



# Installing a Cistern

to reduce runoff and conserve water



*Note: These factsheets are for voluntary improvements by homeowners. You can check permit requirements at DPD Applicant Services: 684-5362, email [SideSewerInfo@Seattle.gov](mailto:SideSewerInfo@Seattle.gov)*

## Why install a cistern?

Cisterns (big rain barrels that hold 200-1000 gallons or more) can help reduce the peak storm runoff that damages our streams and causes sewer overflows. They can also hold water to irrigate your lawn and garden in summer. To get both those benefits, you need to leave the drain valve open October to May so that heavy rains can fill the cistern and then slowly drain out (before the next storm). Then in mid-May, you can close the drain so your cistern fills to store water for summer landscape irrigation. Open the drain again in fall – it’s that easy!

## Is a cistern right for me?

If you are good with tools, or can afford to hire a contractor, there are cisterns (or multiple smaller cistern/barrel systems) that can fit most yards.

### You need:

- ☑ A **level location** near a downspout, **outside** (not inside a building)
- ☑ A **solid base** (packed earth or sand, concrete, etc.)
- ☑ To allow enough space for ingress and egress
- ☑ A safe place to **discharge the overflow** (after cistern fills) a minimum of:
  - 5 feet from any structures on crawl-space or slab foundations
  - 10 feet from any structures with a basement, plus 2 feet more for each foot the basement extends below 5 feet deep
  - or connect aboveground to sewer (below ground requires DPD permit).
- ☑ You may not discharge overflow onto neighboring properties.



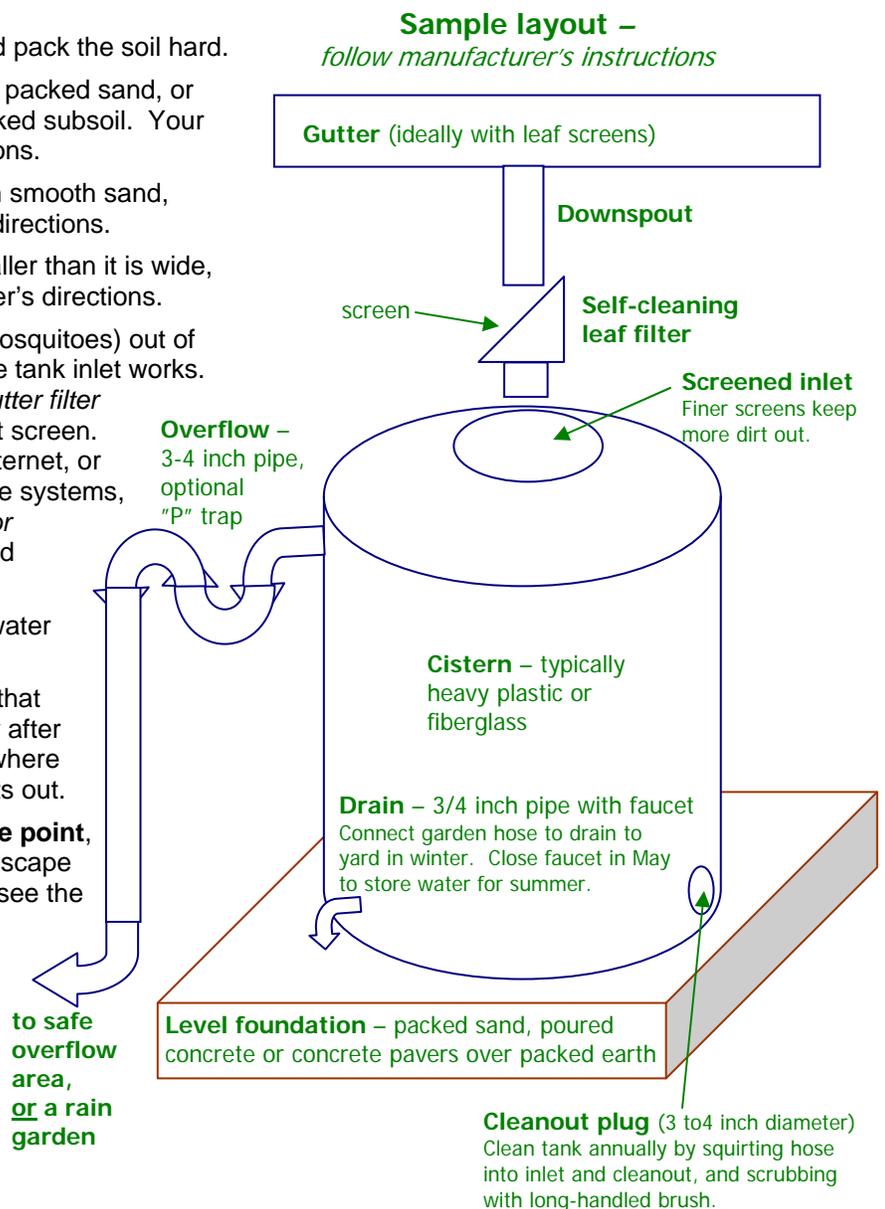
## Getting started – planning and shopping

Because cisterns are still a fairly new idea in Seattle, you’ll need to plan carefully, and shop around for your cistern tank, other materials, and a contractor (if needed). See the RainWise website for help.

