wood.

ENVIRONMENT &
INFRASTRUCTURE SOLUTIONS, INC.
1101 E. Channelside Dr., Suite 200
Tampa, FL 33602
Phone: 1.813.289.0750
Fax: 1.813.289.5474
www.woodplc.com
CA-5392

carollo

PROJECT:

PHASE II REPAIRS

GEOTECHNICAL BASIS OF DESIGN REPORT

LAKE MANATEE DAM

MANATEE COUNTY, FL.

WOOD PROJECT No:
300472X4

REVISIONS			
NO.	DATE	BY	APPROVED

DESIGNED BY:	GRA
DRAWN BY:	VV
CHECKED BY:	KRD
APPROVED BY:	GRA
DATE:	03-2020

SHEET TITLE:

GEOTECHNICAL EXPLORATION

FIGURE	REV. #
1	

F:\PROJECTS-C3D\300472 Lake Manatee\2020\June_2020\300472X4_C03X4 - Lake Manatee.dwg - 1 06/22/2020 11:52am martin.vives

Russel and Axon 1965 Borings

1	JAN. 67	AS-BUILTS
NO.	DATE	DESCRIPTION

REVISIONS

• RUSSELL & AXON • INC. •

CONSULTING ENGINEERS

DAYTONA BEACH, FLA. ST. LOUIS, MO.

WATER WORKS PROJECT

EARTH DAM & GATED SPILLWAY

PART B

BORING LOCATION PLAN

MANATEE COUNTY, FLORIDA

DESIGNED BY G.W.C.	FILE No. 6353-3-3-I-B
DRAWN BY R. Lane	SHEET No. 3 OF 35 SHEETS
CHECKED BY	
DATE May 65	SCALE: 1"=200'

GILBERT W. CLIFFORD CERTIFICATE No. 3078 STATE OF FLORIDA REGISTERED

STATIONING ALONG AXIS

-4+00 -3+00 -2+00 -1+00 0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00

ELEVATION IN FEET - M.S.L.

B-00
BLOWS PER FOOT: 15, 18, 20, 29, 40, 4, 20
ELEV. 56.0 — DEPTH 0.0
53.0 — 3.0 ▽ 12-1-64 — Fine Dark Brown Sand (Organic Color)
43.0 — 13.0 — Fine Brown Sand
29.0 — 27.0 — Gray Clay
19.5 — 36.5
12-1-64

B-0
BLOWS PER FOOT: 8, 25, 32, 37, 42
ELEV. 53.2 — DEPTH 0.0
50.2 — 3.0 ▽ 11-24-64 — Fine Dark Brown Sand (Organic Color)
39.2 — 14.0 — Fine Brown Sand
34.2 — 19.0 — Fine Dark Brown Sand (Hardpan) (Organic Color)
26.7 — 26.5
11-24-64

B-4
BLOWS PER FOOT: 11, 40, 31, 45, 1, 12, 10
ELEV. 46.2 — DEPTH 0.0
44.2 — 2.0 ▽ 11-24-64 — Fine Dark Brown Sand (Organic Color)
28.2 — 23.0 — Fine Gray Sandy Clay
19.2 — 27.0 — Gray Sandy Clay
9.7 — 36.5
11-24-64

B-8
BLOWS PER FOOT: 10, 2, 8, 11, 35, 15, 11
ELEV. 32.7 — DEPTH 0.0
27.7 — 5.0 ▽ 11-23-64 — Fine Brown Sand
24.7 — 8.0 — Gray Clayey Sand
13.1 — 19.0 — Gray Sandy Clay
-3.8 — 36.5
11-23-64

B-12
BLOWS PER FOOT: 16, 21, 9, 27, 11, 16, 11
ELEV. 22.2 — DEPTH 0.0
20.2 — 2.0 ▽ 11-23-64 — Fine Light Tan Sand
9.2 — 13.0 — Gray Clay
-1.8 — 24.0 — Gray Sandy Clay
-14.3 — 36.5
11-23-64

B-14
BLOWS PER FOOT: 8, 16, 18, 12, 14, 13, 9
ELEV. 17.9 — DEPTH 0.0
16.9 — 1.0 ▽ 11-20-64 — Gray Sandy Clay
9.9 — 8.0 — Gray Clay
-5.0 — 22.9 — Gray Sandy Clay
-19.6 — 37.5
-23.1 — 41.0 — Limerock (Soft)
Limerock (Softer to Cut)
11-20-64

B-16
BLOWS PER FOOT: 5, 12, 19, 23, 26, 28
ELEV. 16.9 — DEPTH 0.0
11.9 — 5.0 ▽ 11-23-64 — Fine Gray Sandy Clay
9.0 — 7.9 — Gray Clay
-6.1 — 28.0 — Fine Gray Sandy Clay
-14.6 — 37.5
11-23-64

STATIONING ALONG AXIS

17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00

ELEVATION IN FEET - M.S.L.

