

SPECIALIZING IN SOILS EXPLORATION, PHYSICAL TESTING, ENGINEERING AND NDT EXAMINATION SERVICES

CHALLENGE

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**ENGINEERING & TESTING, INC.** 

### FINAL REPORT L-30 SEEPAGE MANAGEMENT PILOT PROJECT WATER CONSERVATION AREA 3B MIAMI-DADE COUNTY, FLORIDA

Contract # W912EP-05-D-0010 Delivery Order # 0003 Challenge Engineering & Testing, Inc.

**Prepared For:** 

U.S. Army Corps of Engineers – Jacksonville District Geotechnical Branch 701 San Marco Boulevard Jacksonville, Florida 32207

> Submitted By: Challenge Engineering & Testing, Inc. 4234 Halls Mill Road Mobile, Alabama 36691

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### **PURPOSE OF PROJECT**

The U.S. Army Corps of Engineers is interested in determining the type, nature, and characteristics of lithological units that include the Biscayne Aquifer and the extent and conditions of the various materials as they exist to the depths at each of the locations specified.

The purpose of the L-30 Seepage Management Pilot Project (SMPP) is to address seepage management issues along the L-30 Canal related to the onset of other Comprehensive Everglades Restoration Plan (CERP) projects within the next five years.

The Pilot project is being conducted to provide information to determine the appropriate amount of wet season groundwater flow to return to the Everglades National Park (ENP) while minimizing potential impacts to the Miami-Dade West Well field and freshwater flows to Biscayne Bay.

This project is located west of Miami, Florida, northwest of the Tamiami Trail (US41) and Krome Avenue (Route 997). Work was performed along the top to the L-30 Canal Levee which runs mainly north-south and makes a 45 degree southwesterly departure from Krome Avenue toward the Tamiami Trail, commonly known as the "L-30 Triangle."

Challenge Engineering & Testing, Inc. of Mobile, Alabama was requested to assist the Jacksonville District of The U.S. Army Corps of Engineers on this contract.

### **SCOPE OF WORK**

The scope of work consisted of performing in the upland (landside along top of L-30 levee) and in the freshwater wetland environment of the Water Conservation Area 3B the following:

- Core Drilling
- Wireline Core & Splitspoon Sampling
- Installation of Groundwater Monitoring Wells

Authorization to proceed with the requested tasks was issued on September 18th, 2006, Contract #W912EP-05-D-0010 – Delivery Order #0003 by the U.S. Army Corps of Engineers – Jacksonville District.

Field work was requested to be completed by November 19, 2006 for this assignment order.

### **PROCEDURES AND PROJECT SPECIFICATIONS**

This report presents the procedures as followed for the borehole location, soil sampling and the classification of each respective soil sample in conjunction with special notes as recorded regarding conditions encountered in the field.

U.S. Army Corps of Engineer Standard Boring Log Forms 1836 are completed for each core boring performed in the designated location as generated with the Geotechnical Integrator "gINT" Software Program and script/library files as furnished by the Jacksonville District.

Drilling techniques and equipment were in general accordance with the prescribed technical provisions as stated in the Department of the Army Engineering Manual EM-1110-2-1907, "Soil Sampling" Publication.

### FIELD WORK PERFORMED

### PHASE I: TOP OF L-30 LEVEE LANDSIDE CORE BORINGS / WELL INSTALLATION

The landside well drilling phase of work on this project consisted of performing numerous tasks along the top of the L-30 Levee in designated test locations.

Boreholes were located utilizing the x-y coordinates as furnished by the Jacksonville District of the U.S. Army Corps of Engineers and converted by Corpscon to latitude/longitude for GPS location.

Three (3) borings were designated to be located along the top of the levee in the center of the roadway.

In each of the locations the following tasks were performed:

- Large diameter (10") roller bit was used to drill through the levee to top of rock
- PVC (8") surface casing set to top of rock
- Wireline rock coring was commenced with a five foot 4" x 5 ½" core barrel to the base of the rock formation with fresh water
- Boreholes were reamed with a seven and one-half inch (7.5") bit
- Boreholes developed for a period of three (3) hours with compressed air
- U.S. Geological Survey was notified of field progress
- Boreholes were allowed to remain for a minimum of 72 hours
- Borehole logging was performed by U.S.G.S.
- After approximately 7 days, drillcrew returned to perform continuous splitspoon sampling for an additional 30 feet
- Boreholes were backfilled with gravel and crushed limestone

The rig used on this project was a CME-55 four (4) wheel drive truck mounted hydraulic drill unit equipped with a standard manual 140 lb. splitspoon drive hammer and a Moyno reciprocating cavity unit pump.

Groundwater monitoring wells were installed approximately 10 ft. from each of the large diameter boreholes along the backside (south-canal)) top of levee. The construction consisted of two (2) inch diameter schedule 40 Johnson threaded joint "Tri-Lock" PVC installed with two (2) feet of 0.060" slotted screen.

Pea gravel backfill was used to fill the annulus around the screen.

A seal of 3/8" bentonite pellets was placed above the pea gravel. The remaining borehole annulus was backfilled with crushed limestone and gravel to the surface.

Flush mount security covers were completed encased in a three (3) foot by three (3) foot concrete pad. Locking top caps were placed on the well pipe.

The base of the Fort Thompson Formation was noted for each of the borings and reported in the below table. Splitspoon sampling was conducted for thirty (30) feet in the Pinecrest Sands below the Ft. Thompson Formation.

The computed horizontal coordinates for each of the borings to Florida East – NAD 83 State Plane Coordinates and vertical elevations to NAVD 1988 are reported as follows:

### **BORING/WELL DRILLING TEST LOCATIONS**

Boring/Well Number	NAD 1983 F Northing	Florida East Easting	Elevation (Ft.)	Base of Ft. Thompson
CP06-L30PP-CB-0001	524279	826073	17.27	- 57.7
CP06-L30PP-CB-0002	522044	823753	17.49	- 62.5
CP06-L30PP-CB-0003	519743	821358	17.19	- 57.1
		Тс	op of Casing	1
CP06-L30PP-MW-0001	524270	826074	17.12	
CP06-L30PP-MW-0002	522036	823753	17.10	
CP06-L30PP-MW-0003	519734	821356	16.87	

### PHASE II: WATER CONSERVATION AREA 3B FRESHWATER WETLAND WELLS

Two (2) locations in the WCA3B were designated for monitoring wells and platforms to be constructed

Each site was drilled to termination depth with an amphibious track mounted drill setup. The wells were constructed and developed in the same manner as described above for the upland L-30 levee.

Surface casing consisted of installing six (6) inch schedule 80 PVC casing around the well and strapped to a four legged 2" galvanized steel pipe platform with a 48" treated wooden work deck.

### WELL DRILLING TEST LOCATIONS

Boring/Well	NAD 1983 F	Florida East	Top Of
Number	Northing	Easting	Casing
CP06-L30PP-MW-0004	526589	821601	12.00
CP06-L30PP-MW-0005	528482	824038	13.55

### WELL DEVELOPMENT

The large diameter seven and one-half (7.5) inch boreholes were developed by insertion of tremmie pipe to the base of the reamed boreholes and using compressed air as supplied by a portable 185 CFM compressor to lift and blow out water and debris from boreholes. Each was developed for a period of a minimum of three (3) hours as the well was noted to produce "clear water".

Air bubbles were noted to be present rising to the surface waters on both sides of the levee for a distance of up to 105 feet from the well for a period of time of at least 20 minutes following development.

Each of the two (2) inch permanent groundwater monitoring wells was developed by pumping and surging until "clear" water was produced.

As per project specifications, an inventory of core boxes as prepared in the gINT format was submitted to Mrs. Karen Pitchford. The samples were placed in labeled wooden core boxes and delivered to the Corps of Engineer Warehouse on Talleyrand Avenue in Jacksonville, Florida on November 8, 2006. The core boxes were verified received by Mr. Mark Whitson and Dr. June Mirecki of the U.S. Army Corps of Engineers.

### **REPORT SUBMITTALS**

The field boring logs, visual classifications and test results were all entered into the Geotechnical Integrator (gINT) software format as designed by the Jacksonville District which is presented as part of this report.

Digital project photographs were taken throughout the duration of the field work to document progress. Some the photographs are found attached as part of this report to include completed well installations.

Monitoring well construction diagrams are completed for each well.

### FIELD EXPLORATION SUMMARY CONCLUSION

Coordination of field activities was conducted with Mr. Keith Price, Miami Field Office of the South Florida Water Management District during the term of this project.

During the field work on this project, coordination and updates were provided to Mr. Kevin Cunningham of the U.S. Geological Survey and U.S. Army Corps of Engineers Project Geologist Dr. June Mirecki of the Jacksonville District.

A special work permit was secured by Challenge Engineering Testing, Inc, through the Florida Fish and Wildlife Conservation Commission to work in the area due to excessive high water and public usage restrictions.

Challenge Engineering & Testing, Inc. has made every attempt to conduct this field project according to the project specifications and at the direction & satisfaction of all parties involved.

### **REPORT INVESTIGATION LIMITATIONS**

The core borings, installation of the groundwater monitoring wells, analyses and recommendations submitted in this preliminary report are based on the data obtained from the field explorations performed at the locations depicted on the site plan. These locations were chosen by the U.S. Army Corps of Engineers, Jacksonville District. The area explored is limited to the depth and diameter of the core borings. This report does not reflect any variations which may occur adjacent to or between the core borings. The nature and extent of the variations between the borings may not become evident until during future excavations or construction in the area.

This report is based on relatively shallow explorations and a scope of work determined solely by the Corps of Engineers. This report does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.

This report has been prepared for the exclusive use of the U.S. Army Corps of Engineers in accordance with generally accepted soil and foundation engineering practices.

It has been our pleasure for Challenge Engineering & Testing, Inc. to provide the U.S. Army Corps of Engineers – Jacksonville District our geotechnical engineering testing services on this project along the L-30 Levee & in the Water Conservation Area 3B.

I trust that you will find this submittal to be in general conformance with the project guidelines and specifications.

Respectfully Submitted, Challenge Engineering & Testing, Inc.

V. J. Thompson III, P.E. Florida Registration # 37610

### REFERENCE PROJECT PHOTOGRAPHS

**4" WIRELINE CORING SYSTEM USED TO SAMPLE TO ROCK** 



8" SURFACE PVC CASING WAS SET AT EACH OF THE LARGE DIAMETER BORING LOCATIONS









7.5" OPEN BOREHOLES BEING AIR LIFTED WITH COMPRESSOR FOR 3 HOURS EACH PRIOR TO BEING LOGGED BY THE U.S.G.S.





