ASH SKYLINE PLAZA

LOCATION
Fort Wayne, Ind.

PROJECT TYPE
Mixed use (office, parking, plaza)

SIZE
631,541 square feet
(468,000 for parking, 163,541 for offices)

ARCHITECT/SPECIALTY PRECAST ENGINEER
Hoch & Associates, Fort Wayne, Ind.

OWNER
City of Fort Wayne, Fort Wayne, Ind.

STRUCTURAL ENGINEER
Woolpert Inc., Dayton, Ohio

CONSTRUCTION MANAGER
Weigand Construction Co., Fort Wayne, Ind.

PCI-CERTIFIED PRECASTER
Coreslab Structures (INDIANAPOLIS) Inc.
Indianapolis, Ind.

PRECAST COMPONENTS
1265 architectural and structural panels

Precast Delivers
DIVERSE BUILDING NEEDS

Designers find that precast concrete components meet challenges posed when having to integrate the various functions in mixed-use projects

— Craig A. Shutt

Mixed-use projects present unique challenges to designers and contractors. Blending the needs of several different and distinct functions requires solutions that create success for all stakeholders. In many cases, designers find that precast concrete architectural panels and structural systems provide the economy, flexibility, and aesthetic versatility to keep all functions successful.

Precast concrete's capabilities to create a structural frame quickly and economically gets projects off to a fast start, enclosing the shell so interior trades can begin working to install the specialized needs of the various tenants. Architectural panels not only can be erected quickly but they can combine multiple finishes, colors, and accent pieces to minimize installation time. Joining so many pieces into a single-source supplier aids communication and reduces worries and conflicts. For more on the benefits precast concrete can provide, see the sidebar.

Bringing the precaster onto the project early, especially in a design-assist capacity, can ensure that all issues and economic factors are considered and addressed early in the design phase. That input, which can address efficient panel sizes and finish techniques as well as casting, transportation, and erection issues, can minimize costs and boost installation speed, with smaller tolerances and few field adjustments.

The following projects are examples of how precast concrete components aid mixed-use projects of many types around the country.

ASH SKYLINE PLAZA

Combining a large, seven-story parking structure with a small amount of office space and some first-floor retail space created unusual challenges for designers at the Skyline Plaza in Fort Wayne, Ind. To mesh these distinct needs, they created a seven-story precast concrete parking structure topped by a four-level, steel-framed office building and public plaza. Providing smooth access from one section to another and providing load support for both the office columns and the rooftop plantings required close communication and some component customization.

Complicating the project was the public-private collaboration on the space, in which the city owned the parking levels while developers rented the first-floor retail space and the commercial spaces. Ash Brokerage occupies the three lower floors of the office, creating the Ash Skyline Plaza name.

"Because of the city's role in the building's ownership, the project went through a published bid, resulting in pressure on the construction manager to meet the tight budget and construction schedule while working with multiple owners," explains Corey Greika, vice president and sales manager at Coreslab Structures (INDIANAPOLIS) Inc., which fabricated the 1265 precast concrete architectural and structural components.

Adding complications was the plan to construct a condominium building adjacent to the structure at the same time, which ultimately was postponed. "It was part of the design process for that building to be underway simultaneously," he notes. To aid

MIXED USES
The new Ash Skyline Plaza combines a seven-story precast concrete parking structure with a four-level steel-framed office building on top and some first-floor retail space. Photo: Coreslab.

that, the west elevation features an architectural precast concrete fire-separation wall that was designed to be load bearing to accept tees when the project moves ahead.

Precast concrete was chosen for the structure for a variety of reasons, explains Jim Hoch, president of Hoch Associates, the architectural firm on the project. "Precast concrete gave us design flexibility in a big way and gave us a tremendous leg up on the schedule," he says. "It gave us great economy for the material and allowed us to add architectural features at the entry points and key locations without impacting the budget."

"Hoch & Associates has a great specialization in precast concrete and understands it well," says Greika. "They were able to do much of the specialty engineering on the design upfront, which really sped up the process."

'Precast concrete gave us design flexibility in a big way and gave us a tremendous leg up on the schedule.'

