

Category: 11 – Best Building Project – GC (Over \$70 Million)

Contractor: Mortenson Construction

Project Name: Byron G. Rogers Federal Office Building

Overview

After nearly 40 years of continual use and stopgap modifications to address heightened security measures, the timeworn Byron G. Rogers Federal Office Building was facing an uncertain future, but the building had history worth preserving. Designed in the 1960s, the Byron G. Rogers Federal Office Building has become an historic building in Denver, CO. The U.S. General Services Administration (GSA) sought to preserve this historic exterior and elected to modernize the entire 18-story interior and maintain the Formalist style building in the Denver skyline. The completed project is the largest and most complex renovation in the history of the GSA Region 8.

The design-build team, in collaboration with the GSA, constructed 494,156 square feet of pleasant and productive office and amenity spaces for an upgraded work environment with energy efficiency and overall sustainability as one of the project's primary goals. Nearly all of the modifications occurred indoors and were given a new "tuxedo" aesthetic scheme. Dark, cherry-stained maple detailing and black granite finishes contrast against white gypsum walls. Deep saturated colors along office corridors ease complex navigation, while clerestory windows above office doors create interest along hallways while drawing outside light into interior corridors. Mortenson Construction, the design-builder, implemented a stringent Quality Program to set the guidelines for ensuring top quality construction during this major gut and remodel.

This high-performance green building project continues the GSA's legacy of outstanding public architecture by providing a balance between historic significance and current needs and aesthetics. In addition to energy efficiency goals, this building also required structural and window upgrades to meet federal blast requirements. The new window system preserved the appearance of the building and improved the performance and daylighting.

Solutions of Special Projects

As home to nine different Federal Agencies, there was extensive coordination with each of the tenants and the GSA to meet the needed move-in dates. Mortenson incorporated lean strategies to improve schedule, minimize cost and work efficiently with existing conditions. The

design-build team and key subcontractors held multiple pull-planning sessions and had Plan Room computers in the office and on site in order to maximize collaboration. Mortenson utilized a full-time VDC on site to mitigate MEP clashes, to create visual aids such as site logistics and construction phase plans, and to communicate more effectively.

In order to save time and money, the team implemented design solutions to serve “double duty” such as tube steel window supports that provided the blast requirement and provided full-height window support for maximum natural lighting. All the while, Mortenson implemented a Target Value Method to guide the design within the GSA’s budget.

Excellence in project execution and management / team approach

Led by Mortenson Construction, the design-build team includes Bennett Wagner Grody and HOK as architects, RMH Group as mechanical/electrical engineer, Rocky Mountain Institute as sustainability consultant and Martin/Martin as civil/structural engineer.

The team ensured quality by performing lifecycle cost analysis and rigorous energy modeling on the project using DOE-2 software and the eQUEST user interface to create a whole building energy model. The energy modelers produced multiple packages of energy efficiency measures (EEMs) to show various scenarios for consideration, such as the optimized return on investment, or the lowest possible carbon footprint. The packages proved critical in satisfying the owner’s cost and performance expectations while still meeting the overall goals of the project.

An example of great team collaboration was when the entire team came together to solve the challenges through energy charettes. Each team member brought his/her area of expertise to the table to result in a solution that met both up-front and lifecycle cost constraints.

Construction innovations / state-of-the-art advancement

Before the retrofit began in early 2011, the building was poorly insulated, and the heating and cooling systems were very inefficient by today’s standards. The design-build team’s integrated approach helped generate a plan to achieve the project’s aggressive energy goals. An energy use snapshot from 2009 showed its Energy Use Intensity (EUI) was 91.8 kBtu per sf per year. The GSA’s new energy target was to lower the building’s EUI to 39.1 kBtu per sf per year. However, the design-build team worked with the GSA to find ways to generate a design model targeting a more aggressive goal of 27-30 kBtu per sf per year. Whole-building energy modeling predicted hourly energy use and annual energy costs, which led the team to a realistic evaluation

of various alternatives.

Among the solutions is an innovative chilled beam system coupled with a heat recovery and thermal storage system to heat and cool the building. The existing orientation was not ideal as all of the windows on the building essentially faced either northeast or southwest, meaning one side of the building was often too hot and the other was too cool. The new HVAC system includes a 50,000-gallon thermal storage tank in the basement of the building that stores waste heat for future use. Heat is moved around the building as needed rather than a more typical HVAC system that generates heat and exhausts the waste.

The chilled beam system is one of only a few in the U.S. that acts as a building's primary heating and cooling system. It became an ideal solution due to Colorado's dry climate – the building envelope upgrades took the building up to an average R-20 rating. The window and envelope upgrades included four-pane glass and extensive spray foam insulation. A typical rating for most buildings often ranges from R-8 to R-10.

An additional benefit of the chilled beam system is that chilled water pipes take up significantly less space than conditioned air ducts. This allows for greater floor-to-ceiling heights throughout the building, which helps improve daylighting in certain areas.