B-17
BLOWS PER FOOT: 3, 25, 16, 18, 21
ELEV. 16.6 — DEPTH 0.0
13.1 — 3.5 ▽ 11-23-64 — Gray Clay
1.8 — 14.8 — Gray Sandy Clay
-11.4 — 28.0 — Gray Clayey Sand
-14.9 — 31.5
11-25-64

B-18
BLOWS PER FOOT: 16, 11, 15, 17, 18
ELEV. 16.5 — DEPTH 0.0 ▽ 11-25-64
8.5 — 8.0 — Fine Tan and Brown Sand
1.8 — 14.7 — Gray Clay
-12.5 — 29.0 — Gray Sandy Clay
-18.5 — 35.0 — Soft Rock to 35 Feet
11-25-64

B-20
BLOWS PER FOOT: 10, 16, 17, 22, 24
ELEV. 19.5 — DEPTH 0.0
13.5 — 6.0 ▽ 11-25-64 — Fine Tan Sand
11.5 — 8.0 — Gray Clay
0.7 — 18.8 — Gray Sandy Clay
-3.5 — 23.0 — Fine Gray Sand W/ Rock Fragments
-12.0 — 31.5
11-25-64

B-22
BLOWS PER FOOT: 25, 7, 9, 29, 19, 29
ELEV. 18.4 — DEPTH 0.0
14.4 — 4.0 ▽ 11-25-64 — Coarse Gray Sand
9.4 — 8.0 — Gray Clay
-0.6 — 19.0 — Gray Sandy Clay W/ Rock Fragments
-9.6 — 28.0 — Fine Gray Sand
-13.1 — 31.5
11-25-64

B-24
BLOWS PER FOOT: 18, 3, 9, 18, 26, 24, 28, 18
ELEV. 17.4 — DEPTH 0.0
14.4 — 3.0 ▽ 11-25-64 — Fine Tan Sand
10.4 — 7.0 — Coarse Brown Sand
5.4 — 12.0 — Gray Clay with Rock Fragments
-6.6 — 24.0 — Coarse Gray Sand
-8.6 — 26.0 — Fine Gray Clayey Sand
-20.6 — 38.0 — Gray Sandy Clay
-31.6 — 49.0
11-25-64

B-26
BLOWS PER FOOT: 9, 6, 7, 11, 18, 28
ELEV. 18.8 — DEPTH 0.0
15.8 — 3.0 ▽ 11-25-64 — Fine Brown Sand W/ Rock Fragments
10.8 — 8.0 — Coarse Brown Sand
4.8 — 14.5 — Gray Clay
-0.1 — 18.9 — Gray Sandy Clay
-4.2 — 23.0 — Gray Clayey Sand W/ Rock Fragments
-9.7 — 28.5 — Sandy Clay
-12.7 — 31.5
11-25-64

B-30
BLOWS PER FOOT: 3, 7, 8, 7, 22, 39, 22
ELEV. 24.5 — DEPTH 0.0
21.5 — 3.0 ▽ 11-27-64 — Fine Light Tan Sand
16.5 — 8.0 — Gray Clayey Sand W/ Rock Fragments
5.5 — 19.0 — Gray Sandy Clay
1.5 — 23.0 — Gray Clay
-4.2 — 28.7 — Gray Clay W/ Rock Fragments
-8.5 — 33.0 — Gray Clayey Sand W/ Rock Fragments
-12.0 — 36.5
11-27-64

B-34
BLOWS PER FOOT: 13, 9, 10, 11, 13, 25, 35
ELEV. 25.4 — DEPTH 0.0
22.4 — 3.0 ▽ 11-27-64 — Tan Sand
17.4 — 8.0 — Gray Clayey Sand W/ Rock Fragments
12.4 — 13.0 — Gray Sandy Clay
7.4 — 18.0 — Gray Clay
-8.6 — 34.0 — Gray Sandy Clay W/ Rock Fragments
-15.1 — 40.5 — Clay W/ Rock
-19.6 — 45.0 — Hard Rock at 45 Feet
11-27-64

STATIONING ALONG AXIS

38+00 39+00 40+00 41+00 42+00 43+00 44+00 45+00 46+00 47+00 48+00 49+00 50+00 51+00 52+00 53+00 54+00

ELEVATION IN FEET - M.S.L.

