McCarthy Building Companies & Museum of Fine Arts, Houston - Glassell School of Art

OVERVIEW: The Museum of Fine Arts, Houston (MFAH), one of the largest museums in the United States and the oldest art museum in Texas, initiated a two-phase, $450M expansion in 2015. Phase I of the project includes construction of the Glassell School of Art, a highly-regarded art school that serves as the teaching wing of the MFAH. The Glassell School of Art hosts classes, workshops, and educational opportunities for students diverse in age, interests, experience and needs. Nearly doubling the size of the previous structure, the new school is approximately 80,000 square feet and replaces the original building, which was designed by architect S.I. Morris and housed the school since 1979.

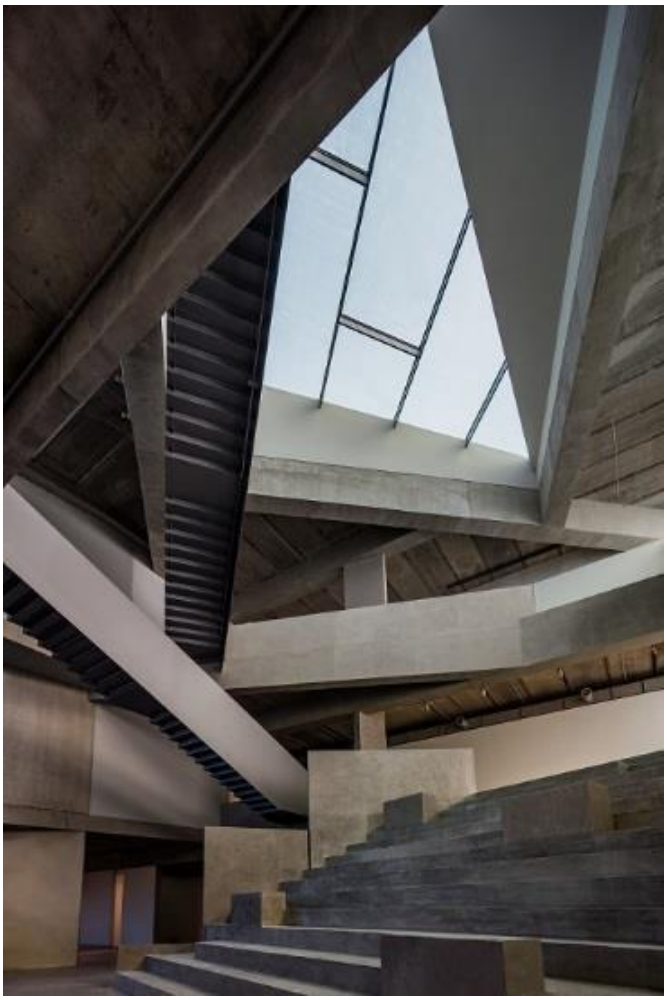
McCarthy served as construction manager-at-risk on the project. McCarthy began demolition in August 2015, broke ground in October 2015, topped out in August 2017 completed the project in May 2018. Inclusive of the $260M project scope, and in addition to constructing the Glassell School, McCarthy completed demolition of the existing school, infrastructure upgrades, a new central utility plant, and a two-level underground parking garage.

PROJECT CHALLENGES:

- Saving 4,300 existing glass blocks from the original Glassell School of Art.
  - It was tedious and challenging to remove the glass blocks. McCarthy worked with its masonry contractor to devise ways to salvage the block while maintaining the

