

Rainwater Harvesting

For Residential & Commercial

This is a presentation on the redesign of a South Tucson neighborhood park. It also includes rainwater harvesting and sustainability.



Making a difference in our lives.

A curb-cut in the Dunbar/Springs Neighborhood

Jay Harman
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Introduction to the South Tucson Park



The purpose for this presentation is to investigate how to fix a park in the city of South Tucson AZ. I am presented with a choice of two different parks. They both have special problems that need to be addressed.

The process of this possible refit will consist of determining the water runoff flow pattern-mainly down the street, what the wind patterns will be like, and how the residents react to a newer park rather than the current park. What is shown here is pretty much just about the park itself and how I can create something better.

I must elaborate on one of the playground's features. For the 'pit' I suggest filling it in but keeping an area available for harvesting rainwater. This might not be a good solution to the problem. After giving it some thought, I believe another course of action would be to construct a cover over it. An interesting thing would also be that the cover would be permeable to allow water access and pool in the original place but also all the children to use the equipment after the rain has stopped.

Another suggestion for the paths and play area would be to use a fine chopped mulch instead of grass or gravel. Or you could just use the micro-clover as ground cover too. Both would retain water and keep the park cooler in the summer.

Park Problems

5th Ave & 31st Street

- Play area is a sunken pit that floods when it rains
- Several unorganized tree placements
- A couple bushes
- Little shade for play equipment
- Upper play area is a heat island
- Basketball court is also a heat island
- Several large rocks are scattered
- Seating area is not inviting
- Lighting is mostly for the basketball court
- Access limited due to others in the control of the entry gate
- Very little ground cover



Sunken play area
J. Harman



Basketball court
J. Harman



Ramada - inside
J. Harman



Second play area heat island
J. Harman

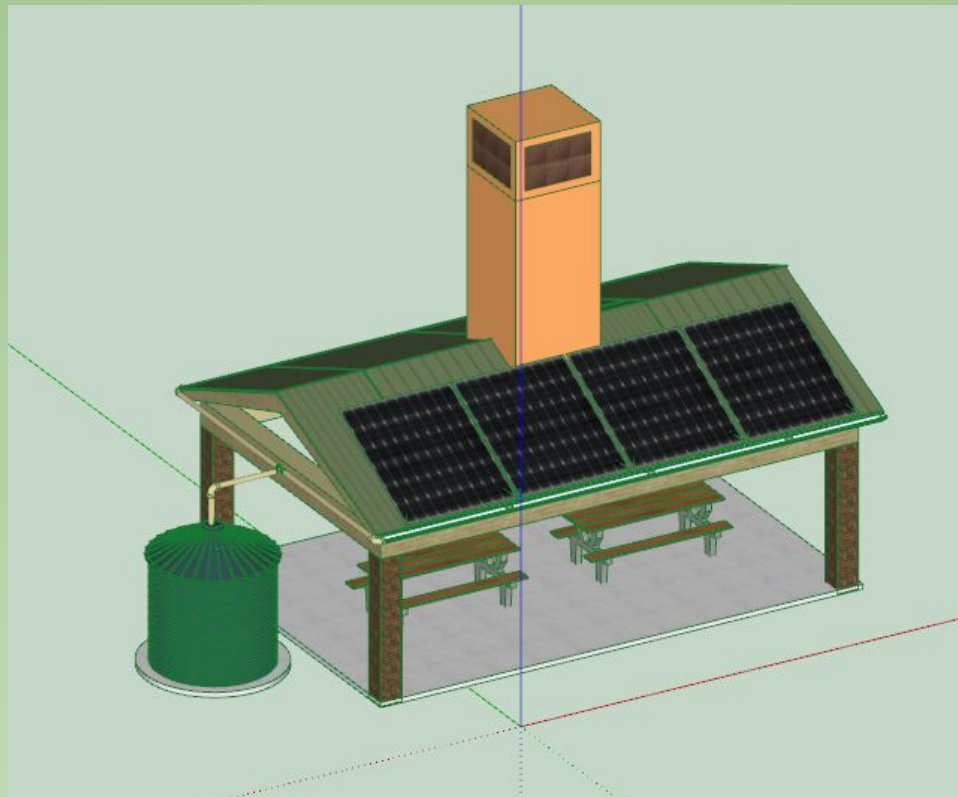


Scattered rocks
J. Harman



Seating area
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Design for a park



Drawn by
J. Harman

Proposed Elements of my design are for park improvements:

- Update and or recycle playground equipment
- Remove the basketball court
- Remove the playground mat
- Use the cement to make terraced planters along walls that can become community gardens
- Fill in the 'pit' but keep some areas for water harvesting
- Make permeable berms for paths
- Keep the original ramada but use a rainwater harvesting system
- Plant microclover as a ground cover for the playground and seating areas
- Take the keys away from the jailer and put in a keypad for the residents to enter.

