In an age where abstract self-reference is high culture, a school in Greeley, Colorado may have trumped everyone and done the most meta thing of all. Aims Community College has created a $24M facility for its construction programs, but the building, itself, is the teaching tool.

The project involved a new three-story Applied Technology and Trades Center (ATTC) on Aims's Greeley campus, which houses the school's Construction Management, Engineering, Technology, Industrial Technology, and Oil & Gas Technology programs, and renovating the adjacent building which houses the Welding program. The two buildings total 84,000 sf and are connected by a large, light-filled lobby. In addition to classrooms, the buildings contain a Maker Space that lets students design, build, and apply what they've learned, and a 7,000 sf Fabrication Lab. The project also involved four new Facilities Buildings, including Facilities Administration, totaling 34,000 sf.

But the big feature is the cutaway design: the learning tools *about* building, *within* the building. From visually-exposed elevator gears to color-coded conduit to propellers in the HVAC ducts, the structure is all about construction education.

"We wanted the building to tell its own story back to the students," Bob Binder, Principal Architect from DLR Group, said. "The future of the AEC industry will come from this building. It embodies the full life cycle of AEC."

Solutions of Special Projects

The challenge was to demo an existing single-level building to make room for the 3-story addition and four new buildings on an occupied campus, renovate two other buildings while occupied, and get the classroom-portion of the project done in time for the fall semester.

"This project transformed the entire north quadrant of the campus," Todd Schroeder, GTC Vice President, said.

During preconstruction, the team realized that Welding's flammable gasses and Maintenance's diesel fuel would both need to be relocated. GTC developed a plan for temporary storage, with fire-rated partition so both could be in the same structure, and relocated the piping.

During excavation the team discovered abandoned, two-to-eight-foot-diameter, concrete utility pipes from the 1960s boiler plant. Crisscrossing the site, the forgotten lines had caused mysterious sinkholes on campus. GTC removed them. Then construction began.

Built in 1973, the Welding Building housed the college's most popular program. Class would be in session during the 52 days their precast concrete structure was gut-and-remodeled, and the building was adjacent to new construction. GTC worked with Aims and the Greeley Fire Department to create "safe" learning areas, and changed egress paths as needed, throughout.

The project was at risk of being hit by the industry's labor shortage. (The irony of a labor shortage on a project that will train the new labor force was not lost on the team.) GTC phased activities and utilized onsite trades in multiple spots simultaneously.

"We sequenced our construction activities to maximize subcontractors' time onsite," Nicole Wempe, GTC's Senior PM said. They began foundations before steel design was complete. They replaced the Welding building's façade while it was occupied because the mason was available.

Aims was simultaneously undergoing a complete upgrade of their electrical infrastructure. GTC worked with the high-voltage contractor during preconstruction and construction to coordinate around schedules and student safety.

Excellence in Project Execution and Management/Team Approach

GTC not only built the project, but they and their subs also collaborated with the Owner and Architect on design. "The partnership between Aims, GTC, and DLR Group was so strong, it was as though we worked for the same company," Schroeder said.

Mike Millsapps, Executive Director of Facilities and Operations at Aims, initially sparked the cutaway-design idea.

"A lot of Owners aren't comfortable with exposed building," Binder said. But in this case the Owner encouraged it. "The OAC team all worked together to design the building. We would say things like, 'Wouldn't it be cool to show the students this, or that?'"

And who better to brainstorm than the builders, themselves? From Braconier Plumbing's idea to use clean-looking ProPress fittings on exposed pipes, to GTC's idea to substitute ceiling tiles with clear Lucite. From Aims's idea to do HVAC duct cutaways with propellers to show airflow, to Montgomery Electric's idea to color-code exposed conduits based on function: red for fire alarm, yellow for lighting control, silver for power, green for low voltage.

"We made things so people would want to look at them," Joe Turecek, GTC Executive Superintendent, said.

