GADDY HOUSE

Clarksville, MD

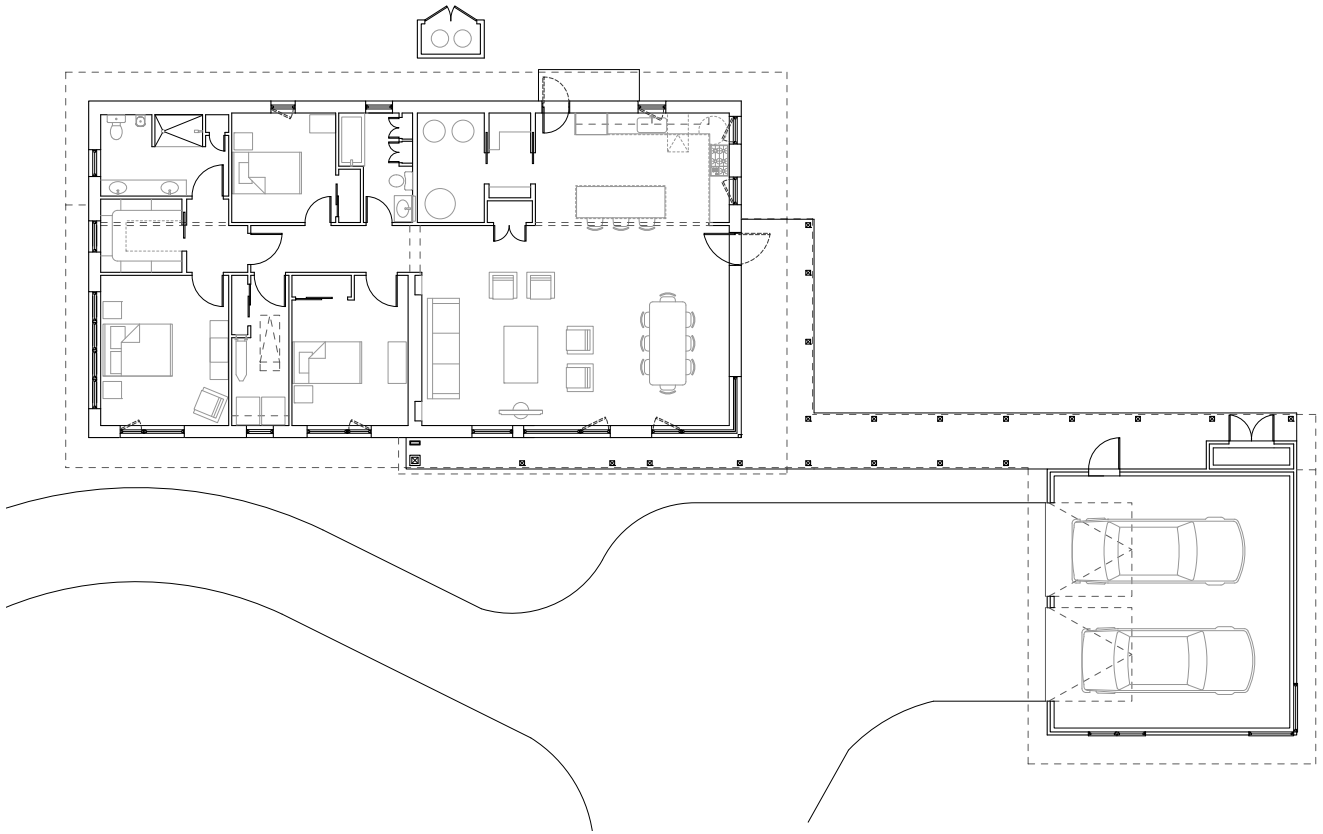
Category:
Residential Architecture

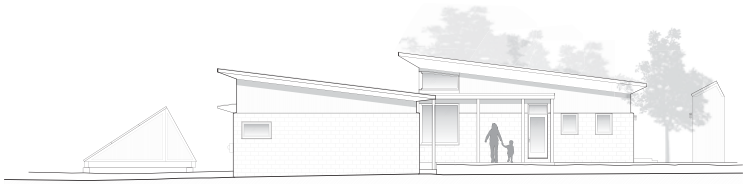
The Gaddy House is a prototype that unites healthy living and efficiency in a dwelling. The technical and functional lessons learned on the project provide novel strategies for the use of materials and technologies available for sustainable housing.

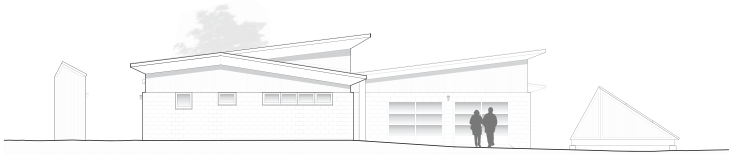
The house is designed to sustain its occupant's health, benefit the surrounding community and protect the environment as much as possible. The intent is to promote the effective use of land, to use no harmful measures or materials, to eliminate the generation of carbon over the life of the project, to use only the water available on site, to have no water runoff and to make positive use of waste.

