1. The walls are built of Navajo FlexCrete, an aerated concrete block containing waste fly-ash from coal-generating electrical plants. The 8” x 24” blocks provide both mass and insulation, facilitating passive heating and cooling. Using building materials containing recycled content minimizes the impacts of extracting virgin materials. (LEED cr MR4.1) The block and interior plaster are both manufactured and extracted regionally, supporting the regional economy and reducing the carbon footprint created in the transportation. (LEED cr MR 5.1-2) The block was donated to the project by Navajo FlexCrete.

2. Interior walls were finished with American Clay plaster. This material contains zero VOC’s, eliminating any negative impacts on the indoor air quality. (LEED cr EQ4.1)

3. Exterior walls were first sealed with an acrylic-based sealer and then finished with traditional cement stucco applied directly to the block.

2. Interior walls were finished with American Clay plaster (donated by the American Clay company).

3. Exterior walls were first sealed with an acrylic-based sealer and then finished with traditional cement stucco.
In the beginning, the first layer of these blocks had to be mortared in place and leveled to facilitate a good wall base from which the subsequent blocks were placed with a thin set mix.
The subsequent layers are easier to install because, instead of mortar, thin set is all that is required to bond the blocks. This characteristic makes FlexCrete much simpler and less labor intensive to install than conventional concrete block. Consequently, most of the home was constructed with unskilled volunteers.
FlexCrete blocks are easily cut and shaped with a band saw.
In a period of 3 weeks, all the walls were erected with unskilled student labor that included ASU students and Guadalupe YouthBuild students.
Selecting the right materials to build exterior walls and the roof dramatically impacts building efficiency and thermal comfort. These building materials will reduce cooling and heating loads, thus decreasing operational costs and greenhouse gas production, as demonstrated in this energy-model analysis comparing the energy use in the home with Navajo FlexCrete vs. traditional stick-frame walls.
In the Phoenix valley, temperatures can reach 120 degrees Fahrenheit. In such a climate, the roof is the most critical element in terms of solar heat gain. Our innovative and environmental roofing system serves as an insulating barrier whose reflective and protective coat prevents water infiltration and minimizes heat penetration into the home.
The roof utilizes a modified Structural Insulated Panel System. The panels were specially made for the project by SIPS Structures of Phoenix as a sandwich of OSB, 8 inches of rigid polystyrene insulation, and cementitious fiberboard. The panels were laid on top of small diameter timber beams, rather than utilizing the internal beams standard to conventional SIPS roofing systems.
The panels were laid quickly and easily with non-skilled labor and were in place in just a few days. The 8 inch panels will provide an effective R-value of 30.
The SIPS panels were then coated with MirrorSEAL, a 100% non-toxic roofing membrane manufactured in Tucson, Arizona, by Innovative Formulations and donated by the company. The application process involved: (1) sealing of the OSB with a water-based primer; (2) installation of a polyester membrane to give structure and strength to the sealer; (3) application of the final sealer coat; and (4) application of a reflective coating.
MirrorSEAL dramatically decreases heat transfer by reflecting a large percentage of heat back into the atmosphere.
Incident solar radiation and its accumulation can reach temperatures of over 130 degrees Fahrenheit. A good reflective coating can minimize solar heat gain, reducing the transfer of heat into indoor spaces.
MirrorSEAL on the rooftop reflects most of the heat back into the atmosphere, thus retaining only a small fraction of the solar radiation on the building surface. This property helps reduce night-time temperatures and the subsequent heat island effect.
MirrorSEAL is a non-contaminant zero VOC water-based roof sealer that has a long life span and significant reflecting properties. Navajo FlexCrete is an excellent material with two basic and very important properties for buildings -- mass and insulation. These characteristics make these materials excellent building elements that enhance indoor air quality and thermal comfort while lowering operational cost.