Project Name: Conceptual Plan for Stormwater Capture, Reuse & Aquifer Recharge, City of Winter Garden

Project Location: Orange County

Project Number: RWSP project number, if available [Will be replaced with Solutions Plan project number]

Project Type: Reclaimed Water Supply and Recharge

Description of Project:

The Conceptual Plan for Stormwater Capture, Reuse and Aquifer Recharge is developed by Andreyev Engineering, Inc., to present an approach to capturing stormwater runoff for reclaimed water augmentation and for artificial aquifer recharge when irrigation water is not required. The project includes the following: cost analysis, aquifer recharge basin analysis, storage capacity, ground-water flow modeling, review of available properties for recharge, identify and review available surface water bodies, identification and selection of source stormwater sites, identification of artificial aquifer recharge sites to discharge the excess reclaimed water sources, and review of the drainage basin data from the City's Drainage Master Plan and estimation of the amount of runoff. The projected stormwater capture and augmentation of the reclaimed water sources is 2.0 million gallons per day (mgd) and the projected aquifer recharge is up to 1.5 mgd. Please see **Figure 1** for a Basin Map.

Planning-Level Project Details:

Added Stormwater Capture and Recharge Capacity

Increased stormwater and reclaimed water capacity will be accomplished by increasing the size of existing retention ponds and construction of new retention pond, installation of lift pumps in the retention ponds to capture and send the stormwater to the City's existing Wastewater Treatment Facility for treatment and use in the reclaimed water system. Increased aquifer recharge capacity will be accomplished by constructing new recharge ponds, creation of wetlands to increase recharge, and taking control of existing subdivision retention ponds to allow aquifer recharge through the retention ponds.

The City's existing Wastewater Treatment Facility, located on East Crest Avenue, has 4 acres of land that can be used to construct retention ponds for capture of additional stormwater to be treated and used for augmentation of the reclaimed water system. The City Park, located on the south shores of Lake Apopka, on North Lakeview Avenue and Division Street, has 6 acres of existing retention pond, drainage ditch and park area which can be converted into one large retention ponds for stormwater capture and reuse. The City owned Marsh Road site, located in the northeast corner of the Carriage Pointe subdivision, has 40 acres that can be converted to a combination of rapid infiltration basins and wetland recharge areas for effective aquifer recharge. The City will need to take control of the Carriage Pointe Subdivision retention pond site in the southwestern portion of the subdivision, and this site has 3 acre retention pond for potential stormwater/reclaimed water storage and aquifer recharge. The City will need to take

control of the Alexander Ridge Subdivision retention pond site in the southern portion of the subdivision, and that site has 3 acre retention pond for potential stormwater/reclaimed water storage and aquifer recharge. Please see **Figures 2 through 6** for maps of these stormwater capture and reclaimed water storage and recharge sites.

Planning-Level Project Details cont.:

Wastewater Treatment Plant Facility
The stormwater retention ponds to be constructed are proposed to be 4 acres in size and 6 feet deep. One thousand feet (1,000 feet) of 16-inch yard piping is proposed to be installed on a surface water pumping station. Drainage structures and manholes will need to be installed. Please see **Attachment B** for a map of the WWTP property.

Park Retention Pond
The stormwater retention pond to be constructed is proposed to be 6 acres in size and 6 feet deep. One thousand feet (1,500 feet) of 16-inch yard piping is proposed to be installed on a surface water pumping station. A mechanical filter and disinfection system is proposed to be installed at this site to allow on-site treatment and direct discharge of the treated water into the reclaimed water system. Drainage structures and manholes will need to be installed. Please see **Attachment B** for a map of the City's Park property.

Marsh Road Site
The rapid infiltration basins to be constructed are proposed to be 5-6 acres in size and 5 to 6 feet deep. Existing wetlands are planned to be investigated and converted into aquifer recharge systems, if possible. The reclaimed water lines, with connections, are proposed to be extended to the proposed rapid infiltration basins and wetland systems. Overflow discharge structures are also proposed for this site.

Existing Subdivision Retention Ponds
The reclaimed water lines, with connections, are proposed to be extended to the proposed retention ponds.

Project Yield:

The project will produce an additional 2.0 mgd of stormwater capture and augmentation of the reclaimed water. At build-out the project is estimated to produce an additional 1.5 mgd of aquifer recharge.

Estimated planning-level costs:

Table 1 summarizes the preliminary estimated planning-level costs.

Table 1. Summary of Estimated Planning-Level Costs for the Conceptual Plan for Stormwater Capture, Reuse and Aquifer Recharge Water Supply Project.

Planning Estimate	Costs
Construction	$2.9 million
Engineering	$0.72 million
Total	$3.6 million
Assuming SJRWMD Participation @ 33%	$1.2million
Final Costs to City of Winter Garden	$2.4 million

SJRWMD = St. Johns River Water Management District

Estimated Implementation Schedule:

This is a conceptual plan so there is no implementation schedule at this time. The City anticipates to start this project as soon as funds are available.

Water Resource Constraints:

There will be no negative impacts to wetlands as a result of this plan. Positive enhancements to area wetlands and lakes include wetland hydration, surface water groundwater level increases, and lake nutrient loading decreases. No additional monitoring will be necessary.

Project Feasibility:

The capture of excess stormwater and artificial aquifer recharge is the least expensive and the most effective option for long term aquifer management and sustainability of water supply in Central Florida region. In many cases, the artificial aquifer recharge system can be implemented with minimal initial capital investment by extending or upgrading existing reclaimed water systems and integrating natural depressions and/or existing retention ponds as artificial aquifer recharge areas. A stormwater capture and artificial aquifer recharge system can be continuously upgraded based on the observed aquifer imbalance data and the available opportunities to increase or decrease recharge, as necessary. With the participation of the SJRWMD or other funding sources, the costs of these projects are reasonable and provide for sustainable aquifer levels and spring flows in the region.

Permittability:

This is a conceptual plan, but Andreyev Engineering, Inc., anticipates that with the participation of the SJRWMD in this project and the Central Florida Water Initiative, permits required by their District will be issued. Due to the nature of this project with: the enhancement of the aquifer systems, reduction in potable water use, and water quality benefits to Lake Apopka; Andreyev Engineering, Inc. anticipates that the FDEP and SJRWMD will be encouraged to issue the permits required for this project.

Cost-Benefit Analysis of Yield:

The proposed project costs are nominal and unit production costs are below $0.80/ 1,000 gallons. Captured stormwaters will be adjacent to the City's WWTF, so piping and pumping costs associated with treatment prior to inclusion into the reclaimed water system are extremely low. Also, benefits will be attributed to Lake Apopka, as much of the storm discharges will be captured and water quality of the lake will be improved.

Other Considerations:

The project is currently being reviewed.

Potential Partners and Governance Options:

The City of Winter Garden, SJRWMD

Funding Sources:

The City of Winter Garden, SJRWMD, grants

References:

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