

FLORIDA INLAND NAVIGATION DISTRICT



June 11, 2013

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JUN 24 2013

FL DEP
FORT PIERCE

Nicole Martin
Florida Dept. of Env. Protection
Submerged Lands & Env. Res. Prog.
3319 Maguire Blvd., Ste. 232
Orlando, Fl. 32803-3767

Cynthia E. Lott, Environmental Specialist III
FL Dept. of Environmental Protection/ SE District
Submerged Lands and Environmental Resource Permitting
1801 SE Hillmoor Drive, Suite C-204
Port St. Lucie, FL 34952

Dear Mrs. Martin and Mrs. Lott:

RE: File No. ERP 31-273920-001-EI, FIND IR-2 DMMA and
File No. 56-0255662-001, FIND SL-2 DMMA

Enclosed in accordance with the specific conditions of the referenced permits is the Baseline Mitigation Area Monitoring Report. Should you need to discuss this information please contact me.

Sincerely,

David K. Roach
Executive Director

Cc: Eric Summa, ACOE

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**FLORIDA INLAND NAVIGATION DISTRICT
DREDGE MATERIAL MANAGEMENT AREA
IR-2 MITIGATION AREA**

Indian River County, Florida

Baseline Mitigation Monitoring Report

**FDEP Permit #s 56-0255662-001, 31-0273920-001-EI, 31-
0273920-003-EM**

April 2013



Prepared for:

**Florida Inland Navigation District
Attn: David Roach, Mark Tamblyn
1314 Marcinski Road
Jupiter, Florida 33477**

Prepared by:

**Hobe Sound Environmental Consultants, Inc.
9512 S.E. Duncan Street
Hobe Sound, Florida 33455
(772) 545-3676
CELL (772) 260-0837
E-Mail: bobhsenv@gmail.com**

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NOTE: This Report, together with the concepts and design presented herein, as an instrument of service, is intended only for the specific purpose and Client for which it was prepared. Reuse of and improper reliance on this Report without written authorization and adaptation by Hobe Sound Environmental Consultants, Inc. shall be without liability to Hobe Sound Environmental Consultants, Inc.

**FLORIDA INLAND NAVIGATION DISTRICT
DREDGE MATERIAL MANAGEMENT AREA
IR-2 MITIGATION AREA
BASELINE MONITORING REPORT**

1.00 INTRODUCTION

The Florida Inland Navigation District (FIND) Dredge Material Management Area (DMMA) IR-2 mitigation area consists of approximately +/- 7.18 acres of land located north of CR 510, east of Federal Highway, and west of the Indian River Lagoon in Section 20, Township 31S, Range 39E, Sebastian, Indian River County, Florida (Figures 1, 2 and 3 of 9). The mitigation area is divided into three (3) areas: a mitigation area of 1.55 acres for DMMA IR-2 construction impacts, a mitigation area of 2.80 acres for DMMA SL-2 construction impacts and a 1.60 acre area for advanced mitigation of future impacts (Figure 4 -6 of 9).

Hobe Sound Environmental Consultants, Inc. (HSE) has been retained by FIND to conduct annual monitoring and prepare annual reports to comply with Florida Department of Environmental Protection (FDEP) Permit #s 56-0255662-001, ERP31-0273920-001-EI and ERP31-0273920-003-EM. The annual reports are being prepared to document the progress of the wetland mitigation area. The reports will include results of annual monitoring comprised of vegetation analysis, panoramic and quadrat photographs, and conclusions.

This is the baseline monitoring report completed by HSE for the DMMA IR-2 mitigation area. Data was collected for this report on 8 April 2013. Monitoring is scheduled annually in April of each year for a period of five (5) consecutive years. A final report will be submitted to the FDEP in April 2018. Table 1 depicts the monitoring schedule for this project site.

THIS DRAWING, TOGETHER WITH THE CONCEPTS AND DESIGN PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DRAWING WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY HOBE SOUND ENVIRONMENTAL CONSULTANTS, INC. SHALL BE WITHOUT LIABILITY TO HOBE SOUND ENVIRONMENTAL CONSULTANTS, INC.

