

Exhibit A

P2 Project Plan
City Center Stormwater Pond
1126 E SR 434
Winter Springs, FL 32708
407-327-5989

Jason Norberg/Director of Public Works and Utilities

- A. **Project Description:** The City Center stormwater pond MAPS (Managed Aquatic Plant Systems) project is focused on removing nitrogen and phosphorus nutrients that can collect in the pond and ultimately reach Lake Jesup. The pond receives stormwater from approximately ½ of the City Center including businesses, a residential community, and City Hall. Water from the pond can travel to surficial waters or be transported through the stormwater system to Lake Jesup. The site was selected for its ease of public observation and ease of MAPS deployment activities. This pollution prevention project is being proposed as a Pollution Prevention (P2) project for resolution for the penalties set forth in the DEP/City Consent Order for the East WWTF, Facility ID #FLA011068, (OGC Case #21-0790).

Nitrogen and phosphorus are nutrients that are essential for plant growth. When these nutrients enter the aquatic environment through runoff or as a result of a sanitary sewer spill, they can cause pollution problems. Phosphorus is the limiting ingredient in natural aquatic ecosystems. When soluble inorganic phosphorus enters the water, it is bound by plants and converted to an organic form, which is no longer bioavailable. However, when those plants die and sink to the bottom, the phosphorus can be re-converted to its inorganic form by bacteria. This excess biologically available nitrogen and phosphorus can result in algae blooms consuming available dissolved oxygen. The lower dissolved oxygen triggers adverse impacts on a wide range of biota. In order to stop this cycle of pollution impacts from recycled forms of phosphorus, the nitrogen and phosphorus needs to be physically removed from the water bodies. The project proposes to do exactly that.

The stormwater treatment pond was installed to attenuate runoff and reduce nutrient and sediment pollution to downstream systems. To improve those natural processes and help remove more nutrients from the pond before the downstream systems, the City is proposing to install MAPS within the pond. These floating wetland islands are harvestable mats with floating wetland plants that are placed within the stormwater pond. These plants utilize the nutrients in the water to grow. The plants are routinely harvested and the MAPS continue to uptake new nutrients from the pond. The plants harvested from the MAPS remove both nitrogen and phosphorus from the pond water preventing further pollution from the nutrients reaching downstream systems. The plants are then composted at an upload location, allowing bacterial decomposition to release some of the organic phosphorus so it can be recycled and reused as a fertilizer ingredients for the growing soil mixtures. The foam and nylon parts of the floating plant mats are reused to start a new cycle of plant growth and nutrient uptake.

- B. **Environmental and Economic Benefits:** The MAPS will be operated and maintained for as long as the solution is viable. The MAPS will cover approximately 5% of surface of the water in the ponds. This represents the normal coverage for a typical stormwater treatment pond installation. The MAPS system target size is 4,575 square feet.

The wetland plants or biomass will be harvested approximately every four months based on plant growth. After each harvest, the vendor will collect a sample of the biomass and take it to a laboratory

for nutrient composition analysis. The analysis will be used to estimate the approximate annual nitrogen and phosphorus removal.

The same MAPS were installed in the City of Titusville Coleman stormwater treatment pond as part of a Pollution Prevention (P2) initiative undertaken by Titusville to offset their own Consent Order. The MAPS utilized for this project will be similar to the MAPS installed in the City of Titusville. Therefore, the solution has direct applicability to this project. From May 2019 to May 2020, the MAPS produced a total net biomass of 11,181 pounds. Using the measured concentration of N and P in the biomass, the MAPS removed a total of 223 pounds of N and 37 pounds of P (Appendix A). Using this empirical data and scaling for the size of the MAPS in the City Center stormwater pond, it is estimated this pollution prevention project will remove 664 pound of N and 111 pounds of P from the pond and prevent nutrient pollution to the downstream systems and Lake Jesup.

Additional environmental benefits include the following:

1. The City will no longer need to use biocides for nuisance weed control.
2. The technology is green infrastructure and has no energy requirements.
3. The MAPS provide harborage and food sources for juvenile aquatic species.

The use of the MAPS are a low impact solution.

City Center Stormwater Pond MAPS Installation Annual Resource Consumption Comparison			
Item	Quantity Discharged (lbs)		
	Before	After	Reduction
Chemicals (N)	62	664	-602
Chemicals (P)	13	111	-98

Notes:

Quantity

Before = Sampled water constituent (mg/l) X flow rate (MGY) X 8.34

After = 1 year of growth and harvest (empirical data from Coleman Pond scaled)

Reduction = Represents removal of water constituent and available capacity to remove additional constituent during rainy season.

- C. **Project Cost:** The project cost is estimated at \$68,213.25 for fabrication of the mats with aerator pots, plant installation, anchoring in the pond, and first year costs.
- D. **Implementation Schedule:** The MAPS is targeted to be purchased, fabricated, and installed within sixty days of approval by the Department. Ongoing monitoring is scheduled to be completed every four months after the MAPS is installed.

