A Review of Applicable Policies and Permitting Requirements for Non-Potable Use of Cisterns
November 27, 2007

Background

Historically, cisterns were used for potable (drinking water) and non-potable uses. In the U.S., the majority of water is supplied by agencies, utilities, and other more conventional sources that historically diminished the use of cisterns. This trend is changing as the cost of water increases, conservation ethics change and various green build initiatives take their use into account.

Currently, there is no existing regulation or policy in the State of Florida regarding the use of cisterns for potable or non-potable use. This research was undertaken to find policies and permitting criteria that is used by other governments that could provide some rationale for understanding how and why permitting and design specifications may be required in the Tampa Bay region.

This research effort was designed to be applied to potential cistern use for irrigation purposes only in the Tampa Bay region. The four main materials cistern tanks are made from are metal, concrete, fiberglass, and plastic. Determining the correct storage value needed for residential use includes calculating roof area, water usage, and rainfall. Maintenance of cisterns should be done often. There are two categories of cisterns; wet and dry systems. Wet systems' pipes don't dry out, must be fitted with screens, and have a tank or ground mounted diverter. Dry systems' pipes don't hold water. Dry systems are considered the best because they eliminate vectors (which are organisms or insects); reduce contamination to the storage tank, and save water.

All cistern setups can be divided into three components: [1] the water collection system (roof, gutter, and downspout), [2] the filter, and [3] the water storage vessel (or cistern). A schematic of a typical rainwater catchment system can be viewed in Figure 1. Though Figure 1 shows an above ground cistern, they can be buried or hidden within the surrounding landscape.