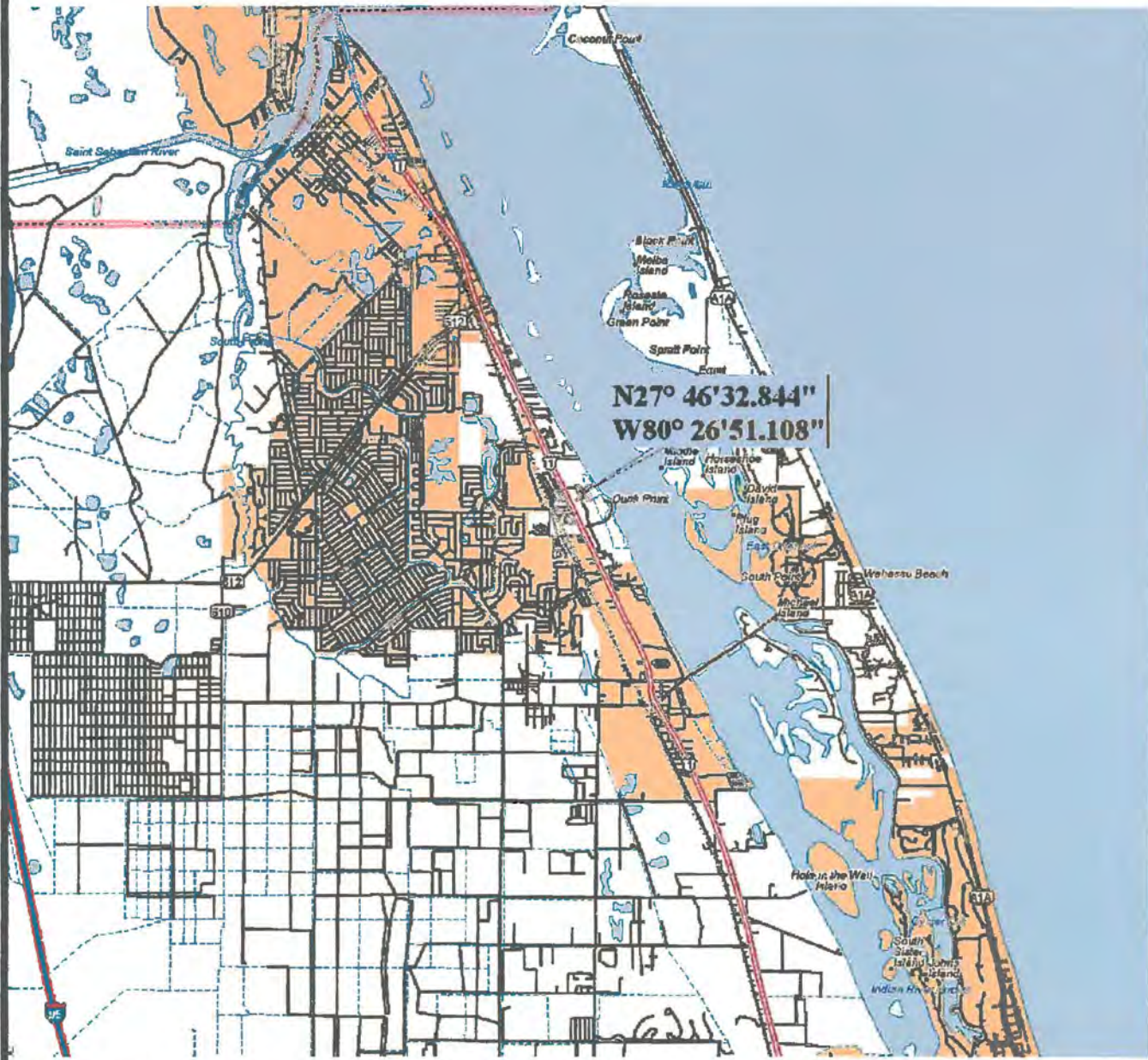
NOT A SURVEY



NORTH



SCALE: 1" = 18,000'



SOURCE: DELORME STREET ATLAS USA, DELUXE.

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.:	DRAWING NAME:	DATE:	FIGURE:
	20	31S	39E	HSE 13-005.01	01 - VIC MAP.DWG	9 APRIL 2013	1 OF 9

LATITUDE: 27°46'32.844"	LONGITUDE: -80°26'51.108"	DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW
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**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
PROJECT VICINITY MAP**

HSE Hobe Sound Environmental Consultants Inc.
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Hobe Sound, FL. 33455
(772) 545-3676, E-mail: bobhsenv@gmail.com

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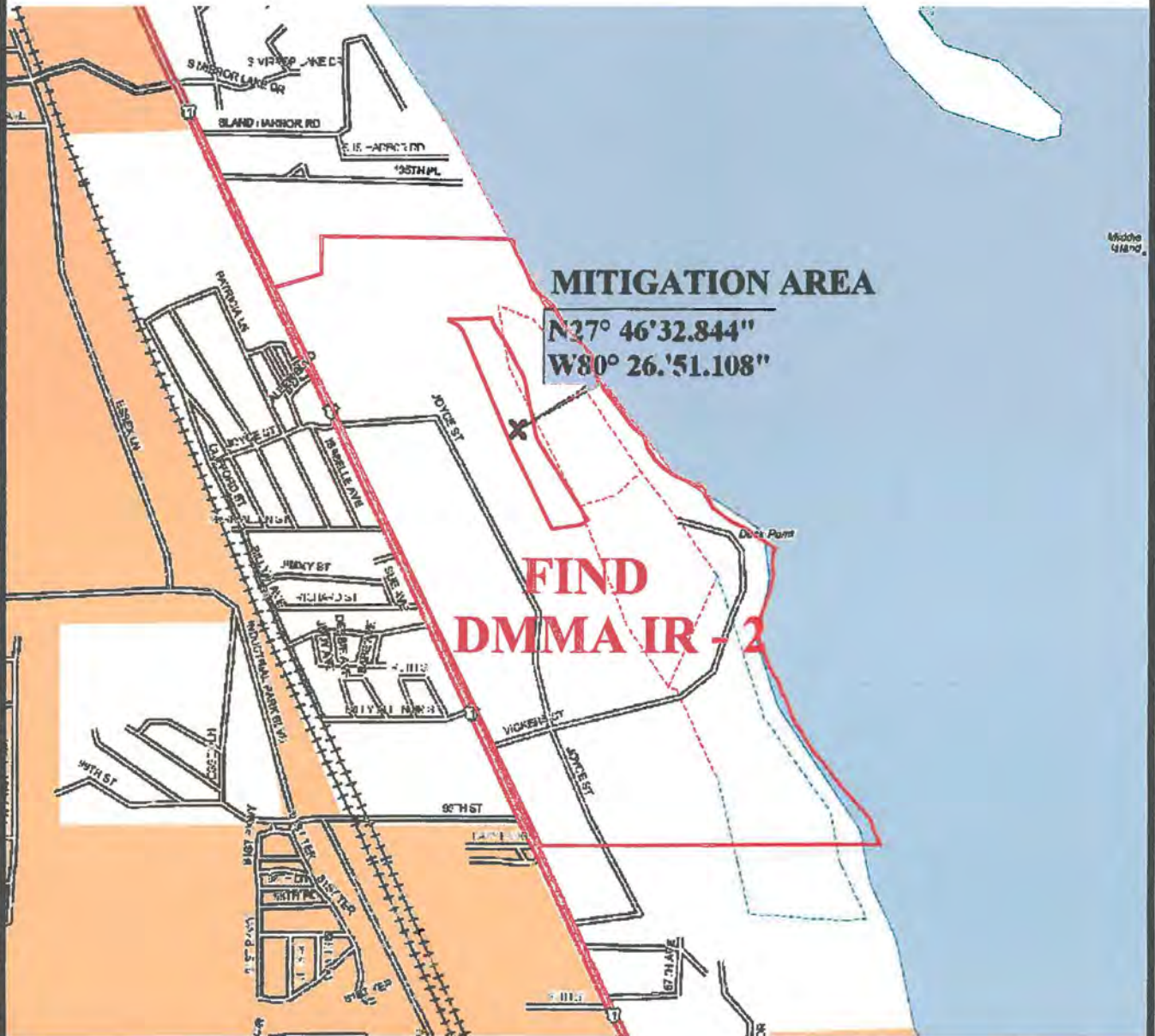
NOT A SURVEY



NORTH



SCALE: 1" = 1000'



