

Collecting Rainwater – 43,000 Gallons at a Time

by Paula Henson, Professional Member, APLD

Fact: It doesn't rain very much in southern California.

Fact: We can collect enough rainwater from the paved surfaces to supply irrigation for the vast majority of our residential gardens.

A residential property perched on a hilltop in the Pacific Palisades area of Los Angeles is undergoing a transformation, but you won't be able to see any of it. When water conservation is a very serious issue, a fully mature garden featuring exotic tropical plants presents a big challenge.

Tackling the challenge of how to efficiently irrigate an established, not-so-climate-appropriate garden involved several possible alternatives to the existing traditional system that included 70 valves. The water source was the primary and most basic consideration.

Elimination of the need for municipal water (for irrigation purposes) meant the garden could survive a severe water shortage. It also significantly reduced the runoff into the local watershed. Although this water is not potable, it could be treated for human consumption in an emergency situation.

The water use on the property was excessive when the current homeowners bought the property. Irrigation upgrades and efficient retrofits reduced the amount by about 35 percent. It made no sense to start removing plants that required a lot of water. Unfortunately (and ironically), many of the existing large trees were suffering due to years of over-watering. We gradually reduced the existing plants. As they needed to be replaced due to disease and regular life span, we slowly altered the selection of plants and created a "California tropical" palette in keeping with the architecture of the house.

After calculating the water needs of the existing landscape plants and comparing that with the amount of water used by the garden, a considerable gap was discovered. By utilizing the oddly fortunate shape of the lot, it made sense to design the shape of the cistern to be site-specific. Because the entire property is on a slope, gravity provided most of the energy to collect the runoff. The tennis court (approximately 7,200 square feet) was the main source, providing about 57,000 gallons in average year. Roof runoff was easily added as a secondary source and adds an additional 12,000 gallons per year.

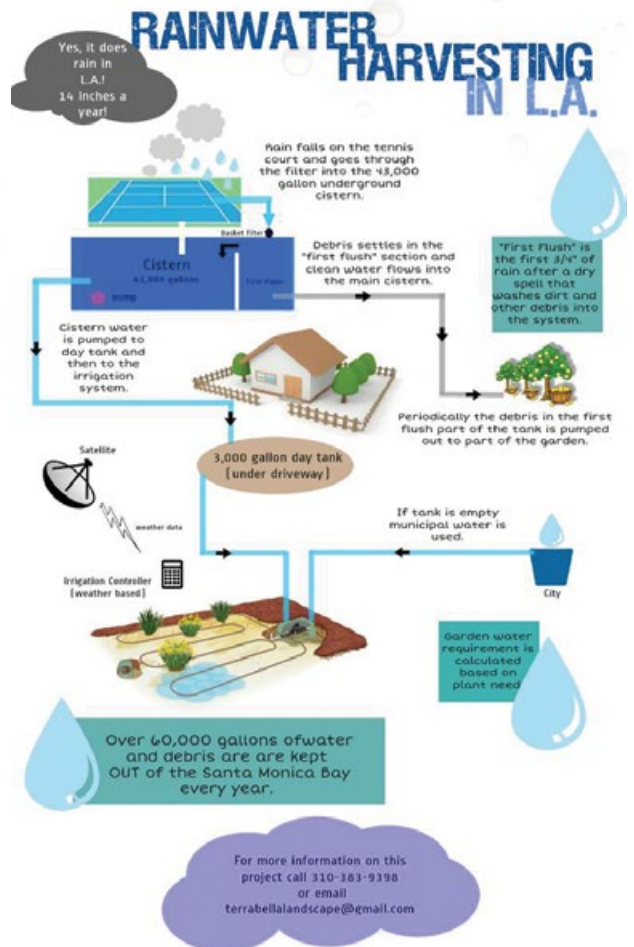
Updating the irrigation system was essential to make the system work efficiently. Most irrigation systems are programmed with very little practical consideration (if any at all). Irrigation or water audits can provide a vast amount of information from the efficiency of the current irrigation system to the amount of water required for each microclimate of one's garden.

The water crisis in southern California is a serious problem. A few seasons of significant rainfall are not a long-term solution. The Los Angeles Department of Water and Power recently announced its rate increases, and the water rate for this particular property will increase by over 17 percent in fiscal year 2013-14.

The cost of a large custom cistern such as this is prohibitively expensive for many homeowners. This very large garden called for a very large cistern. And as every property has different needs and specific parameters (ie. soil testing, grading

inspections), cost estimates are very difficult to calculate. The custom-designed below ground tank was built to fit the available space on the property. The 3,000-gallon tank cost about \$11,000. Installation was about \$15 per gallon.

By implementing changes to increase efficiency and decrease water demand, as well as having a long-term climate-appropriate garden plan, this residence is on the road to sustainable irrigation water use.

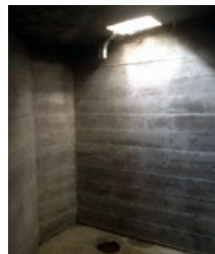


Paula Henson, Professional Member, APLD

Paula Henson is an award-winning garden designer in Los Angeles and currently serves on the APLD Board of the Greater Los Angeles District.



3,000 gallon "day tank" that feeds irrigation system is installed under the driveway



The Team:

- Marilee Kuhlman** ([Comfort Zones Landscape Design](#)), System Designer
- Danny Farkash** ([DNA Construction](#)), General Contractor
- Scott Mather** ([Hey Tanks, L.A.!](#)), System Specs
- Blaine McNutt** ([SmarTek Pacifica](#)), System Automation
- Paula Henson** ([Terra Bella Landscape Design](#)), On-site Project Manager

The goals:

- Make sure the most valuable asset on the property could withstand severe drought conditions.
- Prevent excess storm water runoff from contributing to erosion problems in the area and pollution in the local bay.
- Reduce the need for municipal water.

The challenge:

- A logical way to capture rainwater runoff.
- Adequate space to store collected rainwater.
- The appropriate system of redistributing that water for irrigation.
- Cost.

The solution:

- A 43,000-gallon underground, site-specific concrete cistern.
- A 3,000-gallon [Xerxes](#) "day" tank installed under the driveway.
- Filtered, non-potable water distributed through a below-grade drip irrigation system by a weather-based irrigation controller.
- Drain and rain gutter collection.
- Fully automated monitoring and control.

How much water can you collect?

A non-permeable surface of 1,000 square feet (ie. a roof) with an annual rainfall of 14 inches (Los Angeles average) can result in 8,400 gallons of water per year... and that's just for 1,000 square feet.

How much water your garden needs:

In simple terms, this is like training your garden to achieve optimum health with economic and environmental benefits as an extra bonus. If you enjoy scientific overload, check out wateruseitwisely.com

Realities of urban runoff:

- Storm water pollution has increased 200-700 percent during the last 20 years. ([The Southern California Coastal Water Research Project](#). Neil Shapiro, City of Santa Monica)
- Storm water has become the leading source of water pollution in the Los Angeles area contributing 50-60 percent of the pollutant load. ([The Southern California Coastal Water Research Project](#). Neil Shapiro, City of Santa Monica)
- In Santa Monica, over 325,000 gallons of runoff flow through the storm drain system each day even when it's not raining. ([City of Santa Monica](#))
- In Los Angeles each day, 100 million gallons of polluted urban runoff enter the ocean untreated, leaving toxic chemicals and over 4,300 tons of trash on our beaches annually. ([Los Angeles City Bureau of Sanitation](#))