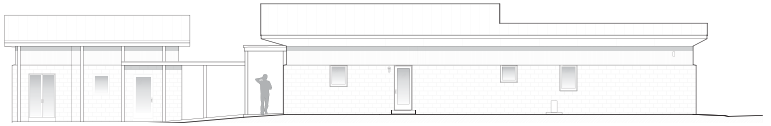
The house creates more energy than it uses; it is net positive and might qualify as Maryland's most energy efficient single family home.

DRAWINGS



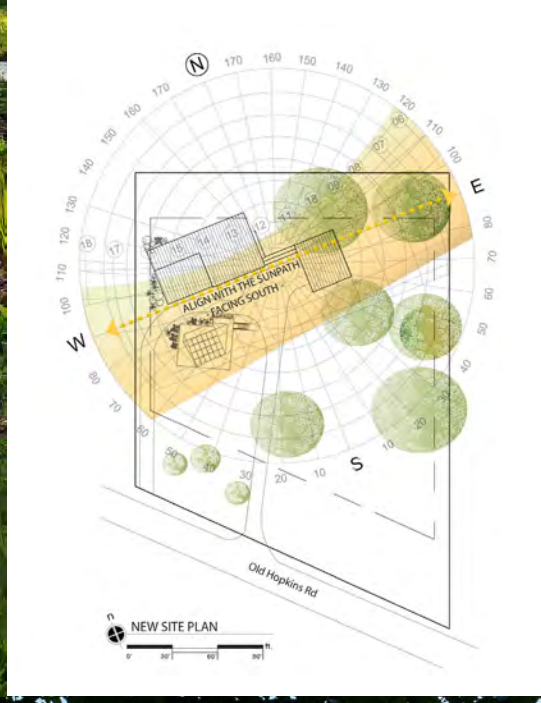






SITE

Its mission begins with the site's location. It was selected for its proximity to the owner's work place and the advantages it allowed for orienting the long dimension of the building footprint to the south. The owner can walk to work in three minutes, and the house is within cycling distance of a grocery store, a hair salon, restaurants, and banks. as a result, this reduces the owner's need to drive, which in turn reduces the associated pollution, and sets an example for a sustainable and healthy lifestyle.



SYNERGY

There is synergy between the house's aesthetics and its green strategies. The project generates electricity with a solar array designed to complement the architecture and emphasize the goal of renewable energy—it is a prominent sculptural site feature in the front landscape. In addition the overhangs on the south facing exterior wall nearly eliminate solar heating through the windows in summer and allow plenty of sunshine in winter.

ENERGY

In October the 6 KW photo-voltaic array generated 584 kWhr while the house consumed only 141 kWhr. In November the panels generated 522 kWhr and the house consumed 128 kWhr. It has continued to be net positive to the present.

Unlike the solar array in the front yard that feeds the grid, the array on the compost shed roof directly supplies electricity to the hot water tank for all domestic hot water use.

The high efficiency mini-split heat pumps keep the house at temperatures above 68 F and powers the refrigerator, other appliances and lighting.

Ventilation is accomplished with an Energy Recovery Ventilator (ERV) and a Heat Recovery Ventilator (HRV). These exhaust stale heated or cooled air while simultaneously transferring the conditioning to the incoming fresh air—at a remarkable 84 % efficiency.