SOURCE: DELORME STREET ATLAS USA, DELUXE

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.:	DRAWING NAME:	DATE:	FIGURE:
	20	31S	39E	HSE 13-005.01	02 - LOC MAP.DWG	9 APRIL 2013	2 OF 9
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
PROJECT LOCATION MAP**

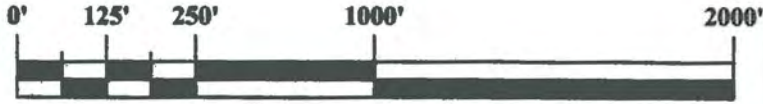
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NOT A SURVEY



NORTH



SCALE: 1" = 250'

LEGEND

- IR-2 - MITIGATION FOR DMMA IR-2 IMPACTS
(±1.55 ACRES)
- SL-2 - MITIGATION FOR DMMA SL-2 IMPACTS
(±2.80 ACRES)
- FM - ADVANCE MITIGATION FOR FUTURE IMPACTS
(±1.60 ACRES)



SOURCE: FDOT 2012 AERIAL PHOTOGRAPH, INDIAN RIVER COUNTY, FL.

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.:	DRAWING NAME:	DATE:	FIGURE:
	20	31S	39E	HSE 13-005.01	03 - 2012 AERIAL.DWG	9 APRIL 2013	3 OF 9

LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108" DESIGNED BY: RLW DRAWN BY: FRP CHECKED BY: RLW

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
2012 AERIAL PHOTOGRAPH**

HSE Hobe Sound Environmental Consultants Inc.
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Hobe Sound, FL. 33455
(772) 545-3676, E-mail: bobhsenv@gmail.com

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NORTH



SCALE: 1" = 300'



LEGEND



IR - 2



SL - 2



FUTURE MITIGATION (FM)

SOURCE: FDOT 2012 AERIAL PHOTOGRAPH

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: 04 - MITIGATION AREAS.DWG	DATE: 21 MARCH 2013	FIGURE: 4 OF 9
	20	31S	39E				

LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108" DESIGNED BY: RLW DRAWN BY: FRP CHECKED BY: RLW

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION
FDEP MITIGATION MONITORING BASELINE
MITIGATION AREAS, IR - 2, SL - 2 AND FUTURE MITIGATION**

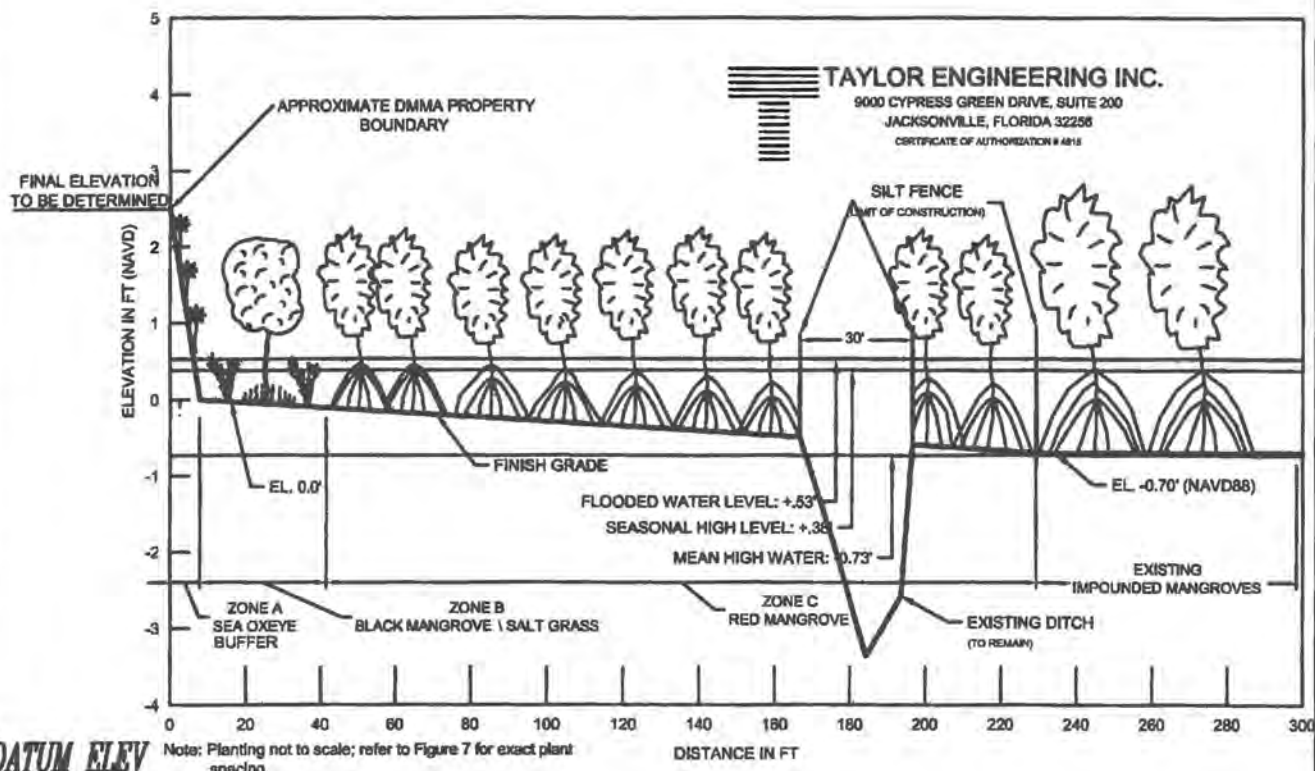
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TAYLOR ENGINEERING INC.
 9000 CYPRESS GREEN DRIVE, SUITE 200
 JACKSONVILLE, FLORIDA 32258
 CERTIFICATE OF AUTHORIZATION # 4816



DATUM ELEV
DATUM

SPECIES (COMMON NAME)	QUANTITY	SPACING (CENTER SPACING)	SIZE
SEA OXYEY DAISEY	10,800	1.5 FT	4 INCH POT
SALT GRASS	3,400	3 FT	ONE - YEAR PLANT
BLACK MANGROVES	300	10FT	ONE-YEAR PLANT
RED MANGROVES	2,500	10FT	3-FOOT STEM PLANT

