Design and Operation of a Residential Rainwater System for Potable Water and Fire Protection - Perspectives of Designer, Builder and Owner

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Rainwater Catchment Components

• 6000 square foot metal roof
• 40,000 gallon underground cistern
• Roof Washer
• Ultraviolet disinfection system
Metal Roof
Underground Cistern
Ultraviolet Disinfection
Roofwasher
Roof Washer Lids
Rainwater Catchment Design Parameters

- Sustain 1 year drought (no rain for 10 months) for 4 people
- 24 inches of average annual rainfall
- 10 GPM potable water
- 26 GPM fire protection
- 5000 gallon minimum fire protection
- 2 inches per hour maximum rainfall
Rainwater Catchment Operation

- High Maintenance during rainy season
- Metal roof slippery – dangerous to clean gutters
- Insects/earthworms enter the roofwasher
- Pollen clogs the mechanical filters
- Collecting water during heavy rain yields good quality water
- Collecting water during light rain yields poor quality water
Rainwater Catchment Results

- System has been running since 2005
- 40K Cisterns are filled to capacity by early winter (December/January)
- 40K Cisterns maintained to capacity to Spring (April/May)
- 40K Cisterns are drained to 50% by late fall (October/November)
- Tested water quality is good
- Recent improvement to water proof/bug proof roof washer lid to reduce maintenance
Costs and Alternatives for Rainwater Catchment

• 5X to 10X more expensive than conventional well system
• Underground water storage more expensive than above ground water storage
• Potable water quality more expensive than landscape water quality
• Automation of water catchment/filtration more expensive than manual operation