

# 2018 FTBA Construction Conference

February 8 & 9, 2018

Orlando, FL



## *I-275, Sunshine Skyway Rest Areas and Seawall Repairs, Manatee and Pinellas Counties*

Andra Diggs II, FDOT District One

## Structures Session 2: 3:30 PM-5:00 PM, Thursday 2/8/2018

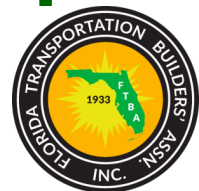
1. GFRP Rebar Cage Fabrication Case Study (15 min)
  - Mikhail Vorobiev, Owens Corning & Contractor (TBA).
2. Bakers Hallover Cut Bulkhead Rehabilitation (15 min)
  - Jake Perez, Bolton, Perez & Assoc. [JPerez@BPAMiami.com](mailto:JPerez@BPAMiami.com)
3. Skyway Rest Area Rehabilitation (15 min)
  - Andra Diggs, FDOT D1, [Andra.Diggs@dot.state.fl.us](mailto:Andra.Diggs@dot.state.fl.us)
4. Halls River Bridge Update (15 min)
  - Thomas Cadennazi, University of Miami, [txc470@miami.edu](mailto:txc470@miami.edu)
5. CFCC Recent Projects and PT developments. (15 min)
  - Jen Tankel, TokyoRope USA, [jen.tankel@tokyoropeusa.com](mailto:jen.tankel@tokyoropeusa.com)
6. Guide Specifications for GFRP Reinforcing (15 min)
  - Antonio Nanni, University of Miami [nanni@miami.edu](mailto:nanni@miami.edu)
  - Brahim Benmokrane, University of Sherbrooke, [Brahim.Benmokrane@USherbrooke.ca](mailto:Brahim.Benmokrane@USherbrooke.ca)



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# Presentation Agenda

- Project Overview
  - Scope of Work
  - Parking Improvements
  - Building/Site Improvements
  - Seawall Cap Repair
  - Barrier Wall Concept
  - Why FRP?
  - Looking Forward



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# Project Overview

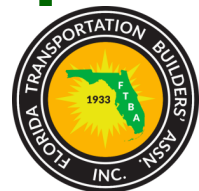
- FDOT Design-Build project includes demolition and reconstruction of the I-275, Sunshine Skyway Rest Area Buildings in Manatee and Pinellas Counties along with seawall repair on the south end of the Sunshine Skyway in Manatee County.
- The project spans two Districts providing an opportunity for D1 and D7 to collaborate to deliver the project.



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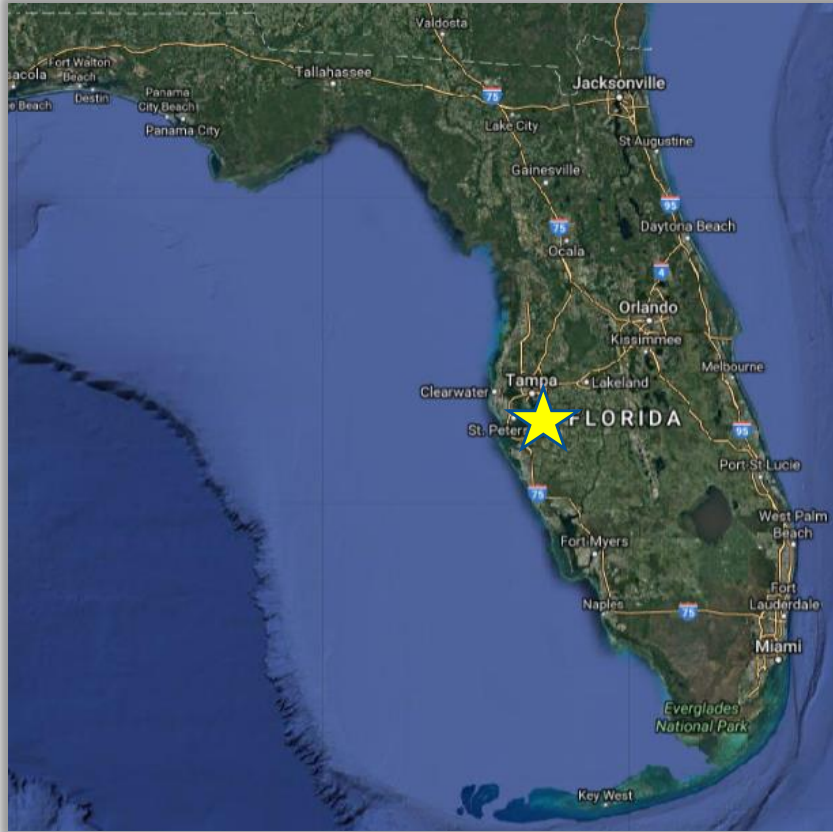
# Project Overview

- **Contractor:** David Nelson Construction
- **EOR:** Reynold Smith & Hills, Inc (RS&H)
- **CEI:** Johnson-Adams & Associates, LLC
- **FPID Nos:** 437635-1-52-01 (Pinellas Rest Area)  
437973-1-52-01 (Manatee Rest Area)  
438528-1-52-01 (Manatee Seawalls)
- **Contract Number:** E1P44
- **Contract Days:** 839

