

Client: Apsaalooke Nation Housing Authority
 Developer: Good Earth Lodges
 Designers: Tom Bowen, Matthew Jelacic, Rob Pyatt
 Design Team: University of Colorado Boulder

Engineering: University of Colorado Boulder
 Engineering Research: Mortenson Center in Engineering for Developing Communities (MCEDC)



EARTH BLOCK HOMES

The Apsaalooke Nation Housing Authority's Good Earth Lodges project is the culmination of a research and development project funded by the Office of Indian Energy and Economic Development. It has three objectives: to determine if the raw materials needed for compressed earth blocks could be found on the Crow Indian Reservation, if the blocks could withstand Montana's extreme climate, and if a tribal workforce could be put in place to carry out the program. With technical assistance from the University of Colorado Boulder's Mortenson Center in Engineering for Developing Communities (MCEDC), the project is meeting these goals. Seven homes have been completed and six more are nearing completion.

Photo: Richard Neill

CORE PROJECT EMPHASES:



LESSONS LEARNED

- The material and human resources for developing climate-appropriate new housing exist on the Crow Indian Reservation.
- In the future the community would prefer site and unit planning based on Crow traditions, such as positioning buildings in a circle.
- Critical partnerships can help to realize local capacity.

BEST PRACTICES

- Affordable housing can both help to alleviate homelessness and provide a pathway to skills building and tribal employment.
- Passive solar orientation and design, combined with compressed earth block construction, provides excellent passive heating during harsh Montana winters.
- Each home has space for large family gatherings.

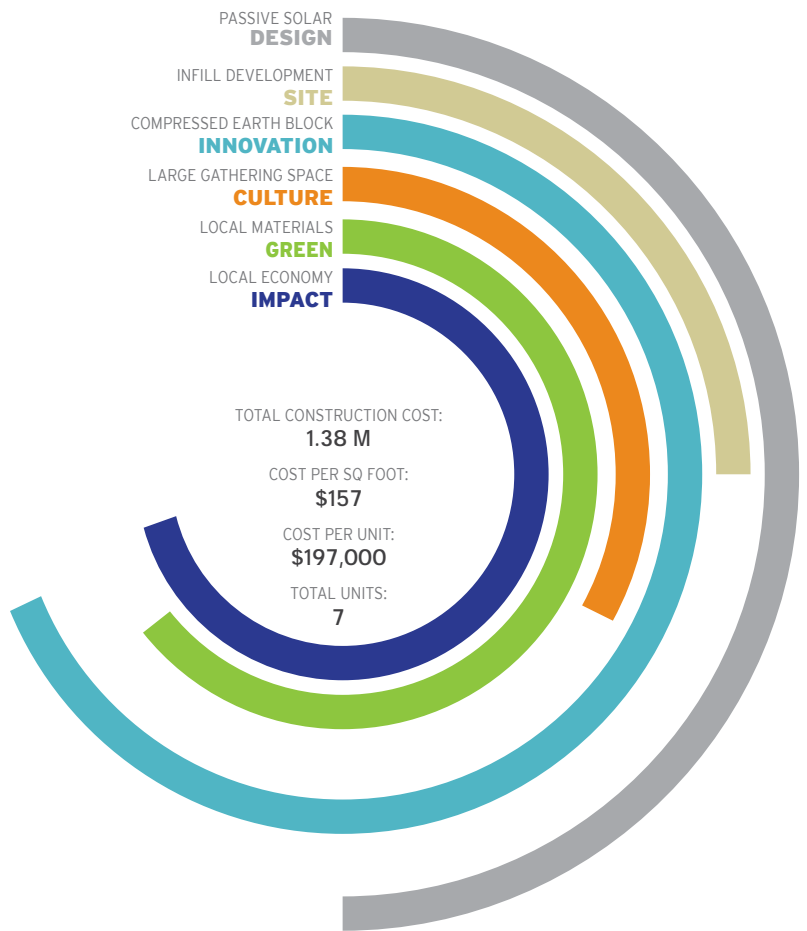


Photo: Richard Neill



Single Family



Northern Plains





GOOD EARTH LODGES

CONTEXT

The Apsaalooke Crow Tribe is located in south-central Montana and is the largest American Indian reservation in the state. Like many American Indian tribes, the Crow are a proud people with strong cultural traditions, but they are plagued with high unemployment, high poverty rates, and a shortage of adequate housing. Few opportunities are available for private enterprise or jobs on the reservation; this lack coincides with a lack of skilled workers. Problems are exacerbated by the reservation's extreme climate, with temperatures as low as -40°F in the winter and as high as 110°F in the summer. Many tribal members live in houses that are poorly suited to the climate, racking up extremely high utility bills, as much as \$500 per month in the winter. (From *Crow Tribe/Good Earth Lodges* by Tim Sullivan.)