IN-HOUSE EXPERTISE HELPS

Hoch's engineers produced the erection drawings for the precast along with the initial bid set. "We had a very defined plan as we put out the plans for bid," Hoch explains. "It's atypical for an architect to be able to do that, but we had the expertise in-house, so we could complete a large portion of the drawings early. We were able to come out of the gate knowing what pieces we needed and how they could be engineered."

The drawings did not include hardware or connection details, he notes. "Fabricators have their own ways to make those elements efficient for their own production needs. By giving them the drawings to that point, we were very successful in speeding up the project's construction."

Creating the initial design took a series of adaptations, adds Steve Young, senior structural engineer at Woolpert Inc., the structural engineering firm on the project. "The project went through three design iterations as the city adapted their needs." The parking structure's size grew from 800 to 1000 to 1200 spaces as more footage was added.

A key element was the decision to exploit the basement. Poor soil conditions in the area created the need to excavate the site to add 1000 auger-cast piles beneath the foundation. "We decided to capture that space rather than give it up since we had to dig it out anyway," he says. That required construction of perimeter foundation walls around the piles—but the addition of a new level. The structure's ramp system also shifted to various locations around the building before the most efficient placement was finalized. "Even with these changes, the shop drawings went through very quickly, with no headaches, again speeding up delivery of the project."

The major areas of concern involved key loading areas, specifically at the ground level and at the parking structure's roof, where the plaza was created on top. The office facility takes up approximately 35,000 square feet of the 77,500-square-foot roof, leaving significant area for the creation of a green roof. The approximate one-acre plaza is one of the largest such green-roof designs in the state. Due to its location, it is not open to the public, providing an attractive tenant amenity.

"The plaza concept developed early in the design phase when we realized there would be significant space on the top level of parking adjacent to the office building," Hoch says. "We looked at options and created the ability for the office owner to create the garden design we have now."

The plaza includes planters with flowers and trees along with walking paths. Among the plantings was an ash tree (reflecting the brokerage's name) that weighed 1500

IN-HOUSE HELP
The architect's engineers produced the erection drawings for the precast along with the initial bid set. Photo: Hoch & Associates.

FIRE PROTECTION
The precast concrete provided inherent fire protection to meet the 2-hour, fire-code requirement for separating retail space, parking, and offices. Photo: Coreslab.

pounds. Ensuring that dead load, as well as the column loads from the office's steel frame transferred into the column paths of the precast concrete parking levels required close consideration.

DEEPER TEES CREATED

Approximately 80% of the office columns aligned with the parking columns, so to accommodate the remaining columns, transfer girders were installed to shift the loads. The roof level features deeper precast concrete double tees than are typical, and their flanges were reduced on the ends to provide more stem strength in the beams. The tees were 7'2" wide as opposed to the 12-foot width used on other levels. On all levels, the tees are 60 feet long, providing open spaces for design flexibility.

The transfer beams were designed 4'4" deep and weighed up to 88,000 pounds, Hoch says. "They were serious pieces, but their integration worked quite well," Hoch says.

The levels below were protected with a special waterproofing system, which also was used at the third level above the retail levels. "It was fairly typical of such systems, but it was more robust than most owing to the conditions that the garden produced," explains Mike Grutsch, the project architect for Hoch Associates. It included an elastomeric waterproof system as well as added topping. "We took a view of providing a long-term solution to protect the uninhabited spaces and retail spaces below to avoid any problems later on."

'We took a view of providing a long-term solution to protect the uninhabited spaces and retail spaces.'

At the street level, additional topping was provided over the tees to create a flat surface for the retail spaces, Young notes. An approximate 3-foot slope north to south in the site had to be evened out so all retail spaces were equally accessible. To achieve that, insulation was added between the tees and the topping. In some areas, the insulation was only 4 inches thick, while in others it was 16 to 20 inches thick.

The precast concrete also provided inherent fire protection to meet the 2-hour, fire-code requirement for separating retail space, parking, and offices. "That was a big savings, as we didn't need to expend time or money to meet that requirement," Grutsch says. Some exhaust venting was added on parking levels, although the open design meets most of the requirements.

DRIVE-THROUGH CREATED
A bank's drive-through lane was created on the first level with 15-foot clearance and a long open space. Photo: Coreslab.

DRIVE-THROUGH PROVIDED

Another loading issue arose on the first level, where a bank client required auto access to incorporate a drive-through window in their space. "They needed a 15-foot clear space and a long open space, which also had to support the dead load of cars on the floors above," says Hoch. "Providing that clearance also opened the space to create a great deal of flexibility for deliveries."

