STATUS UPDATE ON MIRABAY MASTER RETAINING WALL STABILIZATION PROJECT

14 December 2015

Prepared for: Harbor Bay Community Development District, Apollo Beach, Florida
OUTLINE

1. BACKGROUND
   - Timeline
     - Litigation Settlement
     - Pilot Project
     - Peer Review
     - Emergency Repair Project
     - Completed Permitting for Master project
     - 2015 Public Outreach
     - Public Procurement Process

2. CURRENT PHASING PLAN
   - Key Points
   - Maps

3. FINANCING

4. ON-GOING EFFORTS

5. QUESTIONS / ANSWERS
1. BACKGROUND

TIMELINE
### PROJECT TIMELINE

<table>
<thead>
<tr>
<th>Year</th>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>02/2015</td>
<td>Litigation Settlement $8.3 Million</td>
</tr>
<tr>
<td>2014</td>
<td>04/2015</td>
<td>Pilot Study Tests were performed - Seagrass Place - Tybee Isle</td>
</tr>
<tr>
<td>2014</td>
<td>05/2015</td>
<td>Subsurface Confirmation Study - Tie-Rod Assessments - Vibration Monitoring Study - Upland Observation - Existing Seawall Observations - Existing Seawall Cap Deflection Study - Design Drawings</td>
</tr>
<tr>
<td>2014</td>
<td>08/2015</td>
<td>Finalized Seawall Repair Design Plans</td>
</tr>
<tr>
<td>2015</td>
<td>12/2015</td>
<td>Start Construction of Emergency Seawall repair</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td>Submit RFP for Master project</td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td>Anticipated completion of the Master project (dependent on actual construction schedule)</td>
</tr>
</tbody>
</table>

- Excessive Cap Rotation
- Rupture Sheet

About 2,500 LF of Emergency Repairs was Approved
LITIGATION SETTLEMENT

• The litigation investigation resulted in the review and indexing of over 70,000 pages of documents, over 38 sworn depositions being taken, over 900 deposition exhibits.

• In 2013 the litigation settlement resulted in approximately $8.3 million to be used towards funding of the master retaining wall project.
PILOT PROJECT

• The District conducted an RFQ process and retained Ingenium, Inc. (“Ingenium”) to conduct a pilot project and propose various options for stabilizing the community retaining wall, including a rip-rap solution, a rip-rap and knee wall solution, and a new seawall solution (Options I, II, III Rehabilitation Alternatives).

• The District then constructed three different solutions and field tested them at two locations in the community.
The District then retained Langan Engineering & Environmental Services, Inc. ("Langan") Spring 2015 to conduct a peer review of the Pilot Project Report and to serve as the District’s bulkhead wall engineer for the final construction design and administration of the Project.

Langan’s designs further refined the Pilot Project designs into working seawall rehabilitation alternatives to be implemented as part of the master project.

- Peer Review Pilot Test Study
- Review Current Conditions of Retaining Wall System
- Confirmation of Subsurface Conditions
- Existing Tie Rod Observations and Evaluation
- Vibration Monitoring
- Review Baseline Bulkhead Cap Deflection from 2013
- Review Bathymetric Survey Data
- Navigation Study
- Develop Permit Drawings for Master Project
- Commence Preparing Final Designs
CURRENT CONDITIONS

EXISTING TIE ROD

CAP ROTATION

SHEETPILE

SOIL DRAINAGE
Based on the peer reviewed seawall options from Ingenium Inc.’s 25 Sept 2014 “Mirabay Pilot Project Report”, two options were both identified and recommended for further detailed study and final designs:

**Option 3 - NEW SEAWALL**
New Stiffer Deeper Sheetpile, Existing Tieback Only, New Large Cap

**Option 1 - RIP-RAP**
Existing Wall; Rip-Rap Berm; 8-Feet-Wide, EL+3 Top of Rip-Rap
MODIFIED OPTION 1
Existing Wall System, Rip-Rap Berm, 8-Feet-Wide, EL+3 (or higher), Existing Tieback
OPTION 3

