s pretty heavily bifurcated insofar that you have certain markets or segments that have a heavy use of technology,” he observes. “Generally speaking, you get into more of the high-tech construction when you’re doing pharmaceutical and process-related work—process manufacturing, semiconductors, clean rooms, etc.—you generally see a higher degree of sophistication” in those projects, Tocci says.

Overall, the industry is making progress, especially as advanced tools prove their efficacy on the job site. For example, Millin says new technologies, like drones, virtual reality and 3-D printing, “hold so much potential for speeding up or completely automating workflows—and the results are hard to ignore.” He points out that his firm helped a



client reduce survey times by 75 percent by collecting 3-D point cloud data on job sites—cutting a typical two- to three-week process down to a matter of days.

Tocci explains that the value of technological innovation is particularly relevant when it comes to the dimensional control of existing buildings; specifically, he points to the problem with the accuracy of original drawings. In many cases, an older building's drawings were done by hand on Mylar and may not accurately reflect the building and its current condition. By laser scanning critical building components, Tocci says it's easy (and quick) to prove whether a two-dimensional drawing is still relevant or not.

"That usually gives us a good indication of the quality of the drawing, but more often than not it just serves as a validation for

the decision to go and laser scan the entire building because we see enough discrepancies that we understand that, 'OK, this is a typical 1954 hand drawing. We can't carry it as gospel,'" he explains.

New Tools of the Trade

There is a variety of new tools and technologies on the market that hold a great deal of promise in terms of transforming the way buildings are constructed and remodeled—many of which are already being implemented without significant cost or disruption to existing paradigms (see "New Technologies to Consider", page 88).

Millin suggests drones are "the most exciting new technology because they can be integrated into existing workflows, making them much more efficient compared with other technologies. For example, drones are already helping the construction industry build instant ROI by creating job-site-ready maps and models at record speed, where

(continues on page 88)

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NEW TECHNOLOGIES TO CONSIDER

Interested in the latest high-tech construction tools for building projects? Here are a few cutting-edge products the experts mentioned during interviews for this article:



BIM 360 Glue

Autodesk BIM 360 Glue is a cloud-based BIM management and collaboration solution that connects the entire project team and helps streamline BIM project workflows. With virtually anywhere, anytime access to the most recent project models and data and support for over 50 different 3-D model and data formats, BIM 360 Glue extends BIM to key stakeholders with “one-click” web and mobile access and empowers multidisciplinary teams to more quickly and effectively identify and resolve coordination issues. BIM 360 Glue enables builders, architects, engineers and owners across the globe to collaborate in real-time throughout the project life cycle.

info.bim360.autodesk.com/bim-360-glue



FARO Focus Laser Scanner

FARO's latest ultra-portable Focus^S Laser Scanner series enables users to capture fast, straightforward and accurate measurements of complex objects and buildings. The intuitive touchscreen of the Focus^S models has been increased in size and clarity to deliver a better user experience. A built-in 8 megapixel, HDR camera captures detailed imagery while providing a natural color overlay to the scan data in extreme lighting conditions.

www.faro.com/products/construction-bim-cim/faro-focus



Leica BLK360 Laser Scanner

The Leica BLK360 captures full-color panoramic images overlaid on a high-accuracy point cloud. Using the ReCap Pro mobile app, the BLK360 streams image and point cloud data to iPad. The app filters and registers scan data in real time. After capture, ReCap Pro enables point-cloud data transfer to a number of CAD, BIM, VR and AR applications. The integration of BLK360 and Autodesk software dramatically streamlines the reality capture process thereby opening this technology to non-surveying individuals.

leica-geosystems.com/en-us/products/laser-scanners/scanners/blk360



Matterport Pro 2 3D Camera

The Matterport Pro2 3D Camera captures 2-D photography and 3-D data from job sites and automatically stitches them into a complete, immersive 3-D model of a real-world job site that you can share and annotate, as well as export point clouds to Autodesk ReCap or Revit. The tool is quicker than 3-D laser scanning and more complete than handheld 3-D scanners.

matterport.com/pro2-3d-camera



Modelo VR

Present CAD and BIM models and designs in Virtual Reality (VR) with Modelo. Create immersive, digital experiences in the web and tour 3-D models on any mobile device. Modelo is compatible with the most common file formats already in use, including Rhino, SketchUp, Revit, Vectorwork and 3ds Max—meaning it enhances visualization and presentation abilities.

modelo.io



WebGL Software

WebGL is a cross-platform, royalty-free web standard for a low-level 3-D graphics API based on OpenGL ES, exposed to ECMAScript via the HTML5 Canvas element. WebGL brings plugin-free 3-D to the web, implemented right into the browser. Developers familiar with OpenGL ES 2.0 will recognize WebGL as a Shader-based API using GLSL with constructs that are semantically similar to those of the underlying OpenGL ES API.

www.khronos.org/webgl

other technologies can prove difficult to show the value.”

