

DRACHMAN DESIGN-BUILD COALITION

DDBC Residence 1

The Drachman Design-Build Coalition (DDBC) is a non-profit housing provider that links College of Architecture and Landscape Architecture faculty and student technical expertise with the surrounding community to produce prototypes of energy-efficient, low-cost dwellings. Each prototype is permitted as a model residence and is intended for dissemination of strategies into the community and for direct use by other non-profit and for-profit homebuilders.

The first residence built under our newly incorporated non-profit status, DDBC Residence 1 is a rammed earth and steel frame dwelling that houses a family with an annual income below 80% of the mean for Tucson, Arizona. DDBC has partnered with Chicanos Por La Causa to bring a local Hispanic family through CPLC's homeownership courses and budget counseling into this unique residence designed to reduce utilities and maintenance costs. This design, by professors Mary Hardin and John Folan, was drawn and constructed by students of the School of Architecture at The University of Arizona and serves as an energy-conscious prototype for the long, narrow lots with predominantly east-west solar exposure so commonly found in Tucson.

It is difficult to control unwanted solar gain when most of the exterior wall and window area faces east and west. DDBC Residence 1 has an eighteen-inch thick rammed earth wall along the seventy-six feet long west exposure, with no openings for solar gain. The thermal mass of this wall behaves as an energy flywheel, slowly gaining heat during direct sun exposure but re-radiating it into the cool night sky before it can enter the interior of the home. This strategy is particularly well-suited to hot arid regions like the Sonoran Desert.

The south and most of the east wall is rammed earth as well, with the protected north wall and east wall under the carport roof built as steel frame with operable windows or translucent polycarbonate sheathing. A large, sliding door panel opens the living room up to the carport space, which doubles the public space for the eight months of the year when it is pleasant to live outside in Tucson.

Donations from several community partners have helped make this project feasible. Steeler, Inc. of Seattle offered an innovative engineering design for the steel framing, and the concrete footings and floor slab were donated by Sundt Construction of Tucson. Except for the concrete floor, plumbing, and mechanical work, all of the construction was done by U of A Architecture students and faculty. The xeriscape landscaping was designed by students in the Landscape Architecture school and implemented by Canyon Del Oro High School National Honor Society students.

The landscape will also participate in the passive solar strategy for minimizing utilities costs in the residence. Deciduous palo verde trees were planted on the south side of the house to shade the rammed earth wall, fast growing eucalyptus were planted along the west side to quickly gain shade for that exposure. Two fruit trees (lemon and pomegranate) are planted near the east carport where they will receive roof water run-off. Agave and ocotillo are used in the front yard where little run-off water is available.

The construction materials were chosen for low maintenance as well as thermal properties. Rammed earth is sealed and never has to be painted, plastered, or patched. The steel roof and wall panels are warranted for 30 years, and the steel framing is termite-proof. The polycarbonate panels are stronger than glass and are warranted for ten years against UV discoloration.

This residence was constructed on an infill lot in a neighborhood within the Tucson Empowerment Zone. The context is a large stock of houses built from the 1920's to the 1950's, in generally poor condition, with a few new houses on infill lots. This house accommodates a stable, working family in a distressed area. After its completion, this residence has garnered the following design awards:

AIA Arizona Distinguished Building Award 2006

AIA Southern Arizona Chapter Homes of the Year Award 2007

ACSA Faculty Design Awards 2006