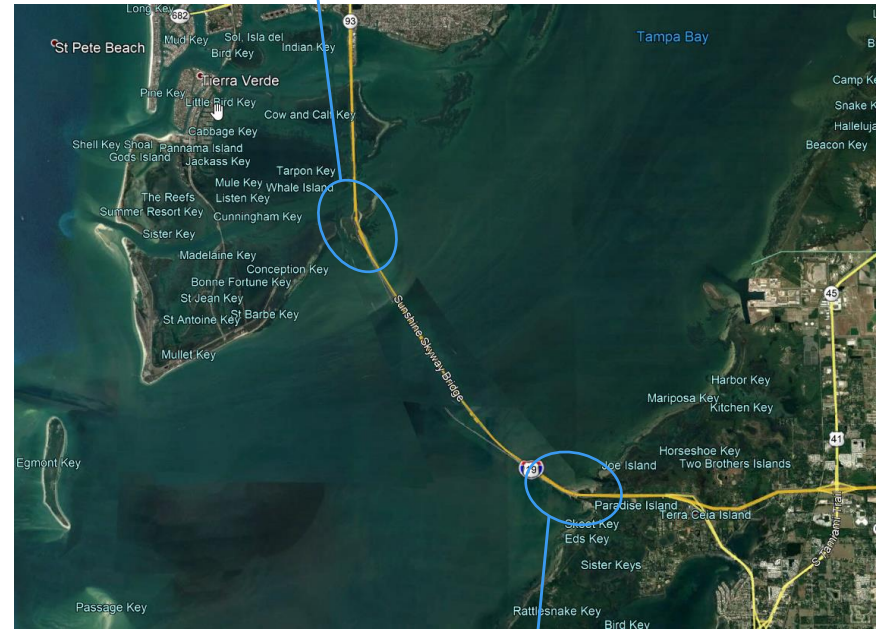


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# Project Overview



North Rest Area  
Pinellas County (D7)



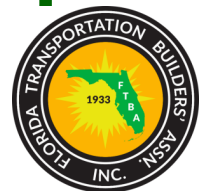
South Rest Area  
Manatee County (D1)



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# Project Overview

- Proposed Scope of Work:
  - Improve parking and access to both existing sites
  - Meet current building code and ADA requirements
  - **Restore existing seawall cap at the South site**
  - **Raise and extend the existing seawall cap including handrail at the South Rest Area to better accommodate pedestrian traffic**
  - **Remove and replace existing guardrail with barrier wall and repair any damaged shoulder area along the fishing pier access road**
  - Install additional erosion protection along Manatee Site



# Project Overview



Existing North Rest Area

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# Project Overview



Proposed North Rest Area

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# Parking Improvements

North Rest Area Parking	Cars	Trucks/RV
Existing Parking Spaces	34	21
Required Parking Spaces (RFP)	34	10
Proposed Parking Spaces (DB Team)	47	13



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# Project Overview



Existing South Rest Area

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# Project Overview



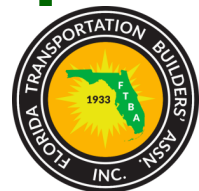
Proposed South Rest Area

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# Parking Improvements

South Rest Area Parking	Cars	Trucks/RV
Existing Parking Spaces	41	15
Required Parking Spaces (RFP)	41	15
Proposed Parking Spaces (DB Team)	53	15



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# Building/Site Improvements

- Existing buildings are outdated and in need of refurbishing
- Current building locations inhibit efficient site usage
- Proposed buildings shall be based on FDOT “Small Building” Guidelines
  - Men - 16 fixtures (toilets & urinals)
  - Women - 24 fixtures (toilets)
  - 2 Family restrooms and other amenities as outlined in the RFP.
- Floodplain definitions updated since original construction
  - Project now located in VE 13 Floodplain Zone
  - Existing grade elevations for Pinellas and Manatee were initially 5.25 AMSL and 4.60 AMSL respectively
  - New construction would need to be 1.0’ above base flood elevation 13.00 to meet low member requirements per the Manatee and City of St. Petersburg Building Codes as well as ASCE24-14



# Building/Site Improvements



Existing Building  
(Manatee shown, Pinellas Similar)