He also points out drones are becoming increasingly cost effective, thanks to the recent proliferation of new models that has driven down hardware prices. “Technologies like 3-D printing and virtual reality hold incredible promise for the future but require more of an initial investment and workflow overhaul,” Millin says.

Nevertheless, Tocci says augmented reality (AR) and virtual reality (VR) can be invaluable tools in certain instances that can save money in the long-run. For example, in the design of hospitals or courtrooms, project teams often build costly physical mockups of operating rooms, courtrooms or other critical spaces for the benefit of end-users who offer their input into the functional elements and ergonomics of the environments before they are constructed. Using AR or VR can more effectively translate a two-dimensional sketch into a 3-D scenario, especially for people who have trouble visualizing between the two. “Having the ability to put [end-users] into an augmented reality or virtual reality that gets them spatially comprehending what they’re dealing with is critical,” Tocci explains. “The additional step of going through and building it in a virtual reality environment is almost a rounding error on the physical mockup cost.”

VR and AR tools don’t necessarily require a huge investment in equipment or resources, however. Tocci says a number of new software tools and apps on the market can be leveraged using smartphones, tablets and other mobile devices to display 3-D geometry in real time. One such tool, Modelo, offers design professionals the ability to upload a SketchUp or Revit model directly into a program that generates a sharable link, which displays a 360-degree, 3-D view of a space using virtually any web browser.

“We can go create a quick mockup showing a three-dimensional space, send a link out and have somebody click on it on their cell phone and spin around to better understand what we’re talking about as opposed to marking up a 2-D floorplan or an elevation or a section and hoping that [clients] understand what the breakroom in their office is going to look like,” Tocci says.

VIEW HOW
MODELO WORKS
VIA SHORT VIDEO.



As far as new technologies for existing buildings and renovation projects go, however, Tocci says “pound-for-pound, the best tool out there is a laser scanner.” Noting the affordability of laser scanners today thanks to competitively priced products, Tocci says laser scanning “is the area to jump into just because of the ROI—it’s been documented 100 times over.” He adds that the cost of hardware is decreasing and availability of computers to handle computationally heavy point clouds is constantly improving, as well.

On the Horizon

So what impact will these new technologies ultimately have on the construction industry, and what’s next in the years ahead? By all measures, automation will play an increasingly more prominent role, and the successful organizations will be the ones that leverage these new tools to


realize greater efficiencies in their building projects.

“The growth of construction-focused, Internet-connected systems will continue to shape the way industry stakeholders approach projects, manage operations and leverage historical data on future projects,” Hollingsworth notes. “The proliferation of useful, previously unavailable data from a variety of sources, including workers, machines, tools, materials, and the environment, will be aggregated, monitored, and analyzed for real-time, actionable insights. As job-site technology matures, those companies that embrace it will see increasing ROI and those companies that don’t will lose their competitive edge.”

“There is so much to look forward to in the construction industry,” Millin says. He is most excited about the application of real-time drone data and foresees a future in which drones will be deployed on every job

site, operating autonomously on schedules to collect aerial data in real-time that will significantly improve safety, lower costs, and help power business and construction design decisions on a daily basis.

While such visions of flying robots may seem more reminiscent of “The Matrix” than some might be comfortable with, Tocci says it’s not terribly important to be concerned with where technology is headed in the future because it’s out of our control.

“What you and I can control is how we’re going to engage with where that technology is going to take us,” he says. “Are we going to choose to be active participants and steering into the challenges and the risks and the missteps that the construction industry has typically taken? Or are we simply going to try to ride our bicycle faster when—let’s face it—we need to get on an airplane?” 

