Ragle Park Water Conservation Program

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Abstract:

This 22 acre sports park renovation project will replace the existing inefficient irrigation system and provide additional recreation amenities such as a new playground and a splash play area. Sensitive to public perceptions regarding waste water, the designers decided to harvest all runoff from the splash play area, and re-use the water for irrigation to the baseball fields as well as water for the rest room toilets. The presentation will demonstrate the challenges faced in utilizing a cistern system for irrigation with both harvested grey water and potable water. The session will show how harvested water and irrigation water needs within the park are calculated. It will also show how the system was introduced to the public as an interpretive educational element within the park.

Keywords:

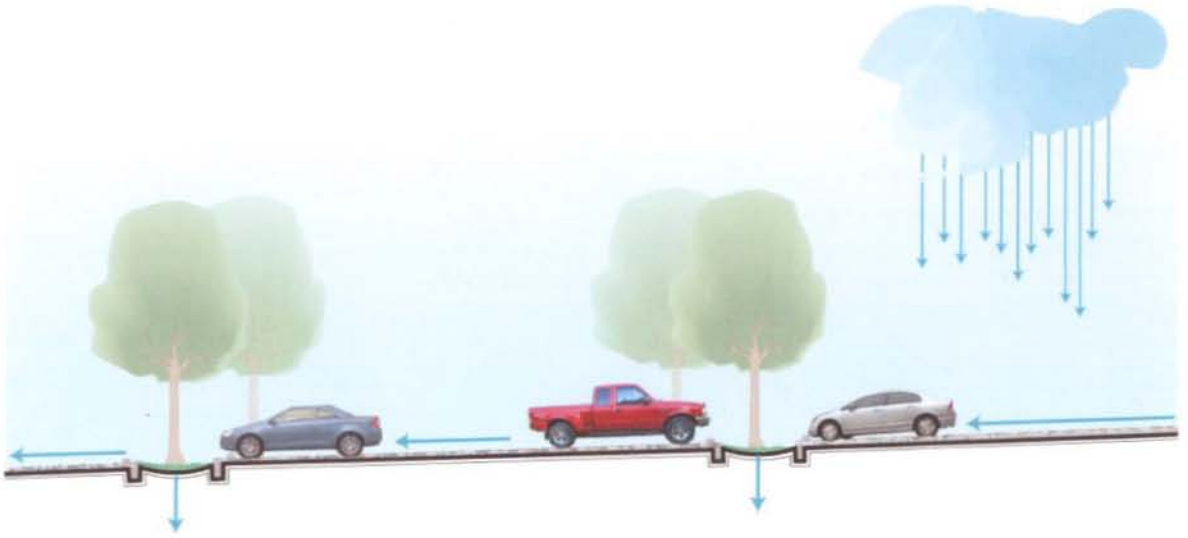
Cistern, pump, water harvesting, non potable irrigation

Water conservation is of great importance in Santa Fe, New Mexico. This 22 acre sports park renovation project will replace the existing inefficient irrigation system and provide additional recreational amenities such as a new playground and a splash play area.

The City of Santa Fe is located in a pinon-juniper environment at about 6600 feet in elevation. Annually, the City receives about 14" in rainfall and another 17" in snowfall. Residents in Santa Fe have reduced their personal water consumption by 31% over the last ten years. In 2007, the documented per capita water consumption was 101 gallons.

Ragle Park is managed by the City of Santa Fe under the Parks and Recreation Department. The Department often receives phone calls from local residents commenting or inquiring about the City's water management practices. So public perception of a water feature within the park was important to consider.

The existing irrigation system is over 30 years old. The park renovation is projected to cost approximately $1.8 million dollars. The proposed park site will have 2 acres of warm season native grass and 8 acres of cool season turf grass, of which 3.35 acres are dedicated to the baseball fields. The remaining park is dedicated to parking, a rest room and concessions building, a large playground, a batting cage and the splash pad. The irrigation system is to be completely replaced, including the controller, backflow preventers and all valves, heads, piping and a new cistern system and pump. Several areas of the park will be passively harvesting drainage from the parking lots into retention areas and depressed parking islands.