FLUSH MOUNT MONITORING WELL PADS CONSTRUCTED ON TOP OF L-30. GPS POSITIONING CONDUCTED ON WELL CASING



COMPLETED FLUSH MOUNT WELL PAD ON SOUTHSIDE OF L-30 WITH BOLTDOWN MANHOLE COVER

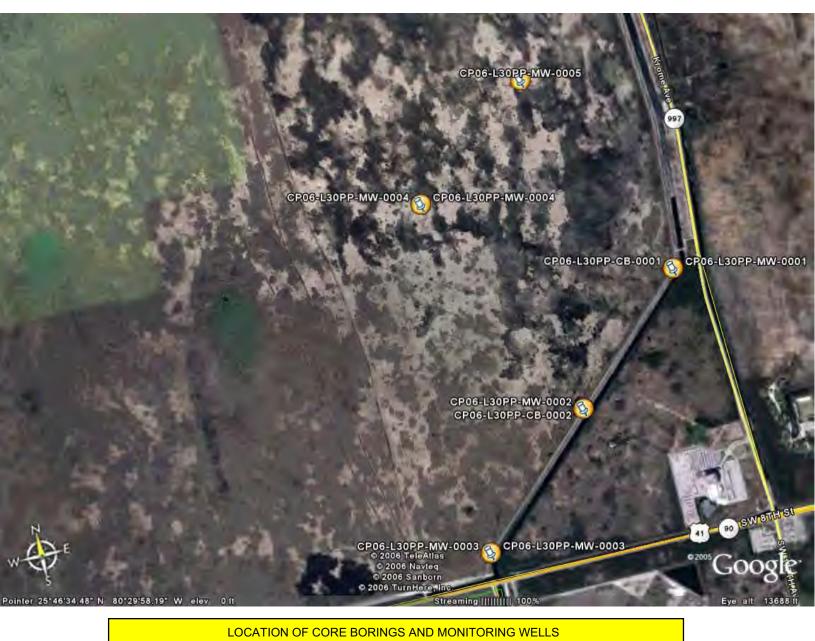


### ATV SWAMP MOUNTED DRILL BUGGY ON-SITE



### MONITORING WELL PLATFORM

### **BORING LOCATION MAP**



L-30 SEEPAGE MANAGEMENT PILOT PROJECT DADE COUNTY, FLORIDA

### SOILS TEST CORE BORING NUMBER "CP06-L30PP-CB-0001"

**Miami-Dade County, Florida** 

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	. Weathered		➤From El11.2 to -12.7 Ft., soft, 5			3	RQD 30		4 x 5-1/2" Diamond DT = 7 HP = 25 DFR =	mins 50 psi	Bit
	Slightly Weathered		From El12.7 to -17.7 Ft., moder slightly weathered, thick bedding, 5Y 8/2 pale yellow	ately hard, vuggy,	100	4 BOX 2	RQD 80		4 x 5-1/2" Diamond DT = 4 HP = 25 DFR =	mins 50 psi	Bit

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DR	ILLING	LOC	G (Cont. Sheet)			Distr	ict					IEETS
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	bated		∿At El22.7 Ft., 2.5Y 8/1 white		100	6	RQD 100	4 x	DT = HP =	3 mins 250 psi	nated Bit	
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			From El32.7 to -37.7 Ft., modera thin bedding, vuggy	ately hard,	50	8			DT = HP =	5 mins 250 psi	nated Bit	

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	nered				100	вдх	RQD 55	4 x 5-1/2" Diamond Ir DT = 4 m HP = 250 DFR = 0	ins psi	
	Unweathered		✓From EI47.7 to -52.7 Ft., thick be vuggy, clay filled vugs, 2.5Y 7/1 ligh	dding, nt gray	100	11	RQD 90	4 x 5-1/2" Diamond Ir DT = 4 m HP = 250 DFR = 0	ins psi	
			ƳFrom El52.7 to -57.7 Ft., thin bed sand filled vugs	lding,		5		4 x 5-1/2" Diamond Ir DT = 4 m HP = 250	ins psi	

SAJ FORM 1836-A JUN 02

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-57.8	75.1	> >> >	SAND, silty, mostly carbonate, Pin	necrest		13	RQD	4	x 5-1/2" Diamond Im	pregnated, Bu	H
			SHELL, mostly angular coarse gra flat and elongated shell up to 1", s	ome	27	14		50.0	SPT Sampl	er <u>0</u> 0	0
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		<b> </b> + <u>†</u> + <u>†</u>	shell up to 1/2", few silt, strong rea HCI, wet, 10G 4/1 dark greenish g	action with	80	17			SPT Sampl	er <u>1</u>	3
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		<b>I</b> I+I+			97	18			SPT Sampl	er 2	
								-65.2		3	5
		<b> </b> <u> </u> + <u> </u> +	At El65.2 Ft., nonplastic, mostly					00.2		8	
		<b> </b> + <u>†</u> + <u>†</u>	fine-grained sand-sized quartz, so angular sand to gravel-sized shell		93	19			SPT Sampl	er 5	
		<b> </b> <u>†</u> <u>+</u> <u>†</u> +	few silt, strong reaction with HCl, v 5Y 6/1 gray					-66.7		8	13
		<b> </b> + <u>†</u> + <u>†</u>	51 0/1 glay					-00.7		2	
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		<b> </b> +‡+‡									
		11+1+			97	21			SPT Sampl		- 35
-69.7	87.0		SHELL, mostly angular fine to coa	reo	<b> </b>			-69.7		16	
			gravel-sized flat and elongated she	ell up to						14	
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		>>>> >>>>	gravel-sized shell up to 1/2", few s	ilt, strong	97	25			SPT Sampl	er 18	
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		>>>>	SHELL, mostly angular coarse gra flat and elongated shell up to 1-1/2	vel-sized	07	07				25	70
			fine-grained sand-sized quartz, str	ong	97	27		-78.7	SPT Sample	er 45	70
			reaction with HCl, wet, weak ceme 5Y 6/1 gray	entation,						29	
					97	28			SPT Sample	er 9	18
-80.2	97.5							-80.2		9	10
			SAND, silty, mostly fine to coarse- sand-sized sandstone up to 1/2", li							10	
			medium-grained sand-sized shell u strong reaction with HCl, wet, wea	up to 1/8",	90	29			SPT Sample	er 7	15
			cementation, 5Y 7/1 light gray (SN					-81.7		8	10
										7	
					90	30			SPT Sample	er 11	_ 21
								-83.2		10	
			NATEL 027 Et como fino to modi	um arcined						14	_
			At El83.7 Ft., some fine to mediu sand-sized shell up to 1/2"	um-graineu	90	31			SPT Sample		47
								-84.7		23	
										15	_
					90	32			SPT Sample		11
								-86.2		5	_
										12	_
					90	33			SPT Sample		26
-87.7	105.0							-87.7		14	_
			NOTES:					140# ham 2.0' split s	mer w/30" drop use spoon (1-3/8" I.D. x 2	d with 2" O.D.).	
			<ol> <li>Soils are field visually classified accordance with the Unified Soils Classification System.</li> <li>Set 17.5 Ft. of 8" Schedule 40 I Through Center of L-30 Levee To Rock.</li> </ol>	PVC Pipe				Abbreviati WOH = DT = D HP = H			
			<ol> <li>Boring Drilled/Sampled In Thre</li> <li>A. Set Surface Casing.</li> <li>B. 4" Wireline Rock Coring To Bas</li> <li>C. Splitspoon Sampling 30 Ft. Belo</li> <li>Rock.</li> </ol>	e Of Rock.							
			4. Borehole Reamed To 7.5" To E Rock. USGS Performed Borehole								
			5. 2" Monitoring Well Set @ X = 826074 Y= 524270								
			Screen From -42.1 to -44.1 Ft.								
			6. Cored to 80 Ft. To Confirm Out	of Rock.							
			7. Boring sealed with available se	diment.							
						l I					

## CPO6-L30PP-CB-OOOL DEPTH: 17,5-200 Run#7

T.J.J

2F

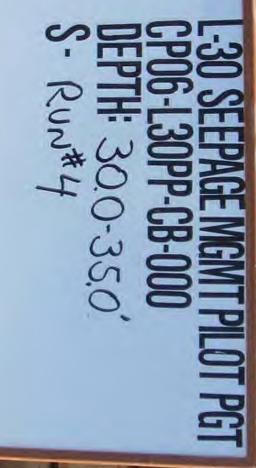
# CPO6-L30PP-CB-0001 DEPTH: 200-250' S-Runta

and the

COL.

# S-RUN#3050-300 S-RUN#300-300

.