The subs were so involved that 175 of them came to the ribbon-cutting. But the construction teams weren't the only ones involved. Millsapps invited the welding instructor, who came to every OAC meeting. He then "test-drove" a demo welding booth for two months, suggesting tweaks, before the team built the other forty-four booths. Aims also used the project for two semesters of lab, and Turecek and Wempe took periodic turns as ad hoc teachers in the classrooms.

"All along the goal was to include the specific programs that were going to be involved," Millsapps said. "It was a great goal we achieved."

Construction Innovations/State-of-the-Art Advancement

The team used BIM software to 3D model the MEP, fire alarm, fire suppression, and structural steel. This significantly reduced the number of clashes that would've slowed construction.

"We went from over 2,000 collisions down to only three that we had to take care of in the end," Turecek said.

After the project, the team gave the 3D computer file to Aims, both for their Maintenance Department and the instructors, who can use it because it's so close to perfect. Additionally, everyone—OAC through subcontractors—used Bluebeam, exclusively.

"GTC brought that in," Millsapps noted, about the use of Bluebeam. "I didn't request it, but it really streamlined the process."

The new buildings are 21st century high-tech. All systems have sensors which relay feedback of everything happening with the structures, and Building Automation Controls (BAS) in the hallways have signage for student education. Welding's fume and dust collection system is state of the art. The interspersed, Lucite ceiling tiles, which allow students a view above, also maintain the plenum rating. Instead of plumbing in a utility closet, pipes are in classrooms, organized for teaching. The elevator windows for viewing into the shaft are made of two-hour-rated, gel-filled glass.

"The elevator windows made assemblies more difficult, because finding two-hour fire-rated windows took a month of lead-time," Brett Sorensen, GTC Project Engineer said. But he agreed that despite the challenges, the cutaways were worth it.

Environmental/Safety

Safety, like the rest of the project, was a team process. GTC worked with Aims's security, class instructors, Greeley Fire, and the Weld County Sheriff. The instructors incorporated OSHA learning into classes. The team raised parapet walls to 6' so workers didn't have to be tied-off all the time. This also helped the owner out long-term for his maintenance team.

"It was really a group mentality for safety," Sorensen said. "We planned ahead. We were pouring slab on deck and slab on grade while detailing and erecting steel above. We treated the building as two sections, so we could pour and erect safely at the same time. Zones were taped off and identified. This also allowed the schedule to accelerate."

Certification wasn't pursued, but Millsapps, who has led other LEED projects, said everything exceeded standards. He estimates the project could achieve LEED Silver. The building was oriented for maximum daylighting. Mechanicals were right-sized to help lower energy use. HVAC wasn't installed in "cold" buildings (storage spaces). And everything was recycled, even the old steam-line piping, which was crushed for fill under the new parking lot.

Excellence in Client Service and/or Contribution to Community

The payoffs were immediate. The facilities buildings, which had been scattered across campus, were centralized. This gave Aims a land bank for future buildings and brought the Facilities and Operations Department closer as a team.

"Now staff work in an open, collaborative environment as a result of being together in one facility," Binder said.

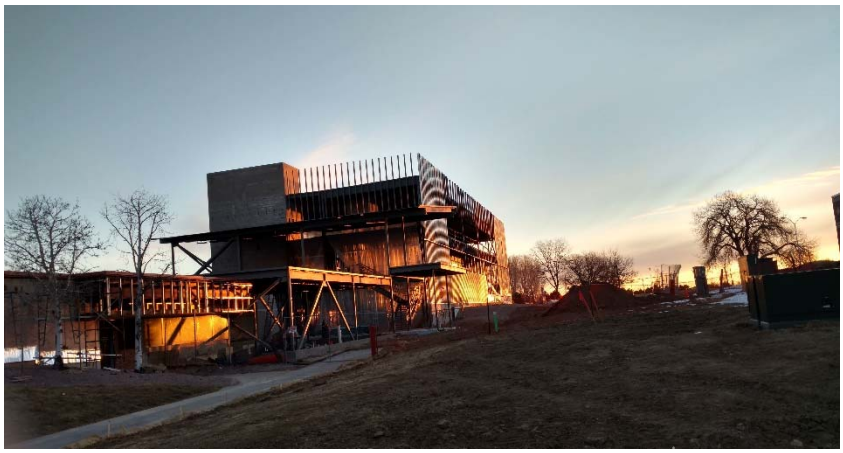
The people of Greeley were also impacted. Aims always designs its curricula to meet community needs, but this project garnered extra attention.

