

Block 32 Utilities Administration Building

Adolfson & Peterson Construction

Keri Burson: kburson@a-p.com; 303-363-7101

Category # 9. Best Building Project – General Contractor (\$10 - \$40 Million)

Overview Statement

The Block 32 Utilities Administration Building (the UAB) in Old Town Fort Collins is the first in the state of Colorado, the third in the US, and the fourth in the world to be certified as LEED Platinum for new construction under the new USGBC LEED v4 standards. Designed to house the administrative functions of Fort Collins Utilities, it is the first phase of the City of Fort Collins' plan to redevelop their municipal services complex and create a more welcoming civic center. This new 3-story, 37,500-sf municipal office building was designed to be one of the most energy efficient buildings in the state and incorporates sustainable features such as photovoltaic panels, a prefabricated insulated panel envelope and windows, the state's first perennial outdoor living wall, and a rain garden.

Solutions of Special Projects

Relocating a Historic Building

Prior to construction, the team had to carefully move a historic landmark, the Butterfly Building – part of the Poudre Valley Creamery facilities that used to occupy the site – 100 feet to the east to make room for the new building. This required careful preservation planning and coordination to lift the building onto steel beams and carefully slide the building foot by foot to its new foundation. The process took two full days and the building was repurposed into a small café for the community.

Changes to the design

The City wanted this building to incorporate things never done before. Most of the ideas were successful; however, some were not and became an obstacle to manage. For example, the building was initially designed to be one of the first direct current power buildings in the

country. To accomplish this, the City kept all the electrical scope out of AP's contract and drawings to allow a specialized expert to manage. When the DC plans didn't materialize, the construction documents were already at 100% and construction was underway. AP had to continually coordinate with the construction architect and the subcontractors to keep the project moving while the design detail was added back in. Because our team had a thorough understanding of what the client was hoping to accomplish, we could communicate that vision to the subcontractors ahead of the drawings.

Excellence in Project Execution and Management/Team Approach:

AP was awarded the project two years before construction began. During that time, we actively supported the City's Block 32 master plan. This included multiple charrettes and designers. All along, AP provided feedback on cost and constructability as the redevelopment ideas unfolded into something more tangible.

During preconstruction, AP vetted every building system from a lifecycle energy standpoint. This included four different structural systems, four mechanical systems and multiple electrical systems. The City wanted to be sure its investment was solid upfront as well as in the long term.

To meet the owner's efficiency goals, several innovative materials were used, including:

LightLouver Daylighting System, a locally produced daylighting system.

Aquatherm fused piping, a state-of-the-art polypropylene, leak-free, one-piece, fused piping system that won't alter water chemistry, resists corrosion and scaling, and is impact resistant.

High-Efficiency Wall Panel System that combines framing and insulation, providing a much more efficient way to build the high-performance exterior walls.

High-performance fiberglass windows, which provide R-values ranging from 5.0 to 20.0, "tuned" solar transmission enabling morning passive-solar warmth and up to 75% afternoon heat rejection, 99.5% UV blockage, dramatic noise reduction, condensation elimination, and enhanced summer/winter occupant comfort.

Envelope Tightness

The high-efficiency wall panel system brought a high air barrier rating, but to increase that, the team wrapped the building in Tyvek and taped and caulked the seams. AP coordinated each detail of envelope installation with City energy engineers with the goal of making the building as tight as possible. Even a small task such as installing and sealing the windows required several coordination meetings to ensure no energy loss. This resulted in the City receiving the best air tightness rating ever produced on a City of Fort Collins building and elevated the standard for future construction.

Increased Construction Recycling Requirements

The City of Fort Collins requires recycling of wood, metal, cardboard, masonry, asphalt and concrete. AP presented our recycling plan for City approval prior to construction. Throughout the project, we logged recycling progress and presented the City a final report at the end of the project.

With careful planning AP was able to recycle 95% of the construction materials.

