

# Green Building

## *A Case Study*

### Copper's Role in the Environmentally Conscious Luxury E'Terra Inn



*The luxurious E'terra Inn occupies a stunning site near Tobermory, Ontario.*

## INTRODUCTION

When Laurie Adams, a fourth generation resident of the Bruce Peninsula, expressed her vision for a luxury Inn that would have as small an impact on the environment as possible she was told it was impossible. Fueled by her passion for, and commitment to, the environment she took on the challenge of creating such a building. After five years of considering every aspect, material choice and impact such a structure would have, the E'Terra Inn has emerged as a stunning example of what is possible when applying Green Building principles.

### LEED® Points Copper Helped to Achieve

#### Credit 4.1 Recycled Content:

7.5% (post-consumer + 1/2 post-industrial)

#### Credit 5.1 Regional Materials:

10% Extracted & Manufactured Regionally

#### Credit 5.5 Regional Materials:

20% Extracted & Manufactured Regionally



The building exterior also features copper gutters, vents, and hardware.

## THE BUILDING

**Overview** - Completed in 2005, the six room luxury Inn is perched on the banks of Georgian Bay north of Toronto, Canada. Perhaps the most important feature of the building is the consideration behind each and every element used to erect it. The resultant building compliments its natural environment and minimizes its impact on the environment in a variety of ways. Success in this realm was recognized by achieving the LEED® Gold certification from the Canadian Green Building Council.

### What Makes it Green - The Building's Features

**Three Materials** - To reflect its natural environment, the building is primarily made up of wood, copper and stone. These materials were selected based on their life cycle environmental impacts.

**The Source, The Supply** - The location of suppliers and the source of materials were very important criteria. As well, Adams considered these as important social factors for her local economy. A small business owner herself, Adams understood the need to support her local community if she expected it to support her. As a result, wherever possible, services and materials were sourced locally or as close as possible. This included using Mallard Construction from the local area, Levitt Goldman Architects from Toronto, and Wolverine Tube (Canada) Inc., as the copper tube supplier from London, Ontario. All are located within a 300 km radius of the Inn. In fact over 30% of the building materials were manufactured and harvested locally.<sup>1</sup>

**Siting** - The impact at the design phase was also minimized by careful consideration of the building's location and siting. Existing trees were mapped in detail and, if necessary, removed selectively to disturb the forest as little as possible.

**Energy & Efficiency** - To minimize energy consumption during the use of the building, it was designed for efficiency. According to Enermodal Engineering of Kitchener, Ontario, the design consists of a number of elements which collectively lead to this efficiency. They include a high-performance envelope, radiant heating, natural cooling using "earth tube" technology, rainwater harvesting, a roof-mounted solar heating system for heating water (which is supplemented by high efficiency space heating boilers), efficient lighting design, and a number of high efficiency wood-burning devices. As a result, the building achieves annual energy savings of 45% compared to the Model National Energy Code of Canada and qualified for a Commercial Building Incentive Program (CBIP) credit of \$22,434.<sup>2</sup>

### COPPER'S ROLE

**Performance Across the Life Cycle** - As one of the three materials which dominate the Inn's design, copper plays a major role. Wherever possible, it was used

<sup>1</sup> Enermodal Engineering Project Narrative 2004 [www.enermodal.com](http://www.enermodal.com)

<sup>2</sup> Ibid.

because of its aesthetic quality and environmental performance across its life cycle. This includes the fact that it is locally available to minimize transportation costs and emissions and has a very high recycled content, low or non-existent maintenance costs, high durability, and is easily recyclable at the end of its service life in the building. Specifically copper and brass were used for all of the plumbing and mechanical systems, including the Inn's 11 bathrooms and miles of associated piping. The copper plumbing tube and fittings - in addition to being locally available, high in recycled content, and at its end-of-life, readily recyclable - were also important to Adams in the event of a worst case scenario such as fire. Adams stated that she felt that using copper, instead of plastic and associated glues and bonding agents which may harm fire fighters, was a big plus. Copper was also used for the Inn's downspouts, eaves, flashings, screens to cover all air intakes, as well as the fire reservoir. In fact the owner was so keen to use copper that when she failed to find shower rods able to support the heavy hemp shower curtains, she had them custom made out of copper.