### **CPO6-L30PP-CB-000 DEPTH:** 35.0-400 **S**- Run\*5

## S-Runt 400-450

### CPO6-L30PP-CB-000\_1 DEPTH: 45.0.50.0 S- Run # 7

## S- Row \* 8 S- Row \* 8

### CPO6-L30 SEEPAGE MGMT PLOT PGT DEPTH: 55.0-60.0 S-Runt 9

### CPO6-L30 SEEPAGE MGMT PLOT PGB-L30 SEEPAGE MGMT PLOT PGB-L30 PP-CB-000\_1 DEPTH: 60:0-65:0 S- Run \*10

## S-Run#11

# S- Runting S- Runting

## S-14 S-14

### CPO6-L30PP-CB-000\_L DEPTH: 76.578.0' S 5

## L-30 SEEPAGE MGMTPILOT PGT CP06-L30PP-CB-000\_L DEPTH: 78.0-79.5 S-16

### CP06-L30 SEEPAGE MGMTPILOT

#### CPOG-L30PP-CB-0001 PU PG-06-L30 SEEPAGE MGMT PILOT PG-0001 PC-0001 PU PC-0001 S 0

### CPO6-L30PP-CB-O00\_L DEPTH: 82.5'-840 9

#### CPO6-L30PP-CB-O001 DEPTH: 840-855 20

### CPO6-L30 SEEPAGE MGMTPILOT P DEPTH: 87.0-88.5

### CPO6-L30PP-CB-0001 DEPTH: 870-88.5

## 

### CPO6-L30PP-CB-0001 DEPTH: 90.0-91.5 S- 24 90.0-91.5

#### CPO6-L30PP-CB-000\_1 DEPTH: 91.5-93.0 25

#### CPO6-L30PP-CB-0001 DEPTH: 93.0-945 5000

#### CPO6-L30PP-CB-0001 PGT DEPTH: 94.5-96.0 3

#### CPOG-L3OPP-CB-000 1 DEPTH: 960-975 200

# CPOG-L30PP-CB-0001 DEPTH: 97.5-99.0 S-29

### CPOG-L30 SEEPAGE MGMTPILIOT PGT DEPTH: 99.0-100.5' () ()

### CPOG-L30PP-CB-0001 DEPTH: 100.5 - 102.0 W

## CPOG-L30PP-CB-0001 DEPTH: 102.0-1035' S-32



#### SOILS TEST CORE BORING NUMBER "CP06-L30PP-CB-0002"

**Miami-Dade County, Florida** 

DRILLING LOG       South Atlantic       Jacksonville District       OF 7 SHEETS         1. PROJECT       9. SIZE AND TYPE OF BIT       See Remarks       Vertical         L-30 Seepage Management Pilot Project       10. COORDINATE SYSTEM/DATUM       HORIZONTAL       VERTICAL         Top Of Levee L-30 (Center of Roadway)       LOCATION COORDINATES       State Plane, FLE (U.S. Ft.)       NADB3       NAVD88         2. BORING DESIGNATION       LOCATION COORDINATES       CONTRACTOR FILE NO.       CME 55 Truckrig       MANUAL HAMMER         CP06-L30PP-CB-0002       X = 823,753       Y = 522,044       11. MANUFACTURER'S DESIGNATION OF DRILL       AUTO HAMMER         Challenge Engineering & Testing, Inc.       2006D30       12. TOTAL SAMPLES       DISTURBED       UNDISTURBED (UD)         Challenge Engineering & Testing, Inc.       2006D30       12. TOTAL NUMBER CORE BOXES       4         Adam Benson       13. TOTAL NUMBER CORE BOXES       4       4         Adam Benson       14. ELEVATION GROUND WATER       5.0 Ft.       10-06-06       10-17-06         S. DIRECTION OF BORING       DEG. FROM       BEARING       15. DATE BORING       17.5 Ft.       COMPLETED         S. THICKNESS OF OVERBURDEN       N/A       16. ELEVATION TOP OF BORING       17.5 Ft.       10-17-06         B. THICKNESS OF OVERBURDE				DIVISIO	N			INCT	<u> </u>			<u>g = eeigiiaaiei</u>				٦
I. PROJECT       9. SIZE AND TYPE OF BIT See Remarks.         L-30 Seepage Management Pilot Project       10. GOORDINATE SYSTEMDATUM       HORIZONTAL       VERTICAL         Top Of Levee L-30 (Center of Roadway)       State Plane, FLE (U.S. FL)       NADD83       NAVD88         2. BORING DESIGNATION       LOCATION COORDINATES       CONTRACTURETS DESIGNATION OF DRILL       AVD83       NAVD83         2. BORING DESIGNATION       LOCATION COORDINATES       CONTRACTURETS DESIGNATION OF DRILL       AVD83       NAVD83         3. DOILLING AGENCY       CONTRACTOR FILE NO       12. TOTAL SAMPLES       DISTURBED (UD)       Challenge Engineering & Testing, Inc.       2006D30       12. TOTAL NUMBER CORE BOXES       4         Adam Benson       .       .       STATED       COMPLETED       10.06-06       10-17-06         S. DIRECTION OF BORING       UPETICAL       VERTICAL       15. DATE BORING       17.07 TA RECOVERY FOR BORING       65 %         C. DEPTH ORILLED INTO ROCK       N/A       16. ELEVATION TOP OF BORING       17.5 FL.       10.0-06-06       10-17-06         S. TOTAL DEPTH OF BORING       109.0 FL       Bob Momberger, Geologist       Bob Momberger, Geologist       Bob Momberger, Geologist         ELEV.       DEPTH       0       CLASSIFICATION OF MATERIALS       X       X       Marced Boring	DRI	LLING	LOG									istrict				s
L-30 Seepage Management Pilot Project Top Of Levee L-30 (Center of Roadway) BORNO BESIGNATION OF DATAL State Plane, FLE (U.S. FLE (U	1. PRO	JECT		1 0000				_					e Remarks			-
Top Of Levee L-30 (Center of Roadway)       State Plane, FLE (U.S. F.L)       NAD83       NAVD88         CONTRACTOR FLE NO.       CONTRACTOR FLE NO.       CM ESTINGED UNDISTUREED	1.	-30 Seepa	de Mai	nagement l	Pilot Proiec	t								VERTIC	AL	-
2. BORING DESIGNATION LOCATION COORDINATES CP06-L30PP-CB-0002 X = 823,753 Y = 522,044 3. DRILLING AGENCY Challenge Engineering & Testing, Inc. 2006D30 4. AMB OF DRILLER Adam Benson 5. DIRECTION OF BORING DIRECTION OF BORING DIRECTION OF BORING DIRECTION OF BORING DIRECTION OF BORING 5. DIRECTION OF BORING DIRECTION OF BORING DIRECTION OF BORING DIRECTION OF BORING DIRECTION OF BORING 1. ELEVATION GOUND WATER 5. DIRECTION OF BORING DIRECTION OF BORING DIRECTION OF BORING 1. ELEVATION TOP OF BORING 5. THICKNESS OF OVERBURDEN 7. DEPTH DIRLED INTO ROCK 7. DEPTH DIRLED INTO ROCK 109.0 Ft. ELEV. 17.5 0.0 17.5 0.0 17															/D88	
CP06-L30PP-CB-0002       X = 823.753       Y = 522.044       CME 55 Truckrig       Status added adde							INATES	11.								-
Challenge Engineering & Testing, Inc.       2006D30       12. TOTAL SAMPLES       33       0         4. MAME OF DRILLER Adam Benson       Adam Benson       13. TOTAL NUMBER CORE BOXES       4         5. DIRECTION OF BORING Source Transmission       VERTICAL       BEARING       14. ELEVATION GROUND WATER       5.0 Ft.         5. DIRECTION OF BORING       VERTICAL       15. DATE BORING       97ARTED       COMPLETED         1. NOTAL NUMBER CORE BOXES       4       10-06-06       10-17-06         5. DIRECTION OF OVERBURDEN       N/A       16. ELEVATION TOP OF BORING       17.5 Ft.         7. DEPTH DRILLED INTO ROCK       N/A       18. SIGNATURE AND TITLE OF INSPECTOR Bob Momberger, Geologist       109.0 Ft.         ELEV.       DEPTH       U       CLASSIFICATION OF MATERIALS       NEC.       00/00/00/00/00/00/00/00/00/00/00/00/00/	С	P06-L30P	P-CB-(	0002	X = 823,	753	Y = 522,044									ŧ
Image Engineering & Testing, Inc. 1       2006030       133       10         Adam Benson       13. TOTAL NUMBER CORE BOXES       4         Adam Benson       14. ELEVATION GROUND WATER       5.0 Ft.         Deventrical       VERTICAL       10.06-06       10.17.06         S. DIRECTION OF BORING       IVENTICAL       16. ELEVATION GROUND WATER       5.0 Ft.         Depth DRILLED INTO ROCK       N/A       16. ELEVATION TOP OF BORING       17.5 Ft.         7. DEPTH DRILLED INTO ROCK       N/A       17. TOTAL RECOVERY FOR BORING       65 %         8. TOTAL DEPTH OF BORING       109.0 Ft.       Bob Momberger, Geologist       18. SIGNATURE AND TITLE OF INSPECTOR         8. TOTAL DEPTH OF BORING       109.0 Ft.       Bob Momberger, Geologist       17.5       17.5         17.5       0.0       L-30 Levee Fill Material       17.5       17.5       17.5         17.5       0.0       L-30 Levee Fill Material       17.5       Advanced Boring						CONT	FRACTOR FILE NO.	42	TOT			EQ	DISTURBED	JNDISTUR	BED (UD)	)
Adam Benson     13. TOTAL HOMBER COME BOLES     4       5. DIRECTION OF BORING SVERTICAL INCLINED     DEG. FROM VERTICAL     14. ELEVATION GROUND WATER     5.0 Ft.       13. THICKNESS OF OVERBURDEN     N/A     15. BATE BORING     10-06-06     10-17-06       3. THICKNESS OF OVERBURDEN     N/A     16. ELEVATION TOP OF BORING     17.5 Ft.     10-17-06       3. THICKNESS OF OVERBURDEN     N/A     16. ELEVATION TOP OF BORING     17.7 Ft.     10-17-06       3. TOTAL DEPTH OF BORING     109.0 Ft.     Bob Momberger, Geologist     Bob Momberger, Geologist       ELEV.     DEPTH     B     CLASSIFICATION OF MATERIALS     BC				ering & Tes	sting, Inc.	20	006D30	12.	1017	AL 3	AWP		33	0		
5.       DEG_FROM VERTICAL       DEG_FROM VERTICAL       14.       LEVATION GROUND WATER       5.0 Ft.         11.       NCLINED       15.       DATE BORING       10-06-06       COMPLETED 10-06-06       10-17-06         3.       THICKNESS OF OVERBURDEN       N/A       16.       ELEVATION TOP OF BORING       17.5 Ft.       17.         7.       DEPTH DRILLED INTO ROCK       N/A       16.       ELEVATION TOP OF BORING       65 %       18.         8.       TOTAL DEPTH OF BORING       109.0 Ft.       10.0 Ft.       18.       SIGNATURE AND TITLE OF INSPECTOR Bob Momberger, Geologist         ELEV.       DEPTH       9 9 9 17.5       0.0       130 Levee Fill Material       17.5         17.5       0.0       L-30 Levee Fill Material       17.5       17.5         17.5       Advanced Boring       Advanced Boring       Advanced Boring								13.	тот		IUMB	ER CORE BOXES	4			
S. DIRECTION OF BORING       VEEL FROM VERTICAL       BEARING       IS. DATE BORING       STARTED       COMPLETED         INCLINED       INCLINED       INCLINED       INCLINED       IO-06-06       10-17-06         S. THICKNESS OF OVERBURDEN       N/A       IS. ELEVATION TOP OF BORING       17.5 Ft.       IO-06-06       10-17-06         S. THICKNESS OF OVERBURDEN       N/A       IS. ELEVATION TOP OF BORING       17.5 Ft.       IO-06-06       10-17-06         S. TOTAL DEPTH OF BORING       109.0 Ft.       Bob Momberger, Geologist       Bob Momberger, Geologist       IS. STARTED STOR         ELEV.       DEPTH       Output       CLASSIFICATION OF MATERIALS       No.       IT.5       IT.5       IT.5       IT.50			-				1	14.	ELE\		ON G	ROUND WATER	5.0 Ft.			
Inclined       15. DATE BORING       10-06-06       10-17-06         A. THICKNESS OF OVERBURDEN       N/A       16. ELEVATION TOP OF BORING       17.5 Ft.         Z. DEPTH DRILLED INTO ROCK       N/A       17. TOTAL RECOVERY FOR BORING       65 %         B. TOTAL DEPTH OF BORING       109.0 Ft.       Bob Momberger, Geologist       18. SIGNATURE AND TITLE OF INSPECTOR         B. TOTAL DEPTH       B. CLASSIFICATION OF MATERIALS       REC.       Structure       Remarks       Structure         17.5       0.0       Image: Structure       Image: Structu			BORING	5	VERTICAL	MI.	BEARING						STARTED	COMPL	ETED	-
7. DEPTH DRILLED INTO ROCK     N/A     17. TOTAL RECOVERY FOR BORING     65 %       3. TOTAL DEPTH OF BORING     109.0 Ft.     Bob Momberger, Geologist       ELEV.       DEPTH     Total Signature and Title OF INSPECTOR       Bob Momberger, Geologist     Bob Momberger, Geologist       17.5     0.0     L-30 Levee Fill Material       Interview     Interview     Interview       Interview     Interview     <								15.	DATI	EBC	RING	5	10-06-06	10-1	7-06	
7. DEPTH DRILLED INTO ROCK     N/A     17. TOTAL RECOVERY FOR BORING     65 %       3. TOTAL DEPTH OF BORING     109.0 Ft.     Bob Momberger, Geologist       ELEV.       DEPTH     Total Signature and Title OF INSPECTOR       Bob Momberger, Geologist     Bob Momberger, Geologist       17.5     0.0     L-30 Levee Fill Material       Interview     Interview     Interview       Interview     Interview     <	6. ТНІС	KNESS OF	OVERB	URDEN	N/A			16.	ELE\	/AT	ΙΟΝ Τ	OP OF BORING	17.5 Ft.			
DEPTH DRLEED INTO ROCK     TO/A       B. TOTAL DEPTH OF BORING     109.0 Ft.       Bob Momberger, Geologist       ELEV.     DEPTH       B.     CLASSIFICATION OF MATERIALS       RC     SC       RC <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>17.</td><td>тот</td><td>AL R</td><td>ECO</td><td>ERY FOR BORIN</td><td></td><td></td><td></td><td>-</td></t<>								17.	тот	AL R	ECO	ERY FOR BORIN				-
Bot Momberger, Geologist       Bot Momberger, Geologist         elev.       DePTH       g       CLASSIFICATION OF MATERIALS       nec.       g       Rop       Remarks       g       g         17.5       0.0       -       -       -       17.5       0.0       -	7. DEP	TH DRILLED		ROCK	N/A											-
ELEV.       DEPTH       O       CLASSIFICATION OF MATERIALS       No.       No.       REMARKS       No.       No.         17.5       0.0       -       -       -       17.5       -<	8. ТОТ	AL DEPTH C	F BOR	ING 10	9.0 Ft.											
17.5       0.0       17.5       17.5         17.5       1.30 Levee Fill Material       1.40 Levee Fill Material         17.5       1.30 Levee Fill Material       1.40 Levee Fill Material         17.5       1.40 Levee Fill Material       1.40 Levee Fill Material         17.5       1.40 Levee Fill Material       1.40 Levee Fill Material         17.5       1.40 Levee Fill Material       1.40 Levee Fill Material         17.5       1.40 Levee Fill Material       1.40 Levee Fill Material         17.5	ELEV.	DEPTH	EGEND	CL	ASSIFICATIO	ON OF	MATERIALS			_				BLOWS/	U.S FI.	
L-30 Levee Fill Material			╞╺┼						+					_		-
	17.5	0.0		1 20 1		ial						17.5				
		-		L-30 Leve		iai										E
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A LEOPM 1936 (Continued)		-	$\boxtimes$													上

