
# Current Movement Toward Decentralized On-site Water Sources and Rainwater Harvesting

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# Moving Away From Centralized Systems

Effects of a Centralized System include:

- Increased surface water pollution through runoff
- Groundwater table depletion
- Saltwater intrusion in coastal regions
- High operating energy costs
- Large constituent liability (less resilient infrastructure)

(T. Younos, et al, 2022)

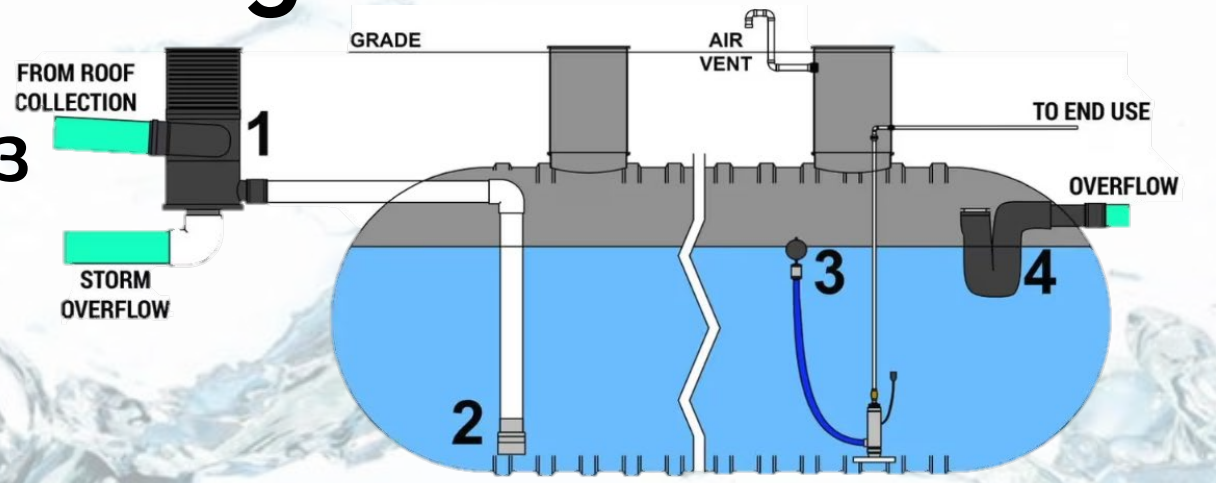
**Federal investigators confirm multiple US water utilities hit by hackers**

(CNN, 2023)

**America's Failing Drinking Water System**

First, Flint, Michigan; then, Jackson, Mississippi. Communities around the country wonder if their water quality problems will lead to the next national crisis. (National Resources Defense Council, 2023)