**The Source & Supply of Copper** - Sourcing the copper locally, Adams was able to meet her personal criteria for supporting the local economy, and she was also able to minimize the impact from transporting the material to the construction site. One challenge of the project was identifying where the materials were originally sourced from. But in the case of the copper, Adams obtained information on the plumbing tube from Wolverine Tube (Canada) Inc., and on other applications from the Canadian Copper & Brass Development Association (CCBDA), who worked with suppliers to track down information wherever possible.

**Durability & Maintenance** - The screens over the eaves and air intakes are an example of the forethought that went into the building's details. While obviously a minor piece of the overall puzzle they still play an important role given that rainwater is collected in a cistern and used for



A copper-intensive control panel for some of the mechanical systems in the Inn.

non-potable water systems such as toilets and clothes washing. By using copper, the owner does not have to worry about maintenance or deterioration of the screens over time.

**The Need for Information** - The roof was one area where copper was not used that it could have been, an oversight Adams says is a result of being unaware it was an option. She chose wood shakes which are expected to last up to 80 years, but she was disappointed to learn of copper roofs which would have likely outlasted every other element in the building.

**The Vision** - As one can see, copper met the owner's criteria on a number of fronts and helped her to achieve her vision. Copper was an important contributor to the Inn's environmental performance and to the achievement of at least 4 of the building's 43 LEED credits.

## CONCLUSION

When Laurie Adams expressed her vision for the E'Terra Inn she was told it was impossible. Five years later looking at the finished product - a stunning example of both luxury accommodation and Green Building best practices - we can all applaud her determination and success in proving the doubters wrong.



Copper was a key component in the design and installation of the water and cooling systems.

## COPPER CONTRIBUTING TO GREEN BUILDINGS

Used for centuries as a ‘noble’ and aesthetically pleasing building material, today copper’s role is more important than ever because of its substantial contribution to any building’s environmental performance. Across its life cycle, from extraction to recycling, copper can enhance energy efficiency, resource use and indoor air quality, as well as minimizing transportation costs and impacts. Copper can be used in any number of applications in a building improving its environmental performance from its envelope and elements including - cladding, roofs, sun shades, eaves, flashings and downspouts to finishing products such as bathroom fixtures, to plumbing, through to innovative new technologies such as high efficiency electrical systems, on-demand lighting systems and photovoltaic cells. Many building products benefit from copper’s recycled content, often over 80%, and its

durability, which tends to be measured in generations rather than years. Copper’s attributes are clearly demonstrated by its role in achieving up to 13 LEED credits across three performance categories - a number of which are demonstrated by the case studies in this series. Finally, its aesthetic qualities ensure designers can achieve their visual aspirations without sacrificing their environmental and cost performance objectives.

For more information on any of the case studies in this series, to learn how copper can be used in your next project, or find out how it can help you to achieve LEED certification, please contact the Canadian Copper & Brass Development Association through [www.coppercanada.ca](http://www.coppercanada.ca) or the Copper Development Association through [www.copper.org](http://www.copper.org).

How Does Copper Make a Building Green?	Where is Copper Used?	Case Studies
<b>Energy &amp; Atmosphere (LEED)</b> Optimize energy performance	Passive solar walls, high efficiency wiring and systems	York University
<b>Material &amp; Resources (LEED)</b> Building reuse, Recycled content, Regional materials	Envelopes, roofs, plumbing, accents and fixtures	York University, Penn State SALA, E’Terra Inn
<b>Innovation &amp; Design Process (LEED)</b> Innovation in design	Recycled content	Penn State SALA
<b>Material &amp; Resources (LEED)</b>	Sunshades, plumbing, internal monitoring systems	Penn State SALA, York University, E’Terra Inn
<b>Competitive Operations, Maintenance &amp; Energy Costs</b>	Passive solar heating, innovative and efficient technologies, low maintenance exteriors	York University, Penn State SALA, E’Terra Inn

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