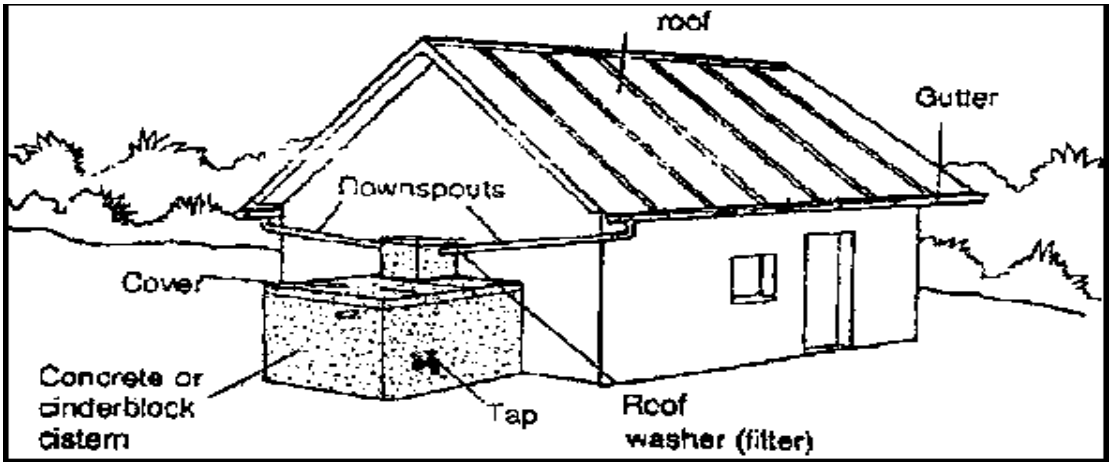


Figure 1

Example of a Residential cistern

Commercial cisterns in Seattle used for toilets and irrigation

Research Results

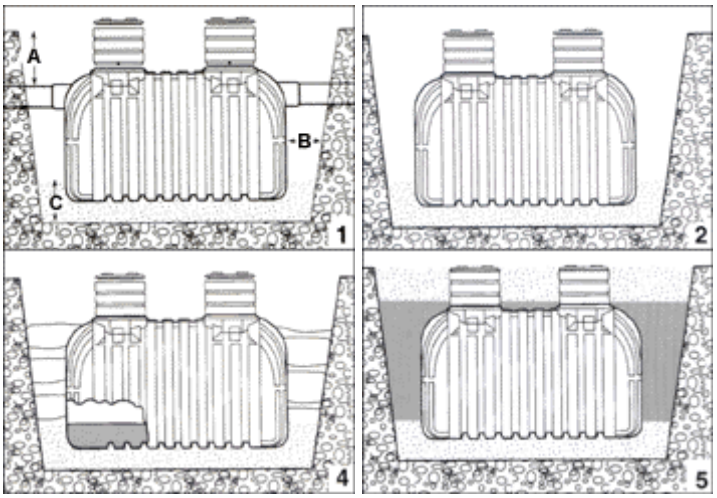
This information was prepared by contacting and evaluating multiple sources of data including use of government websites that had legislation or historical use of cisterns. The state of Hawaii and San Juan County, Washington have historically promoted use of rainwater for potable use because of the limited resources available to them. Contacts in different states (see data under ***Regulations Found and Evaluated***) helped to narrow down this search to local Department of Health policies in the different governments being researched. These different policies and manuals provided information on types of regulation and permitting processes for different areas.

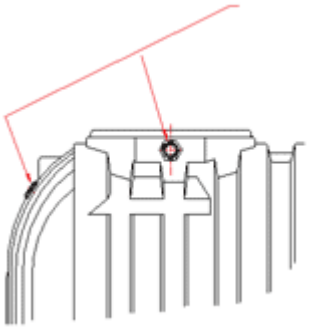
Research completed indicates rainwater harvesting for non-potable use (irrigation) does not appear to require policies or permitting to regulate their water use. In locations where non-potable water is piped inside the house for uses such as toilet flushing and laundry (water uses historically considered potable), policies regarding the use of the collected water were established and various permitting systems put in place to install a system. Some governments allow rainwater harvesting for non-potable use only, while others have policies and permitting requirements allowing for rainwater use for potable purposes

Installation and Costs

Costs vary according to the size and type of system installed. Rainwater harvesting systems generally can lower or eliminate water bills. This should be evaluated as part of the cost. Cisterns cost range from ~$1,500 on up. These tanks can be purchased through retailers or built on premise. Complete systems for homes are designed on a case by case basis. The easiest way to have a rain water harvesting system installed in a home is through a licensed plumber. The tanks need pumps to siphon the water so one can irrigate, or just flush a toilet. Proper installation of cistern tanks is necessary to avoid ruptures, leaks, and to keep the tank level.

Below is a diagram of cistern installation procedures. First, excavation must occur. Second, make sure the lid and manhole extension is properly fitted. Third, install bulkhead fitting in either side of manway or end rib as shown. Fourth, backfill the exterior while filling the tank with water. Last, backfill to the top of the tank.





Local and National Cistern Sources:

Rainwater Connection Box3-3 Thetis Island BC VOR 2 Y0 Canada Phone: 250-246-2155 Fax: 250-246-2175	www.Rainwaterconnection.com

American Rainwater Catchment Systems Association ARCSA P.O. Box 12521 Austin, TX 78711-2521	www.arcsa-usa.org

Rain Harvesting USA, Inc P.O. Box 12521 VP Sales & Marketing 7550 East Whispering Winds Scottsdale, Arizona 85250 1-480-699-2451	www.RainHarvesting.com

SRC Enterprises - Colorado Excavation
& Trucking Contractors
P.O. Box 166 80470
Phone: 303-838-4446
Fax: 303-838-6471
http://www.dig-it-up.com/Construction%20Services/cistern_installations.htm

CATEC Water Recovery Systems
2361 Whitfield Park Ave.
Sarasota, Fl 34243
Phone: 1-888-536-7100
www.CATEC.com

Ecotech Water LLC - Design, Installation and Water Conservation Products
7121 Gulf Blvd.
Saint Pete Beach, FL 33701
Phone: (877) 341-9500
Fax: (888) 367-5556
http://www.ecotechwater.com/Products/products.html

Below are manufacturers of cistern tanks only:

Water Tanks .Com toll free: 1-(877)-655-1100
P.O. Box 340 local: 1-(707)-535-1400
Windsor, CA 95492 fax: 1-(707)-535-1450
http://www.watertanks.com/category/367/search.asp?q=cistern