B-38
BLOWS PER FOOT: 7, 4, 31, 15, 12, 9
ELEV. 25.5 — DEPTH 0.0
24.0 — 1.5 ▽ 11-27-64 — Tan Sand
11.5 — 14.0 — Gray Clay w/ Rocks
6.5 — 19.0 — Gray Sandy Clay
-11.0 — 36.5
11-27-64

B-42
BLOWS PER FOOT: 5, 16, 5, 2, 5, 28, 32
ELEV. 32.5 — DEPTH 0.0
19.5 — 13.0 — Fine Dark Brown Sand (Organic Color)
9.5 — 23.0 — Fine Dark Gray Sand
4.5 — 28.0 — Gray Sandy Clay
-4.0 — 36.5 — Gray Sandy Clay w/ Rocks
11-27-64

B-46
BLOWS PER FOOT: 6, 16, 20, 31, 4, 31, 28, 26
ELEV. 42.4 — DEPTH 0.0
37.4 — 5.0 ▽ 11-28-64 — Fine Dark Brown Sand (Organic Color)
29.4 — 18.0 — Fine Tan Sand
25.4 — 17.0 — Coarse Dark Brown Sand (Organic Color)
19.4 — 23.0 — Fine Dark Brown Sand (Organic Color)
13.4 — 29.0 — Fine Gray Sand
10.9 — 31.5 — Gray Sandy Clay
5.4 — 37.0 — Gray Clay
-4.1 — 46.5
12-1-64

B-50
BLOWS PER FOOT: 4, 12, 39, 13, 11, 5, 9, 3, 11, 13
ELEV. 51.8 — DEPTH 0.0
47.8 — 4.0 ▽ 11-28-64 — Fine Dark Brown Sand (Organic Color)
33.8 — 18.0 — Very Fine Brown Sand
23.8 — 28.0 — Fine Light Brown Sand
11.3 — 40.5 — Coarse Gray Sandy Clay
8.1 — 43.7 — Gray Clay
0.3 — 51.5
11-28-64

B-54
BLOWS PER FOOT: 8, 5, 17, 12, 16, 21, 9, 6, 17, 21, 6, 7
ELEV. 59.0 — DEPTH 0.0
54.0 — 5.0 ▽ 11-30-64 — Fine Brown Sand
51.0 — 8.0 — Fine Dark Brown Sand (Organic Color)
41.0 — 18.0 — Fine Brown Sand
25.0 — 34.0 — Fine Brownish Gray Sand
15.0 — 44.0 — Clayey Sand
3.5 — 55.5
2.0 — 57.0 — Coarse Gray Sandy Clay
Gray Clay
-7.5 — 66.5
11-30-64

NOTE:
1) For Plan Location of Borings See Drawing # 5
2) Dates indicated below Borings are dates Borings were taken.

NO.	DATE	DESCRIPTION	BY	CK'D
		REVISIONS		

RUSSELL & AXON
Consulting Engineers, Incorporated
DAYTONA BEACH, FLA. ST. LOUIS, MO.

WATER WORKS PROJECT
EARTH DAM & GATED SPILLWAY
PART B
EMBANKMENT BORINGS
MANATEE COUNTY FLORIDA

DESIGNED BY G.W.C.	FILE No. 6353-3-4-I-B
DRAWN BY R. Lane	SHEET No. 4
CHECKED BY BR	OF 35 SHEETS
DATE May '65	SCALE: None

SEAL — STATE OF FLORIDA — REGISTERED

Bromwell Borings (1979)

PROJECT: Lake Manatee Dam
CLIENT: Manatee County
CONTRACTOR: GeoData Services, Inc.

