Sitter Family Hall Green Building Profile

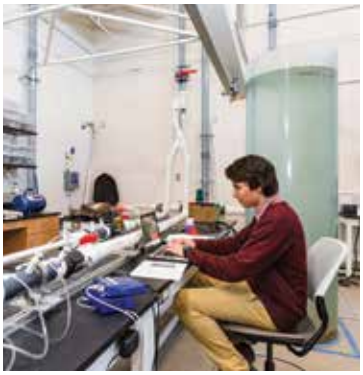
BUILDING INFORMATION

Location	Durango, CO
Square Footage	60,838 ft2
Building Population	23 full-time faculty and staff with teaching and study space for 557 students
Construction Dates	2014-2016
Owner	Fort Lewis College
Architect	Dekker/Perich/Sabatini
Local Architect	Context Architecture, Inc.
Landscape Architect	Dekker/Perich/Sabatini
Mechanical, Electrical, & Plumbing Engineers	Bridgers and Paxton Consulting Engineers, Inc.
Civil Engineer	Goff Engineering & Surveying, Inc.
Structural Engineer	Dekker/Perich/Sabatini
Construction Manager	Jaynes Corporation
Demolition Contractor	Iron Mountain Rolloff & Demolition
Commissioning Agent	Engineering Economics, Inc.
Sustainability Consultant	EDI-Integrative Consulting, LLC
Local Sustainability Consultant	Earthly Ideas LLC

PROJECT NOTES

Sitter Family Hall, the home of the Geosciences and Physics & Engineering Departments, is the fourth LEED® (Leadership in Energy and Environmental Design) certified facility at Fort Lewis College. The U.S. Green Building Council's LEED® green building program is the preeminent program for the design, construction, maintenance and operations of high-performance green buildings. Pursuit of LEED certification for Sitter Family Hall is part of Fort Lewis College's overall commitment to sustainability and meets the requirements of the State of Colorado's High Performance Certification Program.

Durango, located in southwestern Colorado between the San Juan Range of the Rocky Mountains and the high desert, is at 6,513 feet in elevation and has a four-season climate. Fort Lewis College (FLC) is located on College Mesa approximately 300 feet above Durango's historic downtown. This project demolished the 1968, single-story, north wing of the Berndt Hall building and replaced it with a basement and three above grade floors. The new building addition provides interactive yet identifiably distinct spaces for the Geosciences and the Physics & Engineering Departments. It contains state-of-the-art research spaces, including laboratory and electronic equipment, field tools, astronomical & optical technologies, and specialized testing and research facilities. A rooftop research observatory with sliding roof and cutting-edge telescopes supports physics and astronomy classes. In addition to multiple student study areas, there are 22 faculty offices, a shared reception area, and other support spaces. The building occupies a footprint of 23,020 square feet with a gross square footage of 60,838. The new addition encloses the existing courtyard formed by Berndt Hall, with access to the east and a main pedestrian circulation spine of the campus.



The designers incorporated an aesthetic theme throughout the building and site that combined the missions of the building's two departments. Melding the study of our Earth in context of the universe, the building includes several unique functional art features including a Constellation Sky that depicts seven major constellations of the northern hemisphere, the multistory Geologic Wall of Time, which uses local rock to depict geologic development of 1.8 billion years, and a 235-pound Foucault pendulum, which shows the rotation of the Earth. Continuing this theme on the site, the centerpiece of the courtyard's native landscaping is a locally-constructed sundial. The grounds feature a Colorado's Art in Public Places installation called Geospinners, comprised of three suspended boulders meant to be spun by those walking by and a carved stone bench, all created from rock from the Four Corners region.

Sitter Family Hall incorporates numerous integrated green building strategies including heat recovery systems, hydronic and airside economizers that provide free cooling, LED light fixtures, dedicated demand controlled ventilation, high efficiency central plant equipment, a vegetated roof, a roof-mounted photovoltaic system, water conserving fixtures, and sustainable materials use. Below are some of the specifics of the project's green building strategies and features:

