Category 7: Best Building Project – Specialty Contractor (Over $10 Million)
Contractor: RK Mechanical, Inc.
Project Name: Aggie Village at Colorado State University

Colorado State University (CSU) is a public research university located in Fort Collins. It features 13 residence halls providing on-campus living for over 5,000 students. As the university’s population grows with an expected enrollment of 42,000 students by 2020, CSU realized the need for expanded housing options, and the Aggie Village redevelopment project was first on the list.

HOUSING REDEVELOPMENT

The comprehensive site redevelopment project replaced the former Aggie Village North constructed in 1960, which included 145 apartments with 290 beds. The replacement project features three new buildings containing 431 housing units and a total of 973 student beds over 8.4 acres – making it the largest project undertaken at CSU to-date. These modern apartments range from studios to four-bedroom units, rivaling the newest and nicest housing competition off-campus.

The complex provides a housing community for undergraduate students, international students, graduate students, visiting scholars and post-doctoral fellows.

COOK, STUDY, PLAY AND MEET

The complex includes three community centers each equipped with a kitchen, 19 study lounges, four meeting rooms, and recreational areas with games. A grand courtyard provides outdoor programming space for up to 500 people. There are over 800 bicycle parking spaces, bicycle and car share programs and 250 underground parking spaces for residents. The project also includes an underpass connecting the community to the main campus making the commute safer for students.

WINNING VARSITY TEAM

CSU combined some of Denver’s most impressive contractors to create a winning project team. The general contractor, PCL Construction Services, is an international company known for taking on complex projects. The architect, 4240 Architecture Inc., is a Denver-based firm
focused on design ingenuity. Cantor Ruma and Associates, another Colorado-based business provides value-driven engineering. RK Mechanical is the Rocky Mountain Region’s leading full-service mechanical contractor. Our team aids in completing construction projects by designing, fabricating and installing mechanical systems.

For this project, RK Mechanical served as the design-assist mechanical contractor. The scope of work included designing, fabricating and installing the new mechanical systems for each building as well as a standalone heating plant and central plant for chilled water. We also provided preconstruction services with advanced estimating to establish the Guaranteed Maximum Price (GMP), as well as CAD and BIM services.

GRADE A SAFETY AND QUALITY

RK Mechanical is extremely proud to be an ISO 9001:2015, ASME and AISC certified contractor. In addition, RK is an OSHA VPP Star Worksite as well as OSHA VPP Star Mobile Workforce accredited.

RK is rooted in tested processes which are designed to deliver predictable results and produce quality products. By ensuring clarity of expectations early on, our team established rapport with on-site personnel. A full-time quality assurance and quality control (QA/QC) individual was assigned to work on this project, proactively mitigating risks to avoid setbacks. Our licensed safety employee was responsible for conducting site-specific training plans, safety inspections, eliminating hazards on site and ensuring compliance on the project.

GREEN BUILDING REQUIRES A LOT OF HOMEWORK

CSU set the bar high, aiming for LEED Gold certification status. While difficult to achieve, this construction goal provides a positive environmental impact on the community and can result in energy and cost savings for the owner. On this project, sustainability features included LED lights, sustainable transportation efforts, energy-efficient heating and cooling systems, solar shades and natural lighting, raw water for irrigation and low-water landscaping.

All crews were required to comply with LEED guidelines throughout the duration of construction. After completion, a building flush out was performed by RK Mechanical, drawing in outside air and forcing it through the ventilation system to flush out any debris left behind during construction, as well as pollutants that may have seeped in from newly installed materials.
We also capped each of the items that we fabricated in our shops to keep them clean from the onset.

**REVERSING THE SCHEDULE WITH PULL PLANNING**

Pull planning is a non-traditional construction schedule that involves a lot of communication and coordination. The downstream process requires project scheduling to occur in reverse order and calls for a higher level of detail than standard scheduling practices. This ensures involvement from all stakeholders, manages risk, eliminates miscommunication and increases project efficiency.