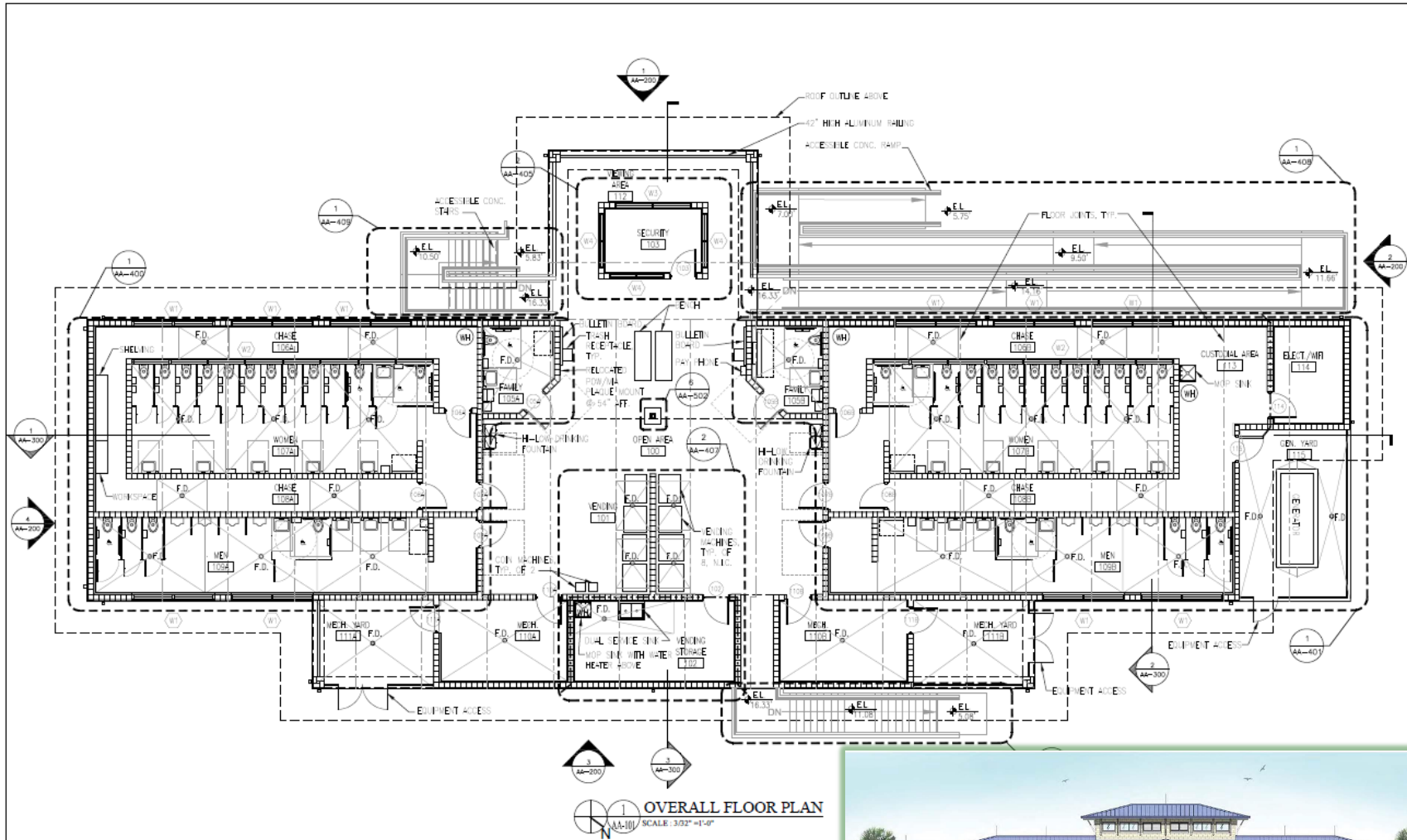


Proposed Building Rendering

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# Building/Site Improvements



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# Building/Site Improvements

Considered a destination where traveler's often stop to enjoy the scenic views, additional site enhancements include:

- Added Picnic Pavilions
- Dog Walk enhancements
- Landscape Opportunities
- Protection of Memorials
- Art Commitment



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# Seawall Cap Repair

2014 Condition Assessment Report documented the condition of the seawalls along the south site (Manatee) and provided recommended repairs for the seawall and revetment

## Recommendations

Based on the above observations, the following repairs are recommended:

1. **North/Northeast area:**
  - There are two options for repairing the seawall cap in this area. Option 1 is to replace the existing seawall cap with a new concrete cap. This work will require excavation of the fill behind the cap and removal of the existing cap. The second option is to keep the existing wall and cap in place and install a new seawall and cap behind it. As noted above, this type of repair has already been

## Sunshine Skyway Seawall at South Fishing Pier Condition Assessment Report

Report by: Farzin Zafarani, PE  
Checked by: Boon Chong, PE  
Date in the field: October 28, 2014

### Description of work

TYLI performed a structural walkthrough of the seawall at south fishing pier of Sunshine Skyway Bridge on October 28, 2014. The walkthrough focused on the areas noted in the FDOT report (see appendix B). Below is a summary of findings and recommendations from this walkthrough.

### Summary of Findings

- The main seawall structure appears to be in tact with no structural damage.
- See below for condition of seawall cap and the riprap:
  1. **North/Northeast area:** Majority of the seawall cap in this area needs to be fully replaced (see photos 1 and 2). There is erosion of soil behind the seawall in some areas (see photo 3). The riprap is mostly intact but is missing in few areas in front of the wall. There is an area from a previous repair with a new seawall and cap installed behind the existing wall (see photo 4).
  2. **Northwest area:** The entire seawall cap in this area needs to be replaced (see photo 5). There is erosion of soil behind the wall with large rocks placed over the eroded areas. There are exposed wall anchors in this area with visible damages (see photos 6 and 7). These wall anchors will need to be repaired. The volume of riprap is insufficient in some areas.
  3. **West area:** The entire seawall cap in this area needs to be replaced (see photos 8 and 9). The volume of riprap is insufficient in some areas.
  4. **Southwest area:** The seawall cap and the riprap appear to be in good condition and no repair is required in this area (see photos 10 and 11).
  5. **Southeast area:** This area was fenced and not accessible for inspection. There are signs of damage on the seawall cap in this area with no riprap in front of the wall (see photos 12 and 13). The cost estimate in Appendix C includes the cost for repairing the seawall cap.