New Fiberglass Reinforced Polymer (FRP) Sheetpile, Existing Tie-back plus new Manta Ray anchor in between tie-back, New Cap
EXISTING TIE ROD ANCHOR SYSTEM

OBSERVATIONS
EXISTING TIE ROD EVALUATION

Tie rod and deadmen system conditions were documented and evaluated throughout the development where bulkhead rehabilitation is planned to provide assurance that they can be reused

- Tie rod corrosion evaluation at every tie rod during construction
- Refurbishment of tie rods during construction as necessary
- Existing tie rods will be protected from corrosion
- Most tie rods have no loss of cross section
- Periodic preventative maintenance to be implemented
1. Weather event in Late July 2015 has triggered the failure and rupture of sheetpile at Skimmer Drive

2. Langan, having inspected the community wall, recommended emergency repair work at approximately 5,000 LF of seawall for the immediate repair of ruptured seawall sheets those endanger of rupturing

3. Implementation of option 3 (new seawall option) with additional anchors in lieu of waterside berm buildup was chosen as best emergency repair alternative based on historical and current cap rotation and vinyl sheetpile deflection

4. The Board authorized emergency work for approximately 2,500 LF of retaining wall and for Langan to closely monitor the remaining emergency repair phases
EMERGENCY REPAIR WORK IN PROGRESS

SHEETPILE INSTALL

TIE-RODS INSPECTION

DRAINAGE EXCAVATION

REBAR / FORMWORK

NEW ANCHOR INSTALLATION

POURED CAP
### Permits for SECTION I of Master Project complete Fall 2015

<table>
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<tr>
<th>NUMBER</th>
<th>AGENCY</th>
<th>ISSUED</th>
<th>EXPIRATION</th>
<th>TYPE</th>
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<tr>
<td>708627</td>
<td>Southwest Florida Water Management District (SWFWMD)</td>
<td>6/25/2015</td>
<td>N/A</td>
<td>ERP Exemption</td>
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<td><strong>LOCAL MASTER PERMIT</strong></td>
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<tr>
<td>58692</td>
<td>Hillsborough County Environmental Protection Commission (HCEPC)</td>
<td>8/25/2015</td>
<td>8/31/2016</td>
<td>Minor Works [3300.87*]</td>
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<td>58694; 58699; 58700; 58701; 58721; 58722; 58723; 58724</td>
<td>HCEPC</td>
<td>8/25/2015</td>
<td>8/31/2016</td>
<td>Minor Works [4124.7*]; [4886.83*]; [2533.93*]; [4223.52*]; [2234.92*]; [1302.58*]; [5471.85*]; [3499.6*]; [8771.54*]</td>
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<tr>
<td><strong>FEDERAL MASTER PERMIT</strong></td>
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<tr>
<td>SAJ-1998-03785 (SP-LDD)</td>
<td>U.S. Army Corps of Engineers (Corps)</td>
<td>10/13/2015</td>
<td>10/13/2020</td>
<td>Construction (Seawall Repair)</td>
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</table>
In 2015, the Board held three town hall style meetings, in June, July and December, addressing engineering and financing issues.

The District published a 12 page FAQ addressing numerous questions regarding the seawall.

The Board has had monthly updates at its public meetings, and in its monthly e-blasts.
PUBLIC PROCUREMENT PROCESS

- RFP for Section 1 including remaining emergency repairs – start 1st Quarter 2016
- RFP for sheetpile - 1st Quarter 2016
- RFP for seawall construction – 1st Quarter 2016
- Master Project Financing - 1st Quarter 2016
MASTER PROJECT STRATEGY

KEY POINTS
KEY POINTS

- **SECTION I**
  - Approximately 1/3 of Phase I requires a New Seawall
  - The remaining 2/3 could be completed using either a New Seawall or Riprap
  - Option 1 can be used at non-navigable areas (i.e. canal dead ends, to control project costs)