Double tees were customized to provide the needed loading, using a smaller module. In this case, the tees were cast 7½ feet wide, again providing more stem support for a narrower tee.

The interior sides of the drive aisle cross-over bays weren't used as shear-wall locations for the structure, Young adds. "That's an atypical approach, but we wanted

QUADRANT ERECTION
The building was erected in quadrants, with the two supporting the office building finished first, allowing that construction to begin. Photo: Hoch & Associates.

to open up visibility throughout the space while still meeting our loading requirements." Perimeter shear walls took most of the load, using splice sleeves to connect them. "It was easy to construct them but challenging to coordinate all of the loads for lateral resistance."

Using steel framing for the office portion helped meet the load needs, Hoch adds. "The steel framing allowed us to reduce the structural dead loads over the concrete levels." An elevator core in the parking levels rises through a penetration in the roof to continue into the office levels, providing easy access between functions.

The precast panels were cast with a gray color and a light sandblasted finish to add texture. Stair and elevator towers at the corners were cast with a dark black, charcoal-colored mix with an undulating pattern.

The schedule for casting and erecting was challenging, Greika notes. "There was a lot of work involved in aligning all of the loads between functions, and the foundation package already had been bid when we got involved. We had to expedite the precast engineering with Hoch and get into production on components quickly. The schedule was a big driver for how the project progressed."

Components were staged at a drop lot nearby and brought into the busy downtown location as needed. A shuttle-trailer system was used, which ultimately backed up into the property next door as the building was finished on the lot.

Access for cranes was available only within the footprint, so the building was constructed in quadrants. The quadrants supporting the office building were finished first, so that construction could commence while the other parking quadrants were built.

"The footprint took up an entire city block, so it was a very user-friendly site, with room to position the crane as work progressed," Young notes. The project was erected in about 4 months, through the end of winter into spring. "We got some pretty cold weather, but it didn't interfere with construction. It was a very smooth process."

'We engaged the precaster early to get their ideas on issues.'

Having the precaster on board early ensured that remained true throughout the process. "We engaged the precaster early to get their ideas on issues with elevation designs, drive aisles, transfer beams, and other areas of concern," Young says. "They provided guidance before bidding and construction began to avoid any issues or surprises. Having feedback and insight early and often really helped the construction process when we began detailing. I can't imagine doing a project of this size without that involvement."

The building has been a big hit in downtown Fort Wayne. Mayor Tom Henry called the building "a tremendous asset" that would bring more investment to the downtown area, which the city was already seeing. Larry Weigand, CEO of Weigand Construction, the general contractor on the project, agreed, calling it an "iconic" building. "This is no ordinary building. Every detail, every feature, exudes quality, innovation, and creativity."

GOOD NEIGHBOR
The design was planned to create a building with personality while still fitting into the residential neighborhood. Photo: Spancrete.

SWEDISH COVENANT HOSPITAL

To expand its facilities at Swedish Covenant Hospital on the north side of Chicago, Ill., on the tight footprint that was available, administrators needed to create a multi-use project combining doctors' offices and a surgery center on the upper three floors and parking on the lower five levels. To deal with challenges presented by the tight space, fast construction schedule, and aesthetic needs, designers specified a total precast concrete structure and architectural precast concrete panels.

"The development of the Center for Ambulatory Surgery at Swedish Covenant reflects the growth of the hospital's surgical program," says CEO Mark Newton. "Swedish Covenant is seeing growth in robotic, vascular, orthopedic, cardiac, women's health, and neurosurgery surgical volumes. The additional three operating suites will allow us to continue providing advanced surgical care to our community."

The design provides additional space on the eighth floor that can be converted into a fourth operating room, if needed in the future. A pharmacy, optical office, and restaurant are located at street level. The 238,000-square-foot facility includes spaces for 260 cars.

The project was undertaken under a design-build format, with BSA Lifestructures providing architectural services while Power Construction Co. served as general contractor. Thornton Tomasetti served as the structural engineer.

'Precast allowed us to build quickly and efficiently.'