WHILE HISTORICALLY SLOW TO ADOPT THESE INNOVATIONS, THE CONSTRUCTION INDUSTRY IS ON THE PRECIPICE OF REALIZING UNPARALLELED EFFICIENCIES AND SAFETY AS IT CONTINUES TO EVOLVE—WHETHER BY CHOICE OR NECESSITY.

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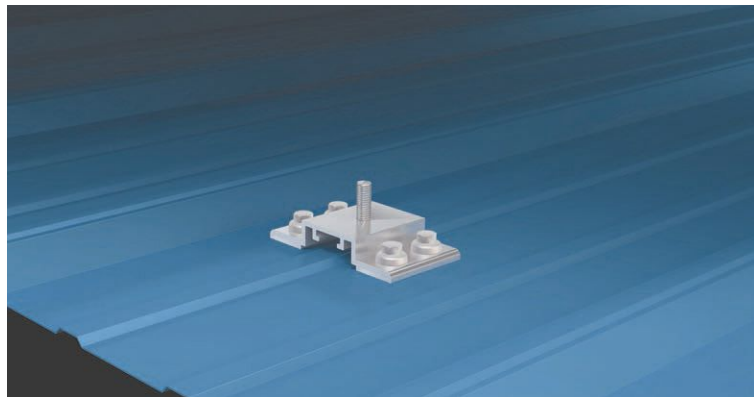
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➔ MOUNTING PLATFORM DESIGNED FOR EXPOSED FASTENER PANELS

The SolarFoot panel from S-5! is made for exposed-fastener metal roofing. With four points of attachment, the product provides a mounting platform to attach the L-Foot of a rail-mounted solar-power system or other ancillaries to the roof. Each piece contains two reservoirs of a factory-applied butyl co-polymeric sealant to ensure a weathertight, durable solution for the roof and solar-power system's life. For installation, peel the release paper from the butyl sealant and fasten through predrilled holes in the SolarFoot's base.

www.s-5.com // Circle No. 45



➔ SOUND-ABSORBING TEXTILES OPTIMIZE ACOUSTICS

Snowsound now offers Snowsound-Fiber textile products that absorb sound to optimize room acoustics. Available in 41 texture/color combinations, the fabric is sold in rolls and can be used for window/roller shades, curtains, partitions, sheers, draperies, upholstery and canopies. Depending on the fiber type and installation, the fabric can achieve a noise reduction coefficient of up to 1.0. Made from 100 percent polyester fiber, fabric weight ranges from 6.5 ounce per square yard to 13.5 ounce per square yard and in thicknesses from 1.7-millimeter velvet to 0.6-millimeter sheer fabric. Each textile is flammability tested, GREENGUARD Gold certified and 100 percent recyclable. The fabric does not contain felt, wool or other difficult to recycle organic materials.

www.snowsoundusa.com // Circle No. 46



↓ MODULAR METAL PANEL SYSTEM ACCOMMODATES SLOPED PANEL DEPTHS

CENTRIA's Intercept modular metal panel system, Intercept RZR, is a rainscreen system that can accommodate a sloped panel depth up to 4 inches and can integrate with Intercept Entyre and Intercept LVLZ for dynamic aesthetics. Available in horizontal and vertical applications, the panels can be specified in zinc or aluminum substrates and in depths of 1 3/8 to 4 inches. Panel lengths can be up to 138 inches (aluminum) or 120 inches (zinc) and up to 48 inches (aluminum) and 32 inches (zinc) wide. Several colors are available, as well as a range of finish options. In addition, the panels can be paired with the company's Metal-Wrap Series insulated composite backup system to meet thermal and moisture performance requirements.

www.centriaperformance.com/intercept // Circle No. 47



← CONDENSING BOILERS CAN BE CASCADED TOGETHER

Weil-McLain now offers its advanced high-efficiency Evergreen condensing boiler line in 70, 110 and 115K BTUH input sizes, joining the existing 220, 299 and 399 sizes.

The 95 percent AFUE boiler features a guided setup wizard, easy-to-understand graphical user interface, simple controls and 10 heating system presets for quick setup. It also has the ability to cascade two to eight boilers together and ZoneStacking up to 24 programmable zones with no external panel required. In commercial applications, optimal energy-efficiency yields reduce energy costs with up to 96.5 percent combustion efficiency. Three multiple-boiler sequencing options are smart mode, series mode and parallel mode.

