

# A Strong Foundation for a Strong Community

The Sustainable Building Design and Construction program at Fleming College is very excited to be building the new Performing Arts Centre in Madoc. Fleming is the first and only college in North America to offer this innovative, intensive program in sustainable building, where practical application of the theory results in a completed project.

This new building will give the town an indoor and outdoor performing arts space. The centre features an outdoor stage under a living roof with festival seating capacity for 300-400 people and an intimate indoor space with seating for 80.



The centre was recently completed in the end of August, 2008 by 26 students in a matter of 18 weeks!

Only the lowest-impact and longest-lasting materials have been chosen to build this structure. From the compacted stone of the rubble trench foundation, up through the load-bearing round straw bale columns, to the galvanized metal roofing, this building represents the best available choices for building materials and mechanical systems in our northern climate.

As a public building, the Madoc Performing Arts Centre will allow thousands of people to experience the beauty, effectiveness and durability of all of these technologies. Furthermore, this centre will hopefully be a gathering place for a forward-thinking community committed to sustainable issues and ideals.

## Highlights of Building:

- \* Fully accessible, single story, 1,800 square feet
- \* Octagonal shape building designed for multi-use
- \* Round bales stacked into 12' columns
- \* Straw bale wall insulation
- \* Three exterior 'wings' optimally framed at 24" centres and infilled with traditional insulation and straw/clay
- \* Timber framed front porch/performance space
- \* Earthen plaster finish with natural paints and stains
- \* Rubble trench foundation with earthbag and hempcrete grade beams
- \* Engineered FSC certified roof trusses
- \* Rammed earth block wainscoting and floors
- \* Radiant floor system
- \* Geothermal horizontal heat-exchange system
- \* Rainwater collection off the steel roofs to flush low-flow toilets
- \* Grid-tied 2.2 kWh solar photovoltaic system
- \* Solar hot water system retrofit on adjacent building



## About Straw bale Construction

### What is the insulation value of a straw bale wall and would it really save you in heating costs?

R-value varies from 30 to 40. *Canadian Society of Agricultural Engineers, Halifax, NS*

Studies by the Canada Mortgage and Housing Corporation (CMHC) have shown that bale homes typically use 25-40% less heating and cooling energy than their frame-walled equivalents.

### Won't mice and other pests eat the walls?

No. The bales you should be using should be straw, NOT hay. Straw refers to the chaffs of the grain. Hay still has the grain on them.

### Won't it burn easily?

Fire needs oxygen to burn. Bales are generally packed so tight that fire cannot catch. Also, the plaster often 'bakes' like a clay pot, preventing the fire from even reaching the straw.

"Bale walls withstood temperatures up to 1,850F for two hours." *Fire safety tests, National Research Council of Canada.*



### Won't the walls rot?

"Straw bale walls do not exhibit any unique propensity for moisture retention. It is clear that straw bale walls can function, without incorporating an interior vapour barrier, in northern climates." *Straw bale Moisture Monitoring Report, submitted to the Canada Mortgage and Housing Corporation (CMHC) by Rob Jolly, 2000.*

### Are straw bale homes cheaper to build?

The cost is no higher than conventional construction. In fact, the materials themselves (straw and plaster) are very low-cost, so owner/builders can save up to 50% of their wall costs.

### Can straw bale really make a difference to the environment?

*The RS Means Green Building: Project Planning and Cost Estimating Guidebook* gives straw bales an embodied energy rating of just 0.24 MJ/kg. This compares very favourably to other manufactured insulations like fibreglass (30.3) and expanded polystyrene (117).

"The embodied energy for the conventional frame house was 509,000 Btus. The embodied energy for the low-impact straw bale house is 41,000 Btus, or about one-twelfth that of the frame house." *Investigation of Environmental Impacts, Straw Bale Construction, by Ann V. Edminster, University of California, Berkeley, 1995.*

### Sources

*More Straw Bale Building. Chris Magwood, Peter Mack & Tina Therrien. New Society Publishers. 2005. Used with permission.*