

2016 ACE AWARDS

Category 10: Best Building Project
(Above \$70 Million—General Contractor)

**University of Colorado Boulder
Sustainability, Energy and
Environment Complex**

PROJECT TEAM	ARCHITECT	MEP ENGINEER
OWNER	gkkworks	Cator Ruma & Associates
University of Colorado Boulder	STRUCTURAL ENGINEER	ELECTRICAL ENGINEER
	S.A. Miro	ME Engineers
GENERAL CONTRACTOR/ CONSTRUCTION MANAGER	CIVIL ENGINEER	
JE Dunn Construction	S.A. Miro	

PROJECT NARRATIVE

Project overview

SEECing a Solution to Environmental Issues.

Tackling the nation’s environmental concerns, is no small feat! Researchers at CU Boulder know this first hand through decades of exploration in order to make sense of and make better, the ways in which we all engage with our surroundings. Now those researches have a unified place to call home. The new Sustainability, Energy and Environment Complex (SEEC), located on CU’s East Campus, serves as a hub of enlightenment and innovation, where researchers come together with the common goal of contributing to a sustainable future. It houses researchers and programs that were previously scattered across 17 separate locations throughout the University’s Boulder campus. Partners include the Renewable & Sustainable Energy Institute (RASEI), the Institute of Arctic and Alpine Research (INSTAAR), Environmental Studies (ENVS), the Department of Atmospheric and Oceanic Sciences (ATOC), and the Center of the American West. Together these individuals will continue to work to address issues including climate change, energy, food, water, policy and more.

The project involves construction of a new 142,000 SF facility and 289,000 SF of renovation to an adjacent building with a connecting link between the two. The complex is comprised of offices, teaching, conference, community interaction and laboratory spaces that will support learning, research and innovation all contributing to solving the environmental challenges that we face.

“It’s meaningful to build a facility that will help the environment in the long term,” said Matt Meyer, Senior Project Manager for JE Dunn Construction.

Solutions of special projects

Planning for the Next 100 Years

To satisfy the University's requirement for the construction of a "100 year building," the thermal envelope of the new structure was carefully detailed. Final selections were based on thermal performance versus relative short term and long term cost. All of the various connections were thermally modeled, and two large-scale mockups were constructed on site. This allowed for physical review of flashing details with roof mock-ups along with allowing for water and air filtration testing exercises.

Portions of the building had strict vibration control requirements to accommodate processes such as Transmission Electron Microscopy (TEM) and Nuclear Magnetic Resonance spectroscopy (NMR). These areas needed to be designed and executed to Class D vibration requirements (Class A is the lightest). A tremendous amount of discussion and collaboration between architect, contractor and trade partners was required. Solutions included a 15" thick supporting structural slab, drywall with detached top tracks, and flexible connections to mechanical and electrical equipment serving the area. Everything down to the elevator, with additional rail isolation, and generators with vibration isolation was addressed. All of this attention to detail resulted in the space nearly meeting a Class E requirement.

Safety and redundancy were critical at SEEC. Failure tests for Air Handlers were conducted. The team tested for correct pressure relationships throughout the complex, which resulted in some modifications to enhance performance. Critical systems were connected to a UPS for redundancy to ensure minimal downtime in the event of a power outage, while other less critical systems were connected to a generator. Thoughtful consideration of each system resulted in assigning the right solutions.

Excellence in project execution and management/team approach

Flexibility was the name of the game for SEEC. The exercises in agility began during the program phase with gkkworks working extensively with CU to evaluate site and building placement options. After JE Dunn was selected as the CM/GC, the project suffered a \$3.5 million cut that required some out of the box ideas to bring the project in to budget.

"gkkworks was very much a solutions driven team player. We all shared common goals and expectations along with a willingness to work together," said Mike Early, JE Dunn Project Manager.

Seeking value and meeting the budget was a priority! The team looked at building systems early and facilitated a dialog with the University to evaluate options based on long-term maintenance and operational demands. Pricing exercises were also performed on various laboratory types, evaluating components and systems to obtain optimal value. Flexible solutions were continually provided to position the project to acclimate to any changes in funding availability or program.

Another solution to get the project to budget was to bring on an Energy Services Company (ESCO) to complete the energy efficiency scopes or work. This separation of scope allowed CU to secure additional funding from another source. While this helped from a budget standpoint, it also created coordination challenges having two contractors literally working on top of each other with overlapping scopes. Fortunately the ESCO shared our common goals for success and contributed with a very proactive and team driven on site staff.

JE Dunn remained the primary point for the construction process, coordinating the overall project sequencing. Constant communication occurred through weekly coordination meetings and joint owner/contractor/architect meetings to keep all aware of everyone's movements. This willingness to work together allowed us to effectively and efficiently manage the schedule.

Construction innovations/state-of-the-art advancement

Naturally a complex that exists to support those working towards environmental betterment needs to model strict standards of sustainability.

Starting with design, maximizing natural light in lab spaces, incorporation of occupancy sensors and carefully planned laboratory orientations all contributed to the goal of sustainability. New fume hoods have adjustable air controls that use less energy, exhaust stacks with fans that turn on and off support as needed energy use, and monitoring equipment is utilized to measure wind speed and direction. This allows for real-time ventilation adjustments to conserve energy. The HVAC system is linked to the lighting controls through the building automation system, to dial back the required air changes when the lighting controls sense a space is vacant.

The majority of materials were sourced from within a thousand-mile radius. Using materials from relatively nearby manufacturers decreased the total carbon footprint of the building.

Since laboratory spaces require 100% outside air, building performance and efficiency were critical. A brand new energy saving component was implemented for this project. The Konvekta system allows boilers and chillers to be downsized for space savings and energy efficiency. As only the 2nd of its kind now in use in Colorado, the team had to work diligently to become knowledgeable about the new system and to ensure that the system would meet performance goals. The team was committed to supporting CU's efforts to be a beacon of sustainability, a commitment that extended from designers to trade partners. Each team member's high level of personal ownership ensured success.

The University of Colorado Boulder has a minimum requirement that all new construction meet LEED Gold standards and SEEC is no exception.

Environmental/Safety

Safety was top of mind and a top priority throughout the project. Everyone, everywhere, all the time are the words the team lived by. Safety was the first topic of discussion during the project team's meetings, site tours, and daily conversations. During pre-installation meetings, the expectations of safety were clearly outlined with the trade partners. Safety was also discussed at

the beginning of each foreman meeting in order to address any safety issues or concerns. Safety committee meetings were held every week, with representatives from all trade partners present. Although the site safety staff was responsible for organizing the meeting, other members of the project team regularly participated to foster a culture of safety. The site superintendent also initiated a few site wide stand-downs to discuss safety concerns and successes, and safety orientations were conducted for all employees working on site.

During National Safety Week in May, the project team worked together to organize a breakfast/lunch day for 300+ employees to show appreciation for their efforts in safety.

Excellence in client service and/or contribution to the community

The delivery of SEEC demonstrates excellence and contribution to the community on many levels. Supporting CU's goal of academic and research excellence with a modern and flexible facility, contributing to the betterment and sustainability of our nation through the environmental research that will be conducted there, and creating a new lasting landmark for the University of Colorado Boulder that the students, researchers, faculty and the community of Boulder can be proud of for the next 100 years.