SOURCE: MITIGATION PLAN BY: TAYLOR ENGINEERING INC. JACKSONVILLE, FLORIDA PERMITS # ERF31-8273928-001-E1, ERF31-8273928-003-EM AND 36-8255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: 05 - MITIGATION PLAN X SECTION	DATE: 21 MARCH 2013	FIGURE: 5 OF 9
	20	31S	39E				

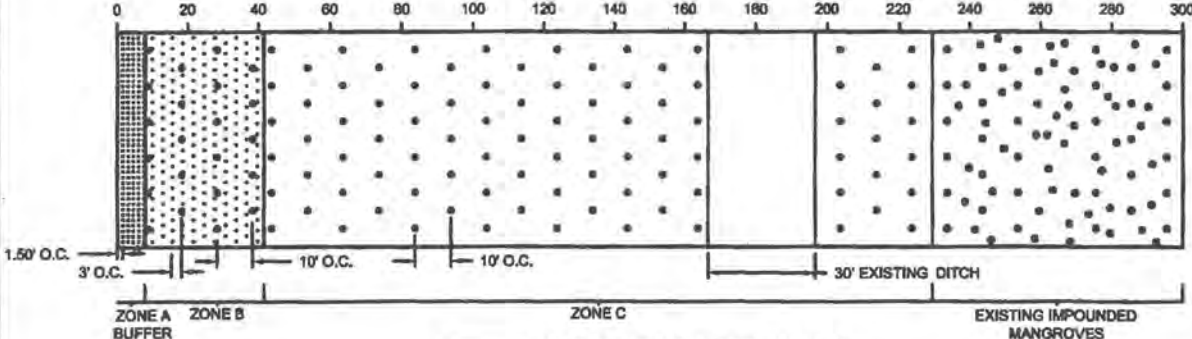
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108" DESIGNED BY: RLW DRAWN BY: FRP CHECKED BY: RLW

FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
MITIGATION PLAN CROSS SECTION

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NOT A SURVEY



TAYLOR ENGINEERING INC.
 9000 CYPRESS GREEN DRIVE, SUITE 200
 JACKSONVILLE, FLORIDA 32256
 CERTIFICATE OF AUTHORIZATION # 4512

LEGEND	
	Sea Oxeye (<i>Boerhaavia frutescens</i>) Buffer
	Black Mangrove (<i>Avicennia germinans</i>) Salt Grass (<i>Distichlis spicata</i>)
	Red Mangrove (<i>Rhizophora mangle</i>)

SOURCE: MITIGATION PLAN BY: TAYLOR ENGINEERING INC. JACKSONVILLE, FLORIDA PERMITS # ERF31-0273920-001-EI, ERF31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.:	DRAWING NAME:	DATE:	FIGURE:
	20	31S	39E	HSE 13-005.01	06 - MIT PLAN VIEW.DWG	21 MARCH 2013	6 OF 9

LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108" DESIGNED BY: RLW DRAWN BY: FRP CHECKED BY: RLW

**FLORIDA INLAND NAVIGATION DISTRICT
 DMMA IR - 2 MITIGATION AREA
 FDEP MITIGATION MONITORING BASELINE
 MITIGATION PLAN VIEW (TYPICAL)**

H S E Hobe Sound Environmental Consultants Inc.
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Table 1. Schedule of Monitoring Reports for the DMMA IR-2 Mitigation Area

<u>Report Number</u>	<u>Date</u>
Baseline Report	April 2013
Report #1	April 2014
Report #2	April 2015
Report #3	April 2016
Report #4	April 2017
Report #5 - FINAL	April 2018

2.00 METHODOLOGY

2.01 Vegetation

HSE established seventeen (17) monitoring transects on-site (Figures 7 and 8 of 9). The beginning of each transect was established with a wooden stake marked with the transect number. At the eastern and western ends of T5, T10 and T15, a 10' tall pvc pipe was stabilized by a 4' piece of rebar driven into the ground behind the stakes to serve as the panoramic photograph locations. Additionally, two (2) panoramic stations were set up at the north and south ends of the monitoring site utilizing the same methodology. Quadrats were set up at all panoramic photograph stations, for a total of eight (8) quadrats (Figure 7 of 9). The panoramic photograph station locations and the SW corner of each quadrat were located using a Garmin GPSMAP175 global positioning system (GPS) unit. The approximate GPS position coordinates for the transects are provided as Table 2 in Figure 8 of 9. The GPS position coordinates for the panoramic photostations and the quadrats can be found as Table 3 in Figure 9 of 9. Plants were identified to species when possible and results were recorded. Within each sample quadrat, the relative plant abundance was estimated and recorded according to the percent-coverage. For a particular sample quadrat, biologists recorded the percent-coverage of all vegetative species or plant groupings observed.

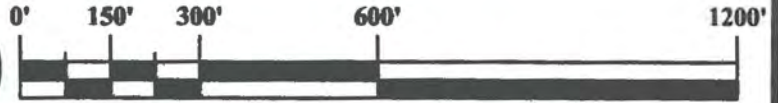
Biologists will conduct annual (April) vegetation surveys of the quadrats for a period of five (5) years. Sample quadrats on the west side of the site are 33 feet × 33 feet (1089 sq. feet), while sample quadrats on the east side of the site in the open water are 10 feet x 10 feet (100 square feet).

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NOT A SURVEY



NORTH



SCALE: 1" = 300'



LEGEND

- Q-1-5 ■ - SAMPLE QUADRAT LOCATION (30' X 30')
- Q-6-8 * - SAMPLE QUADRAT LOCATION (10' X 10')
- P-1-8 📷 - PANORAMIC PHOTOGRAPH LOCATION
- 1-17 ● - TRANSECT LOCATION

SOURCE: 2012 FDOT AERIAL PHOTOGRAPH

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.:	DRAWING NAME:	DATE:	FIGURE:
	20	31S	39E	HSE 13-005.01	07 - TRAN LOC.DWG	9 APRIL 2013	7 OF 9

LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108" DESIGNED BY: RLW DRAWN BY: FRP CHECKED BY: RLW

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
VEGETATION SAMPLE QUADRATS & PANORAMIC PHOTOGRAPH LOCATIONS**

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TABLE: 2 TRANSECT GPS COORDINATES

