

Analyse the impact of implementing rain water harvesting systems on the stormwate...

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information: Impact of Implementing Rainwater harvesting systems on Stormwater Expansion of urban development has contributed to increasing discharge rates of rainwater as well as creating a large space within watersheds. The Galway watershed is not an exception since it has experienced high conurbation in a couple of years. Certain palliation practices have been employed to curb the effect of increased discharge rates; however, in some of the areas Galway, the practice of incorporating rainwater harvesting systems in management has not been exploited (Foraste & Hirschman 2009). In other areas, assessment has not been carried out to determine whether this palliation practices are appropriate. In Galway, high discharge rates can pose a great impact on both the vegetation and the organism within the ecosystem. This report, therefore, analyzes the impact of rainwater harvesting systems such as cisterns and rain barrels on stormwater as a solution to help reduce the volume of stormwater runoff and prevention of pollution to the existing stormwater.

The basic components of residential and small commercial scales are; gutters and downspouts, catchment surface (roof), storage tanks, delivery systems, and water treatment for portable systems (Texas water development board 2005). Field observation is an integral part in the analysis. In analysis, identifying indicators can help in measuring the efficiency of rainwater harvesting techniques. The purpose of the analysis is to determine the amount of surface runoff that comes from each portion of land. The recorded volume from the runoff is then compared to the possible amount of water that could have been collected from the rooftops. The basic method used to calculate the amount of runoff from the structures as well as

from the land surface is $Q = A \times C \times I$

Where

Q= discharge (Acre inches)

A= Area (Acres)

C= Coefficient of runoff

I= Intensity of rainfall in (inches)

The area (A) in terms of acres was obtained by substitution of determining formulae on the applicable mathematics formulas. The intensity of the rainfall was determined by considering a two year one hour storm. The coefficient of runoff from the site was determined by using the weighted average coefficient. The rational method was employed in calculating the total volume of runoff from the land use. Secondly, the total volume collected from the roof is determined using the rational method. In such a case, the area of the roof represents the area value. The coefficient value of this case was determined to be 0.9. Research has it that the coefficient of the roof surface lies within the range 0.75 to 0.95. This implies that the structures can collect approximately 75-90% of the total amount of rainwater falling on the structures based on the efficiency of the catchment systems. The total volume of stormwater runoff from all the land surface is approximately 1000000 gallons, and at 90% efficiency the total volume of water collected from the roofs within the land is 350,000 gallons, which represents 22% of the total volume of stormwater coming from the site. Once the runoff from stormwater is calculated, the volume captured from the structures is also calculated. The percentage of water that could have been collected is also calculated using the neighborhood analysis in watershed

extrapolation. The effect of rainwater harvesting using the same principle of watershed scale interpolation after calculations were done, the setup of rainwater harvesting systems for each land topology is analyzed that is in each section, how can the harvesting system be configured as explained by Horrin (2007).

References

Forest, JA, & Hirschman 2009, ' A Methodology for using Rainwater Harvesting as a Storm water Management BMP', Center For Watershed Protection, Inc., viewed 25 February 2014, < <http://www.cwp.org/cbstp/Resources/d3s3a-asce.pdf>> Horin, B 2007, ' Rainwater as a Resource', Tree People Website, viewed 25 February 2013, Texas Water Development Board, 2005, ' The Texas Manual on Rainwater Harvesting', Texas Water Development Board, viewed 25 February 2014,