- **SECTION II**
  - Mangrove root system provides stabilization of waterside berm, which provides stability to the retaining wall
  - Localized limited rip-rap placement required along with mangrove growth

- **SECTION III (Pocket 101)**
  - Is like PHASE II, except for about 500 LFT which have been impacted by overgrown tree roots

- **SECTIONS II & III**
  - Robust periodic maintenance program required
  - Continued Cap Rotation Monitoring and Seawall Maintenance Required
KEY POINTS (Continued)

- **NAVIGATION**
  - Option 1 rip-rap presents hazards, subject to boater skills, at low or high tide, except if the boat bottoms at low tide

- **SECTION 2 WATERSIDE BERM AND MANGROVES**
  - Re-establish waterside berm back to el +1.5 with stable material
  - Invite mangrove tree growth to provide

- **MAINTENANCE**
  - Under normal conditions should be minimal for both options, but necessary to assure reliable performance of integral components
  - Tie-rods should be inspected periodically – both options
  - Drainage system behind wall and weep holes
  - Canal bathymetry should be inspected periodically – both options

- **DREDGING**
  - Dredging within design limits for Option 3 is acceptable
  - Potential undermining of Option 1 Rip-rap and retaining wall instability caused by maintenance dredging exists
MASTER PROJECT PLAN

SECTION I

Section I – Modified Option 1 Rip Rap Predominant

SECTION II

SECTION III

(Pocket 101)

Notes:
1. APPROXIMATE EMERGENCY SEAWALL REPAIR LENGTHS MUST BE VERIFIED BY BIDDING CONTRACTORS
2. ESTIMATED EMERGENCY REPAIRS LENGTH ARE BASED ON CENTER TO CENTER LINE BETWEEN PROPERTIES

LEGEND:
- WALER INSTALLATION OPTION
- BERM STABILIZATION RIP-RAP TO EL +1.5 MINI, MANGROVE AND MONITOR
- EMERGENCY REPAIR EXECUTED (Option 3)
- OPTION 3 (NEW SEAWALL) CAP ROTATION MAGNITUDE APPROACHING EMERGENCY REPAIR CONDITION (>1 3/4 INCH)
- OPTION 1 (RIP-RAP)
- MODIFIED OPTION 1 OR OPTION 3: FOR AESTHETIC PURPOSES
- BERM STABILIZATION, MANGROVE OPTION
- EXISTING WALER (Approximate Location)
- UNCONVENTIONAL BULKHEAD
Section I – Option 3
New Seawall Predominant
## Quantitative Analysis

### Total Length Estimates Per Section Using Modified Option 1 / Berm Rehabilitation - Mangrove - Fig 1A

<table>
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<tr>
<th></th>
<th>Emergency</th>
<th>Section I</th>
<th>Section II</th>
<th>Section III</th>
<th>Total</th>
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<tr>
<td><strong>Options</strong></td>
<td>Repairs 9-18 LFT</td>
<td>LFT</td>
<td>LFT</td>
<td>LFT</td>
<td>LFT</td>
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<tr>
<td>Berm Rehabilitation / Mangrove</td>
<td>0</td>
<td>340</td>
<td>5808</td>
<td>2574</td>
<td>8722</td>
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<tr>
<td>Option 1</td>
<td>0</td>
<td>10850</td>
<td>0</td>
<td>0</td>
<td>10850</td>
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<tr>
<td>Option 3</td>
<td>1715</td>
<td>4450</td>
<td>0</td>
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<td>4450</td>
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<td><strong>Total LFT</strong></td>
<td>1715</td>
<td>15640</td>
<td>5808</td>
<td>2574</td>
<td>24022</td>
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</table>