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# Seawall Cap Repair



Recommended Limits of  
Northwest Seawall Cap Repair



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# Seawall Cap Repair



Northwest Area – Damaged Seawall Cap



Northwest Area – Exposed Seawall Anchor

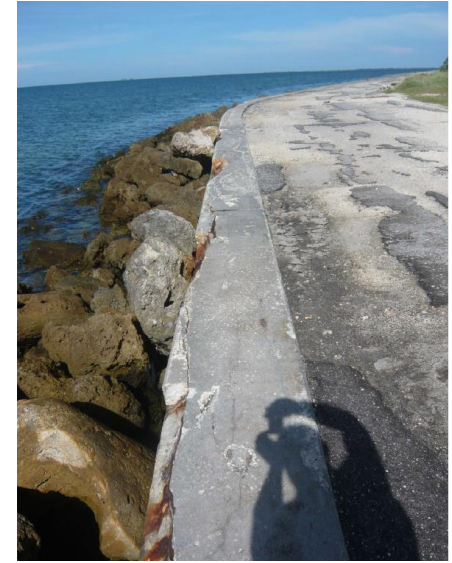


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# Seawall Cap Repair



Recommended Limits of  
West Seawall Cap Repair



# Seawall Cap Repair



West Area – Damaged Seawall Cap



West Area – Damaged Seawall Cap



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# Seawall Cap Repair

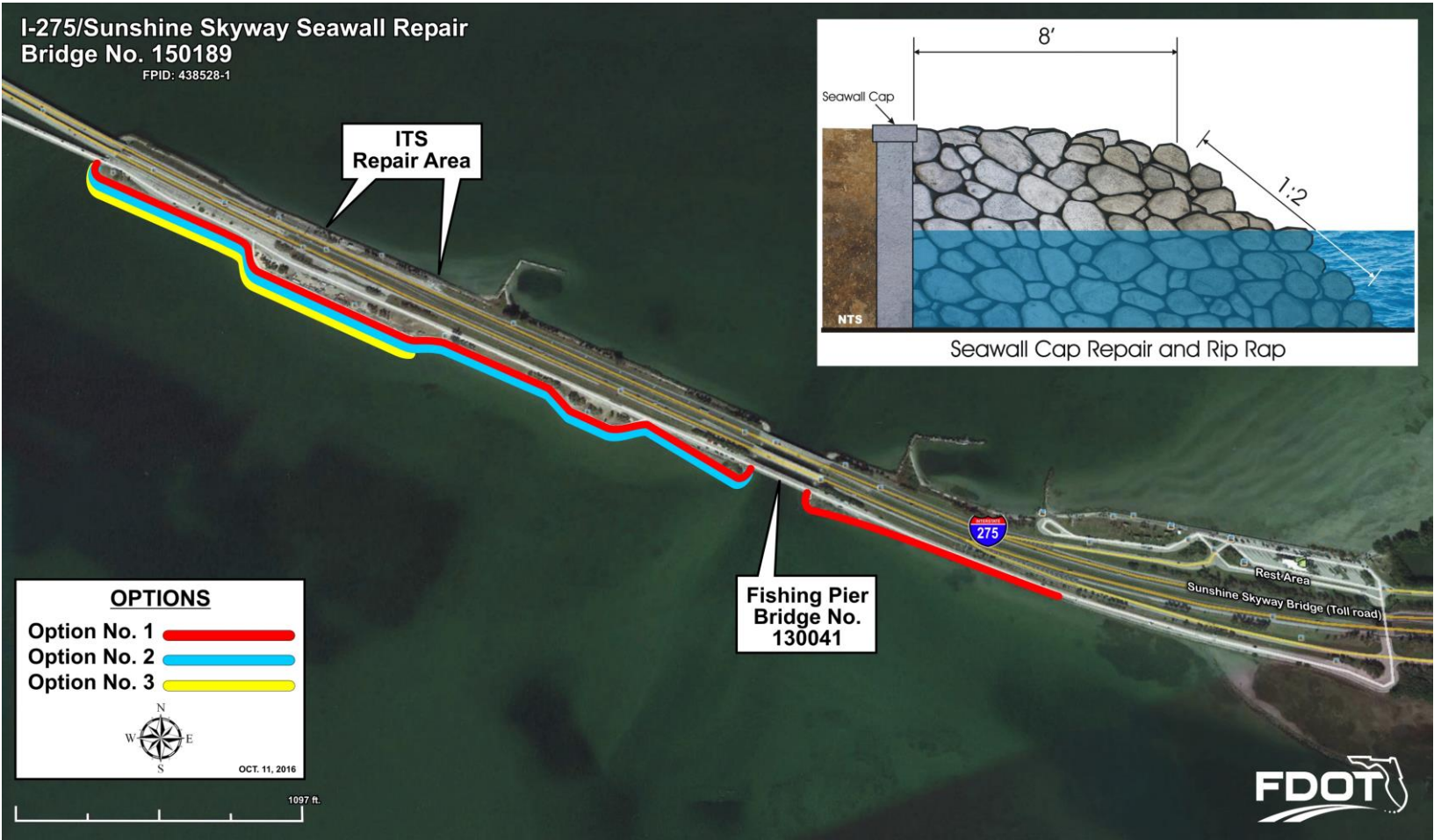
## **SEAWALL: FPID 438528-1:**

Per the Options defined above, remove and replace the existing seawall cap. Metallic reinforcement is not allowed. Non-metallic reinforcement must meet design criteria and specification requirements of the Fiber Reinforced Polymer Guidelines (FRPG) in Volume 4 of the FDOT Structures Manual. Incorporate existing sheet pile, tie-back rods and deadman anchors. Place erosion protection. The erosion protection shall require 8' of bank and shore material of 2.5 feet placed in front of the existing seawall with a 1:2 slope. The riprap is level with the top of the seawall elevation prior to the 1:2 slope. All drainage outlets shall remain open.



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# Seawall Cap Repair



Seawall Cap Repair Bid Options