SUSTAINABLE SITES

- Site Selection: Development did not impact farmland, endangered species habitat, parkland, or wetlands.
- Community Connectivity: Located within a half mile radius of on-campus housing and at least 10 community services and amenities.
- Brownfield Redevelopment: Asbestos-containing materials abated in the existing section of Berndt Hall before demolition.
- Alternative Transportation: Measures taken included installing 30 bicycle storage spaces and two shower/changing rooms, continuation of a campus-wide Green Permit program for low-emitting and fuel-efficient vehicles, and not adding any new parking spaces.
- Open Space: Area preserved in the John F. Reed Natural Area equal to twice the building footprint, which doubled the requirement and earned an innovation credit for the project.
- Heat Island Effect: Roofing materials reject solar heat to reduce thermal gradient differences between developed and undeveloped areas minimizing impact on micro climate and habitat. A combination of a metal roof and grey pavers on the roof terrace with high solar reflectance and the vegetated roof serve to minimize the heat island effect.

WATER EFFICIENCY

- Landscaping: The project used mostly native and xeric plants and grasses, which are all suited to the Durango area. The planting scheme replaced areas previously planted with bluegrass turf with native grass species and native plant materials that will required very little supplemental wa ter once established. Planting design took into account microclimates resulting from building masses that affect shading and wind mitigation.
- Irrigation: No potable water was used for irrigation. The City of Durango Water Treatment Plant provides raw, untreated water to FLC for its irrigation needs. Irrigation systems serving the project are managed by the overall campus irrigation water and control system, which is based on real-time evapotranspiration (ET) data collected from a campus weather station. The irrigation system is properly zoned to serve the various landscape hydrozones and microclimates and employs appropriate, efficient delivery methods and equipment to serve the various plant material types.
- Water Usage in the Building: Selection of dual-flush toilets, ultra-low flow urinals, low-flow faucets, and low-flow showerheads resulted in more than 46 percent savings over baseline fixture performance requirements of the Energy Policy Act of 1992. Exceeding 40 percent reduction earned an innovation credit for the project.

ENERGY AND ATMOSPHERE

- Energy: Whole building energy simulation model indicates over 34 percent reduction in energy cost between the design building model and the base building model prescribed in ASHRAE 90.1-2004.
- Lighting: Lights are controlled by a combination of occupancy sensors, timeclock, daylight sensors, and manual dimmer switches for occupant override and controllability. At maximum usage, interior light fixtures consume .65 watts per square foot to efficiently meet the lighting needs of the building. To save additional energy, office lighting occupancy controls interface with the HVAC distribution system to reduce airflow when spaces are not occupied.
- Building Envelope: Double-glazed low-e windows, building overhangs and light shelves on the south facade, metal framed walls

with continuous exterior insulation and spray-applied polyurethane foam inside the exterior sheathing, and insulation below the metal roof were used to improve the building's envelope and set a path for long-term energy efficiency. The building is clad with a blend of modern metal panel, locally sourced stone, and stucco.

- Heating, Ventilation, and Air Conditioning (HVAC): To support the heating and cooling demand of Sitter Family Hall, the team expanded and upgraded the existing hot water and chilled water plants located in the adjacent Chemistry Building, which resulted in a secondary benefit to other facilities served by these plants. The heating water plant includes the addition of one new boiler and replacement of two existing with high efficiency, condensing boilers. The chilled water plant expansion includes a new variable speed compressor water cooled chiller, associated variable speed cooling tower, and free cooling plate and frame heat exchanger to expand the plant's water side economizer capabilities.
  The building's HVAC systems are zoned to align with the function and use of the building spaces, with dedicated systems for laboratory type spaces and classroom/office areas. Laboratory air systems feature heat recovery and variable air volume dilution ventilation/conditioning, allowing the systems to respond to the occupancy and use of the space. Air systems for the classroom and office areas decouple ventilation and space conditioning, reducing ventilation of the building when occupancy does not warrant, resulting in overall system efficiency. The building automation system controls the building HVAC systems and monitors the energy used and produced by the building.
- Renewable Energy: A rooftop-mounted 23.8 kW photovoltaic system is estimated to generate 5.91 percent renewable energy towards the Sitter Family Hall's energy usage. The system is designed to allow additional panels to be added in the future.
- Commissioning: Employed as a quality-control process to ensure the fundamental building systems are designed, installed, and calibrated to operate as intended by the design team for the FLC's long term benefit.
- Measurement and Verification: Through the use of sub-meters, Fort Lewis College will be able to systematically monitor building energy usage on an ongoing basis and compare this to a simulated energy model and energy usage baseline. This provides the ability to characterize building energy usage, document operating efficiencies, and fine-tune the performance of the building based on building operating problems, condition changes, or systems modifications. To provide accountability to energy goals, FLC will implement a plan to measure and analyze energy consumption and building performance for one year of post-construction occupancy.
- Green Power: Seventy percent of the building's conventional electricity from fossil fuel sources is offset with renewable sources through the purchase of Green-e certified Renewable Energy Certificates for two years. Doubling the required 35 percent offset earned an innovation credit for the project.

