SIRCAL Builds a New Interior for MU’s Swallow Hall While Preserving Its Historic Exterior

PROJECT DESIGNED AND BUILT TO ACHIEVE LEED® CERTIFICATION

In May 2013, the University of Missouri in Columbia announced the renovation of Swallow Hall as part of its “Renew Mizzou” project to improve several red brick buildings in the Francis Quadrangle Historic District. Built in 1892-93 at the southeast corner of the Quad, Swallow Hall was named after George Clinton Swallow, Missouri’s first state geologist. It was placed on the Columbia Historic Preservation Commission’s Notable Properties list in 2002.

SIRCAL Contracting, Inc. and River City Construction, L.L.C. had been working concurrently on the budgeting for both the Swallow Hall renovation project and the Jesse Hall HVAC, life safety system, and elevator project. Since the two buildings are in close proximity and would be sharing access on the east side of Swallow Hall during their respective renovations, MU bid the projects together. SIRCAL and River City decided to joint venture the work, with River City taking over the Jesse Hall project and SIRCAL working on Swallow Hall. The hard bid public contract for general contracting services was awarded in March 2014.

At the 2016 Kansas City Chapter, AGC Building Excellence Awards, River City was honored as a Finalist in the Renovation Project of the Year by a General Contractor category for their work on Jesse Hall.

**Swallow Hall Project Team**

SIRCAL’s Swallow Hall project team included Chris Hentges, Project Director; Jeff Wilson, Project Manager; and Sean Jones, Project Superintendent.

International Architects Atelier was the Design Architect and Architect of Record. IAA was led by Majid Amirahmadi, AIA, Principal; Erin McKinney, AIA, Architect; and Andy Short, AIA, Architect.

Dennis Haynes was the Construction Project Manager for the University of Missouri. Pamela Eugster, RA, was MU’s Project Manager during the design phase.

Structural Engineering Associates, Inc. (SEA), the structural consultant, was led by G. Kelley Gipple, P.E., Principal, and Falgun Surani, P.E., Project Manager. W.L. Cassell & Associates, Inc. was the MEP consultant.

The $16.9 million renovation was paid for with maintenance funds. SIRCAL has been involved in the renovation (continued on next page)

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**Cover Photo:** West elevation showing the polygonal tower with conical “witches hat” spire on the southwest corner. The building retained its classic exterior details including the round arched windows, lintels, and mansard roof dormers. The color and profile of the new die-cast aluminum window frames were matched as closely as possible to the original wood window frames. (The old wood spires were restored to the building and framed with steel during the prior renovation in 2001.) Etched into the limestone signs above the two main entrances is the word “Geology,” a reference to the building’s former role as home to the School of Geology.

-- cover photo by Paul Kivett

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**WEST ELEVATION FOLLOWING CONSTRUCTION. SIGNS OF CONSTRUCTION ACTIVITY ON THE WEST SIDE OF SWALLOW HALL WERE KEPT TO A MINIMUM IN ORDER TO PROVIDE UNIMPEDED VIEWS FROM THE Historic Quad, WHERE THE TIGER WALK, TIGER PROWL, AND OTHER TIME-HONORED TRADITIONS TAKE PLACE. WHILE SHORING BRACES WERE USED ON THE NORTH AND SOUTH EXTERIOR TO STABILIZE THE WALLS DURING CONSTRUCTION, INPLANE (FLAT) BRACING WAS USED TO STABILIZE THE WEST WALL FROM THE INTERIOR. THE PROJECT TEAM ALSO STABILIZED THE BRICK MASONRY FROM THE INTERIOR (WITH GROUT INJECTIONS) AND DEMOLISHED MOST OF THE INTERIOR STRUCTURE FROM THE EAST SIDE – A TRIBUTE TO THEIR ABILITY TO DEVELOP A COMPLEX, CAREFULLY-COORDINATED, AND ULTIMATELY SUCCESSFUL SEQUENCING OF THE WORK.**
Swallow Hall
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of several other historic buildings on the Quad in recent years. They served most recently as a subcontractor on a major renovation (completed in 2011) of Switzler Hall. Prior to that they were a joint venture partner on the addition and renovation (completed in 2008) of the Donald W. Reynolds Journalism Institute.

SIRCAL began assisting with the Swallow Hall renovation budget during the winter of 2013. “While working on the journalism school we addressed similar cost issues associated with stabilizing the masonry and removing the interior,” said Chris Hentges. During the Swallow Hall design process, they also provided value engineering services, he added. These

SIRCAL’s past experience and knowledge with the reconstruction of historic structures allowed our team to establish a realistic and practical construction phasing plan early on in the design process. A true partnership and collaboration among the design team and the SIRCAL construction team allowed us to resolve challenges with ease, making it an enjoyable journey!