Early in the design process, a re-circulating type of system to capture, treat and re-use water within the splash pad system was ruled out as an option due to the high cost of the system and daily maintenance requirements. Overall, the splash pad system consists of a constant pressure mainline, which leads to a valve manifold of bronze solenoid control valves, a pressure gauge and pressure regulator. The system is user-operated by means of a wireless bollard activator. The splash pad for the park will contain seven components, with gentle surface sprays for younger children and larger overhead sprays including a Sea Dragon for older children. The components were selected based on the variety of spray patterns and because they featured Water Conservation options which reduced the demand of the system. The components range in demand from 4 to 14 gallons per minute each. The total potential water use of the splash play area at 100% use is 49 gallons per minute. The system will be pre-programmed to provide greater control over water consumption. At capacities ranging from 80% to 100% of the peak use, the drainage from the splash pad for a typical 8 hour day is estimated to be 19,700 gallons, minus approximately 15% for what is lost to evaporation and "carry off" (i.e...bathing suits) for an estimated total of water harvested to be 16,700 gallons per day.

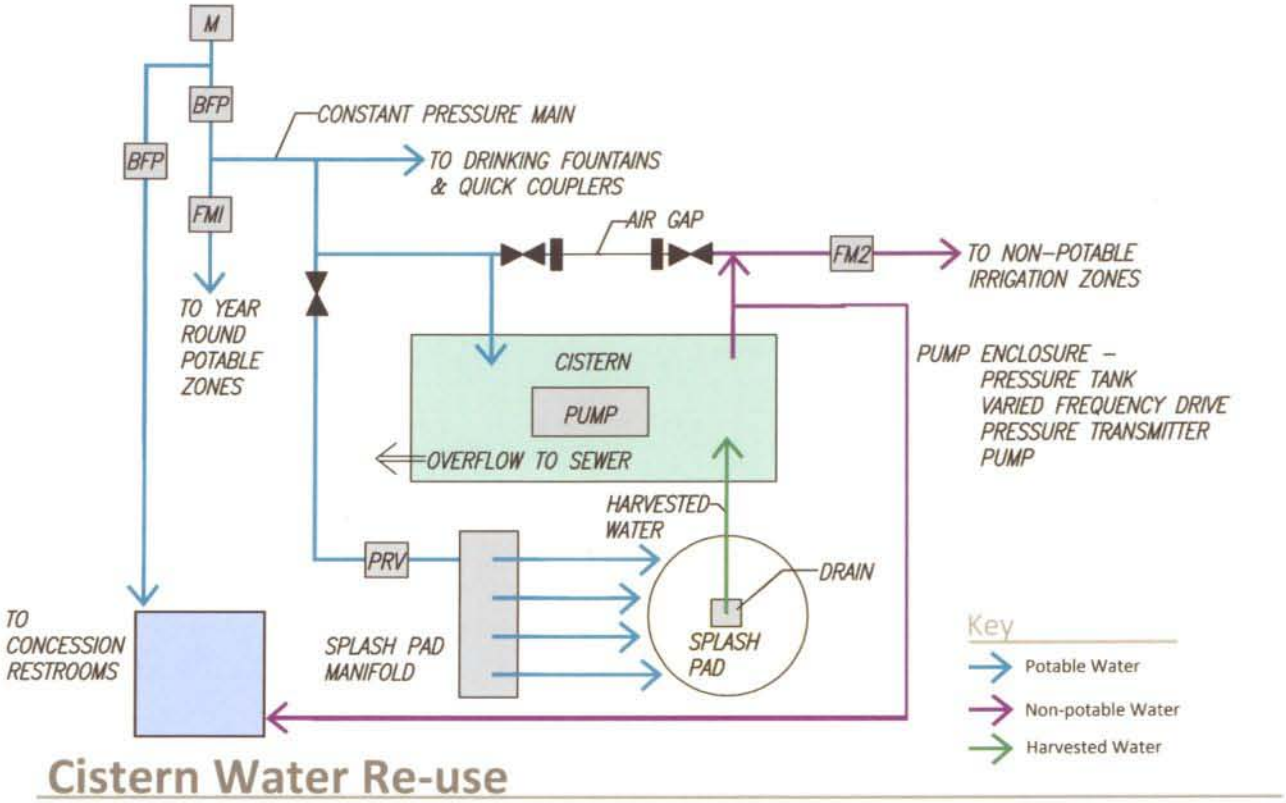
The splash pad itself will drain to a single drop inlet with a basket filter to catch debris. The harvested water will then be stored below grade in a fiberglass cistern. The cistern will be 10 feet in diameter and 64 feet in length, with an overall capacity of 35,000 gallons. This cistern size was based on capturing two 8-hours days of splash pad use. The cistern will have two inlets; one for the harvested water, the other will be a back up water source from the potable water system. From the two outlets, one will supplement the nearby rest rooms for flushing of toilets. The second will provide non-potable irrigation water to the turf grass baseball fields. A third overflow outlet will be provided which will tie into the sewer system at the concession building, in case of any overflow.