"Precast allowed us to build quickly and efficiently," says Alan Antoniewicz, president/COO of Spancrete, the precaster on the project. The team collaborated to ensure the precast design was optimized for casting, delivery, and erection, with 3D/BIM analysis provided.

Precast's design flexibility made it possible to create a building with personality, he adds. The hospital wanted the facility to fit in well with neighboring retail establishments as well as the residential neighborhood. Hospital, city, and neighborhood representatives worked together to express their desires to the building team to ensure a design could be created to complement the neighborhood.

TOTAL PRECAST STRUCTURE

The total-precast concrete structure provided a number of benefits, including providing a strong foundation for the medical center levels. Precast concrete systems reduce vibration and decrease noise transmission, so the soothing environments created on the top three floors will not be disrupted with noise or vibrations from the parking structure below.

A connecting, enclosed walkway joins the new medical building with the existing professional plaza that houses physician offices as well as x-ray and related laboratory services. The new building boasts colors that complement the Swedish Covenant campus and details that were inspired by the surrounding neighborhoods.

"The ease of constructing with precast concrete allowed us to complete the framing of the building and construction of the parking structure in just 7½ weeks," says Antoniewicz. "And the long-term savings experienced by the hospital will be enjoyed for years to come."

FUNCTIONS COMBINED
The new Swedish Covenant Hospital addition combines doctors' offices and a surgery center on the upper three floors and parking on the lower five levels. Photo: Spancrete.

SWEDISH COVENANT PARKING AND MEDICAL COMMONS

LOCATION
Chicago, Ill.

PROJECT TYPE
Mixed use (medical offices, surgery center, parking)

SIZE
106,000 square feet

COST
$38 million

DESIGNER
BSA Lifestructures, Indianapolis, Ind.

OWNER
Swedish Covenant Hospital, Chicago, Ill.

STRUCTURAL ENGINEER
Thornton Tomasetti, Chicago, Ill.

CONTRACTOR
Power Construction Co., Chicago Ill.

PCI-CERTIFIED PRECASTER
Spancrete, Waukesha, Wis.

PRECAST COMPONENTS
Double tees, columns, beams, spandrels, vertical walls, Spancrete wall panels, stairs and landings, and Spancrete hollow-core slabs

Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

POLSINELLI HQ AND HOTEL SORELLA AT PLAZA VISTA

LOCATION
Kansas City, Mo.

PROJECT TYPE
Mixed use (parking, retail, restaurant, office, hotel)

SIZE
400,461 square feet (286,461 for office, 114,000 for hotel)

DESIGNER (POLSINELLI HQ)
HOK (formerly 360 Architecture), Kansas City, Mo.

DESIGNER (HOTEL SORELLA)
Gould Evans, Kansas City, Mo., with Draw Architecture, Kansas City, Mo.

OWNER
VanTrust Real Estate LLC, Kansas City, Mo.

STRUCTURAL ENGINEER
Opus A&E/Bob D Campbell and Associates, Kansas City, Mo.

CONTRACTOR
JE Dunn Construction Co., Kansas City, Mo.

PCI-CERTIFIED PRECASTER
Enterprise Precast Concrete Inc., Omaha, Neb.

PCI-CERTIFIED ERECTOR
J.E. Dunn Construction Co., Kansas City, Mo.

PRECAST COMPONENTS
1275 architectural panels (625 9- and 12-inch-thick panels for the hotel, 650 6-inch-thick panels for the office)

PLAZA VISTA

The project that became the Plaza Vista mixed-use development in downtown Kansas City, Mo., became a victim of a legal dispute halfway through its construction, causing the work to stop. Fortunately, a new developer stepped in to rebrand and reinvigorate the plan. Unfortunately, little of the previous construction could be saved, causing much of it to be demolished. In both phases, however, precast concrete architectural panels were used to clad the building.

"Precast concrete was the material of choice from day one," says Dirk McClure, regional director of business development for Enterprise Precast Concrete, which fabricated the precast concrete components for both stages. "When the project was faced with major challenges and changes well into construction, the modular flexibility and adaptability of a precast concrete cladding solution helped tremendously."

'Precast concrete was the material of choice from day one.'

Started in 2006, the original project was envisioned as a multi-use complex with office and hotel space along with retail and parking. Both buildings were planned to be clad with precast concrete panels on a cast-in-place concrete frame. But disputes arose and construction was halted.