HOLE NO. B-2
Project No. 275
Sheet No. 1 of 2
Location 17+50, -140' cL
Elevation +18.0
Start 7/7/79
Finish 7/7/79
Driller J.B. & B.R.
Inspector J. Bromwell

	CASING	SAMPLER	CORE BARREL
TYPE		S	
SIZE ID		1.5"	
HAMMER WT.		140 lbs	
HAMMER FALL		30"	

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
1		12	2, 3, 9		Brown fine sand	
2		21	6, 9, 12		Same	
3		16	6, 8, 8		Same	
4	5	5	3, 2, 3		Grayish brown fine sand	
5		9	1, 3, 6		Same	7%
6		7	3, 3, 4		Same	
7	10	6	3, 3, 3		Same Shelby Tube 10.5' to 12.5' (No recovery - too sandy)	7%
8	15	24	5, 10, 14		Gray fine sand	

BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 to 4	Very Loose	0 to 2	Very Soft	S: Split Spoon	OB:
4 to 10	Loose	2 to 4	Soft	T: Thin Wall Tube	Rock:
10 to 30	Compact	4 to 8	Firm	U: Undisturbed Piston	Samples:
30 to 50	Dense	8 to 15	Stiff	O: Open End Rod	Hole No.
50+	Very Dense	15 to 30	Very Stiff	W: Wash Sample	

TEST BORING REPORT
Lakeland, Florida
GeoData Services, Inc.

PROJECT: Lake Manatee Dam | HOLE NO. B-2

CLIENT: Manatee County | SHEET NO. 2 of 2

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
	20					
9		7	4 3 4		Dark gray medium sand with pieces of wood	3%
	25					
			2			
10		9	3 6		Gray clay	83%
	30				End of Hole - 28' Installed P-8 in bottom	

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam
CLIENT: Manatee County
CONTRACTOR: Buddy Systems

	CASING	SAMPLER	CORE BARREL
TYPE		SS	
SIZE ID		2"	
HAMMER WT.		140 lbs	
HAMMER FALL		30"	

HOLE NO. B-3
Project No. 275
Sheet No. 1 of 5
Location 12+00
Elevation 52
Start 7/9/79
Finish
Driller Pete
Inspector B. Keshian

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
			8		Dark brown fine sand	
1		24	13		Crushed limestone	
			11		Dark brown fine sand	
2		30	8		Compact dark brown fine sand	
			13			
	5		17			
3		17	7		Very stiff greenish gray silty clay	83%
			9			
UD-1	10		8		Shelby Tube 10' to 12' (24" recovery)	
4		11	3		Gray silty clay	
			5			
	15		6			
			3			
5	20	13	7		Same	82%
			6			

BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 to 4	Very Loose	0 to 2	Very Soft	S: Split Spoon	OB:
4 to 10	Loose	2 to 4	Soft	T: Thin Wall Tube	Rock:
10 to 30	Compact	4 to 8	Firm	U: Undisturbed Piston	Samples:
30 to 50	Dense	8 to 15	Stiff	O: Open End Rod	Hole No.
50+	Very Dense	15 to 30	Very Stiff	W: Wash Sample	

TEST BORING REPORT
GeoData Services, Inc. Lakeland, Florida

PROJECT: Lake Manatee Dam	HOLE NO. B-3
CLIENT: Manatee County	SHEET NO. 2 of 5

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
UD-2	20				Shelby Tube 20' to 22' (24" recovery)	
			5			
			7			
6	25	15	8		Same	
7		10	3		Same	
			5			
	30		5		Lost circulation at 30'	
UD-3					Shelby tube - no recovery; brown sand in tube holder	
8		7	2		Gray sand and clay	
			2			
	35		5		Stopped and grouted hole; moved to 4' off center line and washed to 30' for Shelby Tube	
	40					

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam	HOLE NO. B-3
CLIENT: Manatee County	SHEET NO. 3 of 5

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
UD-4	30				Washed to 30' for Shelby Tube; Pushed 18" - too hard to push (12" recovery)	
9		16	5 5 11		Stiff gray silty clay	88%
	35					
10		22	8 9 13		Very stiff gray silty clay	
UD-5	40				Shelby tube 40' to 41.5' (18" recovery)	
11		16	3 7 9		Same	
	45					
12		46	7 11 35		Same	84%
UD-6	50				Shelby Tube 50' t0 52' (24" recovery)	
					Wash to 58'	

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam	HOLE NO. B-3
CLIENT: Manatee County	SHEET NO. 4 of 5

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
	55					
UD-7					Shelby Tube 58'4" to 60' (20" recovery) very stiff	
	60					
13		25	7 8 17		Gray compact sandy clay	
	65				Wash to 68'	
UD-8					Shelby Tube 68' to 69.5'	
	70					
14			20 50/1"		Very dense gray clayey silt with lenses of sand, clay and rock 71.5 - very hard 71.5-76 - Softer, with lenses 76-78.5 - Hard, with soft lenses	81%
	75					
			70 29 80			

