

AGC Colorado ACE Award



J.R. Butler, Inc.
Presents the

Children's Hospital Colorado South Campus

For the
Best Building Project (\$2 - \$6 million)
2014 Award

Project Team:
Project Manager: Eran Fraenkel
Superintendent: Forrest Hiller

J.R. Butler, Inc.



Better, Faster, Cheaper

The new Children's Hospital South Campus in Highlands Ranch is a stunning four story hospital building designed to serve the growing pediatric needs of the area. The new hospital houses inpatient and outpatient services, a 24/7 urgent care with 22 beds, a full diagnostic imaging center, a lab, a number of specialty clinics, a sports medicine clinic complete with a physical therapy gym, and four operating rooms for surgery. It was of the utmost importance that the building be designed not only with the patients and caregivers comfort and convenience in mind, but also in a timely fashion. When Children's Hospital, Saunders Construction, Davis Partnership, and FKP Architects began seeking a Glass and Glazing partner, J.R. Butler was thrilled to sit atop their list. The project was comprised of roughly 40,000 sq. ft. of glass, yielding a glazing contract size of \$3.4 million.

J.R. Butler was ultimately awarded the project due to our ability to start projects earlier and meet the speed that is demanded to complete the project. Our design and engineering team was brought onto the project just as the schematic design documents were completed. J.R. Butler worked together with the architect, owner, and general contractor in a series of six design meetings to bring the drawings from schematic design to construction documents; this reduces the time needed to bring the drawings from the schematic level to 100% construction documents by 45%. The process was so innovative that J.R. Butler actually owned the BIM 3-D Model, and uploaded it twice a week (every week) to all parties involved. Every detail in the curtain wall shop drawings was literally the same exact detail shown in the architectural drawing. While most shop drawings traditionally take about 2-4 weeks for architectural approval (if not more depending on the number of revisions), J.R. Butler's drawing was approved in 1 day during an all-day page turn with the Architect and GC. With the Construction Documents mirroring the curtain wall Shop Drawings perfectly, the customer now had a set of "as-builts" that are truly meaningful.

The Design Phase revealed several challenges such as a "serpentine" curved frame in the lobby, a "barrel-roof" with trapezoidal frames, and projected covers and sunshades. All of these unique features led to a custom designed curtain wall system. However, the biggest design challenge of them all was incorporating Children's Hospital trademark, shadow boxes. Similar to the existing Hospital in the Anschutz campus, FKP designed this new building to have an identical corrugated metal panel installed behind vision glass to provide an appearance of shadow and depth, known as shadow boxes. Through research, J.R. Butler predicted that such a design would definitely result in a failure to the curtain wall system, since the metal panel would not allow for the frame to breathe, and in turn, heat would become trapped between the glass and the metal panel and lead to condensation on the interior surface of the glass. The only way J.R. Butler would have warranted this frame is if we could install a custom welded pan to serve as the shadow box;

however, this would result in a \$100k add to the project. This alternative resulted in a long debate that originally portrayed J.R. Butler as the “bad guys” since the glazing contractor on the Anschutz campus was able to provide this same design without any complaints. After several back-and-forth arguments on this topic, the owner finally spoke to their own maintenance department to learn that the existing campus had in fact been leaking for years due to this vacuum effect from the Shadow Boxes. J.R. Butler proactively provided a second alternative to this design, that not only eliminated the \$100k increase for the welded pans, but also dropped the price of the original Shadow Box design by another \$100k (a \$200k swing!). The solution was to design a custom silkscreen frit pattern on the glass to mimic the corrugated Shadow Box appearance. Because this pattern wasn’t 100% symmetrical, the biggest fear was that some of the frames would have the glass orientated correctly while other frames would have the pattern upside down. Creating several mock-up samples, and hanging them throughout the manufacturing plant floor so that it was visible from every workstation prevented this.

The biggest fear of an Owner is having a building that leaks, especially on a hospital that houses sick children. J.R. Butler is a strong proponent of building mock-ups for performance testing in order to eliminate the likelihood of water infiltration. Together with the stud framer and water proofer, a mock-up was built in J.R. Butler’s facility, and tested on our testing wall. To no one’s surprise, the mock-up failed immediately. Through constant retesting and isolating controlled variables, the errors in installation were slowly identified; whether it was in relation to how to lap the two air-barrier products, how to handle corners, and whether tie-ins needed to be sealed or pre-flashed prior to penetrating through the air-barrier. The most shocking of all the issues was that the manufacturers’ own air-barrier water proofing sealant didn’t adhere properly to its own product. It was concluded that a Dow Corning sealant must be used in lieu of the original Henry’s sealant. By the sixth and final test, a completely new mock-up had to be built since the original one was worn out; however, the total cost of these multiple tests doesn’t compare with the cost of having a leaking building.

The last challenge for this Children’s Hospital project was the schedule. The Children’s Hospital at the Anschutz Campus was overwhelmed and needed doors open on this new hospital as quickly as possible. One of the strategies that JR Butler recommended was to install the glass before the brick and metal panels. Since the Curtain Wall and Air-barrier create a weather-tight building, this allowed for the interior work to commence nearly 5 months earlier than the original schedule, and removed the Mason and the Panel Contractor from the critical path. Furthermore, since the stair tower on the Northeast corner of the building didn’t contain any interior work, J.R. Butler’s proposed that this area should be installed last, so that all exterior and structural trades can focus on the areas of the building that would result in longer completion duration.

JR Butler was able to utilize our pre-manufactured techniques to install the product early and ahead of schedule, while maintaining the highest level of quality, and working a total of 22,000 man-hours without any accidents.

Constructing a building of the best quality and design, which in the end would ultimately save the lives of children for generations to come, was of vital importance for J.R. Butler. Our pre-construction team comprised of architectural designers and engineers overcame a number of design challenges by the introduction of new innovative techniques. The building is not only practical but also stunning. J.R. Butler was challenged to build the project better, faster, and cheaper to coincide with a motto that we have come to favor.