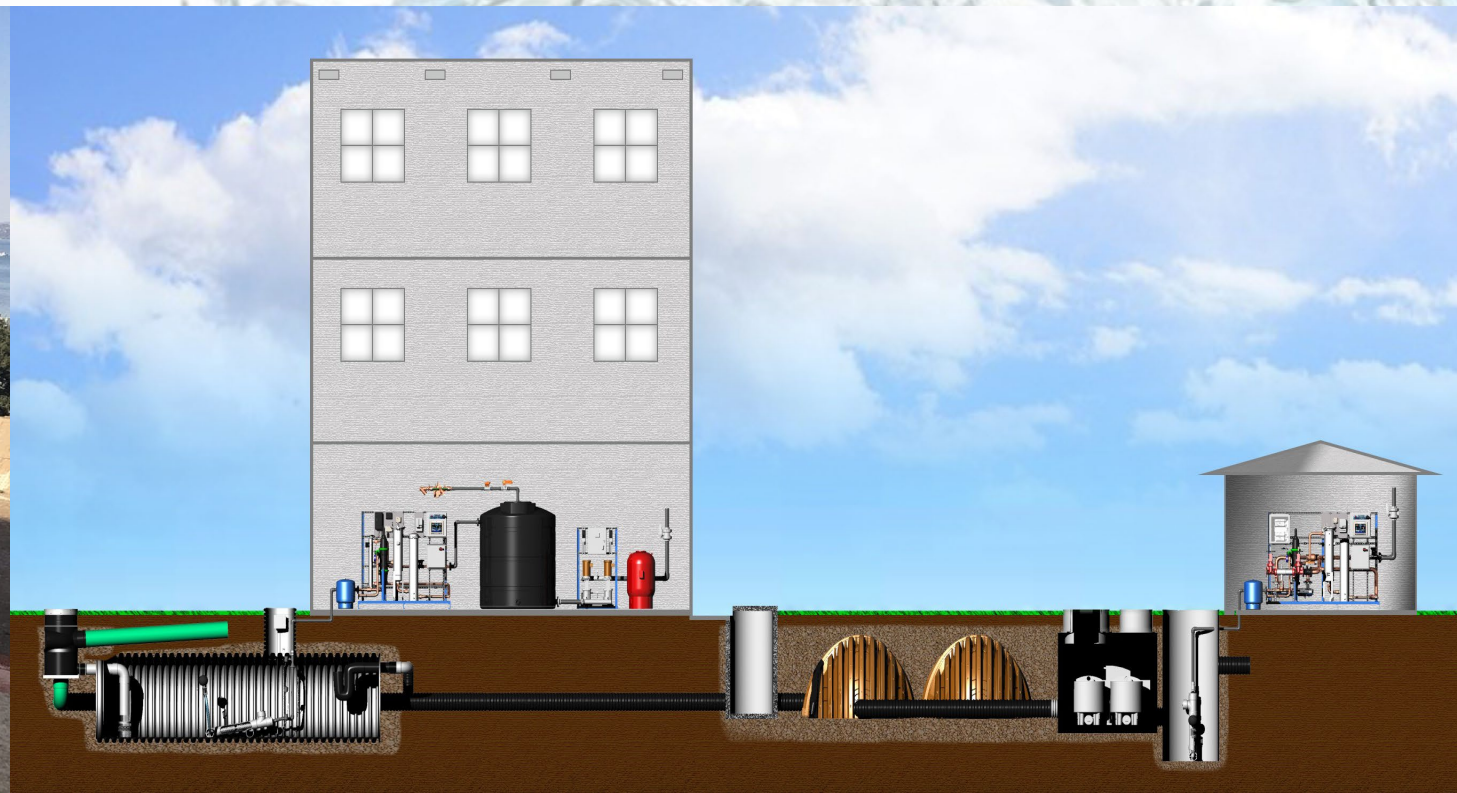
# Rainwater Harvesting Fundamentals




- 4-Step System/ARCSA Standard 63
  - Prefiltration (400 microns or less)
  - Smoothing Inlet
  - Floating Pump Intake
  - Overflow
- Proper Tank Sizing Analysis based on goals
  - % of total demand met
  - Stormwater retention
- Target high demand, non-potable uses first
  - Cooling towers, Irrigation, Water closets
- Create a low maintenance, operator friendly system