– Majid Amirahmadi, AIA Principal, International Architects Atelier

services included analysis of the temporary shoring system and phasing of the work; analysis of the structural floor system; and evaluation of interior finish products.

Prior to the renovation, The Museum of Anthropology and the Department of Anthropology were housed in Swallow Hall. The Museum of Anthropology relocated to Mizzou North, where it will remain. The Department of Anthropology temporarily relocated to Mizzou North and University Place, and has now returned to Swallow Hall.

The Department of Anthropology now occupies the south half of the first floor and most of the second floor, and shares teaching assistant space on the third floor with the Department of Art History and Archaeology. The latter department, formerly housed in McReynolds Hall, relocated to Swallow Hall and now

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Members Companies of The Builders’ Association Who Worked on Swallow Hall

• Ambassador Steel
• Asbestos Removal Services, Inc.
• Central Concrete Co.
• Fritz Mechanical LLC
da Central Missouri Plumbing LLC
• Elliott’s Custom Cabinets, Inc.
• Epoxy Coating Specialists, Inc.
• Glennstone LLC
da Glennstone Roofing & Fence Company
• Meyer Electric, Inc.
• Missouri Builders Service
• QuesTec Mechanical
• Higman Equipment Company, Inc.
da Siggins Company Inc.

EAST SIDE BEFORE RENOVATION

The two east entrances are at the far end of the recessed areas and are partially visible above. The central portion between the north and south wings housed The Museum of Anthropology on the first floor and classrooms and offices on the second floor. The arched stained glass windows above each of the east entrances were preserved and incorporated into the new third floor space.

EAST SIDE DURING RENOVATION

At the time this photo was taken, grout injection had been used to strengthen not only the exterior walls but the interior walls (visible above) that were to remain. Structural demolition had been completed, and the basement was being excavated to a new depth. (Once the micropiles for the basement structure had been constructed and the basement foundation laid, the project team built up to the top floor, constructed the new east façade, and completed the interior.)

EAST SIDE AFTER RENOVATION

The recessed areas of the building have been infilled, increasing its usable square footage. Two ADA entrances now flank the lecture hall and provide enhanced access to the building. The sloped portion of the roof, previously supported by wood joists and rafters, now has a metal deck. Glass behind the lattice work in the dormer allows natural light into the third floor space. Insulated low-e double pane windows have replaced the single pane windows on the east side as well as the rest of the building exterior. SIRCAL also expanded the parking lot on the east and south and built a concrete form liner retaining wall (in foreground, out of view).
occupies the remaining space there.

The SIRCAL team began work at the Swallow Hall site on July 1, 2014. At that time, the building contained two usable floors plus an unusable attic space and a partial basement. The building was dried in by December 2014, with the new roof, windows, and east wall in place. They reached a worker peak of 60 during February 2016 while performing the interior finish work. The University issued its certificate of substantial completion on April 29, 2016.

SIRCAL delivered the project on time and on budget, with no lost-time accidents.

MEETING THE CHALLENGE

The foremost challenge for the project team was to preserve the original appearance of the building while constructing a virtually all-new interior structure that maximized classroom space and added life safety features including a new sprinkler system and fire alarm, said Chris. A related challenge was to ensure that any new building materials — such as the porcelain tile in the main lobby and the ADA-compliant doors at the west entrances — were compatible with the historic character of the building, he added.

SIRCAL self-performed the carpentry as well as the concrete for the sitework and cast-in-place structure.

The reconstruction allowed for 8,349 gross square feet of space to be added to the building in approximately the same footprint. This was achieved by: 1) excavating portions of the basement several feet deeper and excavating previously unexcavated areas; 2) filling in the recessed spaces on the east side of the building (eliminating the north and south wings); 3) raising the roof height of the east side attic spaces to access the volume of the pitched roof attic space.

PHASING THE WORK

The task of building the new interior while keeping the west exterior as free as possible from construction activity was made more challenging due to the tight site conditions. Swallow Hall is bounded by the Chancellor’s “Residence on the Quad” to the north, Jesse Hall to the south, and the Quad to the west.