DRI	LLING	LOG	6 (Cont. Sheet)	INSTALLA Jackso		Dietr	ict		SHEET 2 OF 7 S	
PROJEC			- •					UM HORIZONTAL	VERTICAL	/NEE13
L-30	Seepage	Manag	gement Pilot Project	State I	Plane,	FLE	(U.S.	. Ft.) NAD83	NAVD88	
	ON COORD			ELEVATIO		OFE	BORIN	G		
X = 8	323,753	Y = 52	22,044	17.5 F	t.			-		
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIA	ALS	RÉC.	BOX OR SAMPLE	RQD OR UD	REMA	RKS 018	N-VALUE
								Advance w/ tricon	d Boring e roller bit	
0.2	17.3			liforous				0.2		_
			LIMESTONE, oolitic, sparsely foss soft, moderately weathered, fine-gi thin bedding, vuggy, Ft. Thompson Formation, 2.5Y 8/2 pale yellow	ained,	81	1	RQD 20	4 x 5-1/2" Diamono DT = 1 HP = 2 DFR =	mins 50 psi	
-2.5	20.0		LIMESTONE, hard, moderately we fine-grained, thick bedding, pitted, 5Y 8/1 white At El4.0 Ft., 5Y 7/3 pale yellow	athered,				-2.5		
-5.5	23.0		LIMESTONE, fossiliferous, modera	ately hard, bedding,	100	2 BOX	RQD 85	4 x 5-1/2" Diamond DT = 4 HP = 2 DFR =	mins 50 psi	
	Clichtle, MAcadecond	ини и и и и и и и и и и и и и и и и и и	At El9.5 Ft., thin bedding, 5Y 8/1	-	60	1	RQD 10	-7.5 4 x 5-1/2" Diamond DT = 3 HP = 2 DFR =	mins 50 psi	
-12.5	30.0		SAND, silty, soft, mostly subangula fine-grained sand-sized carbonate, reaction with HCI, wet, 2.5Y 8/2 pa (SM)	strong				-12.5		
-14.5	32.0		LIMESTONE, fossiliferous, modera moderately weathered, fine-grained bedding, vuggy, 5Y 8/1 white		60	вох 2	RQD 0	4 x 5-1/2" Diamond DT = 4 HP = 2 DFR =	mins 50 psi	
			At El17.0 Ft., 5Y 6/4 pale olive					-17.5		

DR	ILLING	LOC	G (Cont. Sheet)	INSTALL						)6-L30PF	SHEET 3	
PROJEC				Jacks COORDIN	onville			им	HORIZONTAL	Ve	OF 7 SI	IEETS
		/lanag	gement Pilot Project		Plane,				NAD83		NAVD88	
	ON COORDII			ELEVATI				•		•		
X = 8	823,753	Y = 5	22,044	17.5	=t.							
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATER	ALS	RÉC.	BOX OR SAMPLE	RQD OR UD		RE	MARKS	BLOWS/ 0.5 FT.	N-VALUE
	Moderately Weathered		ົ∽From El20.5 to -31.5 Ft., unwea aphanitic, thin bedding, pitted, 5Y	thered, 8/1 white	60	5	RQD 25	-22.5	HP =	ond Impreg = 3 mins = 250 psi ₹ = 0 %	nated Bit	
					60	вох	RQD	4	HP =	ond Impreg = 5 mins = 250 psi R = 0 %	nated Bit	
	Unweathered		➤From EI31.5 to -37.5 Ft., soft, unweathered, aphanitic, thin bedd clay filled pits	ing, pitted,	66	7	RQD 0	4	HP =	ond Impreg = 5 mins = 250 psi R = 0 %	nated Bit	
	Unweathered				60	вдх	RQD 25	<u>-32.5</u> 4 -37.5	HP =	ond Impreg = 6 mins = 250 psi ₹ = 0 %	nated Bit	

SAJ FORM 1836-A JUN 02

DR	ILLING	LOG	G (Cont. Sheet)	INSTALLA					SHEET 4	
ROJEC				Jackso COORDIN					OF 7 S	HEETS
		Manag	gement Pilot Project	State				1	NAVD88	
OCATI	ON COORDI	NATES	5	ELEVATIO	он тор	OF E	ORIN	G	÷	
X = 8	823,753	Y = 52	22,044	17.5 F	t.					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIA	ALS	RÉC.	BOX OR SAMPLE	RQD OR UD	REMA	NKS 020 5 FT.	N-VALUE
	Mod. Weathered		From El37.5 to -39.5 Ft., moderate moderately weathered, aphanitic, t bedding, vuggy, 5Y 7/2 light gray	hin			RQD	4 x 5-1/2" Diamon DT = 4		
	Unweathered		unweathered, aphanitic, thin beddi clay filled pits, 5Y 8/1 white	ng, pitted,	25	9	0	-42.5	50 psi	
			From El43.5 to -46.0 Ft., modera moderately weathered, aphanitic, t bedding, vuggy, sand filled vugs, 5 yellow From El46.0 to -51.5 Ft., modera weathered, aphanitic, thin bedding, clay filled pits, 10YR 7/2 light gray	hin Y 7/3 pale tely	20	вдух	RQD 0	4 x 5-1/2" Diamon DT = 6 HP = 2 DFR =	6 mins 50 psi	
	- Modectatesijesijy Akidestherded		✓From El51.5 to -55.5 Ft., unweatl aphanitic, medium bedding, vuggy, filled vugs, 10YR 8/2 very pale brow	sand	80	11	RQD 8	-47.5 4 x 5-1/2" Diamon DT = 6 HP = 2 DFR =	6 mins 50 psi	
	d: Weathered		From El55.5 to -57.5 Ft., modera weathered, fine-grained, thick bedo pitted, sand filled pits, 2.5Y 6/1 gra	ding,	90	врх	RQD 60	4 x 5-1/2" Diamon	3 mins 50 psi	

SAJ FORM 1836-A JUN 02

DRI	LLING	LOC	G (Cont. Sheet)	INSTALLA		Dict	ict			SHEET S	
PROJEC			. ,	Jackso COORDIN				UM	HORIZONTAL	VERTICAL	MEETS
	-	Manag	gement Pilot Project	State					NAD83	NAVD88	
	ON COORD	INATE	S	ELEVATIO	ON TOP	OF B	ORIN	G			
X = 8	323,753	Y = 5	22,044	17.5 F	t.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERI	ALS	RÉC.	BOX OR SAMPLE	RQD OR UD		REMARKS	BLOWS/	N-VALUE
64 E	Slichtly Waathered		LIMESTONE, soft, slightly weathe aphanitic, 5Y 7/3 pale yellow	red,	0	вдх 4	RQD 0		4 x 5-1/2" Diamond Im DT = 2 mir HP = 250 p DFR = 0 %	ns osi	
-61.5	79.0		LIMESTONE, fossiliferous, soft, sl					-61.5		WOF	
00.5			weathered, aphanitic, pitted, sand 5Y 7/3 pale yellow	filled pits,	20	14			SPT Sampl		<u> </u>
-62.5	80.0	<b>1</b>	SHELL, mostly angular coarse-gra	ained	- 20	'			or i dampi	0	0
		> >> > > >> >	sand-sized shell up to 1/2", little cla reaction with HCI, wet, Pinecrest S					-63.0		7	_
		> >> > > >> >	Formation, 2.5Y 7/1 light gray	ballu		45					_
		> >> > > >> >			40	15			SPT Sampl		23
			At El64.5 Ft., some coarse grave	al-sized				-64.5		11	_
			limestone up to 1"	51-31260						7	_
		ר ככ כ			97	16			SPT Sampl	ler <u>14</u>	28
		> >> > > >> >						-66.0		14	20
		> >> > > >> >								8	
					73	17			SPT Sampl	ler 17	
		> $>>$ $>$						67 F		16	- 33
		> >> > > >> >						-67.5		7	
		) ) ) ) ) ) ) )			100	10			CDT Compl		_
-68.5	86.0	>>>>>	SAND, clayey, nonplastic, soft, mo	ostlv	100	18			SPT Sampl		16
			fine-grained sand-sized carbonate	, little clay,				-69.0		8	
			strong reaction with HCl, wet, 2.5Y	7/1 light						12	
-70.0	87.5		gray (SC)		50	19			SPT Sampl	ler 14	
		D D D D D D D D	SHELL, mostly angular coarse-gra	ained	1			-70.5		15	29
		ר ככ כ	sand-sized shell up to 1/4", some coarse-grained sand-sized limesto				1			12	
		) )) ) ) )) )	1/2", little clay, strong reaction with		77	20			SPT Sampl		
		> >> > > >> >	2.5Y 6/1 gray		1''	[				12 14	26
		> >> > > >> >			<u> </u>	<u> </u>		-72.0			_
											_
		ר ככ כ			90	21			SPT Sampl		18
		>>>>						-73.5		10	
		) )) ) ) )) )	At El73.5 Ft., nonplastic, mostly medium-grained sand-sized shell							10	
-74.5	92.0	> >> > > >> >	little fine to medium-grained sand-	sized	90	22			SPT Sampl	ler 8	
		$\overline{V}$	carbonate, strong reaction with HC	ز, wet,	1			-75.0		7	15
			CLAY, lean, medium plasticity, sof					10.0		5	
			clay, some shell up to 1/4", little fir sand-sized carbonate, strong reac		90	23			SPT Sampl		-
			HCl, wet, 2.5Y 5/1 gray (CL)		30	23			or i Sallipi		14
		V/	At El76.5 Ft., some fine-grained					-76.5		7	_
		V//	sand-sized quartz, little coarse-gra		90	24			SPT Sampl	ampler <u>6</u>	
			sand-sized shell, strong reaction w							5	

DRI	LLING	LO	G (Cont. Sheet)	INSTALLA		<b>D</b> <sup>1</sup> · ·				SHEET 6		]		
PROJEC				Jackso COORDIN				им	HORIZONTAL	OF 7 S	HEETS	4		
		Mana	gement Pilot Project	State F		NAVD88								
	ON COORD		· · ·	ELEVATIO	ELEVATION TOP OF BORING									
X = 8	323,753	Y = 5	22,044	17.5 F	t.		_							
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATER	RIALS	RÉC.	BOX OR SAMPLE	RQD OR UD		REMARKS	BLOWS/ 0.5 FT.	N-VALUE			
		V//	wet, 10Y 6/1 greenish gray		90	24		-78.0	SPT Sampl	er 5	10	-		
-78.5	96.0	V//					1			15		Ŧ		
			SAND, silty, very soft, mostly fine sand-sized quartz, little silt, little	-grained	67	25			SPT Sampl	er 15	٦	F		
		:+:+	coarse-grained sand-sized shell u					-79.5		8	23	F		
			strong reaction with HCl, wet, 10' greenish gray (SM)	Y 7/1 light			1			7		Ŧ		
					47	26			SPT Sampl	er 14	-	F		
-81.0	31.0 98.5							-81.0		14	28	-		
-01.0	90.5	> >> > > >> >	SHELL, mostly angular fine to co					-01.0		7		╞		
			fine-grained sand-sized quartz lit		90	27			SPT Sample		-	-		
		>>>>	gravel-sized limestone up to 1/2",	, few silt,		<b>_</b> .		00 F		21	- 35	E		
		) ) ) ) ) ) ) )		Y 7/1 light				-82.5		21		╈		
		) ) ) ) ) ) )	At El82.5 Ft., few fine-grained s	sand-sized	90	28			SPT Sampl		-	-		
			'		90	20			SFT Sampi		44	F		
								-84.0		21	-	Ŧ		
										12	-	F		
			At El85.0 Ft., some fine to med	ium-arained	90	29			SPT Sampl		20	F		
		>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	sand-sized quartz, trace sand to					-85.5		9	_	ŧ		
										5	_	È		
		Þ >> >			90	30			SPT Sampl	er 10	20	E		
		>>>>						-87.0		10		╞		
-87.5	105.0	>>>>								17		F		
			SAND, silty, some fine-grained sa guartz, little fine-grained sand-siz		90	31			SPT Sampl	er <u>23</u>	65	ŀ		
			carbonate, little sand to gravel-size to 1/2", strong reaction with HCl,					-88.5		42	05	-		
			10Y 6/1 greenish gray (SM)	-						27		ŀ		
			<sup>L</sup> At El88.5 Ft., few coarse-graine sand-sized limestone up to 1/4"	ed	90	32			SPT Sampl	er 37	<b>│</b>	F		
								-90.0		37	74	-		
		<b> </b> + <u>†</u> + <u>†</u>								14		F		
					97	33			SPT Sampl	er 34	┨	F		
-91.4	168.8							-91.5		37	71	F		
0.10		+++	LIMESTONE, fossiliferous, mode coarse-grained, pitted, clay filled						ammer w/30" drop use	ad with		╞		
			10Y 6/1 greenish gray	- ····,	1				it spoon (1-3/8" I.D. x			ŧ		
			NOTES:		1			Abbrevi	iations:			F		
			1. Soils are field visually classifie	ad in				WOR	= Weight of Rods.			F		
			accordance with the Unified Soils		1			HP =	Drill Time. Hydraulic Pressure.			F		
			Classification System.		1			DFR	= Drill Fluid Return.			F		
	2. Set 17.5 Ft. of 8" Schedule 40 Through Center of L-30 Levee To Rock.											F		
			<ol> <li>Boring Drilled/Sampled In Thread A. Set Surface Casing.</li> <li>B. 4" Wireline Rock Coring To Ba C. Splitspoon Sampling 30 Ft. Be Rock.</li> </ol>	se Of Rock.										
		1												

