



Home on the Range
220 South 27th Street
Billings, Montana 59601

61% potable water savings

79% energy savings over code
- minimum building

90% of construction waste
diverted from the landfill

LEED® Facts

Home on the Range
Billings, Montana

LEED for NC v2.1
Certification awarded 7/16/07

Platinum 57*

Sustainable Sites 10/14

Water Efficiency 4/5

Energy & Atmosphere 16/17

Materials & Resources 11/13

Indoor Environmental Quality 11/15

Innovation & Design 5/5

**Out of a possible 69 points*

The information provided is based on that stated in the LEED project certification submittals. USGBC and Chapters do not warrant or represent the accuracy of this information. Each building's actual performance is based on unique design, construction, operation, and maintenance/ Energy efficiency and sustainable results will vary.



Home on the Range – Billings

Sustainability “On the Range”

Protecting water quality, family farms and ranches, and unique quality of life

PROJECT BACKGROUND

For more than 35 years, Northern Plains Resource Council has organized Montana citizens to protect their water quality, family farms and ranches, and unique quality of life. Northern Plains is a founding member of WORC (Western Organization of Resource Councils), which today represents a regional network of seven Western organizations, providing technical assistance and coordinating efforts on issues such as sensible energy development and sustainable agriculture.

In 2003, Northern Plains and WORC decided to create a permanent home by purchasing and renovating its own building, a building that would express the organizations’ commitment to energy conservation and community values. They purchased a vacant, concrete block building constructed in 1940 as a grocery store. Working with High Plains Architects and Hardy Construction Co., they managed to transform an uninsulated, largely windowless building—widely considered one of the most blighted properties in Billings, Montana—into a demonstration of green building strategies and technologies.

STRATEGIES AND RESULTS

The floor plan is organized around a gallery/circulation space that diagonally connects the two principal building entrances. Because the street grid in downtown Billings and the building are oriented 35 degrees off of cardinal directions, the diagonal of the gallery runs almost exactly east-west. This allows the three large roof monitors that correspond to the gallery and open office spaces to have glazing facing due north and the sloping monitor roofs with solar panels to face south.

Significant emphasis was placed on daylighting. The roof monitors were sized and located strategically to place daylight into the middle of the building, while new windows with light shelves were introduced to the outer walls to daylight the perimeter portions of the interior. When combined with a photosensor-coupled uplighting system, the daylighting has been enormously successful, using only 35% as much electricity as the base model.

Overall, the building uses a net 79% less energy than the ASHRAE-90.1-1999 base case when the photovoltaic system is included. High levels of insulation on the roof, walls, windows, and subgrade reduce heat transfer through the envelope, while interior temperature fluctuation is further moderated with high levels of mass in both the floor slab and concrete block walls, which are insulated on the exterior.

After using those measures to reduce energy demand, the design team focused on providing mechanical systems that supply the remaining energy needs as efficiently as possible. The building is heated by a radiant concrete slab, eliminating the high levels of fan energy required to keep hot air from stratifying in the high ceilings of the loft-style offices. Building cooling is provided by evaporative units, which use approximately 25% as much energy as conventional refrigeration air conditioning in the dry, semi-arid climate of Billings, Montana. On site renewable energy from a 9.9kW photovoltaic system on the roof provides 48% of the annual energy regulated loads of the building.

The combination of a waterless urinal and micro-flush composting toilets reduce water use by 61% compared to the baseline model, while landscaping featuring native and water-wise vegetation significantly reduces irrigation demand in this semi-arid climate.

The parking lot consists of plastic mat system that uses recycled glass cullet as the top layer. The permeable pavement system eliminates stormwater in all but the most severe storm events, while the glass cullet also mitigates the urban heat island effect. Because of the sparkle from the glass cullet, it is referred to as the “enchanted parking lot.”

Approximately 90% of the construction and demolition waste was diverted from the landfill through a variety of means, including using the coarse materials from demolished concrete blocks as boulders in the south boulder pit, while the demolished fine materials were used as leveling fill under the concrete slab.

All of the aforementioned are highlights of how the project successfully achieved a number of energy efficiency, renewable energy, water efficiency, and other green building goals. The most inventive solutions simultaneously addressed multiple project goals, such as the “enchanted” parking lot’s recycled content materials and stormwater and urban heat island effect mitigation. In addition to meeting those goals, the project also captured the imagination of many people because there were a number of “human interest” stories. But the biggest story of the project was the reinvention of a derelict building into a significant demonstration green building.

“ We are living our values. Our organization knows firsthand the real impacts of energy development since our members live over the surface of coal and oil and gas. We need to change our direction away from old technology that is inefficient and contributes to global warming pollution. We want to show folks how they can create change.”

Mark Fix, Rancher on the Tongue River south of Miles City and former Chair of Northern Plains Resource Council



Architect: Randy Hafer, High Plains Architects, P.C.
Civil Engineer: Matt Waite, Engineering Inc.
Commissioning Agent: Ron Pecarina, Energy & Sustainable Design Consultants
Contractor: JD Broadbent, Hardy Construction
Developer:
Electrical Engineer:
Interior Designer: Beau Mossman, Bechtel Slade, P.C.
Landscape Architect: Linda Iverson, Linda Iverson Landscape Design
LEED Consultant: Ed Gulick, High Plains Architects, P.C.
Lighting Designer:
Mechanical Engineer: Art Fust, Energy A.D.
MEP Engineer:
Owner: Northern Plains Resource Council
Plumbing Engineer:
Structural Engineer: Wes Krivonen, Krivonen Associates

Project Size: 9,786 square feet

Total Project Cost (cost per square foot in parentheses):
\$1,403,400 (\$143/sq. ft.)