Additionally, the area on the south could not be overloaded with heavy equipment due to an arched brick underground steam tunnel. This left the parking lot on the east side of the building off Ninth Street as the only area available for staging and crane access. SIRCAL addressed these challenges by carefully and meticulously phasing the work as follows:

Phase 1: The project team’s first major task was to stabilize the exterior walls to ensure that they could be safely disconnected from the existing floor plates and remain in compliance with wind and seismic load codes. The floor plates were temporarily left intact so they could be used to access the north, south and west walls during the grout-injection process.

When grout-injection was complete, the brick was power-washed with a mild detergent, and all masonry walls were tested to ensure they achieved the required solid fill foundation. Once the structural walls that were to remain had been stabilized, the project team went through the building and cataloged cast iron columns and other items that were to be salvaged. “It was important to preserve the original fabric of the building,” stated Majid.

Phase 2: SIRCAL braced the north and south walls from the exterior.

Phase 3: The west entry wall, and the north and south interior box walls just east of the twin polygonal towers, were braced from the interior using inplane (flat) bracing.

SIRCAL was then able to begin removing portions of the interior structure in accordance with the demolition plan. Most of the building’s interior structure was reconstructed. The original wood structure with round cast iron columns was replaced with a new cast-in-place structure, stated Jeff Wilson.

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Swallow Hall  
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Phase 4: The central portion of the east wall, (including the recessed areas), were removed. The floors and the roof supported by it were simultaneously removed as well.

Phase 5: Portions of the interior walls and the cast iron columns were removed. The floors and the roof supported by it were simultaneously removed as well.

Phase 6: Existing interior walls around the center of the building were underpinned and excavation for the new east superstructure began.

Phase 7: The east superstructure containing most of the building (except for the portion on the west) was built.

Phase 8: The west entry wall and the interior north and south box walls were braced from the new east superstructure.

Phase 9: With all temporary braces installed, the remainder of the existing west structure was demolished and excavation for a new west superstructure was completed.

Phase 10: The new west superstructure was built, the walls were attached to the new floors and metal studs, and all temporary braces were removed.

A new 900 square foot classroom is now at the center of the basement in former unexcavated space. For the first time, the basement is accessible by stairs (which are located on the southeast corner). Two restrooms were built west of these stairs to serve the new classroom space.

The basement formerly contained a boiler that supplied radiant heat and energy for the window air conditioning units. SIRCAL built a 2,000 square foot mechanical area east of the new classroom for the new central HVAC system which now serves the entire building. It has two large air handling units as well as a separate unit for the lecture hall.

SIRCAL reconstructed the steam tunnels under the west side of the building and reconnected them to the steam tunnel underneath the sidewalk circling the Quad. The limestone stairs at the main entrances were removed during this process and replaced with new limestone stairs. The steam tunnels supply hot and chilled water not only to Swallow Hall but to much of the rest of the campus.

Formerly, occupants could not cross the building from one side to the other on the first floor without going through The Museum of Anthropology display area, which was located in the center portion of the building. During periods when the Museum was closed, they had to go to the second floor to cross the building. Occupants can now enter the building on one side and exit on the other side.

The wood stairways at the center of the building were replaced with structural steel staircases located on the northeast and southeast corners. A new traction elevator is located near the northeast stairs and replaces the old hydraulic elevator.

GOING FOR GOLD  

The project is beingsubmitted by MU for LEED certification. Utilizing campus-wide sustainable practices, and building-specific design and construction criteria, it has the potential to achieve LEED Gold certification. Swallow Hall’s sustainable features include:

• Water use reduction (the building is anticipated to reduce potable water usage by 35 percent);
• Water-efficient landscaping;
• Enhanced energy performance (the building is anticipated to achieve an annual energy cost savings of 51%);
• Use of on-site and off-site renewable energy;
• Construction waste management (as of April 2016, 93.24 percent of construction waste was diverted from landfills to area recycling facilities);
• Use of building materials containing recycled content that are manufactured regionally and are low-emitting for better indoor air quality; and
• Controllability of lighting for user comfort and reduced energy usage.

FROM RED CAMPUS TO WHITE  

Swallow Hall is part of MU’s “Red Campus,” so named because of the red brick construction used throughout the Francis Quadrangle Historic District. East of the Red Campus is the “White Campus,” named for its white limestone buildings including Stewart Hall, SIRCAL’s next renovation project. This historically-significant building was constructed in 1912.

Stewart Hall provides space for Biological Sciences and the Geography Department. The renovation project will include the addition of two new vertical circulation enclosures, repairs to the building envelope, and replacement of building systems including mechanical systems, electrical systems, fire suppression, and fire alarm systems. ▲