TRANSECT # 01	MITIGATION AREA IR-2	LATITUDE: 27°46'47.712" LONGITUDE: -80°26'50.388"	TRANSECT # 10	MITIGATION AREA SL-2	LATITUDE: 27°46'53.940" LONGITUDE: -80°26'53.592"
TRANSECT # 02	MITIGATION AREA IR-2	LATITUDE: 27°46'48.468" LONGITUDE: -80°26'50.676"	TRANSECT # 11	MITIGATION AREA SL-2	LATITUDE: 27°46'54.660" LONGITUDE: -80°26'53.880"
TRANSECT # 03	MITIGATION AREA IR-2	LATITUDE: 27°46'49.188" LONGITUDE: -80°26'51.108"	TRANSECT # 12	MITIGATION AREA SL-2	LATITUDE: 27°46'55.308" LONGITUDE: -80°26'54.240"
TRANSECT # 04	MITIGATION AREA IR-2	LATITUDE: 27°46'49.908" LONGITUDE: -80°26'51.432"	TRANSECT # 13	MITIGATION AREA SL-2	LATITUDE: 27°46'55.992" LONGITUDE: -80°26'54.456"
TRANSECT # 05	MITIGATION AREA IR-2	LATITUDE: 27°46'50.628" LONGITUDE: -80°26'51.864"	TRANSECT # 14	MITIGATION AREA SL-2	LATITUDE: 27°46'56.640" LONGITUDE: -80°26'54.888"
TRANSECT # 06	MITIGATION AREA SL-2	LATITUDE: 27°46'51.312" LONGITUDE: -80°26'52.188"	TRANSECT # 15	MITIGATION AREA SL-2	LATITUDE: 27°46'57.360" LONGITUDE: -80°26'55.248"
TRANSECT # 07	MITIGATION AREA SL-2	LATITUDE: 27°46'51.888" LONGITUDE: -80°26'52.548"	TRANSECT # 16	MITIGATION AREA SL-2	LATITUDE: 27°46'57.864" LONGITUDE: -80°26'55.500"
TRANSECT # 08	MITIGATION AREA SL-2	LATITUDE: 27°46'52.572" LONGITUDE: -80°26'52.944"	TRANSECT # 17	MITIGATION AREA SL-2	LATITUDE: 27°46'58.692" LONGITUDE: -80°26'55.824"
TRANSECT # 09	MITIGATION AREA SL-2	LATITUDE: 27°46'53.292" LONGITUDE: -80°26'53.304"			

SOURCE: HSE

PERMITS # ERP31-0273920-001-E1, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC. 20	TWP. 31S	R. 39E	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: 08 - TRAN LOC.DWG	DATE: 9 APRIL 2013	FIGURE: 8 OF 9
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
TRANSECT LOCATION GPS COORDINATES**

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TABLE: 3 PANORAMIC PHOTOGRAPH AND QUADRAT GPS COORDINATES

PANORAMIC PHOTOGRAPH STATION # 01	MITIGATION AREA IR-2	LATITUDE: 27°46'47.431" LONGITUDE: -80°26'49.037"	PANORAMIC PHOTOGRAPH STATION # 05	MITIGATION AREA SL-1	LATITUDE: 27°47'00.568" LONGITUDE: -80°26'55.664"
PANORAMIC PHOTOGRAPH STATION # 02	MITIGATION AREA IR-2	LATITUDE: 27°46'50.628" LONGITUDE: -80°26'51.864"	PANORAMIC PHOTOGRAPH STATION # 06	MITIGATION AREA FM	LATITUDE: 27°46'58.036" LONGITUDE: -80°26'52.960"
PANORAMIC PHOTOGRAPH STATION # 03	MITIGATION AREA SL-2	LATITUDE: 27°46'53.940" LONGITUDE: -80°26'53.592"	PANORAMIC PHOTOGRAPH STATION # 07	MITIGATION AREA FM	LATITUDE: 27°46'54.669" LONGITUDE: -80°26'51.664"
PANORAMIC PHOTOGRAPH STATION # 04	MITIGATION AREA SL-2	LATITUDE: 27°46'57.360" LONGITUDE: -80°26'55.248"	PANORAMIC PHOTOGRAPH STATION # 08	MITIGATION AREA FM	LATITUDE: 27°46'51.276" LONGITUDE: -80°26'49.920"
SAMPLE QUADRAT STATION # 01	MITIGATION AREA SL-2	LATITUDE: 27°46'47.550" LONGITUDE: -80°26'49.408"	SAMPLE QUADRAT STATION # 05	MITIGATION AREA FM	LATITUDE: 27°46'59.664" LONGITUDE: -80°26'55.860"
SAMPLE QUADRAT STATION # 02	MITIGATION AREA SL-2	LATITUDE: 27°46'50.448" LONGITUDE: -80°26'51.612"	SAMPLE QUADRAT STATION # 06	MITIGATION AREA FM	LATITUDE: 27°46'58.036" LONGITUDE: -80°26'52.960"
SAMPLE QUADRAT STATION # 03	MITIGATION AREA SL-2	LATITUDE: 27°46'54.012" LONGITUDE: -80°26'52.584"	SAMPLE QUADRAT STATION # 07	MITIGATION AREA FM	LATITUDE: 27°46'54.669" LONGITUDE: -80°26'51.664"
SAMPLE QUADRAT STATION # 04	MITIGATION AREA SL-2	LATITUDE: 27°46'57.432" LONGITUDE: -80°26'54.024"	SAMPLE QUADRAT STATION # 08	MITIGATION AREA FM	LATITUDE: 27°46'51.276" LONGITUDE: -80°26'49.920"

SOURCE: RLW

PERMITS # ERP31-0273920-001-EJ, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC. 20	TWP. 31S	R. 39E	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: 09 - TRAN LOC.DWG	DATE: 9 APRIL 2013	FIGURE: 9 OF 9
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LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108" DESIGNED BY: RLW DRAWN BY: FRP CHECKED BY: RLW

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
PANORAMIC PHOTOGRAPH & QUADRAT GPS LOCATIONS**

H S E Hobe Sound Environmental Consultants Inc.
9512 SE Duncan Street
Hobe Sound, FL. 33455
(772) 545-3676, E-mail: bobhsenv@gmail.com

2.02 Photographic Documentation

Panoramic and quadrat photographs were taken at the locations shown in Figures 7 and 9 of 9. Each quadrat photograph includes a range pole marked in 12" intervals. This will allow the vertical growth of species to be followed accurately during the monitoring period.