PROJECT: Lake Manatee Dam	HOLE NO. B-3
CLIENT: Manatee County	SHEET NO. 5 of 5

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
15	80	109			Light gray, very hard slightly silty coarse sand 79.5-83 - Very hard gray limestone	
					Wash to 88.5' with rock bit 83-86 - firm limestone	
	85				86-88.5 - Very hard gray limestone	
16			50/1"		No sample	
	90				Soft from 93' to	
	95					
17		20	5 7 13			91%
	100				End of Hole - 100'	

TEST BORING REPORT

GeoData Services, Inc. Lakeland, Florida

PROJECT: Lake Manatee Dam
CLIENT: Manatee County
CONTRACTOR: Buddy Systems

HOLE NO. B-4
Project No. 275
Sheet No. 1 of 5
Location 17+50, cL ≈ 4'
Elevation
Start
Finish
Driller Pete
Inspector B. Keshian

	CASING	SAMPLER	CORE BARREL
TYPE		SS	
SIZE ID		2"	
HAMMER WT.		140 lbs	
HAMMER FALL		30	

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
1		23	5 10 13		Dark brown fine sand	
2	5	20	5 9 11		Same	
UD-14					Shelby Tube 8' to 10' (18" recovery) Wood in drill cuttings	
	10					
3		2	2		Gray clayey sand	24%
4		8	2 4 4		Same	
	15					
UD-15					Shelby Tube 18' to 20' (18" recovery)	

BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 to 4	Very Loose	0 to 2	Very Soft	S: Split Spoon	OB:
4 to 10	Loose	2 to 4	Soft	T: Thin Wall Tube	Rock:
10 to 30	Compact	4 to 8	Firm	U: Undisturbed Piston	Samples:
30 to 50	Dense	8 to 15	Stiff	O: Open End Rod	Hole No.
50+	Very Dense	15 to 30	Very Stiff	W: Wash Sample	

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam	HOLE NO. B-4
CLIENT: Manatee County	SHEET NO. 2 of 5

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
			2			
5		9	4		Gray sandy clay	43%
			5			
			2			
			3			
6	25	8	5		Greenish gray clayey sand	
UD-16					Shelby Tube 28' to 30' (18" recovery)	
	30		2			
			2			
7		4	2		Greenish gray clayey sand	
8		7	1		Same	
			2			
	35		5			
UD-17					Shelby Tube 38' to 40'	
	40					
			1			
9		12	4		Same	30%
			8			
10		14	6		Same with gravel	
			6			
	45		8			

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam	HOLE NO. B-4
CLIENT: Manatee County	SHEET NO. 3 of 5

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
UD-18					Loss of circulation at 48' Pushed sampler by hand 48.5' to 50'	
	50					
			0			
			0			
11			0		Soft greenish gray clayey sand	36%
			2			
			2			
12		4	2		Greenish gray slightly clayey sand	5%
			4			
			6			
13		19	13		Change from clayey sand to medium sand with organic debris Had the contact in the spoon	
	55					
UD-19					Shelby Tube 58' to 60'	
	60					
			4			
14		37	6		Greenish gray clayey sand	
			31			
	65					
15		66	18		Gray clayey sand with muck gravel and rock	29%
	70		28			
			38			

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam	HOLE NO. B-4
CLIENT: Manatee County	SHEET NO. 4 of 5

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
					Hit hard rock at 72', ran NX barrel from 72-77	
	75					
16		17	50/"		50 blows in very stiff clayey sand	
			9			
	80		8			
	85					
17			76/"		Same	
	90					
	95					

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam	HOLE NO. B-4
CLIENT: Manatee County	SHEET NO. 5 of 5

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
18		37	10		Greenish gray clayey sand	32%
			16			
UD-20	100		21		Shelby Tube 100' to 102'	
	105					
19			50/"		Greenish gray sandy clay	
			0			
	110		0			
	115					
20			10			
	120	40	13		Gray clayey sand End of Hole - 120'	33%
			27			

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam
CLIENT: Manatee County
CONTRACTOR: GeoData Services, Inc.

