Installing a Rainwater Harvesting Cistern for Non-spray Irrigation

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

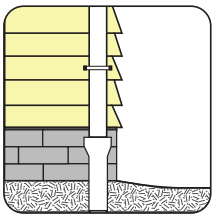
Rainwater harvesting is the age-old practice of collecting and using rainwater from your roof or other above-ground impervious surfaces. By installing a rainwater harvesting system, you can reduce the volume of potable drinking water used for irrigation. In addition, you help to maintain the health and beauty of the San Francisco Bay by reducing the amount of stormwater entering the sewer system. A rain barrel typically refers to a rainwater storage tank with a capacity between 50 and 200 gallons, while a cistern is a larger storage container that can store 200 to 10,000 gallons. Cisterns come in many shapes, sizes, and materials, and can be installed underground to save space.

Permit Requirements to Install a Cistern

If your downspout is ***connected*** to the sewer system,

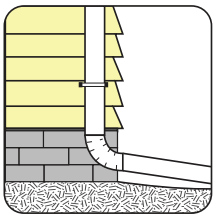
you will need a permit from the Department of Building Inspection (DBI), Plumbing Division. Permit requirements include a basic site map identifying the location(s) of your cistern and intended destination for overflow (a drain or suitable garden area). There is a permit fee, which covers the permit and site visit by a DBI Plumbing Inspector. The SFPUC offers a rebate up to $225 towards the cost of your permit.

Connected



For installations where a downspout disconnection is not optimum, consider using a diverter kit that attaches directly to your downspout and diverts water into your cistern. Once the cistern is full, water is diverted back into the downspout. A diverter kit allows you to connect to the existing downspout while maintaining the connection to the sewer system.

Disconnected



If your downspout is ***disconnected*** from the sewer system,

you do not need a permit from DBI as long as your cistern meets the following requirements:

- Cistern capacity is less than 5,000 gallons
- Height to width ratio is less than 2-to-1
- Captured rainwater is only used for non-spray irrigation
- Cistern is supported directly on grade
- Rainwater system does not require power or a makeup water supply connection

If your cistern installation does not meet the above requirements, contact the DBI Plumbing Division for requirements regarding your site-specific rainwater harvesting system.

For further details on the design, installation, and maintenance of rainwater harvesting systems, please see the SFPUC **Rainwater Harvesting Manual**.

To learn more about rainwater harvesting and available incentives, please visit:

www.sfwater.org/rainwater

Questions? Contact us!

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Guidelines For Your Rainwater Harvesting Cistern

Design and Installation

- Treated metal, clay, or concrete tile roofing generate the cleanest rainwater for capture and reuse. Rainwater should not be harvested from roofs with untreated metal (galvanized), copper, treated wood, lead flashing, or asbestos.
- As required by the California Plumbing Code, install a debris excluder or a first-flush diverter on your downspout.
- Create a firm and level foundation location near the downspout on which to place the cistern. For tanks over 500 gallons, a concrete pad or compacted gravel foundation is needed.
- Cisterns over 5,000 gallons in size require a licensed civil engineer to properly design the foundation and seismic support. Additional permits from DBI are required for cisterns of this size. When designing an overflow method, remember that in heavy storms cisterns could overflow. A 1,000 square foot roof will produce about 600 gallons of runoff during a storm that produces 1" of rain.
- **Overflow water should be directed to a drain or suitable rain garden that can absorb water onsite at an appropriate rate. Overflow must be directed away from your home, the cistern, or neighboring properties**.
- Ensure your cistern overflow pipe has a screen to prevent insects, birds, or rodents from entering the cistern.
- If you are using rainwater for drip irrigation, install a 100 micron filter downstream of the cistern to prevent clogging of the drip emitters.
- If irrigating edible landscapes, consider using irrigation piping that meet FDA food grade standards.
- For rainwater systems that are used indoors, have pumps, or require treatment please review the SFPUC Rainwater Harvesting Manual and **consult with DBI**.
- Adhere the required warning label to your cistern:

Maintenance

There are simple steps you can take to ensure your rainwater harvesting system functions at its best:

- Inspect catchment area every six months, before and after the rainy season, to remove debris, algae growth, or any other obstructions from the surface.
- Before and after the rainy season, ensure downspouts, gutters, screens, and filters are clean and clear to prevent debris from entering the system. Clean with warm water.
- Ensure first-flush diverters are functioning by checking to ensure they do not contain standing water after storm events.
- Once a year, flush out any debris or buildup that may have accumulated on the bottom of the cistern. For tough buildup, you may scrub the bottom using vinegar or another non-toxic cleaner.
- Maintain clear access to the cistern and outlets for regular maintenance.

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