

CISTERN

This water is readily available for use after each rain event. Annually the cistern harvests approximately 116,297 gallons of water, accounting for disconnection in the winter. The cost of water in this Morris County municipality is \$2.75/1,000 gallons for 60,000 to 80,000 gallons and is \$4.25/1,000 gallons from 80,001 to 100,000 gallons. It becomes apparent that reducing usage of water to a lower level can help achieve a significant cost savings. The cost of water varies by municipality and often by use. Frequently there is a higher usage charge above a certain gallon use.

Brochure created by Pat Rector, Rutgers Cooperative Extension Environmental and Resource Management Agent for Morris and Somerset Counties and Christopher C. Obropta, Ph.D., PE., Associate Extension Specialist in Water Resources

COSTS

- The cost of cisterns vary but the typically range is approximately \$1.00/ gallon
- Another significant cost is the cost of transportation of the cistern, which may cost as much as the cistern itself
- As discussed previously, the cost can be recaptured over time



Cistern at Parsippany Troy-Hills DPW facility with diverter
Photo credit Pat Rector

MAINTENANCE

The diverter allows the first flush of water, which is typically more laden with pollutants, to bypass the system. This also helps to reduce the amount of sediment that enters the cistern, reducing costs of maintenance. The diverter also allows water to bypass the cistern when it is full or during the winter. Inspect the roof area periodically to ensure it remains clear of debris. Inspect gutters, downspouts, cistern screens, overflow pipe and cover. Clean out debris from the cistern once annually, usually in the dry months.

For more information please contact:

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

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HARVESTING CISTERNS Greening the Department of Public Works (DPW) Facility in the Troy Brook Watershed



The Parsippany Department of Public Works (DPW) facility is approximately three acres. Most of the area consists of impervious surfaces. During the 1.25 inch two hour water quality storm, an estimated 71,275 gallons (9,801 ft³) of stormwater runoff are generated at the facility.

Implementation Project completed by
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THE SITUATION



Parking lot and roof top at the Parsippany-Troy Hills DPW facility combine to create considerable impervious surface area.
Photo credit Ed English

The Troy Brook is adjacent to the Parsippany-Troy Hills Department of Public Works (DPW) facility. The Troy Brook has an impairment for biological life. The Troy Brook Regional Stormwater Management Plan has identified the DPW facility as an area that contributes to localized flooding issues in the stream.

The roof of the main building of the Public Works facility has 5,500 square feet of impervious surface. The front section of the building originally drained to the parking lot and then to the Troy Brook carrying sediments and pollutants from the parking lot into the stream.

The roof at the rear of the building has been disconnected with pervious pavers. (See brochure *Pervious Pavers*).

THE SOLUTION



5,000 gallon cistern installed at the Parsippany-Troy Hills DPW yard capturing roof runoff from the main building on site.
Photo by Ed English

The Rutgers Cooperative Extension Water Resources Program, utilizing funding from Section 319(h) of the Clean Water Act grant from the NJ Department of Environmental Protection, installed a 5,000 gallon cistern. There are six downspouts directed to the cistern, disconnecting 5,500 square feet of rooftop. Coupled with the roof drainage that is directed to the grass pavers at the back of the building, all the building's rooftop runoff is disconnected.

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The cistern at the Parsippany-Troy Hills DPW. This water is used for truck washing and to fill street sweepers.
Photo credit Pat Rector

Cisterns utilize water that previously drained from an impervious surface, commonly roof tops. Cisterns enable harvesting of water for many uses, including irrigation, truck washing, or street sweeping. Rainwater harvested from cisterns is not usable for drinking. Cisterns vary in size from 100 gallons to tens of thousands of gallons. The economic benefit will vary depending upon several factors; predominately the amount of rainfall in a given year and the cost of water in the municipality in which the DPW is located. Monthly estimated rainfall for Parsippany in 2011 ranged from 2.90 to 4.89 inches, with a total of 50.9 inches and an average monthly precipitation of 4.24 inches. This cistern is estimated to capture 4,286 gallons for every 1.25 inch two-hour storm event (water quality storm). The harvested rainwater is used to wash the DPW vehicles and for street sweeping.

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Close up view of cistern and diverter. Photo credit Pat Rector

Most rainfall events in New Jersey are less than one inch in 24 hours. For water quality we use a standard of 1.25 inches of rain in two-hours. The Parsippany-Troy Hills DPW garage is 5,500 ft², and one-half drains to the cistern. Therefore during the water quality rain fall event the amount of runoff would be 4,286 gallons, more than filling the cistern.

NOTE: many cisterns will not be connected during the winter months.