2.03 Exotic Species

Exotic and nuisance species such as those listed by the Florida Exotic Pest Council's Category I Invasive Exotic Species List were noted by biologists and are addressed in the recommendations section.

3.00 RESULTS

3.01 Vegetation

The mitigation area is dominated by native vegetation including, but not limited to, white mangrove (*Laguncularia racemosa*), red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), three square bulrush (*Scirpus americanus*) and salt grass (*Distichlis spicata*). Areas along the west berm behind the photostations and on the islands between the cuts are dominated by sea oxeye daisy (*Borrchia frutescens*), with red, black and white mangrove on the islands. Vegetation appeared healthy and free of insect damage or any other relative forms of stress at the time of monitoring. Additionally, mangrove species, especially white mangrove, and other desirable native wetland species including herb-of-grace (*Bacopa monnieri*) and fragrant flatsedge (*Cyperus odoratus*) were observed naturally recruiting throughout the mitigation area. There is one grass that has been potentially identified as fall panicgrass, but this identification is not positive. A sample will be sent to a grass expert for positive identification and the information will be forwarded to the Department as soon as it is received.

The red mangroves that were planted in the open water area east of the cuts show evidence of stress. Many are dead and the remainder are struggling. Please refer to the panoramic photographs of quadrats 6-8, Appendix A, Figures 3 and 4 of 4.

Cattail (*Typha* sp.) is the dominant invasive species within the conservation area. For additional information on exotic vegetation, please refer to Section 3.03. Comparative analysis will be conducted of vegetation and relative conditions during the next monitoring event and will begin to reveal if the permit success criteria is being met, as required, within five (5) years of this baseline report. Results of the vegetation transects are shown in Table 4.

3.02 Photographic Documentation

The panoramic and quadrat photographs (Appendix A) illustrate conditions within the mitigation area.

3.03 Exotic/Nuisance Vegetation

Currently, coverage of the exotic cattail is light to moderate throughout portions of the mitigation area. Collectively, cattail exists at approximately 10% coverage throughout the extent of the mitigation area. Other exotic/nuisance species observed at <5% coverage include torpedo grass (*Panicum repens*) and alligatorweed (*Alternanthera philoxeroides*). It should be noted that a relatively strong seed source for cattail exists just outside of the mitigation area, therefore making invasion by this species an on-going problem which will need constant maintenance. All of the observed exotic species are aggressive and can quickly out-compete desirable, native vegetation. An exotic and nuisance species management plan will be implemented and will continue at routine intervals to efficiently eradicate and/or control these species. Continued treatment of the mitigation area will likely increase recruitment of desirable native vegetation within the mitigation area and

Table 4. Vegetation Transect Results for the Florida Inland Navigation District DMMA IR-2 Mitigation Area

Quadrat 1, Water depth: 0"

Common Name	Scientific Name	Percent-Coverage	Vegetative Index
		Baseline Report (4/13)	
Herb-of-grace	<i>Bacopa monnieri</i>	25	OBL
Fragrant flatsedge	<i>Cyperus odoratus</i>	15	FACW
Rosy camphorweed	<i>Pluchea baccharis</i>	<5	FACW
White mangrove	<i>Laguncularia racemosa</i>	5	OBL
Red mangrove	<i>Rhizophora mangle</i>	<5	OBL
Black mangrove	<i>Avicennia germinans</i>	<5	OBL
Bare ground	n/a	5	FAC
Cattail	<i>Typha sp.</i>	<5	OBL
Saltgrass	<i>Distichlis spicata</i>	5	OBL
Fall panicgrass	<i>Panicum dichotomiflorum</i>	25	FACW
Blue-green algae	<i>Cyanobacteria</i>	15	NI
Saltwort	<i>Batis maritima</i>	<5	OBL

Quadrat 2, Water depth: 0 - 0.5"

Common Name	Scientific Name	Percent-Coverage	Vegetative Index
		Baseline Report (04/13)	
White mangrove	<i>L. racemosa</i>	5	OBL
Red mangrove	<i>R. mangle</i>	<5	OBL
Black mangrove	<i>A. germinans</i>	<5	OBL
Saltgrass	<i>D. spicata</i>	60	OBL
Fragrant flatsedge	<i>C. odoratus</i>	15	FACW
Cattail	<i>Typha sp.</i>	<5	OBL
Sea oxeye daisy	<i>Borrchia frutescens</i>	<5	OBL
Herb-of-grace	<i>B. monnieri</i>	<5	OBL
Blue-green algae	<i>Cyanobacteria</i>	5	NI
Alligatorweed	<i>Alternanthera philoxeroides</i>	10	OBL

Table 4. continued.

Quadrat 3, Water depth: 0.5 - 1.0"

Common Name	Scientific Name	Percent-Coverage	Vegetative Index
		Baseline Report (04/13)	
White mangrove	<i>L. racemosa</i>	<5	OBL
Red mangrove	<i>R. mangle</i>	5	OBL
Fragrant flatsedge	<i>C. odoratus</i>	5	FACW
Rosy camphorweed	<i>P. baccharis</i>	<5	FACW
Alligatorweed	<i>A. philoxeroides</i>	5	OBL
Saltgrass	<i>D. spicata</i>	55	OBL
Cattail	<i>Typha sp.</i>	25	OBL

Quadrat 4, Water depth: 0 - 1"

Common Name	Scientific Name	Percent-Coverage	Vegetative Index
		Baseline Report (04/13)	
Fall panicgrass	<i>P. dichotomiflorum</i>	25	OBL
Bare ground	<i>n/a</i>	20	n/a
Blue-green algae	<i>Cyanobacteria</i>	45	NI
Open water	<i>n/a</i>	5	n/a
Red mangrove	<i>R. mangle</i>	<5	OBL
White mangrove	<i>L. racemosa</i>	<5	OBL

Quadrat 5; Water depth: 0"- saturated to surface

Common Name	Scientific Name	Percent-Coverage	Vegetative Index
		Baseline Report (04/13)	
White mangrove	<i>Laguncularia racemosa</i>	10	OBL
Black mangrove	<i>A. germinans</i>	<5	OBL
Red mangrove	<i>R. mangle</i>	<5	OBL
Saltgrass	<i>D. spicata</i>	20	OBL
Fragrant flatsedge	<i>C. odoratus</i>	5	FACW

Table 4. continued.