WATER

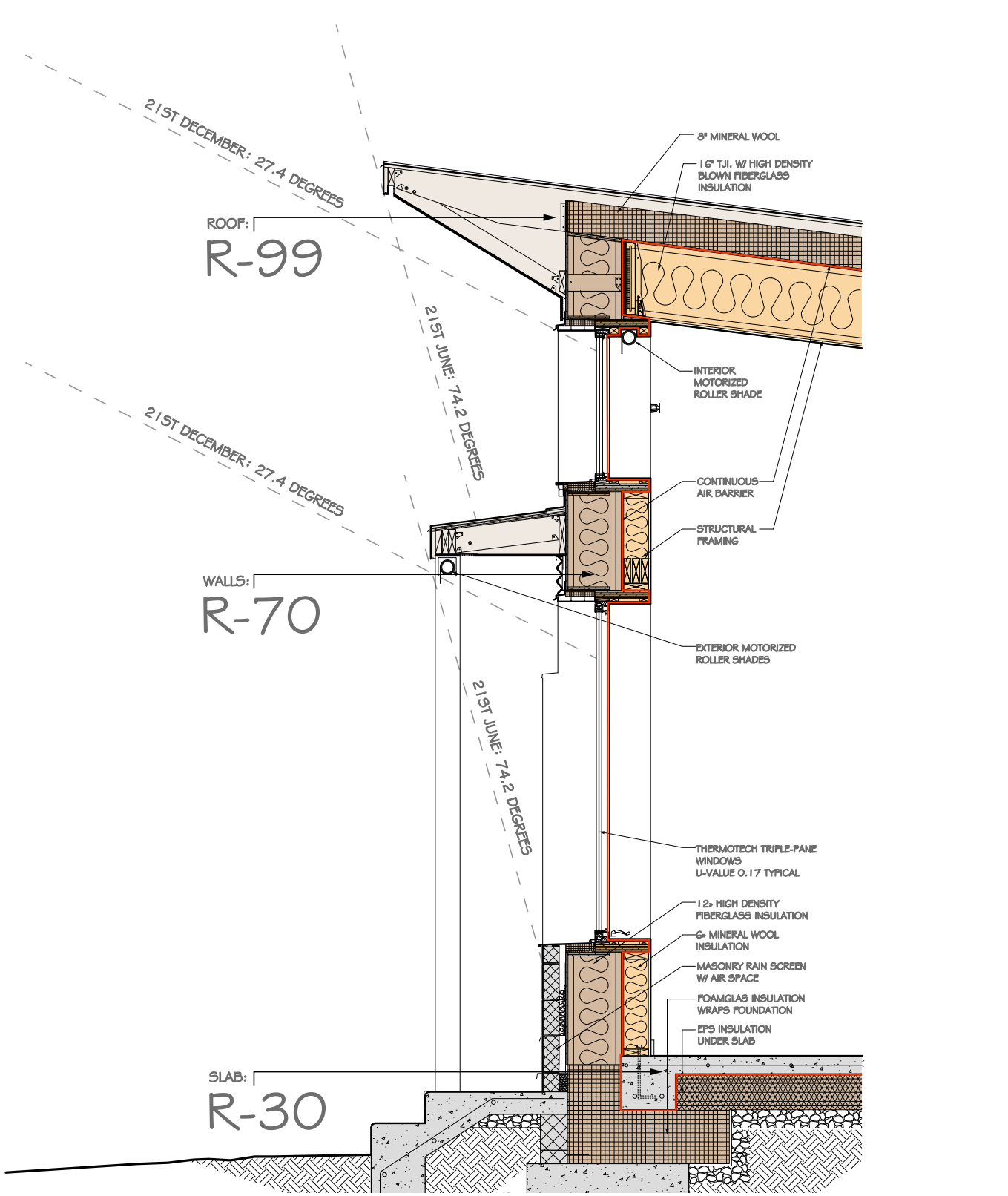
All of the rainwater from the house roofs sheds into a rain garden. All the rainwater from the solar panels sheds into a 1,500 gallon cistern. The house conserves water in the bathrooms by having two toilets that use only 0.8 gallons per flush and two waterless urinals.

INSULATION

The house is insulated and airtight to a high degree. R- 30 under the slab, R- 70 in the walls and R- 99 in the roof. The triple glazed windows, roof configuration and the house's orientation are calculated to maximize solar efficiency.

Technical innovations include the use of Foamglas to support and insulate the foundation, which of course supports the walls. This is possible due to the insulation›s high compressive strength. Foamglas also has the advantages that it is non-combustible, vapor tight, pest resistant and environmentally benign.

Maintaining the tight air barrier and providing adequate venting over the cooktop was a challenge. It was met by a hood that eliminates most air born grease and smoke and connects to a heat recovery ventilator (HRV).



APPLIANCES

Efficient appliances are part of the strategy to minimize energy use. One of the most intriguing is a heat pump clothes dryer, more efficient than a conventional dryer and does not pump conditioned air to the outside.

The house is equipped with an induction cook top, which increases efficiency and reduces emissions from spilled food.

Based on Energy Star Ratings, the house uses the most efficient refrigerator available and the most efficient ceiling fan available on the market.

The house does not have a disposer. The owner anticipates composting organic material normally going down the drain.

MATERIALS

Environmentally benign exterior materials are used. Cladding consists of concrete masonry units and aluminum-zinc alloy coated steel. Both of these products are long lasting, and almost maintenance free. They require no paint, which reduces the use of volatile organic compounds.

The roof and gutters are also aluminum-zinc alloy coated steel, which has high reflectance. The driveway is concrete which is a more durable material than asphalt. as well as being highly reflective. Both of these materials reduce the heat island effect.

The kitchen counters and bathroom vanity tops are stainless steel. It is another recyclable material that is very functional. The flooring is porcelain tile emitting virtually no volatile organic compounds.

EDUCATION & CONNECTING TO THE COMMUNITY

Fostering a sense of community with house tours for neighbors and professionals, the house gives back as a teaching tool. The mission goals, strategies and results for the project has also been communicated through a blog and a Facebook Page. Additionally the project was presented at:

-The Living Building Future Conference in Portland, Oregon
-Design DC
-Bethesda Green
-Living Building Challenge symposium at the DC AIA

At a much smaller scale, the architect designed and built a collage as a house warming present—visible in the living space photos. It is made from materials and samples from the design and construction process.