Units may be wall-mounted or floor-standing, use natural or propane gas, and each features a stainless steel, fire-tube heat exchanger with a non-metallic base.

www.weil-mclain.com // Circle No. 48



➔ SILICONE ADDITIVE ENHANCES EXTERIOR AESTHETICS

Dow Performance Silicones has introduced Dow Corning 904H Coating Additives, a silicone additive for architectural façade coatings that supports enhanced aesthetics for building exteriors. It helps reduce the “snail trail” effect, which frequently is seen in cold and humid climates when surfactants and other water-soluble ingredients in coating formulations leach to the surface. The additive, which can be added to existing formulations, also can improve water resistance, repellency and beading in coatings by increasing their surface hydrophobicity.

bit.ly/2C8CsVm // Circle No. 49



⬅ ADHESIVE-BACKED FLOOR MATS IMPROVE SAFETY

PIG Grippy Floor Mats from New Pig Corp. are adhesive-backed to eliminate trip hazards and to keep walkways safer. Grippy, which stays flat and can adhere to most common commercial floor surfaces, does not shift, bunch or flip. The mats, which are NFSI Certified as a high-traction surface, are built to last up to three months; they peel up easily from the floor when necessary. An engineered fiber matrix provides an efficient and absorbent top layer that wicks moisture across the mat and dries quickly. A middle liquid-proof barrier prevents fluids from passing through. The mats are available in 100- or 50-foot rolls, in pre-cut sizes in various widths and colors, or they can be cut to fit any space.



Learn about these adhesive-backed mats via a short video.

www.grippymat.com // Circle No. 50

➔ LOW-PROFILE LEDs ARE SUITED FOR CANS AND BOXES

Super Bright LEDs now offers 7- and 9-inch low-profile LED panel lights/can light retrofits. They can be used with 4-, 5- or 6-inch existing cans or can be mounted directly into round or octagonal junction boxes. Designed for residential and commercial lighting applications, the 12- and 18-watt LED cans emit 1,000 or 1,600 lumens of dimmable natural white illumination, which is comparable to 100- and 160-watt incandescent fixtures, but last approximately 25 times longer. Each light has junction-box mounting hardware and an E26/E27 Edison screw base adapter; can light mounting hardware is sold separately.

www.superbrightleds.com // Circle No. 51



⬅ PANELS CAN BE USED IN VARIOUS APPLICATIONS

Architectural Systems Inc. has made available its XtraMDF panels. XtraRust, XtraMatte and XtraConcrete feature a protective scratch-resistant, anti-fingerprint, UV-resistant finish. They also have a durable MDF core that is balanced on both sides to accommodate horizontal or vertical use. XtraStone and XtraCement are made of natural stone veneers adhered to an MDF or concrete core. All panels can be cut to size, mitered and milled. Applications include tabletops, doors, architectural millwork and feature walls in any contract setting.

www.archsystems.com // Circle No. 52

→ ACOUSTIC PANELS ARE DESIGNED FOR EXPOSED STRUCTURES

Armstrong Ceiling & Wall Solutions has expanded its portfolio of acoustical solutions for exposed structure environments. The Spotlight acoustic solutions are suspended below the deck and feature dozens of blades, baffles, clouds and canopies to reduce noise and visually define a space. When installed in a manner that covers 5 to 50 percent of the deck, the panels absorb sound from all sides. InvisAcoustics Basics ceiling panels also have been expanded. With a noise reduction coefficient of 0.75, the panels absorb 75 percent of the sound that hits them. They attach directly to an exposed structure's deck and can be field painted to match. Other direct-to-deck acoustic solutions



View unique visuals that can be created with exposed structure solutions.

include Capz and Tectum panels, as well as a direct-attach option for SoundScapes Blades vertical panels.

www.armstrongceilings.com/exposedstructure // Circle No. 53



← LIGHTING SERIES INSPIRED BY DESTROYED BUILDINGS

Boom, an exclusive lighting series from Stickbulb and designed by RUX, is made from wood and inspired by destroyed buildings. The series features cast-brass joints and linear wooden bulbs to create forms that resemble exploding light. The design team came up with designs with minimal parts that can be manufactured within a 5-mile radius of their Long Island City studio. The Double Boom, for example, is made from water tower redwood, which comes from demolished water towers in New York City. Other pieces include the Little Boom, Middle Boom and Big Boom.