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# Similar Repair Procedure – Cedar Key SR24 Bulkhead Rehabilitation



Installing 2-piece stirrup bars in bulkhead cap



Installing 2-piece stirrup bars in bulkhead cap



Plastic zip-ties for securing GFRP rebar



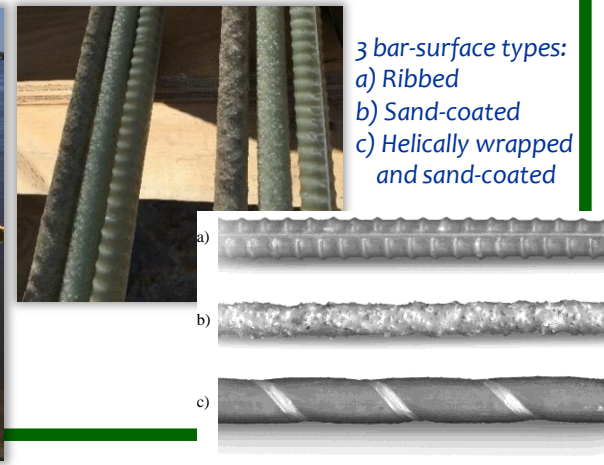
Curing concrete bulkhead cap prior to form removal



Temporary UV protection for bulkhead cap reinforcing



Forming bulkhead cap



3 bar-surface types:  
a) Ribbed  
b) Sand-coated  
c) Helically wrapped and sand-coated

# Seawall Modification – Manatee



Limits of Southeast Seawall  
Modification



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# Seawall Modification

## FPID 437973-1, South Rest Area Site:

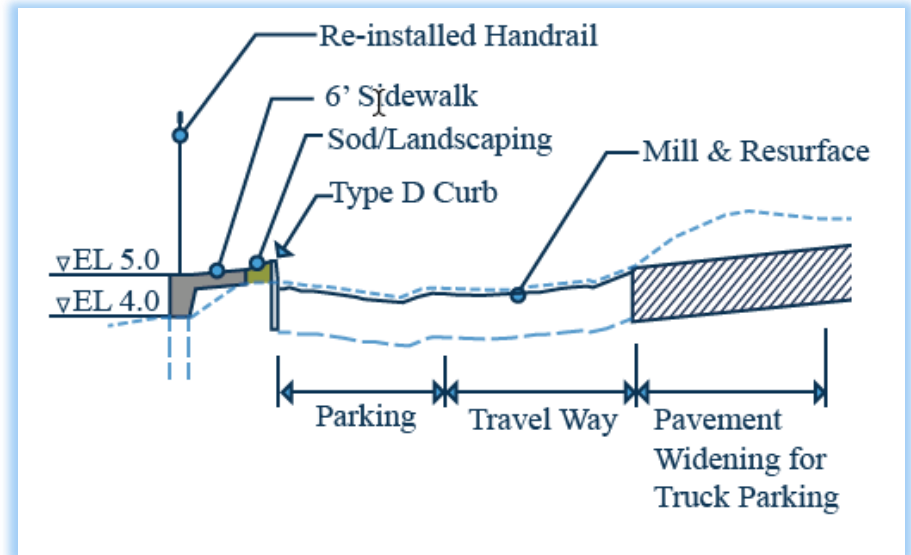
The existing seawall/handrail shall be raised to a minimum of 5.0 elevation and be ADA compliant between the proposed parking area and seawall/handrail. Extend the seawall southward 285' from the end of the existing seawall at the same 5.0 elevation. The seawall improvements and extension is approximately 1125 feet, see South Rest Area Seawall Limits. Fill behind the seawall to provide for a grassed area and grade for drainage. Metallic reinforcement is not allowed for reinforcement of the seawall cap. Reinforcement must meet design criteria and specification requirements of the Fiber Reinforced Polymer Guidelines (FRPG) in Volume 4 of the FDOT Structures Manual.



