

# Cady-Guyton Residence



The Cady-Guyton Home is built into a south facing hill that allows for a passive solar design with an earth-bermed first floor (daylight basement). There is a woodshop (20x30ft) and a small solar greenhouse in addition to the 1550 sq ft. living space.

Type of Construction: Site built /stick frame

Date of Completion:

Building Size: 2110 sq ft

Major Funding: Owner financed

Certification: Built before green home certifications

Location: Alexander, NC

## Site & Water Conservation

- Parts of the trees that were cleared for the house site were chipped for landscape mulch
- The Wood Shop roof is a living roof system (Green Roof) made with engineered I- joists and  $\frac{3}{4}$ " OSB decking, a waterproof membrane (Bituthene) & a drainage mat. 5" of topsoil & compost from Nothing Wasted is the final layer with a cover crop growing for the vegetation & soil improvement.



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"I visited a friend in Pennsylvania in the winter who had a passive solar earth-bermed house with insulating night curtains that required no additional heat. Over night the house lost 2° with no heating while it was 20° outside. It was the most direct teaching I have ever had on the concept and value of passive solar design." - Boone Guyton, Cady/Guyton Construction and Homeowner

## Indoor Air Quality & Health

- Boron termite treatment, a naturally occurring element



Kitchen

## Sustainable Materials

- Local bamboo used at exterior entrance, railing for interior stairs is locust from site
- Recycled wood is used as trim & for office cabinets
- Kitchen counter tiles are scrap marble embedded in a binder- pre-consumer recycling
- Very little framing over 2x6 dimension; mostly from fast growing plantation trees
- Roof is trussed & joists are engineered Trus Joist Macmillan I-joists
- 40 yr guaranteed architectural asphalt shingles on roof
- Interior paint is recycled-Ecoat paint from Shelter Ecology
- Exterior siding is traditional wire lath stucco



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## Energy

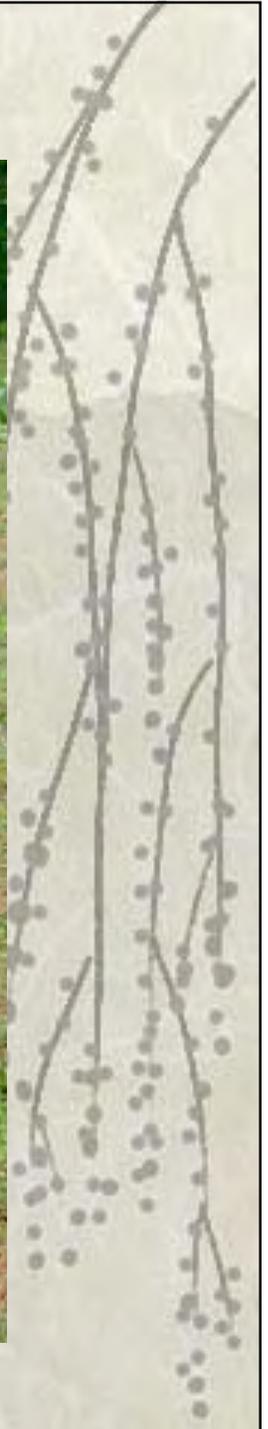
- Passive solar orientation - 1160 sq ft main floor- 120 sq ft of south glazing with a 2½" poured concrete floor for mass & a brick partition wall between the living area & the kitchen. Daylight basement with 390 sq ft living space. Basement has 60 sq ft of glazing & a 4" insulated slab.
- The foundation is insulated with 3" of rigid Styrofoam & is bermed on three sides. It houses the mechanical, storage area & a bedroom/bath in the southeast corner.
- The insulation on the upper floor is recycled cellulose blown in the walls & the ceiling. The framing is 2x6 on two foot centers with a ½" of rigid insulation on the inside as a thermal brake & added insulation providing R-23 in the walls & R-38 in the ceiling.
- The heating system is radiant floor in concrete poured on grade in the first floor with 2" rigid foam underneath & 1" on the perimeter. The radiant pipe on the second floor is in 2½" concrete on top of the tongue & groove OSB sub floor. It remains as the finished floor with Kemiko stain & sealer. This also works as thermal mass for the passive solar gain.
- The heating equipment is a 50 gal direct vent gas water heater that also supplies the domestic hot water. Radiant floors are efficient due to lower operating temperature & less stratification of heat. An active solar water system assists the domestic hot water & the radiant floor. The system is two 3X13' flat plate collectors & a 150 gal storage tank. A soapstone wood stove is used for back up.
- Compact fluorescent lighting & efficient Maytag plus refrigerator
  - Efficient windows; Golden- Low E with Argon gas. Warm window night curtains on most windows adds R-7.
  - The Wood Shop roof is a living roof system (Green Roof)



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Wood Shop



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## Wood Shop and Greenhouse:

- The Wood Shop's 3 walls are Faswall concrete form blocks-recycled wood fiber insulating forms. (Made from recycled and mineralized wood chips mixed with cement.) These were poured solid with concrete to make an R-19 wall with thermal mass. The shop is bermed into a hill on 2 sides which gives added temperature stability.

- Faswall form blocks make up the Greenhouse's bermed north wall & half of the east wall. The 7/12 Greenhouse roof is sloped toward the south with a 2 layer Polycarbonate glazing as well as 6 ft of enameled metal roof that holds the solar collectors for the active hot water system. Thermal mass is provided by 755 gal metal drums of water painted flat black along the north wall as well as a concrete & stone floor & planter (greenhouse). Some additional heating is gained through the solar heated water from the collectors on the roof that pass through the greenhouse as it circulates to the house. The greenhouse has maintained above freezing temperatures without supplemental heat through the winter.



Walkway



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Greenhouse with PV Panels

"Don't make it (your home) so big and use the simplest strategies first and build from that. Passive solar is the best way to be more energy conservative with the least cost, when available at the site. Using trees from the site-clearing for trim, cabinets or flooring has been a really satisfying part of green building for us." - Boone Guyton, Cady/Guyton Construction and Homeowner