www.stickbulb.com // Circle No. 54

↓ DOOR OPENER HAS LOW-POWER DRAW

ASSA ABLOY's group brand Securitron has introduced the M680E Magnalock with EcoMag technology. With a holding strength of up to 1,200 pounds, its power draw is as low as 60mA, which is an 80 percent reduction compared to the previous M680 series product. Beyond its energy-efficient properties, EcoMag maintains sustainability through its entire production process, including shipping the product in a cardboard box with a fully biodegradable foam packaging insert made from corn starch.

www.assaabloy.com // Circle No. 55



↑ NEUTRAL FABRICS ARE SUITABLE FOR OUTDOOR USES

Phifer's newly introduced Luxe Life Collection of cushion and sling performance fabrics features neutral colors influenced by mixed metal accents and organic browns. New yarn introductions include mushroom and oyster zinc; classic black and optic white color pairings are updated with taupe, gray and walnut. The 100 percent recyclable GeoBella indoor/outdoor fabrics feature a soft, touchable texture reminiscent of indoor furniture but with the stability and strength required for outdoor cushions. Phifertex outdoor fabrics are suitable for awnings, umbrellas and new fabric applications, such as wrapped furniture and padded slings.

www.phifer.com // Circle No. 56

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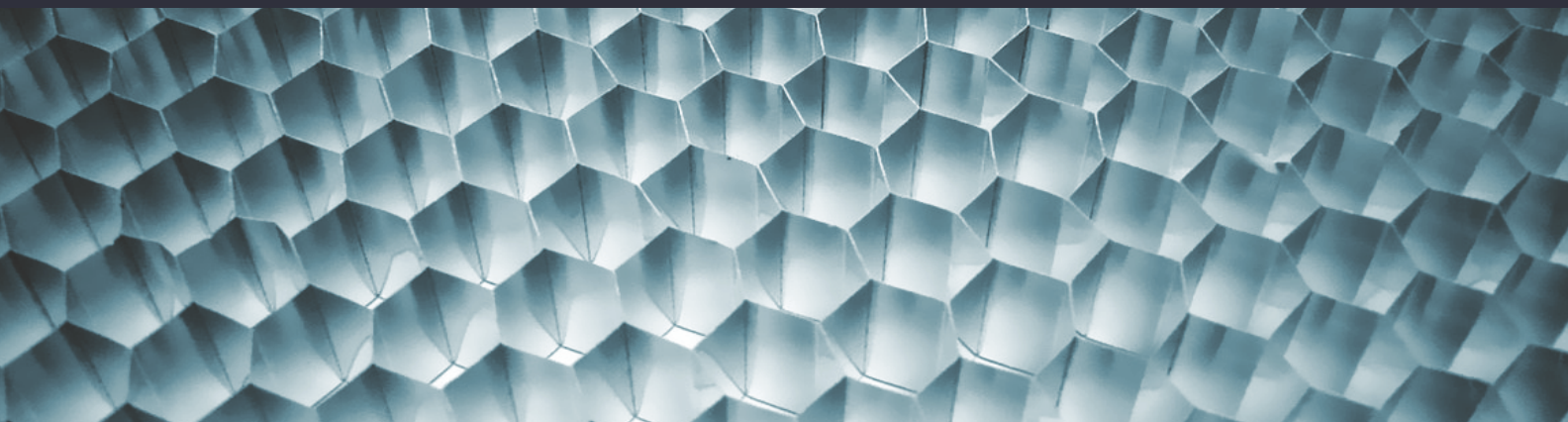
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Circle No. 57





← WALL AND CEILING PANEL RESEMBLES WOOD

CertainTeed Ceilings has introduced Decoustic Rondolo, a line of custom micro-perforated acoustic wood panels and planks with a low flame spread rating and good sound absorption properties. The product has a Class A rating based on third-party ASTM E84 testing on finished composite panels and noise reduction coefficient values up to 0.95. All panels, which are manufactured from no-added urea formaldehyde, can be custom engineered in varying shapes and sizes. Each is delivered onsite ready for installation and can be integrated into Decoustics' suspension and mounting systems, including the 100 percent downwardly accessible Ceilencio system.

