# **Cypress Creek Wellfield Surface** Water Management Project

# Northern Tampa Bay Phase II LTPRG Meeting

#### **December 12, 2007**





#### Building the Region's Water Supply

#### Cypress Creek Wellfield Surface Water Management Project



DRAINAGE MODIFICATIONS TO IMPROVE WETLAND HYDROLOGY AT THE CYPRESS CREEK WELLFIELD AND TO REDUCE FLOODING CONDITIONS IN SADDLEWOOD ESTATES AND QUAIL HOLLOW SUBDIVISIONS



**COMPLETION DATE:** August 21, 2007

JOINTLY FUNDED BY TAMPA BAY WATER (727-796-2355) AND THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT (1-800-423-1476) GOVERNING BOARD, AND ALAFIA RIVER, COASTAL RIVERS, HILLSBOROUGH RIVER, NORTHWEST HILLSBOROUGH, PINELLAS-ANCLOTE RIVER, AND WITHLACOOCHEE RIVER BASIN BOARDS

# **Cypress Creek Wellfield Surface Water Management Project**

Cooperative Project Between Tampa Bay Water and Southwest Florida Water Management District (\$2.8 Million)

 Phase I Mitigation Project (Phase I Mitigation Plan - Candidate Sites
 Evaluation Study 2000)





# **Cypress Creek Surface Water Management Project Objectives**

 Modify Existing Drainage Patterns within the Cypress Creek Watershed to:
 Improve the Wetland Hydrology at Targeted Wetland Destantion Sites in the COWF

- Wetland Restoration Sites in the CCWF
- Reduce Flooding Conditions in Saddlewood Estates and Quail Hollow)

Without Adverse Ecological or Hydrological Impacts!









#### **Three Project Phases**

#### **Feasibility Study and Basis of Design Report**

- July 2004 through January 2005
- Warren Hogg (Tampa Bay Water, Project Manager)
- Dave Arnold, Len Bartos, and Wojciech Mroz (SWFWMD)

#### **Design and Permitting**

- January 2005 through November 2006
- Warren Hogg (Tampa Bay Water, Project Manager)
- Dave Arnold, Monte Ritter, Alex Aycrigg, and John Emery (SWFWMD)
- Tracy Hurst (US ACOE)

#### **Construction (Clark Hunt Construction Inc.)**

- December 2006 through June 2007
- Patty Fesmire (Tampa Bay Water, Project Manager)
- Dave Arnold (SWFWMD's Project Manger) and Chris Reed



# **Project Team**

#### RS&H

Rob Garrigues, PE Jim Mykytka Steve Noriega, PE Cynthia Wheeler Judy Smith (HDR) Ryan Horstman (Wilson Miller) Mike Finch, PE (Jacobs) Derek Jones

#### HDR

Richard Gibney, PE Debra Daigle, PG Betsy Davis Chip Messenkopf, PWS George Eliason, PWS

EAM

**SDI Environmental, Inc.** Cathleen Jonas, PG John Palmer, PG John Loper, PE

**Brian Ormiston, PhD** 

**Roberts Communication & Marketing, Inc.** Deanne Roberts, APR

**Bayside Engineering (Survey)** Danny Polk, PLS

Metzger & Willard, Inc. (Survey) Dan Willard, PE



 Phase I Mitigation Plan - Candidate Sites Evaluation Study 2000
 Identification of Candidate Wetland Mitigation Sites - Sites Not Expected to Fully Recover Following Pumpage Reductions







 Above Normal Rainfall and Residential Flooding in Saddlewood Estates and Quail Hollow Subdivisions

1997/1998; 2003; and 2004





### Areas Experiencing High Water In Western Portion of Quail Hollow







#### **Areas Experiencing High Water In Saddlewood Estates**



# **Saddlewood Estates – Hialeah Way** and Shenandoah Run





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DA

Series of Community Meetings with SWFWMD, Tampa Bay Water, and Pasco County Staff Occur in 2003 and 2004 to the Address Residential Flooding Concerns

#### SWFWMD Performs a Preliminary Feasibility Study (February 2004)

 Evaluated Options to Alleviate Flooding Concerns that Involved Moving Water from Dye's Crossing Floodplain towards the Main Floodplain of Cypress Creek and into Wetlands Identified as Priority Sites for Mitigation on the CCWF





 Tampa Bay Water Recognizes the **Potential for SWFWMD's Flood Mitigation Project to also serve as a Permanent Wetland Restoration** Project Initiates the CCWF Surface Water **Management Project (June 2004)** 





# Reduction in High Water Levels and Duration of High Water Levels in Dye's Crossing Floodplain "Wetland with High Water Levels" Rehydrate Wetlands "Wetlands with Not Enough Water"

Design Concept Objectives





#### Approach to Meeting Project Objectives

#### Detailed Evaluations of Surface Water Alternatives to:

- Increase Water Flow through Dye's Crossing
- Utilize Existing Storage South of Dye's Crossing
- Control Surface Water Flows Leaving the Wellfield
- Divert High Flows to West Towards Target Wetlands





### Surface Water Management Alternatives to Existing Conditions

- Dye's Crossing Floodplain Alternatives
   Alternative A
- Diversion of Water From Dye's Crossing Floodplain
   Alternative B
  - Surface Water Modification Area North of Main Access Road – Alternative C
  - Surface Water Modification Area South of Main Access Road – Alternative D
  - Surface Water Modification Area West of Main Access Road – Alternative E









#### Approach to Meeting Project Objectives

 Increase Water Flow through Dye's Crossing – Replace Existing Structure





Weir Elevation 61 20 h North of Dye's Crossing Rd



#### 4 (4 ft x 8 ft) Type H Structures with Double 30" Diameter Pipes (North of Dye's Crossing)

Weir Bottom Elevation 68.29 ft

Road Elevation ~71.00 ft







8 - Tideflex Backflow Preventers (South of Dye's Crossing)