# Seawall Modification – Manatee



Existing Pedestrian Pathway



Proposed Improvements



# Barrier Wall Concept



Limits of Proposed Barrier Wall



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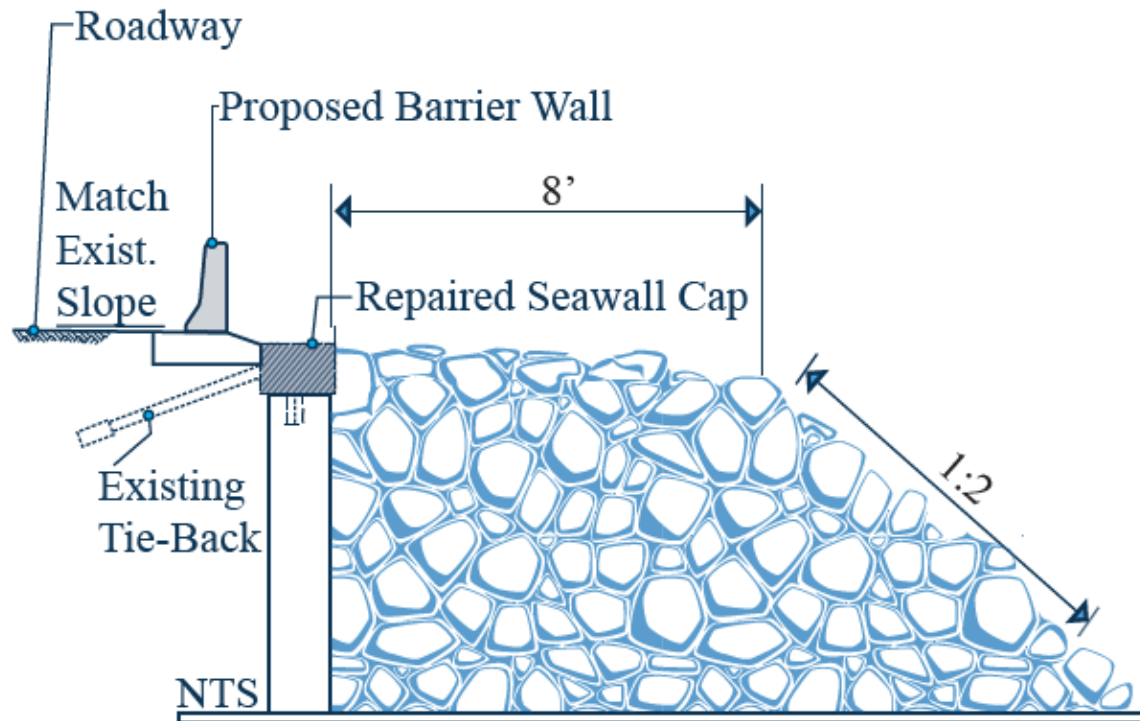
# Barrier Wall Concept

## From the RFP:

Along the fishing pier access road, remove the existing guardrail and repair any damaged shoulder area, install a barrier wall per the limits shown in the Barrier Wall Concept and Barrier Wall Limits. Three segments are proposed as noted in the Barrier Wall Limits. Segments 1 and 3 will tie into the existing guardrail while Segment 2 does not tie into the guardrail. The barrier wall within Segment 2 shall be adjacent to the seawall and the guardrail within Segment 2 shall remain in place. The barrier may be precast or cast-in-place using non-metallic reinforcement. Drainage slots will be required within the barrier limits to allow for water to run off the access road and shoulder.