HOLE NO. B-5
Project No. 275
Sheet No. 1 of 3
Location 17 + 50 -60cL
Elevation 37.5
Start 7/18/79
Finish 7/19/79
Driller JB & BR
Inspector J. Bromwell

	CASING	SAMPLER	CORE BARREL
TYPE		S	
SIZE ID		1.5"	
HAMMER WT.		140 lbs	
HAMMER FALL		30"	

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
1		9	2, 4, 5		Dark brown fine sand	
2		15	4, 7, 8		Same	
3		24	6, 10, 14		Same	
4	5	17	4, 7, 10		Same	
5		32	10, 14, 18		Brown fine sand	8%
6	10	19	5, 10, 9		Black fine sand Shelby Tube from 10'6" to 11'8" (No recovery)	
7	15	23	9, 10, 13		Dark brown fine sand	8%

BLOWS/FT	DENSITY
0 to 4	Very Loose
4 to 10	Loose
10 to 30	Compact
30 to 50	Dense
50+	Very Dense

BLOWS/FT	CONSISTENCY
0 to 2	Very Soft
2 to 4	Soft
4 to 8	Firm
8 to 15	Stiff
15 to 30	Very Stiff

SAMPLE IDENTIFICATION
S: Split Spoon
T: Thin Wall Tube
U: Undisturbed Piston
O: Open End Rod
W: Wash Sample

SUMMARY
OB:
Rock:
Samples:
Hole No.

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam	HOLE NO. B-5
CLIENT: Manatee County	SHEET NO. 2 of 3

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	%-#200 Sieve
	20				Shelby Tube 20' to 21'3" (15" recovery, wood in bottom)	
			9			
8		55	22		Dense dark brown fine sand	
			33			
	25		10			
9		47	17		Same	
			30			
	30				Could not push Shelby 1"	
			10			
10		36	11		Dense dark brown fine sand	10%
			25			
	35		11			
11		22	13		Gray medium sand	
			9			
	40		14			
12		32	19			
			13		Gray coarse sand	

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

PROJECT: Lake Manatee Dam	HOLE NO. B-5
CLIENT: Manatee County	SHEET NO. 3 of 3

Sample No.	Depth	SPT Blows /Ft	Blows /6 Inches	Strata Change	FIELD CLASSIFICATION AND REMARKS	
13	45	13	3 5 8		Soft gray clayey sand	
	50		10			
14			100		Same with gravel for 5½", bed clay with limestone fragments; changed to rock bit	21%
	55		50		No sample	
	60				End of Hole - 60' P-17 installed in hole	

GeoData Services, Inc. Lakeland, Florida TEST BORING REPORT

Driggers Borings 2011

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO. B-1**

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

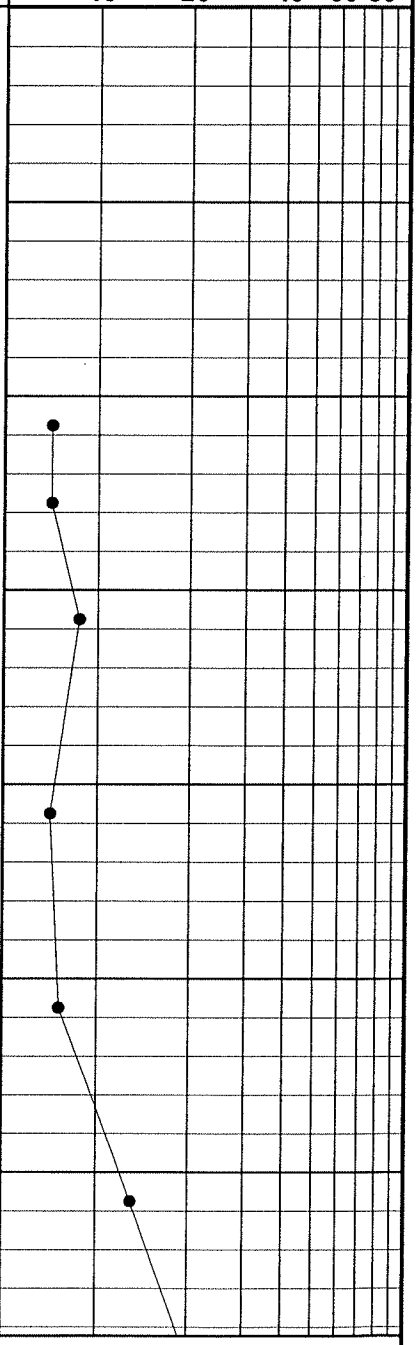
Location See Plate I **Foreman** J.R.