"I was overwhelmed by the community support for this project," Millsapps said. "People were calling to learn about it, showing interest, taking the time to take tours. We received a lot of feedback. They would say things like, 'I know when I hire a skilled worker, I look for ___.' A lot

of people from the community were involved with this—people who have a vested interest in hiring the graduates."

And the education payoff continues. Welding students built a pergola for the site, which GTC installed. The photovoltaic class will add a solar array to the pergola, which will supply power to the building. The team created a snowmelt system that is student-run. Fire risers have been left exposed for students to "figure out." Students will build the new boiler plant.

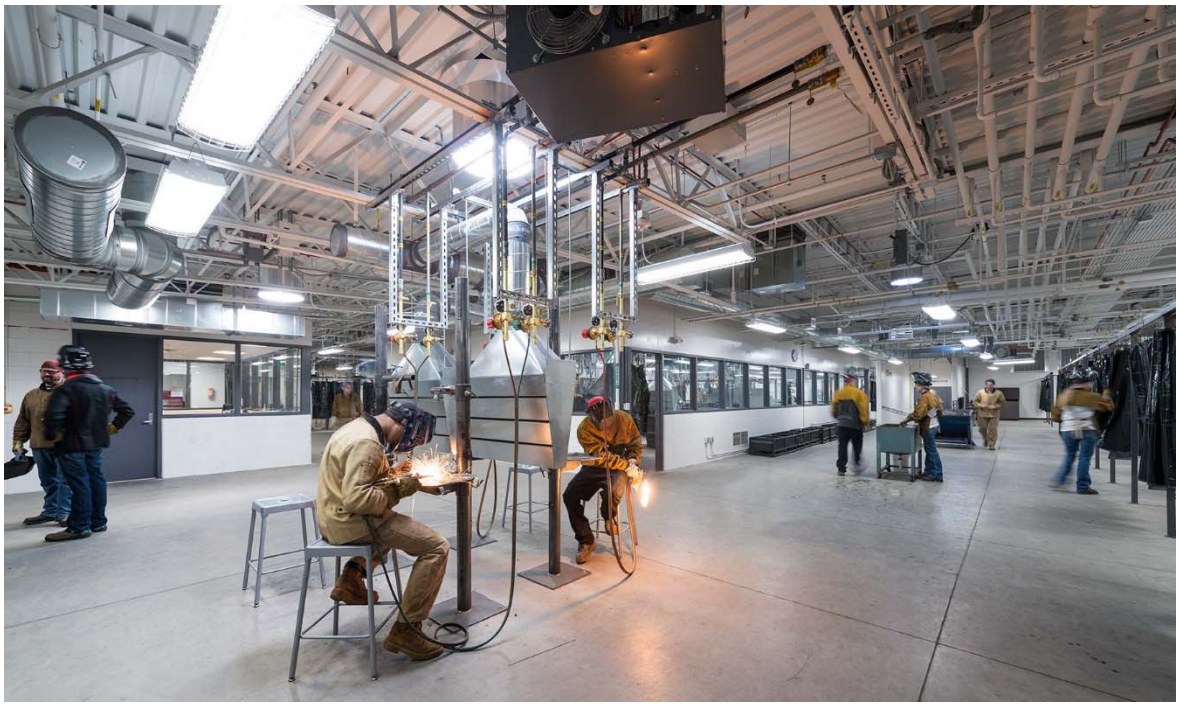
Turecek visited after school started. "The best part was seeing them use the building to teach what they were learning from the book."