RK Mechanical joined the project team with a step-by-step schedule that included specific completion dates, facilitating the sequencing of all subcontractors.

**PROBLEM-SOLVING FOR BAD WEATHER AND TIGHT SPACES**

In the spring of 2015, Colorado received unexpected rain that caused major project schedule delays. Due to the bad weather, the project was four months behind schedule with only six months remaining. RK Mechanical analyzed solutions that would fast-track the delayed schedule. Our team created a plan which negotiated time and space for fabricating unplanned materials in-house. Performing this work in our shop not only helped meet original completion dates but also increased the quality of the final product.

We faced further challenges due to the campus’ buildings close proximity to each other. The project site made laydown space tight. Our solution was to build carts to fit through unit doorways for easy material transportation and installation. We prioritized materials and loaded carts by unit. Once all of the components for the specific units were in each cart, our team went room by room installing everything needed for each unit at once.

Even though we were handed the project significantly behind schedule due to storm delays, in just two weeks’ time, we were able to put the project back on track by working overtime with 90 RK Mechanical employees dedicated to this project at its peak.

**ADVANCED PREP FOR FINALS**

CSU recently built a similar housing project that took approximately three years to build. CSU determined that project to be a scheduling failure and identified the problem as inefficient electrical and mechanical subcontractors.
RK Mechanical, combined with the new electrical team, were able to complete the Aggie Village project, similar in size and scope to CSU’s previous housing project, in just 18 months. The size of our shop, along with our in-house prefabrication capabilities, enabled us to work quickly and efficiently.

**WOODWORKING COURSE**

The Aggie Village redevelopment project was built with a wood structure, adding a new challenge to the RK Mechanical team, who is used to working with metal studs. The sequencing and installation tested our team and required additional on-site training, including:

- Where to properly drill holes in the wood when installing equipment.
- How to grout underneath shower pans for leveling.

The training improved the confidence of our crew and the overall quality of the project.

**OPTIMIZING TECHNOLOGY**

The RK Mechanical team used Viega piping throughout the buildings. Prior to this, our team typically used a hex product called Uponor. After conducting in-depth research, we found that Viega offers the best technology for fittings in the winter time. By using this piping, our team was able to insert pipes into fittings and tighten them on the spot, rather than waiting days for the Uponor pipes to expand due to the cold. This material modification expedited joint testing, aiding in the acceleration of the schedule.

**A TRUE TEAM PLAYER**

RK Mechanical proactively collaborated with the project owner early on as our team identified a concern about long-term maintainability for CSU’s facility managers. Per the original construction plans, each unit would include a 15” to 18” space to access equipment that would require maintenance in the future. This challenge did not impede our team from completing the mechanical scope of work, but we knew that it would be a challenge for the owner long-term. As a true partner, we identified the spacing problem and came up with a solution. Our team built a prototype of our proposed layout adjustments to present to the CSU maintenance crew. Once approved, we built four additional varying prototypes to ensure quality and uniformity throughout.
Our team’s innovation and dedication to project success saved the CSU facility management team from future obstacles as the only other solution would have been to completely rework the pipe layout to gain access to the equipment and filters.

**HONOR ROLL-WORTHY VALUE ENGINEERING**

Our level of experience in selecting equipment, systems options and constructability all played a major role in value engineering on this project. Some value engineering options provided on this project included:

- Purchasing all mechanical equipment from one vendor, saving money and standardizing materials.
- Reviewing control systems and recommending cost-effective alternatives.
- Reviewing requirements for component construction and suggesting alternate low-cost materials.
- Performing just-in-time deliveries.

**CREATING LASTING CONNECTIONS**

As a result of our team’s dedication, leadership and innovation on this project, RK Mechanical is a long-term partner with CSU. The new Aggie Village campus is now home to triple the number of students than the previous complex and has positively transformed the university’s campus, allowing it to remain competitive for years to come.