Completion Depth 60.9' **Date** 5/3/11 **Depth To Water** ** **Time** **Date** 5/3/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL: +36.7+/-'	
0			Dark brown Fine SAND (SP)	
5				
			Dark brown silty Fine SAND with finely divided organic material (SM)	
			Dark brown Fine SAND with trace of roots (SP)	
10			Loose brown to dark brown Fine SAND (SP)	2/3/2
				2/2/3
15			Loose dark brown Fine SAND with pockets of brown clayey Fine SAND (SP/SC)	3/4/4
			Loose grayish-brown Fine SAND (SP)	
20				2/2/3
			Loose dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	
25				3/3/3
			Stiff to very stiff green phosphatic, sandy CLAY (CH)	
30				2/3/10

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP

10 20 40 60 80



Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 35.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO. B-1**

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

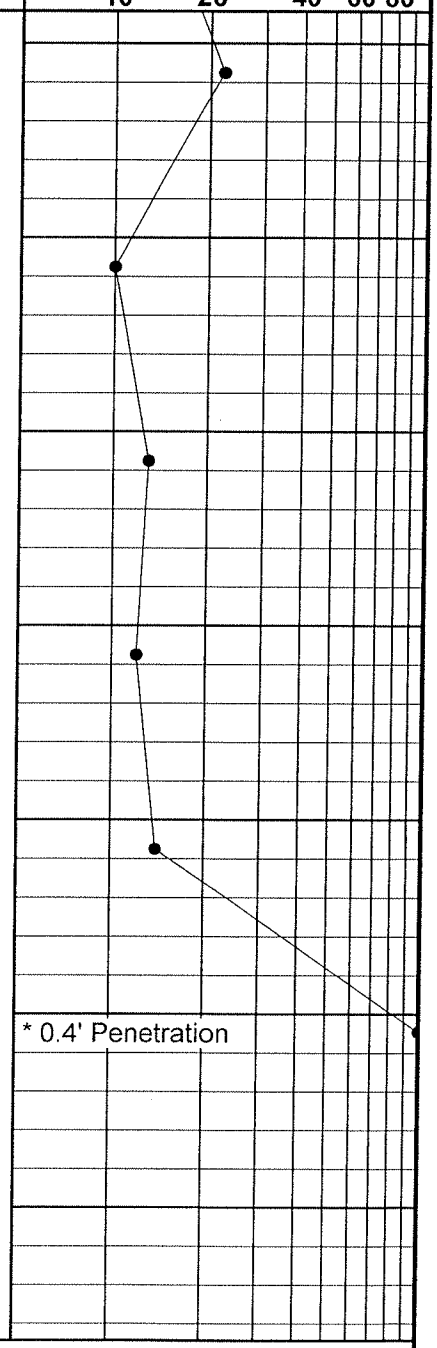
Location See Plate I **Foreman** J.R.

Completion Depth 60.9' **Date** 5/3/11 **Depth To Water** ** **Time** **Date** 5/3/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL: +36.7+/-'	
35			Stiff to very stiff green phosphatic, sandy CLAY (CH)	7/10/12
40				5/5/5
45			Medium dense green phosphatic, clayey Fine SAND (SC)	5/6/7
50			Loose dark gray phosphatic Fine SAND (SP)	
			Loose green phosphatic, silty Fine SAND (SM)	4/4/8
55			Very stiff green phosphatic CLAY (CH)	8/7/7
60			Medium dense to very dense dark gray phosphatic Fine SAND (SP)	19/50*
65				

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP

10 20 40 60 80



* 0.4' Penetration

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 35.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO.** B-2