www.certainteed.com/commercial-ceilings/ceilings-decoustics // Circle No. 58

→ LOW-IRON GLASS OFFERS HIGH LIGHT TRANSMISSION

AGC has debuted Clearvision, a low-iron glass that delivers 92 percent light transmission that is suitable for architectural applications that require a high degree of transparency or color optimization. The glass can be specified for interiors and exteriors and is available in laminated, heat-treated, bent, silk-screened or insulated configurations. The double- and triple-glazing units maintain high light transmission while maximizing solar energy. Standard thicknesses from 3 to 12 millimeters are available with custom thicknesses available upon request. The glass also can be used in frameless and heavy glass shower enclosures, custom tabletops, shelving and display cases. Clearvision is Cradle to Cradle Silver certified.

www.agcglass.com // Circle No. 59



↓ FLOORING LINE IS RENAMED AND EXPANDED

Ecore has renamed its Tru Ecore commercial product collection to Rx and has added new products, colors and patterns. Forest Rx now features six original wood-grain patterns and five new patterns. Terrain Rx was renamed Strait Rx and includes six modern finishes resembling linen. Cosmos Rx, which includes six solid colors with subtle highlights, and Infinity Rx, which boasts six linear patterns, are new additions to the collection. The preceding four products feature vinyl surfaces fusion-bonded to a performance backing.



Galaxy Rx is a virgin rubber surface fusion bonded to performance backing and has 12 solid colors. The collection provides flooring solutions for health care, senior living spaces, fitness facilities and any other area undergoing heavy commercial use.

www.ecorecommercial.com/products/Rx // Circle No. 60

↓ OPEN-CELL SPRAY FOAM IMPROVES COHESION CAPABILITIES

Icynene has released Icynene Classic Ultra and Icynene Classic Ultra Select light-density spray-foam insulation products. The open-cell products do not require paddle mixing by hand prior to application. Instead, applicators can use the Icynene Draw Mixer, a 13.3-pound expanding blade mixer, which is exclusive to Icynene through equipment partner Graco. Classic Ultra has up to 90 percent improved cohesion properties and Classic Ultra Select up to 30 percent improvement compared to existing Icynene open-cell spray foam insulation products.

Classic Ultra also is low-VOC and is GREEN-GUARD Gold certified. Both products, which have an R-value of 3.7 per inch, can begin spraying with drum temperatures as low as 60 F for Classic Ultra and as low as 70 F for Classic Ultra Select.

www.icynene.com // Circle No. 61





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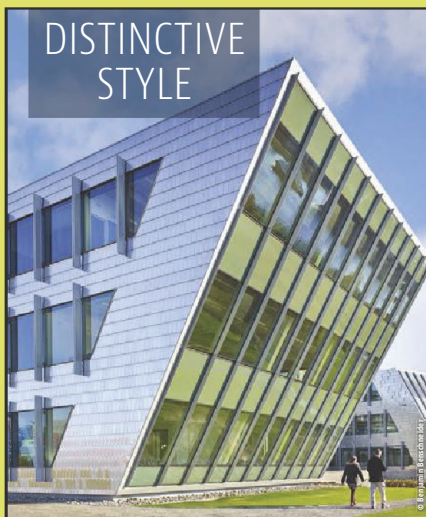
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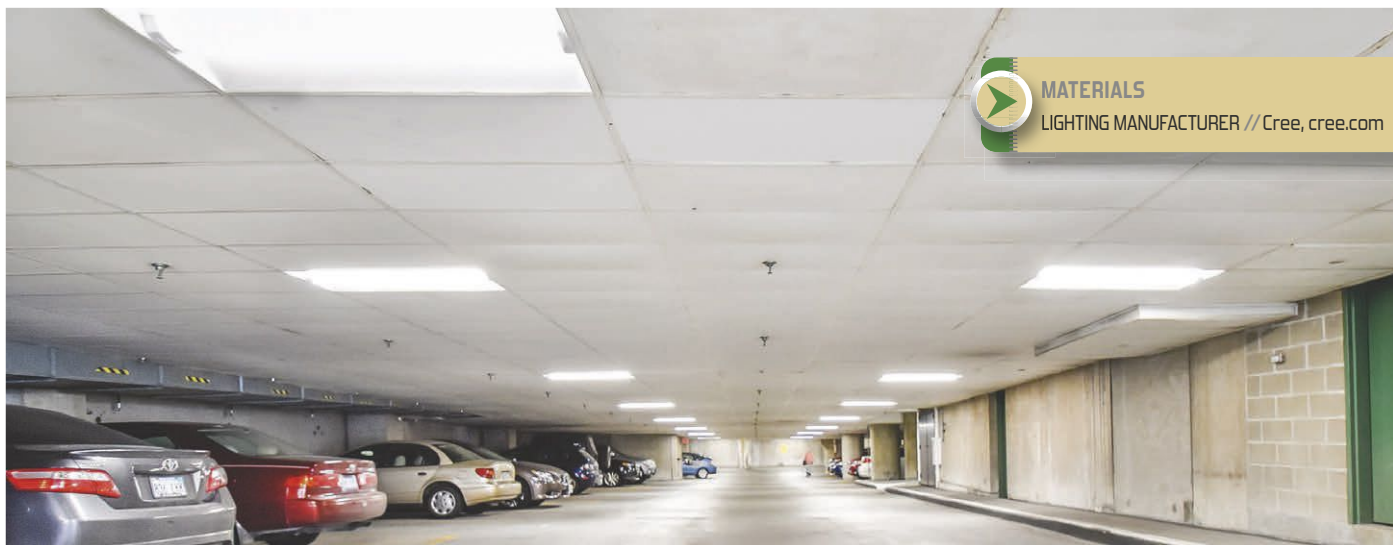
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PARKING GARAGE RETROFITS IMPACT KANSAS CITY'S ENERGY CONSUMPTION