# Barrier Wall Concept



## Design Criteria

- i. AASHTO Guide Spec.
- ii. NCHRP 350/MASH

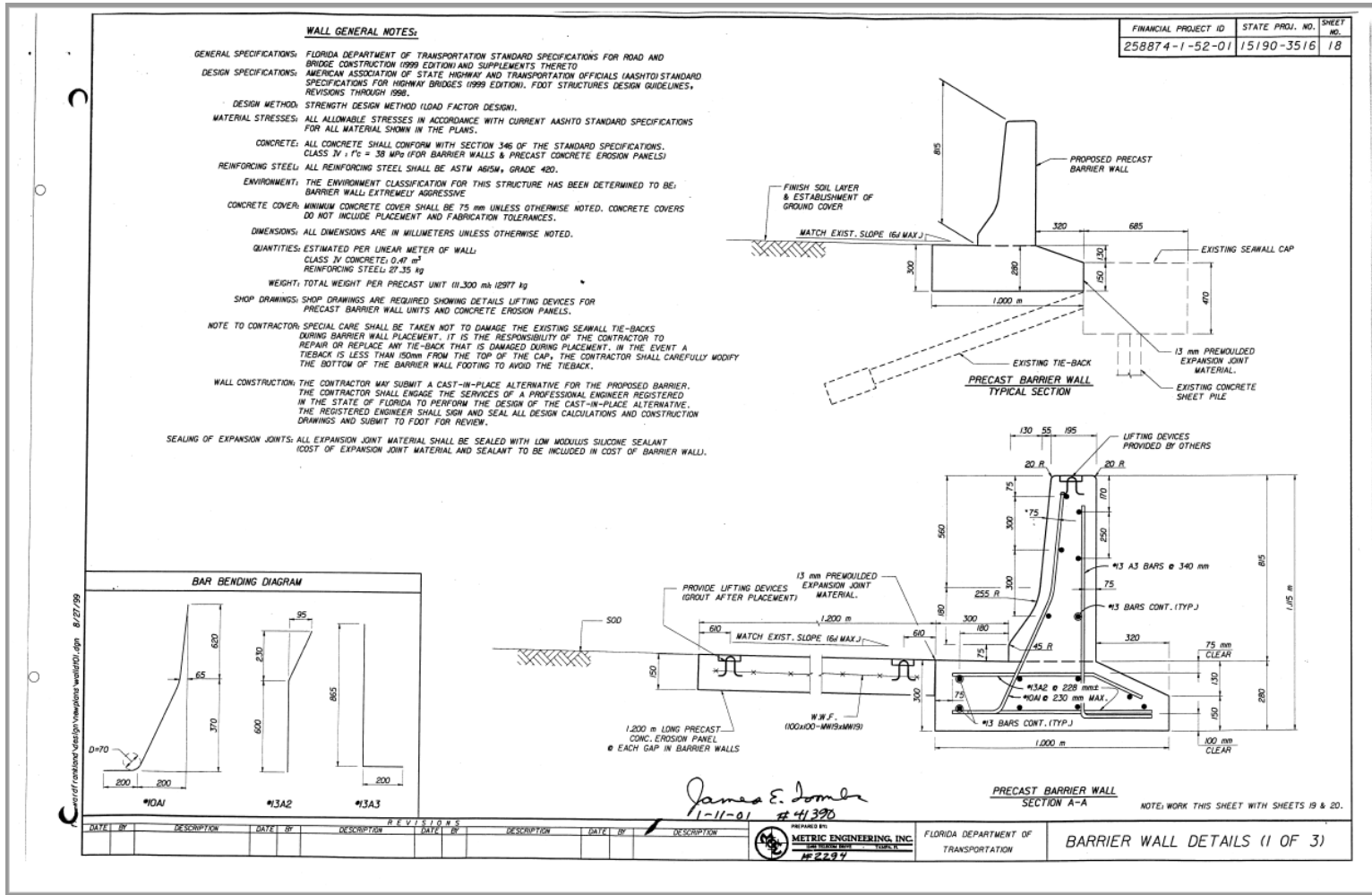
## Material Specifications

- i. GFRP Rebar – Dev932



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# Barrier Wall Concept



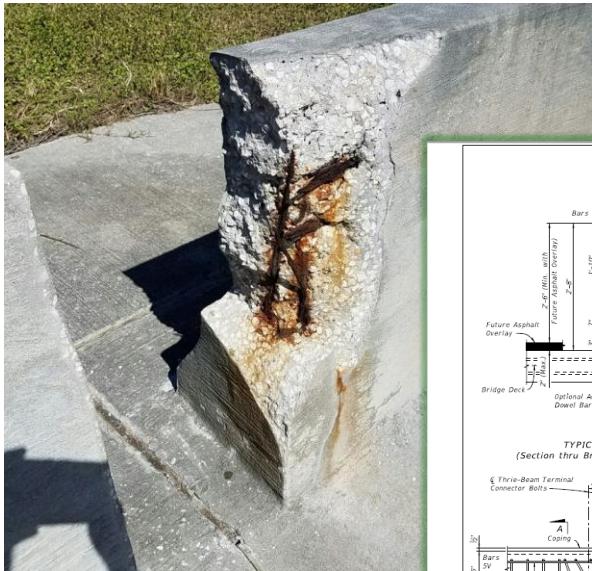
Original Concept

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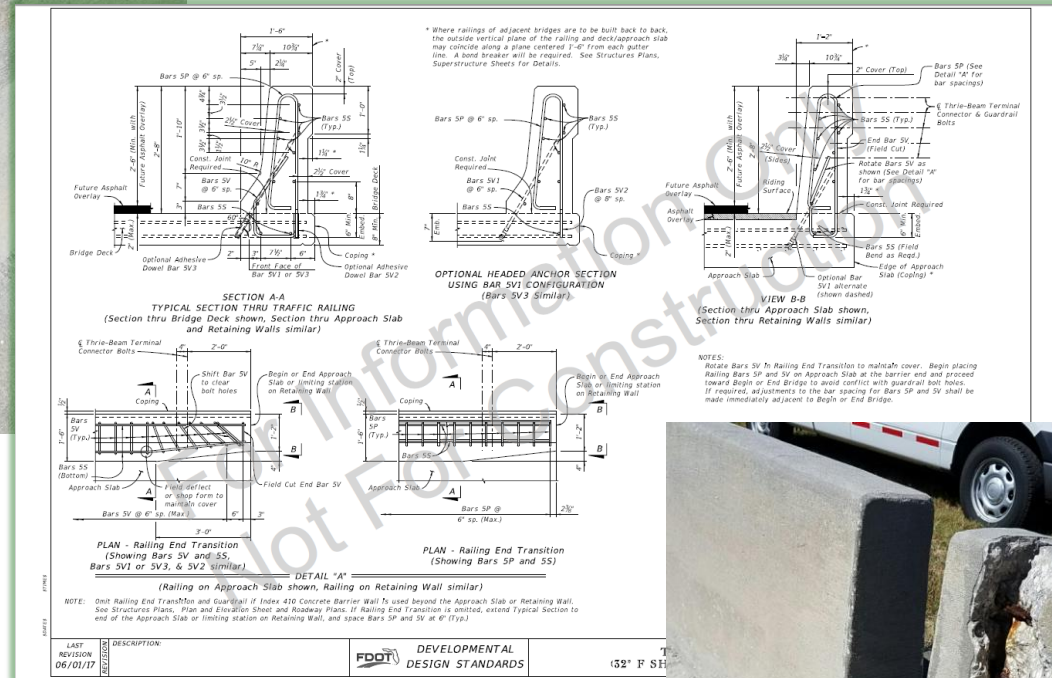