## **Dye's Crossing Floodplain – High Water Level Conditions**





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#### Berm, Pipes, and Weirs South of Dye

Approximately 7,500 ft Long Berm Average Height 2 to 3 ft Berm Width - 15 feet in Uplands - 12 feet in Wetlands Berm Elevation - 71 feet 274 feet Long Concrete Weir







Berm A1a Through an Upland Area After Construction

Berm A1a Through an Upland Area After Construction

274 ft Long Concrete Weir at Main Flow Channel along Berm A1a – West End

## Top of Weir Elevation 70.0 ft

#### 18" Diameter High Flow Pipe Elevation 67.93 ft

30" Diameter Low Flow Pipe (Invert Elevation 65.0 ft)





#### East End of Weir







## Benefits of Alternative A

- Utilizes Existing Storage South of Dye's Crossing
  - Facilitates the Implementation of Other Alternatives (B through E) to Divert Water to the West
  - Allows More Flow at Dye's Crossing Providing Additional Storage North of Dye's Crossing
- Increases Wetland Hydrology and Ecological Benefits to Dye's Crossing Floodplain (~480 Acres South of Dye's Crossing)









## **Design Considerations**

- Limited Bottom Width of Ditches to 5 ft with 3:1 Side Slopes
- **Ditches Constructed Outside Wetland Limits**
- Use of Existing Ditches, Woods Roads, and Other Disturbed Areas for Ditch Alignments
- Use of Existing Cross Drain Locations for Crossing Ten Cent Road





## Environmental Considerations

•Wetland Seasonal Highs and Normal Pools (Initial Starting Water Elevations)
-Hydrological and Biological Indicators
-Survey of Hydrological Indicators
•Determine Wetland Invert/Outflow Elevations
•Identification of Natural Connections between Wetlands
•Assess Effects of Flooding on Trees and Flood Tolerance in Plants







#### Trees Flagged for Removal

Before Conditions at B2 Ditch – West of Ten Cent Road

B2 Ditch During Construction – West of Ten Cent Road

B2 Ditch Following Construction (Pop Off Elevation 68.0 ft) – West of Ten Cent Road

3 24"x38" Elliptical Pipes Under Ten Cent Road - Ditch B2 Ditch B3 Following Construction (Pop Off Elevation 68.2 ft) – East of Ten Cent Road Benefits of Alternative B

- Diverts Water from Dye's Crossing
- Increases Water Storage North and South of Dye's Crossing
- Allows More Flow at Dye's Crossing
- Provides Water for Enhancing Wetland Hydrology and Ecological Benefits to Target Wetlands (~ 113 Acres of Isolated Wetlands)













Ditch D1 South of Ten Cent Road (Within Maintained Right of Way)

### Ditch D1 South of Ten Cent Road (Outside Wetland Edge)

D2 Ditch Following Construction – South of Ten Cent Road



### **Ditches Start Outside Wetland Lines**

**Ted's Marsh** 

Ditch E3 South of Ten Cent Road (Previous Woods Road)



# **Issues During Construction**

## Avoidance of Gopher Tortoises





#### Silt Fencing Used to Keep Gopher Tortoises out of Construction Area

FEB 19


## Limited Clearing Activities to Morning Hours to Avoid Gopher Tortoises FEB 28 2007

### Permitting Issues Environmental Management

Wetland Jurisdictional Line Approvals -SWFWMD/ACOE Approval of Seasonal High Water Elevations Avoidance and Minimization of Wetland Impacts - 1.65 Acres of Permanent and 0.629 Acres of Temporary Wetland Impacts Maintaining Existing Wetland Hydroperiods Cultural Resource Clearance U.S. Fish and Wildlife Clearance Environmental Monitoring Plan Approval





otential Historical and Archeological Invo



Acres Acres 60540 5.54 P.11 643.00 3.4 24 632.20 2.2 640.00 25 33.25 3.5 34.96 5 43.10 36 601.15 110 80.00 115.25 24 Astronue Pares 30 Survey a in the Month of June 1148 by John & Guers John B. Guers Chammen George W. Anders & Chammen comments compress with fill of former thank 1: + 1129. Contra

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1848 Plat Depicting Indian Trail

## Permitting Issues Stormwater Management

- Water Management District Approval of Existing Conditions Model
  - Pre vs. Post Comparison for Discharge and Peak Stage
- Maintain Historic Storage Volumes
  Maintain Consistency Between Pre and Post Model Set-up
- Maintain Consistent Datum Throughout Model

  Input







**Existing** Conditions Surface Water Mode ICPR vs. SWMM (Level Pool vs. Riverine) Model **Input Data** Water Level Recorders and Flow Measurements **Topographic Information (Basin Delineation/Times of** Concentration **Existing Drainage Facilities** Soils Data (CN Values) **Initial Starting Water Elevations (Wetland Seasonal Highs and Normal Pools**) - Rainfall Information **Model Calibration** TAMPA



## **Proposed Conditions Surface Water Mode**

 Input Proposed Concepts into Existing **Conditions** Model Run Model Using Statistical Rainfall Events - Mean Annual - 5-Year/24 hr - 10-Year/24 hr - 25-Year/24 hr 50-Year/24 hr 100-Year/24 hr 100-Year/5 Day





#### **Continuous Water Level Recorders and Flow Measurement Sites (Hurricane Jeanne)**



## **Engineering and Ecological Field Review**







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 Light Detection and **Ranging** (LiDAR) Large amounts of high accuracy elevation data can be collected rapidly **Alternative to** traditional survey



the range and scan angle to ground surface reference station













# THANK YOU

## QUESTIONS AND ANSWERS