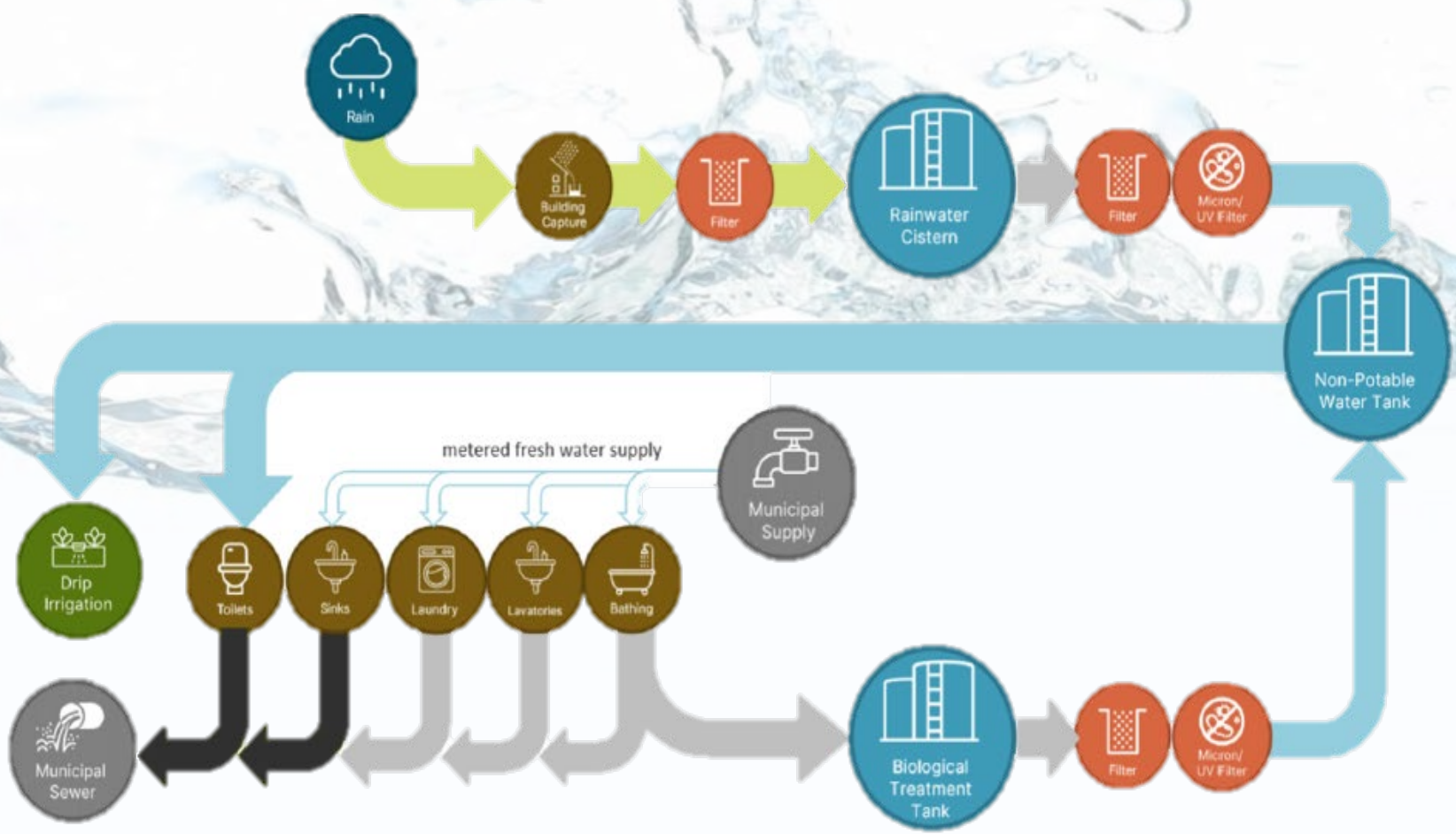
# Stormwater Management

- The primary driver of integrating rainwater harvesting in urban environments is stormwater retention credits (helps downsize traditional stormwater detention systems)

# Graywater-Rainwater Hybrid

- Beneficial for supplementing supply in regions with low and inconsistent rainfall
- Added benefit of reducing building sewer fees
- Most effective in a high population, small footprint multi-story residential building.




GLUMAC, 2024

# Study on Life-Cycle Analysis and Cost Assessment

"Selection of the optimal decentralized water system for either commercial or domestic building is multi-faceted and requires consideration of urban water availability ; social acceptance of urban water reuse; financial cost savings ; and the environmental impacts"(J.Y.C Leong et al, 2019)

The type of decentralized system utilized will depend on several factors ( rainfall, local jurisdiction, cost of water, availability of surface water, contaminated water sources)

# Energy and Material Savings

- Reduced municipal pipe sizing with rainwater supplementation (Western Virginia Regional Jail)
- In 75% of New York City buildings, it would be more cost-effective to add a rainwater harvesting system than expand capacity from the existing drinking water system for building additions. (van Dijk et al., 2020)
- Study of residential rainwater harvesting in Florida concludes the cost of water provided by rainwater harvesting is significantly less than alternative centralized approaches. (Wurthmann, 2019)

# Collaborative Guidelines and Standards

- There is a growing demand for industry and regulatory agencies to work together on progressing decentralized on-site water reuse systems
- Exchange of information between the academic community and industry requires ongoing communication

- Standard 63 is regularly updated by ARCSA, ASPE, ANSI, and other organizations in a collaborative manor
- WE Stand committee of IAPMO provides a platform for the creation of safe and reliable water efficiencies at the building level by code officials, manufacturers, plumbing engineers, plumbing trades, and other trades involved in stormwater management systems
- Guidebook for Developing and Implementing Regulations for Onsite Non-potable Water Systems created by the National Blue Ribbon Commission to help communities adopt regulations using a risk-based public health approach.

# References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# Thank you!

# Questions?