COMMUNITY

On the Crow Indian Reservation, most of the existing houses are aged stick-frame and trailer homes. Approximately 8,000 tribal members live on the Crow Reservation. In 1997, the Bureau of Indian Affairs (BIA) identified a need for 1,040 new housing units. This need has increased to approximately 1,500 units. The BIA recorded that 370 (48 percent) of the reservation's 1,130 housing units are in substandard condition. Although a large population of homeless people live on the reservation, they are mostly unseen because families take in members, which leads to overcrowding.



Photo: Richard Neill

SITE

Seven completed homes are on scattered sites in two communities, Crow Agency, and Lodge Grass. Another six homes are under construction in a new subdivision located in Crow Agency, on the western side of the community and on a high wind-swept plateau overlooking the Little Bighorn Valley where most of the homes are located.

“ We needed land for more housing, and started to identify property throughout the reservation based on factors like water, sewer and infrastructure. - Michael Stewart, ANHA ”



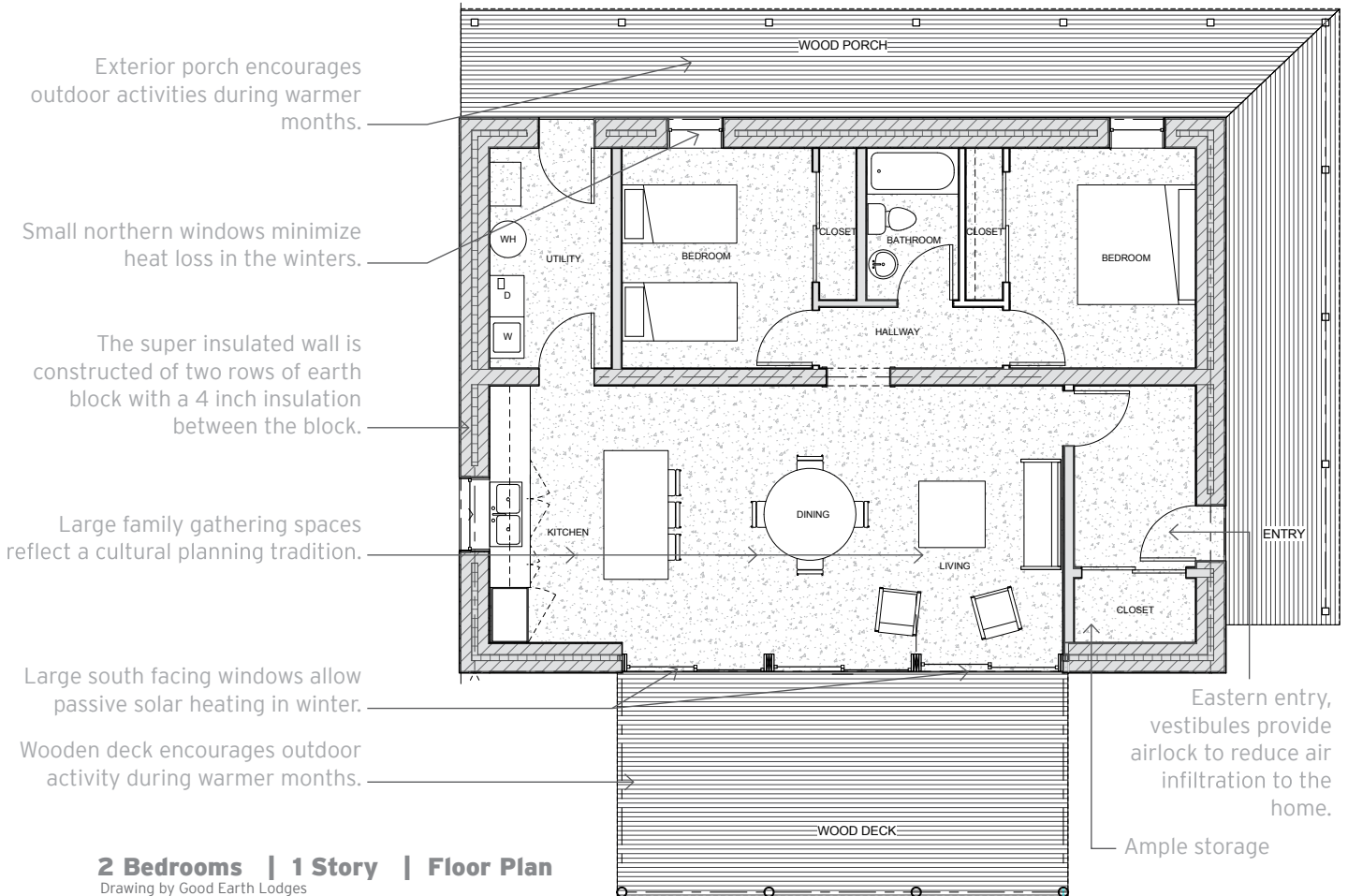
DESIGN

The single-family homes were designed with participation from community members who wanted a large, shared open space that combines kitchen, living, and dining into a single space, and a vaulted ceiling that would open up to the south, allowing the warm winter sun in and blocking the summer sun. This responds to the need for a large interior space for family gatherings and to the centrality of food in the Crow culture. Bedrooms are relatively small to maximize the large shared space and to provide space for storage. The homes are built using a double-wythe earth block construction technique. Each compressed earth block weighs 28 pounds. The walls of the houses are built with two rows of the 7-inch blocks, with the 4-inch space in between filled with insulation, creating an 18-inch total wall thickness. The roofs on the first seven homes were built using structural insulated panels. This technique was modified to trusses and spray-on insulation in later designs, to reduce costs and simplify construction.

GREEN

The houses feature a passive solar design, with south-facing facades containing a trio of sliding glass doors and high windows. No windows are on the east side of the house, to protect from the summer's harsh sun. The exterior shell is primarily compressed earth block construction made of locally sourced materials and labor. Vaulted ceilings provide natural light and improve ventilation through the structure. The first seven homes have ground-source heat pumps. The current designs use standard heat pumps to reduce the cost and simplify construction.

“ We would rather utilize the heat on the southern facing wall during the winter and then block that sun during the summer months. ”
 - Larry Falls Down



CULTURE