Parking garages seldom conjure images of glamour and rarely are even considered noteworthy buildings. However, these garages' size and energy demands represent a fantastic opportunity to showcase energy reduction and high-efficiency products.

Recognizing that, the Washington, D.C.-based Building Owners and Managers Association International; Houston-based International Facility Management Association; Alexandria, Va.-based International Parking Institute; and the Washington-based U.S. Green Building Council, in conjunction with the U.S. Department of Energy Better Buildings Alliance,

Washington, collaborate annually to recognize real-estate owners that have achieved exceptional performance in parking-facility energy reduction through high-efficiency lighting and controls.

In 2016, Kansas City, Mo.-based MC Realty accepted two Lighting Energy Efficiency in Parking (LEEP) campaign awards for "Highest Percentage of Energy Savings in a Retrofit at a Single Parking Structure" and "Exemplary Office Sector Parking Facility."

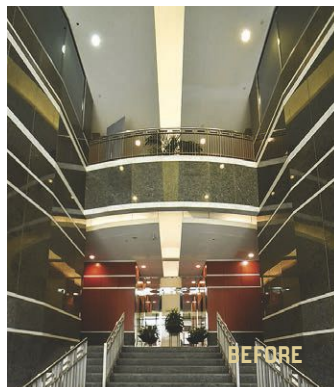
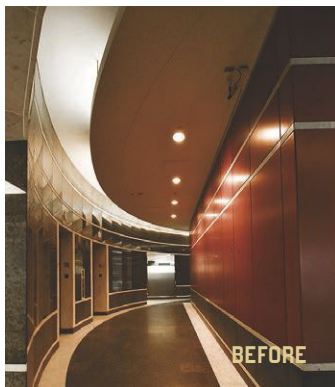
These two awards are only a small fraction of what MC Realty has achieved in terms of LED lighting projects. It regularly