Benefits of Micro Clover



- Durable to for walking and to be played on
- Grows well with grass
- Produces nitrogen
- May reduce the need for one fertilizer application
- Flowers are a found source for bees
- Crowds out weeds
- Drought tolerant
- Cold hardy - may stay green in winter - depends on temperature
- Reduces erosion
- Resistant to dog urine
- Resistant to de-icing salts

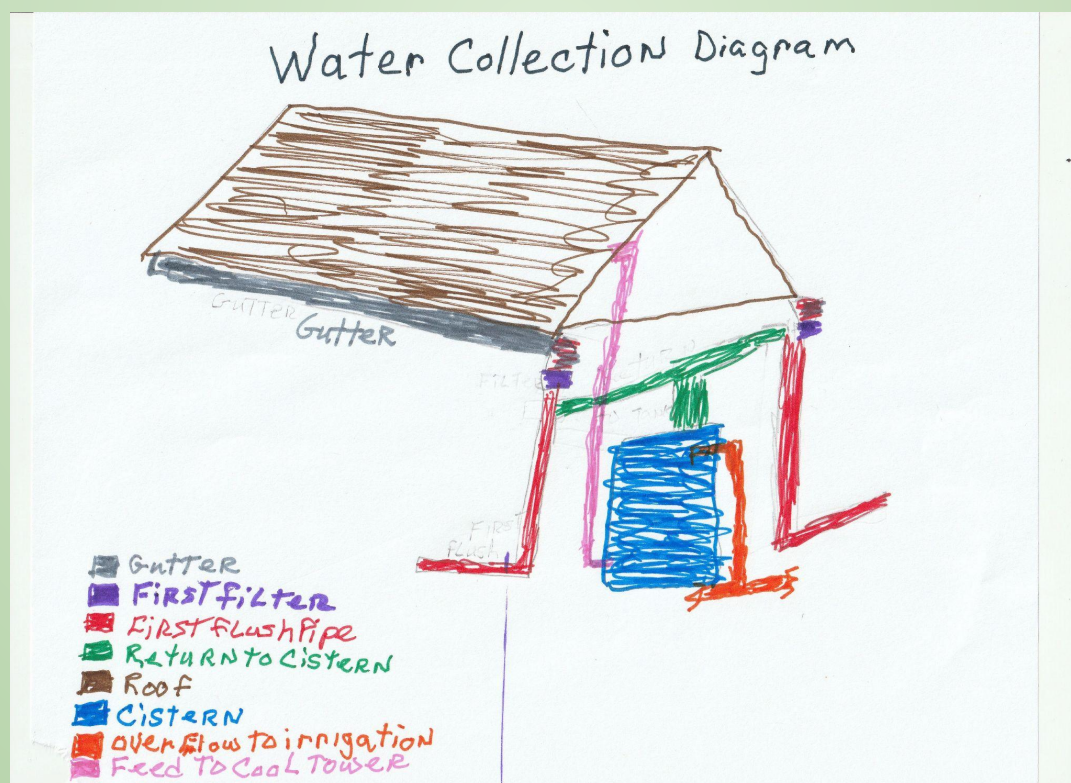
New ramada features:

- Rainwater harvesting
- Solar panels
- Cool Tower
- A pump for irrigation and cool tower evaporation

How the ramada works:

Water from the cistern will be pumped to the cooler pads and the reservoir. The pump is powered by the solar panels which will also power the lights and the keypad on the gate. The cistern water will be used for irrigation as well. Cold air can be contained with the block walls surrounding the park.