# Why FRP?



Initial cost is an obvious factor, but long-term maintenance and durability cannot be overlooked



Developmental Index  
No. D22420

The use of FRP Composites requires the prior approval of the State Structures Design Engineer (SSDE). Obtain concept approval before proceeding with any design efforts.



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# Why FRP?

## Per Section 2 of the Fiber Reinforced Polymer Guidelines:

A. GFRP and/or CFRP reinforcing bars may be used in the following concrete components when approved by the SSDE:

- Approach Slabs
- Bridge Decks and Bridge Deck overlays
- Cast-in-Place Flat Slab Superstructures
- Pile Bent Caps not in direct contact with water
- Pier Columns and Caps not in direct contact with water
- Retaining Walls, Noise Walls, Perimeter Walls
- Traffic Railings
- Pedestrian/Bicycle Railings
- Bulkheads and Bulkhead Copings with or without Traffic or Pedestrian/Bicycle Railings
- MSE Wall
- MSE Wall Copings with or without Traffic or Pedestrian/Bicycle Railings
- Drainage Structures



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# Why FRP?

## Construction and Material Specifications

### - Standard Specifications

- Implemented previous FRP Developmental Specifications
- **105** – Contractor Quality Control (FRP Producers)
- **400** Concrete (includes FRP Bar construction considerations);
- **415** Reinforcing for Concrete (FRP Bar construction considerations);
- **450** Precast Prestressed Concrete Construction (FRP Bars/Strand construction considerations);
- **471** FRP Fender Systems (Design Criteria and construction considerations);
- **932** Nonmetallic Accessory Materials for Concrete Pavement and Concrete Structures (GFRP and CFRP Bars material specs);
- **933** Prestressing Strand (CFRP Strand material specs)
- **973** FRP Composite Structural Shapes (material and fabrication requirements)



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# Looking Forward

## Promote the Use of FRP – Use it where you need it

### FDOT Transportation Innovation Challenge

#### Structures Design Office

Curved Precast Spliced U-Girder Bridges

**Fiber Reinforced Polymer Reinforcing**

Geosynthetic Reinforced Soil Integrated Bridge System

Geosynthetic Reinforced Soil Wall

Prefabricated Bridge Elements and Systems

Segmental Block Walls

*Structures Design - Transportation Innovation*  
Fiber Reinforced Polymer (FRP)  
Reinforcing Bars and Strands

[Overview](#)

[Usage Restrictions / Parameters](#)

[Design Criteria](#)

[Specifications](#)

[Standards](#)

[Producer Quality Control Program](#)

[Technology Transfer \(T<sup>2</sup>\)](#)

[Contact](#)

<http://www.fdot.gov/structures/innovation/FRP.shtm>

#### Technology Transfer (T<sup>2</sup>)

The following links to FDOT meetings, seminars and workshops are provide as background information for potential users and industry partners:

- [FDOT/FHWA Corrosion-Resistant Rebar \(CRRB\) Seminar](#) (July 17, 2012)
- [FHWA/NCHRP 20-68A U.S. Domestic Scan 13-03](#) meeting with FDOT (June 4-5, 2015)
- [FDOT-FRP Rebar Industry Workshop](#) (June 15, 2016)
- [Composites-Halls River Bridge Promotional Video for CAMX 2016](#) (September 26-29, 2016)
- [CAMX 2016: FDOT-FRP Deployment for Structural Applications \(for new construction\)](#) (September 29, 2016)
- [ACMA-Transportation Structures Council \(TSC\) Meeting - FDOT Presentation](#) (Sept. 29, 2016)
- FDOT/FTBA Construction Conference - FRP Presentation Schedule Pending (Feb. 2-3, 2017)
- [FDOT-CO Winter FRP-RC Workshop](#) (Feb. 3, 2017)
- [Halls River Bridge Replacement FRP Demonstration Project Workshop](#) (May 3, 2017)

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# Questions ?

## FDOT Contact Information:

### **Structures Design Office:**

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### **State Materials Office:**

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Ivan Lasa, B.S.C.E. (Corrosion Lab.)

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