DRILLING	LO	G (Cont. Sheet)	INSTALLA	SHEE	T 7 Sheets								
ROJECT		•	Jacksonville District     OF     7       COORDINATE SYSTEM/DATUM     HORIZONTAL     VERTICAL										
	Mana	gement Pilot Project	State Plane, FLE (U.S. Ft.) NAD83 NAVD88										
OCATION COORD			ELEVATION TOP OF BORING										
X = 823,753	Y = 5	22,044	17.5 F	_									
ELEV. DEPTH	LEGEND	CLASSIFICATION OF MATERI	ALS	RÉC.	BOX OR SAMPLE	RQD OR UD	REM	ARKS	0.5 FT.				
SAJ FORM 18		<ol> <li>Borehole Reamed To 7.5" To E Rock. USGS Performed Borehole</li> <li>2" Monitoring Well Set @ X = 823754 Y= 522036</li> <li>Screen From -40.7 to -42.7 Ft.</li> <li>Cored to 80 Ft. To Confirm Out</li> <li>7. Boring sealed with available se</li> </ol>	Logging.										

### CPO6-L30PP-CB-OODA DEPTH: 173-200 Run#1

#### CPO6-L30PP-CB-0002 DEPTH: 200-250 S-Run#2

### CPO6-L30PP-CB-0002 DEPTH: 250-300 S-Run #3

# CPO6-L30PP-CB-0002 DEPTH: 30.0-35.0 S-Run # 4

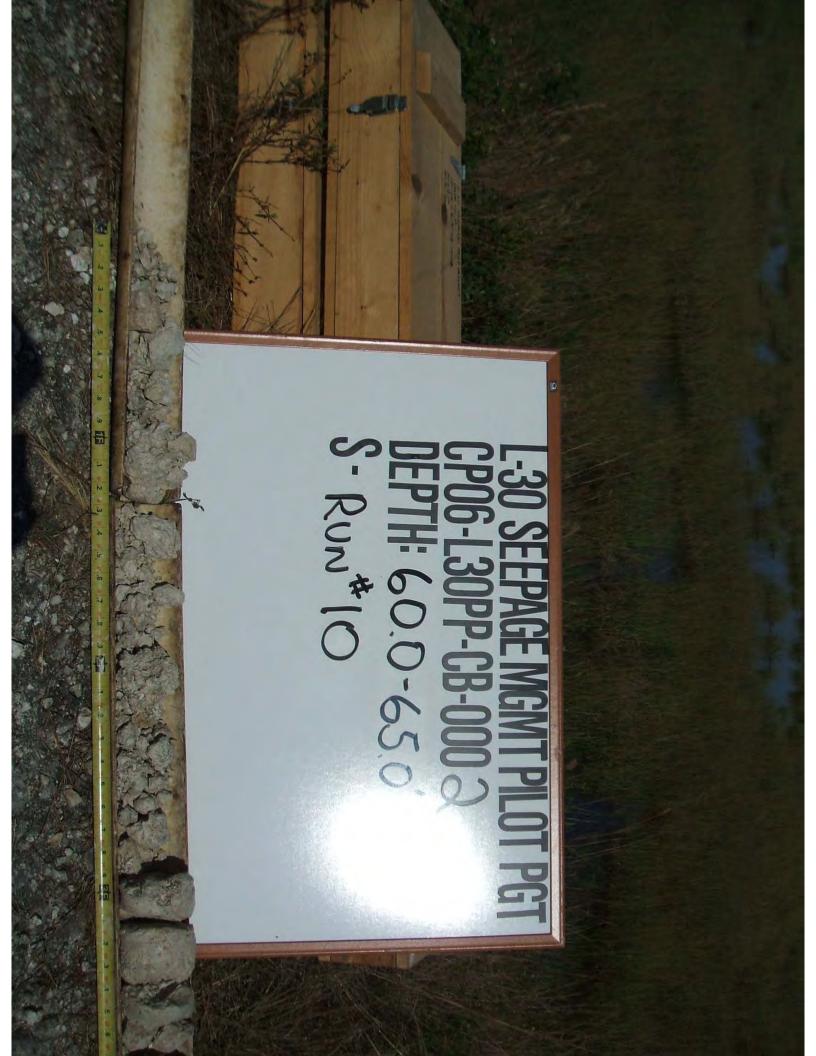
### S-Run #5

#### CPO6-L30PP-CB-000 a DEPTH: 40.0-45.0 Run#6

### CPO6-L30 SEEPAGE MGMT PLOT PGT DEPTH: 45.0-50.0 S- RUN\*7

### **S-Run#8**

### CPOG-L30PP-CB-0002 DEPTH: 55.0-60.0 S- Run # 9



### CPO6-L30PP-CB-0002 DEPTH: 65-70.0 S-Run \* 1

#### S-RUN#12 S-RUN#12

# **CP06-L30PP-CB-000** a **DEPTH:** 79.0-80.2' S-14

BAGS 33 GALLON

#### -30 SEEPA CP P06-L Eblin: 80.2-8300 9 G AT PILOT PG

CPO6-L30PP-CB-000 a DEPTH: 82.0-83.5 5

# CPO6-L30PP-CB-000 a DEPTH: 83.5-85.0

# S-18 S-18

# CPO6-L30PP-CB-000 a DEPTH: 86.5-88.0 S-19

### CPO6-L30PP-CB-000 2 DEPTH: 88 0-095 20

#### CPO6-L30PP-CB-000 2 DEPTH: 89.5-910 j

### CPOG-L30PP-CB-000 a DEPTH: 910-93.5' ·Ja

# CPOG-L30PP-CB-000 a DEPTH: 92.5-94.0 S-23

#### CPOG-L30PP-CB-000 2 DEPTH: 94.0-955 2F

#### CPOG-L30PP-CB-000 2 DEPTH: 95.5-970 ц. . ЗС

#### CPO6-L30PP-CB-000 a DEPTH: 97.0-98.5' 20

### CPO6-L30PP-CB-000 2 DEPTH: 98.5-100.0 2

#### CPO6-L30PP-CB-000 2 DEPTH: 101-5-103.0 200



#### CPOG-L30PP-CB-000 2 DEPTH: 1030-1045 30

#### CPO6-L30PP-CB-000 a DEPTH: 104.5-106.0 Ú

### CPO6-L30PP-CB-000 a DEPTH: 106.0-107.5

#### CPO6-L30PP-CB-000 a DEPTH: 107.5-109.0 ろう

#### SOILS TEST CORE BORING NUMBER "CP06-L30PP-CB-0003"

**Miami-Dade County, Florida** 

DRILLING LOG     South Attentic				DIVISIO	N			INST			.g _ co.gac		SHEET		
1. PROJECT L-01 Seepage Management Pilot Project T-0 Of Leven L-30 (Seepage Management Pilot Project T-0 Of Leven L-30 (Center of Rendwy) 2. Bolluke Assertion J. L-20 (Seepage Management Pilot Project T-0 Of Leven L-30 (Center of Rendwy) Contractor of Contractor Pilot R- Contractor R- Contractor R- Contractor R- Contractor R- Contractor R- Contractor R	DRI	LLING	LOG								listrict		-		s
L-30 Sengage Management Pilot Project     10. COORDINATE SYSTEMDATINI HORIZONTAL VENTERDATINI FORIZONTAL VENTERDATION CONCENTRATES     INAVIORAL MANDER       2. BORING DESIGNATION I LOCATION COORDINATES     INAVIORAL MANDER     INAVIORAL MANDER       2. BORING DESIGNATION I LOCATION COORDINATES     CME 55 Trucking     INAVIORAL MANDER       3. PRILINA AGENEY     COORTACTOR FLA ION     INAVIORAL MANDER       3. PRILINA AGENEY     COORTACTOR FLA ION     INAVIORAL MANDER       Challenge Engineering & Tosting, Inc.     2006030     13. TOTAL MUNDER CORE BOXES     5       Adam Borson     13. TOTAL MUNDER CORE BOXES     5     INAVIORAL MANDER       Challenge Engineering & Tosting, Inc.     2006030     14. ELEVATION GOUND WATER     5.0 FL       Challenge Engineering & Tosting, Inc.     2006030     14. ELEVATION GOUND WATER     5.0 FL       Challenge Engineering & Tosting, Inc.     2006030     14. ELEVATION GOUND WATER     5.0 FL       Challenge Engineering & Tosting, Inc.     100.07.06     10.018-06     10.018-06       Challenge Engineering & Tosting, Inc.     105.0 FL     15. DATE BORING     17.2 FL     17. TOTAL MUNDER CORE TORNO       Challenge Engineering & Calassification OP MATERIALS     16. DATE BORING     17.2     17.2       TOTAL DEPTH OF DERME     L-30 LEVENE FII Material     17.2     17.2     Advanced Boring       I     I	1. PRO	JECT		1 000				_				e Remarks	<b>-</b> 3		4
Top Of Larver L-30 (Center of Read-way)         Sites Plane, FLE (U.S. F.):         NA083         NAV088           CONING GESENATON OPEL-30PP-CB-000         X = 821,358         Y = 619,731         CAMPACE STRUE DESENATION OF DILL OME 55 Truckrig         JUND HAMBER OF DILL OME 55 Truckrig         JUND HAMBER OF DILL STRUE DESENATION OF DILL STRUE DESENATION OF DILL STRUE DESENATION OF DILL STRUE DESENATION OF DILL OME 55 Truckrig         JUND HAMBER OF DILL STRUE DESENATION OF DILL DILLERA ANALE ANALES         JUND HAMBER OF DILL STRUE DESENATION STRUE DESENATION OF DILL STRUE DESENATION OF DILLERA STRUE DESENATION STRUE DESENATION OF DILLERA STRUE DESENATION STRUE DESENATION OF DILLERA STRUE DESENATION STRUE DESENATION STRUE DESENATION STRUE DESENATION STRUE DESENATION STRUE DESENATION OF DILLERA STRUE DESENATION STRUE DESENATION STRUE DESENATION STRUE DESENATION STRUE DESENATION STRUE DESEN	1.	-30 Seena	ae Mai	nagement	Pilot Proiec	t							VERTIC	AL	+
2. BORNO CEBIGNATION I LOCATION COORDINATES CPOBLOPPC-LEN003 X = B21,385 ¥ = 519,743 3. BORLINA AGENERY Challange Engineering & Testing, Inc. 2006030 4. MARE OT DELLER Adam Benson 5. DIRECTION OF BORLING 1. TOTAL BAMPLES 33 0 4. MARE OT BORNO 5. DIRECTION OF BORLING 1. TOTAL BAMPLES 33 0 4. MARE OT BORNO 5. DIRECTION OF BORLING 1. TOTAL BAMPLES 5. 5. CHALLER Adam Benson 5. DIRECTION OF BORLING 1. TOTAL BAMPLES 5. 5. CHALLER Adam Benson 5. DIRECTION OF BORLING 1. TOTAL BENERO 1. TOTAL BENERO 1. TOTAL BENERO 1. TOTAL DEPTH OF BORLING 1. TOTAL DEPTH OF BORLING 1. TOTAL DEPTH OF BORLING 1. TOTAL DEPTH OF BORLING 1. 200 LEVERO FOR BORLIN												1	1		
CP0EL30PP-CE-0003       X = 821,358       Y = 519,743       CME 55 Trucking       IDE TOTAL SAMPLES       IDE TOTAL SAMPL							INATES	11. 1				, 			-
Challenge Engineering & Testing, Inc. 1         2006D30         12.         TOTAL SAMPLES         33         0           Add of Banson         13.         TOTAL NUMBER CORE SORES         5         -	С	P06-L30P	P-CB-(	0003	X = 821,	358	Y = 519,743								:
L. Unlikery						CONT	RACTOR FILE NO.	42 7		SAMD		DISTURBED U	NDISTUR	BED (UD)	)
Adam Benson         Is. 10-47-00-800-800-30-3         3           EDERCTION OF BORING         DESC. FROM BEARING         14. ELEVATION BORING         5.0 Ft.           16. TOTAL RECOVERY FOR BORING         10-17-00.         COMPLETER 10-17-00.         10-17-00.           8. THICKNESS OF OVERBURGEN         N/A         15. ELEVATION TOP OF BORING         17.2 Ft.           7. DEPTH BILLED INTO ROCK         N/A         18. ELEVATION TOP OF BORING         17.2 N.           8. TOTAL RECOVERY FOR BORING         105.0 Ft.         10.61.000.         10.61.000.           8. TOTAL RECOVERY FOR BORING         105.0 Ft.         10.61.000.         10.61.000.           8. TOTAL RECOVERY FOR BORING         10.5.0 Ft.         10.61.000.         10.61.000.           8. TOTAL RECOVERY FOR BORING         10.5.0 Ft.         10.61.000.         10.61.000.           17.2         0.0         10.5.0 Ft.         10.61.000.         10.7.2           17.2         0.0         1.30 Levvee Fill Material         10.1.000.         17.2         10.1.000.           17.2         0.0         1.30 Levvee Fill Material         10.1.000.         17.2         10.1.000.           17.2         1.30 Levvee Fill Material         10.1.000.         10.1.000.         10.1.000.           17.2         1.30 Le				ering & Tes	sting, Inc.	20	06D30	12.	UTAL	SAMP	LES	33	0		
