

# Project Name: C-1 Borrow Pit Reservoir (BPR)

**Project Location:** Southern Brevard County, Palm City

**Project Number:** RWSP project number - \_\_\_\_\_

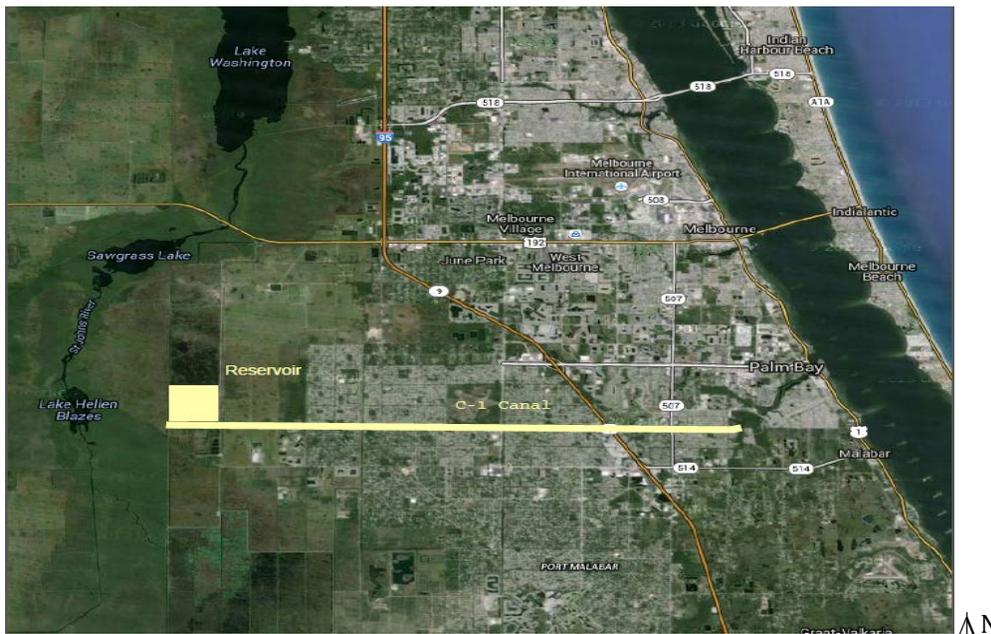
**Project Type:** Stormwater Reuse/Surface Water Augmentation/IRL Nutrient Removal and Agriculture/ Industrial and Public Water Supply

## Description of Project:

The C-1 BPR project is an environmental restoration project that may also be an Alternative Water Supply (AWS) project. The project proposal includes several components: a below grade reservoir; intake with adjustable weir; stormwater pump station; water quality treatment system and Supervisory Control and Data Acquisition (SCADA) system.

The eastern portion of the City of Palm Bay and surrounding Brevard County was ditched and drained consistent with land management practices in the past. In the historic pre-developed condition, stormwater was retained on the land and would episodically discharge to the east into the headwaters of the St. John's River and to the west into the Indian River Lagoon watershed. The episodic events for discharges to estuaries are part of a healthy ecosystem. The constant draining from an artificially expanded watershed is a problem.

The freshwater flows from this area into the Indian River Lagoon are creating negative environmental conditions in the oligohaline ecosystem where the C-1 Canal discharges into the Lagoon. The intent of this project is to create a storage reservoir so stormwater can be stored and released to mimic the natural condition to the maximum extent practical while maintaining flood protection for the community.



Proposed C-1 Canal Reservoir Location, Palm City, Florida

### **Planning-Level Project Details:**

The project includes the following systems and components:

#### **Added Surface Water Storage Capacity**

A below reservoir approximately 3½-5 BG will be excavated. It will be created by excavating approximately 600 acres, 20'-30' deep. A pump system capacity will be in the range of 50-100 MGD, depending on reservoir volume.

#### **Additional Information needed**

In discussions with local engineers and geologists, the soils and near surface geology in this area appears well suited for a reservoir system. Tight soils with good engineering characteristics make the site both suitable as a reservoir and a good source of fill material. Detailed soils information for this project have not been obtained. There will be significant water quality treatment through added residence time in the reservoir itself. There may be some need for additional water quality treatment.

### **Project Yield:**

The project in this preliminary design configuration could provide 50 MGD annual average of flow of water to the SJR watershed. While this project is being put forward in a water supply plan, the project origin is a restoration concept for the Indian River Lagoon where constant freshwater flows have negatively impacted this fragile oligohaline ecosystem.