National Tank Outlet toll free: 1-(888)-686-8265
http://search.store.yahoo.com/cgi-bin/nsearch?query=cistern&vwcatalog=yhst-57325452875569&.autodone=http%3A%2F%2Fwww.ntotank.com%2F%3Fgclid%3DCITs5KSspY8CFSA4gQodfwUTJw

Peabody Engineering toll free: 1-(800)-473-2263
13435 Estelle Street
Corona, CA 92879
http://www.etanks.com/belowgroundb.html

United States Plastic Corp. toll free: 1-(800)-809-4217
1390 Neubrecht Rd. fax: 1-(800)-854-5498
Lima, Ohio 45801-3196
http://www.usplastic.com/catalog/product.asp?catalog%5Fname=USPlastic&category%5Fname=20743&product%5Fid=20737

Tim Bennecker installed a 1700-gallon cistern in his front yard in Tacoma, Washington. He plans on using the water to flush his toilets, wash his clothes and irrigate his lawn. The tank cost $1900 and the excavation cost him $3000.

Figure 1

The concrete block structure circled in Figure 2 is a 3000 gallons capacity cistern. Figure 3 is a picture of the system highlighted in figure 2 being built. This house built near Interlachen, Florida, has been occupied since mid-1998. It isn't connected to any public sewer or septic tank. The rain water collected is the home's main water source.

Figure 3

Below is a list of project contributors and sources for cisterns.

Product / Category	Company Name	Address	Phone	Additional Information
				.
Do - It - Yourself Rain Catchement System	Eco-$mart (Distributor) www.ecosmartinc.com	4411 Bee Ridge Road, Suite 344 Sarasota, FL 34233	(888)-329-2705	New since FHLC construction
Plumbing & Installation	Drain Doctors http://www.draindoctorsfl.com/	5008 W. Linebaugh Ave. Tampa, Fl 33624	(813)-837-1745	.
Consulting & Installation	Aaron's Rain Barrels http://www.ne-design.net/contact.html	86 Watertower Plaza #174 Leominster, MA 01453	(978)-790-1816	.
Plumbing & Installation	Mr. Rooter Plumbing http://mrrootertampa.helplocal.org/index.html	6089 Johns Rd. Suite 1 Tampa, Fl 33634	(877)-368-3431	.
Pump and Pressure Tank	Gorman Company	5757 McIntosh Road Sarasota, FL 34233	(941)-921-7971	.
Interior Coating/ Seal	Somay Products, Inc. http://somay.com/index.html	3501 NW 41st Street Miami, Fl 33142-4382	(305)-633-6333	.
Custom Cistern Design	Aqua Systems	2907 N. Florida Ave. Tampa, Fl 33602	(813) 223-7798	.

EPA Survey

In April 1999, the EPA's Guidance Manual for Conducting Sanitary Surveys of Public Water Systems; Surface Water and Ground Water Under the Direct Influence (GWUDI) was published. According to the document, cisterns should be constructed of non-toxic materials that make it watertight. Its access cover should be lockable, heavy enough to keep children out and at least two inches above the surface. The piping for the cistern should include a drain for cleaning, an overflow, and an intake to the system pump. The drain and overflow need to be screened to prevent insects, animals, and debris from getting into the cistern. A free-flowing drain line with and isolation valve should be located at the bottom of the cistern. The intake to the system should be six inches above the floor and screened to prevent contamination.

Regulations Found and Evaluated
Seattle – King County Washington

This county has policies and procedures regarding rainwater harvesting and connection to plumbing fixtures. The department/issuing agency for these procedures is the Seattle- King County Department of Health. The plan system is reviewed through the building and plumbing permit processes of the individual authority within the county having jurisdictions. The plans must include details and calculations of the entire rainwater harvesting system from the point of capture to the supply at the fixture or outlet.

All of the system components, unless addressed specifically in the document, must meet all applicable provisions of the County's Plumbing Code. Seattle-King County allows for harvested rainwater to be used for water closets, urinals, hose bibs, industrial applications, domestic clothes washing, irrigation and water features only. Other usages must be approved by the individual jurisdiction.