Alligatorweed	<i>Alternanthera philoxeroides</i>	<5	OBL
Sea blite	<i>S. linearis</i>	5	OBL
Bare ground	<i>n/a</i>	5	n/a
Blue-green algae	<i>n/a</i>	10	NI
Herb-of-grace	<i>B. monnieri</i>	10	OBL
Fall panicgrass	<i>P. dichotomiflorum</i>	25	FACW

Quadrat 6; Water Depth: 4-10"

Common Name	Scientific Name	Percent-Coverage	Vegetative Index
		Baseline Report (04/13)	
Red mangrove	<i>R. mangle</i>	<5 (1 dead)	OBL
Open water	<i>n/a</i>	100	n/a

Quadrat 7; Water Depth: 3-8"

Common Name	Scientific Name	Percent-Coverage	Vegetative Index
		Baseline Report (04/13)	
Red mangrove	<i>R. mangle</i>	<5 (1 dead)	OBL
Open water	<i>n/a</i>	100	n/a

Quadrat 7; Water Depth: 3-8"

Common Name	Scientific Name	Percent-Coverage	Vegetative Index
		Baseline Report (04/13)	
Red mangrove	<i>R. mangle</i>	<5	OBL
Torpedo grass	<i>Panicum repens</i>	<5	FACW
Open water	<i>n/a</i>	95	n/a

OBL - Obligate
UP - Upland

FAC - Facultative
NI - Non-indicator

FACW - Facultative wet

aid in remaining in compliance with FDEP Permit #s 56-0255662-001, ERP31-0273920-001-EI and ERP31-0273920-003-EM. Recruitment of desirable native species should occur quickly once the cattails are eradicated, as they should spread through both seed and existing rhizomes throughout the mitigation area.

4.00 CONCLUSIONS/RECOMMENDATIONS

- The mitigation area west of the east berm is dominated by native species such as white, black and red mangroves, saltgrass and three-square bulrush
- The mitigation area east of the east berm is dominated by sea oxeye daisy and mangroves on the higher areas, with some red mangroves in the water.
- Native vegetation, such as fragrant flatsedge and herb-of-grace, is naturally recruiting into the mitigation area.
- Native vegetation appears healthy and free of insect damage or any other forms of relative stress at the time of this monitoring event.
- The planted red mangroves within the mitigation area east of the east berm are struggling. By the next monitoring event, it should be more obvious how many plants have survived.
- One grass (potentially fall panicgrass) was not definitively identified and will be sent to a grass expert for positive identification. The Department will be notified as soon as this information is received.
- Cattails were observed at an areal coverage of approximately $\pm 10\%$ throughout the extent of the western mitigation area. This is a very aggressive exotic species and special attention should be placed on the control/treatment of it within the mitigation area. There is a large seed source of cattail directly adjacent to the mitigation area on the west side of the access road, so maintenance to keep this species under control will need to be on-going.
- Torpedo grass and alligator weed were observed within the mitigation area at $< 5\%$.
- An exotic/nuisance management plan will be implemented and maintenance will be on-going.

- FDEP permit success criteria will be met if desirable native vegetation exists at 95% within the mitigation area within five (5) years of the baseline report, and exotic/nuisance vegetation is being maintained at an aerial coverage of less than 5%.
- The next monitoring event is scheduled to occur in April 2014.

5.00 CERTIFICATION

This report represents a true, accurate and representative description of the activities and site conditions at the time of this report.

Freda R. Posin

**Freda R. Posin
Senior Environmental Specialist
Hobe Sound Environmental Consultants, Inc**

9 April 2013

**FLORIDA
INLAND NAVIGATION
DISTRICT (FIND)**

**APPENDIX: A
PANORAMIC PHOTOGRAPHS**

**FDEP MITIGATION MONITORING
DMMA IR - 2 MITIGATION AREA
PERMITS # ERP31-0273920-001-EI
ERP31-0273920-003-EM AND 56-0255662-001**

THIS DRAWING, TOGETHER WITH THE CONCEPTS AND DESIGN PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DRAWING WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY HOBE SOUND ENVIRONMENTAL CONSULTANTS, INC. SHALL BE WITHOUT LIABILITY TO HOBE SOUND ENVIRONMENTAL CONSULTANTS, INC.



PANORAMIC PHOTOGRAPH #1: VIEW TO NORTH, PAN WEST TO EAST



PANORAMIC PHOTOGRAPH #2: VIEW TO EAST, PAN NORTH TO SOUTH

SOURCE: HSE

PERMITS # ERP31-0273920-001-XI, ERP31-0273920-003-EM AND 56-0255662-001

LATITUDE: N27°46'32.844	LONGITUDE: W080° 26'51.100	DESIGNED BY: RLW	DRAWN BY: MGS			CHECKED BY: FRP
FLORIDA INLAND NAVIGATION DISTRICT DMMA IR - 2 MITIGATION AREA	INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: 13-005.01	
		20	31S	39E		
FDEP MITIGATION MONITORING BASELINE PANORAMIC PHOTOGRAPHS 1 AND 2	DRAWING NAME: PAN-PHOTO 1-8.DWG	DATE: 21 MARCH 2013		APPENDIX : A 1 OF 4		

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PANORAMIC PHOTOGRAPH #3: VIEW TO EAST, PAN NORTH TO SOUTH



PANORAMIC PHOTOGRAPH #4: VIEW TO EAST, PAN NORTH TO SOUTH

SOURCE: HSE

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

LATITUDE: N27°46'32.844	LONGITUDE: W080° 26'51.100	DESIGNED BY: RLW	DRAWN BY: MGS			CHECKED BY: FRP
FLORIDA INLAND NAVIGATION DISTRICT DMMA IR - 2 MITIGATION AREA	INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: 13-005.01	
		20	31S	39E		
FDEP MITIGATION MONITORING BASELINE PANORAMIC PHOTOGRAPHS 3 AND 4	DRAWING NAME: PAN-PHOTO 1-&.DWG	DATE: 21 MARCH 2013		APPENDIX : A 2 OF 4		

