SOLARES
ARCHITECTURE

***REPORTS* ON ENVIRONMENTALLY INTEGRATED HOMES**

NORTHERN ONTARIO CABIN

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Nearly 800 kilometers from our Toronto office sits our most northern project in Ontario. Designing for this remote location, with a modest budget and owner dreams of an efficient cabin, led the way for a unique project constructed entirely with locally available materials.

Our clients had always lived in an urban setting, until they decided to pack up their belongings and move north. Far north. They found a site way up there and hired Solares to help them create a compact house with building systems that would maximize the home's energy efficiency.

Part of our clients' vision for a compact house was to locate some of the secondary program (the guest bedroom and study) in space under the roof. Understandably, many people make the assumption that attic space in a home is "bonus" space. While this may be the case in older homes with rafter-framed roofs, newer homes are all framed with engineered trusses which save money and time but make the attic space unusable because the cross members criss-cross their way through the volume.

The simple solution to creating a "bonus" attic space is to hand-frame the roof with rafters. The big drawback though is that the insulation layer must be located between the rafters instead of on the attic floor. This greatly reduces the amount of insulation you can have, unless you use really, really deep rafters.

To accommodate both an attic space AND super insulation, we used 12" deep engineered trusses and framed them like rafters. This allowed for a small attic space under the roof and tons of insulation. The end result is a usable second floor with a spare bedroom, a study, and a powder room with plumbing roughed in for a future bathtub under the sloped roof.

Throughout the rest of the house, energy, space efficiency, budget and comfort were the driving forces behind design decisions permeating from the footings to the roof. For the entire project we kept to a budget of $350,000, including the garage, all taxes, fees and site servicing.

Digging a basement this far north would be a very costly undertaking, as the depth of the frost line is much lower than in southern Ontario. For this home we used a frost protected shallow footing, which is essentially a structural slab-on-grade, which acts a big, concrete “raft”. Thick insulation is applied underneath and to the sides of the slab. Insulation is also laid about 24” below the final grade extending outwardsfrom the slab as a sort of “skirt” to keep the winter freeze away from the house. For each foot of this horizontal insulation there is a corresponding downward foot of soil frost protection.

The walls of the house are made of 2x6 framing with Roxulbatt insulation between the studs and two inches of Polyiso on the outside. The exterior cladding of the house is made up of steel roofing and siding, and locally available double-glazed vinyl windows.

Local availability was a key driving force behind this project. We made the commitment to source all building materials, finishes and appliances entirely from nearby suppliers. This meant that everything from vinyl windows to structure to flooring to kitchen and bathroom fixtures were from the local Home Hardware. Nothing was shipped or specially sourced.

The overall design of the house is simple, efficient and cozy. A kitchen, living room, dining room, bathroom, study and two bedrooms are all accommodated in a modest 1,150 square feet. The main entrance is through a screened-in porch that plays double duty as a mudroom and outdoor living space.

We also naturally incorporated our always-essential passive solar design principles, such as the south-facing kitchen/dining area that brings in solar heat gain in the winter. The passive solar heating is supplemented by a high-efficiency electric boiler which delivers heat through in-floor heating tubes.

So how do you design a super-efficient and affordable cabin? You simmer things down to the essentials and really understand your priorities. For this project, a compact second floor, high-efficiency building envelope and local availability were our guides. All design decisions had to go through those filters. The result is a resourceful, efficient, cozy cabin that fulfills these owners' dreams of a life in the North.