Construction Innovations/State-of-the-Art Advancement

The largest project challenge was the City's desire to be cutting edge in energy efficiency, with the constraint of a limited budget. To address this, the team focused on ensuring the opaque wall assemblies, air tightness and glazing, all worked together to optimize performance.

opaque wall assemblies

The UAB used a panelized stud framing system for its core insulating element with integral EPS foam insulation. Studs were formed in S shaped profiles and fabricated with perforations in half their depth. This allowed molded EPS foam to bridge between studs, effectively providing a more continuous layer of insulation through the whole EPS layer. This system alone approaches IECC code minimums for an opaque wall assembly insulation. However, the UAB assembly also includes a 1.5" layer of mineral wool in a continuous application outward of the wall system. This allowed the building to achieve a u-factor of 0.037. Since the panelized insulated framing system is a tested assembly applicable for use without exterior sheathing on non-regulated envelop construction, the savings of avoiding sheathing allowed the insulation to be swapped into the budget for little to no cost.

air tightness

According to regulations, “uncontrolled air movement through the building envelope can account for as much as 30% of a building’s annual HVAC costs.” Considering the importance of envelope air tightness, the Fort Collins commercial energy code contains requirements over the IECC in regards to barrier design. As a result, the UAB was subject to a third-party commissioning review, specifically verifying the continuity of the air barrier. During the construction commissioning process, the physical air barrier assembly was tested to verify the performance. City Code requires air barriers be tested for building leaks and not exceed .25 CFM/sf @ 75 pascals of pressure. The UAB achieved .09 CFM/sf @ 75 pascals of pressure.

glazing

The team spent a great deal of time optimizing performance of the opaque wall assembly and that process led them to push the performance of the glazing system. Otherwise, the effort on the opaque walls wouldn’t have mattered. Fiberglass frame glazing is not common in commercial multistory buildings. By addressing the thermal bridging properties of the glazing frame material with fiberglass, thermal conductivity around the glass was reduced significantly. The glass was an insulated double glazed light with a suspended heat mirror film, which created multiple chambers of air within the glazing unit, reducing conducted and radiated heat. This non typical level of glazing performance did come with a cost tradeoff. However, the glazing performance in combination with the opaque walls led the team to identify tradeoffs in the mechanical system. The UAB was able to achieve significant energy savings related to the building envelope, eliminating the need for an expensive mechanical system.

Environmental/Safety

Because this project has set such a standard for innovation and sustainability, the project team conducted tours almost daily near its completion for City faculty, other interested groups, and CSU students in the Construction Management Department.

The project brought the additional safety concern of having to coordinate around multiple public events that surrounded the site. To prepare, we met with City personnel, including safety and

event reps, to ensure safety was always at the forefront of planning. Through careful coordination, none of the events needed to be moved; we were able to keep the job running, and there were no safety issues. The events included:

- Realities Ride
- Taste of Fort Collins
- Colorado's Brewer's Festival
- The Human Race
- New Belgium's Tour de Fat

Excellence in Client Service and/or Contribution to Community

Arts in Public Places Program. The City set aside 15% of the budget for its Arts in Public Places program, which is “intended to encourage and enhance artistic expression and appreciation and to add value to the Fort Collins community...” These include a sculpture of the Poudre River as part of the entryway column, and stained glass found in both stairwells. Specially designed walls on the ramps at the building front represent different energy types: wind, coal and solar.

QC on these walls took four mock-ups of various concrete mixes and techniques to ensure a perfected approach. By the actual pour, the process went smoothly.

Nature in the City (NIC). The project is home to Colorado's first outdoor perennial living wall. The wall was designed as a case study to determine feasibility of green walls in arid climates and to demonstrate what plants work best in a vertical setting, how habitat can be enhanced through a green wall and what energy savings can be achieved. The project team coordinated the installation and care of the wall with NIC to ensure it went in at the optimal season.













