



Going Green in Culpeper

Mike and Marie are building their own house in Culpeper County. It is being constructed as an energy-efficient home for their retirement. They have been working with the Green Building Resource Center for about ten months on the design and site details for their non-standard construction.

We, at the Green Building Resource Center, have enjoyed being a “resource” for Mike and Marie and look forward to helping others build more energy-efficient homes in Culpeper County. The following interview will give some insight into the process they have gone through thus far.

1. Why did you decide on building your own home?

We plan to retire in Culpeper County and wanted to build a home that was going to fit our needs for retirement, plus leave a legacy for our children. Having looked at hundreds of pre-designed plans, there never seemed to be a plan that even came close to what we were looking for— small, energy efficient, easy to maintain, and simple.

2. Why did you choose to build a home that exceeds current energy code?

It just made sense. If every one of us strived for a net zero home, we would require less energy to heat and cool; it would be so good for our environment. Of course, net zero is hard to achieve in the middle of the woods, so going passive with Structural Insulated Panels (SIP) made sense to us for all the right reasons.

3. What are the three most important elements, in your opinion, for energy efficient design?

We started thinking small, capitalizing on the natural features of the site and planning every element of the home with an eye to the future.

4. What building materials did you use that are different from standard construction?

Many of the materials in our home are found in other homes as well, such as concrete, dimensional lumber, doors and windows, etc. Our walls and roof, however, are made from SIP (R21 and R41); our basement is precast concrete (Superior Walls at R12.5); we have very energy efficient windows; our vinyl board and batten siding is insulated (R2.6); and we have a standing seam metal roof. Our home is super tight, as all the openings are foamed, and we are installing an Energy Recovery Ventilator (ERV) to keep the air clean and fresh.

5. Why did you choose SIPs as opposed to standard framing for the walls?

They offer superior insulation value and less opportunity for air infiltration, along with very little waste and the flexibility to do some creative design work.

6. How does building with SIPs differ from building with traditional walls?

The house went up fast... very fast. In fact, the entire roof went up in one 12-hour day, and we were under cover before we went to bed. The SIPs are delivered, stacked, and then assembled one at



East wall going up



Roof panels being installed

a time, so the house goes up quickly.

You can also have greater spans with few overhead beams, taller walls that are always true and square.

7. What difficulties have you encountered because of your choices to use non-standard materials?

Planning ahead has been a challenge in lots of ways. We are determined to have as few penetrations as possible in the house, so avoiding outside walls for all kinds of things has been interesting. As

our walls are six inches thick, some of the finishing work will be challenging, too. There were some details we didn't think about, either, such as the ventilation for the cold roof (i.e., a ventilated roof on top of the SIP roof), and some site adjustments that had to be made due to design oversight. Our overall lack of knowledge of SIPs and Superior Walls presented some challenges, as trying to fit the parts together resulted in a lot of creative problem solving by the designer, SIP provider, County Building Department, contractor and the owners. Overall, it was worth it as we love our house and all that it has to offer.

8. Would you recommend this type of construction to others?

We are very pleased with our home. Of course, it is not for everyone due to the research and planning needed to put it all together. What we like most is that we will be living simply, in a small home that features everything we need (i.e., kitchen, living room, washer and dryer, shower and tub and toilet, office and bedroom all on one floor). Of course, the view, and the light, and the fact that the roof and porch overhangs help heat and cool the house is another bonus. Yes, this is a great way to build a home!

9. Have you had the opportunity to be in the house during cold weather?

Yes! On the coldest of days our home is usually 15 to 20 degrees warmer inside than it is outside. We do have a wood stove installed on the main floor, and while it takes a few hours to warm up the structure, when it gets warm, it is warm all over. It can be 24° outside and 74° inside in less than three hours, just heating with wood, and the house holds the heat very well. Once we warm up, we have to regulate the heat from the woodstove in order not to overheat the house, which is easy to do. On the Winter Solstice it was so fulfilling to see the sun reach 100% of the south facing windows; the passive gain that we get isn't much, but it certainly helps.

10. Have you had any energy projections done for your home?

No energy projections have been done, but we did do some energy modeling which showed we would need very little HVAC assistance. If they made a one ton heat pump we would buy it, as the one and half ton is probably going to be a bit much. Our home has a passive solar “chimney” for summer cooling, and we are working on a mechanical “circulator” to help move around superheated air in the winter.

Mike and Marie's home is currently in the pre-drywall stage as they decide on a heating system that best suits their needs. We will be following their progress in future issues. If you have questions about green building or energy efficiency, please contact the Green Building Resource Center at 540-727-3444 x 387 or check out our website at www.culpepercounty.gov/gbrc



SIP's waiting to be raised



Inside corner of foundation