B. DIRECTION OF BORING         DRE. PROM WENTCAL         IBEARING         14. ELEVATION GROUND WATER         5.0 FL.         COMPLETED         10.000 Line         10.000 Line <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>13. 1</td><td>OTAL</td><td>NUMB</td><td>ER CORE BOXES</td><td>5</td><td></td><td></td><td></td></t<>								13. 1	OTAL	NUMB	ER CORE BOXES	5			
BETTER INTO OF BORING     USER LEX/IN     ELANING       IMPLINED     INTO ANSE OF OVERBURGEN     N/A       16. DATE BORING     17.2 FL.       17. DEPTH DRILLED INTO ROCK     N/A       18. TOTAL RECOVERY TOR BORING     17.2 FL.       18. SIGALWARE AND TILE OF RESERCTOR       17. DEPTH B     CLASSFICATION OF MATERIALS       17.2     0.0       17.2     0.0       17.2     0.0       17.2     0.0			-	-			1	14.			ROUND WATER	5.0 Ft.			
Imachanes         Imachanes <thimachanes< th="">         Imachanes         <thimachanes< th="">         Imachanes         Imachanes</thimachanes<></thimachanes<>			BORING	)	DEG. FRO	M	BEARING						COMPL	ETED	-
V.     DEPTH ORILLED INTO ROCK     N/A     17. TOTAL RECOVERY FOR BORING     73 %       B. TOTAL DEPTH OF BORING     105.0 FL     BioMartue And Data Data Data Data Data Data Data Dat								15. [	ATE B	ORING	3	10-07-06	10-1	8-06	
V.     DEPTH ORILLED INTO ROCK     N/A     17. TOTAL RECOVERY FOR BORING     73 %       B. TOTAL DEPTH OF BORING     105.0 FL     BioMartue And Data Data Data Data Data Data Data Dat	6. ТНІС	KNESS OF	OVERB	URDEN	N/A		•	16. 1		τιοη τ	OP OF BORING	17.2 Ft.			
John Banklad Jirl Market Singer, Geologist       a. Total Depth of Borning       172     0.0       172     0.0       173     1.30 Levee Fill Material       174     1.30 Levee Fill Material       175     1.30 Levee Fill Material								17. 1	OTAL	RECO	VERY FOR BORIN				-
Both Company         DepTrin         Use         Description         Descripion         Description         Descr	7. DEP	TH DRILLED	) INTO	ROCK	N/A										-
ELEV.         DEPTH         83         CLASSIFICATION OF MATERIALS         Nec.         85         80         REMARKS         84         V           17.2         0.0         -	8. тот	AL DEPTH C	OF BOR	<b>ing</b> 10	5.0 Ft.										
17.2 0.0 L-30 Levee Fill Material L-30 Levee Fill Material Advanced Boring w/ tricone roller bit	ELEV.	DEPTH	EGEND	CL	ASSIFICATI	ON OF	MATERIALS	RE					STOWS/	-VALUE	
L-30 Levee Fill Material			┝┛┝					_						z	-
Advanced Boring withione roller bit	17.2	0.0									17.2				
v / tricone roller bit	ŀ	-		L-30 Leve	ee Fill Mate	rial									ŀ
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DR	ILLING	LOC	G (Cont. Sheet)	INSTALLA					nation CP06-L	SHEET 2	
		(		Jackso					!	OF 6 S	HEETS
PROJEC L-30		Manao	gement Pilot Project	COORDIN State					HORIZONTAL NAD83	VERTICAL NAVD88	
	ON COORDI		-	ELEVATIO					1		
X =	821,358	Y = 5	19,743	17.2 F	t.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATER	ALS	RÉC.	BOX OR SAMPLE	RQD OR UD		REMAR	S BLOWS/ 0.5 FT.	N-VALUE
									Advanced I w/ tricone	Boring	
-0.3	17.5		LIMESTONE, oolitic, sparsely foss moderately hard, slightly weathere fine-grained, thick bedding, vuggy vugs, Ft. Thompson Formation, 2.5Y 8/2 pale yellow	d, , peat filled	100	1	RQD 50	-0.3 4 -2.8	x 5-1/2" Diamond I DT = 3 n HP = 250 DFR = 5	nins ) psi	
			<ul> <li>At El2.8 Ft., vuggy, quartz filled</li> <li>From El4.3 to -12.8 Ft., aphaniti bedding, pitted, sand filled pits, 2.9 gray</li> <li>At El6.8 Ft., pitted, clay filled pits</li> </ul>	c, thick 5Y 7/2 light	100	2 BOX 1	RQD 30	-7.8	x 5-1/2" Diamond I DT = 6 n HP = 250 DFR = 2	nins ) psi	
-12.8	30.0				70	3	RQD 45		x 5-1/2" Diamond I DT = 5 n HP = 250 DFR = 0	nins ) psi	
-12.8	30.0		LIMESTONE, fossiliferous, very so weathered, aphanitic, thin bedding clay filled vugs, 2.5Y 8/1 white	oft, slightly , vuggy,	6	BOX 2 4	RQD		x 5-1/2" Diamond I DT = 3 n HP = 250 DFR = 0	nins ) psi	

SAJ FORM 1836-A JUN 02

DR	ILLING	LOC	G (Cont. Sheet)	INSTALLA Jacks		Distr	rict		SHEET 3 OF 6 SHEETS
PROJEC	т			COORDIN				UM HORIZONTAL	VERTICAL
L-30	Seepage I	Mana	gement Pilot Project	State	Plane,	FLE	(U.S.	. Ft.) NAD83	NAVD88
	ON COORDI			ELEVATIO		OF E	BORIN	G	
X = 8	821,358		19,743	17.2 F	t.	-	-		
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATER	RIALS	RÉC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT. N-VALUE
			At El17.8 Ft., sparsely fossilifero moderately hard, slightly weather aphanitic, thick bedding, pitted At El21.8 Ft., fossiliferous	ous, ed,	90	5	RQD 50	4 x 5-1/2" Diamond Imp DT = 4 mins HP = 250 ps DFR = 0 % -22.8	i l
			NAt El25.8 Ft., soft, vuggy, clay f	illed vugs	96	BOX 2	RQD 20	4 x 5-1/2" Diamond Imp	s i
	Inweathered		At El27.3 Ft., moderately hard, unweathered, aphanitic, medium vuggy, sand filled vugs, 5Y 8/1 wl	bedding, hite	70	7	RQD 20	-27.8 4 x 5-1/2" Diamond Imp DT = 3 mins HP = 250 ps DFR = 0 %	i l
					90	BOX 3	RQD 25	4 x 5-1/2" Diamond Imp DT = 4 mins HP = 250 ps DFR = 0 %	i l

SAJ FORM 1836-A

DRI	ILLING	LOC	G (Cont. Sheet)	INSTAL Jack	LATION sonville	Distr	ict				SHEET OF 6	4 Sheets
PROJEC	т			COORDI				им	HORIZO	NTAL	VERTICAL	
L-30	Seepage N	Mana	gement Pilot Project	State	Plane,	FLE	(U.S.	Ft.)	NAD	83	NAVD8	8
	ON COORDI			ELEVAT		OF E	BORIN	G				
X = 8	321,358		19,743	17.2	Ft.							
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATER	RIALS	RÉC.	BOX OR SAMPLE	RQD OR UD			REMARKS	BLOWS	0.5 FT. N-VALUE
	Slightly Weathered		At El37.8 Ft., slightly weathered 2.5Y 8/1 white	d, pitted,	70	9 BOX 3	RQD 20	-42.8	4 x 5-1/2" [	Diamond Im DT = 2 mir HP = 250 p DFR = 0 %	osi	it
-44.8	62.0		LIMESTONE, hard, unweathered 2.5Y 6/1 gray	, pitted,	80	10	RQD 20		4 x 5-1/2" [	Diamond Im DT = 7 mir HP = 250 p DFR = 0 9	osi	it
-49.8	67.0 Moderately Weathered		At El47.8 Ft., moderately weath bedding, vuggy, clay filled vugs		40	11 BOX 4	RQD	<u>-47.8</u> 4	4 x 5-1/2" [	Diamond Im DT = 2 mir HP = 250 p DFR = 0 9	osi	it
-54.8	72.0	I I	SHELL, mostly angular sand to g shell up to 1/2", few fine-grained carbonate, trace limestone up to reaction with HCI, wet, 5Y 7/1 ligl	sand-sized 1/8", strong	20	12	RQD 0		4 x 5-1/2" [	Diamond Im DT = 1 mir HP = 250 p DFR = 0 %	osi	it
		) ) ) ) ) ) ) ) )	At El57.1 Ft., little fine-grained carbonate, Pinecrest Sand Formate	sand-sized ation				-57:8				