Ultimately, VanTrust Real Estate stepped in to restart the project, changing its name to Plaza Vista. After evaluating the site and opportunities, they decided to start from scratch, replacing the existing construction on the office portion with a steel frame and new precast concrete panels. The development was revamped to feature a 10-story, 253,000-square-foot headquarters building alongside the already-started, 130-room boutique hotel, along with 17,500 square feet of retail space, all built atop an existing six-level, cast-in-place concrete parking structure with space for 940 cars.

"We came to the project late, with some of the building already constructed," says Sandy Price, vice president and senior project designer at HOK (which absorbed the project's original designer, 360 Architecture). Part of their design process ultimately involved removing the existing panels, grinding them up, and repurposing them.

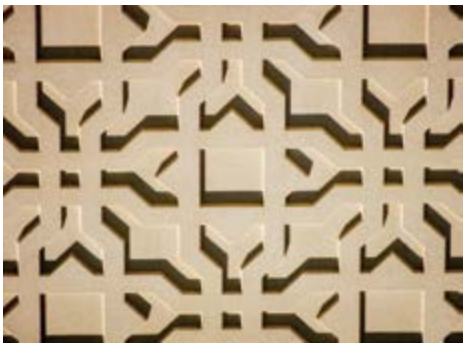
"The hotel portion had been nearly completed, and it featured precast concrete panels, which helped influence our decision to continue that specification for the offices," he says. "But we also factored in precast's efficiency, speed of erection, and economics."

OFFICE PANELS
The office building's panels feature white cement with an acid-wash finish, which brought out each panel's color and made strategic use of aggregates. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

HISTORIC SETTING

A key element was the project's location on Kansas City's historic plaza, which is dominated by older, masonry buildings. "If you want to add contemporary office and retail space into that environment, precast concrete makes much more sense for a 10-story building than masonry," Price says. "It provided the mass and solidity we wanted while adding a sense of permanence that is inherent in the legacy buildings around it."

The new tenant, the Polsinelli law firm, required less specialized spaces, allowing designers to plan flexible floor plans that could benefit the developer long term. "We went through multiple studies to repurpose the existing space, but it just wasn't practical," says Jeremy Tinkler, project architect at HOK. "The original project was designed specifically for that tenant and wasn't practical for other uses. Our goal was to create space that was efficient and flexible for a variety of tenants."



DETAIL TOUCH
Accents with a Spanish Moorish influence were cast into panels below windows. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

The building's interior was completely revamped. "The original design included a massive atrium at its core, so the interior looked inward from the plaza," Tinkler explains. "We wanted to reverse that and take advantage of the views." That created a more compact design and added more perimeter offices. Outdoor terraces and a patio were added to further emphasize the connection to the plaza.

Designers faced two challenges with casting the precast concrete panels. They had to match the panels already erected on the adjacent hotel while creating a complementary look for the office/retail space. "Through special care and detailing, the precast concrete match on the hotel was incredible," McClure says. "That's especially true considering the Phase 1 pieces had been installed and were in place for years prior to final completion."

'Through special care and detailing, the precast concrete match on the hotel was incredible.'

For the office building, a new concept was created. The original panels had a red, almost pink cast, and the designers wanted something closer to a limestone finish. They

DEVELOPMENT RESTARTED
The two-building development was revived at Plaza Vista when VanTrust Real Estate took over and scrapped construction already completed. It features a 130-room hotel, 10-story office building and parking. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

COMPLEMENTARY DESIGN
Designers wanted to create a look that stayed within the spirit of the location while providing a complementary look to the hotel. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

specified white cement with an acid-wash finish, which brought out each panel's color and made strategic use of aggregates. "Our goal wasn't to match the hotel's look but to find a design that stayed within the spirit of the location while providing a complementary look," says Price.

A formliner with an intricate infill pattern was used on some panels, with a design created by Price. "I researched designs that would hint at the Spanish Moorish influences in the area," he explains. The accent was used between window levels. "It offered an opportunity to use shadows in a creative way to add detail that changed through the day."

The precast panels played a key role as the framing elements for balconies that provide scenic views of the area. Panels also hide from view penthouse equipment at the building's top. To support the precast and glass aesthetic that embodies the overall massing of the building, the design team maintained a similar rhythm of precast concrete columns separated with a metal-grate infill to subtly hide the large equipment.