Permits needed to install the system include:

- Plumbing permit for rainwater harvesting systems to include the system itself and all outlets being served by the system
- Electrical permit for the pump or other electrical controls
- Building permits for cistern footings, foundations, enclosures and roof structures
- Grading permits, +/- erosion control, may be necessary for underground tanks
- Critical areas determination may be required

Other inclusions for the document include:

- Zoning Requirements
- Requirements for the system components and cisterns
- Inspections and Testing
- System maintenance

Ohio

The State Department of Health (DOH) regulates cisterns under the Ohio Administrative Code Chapter 3701-28 Private Water Systems. This regulation is for potable use.

Cisterns for non-potable uses (irrigation) are not regulated by any agency in Ohio. Cisterns for domestic purposes such as laundry and toilet flushing may be subject to regulation under Private Water System Regulation where the system is being plumbed into the house (these uses are still under review by their DOH).

San Juan County Washington

San Juan County allows for both potable and non-potable use of cisterns. For potable use, the design must meet the standards for the Washington Department of Health and the County Department of Health and Human Services.

Western Washington Storm Water Management Manual uses cisterns as a BMP for storm water runoff. Design information is referenced to the University of Florida IFAS site.

As with most western states, water rights are an issue. Rainwater collectors need to apply for water rights permits. Senior water right applications are given priority over junior ones.

In the "Low Impact Development: A Technical Guidance Manual for Puget Sound," document, it mentions cisterns for landscape and potable use. San Juan Marrowstone are islands that have limited groundwater supplies. According to this document, rainwater harvesting is important to meet landscape and potable needs. Seattle uses harvested water for 60-80% of their flushing needs. The guideline this document mentions is the National Sanitation Foundation (NSF) certification of products for rainwater collection systems for drinking water use. These systems must follow the USEPA Drinking Water Regulations and Health Advisories for levels of contaminants. The document states that for potable systems, water must be filtered and disinfected after the water exits the storage reservoir and immediately before point of use.

Appendix A-1 of the San Juan County Code provides guidelines for Rainwater Catchment Systems. Rainwater catchment must be treated for domestic use. Any use of untreated catchment water for irrigation shall be clearly labeled with signs indicating non-potable water. All rainwater catchment systems must comply with the standards in the *EPA Manual for Individual and Non-community Water Supply Systems* and all components must comply with National Sanitation Foundation (NSF), Food and Drug Administration (FDA), or American Water Works Association (AWWA) standards. All storage tanks for water intended for domestic use must meet drinking water standards.
There can be no cross-connections between potable and non-potable water supplies. A *Declaration of Covenant of an Alternative (Non-standard) Water Source* must be recorded with the County Auditor and a permanent sign describing the system and warning users should be attached in a prominent location, such as above the kitchen sink.

Cistern underneath deck of home in San Juan County

Portland, Oregon

For residential use: Permits are not required for rainwater harvesting for uses outside of the house. To use water indoors a permit is required (for toilets). The City's permitting guide provides a step by step process. For the rainwater to entirely replace potable water, a permit appeal must be applied for. This appeal process allows the City's and Bureau of Development Services to go over the design and installation to ensure the project has been entirely thought through.

For commercial/multifamily applications: To use harvested rainwater to flush toilets, you are required to treat the water with filters, UV and/or chlorinating (usually a combination of the first two and possibly all three).

Montana

Montana standards for cisterns for individual non-public systems are stated in **Circular DEQ-17.** This circular can be used by people to assist in placement, construction, operation, maintenance, cleaning, filling, and disinfection of cisterns on private property.

Tampa Bay Water

APPENDICES

http://www.co.san-juan.wa.us/publicworks/stormwater%20utility/low%20impact%20development%20applications/low%20impact%20development%20manual.pdf

http://www.co.san-juan.wa.us/health/ehsdocs/watercodeapx.pdf

http://www.opdr.ci.portland.or.us/pubs/CodeGuides/Cabo/RES34%201.pdf

http://www.portlandonline.com/osd/index.cfm?a=114750&c=42113

http://www.deq.state.mt.us/wqinfo/Circulars/Circular17.pdf

http://www.epa.gov/safewater/mdbp/pdf/sansurv/sansurv.pdf

http://www.treehugger.com/files/2005/05/seattle_man_ins.php

http://www.co.san-juan.wa.us/planning/comp%20plan%20files/comp%20plan%20section%20b--element%204.pdf