SAJ FORM 1836-A JUN 02

DR	ILLING	LO	G (Cont. Sheet)	Jackso		Distr	ict			SHEET 5 OF 6 SI	HEETS
PROJEC	т				COORDINATE SYSTEM/DATUM HORIZONTAL						
L-30	Seepage	Mana	gement Pilot Project	State F	Plane,	FLE	(U.S.	Ft.)	NAD83	NAVD88	
	ON COORD			ELEVATIO		OF E	BORIN	G			
X = 8	321,358	1	19,743	17.2 F	t.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIA	ALS	RÉC.	BOX OR SAMPLE	RQD OR UD		REMARKS	BLOWS/ 0.5 FT.	N-VALUE
		>>>				13	RQD	4	x 5-1/2" Diamond Imp	pregnated Bit	
		>>>:			67	14			SPT Sample	er 2	-
		) )) ; ) )) ;						50.0		2	4
		> >> : > >> :	) )					-59.3		3	
		> >> : > >> :			73	15					-
					13	15			SPT Sample		6
								-60.8		4	
										3	_
		þ >> :			73	16			SPT Sample		5
				<b>1 </b>				-62.3		3	
		>>>:	gravel-sized shell up to 1/2", few sil	to coarse						7	
		) ) ) ; ) ) ) ;	clay, strong reaction with HCl, wet,		47	17			SPT Sample	er <u>6</u>	12
			10Ý 6/1 greenish gray					-63.8		6	12
										5	
					97	18			SPT Sample	er 4	1
-65.3	82.5							-65.3		7	11
00.0	02.0		SAND, silty, mostly fine-grained sa		100	19		-65.6	SPT Sample	er <u>50/0.3</u> '	
-66.8	84.0		carbonate, little angular sand to gra shell up to 1/2", few sandstone, stro reaction with HCI, wet, moderate cementation, N 6/ gray (SM)					-66.8	Advanced Bo	ring	
00.0	04.0	2 22 3	SHELL, low plasticity, mostly angul	ar sand to				00.0		14	
		>>>:	gravel-sized shell up to 1/2", little cl silt, strong reaction with HCl, wet,	ay, few	90	20			SPT Sample	er 14	1
			10Y 6/1 greenish gray						<b>e</b> : • <b>e</b> ap.	17	31
		) )) ; ) )) ;						-68.3		9	
					53	21					-
		> >> : > >> :			55	21			SPT Sample		40
								-69.8		21	
		) )) ] ) )) ]	gravel-sized shell up to 3/4", few sil							19	-
			reaction with HCI, wet, 101 6/1 gree	enisn gray	80	22			SPT Sample		48
								-71.3		26	
										22	-
		$p$ $\infty$ :			90	23			SPT Sample		38
-72.8	90.0	) )) ; ) )) ;	CAND alter marking "	4				-72.8		17	
			SAND, silty, mostly medium-graine sand-sized quartz, some angular							11	
			medium-grained sand-sized shell u	p to 1/4",	97	24			SPT Sample	er 12	27
		┨┤┤┤	strong reaction with HCl, wet, N 6/ (SM)	yıay	L			-74.3		15	
										14	
					97	25			SPT Sample	er 14	1_
					1			-75.8		14	28
								-15.0		9	
					97	26			SPT Sample		1
		<b> </b>			<b> </b> ''				or i oampie	7	13
		┨╢╢				07		-77.3			
	ORM 18				67	27			SPT Sample	er 8	

SAJ FORM 1836-A JUN 02

DRILLING LOG (Cont. Sheet)					INSTALLATION Jacksonville District							IEETS
PROJECT				COORDINATE SYSTEM/DATUM HORIZONTAL V								
L-30 Seepage Management Pilot Project				State	Plane,	, FLE	(U.S	. Ft.)	NAD83	N/	AVD88	
				ELEVATIO		POFE	BORIN	G				
X = 8	321,358	1	519,743 T	17.2 F	t.							ш
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATI		RÉC.	BOX OR SAMPLE	RQD OR UD		REMAR	RKS	BLOWS/ 0.5 FT.	N-VALUE
			At El77.8 Ft., some angular sa gravel-sized shell up to 1/2", tra reaction with HCl, wet, N 6/ grav	ce silt, strong	67	27		-78.8	SPT Sa	mpler	5 6	- 11
			At El78.8 Ft., some angular sa gravel-sized shell up to 1"	and to	97	28			SPT Sa	mpler	2	
					-			-80.3			7	- 10
					97	29		04.0	SPT Sa	mpler	25 23	48
			At El81.8 Ft., little angular me sand-sized shell up to 1/4", stro with HCl, wet, N 6/ gray	dium-grained	97	30	-	-81.8	SPT Sa	mpler	12 20	-
			At El83.3 Ft., some angular sa	and to			-	-83.3			27	47
			gravel-sized shell up to 1"		93	31			SPT Sa	mpler	26	- 54
			At El84.8 Ft., some angular sa gravel-sized shell up to 1-1/2"	and to	70	32		-84.8	SPT Sa	mplor	15 26	_
			At El86.3 Ft., little angular sar	nd to			-	-86.3			13 6	- 39
-87.8	105.0		gravel-sized shell up to 1/2", we cementation, 10Y 7/1 light greet		73	33		-87.8	SPT Sa	mpler	7	15
-07.0	105.0		NOTES:					140# ha	ammer w/30" drop t spoon (1-3/8" I.D			
			1. Soils are field visually classif accordance with the Unified Soi Classification System.						ations: Drill Time. Hydraulic Pressui	~		
			2. Set 17.5 Ft. of 8" Schedule 4 Through Center of L-30 Levee 7 Rock.						= Drill Fluid Return			
			<ol> <li>Boring Drilled/Sampled In Th A. Set Surface Casing.</li> <li>B. 4" Wireline Rock Coring To E C. Splitspoon Sampling 30 Ft. E Rock.</li> </ol>	Base Of Rock.								
			4. Borehole Reamed To 7.5" To Rock. USGS Performed Boreho									
			5. 2" Monitoring Well Set @ X = 821356 Y= 519734									
			Screen From -41.8 to -43.8 Ft.									
			<ol> <li>6. Cored to 80 Ft. To Confirm C</li> <li>7. Boring sealed with available</li> </ol>									
				countent.								
	ORM 18	26 /	1 \			1	I	l				1

# S-Run#175-200 S-

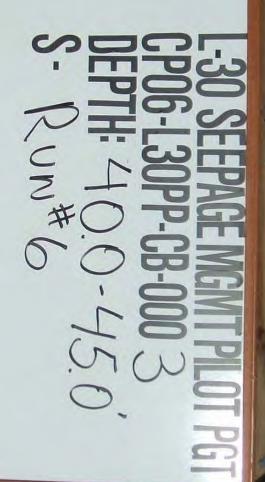
## CPOG-L3OPP-CB-COOL DEPTH: 200-250 S-Runt 200-250

TUN

## S-Run#3 S-Run#3 S-Run#3

## S- Run \*4

### S- Run\*5 S- Run\*5



TU

TU

## S-Rum\*7 S-Rum\*7



#### S- Run \* 9 S- Run \* 9 S- Run \* 9 S- Run \* 9 S- Control of the second sec

#### S-Run \*10

#### S- Run # II

### **CP06-L30 SEEPAGE MGMT PLOT PGT DEPTH:** 70.0-75.0 **S**- Run#12

# CPO6-L30PP-CB-0003 DEPTH: 75.0-76.5

#### CPO6-L30PP-CB-0003 DEPTH: 76.5-78.0 <mark>1</mark>5

# CPO6-L30PP-CB-0003 DEPTH: 780-795

#### CPO6-L30 SEEPAGE MGMTPILOT 79.5-810

## CPO6-L30PP-CB-0003 DEPTH: 81.0-82.5

# CPO6-L30PP-CB-0003 DEPTH: 02.5.840

# CPO6-L30PP-CB-0003 DEPTH: 840-855

# CPO6-L30 SEEPAGE MGMTPILOT PGT DEPTH: 85.5-820 S-5-820





## CPO6-L30PP-CB-0003 DEPTH: 90.0.91.5

## S-35 S-35



# CPO6-L30PP-CB-0003 DEPTH: 94.5-96.0

# CPO6-L30 SEEPAGE MGMT PILOT PGT DEPTH: 96.0-97.5.

### CPOG-L30PP-CB-0003 DEPTH: 97.5-99.0

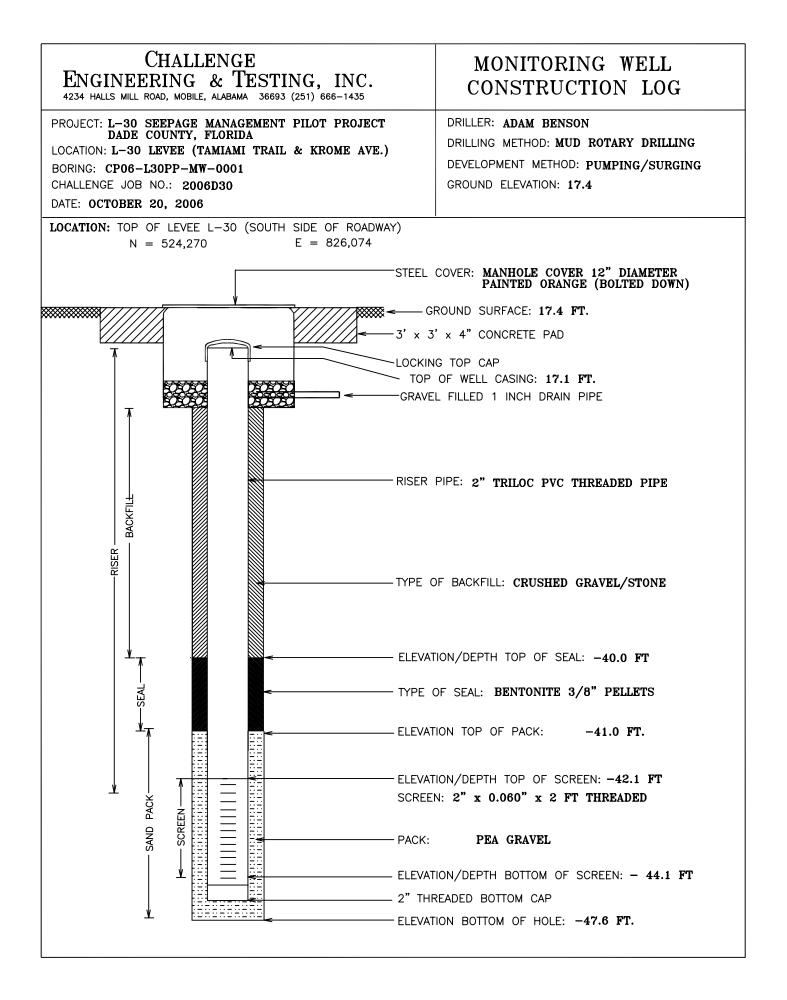
#### CPO6-L30 SEEPAGE MGMTPILOT PC DEPTH: 99.0-100.5 5

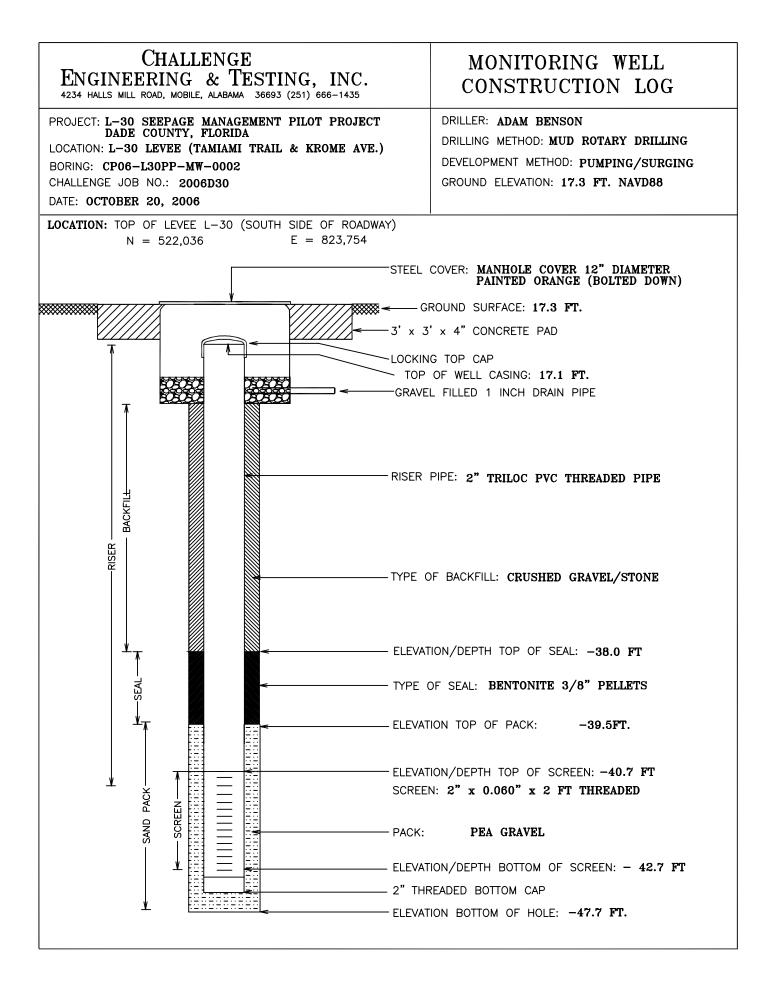
#### CPO6-L30PP-CB-0003 DEPTH: 100.5-102.0 W