- Start by talking to your neighbors, if it will be visible to them. A low fence or trellis can help improve appearance.
- Read the *Disconnecting Downspouts* and *Materials & Suppliers* factsheets at [www.seattle.gov/util/RainWise](http://www.seattle.gov/util/RainWise) You may want to read the Seattle Department of Planning & Development CAM 701 *Rainwater Harvesting for Beneficial Use* <http://www.seattle.gov/DPD/Publications/CAM/CAM701.pdf> If considering indoor use (such as toilet flushing), read the plumbing code *Rainwater Harvesting and Connection to Plumbing Fixtures*, which is available along with more rain water harvesting design resources at [http://www.seattle.gov/util/Services/Yard/Natural\\_Lawn\\_&\\_Garden\\_Care/Rain\\_Water\\_Harvesting/index.asp](http://www.seattle.gov/util/Services/Yard/Natural_Lawn_&_Garden_Care/Rain_Water_Harvesting/index.asp)
- How big a cistern do I need? Whatever size fits your space (200 to 1000 gallons) can help reduce winter peak runoff from your property. For roof runoff calculations, follow the “Rain Water Harvesting” link on the RainWise website.
- Additional sizing and other requirements apply if designing a system for stormwater code compliance, or if applying for a Stormwater Facility Credit – see the RainWise website or contact DPD at the number above for more information.
- Shop around for cistern tanks. While reused tanks may be available, the safest choice is a new tank. The cheapest source may be agricultural suppliers, since farmers already use plastic tanks for many purposes (see *Materials & Suppliers* fact sheet). Choose a dark-colored tank to limit algae growth, and place in a shaded location.
- Decide whether to go above ground or below. (Below-ground tanks are more expensive and harder to install.)
- Decide on a location, and foundation. A full tank is heavy (water weighs 8.4 lb./gallon) – you need a level, firm foundation to hold one safely. Tanks that are higher than they are wide typically need to be secured for earthquake protection, so it’s easier to use shorter, wider tank. A shaded location (on north side of house) will limit algae growth.
- Shop for pipe and connectors (ABS or PVC Schedule 40 plastic is best) to connect your downspout to a screened inlet, to your tank, to an overflow, and to a drain valve (a garden-hose faucet works well).
- **Hire a contractor or engineer** to plan or install, if this sounds like too much – find one on the RainWise website.

## How to Install a Cistern

- 1) **Level the ground** (use a carpenter's level) and pack the soil hard.
- 2) **Build a level foundation.** Place 4-6 inches of packed sand, or concrete pavers, or poured concrete, over packed subsoil. Your cistern tank supplier should provide specifications.
- 3) **Place the tank** – check that it's level, sitting on smooth sand, gravel or concrete. Follow the tank supplier's directions.
- 4) **Secure the tank** for earthquake safety, if it's taller than it is wide, to a building or metal frame. Follow the supplier's directions.
- 5) **Install a screened inlet** to keep debris (and mosquitoes) out of the tank. An aluminum window screen over the tank inlet works. Adding a *self-cleaning downspout screen or gutter filter* above it will keep leaves from clogging the inlet screen. Google "Downspout Filters, Screens" on the internet, or ask at your hardware store. For more elaborate systems, Google "First Flush Diverters, Roof Washers, or Cistern Installation" or check local plumbing and drainage suppliers.
- 6) **Make gutter connections** so that roof runoff water falls into the screened inlet.
- 7) **Install a 3-4 inch diameter overflow pipe** so that rapid flows from big storms can overflow safely after the tank fills. Place a "P" trap (optional) somewhere in the overflow, to keep mosquitoes and rodents out.
- 8) **Extend the overflow pipe to a safe discharge point**, where water can spread out into a lawn or landscape area. See "discharge distances" on front, and see the *Disconnecting Downspouts* factsheet on the RainWise website below.
- 9) **Install a drain valve**, usually a garden-hose faucet. Connect a garden hose to the faucet. Like the overflow pipe, run the garden hose from the drain to a safe place for water to soak into the soil or flow to the street drain.



## Using your cistern

From October through May, leave the drain faucet open, or partly open, so the cistern can slowly drain out through the hose between storms. That way, when a big storm comes, it's ready to hold and slowly release the excess flow from your roof. That helps reduce flooding, sewer overflows, and erosion in our streams. In mid-May, close the faucet valve so your cistern fills up to store water for summer. Use your cistern to catch rainwater for irrigation or other outdoor uses all summer. Then open the valve again October 1, to help protect our streams all winter.

**Disclaimer:** This sheet contains general principles only, which may not be appropriate or safe for every property or project. Use good common sense. You assume the risk and are responsible for all consequences of your modifications to drainage flow or your property, for legal compliance, and for necessary permits and authorizations. The City of Seattle is not responsible for your modifications and disclaims liability for your actions.

See links on the RainWise website if designing with intent to apply for a [Stormwater Facility Credit](#), or for code requirements and additional design guidance in the [Stormwater Flow Control Manual](#).

**Learn more:** To qualify for RainWise Rebates, follow the Design Details on the RainWise website below. See also "Rain Water Harvesting" on the website, or Google "Cistern". Read the cautions in the *Disconnecting Downspouts* fact sheet, and see *Materials and Suppliers* for sources of cistern equipment. See also the fact sheets on Rain Gardens, Infiltration Trenches, Permeable Paving, Compost-Amended Soil, Trees, and more at [www.seattle.gov/util/rainwise](http://www.seattle.gov/util/rainwise) For printed copies contact the Garden Hotline at (206) 633-0224 or email [help@gardenhotline.org](mailto:help@gardenhotline.org)

Learn more at [www.seattle.gov/util/rainwise](http://www.seattle.gov/util/rainwise)



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