Water Collection & Distribution

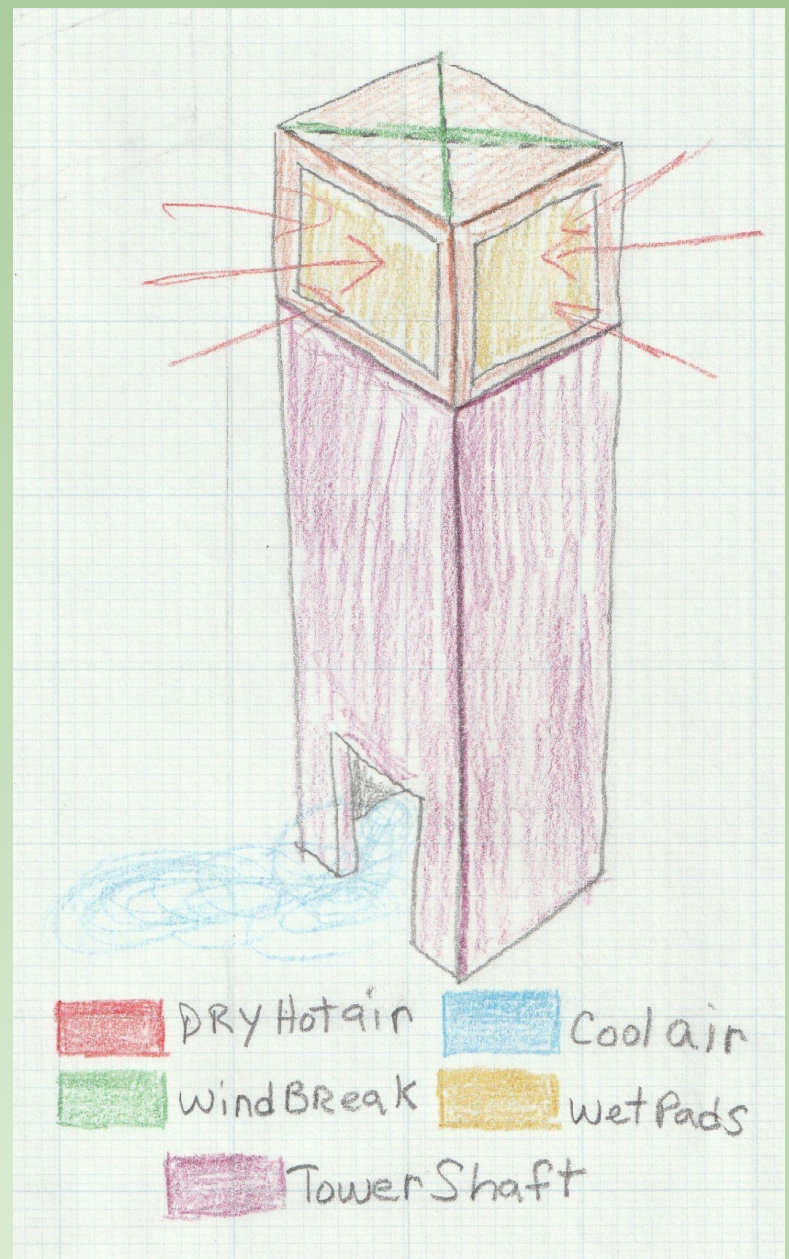


1. Rain runs off roof
2. Follows the gutter
3. Falls into a filter
4. Goes down the first flush pipe
5. Comes back up to main fill pipe
6. Enters the cistern
7. Overflow pipe runs to irrigation system
8. Electric pump pumps water to Cool Tower reservoir
9. Reservoir distributes water to cool pads



Dr. Nader Chalfoun Creator of Cool Towers

- Professor Emeritus of Architecture and Environmental Sciences, University of Arizona
 - PhD, LEED AP, CEA
 - Bass guitar/singer, The Bell Boys
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- A Turret to house the pads and water reservoir
 - A membrane to break the flow of wind through the pads, keep it from disrupting the air flow
 - A shaft to allow cool air to descend
 - A bottom opening for the cool air to exit, either a side opening or just an open bottom



Drawn by
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How it works:

As the hot or warm air floats through the wet pads, the cool air sinks down through the shaft. The slower the air goes through the pads makes it cooler as it sinks into the shaft. The longer the shaft the cooler the air becomes. My tower will be similar to Ronstadt Station downtown. It will have an open bottom to cool the whole of the ramada. This system does not require a fan or blower and wind is not required either. A membrane should be installed in an X form in the middle of the Turret (where the pads are located) to keep wind from disrupting the flow.