### Total Length Estimates Per Section Using Option 3 / Berm Rehabilitation - Mangrove - Fig 1B

<table>
<thead>
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<th>Emergency</th>
<th>Section I</th>
<th>Section II</th>
<th>Section III</th>
<th>Total</th>
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<tbody>
<tr>
<td><strong>Options</strong></td>
<td>Repairs 9-18 LFT</td>
<td>LFT</td>
<td>LFT</td>
<td>LFT</td>
<td>LFT</td>
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<tr>
<td>Berm Rehabilitation / Mangrove</td>
<td>0</td>
<td>340</td>
<td>5808</td>
<td>2574</td>
<td>8722</td>
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<tr>
<td>Option 1</td>
<td>0</td>
<td>1400</td>
<td>0</td>
<td>0</td>
<td>1400</td>
</tr>
<tr>
<td>Option 3</td>
<td>1715</td>
<td>13900</td>
<td>0</td>
<td>0</td>
<td>13900</td>
</tr>
<tr>
<td><strong>Total LFT</strong></td>
<td>1715</td>
<td>15640</td>
<td>5808</td>
<td>2574</td>
<td>24022</td>
</tr>
</tbody>
</table>

Note: The linear footage presented in these charts are estimated and based on measurements from AutoCAD drawings and aerial photographs.
Navigation study considered various boat sizes, channel widths, high and low water depths, and bathymetry among a host of other navigation considerations, and commented on boater navigation skill.
**NAVIGATION STUDY SUMMARY**

- Option 3 poses no concerns with navigation relative to rip rap impacts.
- Docks act as buffers to rip rap, but do not eliminate risk of rip rap impact.
- No practical action to overcome inexperienced boat user skill to prevent impact with rip rap.
FINANCIAL CONSIDERATIONS

- **ECONOMICS**
  - Emergency repairs currently contracted (Phases 1-8)
  - Remaining to be funded as part of Master Project (Phases 9-18)
  - Option 1 rip-rap and Option 3 difference is approximately $4 million dollars based on preliminary estimates

- **FUNDING**
  - Estimated $5 million dollars available for Section I construction in bank from original litigation settlement,
  - Exploring long term bonding with assessments, to finance the remainder if the Master Project retaining wall project, refer back to financial presentation.
## FINANCIAL ANALYSIS

### Section 1 Cost Estimates - Rip-Rap Option

<table>
<thead>
<tr>
<th>Solution</th>
<th>Linear Feet*</th>
<th>Remaining Phase 1 Area Construction Costs**</th>
<th>Soft Costs</th>
<th>Total Construction Cost Estimate</th>
<th>Total Construction Cost Estimate With 20% Margin of Error</th>
<th>Construction Cost Estimate for Financing Purposes***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berm Rehab./Mangroves</td>
<td>340 LF</td>
<td>$44,070</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified Option 1 (Approx. $325 / LF)</td>
<td>10,850 LF</td>
<td>$3,526,250</td>
<td></td>
<td></td>
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<tr>
<td>Option 3 (Approx. $684 / LF)</td>
<td>6,165 LF</td>
<td>$4,216,860</td>
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<tr>
<td>Totals</td>
<td>17,355 LF</td>
<td>$7,787,180</td>
<td>$1,437,286</td>
<td>$9,224,466</td>
<td>$11,069,359</td>
<td>$6,069,359</td>
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</tbody>
</table>

### Section 1 Cost Estimates – New Wall Option

<table>
<thead>
<tr>
<th>Solution</th>
<th>Linear Feet*</th>
<th>Remaining Phase 1 Area Construction Costs**</th>
<th>Soft Costs</th>
<th>Total Construction Cost Estimate</th>
<th>Total Construction Cost Estimate With 20% Margin of Error</th>
<th>Construction Cost Estimate for Financing Purposes***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berm Rehab./Mangroves</td>
<td>340 LF</td>
<td>$44,070</td>
<td></td>
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<tr>
<td>Modified Option 1 (Approx. $325 / LF)</td>
<td>1,400 LF</td>
<td>$455,000</td>
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<tr>
<td>Option 3 (Approx. $684 / LF)</td>
<td>15,615 LF</td>
<td>$10,680,660</td>
<td>$1,993,347</td>
<td>$13,173,077</td>
<td>$15,807,692</td>
<td>$10,807,692</td>
</tr>
<tr>
<td>Totals</td>
<td>17,355 LF</td>
<td>$11,179,730</td>
<td>$1,993,347</td>
<td>$13,173,077</td>
<td>$15,807,692</td>
<td>$10,807,692</td>
</tr>
</tbody>
</table>