### **Estimated planning-level costs:**

Planning level costs for a 50 MGD raw water project were made in a spreadsheet with excavation estimates and fill values. The largest cost is in excavation of approximately 20 Million Cubic Yards of fill. Should the excavated soil quality meet road construction standards, the reservoir construction could coincide with planned regional highway construction or other major heavy site construction (more on this in the partnerships section).

It is possible and likely that surplus revenue could be generated from the fill sale to offset or even exceed the cost of the intake weir and pump station. Since many variables exist for this preliminary project proposal, a range of costs is provided below.

**Table 1.** Summary of Estimated Planning-Level Costs for the C-1 Borrow Pit Reservoir Water Supply Project.

<b>Planning Level Estimate</b>	<b>Phase 1 (50 mgd) delivered</b>		
Construction costs	\$15-100 million		
Non-construction costs	\$0.5 million		
Land costs	\$1.2 million		
Total Capital Costs	\$17-92 million		
Total Annual Costs (O&M)	\$2-3 million		
Unit Cost of Production (\$/1,000 gallons)	\$0.25-1.00/1,000 gall.		

### **Estimated Implementation Schedule:**

Not permitted

Phase 1: 2018-2022

### **Water Resource Constraints:**

The goal for this project is to take as much water from the C-1 contributing watershed to the Indian River Lagoon as practical during low flow conditions. This will more closely mimic the natural flow regime of the Indian River Lagoon Watershed. Further, releasing this water at the highest point in the St John’s River system will also more closely mimic the Time of Concentration (TOC) of a large natural watershed. Timing of flows to mimic the natural conditions for these watersheds is the first design constraint.

Additional research and consideration will be provided for nutrient concentrations. By adding around 100 days of residence time, the reservoir system will provide significant treatment for both nitrogen and phosphorous.

### **Project Feasibility:**

This project is a new concept. Typical reservoirs are aboveground and filled by pumping. The BPR storage is made available by pumping out of the reservoir at lower rates in between and during stormwater events. This design concept maximizes system performance and efficiency.

The reservoir fills by gravity. This provides a high degree of reliability to capture stormwater while preventing its introduction to the IRL. A high percentage of water can be captured compared with a system that only pumps during and shortly after a rainfall event. It also provides reliable flood protection; the original intent of the C-1 canal.

## **Permittability:**

An ecosystem restoration concept blended with a water supply initiative is new, borrow pit permitting and operations are not. This application provides storage of stormwater runoff while maintaining the system capacity for flood water discharges during major rain events.

## **Cost-Benefit Analysis of Yield:**

As an alternative water supply (AWS) project, the C-1 Borrow Pit Reservoir is a significant environmental restoration initiative while providing additional water supply. Since the current discharges to the IRL are damaging and unwanted, this project will have a substantial positive overall benefit for the IRL and the SJR. Unit production costs below \$1.00/ 1,000 gallons makes this proposal cost feasible for a standalone AWS or as a component of some other AWS project. Other costs would be added if this were a standalone AWS. These costs would typically include major piping for distribution and treatment.

## **Other Considerations:**

The project is currently in the concept stage. Significant stakeholder involvement will be needed. Additional activities and resulting evaluation-analyses is necessary to quantify design variables and fix the estimated project cost. Land acquisition could be the next stage in the process or to be timed with other regional initiatives prior to final design and permitting.

## **Potential Partners and Governance Options:**

The potential project partners are the FDOT, SJRWMD, FDEP, public utility suppliers using or proposing to use the flows in SJR for water supply and the US Congress through the IRL Estuary Program. Preliminary discussions with FDOT's East Central Florida Corridor Task Force have begun. The 20 MCY of fill that could come from the reservoir is a quantity of fill consistent with a transportation corridor under consideration by this Task Force. There is not a stand out agency with the highest degree of authority in this project concept. Many of the partners have a very high return on investment in this environmental restoration initiative.

## **Funding Sources:**

This is an unfunded project concept with potential partners including: the Indian River Lagoon National Estuary Program (Federal Appropriation); SJRWMD (Alternative Water Supply); SJRWMD (Natural Systems Restoration); Florida Department of Transportation (Federal Highway Administration Appropriation); various water supply authorities may want to create similar partnerships.

## **References:**

N/A

**Regulatory Sheet Placeholder**