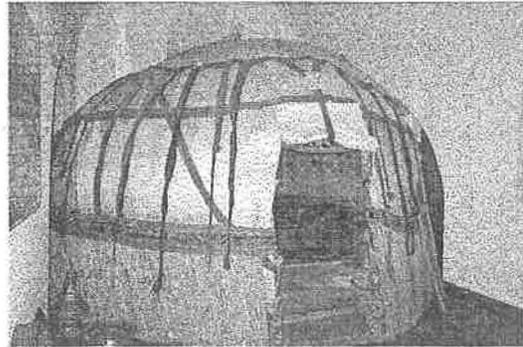


# Double Plays: Old and New

by John Solso

Thinking of “double plays” reminded me of the yurt, which is a multiple-play dwelling, where one space serves as living room, bedroom and kitchen. Recently, I joined an Earth Watch expedition whose mission was to document traditional houses in Turkey. In ancient times when the Turks roamed about Central Asia living in yurts, their nomadic life limited the number of possessions each family could carry.



Later, from the 11th Century, as the Turks settled in Anatolia, those clutter free habits carried over to the permanent settlements. For example, the traditional Turkish room is multifunctional. Like a yurt, each room may be used for working, sleeping and cooking, without having a single dedicated function.



The courtyard, together with an associated veranda, is the primary space for daytime activities.

As I measured and photographed dozens of these houses, I noted that 90% of the verandas were located in the south or southeast part of the house for solar access. The wide overhang shelters the wall while making the space comfortable for working, relaxing or cooking.

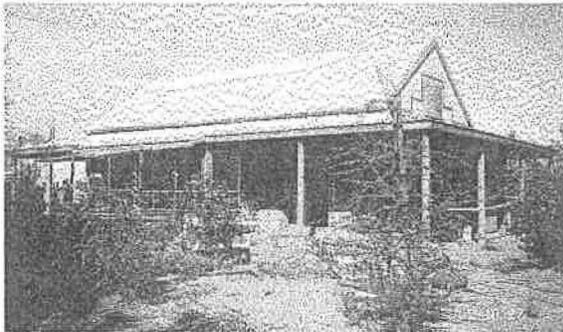
A purely Turkish innovation, the *cumba*, [pronounced “jumba”] is an irregular part of a room which floats over the street (similar to a bay window).

Since the *cumba* is free from geometric constraints of the street and house, it can (1) channel breezes, (2) capture sunlight and (3) focus on interesting vistas.



+++

Skipping ahead by two or three centuries we have the Softub®, an ingeniously engineered hot tub. The rigid foam insulation doubles as the structure supporting the tub wall. And unlike other hot tubs, which have electric heating elements, there is no need for a heater, since a heat exchanger wrapped around the pump motor captures heat that would otherwise be wasted.

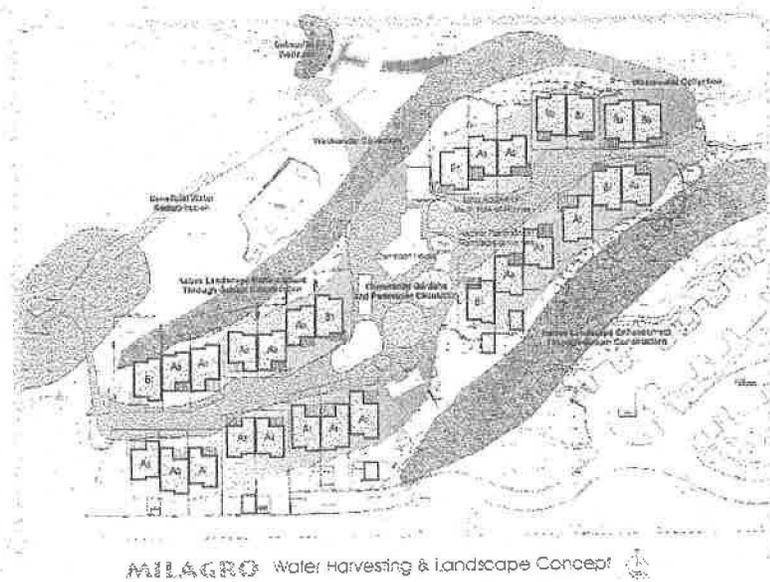


Houses also can have walls built of insulation, such as straw bales. Two years ago, Carolyn Roberts, with the help of her two young sons, designed and built this load-bearing straw bale house in Tucson. The wide overhang on four sides protects the walls while offering useful living space. And, in the winter, the sun space serves as a living room while collecting solar energy. This house virtually heats and cools itself and cost less than a power-hungry conventional house.

The batch water heater is also insulated by straw bales and uses a secondhand tank. The night lid doubles as a reflector during the day. Carolyn’s house is proof that, by changing our approach to architectural design, we can make our buildings *simple, natural and comfortable*.