*All linear footage amounts are estimates, and actual measurements may vary.

**Includes 1,715 LF of remaining emergency repairs.

***The CDD estimates having $5,000,000 cash on hand, and so financing amounts are anticipated to be reduced as shown.

**ALL FINAL, ACTUAL CONSTRUCTION COSTS MAY VARY FROM THE ESTIMATES STATED HEREIN BASED ON FINAL CONTRACT AMOUNTS DETERMINED THROUGH PUBLIC BIDDING.**
## FINANCIAL ANALYSIS

### Sections 2 & 3 Cost Estimates – Waterside Berm Rehab./Mangroves

- Section 2 (5,808 LF) = $756,584  
- Section 3 (2,574 LF) = $330,759  

(Note: Section 3 linear footage does not include certain areas impacted by trees and/or vegetation.)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Option 1</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment of Seawall Waterside and Landside to Prevent Soil Migration through Seawall Sheets</td>
<td>Necessary on localized basis at time of construction &amp; going forward</td>
<td>New seawall prevents this</td>
</tr>
<tr>
<td>Future Repairs</td>
<td>Would require movement of rip-rap</td>
<td>Minor</td>
</tr>
<tr>
<td>Canal Dredging</td>
<td>Dredging may displace rip-rap</td>
<td>Minor to none</td>
</tr>
<tr>
<td>Navigation</td>
<td>Proximity to docks</td>
<td>None</td>
</tr>
<tr>
<td>Mangrove Maintenance</td>
<td>More mangroves will recruit, thereby increasing costs</td>
<td>None</td>
</tr>
<tr>
<td>Tie-Rod Maintenance</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
ON-GOING EFFORTS
ON-GOING EFFORTS

- Ongoing Emergency Repairs (Phases 1 through 8)
  1. Construction of Phase 4 and starting Phase 5
  2. Engineering Monitoring of Construction
  3. Continued cap rotation monitoring
  4. Resident Inquiries

- Master Project Design Drawings for RFP

- Preparing RFP Bid Packages for Master Project (Including Phases 9 through 18 Emergency Repairs)
MILESTONES AND PROJECT GOAL

- Complete Ongoing Emergency Repairs Early 1st quarter 2016
- Send out RFP package to contractors early 1st quarter 2016 and start bid process
- Award project to contractor and continue with remaining emergency repairs by mid 1st quarter 2016
- Begin master retaining wall project end of Summer 2016
- Complete the project by end of 2018
- Implement formal retaining wall system maintenance program and periodic maintenance ASAP
LONG TERM MAINTENANCE PLAN

- Implement formal retaining wall system maintenance program and periodic maintenance for the Mirabay community

- **Maintenance Dredging for Mirabay Canal System** (every 5 to 10 years)

- **Option 1 and 3 Common Periodic Maintenance Practices** (annual)
  - Check of drainage system performance (weepholes, swales)
  - Check of existing tie rod conditions
  - Continue cap rotation measurements and alignment check, not as frequent as waterside berm mangrove alternative

- **Waterside Berm Establishment/Mangrove Tree Recruitment** (every 6 to 12 months, with expanded frequency depending on overall performance)
  - Frequent cap rotation monitoring
  - Check depth to top of re-established waterside berm where needed
  - Check recruitment of Mangrove tree development where needed
QUESTIONS / ANSWERS

THANK YOU