

RAINWATER HARVESTING: A DECENTRALIZED WATER SYSTEM COMPLEMENTING THE CENTRALIZED WATER SYSTEM

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Abstract. Water in Atlanta is plentiful. However, it is just not managed very well. We use approximately 600,000,000 gallons of water each day (gpd) in metro Atlanta according to the Metro North Georgia Water District (MNGWD) and 20% of this water goes towards non-potable use. The metro area covers 4832 square miles. If 1 inch of rain was evenly distributed over the 14 counties and could be captured, it could supply Atlanta's water for 140 days. This same concept can be applied, but not quite as efficiently. Rain harvesting (RH) allows the capture of 0.625 gallons of water per inch per 1 inch of rain off a roof, but in reality just over 0.5 gallons of water per inch is realistically captured. RH can lose approximately 15-20% during catchment depending on the roof and weather condition; however once in the tank the water loss is negligible. Rainwater can be stored, delivered and treated very efficiently using very little energy. This plan will explain how the City of Atlanta Department of Watershed Management (DOWM) and other utilities can use rainwater to supply their non-potable water needs and keep more of the revenues generated from the sale of this water.

Through the practice of RH large municipal rooftops can be used to collect water for irrigation trucks and other non-potable needs. The clients will be charged, as are fire hydrant users of water providing a revenue stream for the city. The water will be distributed through blue fire hydrants on the street for easy access by using the meters currently available. The tanks can be set up on public property preferably owned by the city or on private property for others who may need this water and do not want to spend the money to build the system. Tanks can also be installed throughout the city for community gardens, farms and parks to offset potable water use. The success will come from the economics of a more efficient and less expensive water source.

INTRODUCTION

This presentation illustrates rainwater harvesting as a permanent solution to many of the drought and emergency water issues faced in Metropolitan North Georgia Water Planning District (The District). By replacing municipal non-potable water with rainwater much of the 20% of the water needs can be stored and used for non-potable needs. Tanks are sized to hold enough water to last between rain

events supplying water for droughts. Stormwater management can be easily controlled adding another value to the system. During emergencies water will be available if the centralized system brakes down. This concept will provide a better revenue source for water than traditional sources such as lake reservoirs because of lower treatment and delivery costs. Storing water in tanks also eliminates evaporation. Stormwater management will be improved and is easier to control. The presentation proposes a pilot program and site for the Atlanta Department of Watershed Management to implement a decentralized water system to complement their centralized system. Uses will include, but is not limited to urban farming, irrigation trucks, utility trucks used for drilling, water trucks for dust control and portable potty trucks. Green infrastructure management will be included in the design allowing the site to be used as a training center for inspectors and designers. This same concept can be used by other utilities where rainfall is abundant. Funding can come through the Georgia Environmental Finance Authority (GEFA) and their low interest loan program Green Project Reserve.

This proposal identifies a source for non-potable water to be used for irrigation trucks, port-a-potties, street sweepers, utility trucks and more. The source of this water will come from the roof of the building at 1150 Murphy Ave. This proposal will include the examination of the water tank, site access, catchment area, cost and ROI to design decentralized non-potable water source for municipalities to use in place of potable water for non-potable needs. This is a pilot project designed to repurpose unused existing infrastructure and provide a rain harvesting system (RHS) that can be used to sell water to mobile water sources. RHS will produce and store water more efficiently than reservoirs and help reduce non-point source pollution in an urban area.

The plan is to upgrade the existing 75,000 gallon elevated tank, put in two 50,000 gallon underground tanks to collect the rooftop water off the building. The site will be designed a pilot system to use the rainwater, manage stormwater, train inspectors in green infrastructure practices. The concept will create a more profitable revenue stream through energy savings and can be implemented very quickly, with in months or years instead of the decades that traditional reservoirs require.

This site was chosen because of the existing tank and large roof area of just over 100,000 square feet. The state of Georgia owns the building, which is used for storage and the tank was originally used for fire repression. The tank has been abandoned and can be refurbished for about 50-65% the cost of a new tank. This area of southwest Atlanta area is struggling to come back former vibrant industrialized era and has great potential. The location is near the SW corner of the Beltline and only a few blocks from the Beltline Farm. It is a great location to serve downtown Atlanta and the Beltline. When the tank is restored it can be painted with a message When it Rains ... We Store... coined by the Southeastern Rainwater Harvesting Systems Association promoting Atlanta's commitment to sustainability.

METHODOLOGY

The idea came through identifying water needs for several years through observations and studying rain harvesting (RH) through study, design and construction. Through my learning process I came to realize it would be hard to get support for the widespread implementation of rain harvesting on the municipal/utility level unless there was a revenue stream for them. Through researching the costs of water treatment and distribution, the inefficiency of lake reservoir storage rainwater seems as the best solution for a non-potable water supply. Water treatment and distribution can cost as much as 75% of the production cost to produce potable water. By creating a more profitable revenue stream for utilities using rainwater for non-potable use utilities can increase revenues and control stormwater more efficiently.

Stormwater concerns are becoming more of an issue in controlling water pollution. Rain harvesting is becoming recognized as a practice to control pollution. By using rain harvesting as a BMP runoff can be controlled and the water can be used for a purpose instead of a nuisance. This site can be used as a training ground for inspectors.

TOPICAL INFORMATION

Learning Objective Include:

- Benefits of rainwater as a water source.
- Benefits of a decentralized water system.
- Uses of rainwater.
- How to deliver rainwater to vehicles.
- Cost of rainwater compared to domestic water.
- Stormwater management benefits.
- Loss of water of traditional sources through evaporation and seepage.

Conclusions Include:

- By setting up rain tanks the utility can sell rainwater to businesses throughout the city.
- A higher rate of profit due to a lower cost of treatment and delivery.
- A source of water for irrigating parks, urban farms and urban gardens.
- More efficient storage than reservoirs.
- Replace potable water with rainwater for non-potable needs.
- Energy costs can be eliminated or reduced through the sale of electricity through photovoltaic panels.
- An emergency water reserve will be available throughout the city.
- 30 days of storage during droughts.
- Stormwater management tool.
- New jobs for engineers, contractors, plumbers, and maintenance personnel.

CONCLUSION

Expanding the reservoir system with the cost of land, new infrastructure, energy use and the waste due to evaporation seems ridiculous. A decentralized system can be implemented in years instead of the decades it takes to complete a reservoir. The system will complement the centralized system and be a more profitable revenue stream. By managing rainwater and stormwater more efficiently there should be plenty of water for generations.

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