+++

Like Carolyn Roberts, others in Tucson looking for a better way to house themselves, banded together to develop their own neighborhood of 28 dwellings, and called it Milagro. Its members aspire to practice “deep ecology” in which all aspects of building, living and working are integrated with the environment, much as the ground squirrel is at home in his burrow. An ambitious goal, to be sure, but one which has, at least partially, been achieved.

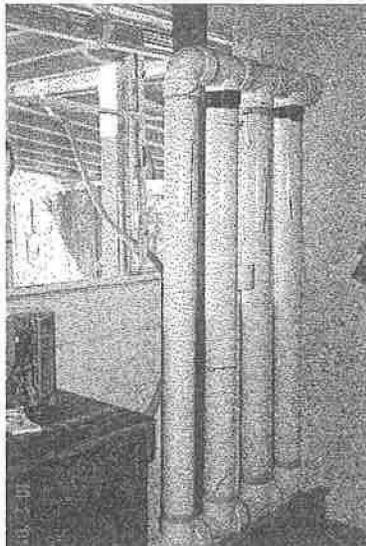


Rainwater from the metal roofs is collected in cisterns and also in 18" deep permaculture basins located in the front and rear of the house. Permaculture dictates that berms, swales, washes, basins, etc. have more than one function. So, not only do these basins collect water, but they provide a habitat for fauna and flora, food for local fauna (javelina), food for residents (fruit trees), and landscaping.

In addition to harvesting water, the roofs are used to support solar water heaters and photovoltaic panels at the optimum angle.

+++

During the summer of 2001, with Steve Baer's encouragement, I filled a styrofoam box with water and tried to create a thermosyphon by connecting hoses attached to a copper heat exchanger exposed to the night sky.



Later, I assembled 4" diameter PVC pipes to create a thermal storage (16 gal H<sub>2</sub>O) inside our house. This was connected to a copper heat exchanger (5 square feet) on the roof with 3/4" heater hose.

The temperature of the water storage was observed to be reduced by about 7 or 8 degrees F overnight. Problems were (1) fitting the PVC together, (2) bubbles in the hoses, and (3) leaks.

Finally, I made an eleven foot tall mockup.

A full scale system will be built in a triplex in Milagro. The shape of the roof, romantic as it might be, is less than ideal for our experiment, principally because it lacks large, unobstructed, south-facing surfaces. Aluminum BigFins™, for night radiation, will be mounted on the west-facing roof above the thermal water storage on the first floor, just inside the door.

This study model of the experimental triplex to is shown at 9 AM January 21 for winter heating. Unglazed black pig-mats may be placed on the limited south-facing roof with water circulated by a PV-powered pump. Alternatively, the above mentioned BigFins™ on the northwest side of the house could be used in winter for a “double play.”



Sun angles, 21 Jan 9 AM

For information about Milagro visit  
[www.milagrococohousing.org](http://www.milagrococohousing.org)

or call

John Solso

3047 N Gaia Place

Tucson AZ 85745

520-293-8667

OIdSol@aol.com



# MILAGRO

# ... in Balance with Nature

The preservation and restoration of the environment is advantageous not only for plants and wildlife, but also for people. Because of wise water use at Milagro, the entire 43-acre site will be lush with the Milagro development, than without it. A healthy and alive desert ecosystem provides beauty and tranquility to people. At Milagro, every individual design aspect is intended to be a solution to more than one problem. For example, using rainwater and recycled wastewater for all landscaping needs saves precious groundwater **and** creates abundant plant and animal life. In turn, the increased abundance of trees and vegetation provides cooling and shade to buildings and people **and** reduces the need for energy-consuming coolers and heaters.

## Creating a Nature Preserve

---

### **35 Acres of Preserved Natural Desert**

35 of Milagro's 43-acre site will be preserved and restored as natural desert. Permeable dams used to retain rainwater, (gabions), will be used in the site's washes to reduce erosion and flooding and to increase plant and wildlife diversity by helping to retain more nutrients. The harvesting of rainwater and wastewater recycling will also be used to increase desert vegetation. Young ironwoods, mesquites, and other native vegetation will be planted on the 35-acre site to help abundant landscapes to flourish. As animal and plant life increase, the desert's ecosystem becomes increasingly healthy.

### **Desert-Friendly Landscapes**

The selection of trees and shrubs within the 8 acres of the Milagro community will provide an environment that enhances the native habitat. Orchards of citrus, plum and other food producing trees will yield about 100 lbs. of fruit per person per year. Plants will be pesticide and pest free by using permaculture landscaping strategies.

## Energy Conservation

---

### **Passive Solar Orientation**

Buildings and landscapes are designed to optimize sunlight. Major window openings face south so buildings will be shaded in the summer from the high sun and warmed in the winter from the low sun. Trees are planted to provide shade to east and west sides of buildings, while simultaneously helping to reflect light back into north facing windows in the winter. Shade from trees along the pedestrian pathway helps to cool the community from the hot summer sun.