The cistern system will be operated by the irrigation controller. When a control valve is activated, the system will sense a loss of pressure. The pressure transmitter activates the pump, located above the cistern at grade. When the irrigation is off, the system reads the pressure, and the pump is turned off as well. The pressure tank is designed to help adjust to minor fluctuations in water pressure, helping to ensure the pump is not activated when not needed.

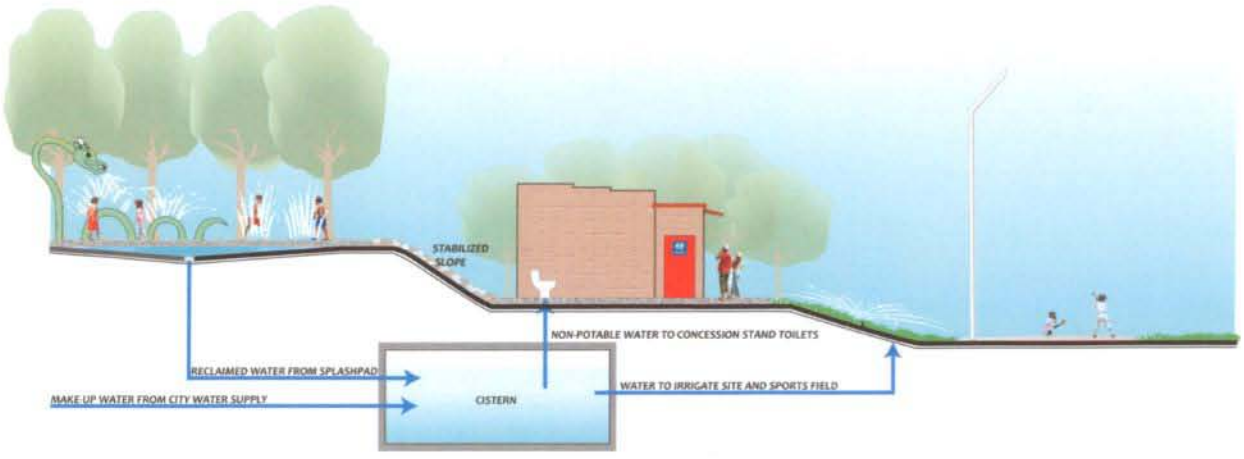
The pump is designed as a centrifugal pump with a variable frequency drive for energy savings. The variable frequency drive adjusts the speed of the pump, in response to demand. Originally, the pump system was designed to provide 70 gallons per minute. Once base watering schedules were calculated for all of the zones, the pump size was increased. The new pump will be designed to provide 250 gallons per minute for the irrigation system, allowing for the entire park to be irrigated in one night. This system, while approximately 30% more expensive than the original, provides the high demand needed. The pump system was decided to be above grade to facilitate maintenance. If the cistern pump were submersible, only a certified staff member could enter the cistern to perform maintenance on the pump. For winterization of the system, a sump pump will be used to drain the cistern. The cistern is designed with a low water level sensor, which will communicate to the irrigation controller, opening the master valve if additional potable water is needed.

The projected water use for the harvested cistern water was calculated using the Irrigation Association Base Watering Schedule. The schedule was calculated based on a projected 70% distribution uniformity, July historical ET rates, sandy loam soils and three days per week available for irrigation. A base schedule and a run time were calculated for each of the different types of zones. The total peak water use in July was calculated to be 107,300 gallons per complete irrigation cycle for the park. Of this amount, 35,300 gallons, or 33% will be from water harvested from the splash pad.

Since the water harvesting from the splash pad will only be available in the summer months, an alternate system had to be made available to use a completely potable water system during the Spring and Fall. By building in a by-pass within the mainline, the two methods will be easily switched over on a seasonal basis. The diagram below describes the overall irrigation system.



In order to inform and educate the public, a series of interpretive signs like the one shown below will be posted in the park describing how the water is captured and where in the park the water is being re-used. Each of the baseball fields that utilize the harvested water will have signage as well.



Conclusion:

Water harvesting from a water feature allows local parks departments to provide a valuable summertime amenity, while conserving potable water. Affective communications, through educational signage can help the public to understand the value of resource conservation efforts. By irrigating with the harvested water, approximately 1.28 million gallons of potable water is projected to be saved in the peak water use month of July. Future data collection by the Parks Department will tell them not only the annual reduction of potable water use, but the annual savings, as compared to the cost of the system.

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