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PANORAMIC PHOTOGRAPH #5: VIEW TO SOUTH, PAN EAST TO WEST



PANORAMIC PHOTOGRAPH #6: VIEW TO WEST, PAN SOUTH TO NORTH

SOURCE: HSE

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

LATITUDE: N27°46'32.844	LONGITUDE: W089° 26'51.100	DESIGNED BY: RLW	DRAWN BY: MGS			CHECKED BY: FRP
FLORIDA INLAND NAVIGATION DISTRICT DMMA IR - 2 MITIGATION AREA	INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.:	
		20	31S	39E	13-005.01	
FDEP MITIGATION MONITORING BASELINE PANORAMIC PHOTOGRAPHS 5 AND 6	DRAWING NAME: PAN-PHOTO 1-8.DWG	DATE: 21 MARCH 2013		APPENDIX : A 3 OF 4		

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PANORAMIC PHOTOGRAPH #7: VIEW TO WEST, PAN SOUTH TO NORTH



PANORAMIC PHOTOGRAPH #8: VIEW TO WEST, PAN SOUTH TO NORTH

SOURCE: HSE

PERMITS # ERP31-0273920-001-XI, ERP31-0273920-003-EM AND 56-0255662-001

LATITUDE: N27°46'32.844	LONGITUDE: W080° 26'51.108	DESIGNED BY: RLW	DRAWN BY: MGS			CHECKED BY: FRP
FLORIDA INLAND NAVIGATION DISTRICT DMMA IR - 2 MITIGATION AREA FDEP MITIGATION MONITORING BASELINE PANORAMIC PHOTOGRAPHS 7 AND 8	INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: 13-005.01	
		20	31S	39E		
DRAWING NAME: PAN-PHOTO 1-8.DWG		DATE: 21 MARCH 2013		APPENDIX : A 4 OF 4		

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**FLORIDA
INLAND NAVIGATION
DISTRICT (FIND)**

**APPENDIX: B
QUADRAT PHOTOGRAPHS**

**FDEP MITIGATION MONITORING
DMMA IR-2 MITIGATION AREA
PERMITS # ERP31-0273920-001-EI
ERP31-0273920-003-EM AND 56-0255662-001**

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SOURCE: PHOTOGRAPHS BY HSE



SAMPLE QUADRAT #1: VIEW TO EAST



SAMPLE QUADRAT #1: VIEW TO NORTH

PERMITS # ERP31-0273920-001-EI , ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: APP - B PHOTOGRAPHS.DWG	DATE:	APPENDIX B; PHOTOS 1 OF 8
	20	31S	39E			28 MARCH 2013	
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
SAMPLE QUADRAT #1**

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SOURCE: PHOTOGRAPHS BY HSE



SAMPLE QUADRAT #2: VIEW TO EAST



SAMPLE QUADRAT #2: VIEW TO NORTH

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: APP - B PHOTOGRAPHS.DWG	DATE: 28 MARCH 2013	APPENDIX B; PHOTOS 2 OF 8
	20	31S	39E				
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
SAMPLE QUADRAT # 2**

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SOURCE: PHOTOGRAPHS BY HSE



SAMPLE QUADRAT #3: VIEW TO EAST



SAMPLE QUADRAT #3: VIEW TO NORTH

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: APP - B PHOTOGRAPHS.DWG	DATE:	APPENDIX B; PHOTOS 3 OF 8
	20	31S	39E			28 MARCH 2013	
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
SAMPLE QUADRAT # 3**

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SAMPLE QUADRAT #4: VIEW TO EAST



SAMPLE QUADRAT #4: VIEW TO NORTH

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: APP - B PHOTOGRAPHS.DWG	DATE: 28 MARCH 2013	APPENDIX B; PHOTOS 4 OF 8
	20	31S	39E				
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
SAMPLE QUADRAT # 4**

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SAMPLE QUADRAT #5: VIEW TO EAST



SAMPLE QUADRAT #5: VIEW TO NORTH

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: APP - B PHOTOGRAPHS.DWG	DATE: 28 MARCH 2013	APPENDIX B; PHOTOS 5 OF 8
	20	31S	39E				
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
SAMPLE QUADRAT #5**



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SOURCE PHOTOGRAPHS BY HSE



SAMPLE QUADRAT #6: VIEW TO WEST



SAMPLE QUADRAT #7: VIEW TO WEST

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: APP - B PHOTOGRAPHS.DWG	DATE: 28 MARCH 2013	APPENDIX B; PHOTOS 6 OF 8
	20	31S	39E				
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
SAMPLE QUADRATS 6 & 7**

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THIS DRAWING, TOGETHER WITH THE CONCEPTS AND DESIGN PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DRAWING WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY HOBE SOUND ENVIRONMENTAL CONSULTANTS, INC. SHALL BE WITHOUT LIABILITY TO HOBE SOUND ENVIRONMENTAL CONSULTANTS, INC.

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SAMPLE QUADRAT #8: VIEW TO WEST



TYPICAL BREACH IN BERM WITH SEA OXEYE DAISY, NEAR TRANSECT #5: VIEW TO EAST

PERMITS # ERF31-0273920-001-EI , ERF31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: APP - B PHOTOGRAPHS.DWG	DATE: 28 MARCH 2013	APPENDIX B; PHOTOS 7 OF 8
	20	31S	39E				
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
SAMPLE QUADRAT #8 VIEW TO WEST AND BERM BREACH**

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SOURCE: PHOTOGRAPHS BY HSE



TYPICAL BREACH IN BERM WITH SEA OXEYE DAISY, NEAR TRANSECT #10: VIEW TO EAST



TYPICAL BREACH IN BERM WITH SEA OXEYE DAISY, NEAR TRANSECT #15: VIEW TO EAST

PERMITS # ERP31-0273920-001-EI, ERP31-0273920-003-EM AND 56-0255662-001

INDIAN RIVER, COUNTY FLORIDA	SEC.	TWP.	R.	HSE JOB NO.: HSE 13-005.01	DRAWING NAME: APP - B PHOTOGRAPHS.DWG	DATE: 28 MARCH 2013	APPENDIX B; PHOTOS 8 OF 8
	20	31S	39E				
LATITUDE: 27°46'32.844" LONGITUDE: -80°26'51.108"				DESIGNED BY: RLW	DRAWN BY: FRP	CHECKED BY: RLW	

**FLORIDA INLAND NAVIGATION DISTRICT
DMMA IR - 2 MITIGATION AREA
FDEP MITIGATION MONITORING BASELINE
BERM BREACHS NEAR TRANSECTS #10 & #15**

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