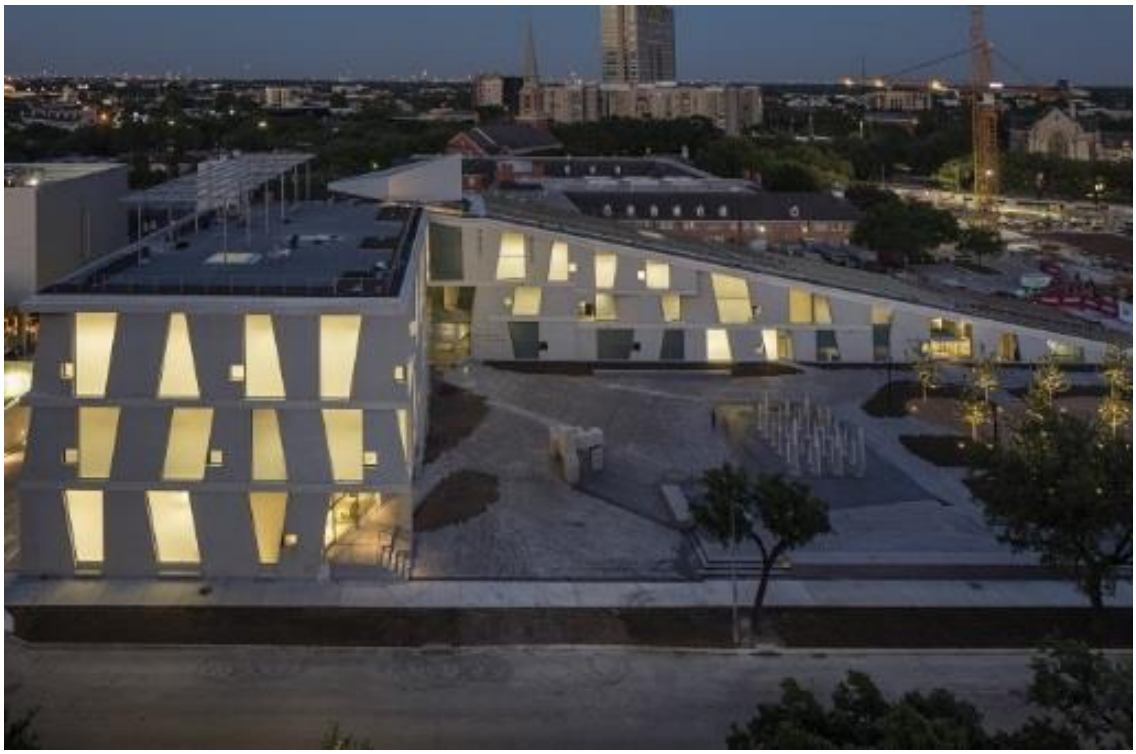
schedule. The design team incorporated some of the salvaged eight foot by eight foot pieces in the new Glassell School of Art.

- The “puzzle” design of the new Glassell School of Art
  - The building features 177 precast panels, with no two panels the same shape.
  - 139 massive glass windows, each with a unique size and trapezoidal shape – either straight or at a 10-degree slant in-or-out.
  - The glass came from Europe and the units were made in Mexico. The U.S. doesn’t have capability for fabrication of glass that size.
- McCarthy self-performed concrete work
  - The hybrid Precast/Concrete/Hollow Core Plank structure created a unique challenge - it isn’t common practice to put the parts and pieces together.
  - Precast concrete panels sat up to 40 dowels that stuck out of the cast-in-place concrete - which meant extremely close tolerances.
  - Extreme precision had to be taken when working with the precast templates to ensure dowels went in the right location.
- Unique hybrid structure sloping, walkable roof
  - Building features a sloping path that rises from an outdoor amphitheater at ground level to a green space with vegetation at the top overlooking the campus. The roof is three stories above ground.
  - With the amount of rain in Houston and a steep slope, teams had to figure out how to keep the rooftop greenery in place and not be washed away in storms.



TECHNOLOGY USED:

- BIM
  - Concrete Lift drawings in conjunction with Precast Model and Hollow Core Plank model allowed for tight coordination of the structure.
  - Virtual Reality allowed the Museum to see the building before construction and assist in making decisions.
  - Site Logistics models to show the Museum fence locations, delivery points, pedestrian access routes and tower cranes.
  - Review of constructability issues with numerous odd angles intersecting each other on different planes which allowed McCarthy to see it in 3D and better plan and coordinate.
- 3D MEP Coordination
  - With no ceiling and everything exposed McCarthy modeled everything, including devices, switches and even ½" conduit runs. This allowed the design team to precisely position everything.
  - Allowing better placement of devices from an architectural standpoint.
  - There were exposed ceilings, but Architect wanted everything stacked and on one side of the room. Nor did they want anything in the corridors to be seen.
- Laser Scanning
  - Long cantilevered beams were made to deflect. By laser scanning the structure we were able to bring into the model and assist fabrication with the right tolerances we were asked to maintain.



KEY PROJECT PARTNERS: McCarthy Building Companies (Construction Manager-at-Risk)

Kendall-Heaton Associates (Architect)
Steven Holl Architects (Design Architect)
Guy Nordenson and Associates (Structural Engineer)
Cardno Haynes Whaley (Structural Engineer)
L'Observatoire International (Lighting Consultant)
ICOR Consulting Engineers (MEP Engineer)
Deborah Nevins & Associates (Landscape Design)
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