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Jacksonville University - 2010

The Grey water Project participated in the EPA P3 competition, funded by the EPA for college students to develop

about 9.6 gallons per hour. For 1 day, it was calculated to be 230 gallons of air condensate produced.

The cistern size needed to store A/C condensate and rainwater was determined to be 1,200 gallons based on A/C condensate calculations and rainfall estimates. It was estimated that 536 gallons of rain is collected per day based on average monthly rainfall in the Jacksonville area. (Department of Meteorology, University of Utah). Average rainfall per year is 52.34 inches per year. Based this amount, the average rainfall per month in feet was determined, then multiplied with the area of the roof (6000 sq ft) to get the total cubic ft of rain per year (26,170 ft^3 /year). The total feet of rain per year were converted to gallons by multiplying by 7.48 gallons per cubic feet to get 195,751.6 gallons per year. 536 gallons was calculated by dividing the total amount of rainfall in gallons per year by 365 days.

For garden irrigation, it was estimated the garden will require approximately about 65 gallons per watering event. The garden is watered every two days during the spring and summer months and every 10 days during the fall and winter months (Florida Green Industries 2002).

Phase II was developing and implementing a separate design for the collection and delivery of laundry wastewater to the garden for irrigation. A filtration tank and another cistern are required to properly store laundry water. In the case of overflow, laundry water can be diverted to sewer lines.

The size of the cistern is estimated to be 2500 to 3000 gallons based on an estimated amount of 1,728 gallons laundry wastewater produced per day per residential building. A typical US top-loading washing machine uses 30 gallons per cycle (greywater.com). This estimation was calculated based on 192 students using the laundry room per week, the total number of students living in the four apartment buildings with laundry rooms. The average number of washes expected per day was calculated to be 27.4, multiplied with 63 gallons (2-cycle laundry wash) to get 1,728 gallons per day.

It was planned to alternate between the rainwater and AC condensate stored in the cistern from Phase I with the grey water (laundry wastewater) stored in the cistern proposed for Phase II for irrigation of the garden. We wanted to switch the sources of water to minimize potential negative impacts of grey water to the soil such as changes in nutrient concentration or changes in pH (Pinto et al.). Zinc toxicity can occur in plants with a soil pH of 8.5 or greater (Christova-Boal et al. 1996). Salts contained in laundry detergents can also be detrimental (49-480 mg/L) because they can contribute to the salinization of the soil (Christova-Boal et al. 1996).

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