

## A Design Assistance Success Story

---



When *The City of Fort Collins*, CO, built a new office building for 155 city employees, it incorporated efficiency as part of the design process with five major goals:

- Meet the City of Fort Collins Facility Services Green Building Criteria.
- Reduce energy costs to 25 percent below the Fort Collins Energy Code requirements.
- Use daylighting in designated areas to increase worker comfort and productivity while reducing electrical lighting energy consumption.
- Provide uniform comfort throughout the building and visually connect the building to outdoors while controlling glare and solar heat gain.
- Reduce the environmental impact of the building by decreasing consumption and incorporating sustainable materials and components.

---

# Sustainable Design for Fort Collins Office Building

---

## *Design Process*

To meet these goals, the City's Green Building Criteria, which are based on the Leadership in Energy and Environmental Design (LEED) Criteria, were used. The design team, worked in an integrated process to learn how systems interacted in order to achieve the best results. For example, using high-performance glazings reduced the size of air conditioning equipment needed by 20%. An energy consultant performed computer modeling of the building to evaluate these types of interactions.

The team was also faced with design challenges. One of the biggest was incorporating daylighting into the building, which had a long north-south axis, without substantially increasing the summertime cooling load and interior glare. Solar control is much easier to achieve in buildings with a predominant east-west axis. Impacts were addressed with high-performance glazing, exterior shading on the first floor, and internal light shelves which reflect direct sunlight coming through the upper glazing onto the ceiling.



*215 North Mason Office Building – Exterior shading helps reduce direct sun of the first floor.*

## *Design Features*

A number of innovative design features came out of the design process –

- Daylighting is accomplished with a 10-foot ceiling, daylight glazing above the view windows, and light shelves to project light further into the building.
- High-efficiency electric lighting that dims in response to daylight availability.
- High-efficiency, variable-air-volume HVAC roof top units.
- Energy Efficient building transformers.
- Controls that limit electric demand from electric reheat.

## A Design Assistance Success Story



*Dual light shelves reflect light across the ceiling for more balanced daylighting*

### Results

Utility bills from 2003 show a reduction of approximately 18% in total gas and electric energy compared to a conventional building built to Fort Collins code. The average reduction in electric demand is also about 18%. Data for the code building are from a computer building model that was created during design.

### Lessons Learned

Although there many successes with this building, there were also some lessons learned that can be applied to future buildings. One of the biggest lessons had to do with control of electric lighting. The building was designed and built with switching controls that would switch banks of lights (near the windows) off and on in response to daylight availability. Shortly after building completion, there was a high level of dissatisfaction from building occupants with this system because of the sudden change in light levels. A dimming system was subsequently retrofitted, with the result of much higher occupant acceptance of the lighting system.

A contributor to early dissatisfaction with the switching system was the orientation of the fixtures. The rows were oriented perpendicular to the long east and west walls. The daylight switching controls only turned off one half of the fixture, nearest the windows. This gave the appearance that something was wrong with the fixture. On the shorter north and south faces, where the fixtures ran parallel to the windows, the entire fixture nearest the window would turn on and off in response to daylight availability. This was more acceptable to occupants, although dimming was still preferred.

### PROJECT DETAILS

**Facility:** 215 N. Mason Office Building (opened May, 2001)

**Facility Size:** 71,500 gross square feet (gsf), 155 employees from 8 departments

**Facility Location:** 215 N Mason St., Fort Collins, CO

**Design Team:** Neenan Co.– Design-build team leader, OZ Architecture – Architect, Architectural Energy Corp. – Energy Consultant, Swanson Rink, Inc. – mechanical and electrical

**Project Cost:** \$8.8 million or \$123/sf (design build)

**Energy Cost (2002):** \$0.80/sf/year for gas and electricity

**Energy Use (2003):** Electricity 904,480 kWh/yr, Gas 3,940 therms/yr, total 48.7 kBtu/sf per year

### Fort Collins Utilities' Design Assistance Program

This project was supported with help from the Fort Collins Utilities Design Assistance Program. The program offers:

- Utilities staff support during the design process
- Financial support to supplement the incremental cost of energy, daylighting, and/or commissioning consultants

For more information, contact:

Gary Schroeder or John Phelan at **970-221-6700**

Or visit,

[www.fcgov.com/utilities/es-indesignasst.php](http://www.fcgov.com/utilities/es-indesignasst.php)