Environmental/Safety

Mortenson and all specialty contractors recorded 1,443,204 total man-hours on this 26-month project. With 15 OSHA-recordable accidents, only six cases were OSHA restricted days and four accidents resulted in lost time. These results include Mortenson as well as all specialty contractors. It is Mortenson's expectation that no one will suffer an injury in the execution of our work, and, to that end, we developed a focused, company-wide Zero Injury Program. This initiative has made great strides in creating a culture where every team member is obligated to stop unsafe work or correct unsafe acts, and where employee injury on any of our projects is a rare occurrence. The Zero Injury Policy states: Mortenson is committed to eliminating worker injury at every project site and every work place.

Due to the GSA's drive for sustainability, this office space is now more welcoming, fresh and modern. The goal for the building was to construct to at least a LEED Silver rating. The design team accepted this goal and then surpassed it and is now awaiting certification for LEED Gold.

Building upgrades included the replacement of the mechanical, electrical, lighting, fire

protection, and plumbing systems, as well as the replacement of all exterior windows and the complete renovation of all tenant spaces and most public spaces. The office tower was upgraded to comply with current building codes, the GSA facility requirements, and current seismic and progressive collapse criteria.

In conjunction with increasingly stringent federal mandates and executive orders requiring energy efficiency (and a clear path to Net Zero by 2030), the GSA holds sustainability and efficiency as a priority.

The final design revealed the true value of a collaborative design process focused on energy savings: A successful balance of upfront cost, energy reduction and return on investment led to sustainability and energy efficiency upgrades that exceeded the GSA's targets for LEED, water and energy savings.

Excellence in client service and/or contribution to the community

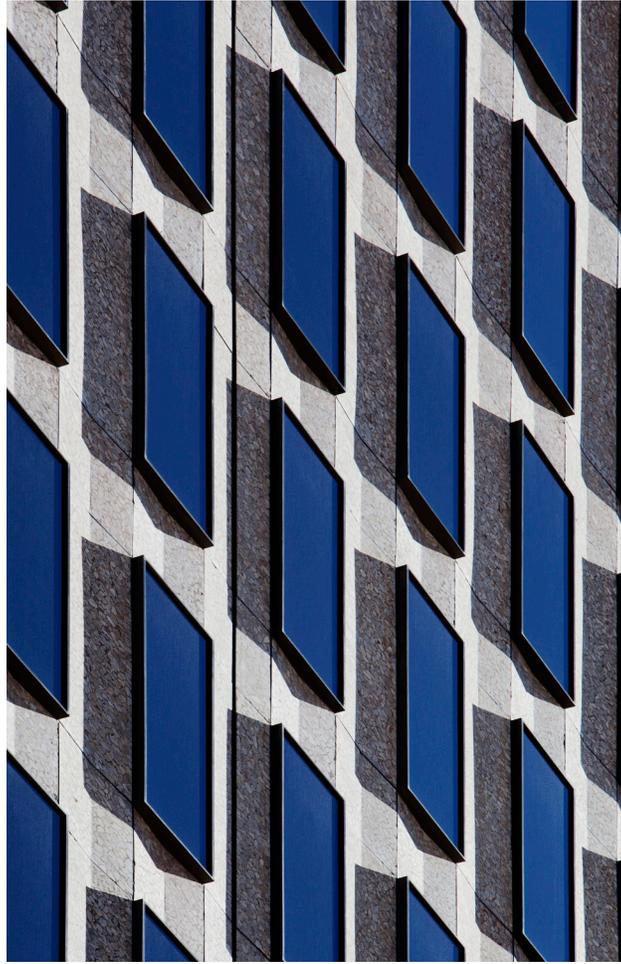
The Byron G. Rogers Federal Office Building won Engineering News-Record's 2014 Best Project for government/public buildings in the mountain states. This project stands out in our local community and as an example to the private sector. The GSA's strive for sustainability shows it is not always necessary to raze a building and start over. It is possible to do a deep retrofit and create a new 100-year building out of an old one.

While working on the project, the team was involved in serving the surrounding community. At University Prep School, a tuition free K-5 public charter school located in northeast Denver, the team made improvements to fifteen window mounted HVAC units (and other HVAC system enhancements) that improved classroom conditions for student learning. The team also supported Denver area Concert for Kids' "Holiday for Kids" event by volunteering time and hosting a gift drive.

In order to help educate readers about the project at Byron Rogers FOB, many articles were published in ENR, Denver Business Journal, Colorado Construction and Design, and The Denver Post specifically about historic restoration, sustainability and energy efficiency efforts. Byron Rogers FOB was also the subject of a deep energy retrofit study by the University of Colorado and Rocky Mountain Institute. That article can be found in Facilities Management publication.



Top: Exterior window detail.
All windows were replaced without affecting the historical exterior.



Bottom:
Office space





Chilled Beam System