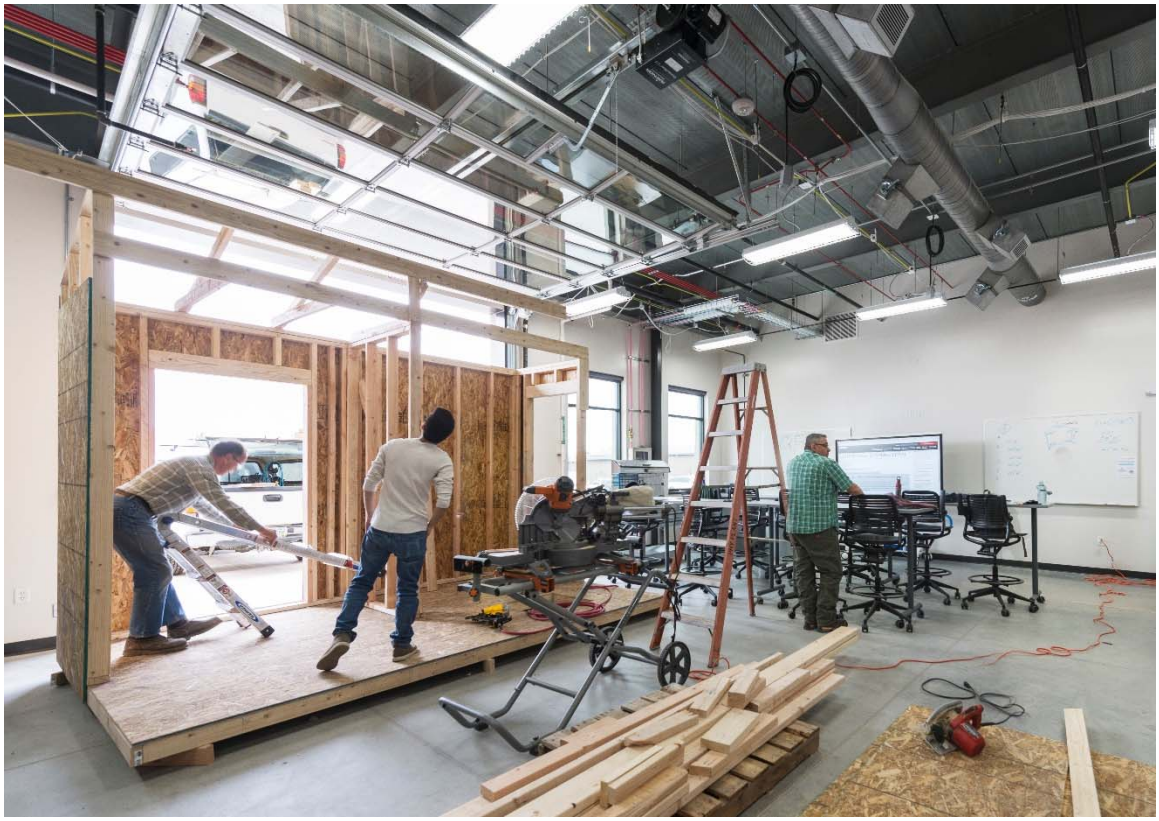



APPLIED TECHNOLOGY AND TRADES CENTER
Aims


RETURN
SUPPLY
SUPPLY, RETURN, AND EXHAUST AIR DUCTWORK
SUPPLY DUCTWORK CONTAINS THE CONDITIONED AIR DUCTED FROM THE ROOFTOP AC UNIT TO THE ASSOCIATED SPACE. SUPPLY AIR IS A MIXTURE OF FRESH OUTSIDE AIR AND RETURN AIR. RETURN AIR IS DUCTED BACK FROM THE SPACE TO THE ROOFTOP AC UNIT. EXHAUST FANS LOCATED ON THE ROOF TO UTILIZE EXHAUST DUCTWORK TO ELIMINATE RESTROOM ODORS OR HAZARDOUS FUMES.


PIT PLAN
Aims






Facilities and Operations Offices
Fleet Vehicle Storage
Applied Technology and Trades Center
Ice Slider Storage
Facilities Shop
Purchasing and Receiving