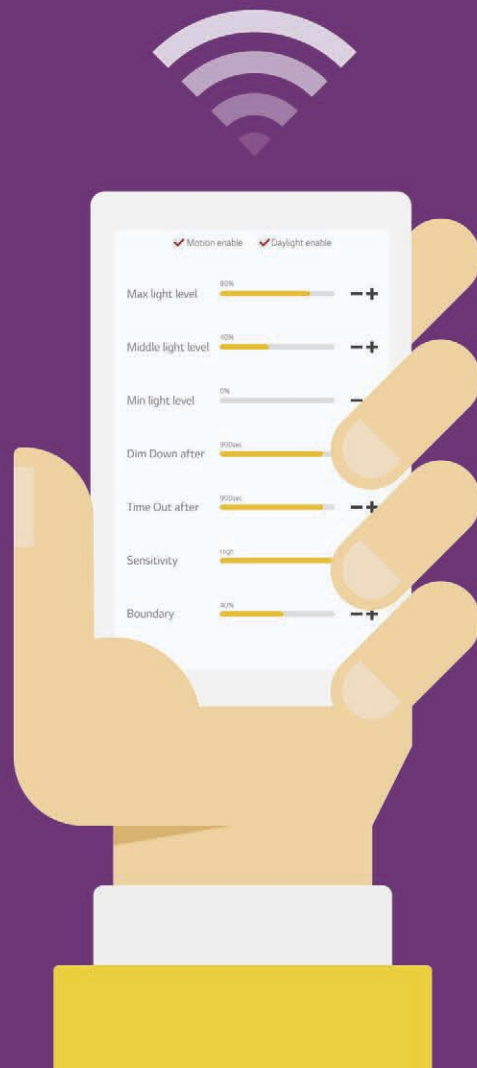
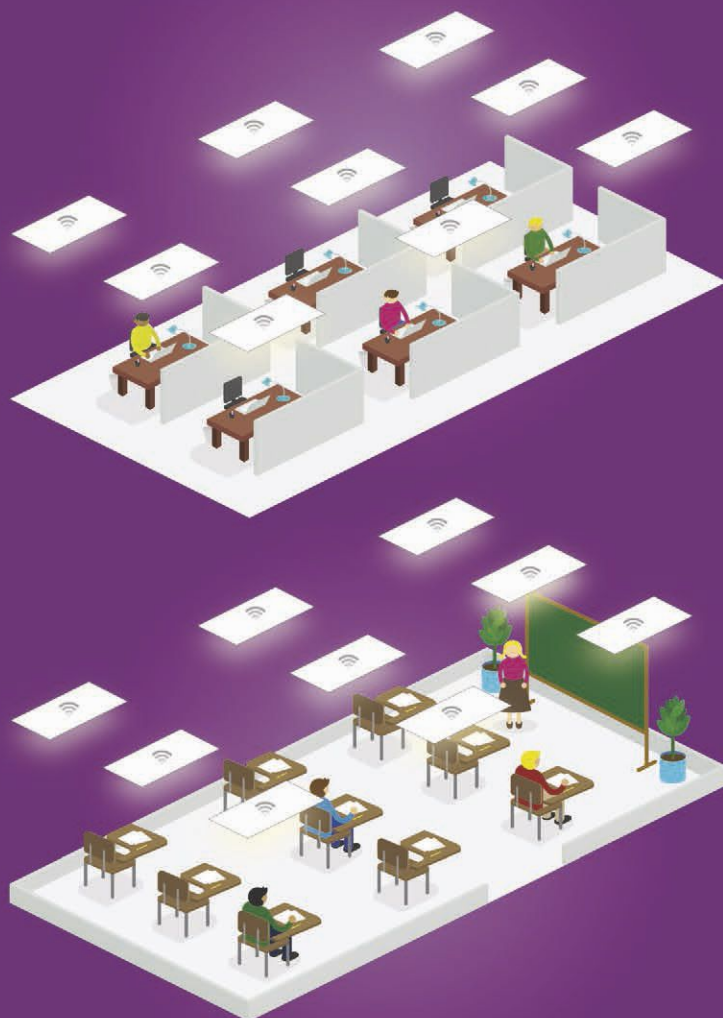
retrofits parking garages and stairwells with energy-efficient products, partnering with clean-energy company BioStar Renewables, Kansas City, for many of them. All told, MC Realty and BioStar Renewables conducted nine LED upgrades in Kansas City that will save an estimated 2 million kWh per year, or the equivalent of the annual electricity use of 208 homes. Electric and maintenance costs related to lighting should see an 80 percent reduction, saving about \$265,000 annually and preventing about 1,400 metric tons of greenhouse-gas emissions per year.

Among the projects are the

LEEP award winner Broadway Square Building. Broadway Square included a lighting retrofit of the parking garage and common areas, which include the main lobby and restrooms on each floor. In addition, Poindexter Garage, which won highest percentage energy savings in the LEEP awards, saw an 83 percent energy reduction.

The LEEP awards began in 2012 and since have added more than 560 million square feet of parking structure or lot space, equaling an energy savings of 227 million kWh or about \$23.6 million, which is enough to annually power 21,000 U.S. homes. 





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