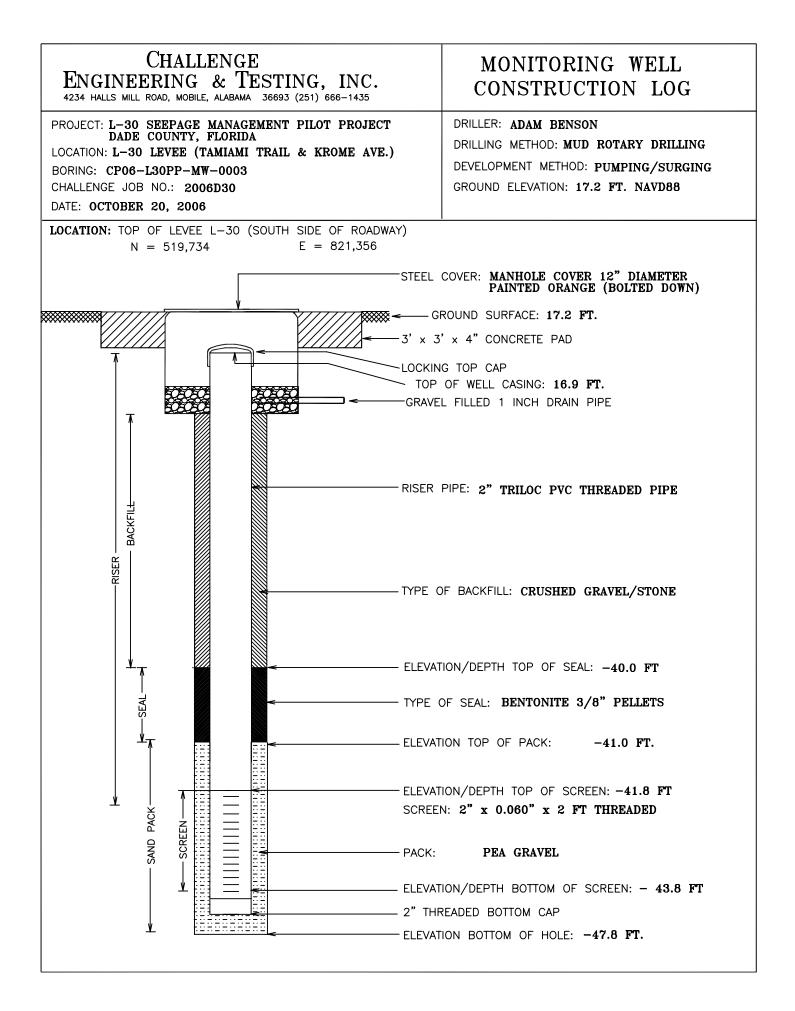
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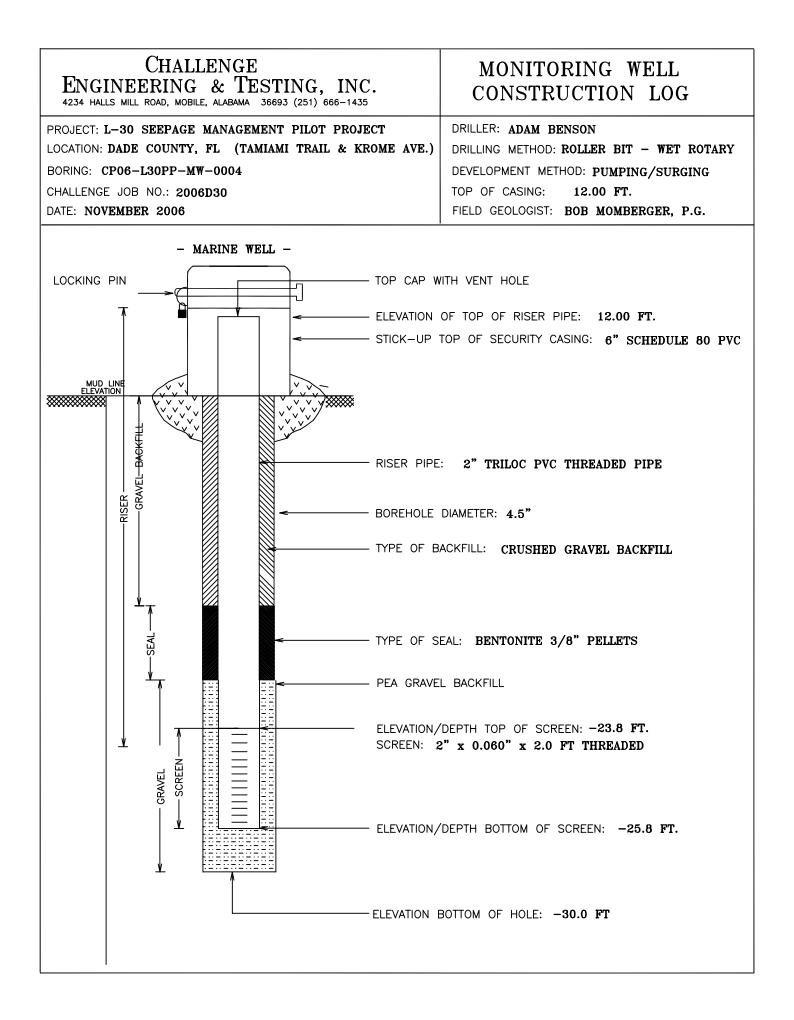
#### CPOG-L30PP-CB-0003 DEPTH: 103.5-105.0 いい

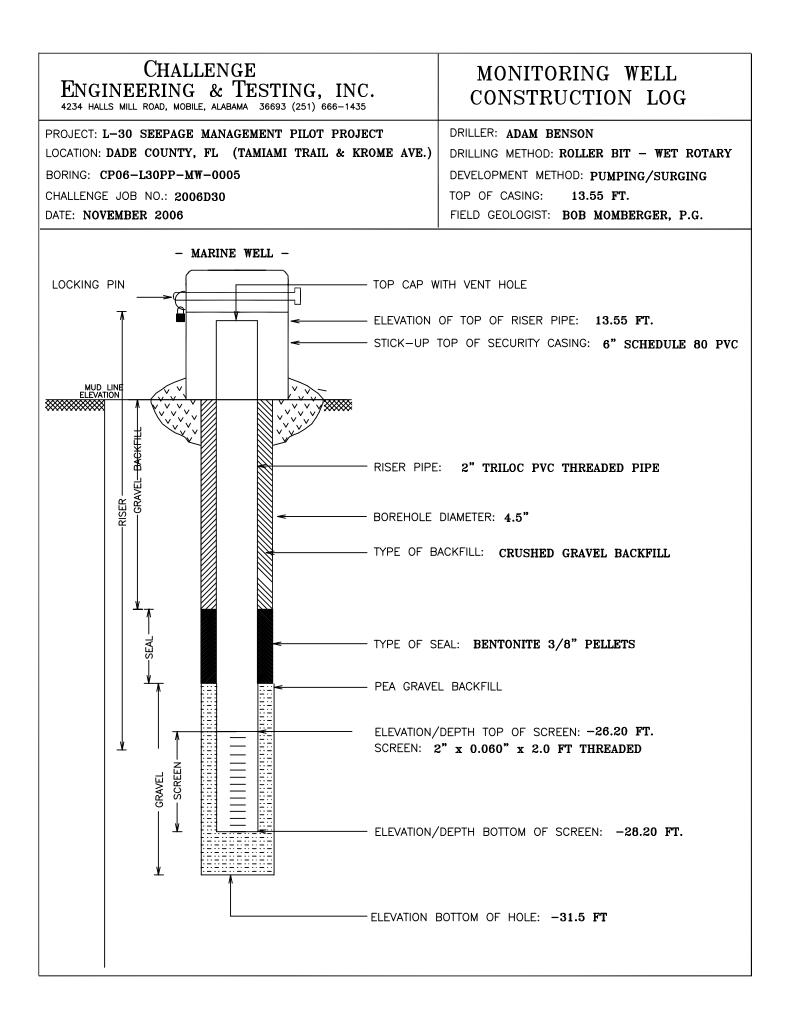
#### MONITORING WELL CONSTRUCTION DIAGRAMS











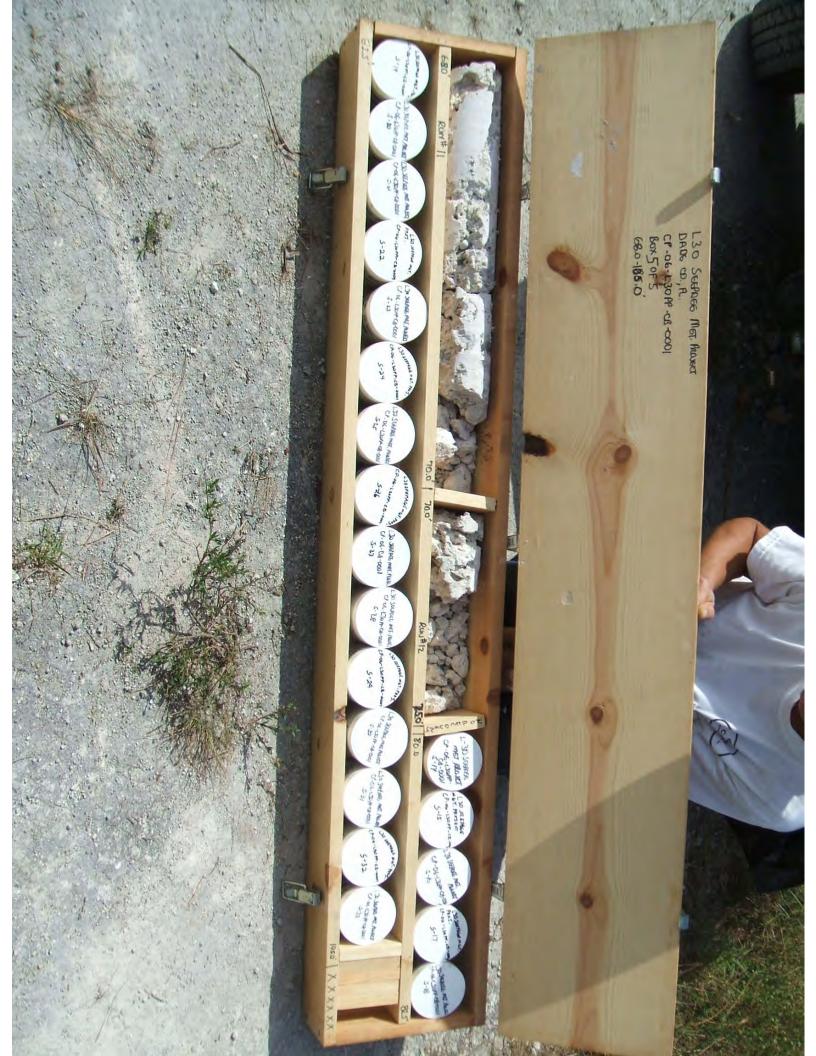
#### CORE BOX INVENTORY REPORT & PHOTOGRAPHS



























## **U.S.G.S. BOREHOLE LOGS**