The design of the Crow Good Earth Lodges is in response to the needs of the larger, multigenerational families typical of the Crow community. The intent, however, is to build more houses to lessen the demand for housing, so that the need for more than one generation to share a single house is reduced. Multigenerational families living under one roof is not a cultural preference but a forced condition based on limited availability of housing. The large gathering space is important for large family gatherings and a relatively communal lifestyle.





GOOD EARTH LODGES

INNOVATION

Creating a new material and a new production process while training workers in both the production of the material and its use in construction was challenging, but there is great pride in the project and the way in which Crow resources and Crow tribal members were used to construct these homes. The external collaboration between the University of Colorado Boulder and the Apsaalooke Nation Housing Authority has been embraced by all who have participated in the projects. Involvement of the university in the project has been instrumental both in providing technical and management support and also in providing continuity, as the staffing within the housing authority has continued to change due to internal challenges and changes in government during the life of

VISION

The long-term vision in collaboration with the Division of Energy and Mineral Development is to continue to develop and enhance the tribe's ability to identify resources that enhance its economic stability. The Good Earth Lodges starts to achieve that vision. Historically, the focus was to extract resources on tribal lands. This project, although challenging, identifies a series of solutions for issues on the Crow Reservation, such as addressing unemployment and the need for job training, addressing the critical need for housing, and identifying resources on tribal lands which can be used in construction and tribal enterprise.

“ The Crow people believe that they have three mothers. The first is the woman who gives birth to the child. The last is Mother Earth, who the people go back to when they die. And then the home, the lodge is our mother, it protects us as we are being raised, coming up in this world. ”
- Cedric Black Eagle



Photo: Apsaalooke Nation Housing Authority



Photo: Apsaalooke Nation Housing Authority

LESSONS LEARNED / CONCLUSION

The Good Earth Lodges project explores the potential for sovereign nations to produce their own building materials and use their own labor to create more sustainable, locally based economies. It is an excellent example of how universities can collaborate with tribal communities to develop projects that fit the needs and achieve the vision of the community. The project also provides lessons about the challenges of achieving locally produced, locally sourced, and locally built houses. Moving outside of conventional construction practices and materials presents significant challenges, but it also allows for creative solutions. It allows tribes to work outside the conventional marketplace to provide innovative products and approaches to achieve many additional benefits beyond the provision of housing.



Photo: Richard Neill

