4.1-e RAIN BARREL AND CISTERN

Alternative Names: Rainwater Harvesting, Stormwater Reservoir, Gray Water Collection System, Stormwater Storage Tank

BMP DESIGN APPROACH
☐ Pollutant Source Control
■ **Hydrologic Source Control**
☐ Stormwater Treatment
SCALE OF APPLICATION
■ **All SFR and MFR < 1 acre**
■ **MFR 1-5 Acre and CICU < 5 acres**
■ **MFR and CICU > 5 acres and all WQIPs**
TYPE OF APPLICATION
☐ Temporary
■ **Permanent**

DESCRIPTION

Rain barrels and cisterns capture and store stormwater runoff from rooftops and other impervious catchment areas, providing water for non-potable uses such as landscape irrigation. The difference between a barrel and a cistern relates to their size and application. Barrels are smaller and typically used in residential applications, whereas cisterns store larger volumes of water and are more applicable for larger drainage areas and structures.

Internal cistern stormwater collection tank at the Platinum LEED certified Tahoe Environmental Research Center (TERC) in Incline Village. Photo Courtesy of TERC.

APPLICABILITY

- Barrels are suitable for small scale applications such as collection of roof runoff from private residences.
- Barrels have limitations in Tahoe due to freezing winter conditions and low summer precipitation totals.
- Cisterns are most suitable for large scale applications such as collection of roof runoff from commercial properties or redevelopment projects.

Advantages

- Recycles roof stormwater runoff for non-potable water uses.
- Reduces water demands and cost for landscape irrigation.

Disadvantages

- Standing water can potentially promote mosquito breeding if the system is not properly covered.
- Recommended underground systems may require pumping dependent upon site topography and where captured water will be used.
- Because summer precipitation in the Lake Tahoe Region is infrequent, water availability from the barrel or cistern is uncertain.

DESIGN CONSIDERATIONS

- Use barrels, cisterns, drainpipes, and roof surfaces made of non-reactive, chemically inert materials such as galvanized steel or plastic in order to avoid adverse effects on water quality.
- Size barrels and cisterns to retain at least the 20-yr/1-hr storm volume generated from the contributing roof area. Consider sizing barrels and cisterns above this minimum criterion to provide additional water supply.
- Consider using multiple barrels or cisterns to increase available water storage.
- Eliminate access openings to the extent possible to control adult mosquitoes.
- Ensure the design includes appropriate safety devices to avoid unauthorized access to the water storage reservoir (e.g., child safety).
- Install a bypass/overflow system to accommodate the conveyance of runoff when the system is full.
- Consider the cold winters in the Lake Tahoe Region when designing systems, including microclimate, aspect and topography, to weigh functionality of above ground versus below ground or indoor systems in freezing conditions and potential damage to barrels and cisterns.
- Pre-manufactured residential and commercial use rain barrels and cisterns come in a variety of sizes.
- Paved non-vehicular surfaces may also be generally suitable for water harvesting; vehicular paving with light traffic may also be clean enough.

INSTALLATION CONSIDERATIONS

- Install according to manufacturer's specifications.
- Grade a level footing for placement of a barrel or cistern to connect to a gutter downspout.
- Connect the downspout to the barrel or cistern. Several types of gutter adapters are available to direct water into the barrel or cistern, such as flexible hoses or downspout redirectors.
- Position the rain barrel or cistern at an elevation above the location of the desired use of the captured water (e.g., vegetation/landscaping, rain garden, etc.) to gravity feed rather than pump whenever possible.

- Consider installing a sediment trap between the downspout and the rain barrel or cistern for easier maintenance of the system.

INSPECTION AND MAINTENANCE

- Inspect gutter systems draining to rain barrels and cisterns in the spring and fall. Remove accumulated sediment and debris.
- Inspect barrels and cisterns in the spring and fall. Flush any accumulated sediment and debris out the system.

EFFECTIVENESS CONSIDERATIONS

Rain barrels and cisterns are likely most applicable and effective for larger redevelopment projects in the Lake Tahoe Region that can account for cold climate constraints in the overall site design and operations of the project. Underground or indoor systems are more appropriate for year-round use, but these systems are more difficult to design, construct, and maintain.