MATERIALS AND RESOURCES

- Recycled Content Materials: To reduce the impacts from the extraction and processing of virgin materials and support closing the loop for recycling, recycled content materials included: reinforcing steel, wire mesh, and fly ash in concrete, structural steel, metal stairs, metal roofing, hollow metal doors and frames, rolling doors, aluminum storefront, curtainwall, and composite wall panels, insulation, ceiling tiles and grid, metal framing, gypsum board, linoleum flooring and tackable surfaces, visual display units, carpet tile, lockers, and door hardware. Exceeding 30 percent recycled content materials earned an innovation credit for the project.
- Regionally Extracted Materials: To reduce transportation impacts and support regional businesses, regionally extracted materials (those manufactured and whose raw materials are extracted within a 500-mile radius of the jobsite) included: concrete, stone veneer, structural steel, reinforcing steel and wire mesh, insulation, gypsum board, and exterior sheathing.
- Certified Wood: To encourage environmentally responsible forest management, much of the wood used on the project was certified by the Forest Stewardship Council. This included plywood, red oak veneer, particleboard, doors, and lab casework.
- Construction Waste Management: Successful waste management program diverted more than 86% (2,377 tons) of the demolition and construction waste from landfills. Fort Lewis College salvaged many reusable materials from inside the existing building prior to its demolition. From the existing building's exterior, the demolition contractor salvaged the sandstone veneer that Fort Lewis stock piled for a future project. The project site utilized crushed concrete from the demolition as base course. Recycled materials included asphalt, concrete, masonry, wood, cardboard, all types of scrap metal, and copper wiring.

INDOOR ENVIRONMENTAL QUALITY

- Outdoor Air Delivery Monitoring: Permanent monitoring and feedback of ventilation system performance help sustain long-term occupant health and well-being.
- Construction Indoor Air Quality (IAQ) Management Plan: To help sustain the comfort and well-being of construction workers and building occupants, the construction team implemented a combination of housekeeping, HVAC protection, source control, moisture control, and scheduling measures.
- Low-Emitting Materials for IAQ: Low-toxicity building products such as adhesives and sealants, paints and coatings, carpeting, and composite wood products were used to reduce the quantity of indoor air contaminants.
- Pollutant Source Control: Entryway systems installed at each exterior entry point will be maintained on a regular basis. Areas with chemical use (custodial closets and the dark room) are physically separated from other spaces and have appropriate ventilation.
- Air Filtering: Air quality is enhanced through the use of air filtration with efficiencies exceeding those found in conventional installations.
- Thermal Comfort: The HVAC system is designed to make each space as comfortable as possible to each occupant. A temperature sensor is located in every classroom/laboratory space. Office spaces are zoned with no more than two offices with similar exposures and space characteristics per zone of control. This configuration allows the automation system to adjust the amount and temperature of air supplied to condition individual variable use spaces and common office occupancies.

- Daylight and Views: To provide a connection between indoor spaces and the outdoors, the team provided daylight and views for many spaces throughout the building including labs, classrooms, and student study areas. Located along the north wall of the second floor, faculty offices include wall-to-wall windows, which also pass on borrowed light whenever possible to the interior spaces. All three stairwells include large windows to provide natural illumination and take advantage of views. The 3-story east entry lobby showcases the 43-foot Foucault pendulum, visible from outside the building and on all floors inside the building.

INNOVATION AND DESIGN PROCESS

- LEED Accredited Professionals: Several principal participants of the project team have successfully completed one of the LEED Accredited Professional exams.

AWARDS AND HONORS

- Sitter Family Hall earned LEED Gold® (42 points) in July 2017, making it the fourth building on Fort Lewis College's campus to achieve LEED Gold certification.