PANELS' LIGHT WEIGHT HELPS

The lighter weight of the precast panels compared to masonry was a benefit, as the building's frame was threaded into the six-story, cast-in-place concrete underground parking structure's foundation beneath it, making weight a primary concern. "Using precast definitely lightened the load," McClure says. Price agrees. "The panel attachments and columns had to coordinate with the existing columns from the parking structure. Precast was a great solution for this, it worked out quite well."

'Using precast definitely lightened the load.'

Precast Helps Meet Varied Goals

Precast concrete can help mixed-use projects meet a variety of challenges and achieve a range of goals for owners, building users, and the construction team. These include:

1. Create a distinctive character that projects an upscale image while allowing each function within the building to maintain its own functional design.

   The plasticity of precast concrete components and the variety of finishes that can be applied ensure that designs blend with any surroundings and project any needed corporate image while also allowing for diversity.

2. Ensure parking levels do not overwhelm other functions in the building and fit with the surrounding neighborhood.

   Precast concrete designs can feature inset brick, granite, and punched-window effects that replicate housing or other types of surrounding architecture.

3. Ensure code requirements for fire separation between parking and other functions is met.

   Precast concrete hollow-core slabs and double tees provide the necessary separation between parking and other functional areas of the mixed-use facility.

4. Design open interior spaces to maximize parking layout and provide secure environment.

   Double tees can span long distances to eliminate columns and provide unobstructed views through the levels.

   Moment frames, K frames, litewalls and other unique structural supports can open interiors and smooth traffic flow.

5. Provide structural support for many small rooms above open, column-free ballrooms and conference areas.

   Hollow-core slab spans long distances while providing structural support, minimizing columns on lower floors.

6. Create high fire resistance.

   Precast concrete's noncombustible composition minimizes fire spread, while modular design techniques provide time for detection, evacuation, and suppression.

7. Use durable materials that won't show dents and other misuse.

   The density of the material minimizes chances for damage to interior walls or ceilings by guests.

8. Meet the area's seismic requirements.

   Precast systems using proven connection technology allow precast concrete components to be used in all seismic zones.

9. Speed construction to provide faster return on investment and meet scheduling commitments.

   A total-precast concrete system speeds construction, minimizes component pieces by combining structural and architectural elements, and provides single-source responsibility.

Component casting begins when the shop drawings are complete, ensuring erection begins when the site is prepared. Year-round, all-weather construction ensures schedules are met.

BLENDING MATERIALS
Glass panels contrast with the white precast panels on the building, with large openings adding a feeling of openness to the building. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

The designers' use of precast concrete panels tied into their plan to create the building for long-term durability. That plan was put to the test during construction following a major gas-leak explosion across the street (unrelated to the project). "It put the building to a serious test of blast and fire resistance," says McClure. "While this event was obviously not planned or foreseen, the precast held up very well, which is a tremendous testimony."

Delivery of materials posed no challenges, Price says. "It's always challenging to work in the downtown area, but deliveries worked great with our precast partners." The plant was a 3-hour drive away, allowing quick responses for sequencing deliveries and ensuring no backup of components to be erected.

'It was a tight site, but the contractor worked diligently to ensure delivery, staging, and erection wouldn't interfere with traffic.'

"It was a tight site, but the contractor worked diligently to ensure delivery, staging, and erection wouldn't interfere with traffic." The designers went through a round of design to optimize panel sizes to find the most efficient sizes to transport and erect. "The contractor and precaster were both experienced at working in tight sites, and they did a great job in a short period of time."

The 650 panels for the office and remaining 625 pieces for the hotel, encompassing 113,300 square feet of vertical precast, included both 9- and 12-inch thicknesses for the hotel and 6-inch-thick panels for the office. The project has received LEED certification, to which the precast panels contributed through their use of regional content and local manufacture, the use of recycled content, and their ability to be recycled—which was proven when the original panels were removed and repurposed.

The new design shows how projects can be reinvigorated even when stalled. "Our overall goal for the project was to create a timeless piece of architecture," says Tinkler. "We didn't want it to be overstated, but we did want it to provide an elegant backdrop to the plaza that fit with its historic neighbors. Precast concrete was absolutely the ideal material to provide the exterior look we wanted to achieve our goals."