### **Photovoltaics**

All the homes at Milagro will be wired to accept photovoltaic panels- a state of the art technology that turns sunlight into electricity.

### **Thermal Mass Home Construction**

Adobe, the main Milagro building material, has the ability to store energy in the form of heat and cold, moderating the interior temperature swings so that less energy is needed to maintain cooling and warmth.

## Water Conservation

---

### **Rainwater Harvesting**

Rainwater is considered to be a hundred times purer than normal household potable water. At Milagro, rainwater is viewed as a precious resource to be harvested and used to nurture the community gardens. The roofs of the homes and community facilities at Milagro are designed to collect rainwater and bring it either to the back yards, to be used for private landscaping, or to the community common landscaped areas to be used for the garden areas.

### **Beneficial Use of Wastewater**

One of the more innovative features at Milagro is that all household wastewater is recycled and filtered through a sub-surface "wetlands" that uses natural microorganisms to purify the water. From there, it is recirculated into the community gardens and orchard by sub-surface irrigation.

### **Water-Saving Appliances**

All buildings at Milagro use water-saving faucets, toilets and aerators. Front loading washing machines, which use 40% less water than top loading machines, will be used in the homes and in the common house.

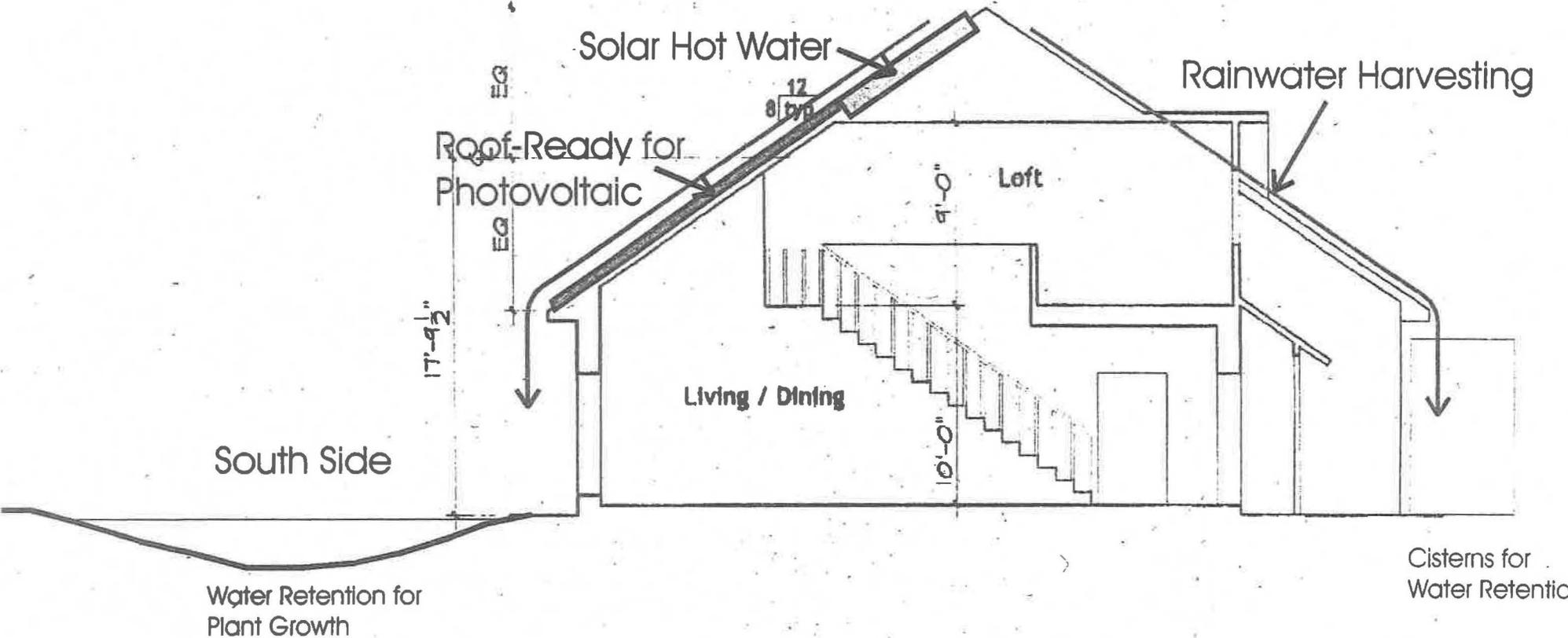
### **Wise Garden and Desert Landscaping**

Similar to the way gabions are used to retain rainwater in washes, basins and swales are used to optimize water use on landscapes and gardens. Basins and swales prevent water runoff by retaining water close to the plant source. Longer periods of water retention help to develop the rich soils necessary for healthy plant systems.

# MILAGRO

A COMMUNITY IN BALANCE WITH NATURE

520-622-6918 / [www.milagrocohousing.org](http://www.milagrocohousing.org)



# MILAGRO

A COMMUNITY IN BALANCE WITH NATURE