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

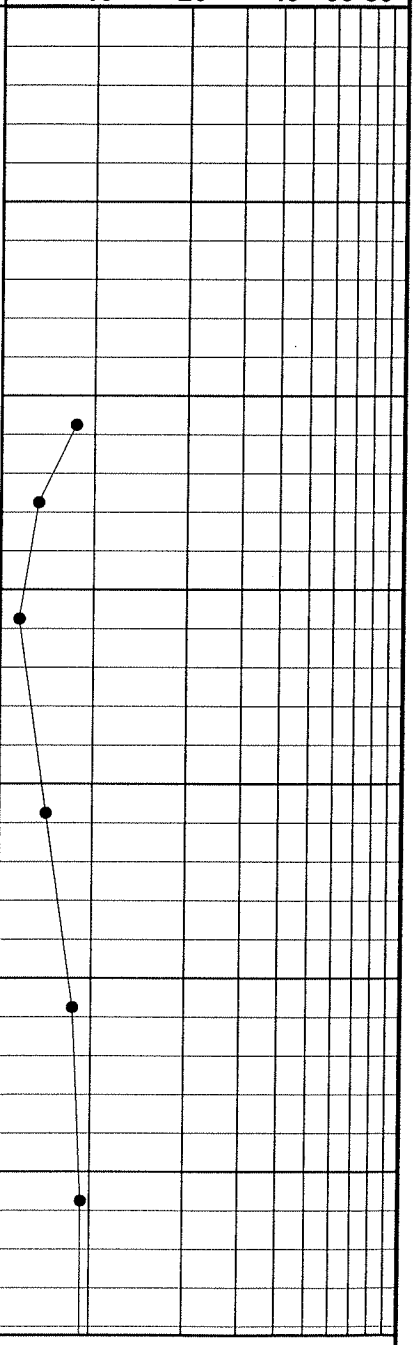
Location See Plate I **Foreman** J.R.

Completion Depth 51.5' **Date** 5/2/11 **Depth To Water** ** **Time** **Date** 5/2/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION (SURF. EL: +30.5+/-')	BLOWS ON SAMPLER PER 6" OR PEN. STR.
0			Dark brown Fine SAND with trace of roots (SP)	
			Dark brown Fine SAND (SP)	
			Grayish-brown Fine SAND (SP)	
5			Brown Fine SAND (SP)	
			Grayish-brown Fine SAND (SP)	
10			Loose dark brown Fine SAND (SP)	3/4/4
			Very loose grayish-brown Fine SAND with trace of silty, slightly clayey Fine SAND (SP)	1/2/2
15			Very loose to loose dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	2/1/1
20				2/3/2
			Loose grayish-brown Fine SAND (SP)	
25				6/5/3
			Stiff green phosphatic, sandy CLAY (CH)	
30				3/4/5
			Stiff green phosphatic CLAY (CH)	

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP

10 20 40 60 80



Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 30.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO.** B-2

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

Location See Plate I **Foreman** J.R.

Completion Depth 51.5' **Date** 5/2/11 **Depth To Water** ** **Time** **Date** 5/2/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.	STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP
			SURF. EL: +30.5+/-'		10 20 40 60 80
35			Stiff green phosphatic CLAY (CH)	4/4/5	
40				3/4/8	
45			Very stiff green phosphatic CLAY with gray phosphatic Fine SAND lenses (CH/SP)	9/12/13	
50			Medium dense gray phosphatic Fine SAND (SP)	11/11/13	
55					
60					
65					

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 30.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO.** B-3

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

Location See Plate I **Foreman** J.R.

Completion Depth 60.8' **Date** 5/2/11 **Depth To Water** ** **Time** **Date** 5/2/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION (SURF. EL: +24.8+/-')	BLOWS ON SAMPLER PER 6" OR PEN. STR.	STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP (10 20 40 60 80)
0			Dark brown Fine SAND with some roots (SP)		
			Dark brown Fine SAND (SP)		
5			Grayish-brown Fine SAND (SP)		
			Gray and orangish-brown phosphatic, sandy CLAY (CH)		
			Green phosphatic, sandy CLAY (CH)		
10			Very loose light brown phosphatic Fine SAND (SP)	1/1/2	
			Very loose dark brown Fine SAND with trace of finely divided organic material (SP)	3/3/4	
15			Loose to very loose dark brown silty Fine SAND with trace of finely divided organic material (SM)	1/1/2	
20			Very loose brown Fine SAND (SP)	1/0/0	
25			Stiff green phosphatic CLAY (CH)	3/5/4	
30				3/5/5	

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 26.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO.** B-3

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

Location See Plate I **Foreman** J.R.

Completion Depth 60.8' **Date** 5/2/11 **Depth To Water** ** **Time** **Date** 5/2/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.	STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP
			SURF. EL: +24.8+/-'		10 20 40 60 80
35			Stiff green phosphatic CLAY (CH)	4/4/6	
40			Hard green phosphatic, sandy CLAY with seams of dark gray phosphatic Fine to Medium Fine SAND (CL/SP)	5/19/50*	* 0.1' Penetration
45			Very dense gray phosphatic Fine to Medium Fine SAND (SP)	31/50*	* 0.4' Penetration
50			Hard light gray cemented, dolomitic SILT (ML)	50*	* 0.3' Penetration
55			Hard green phosphatic, sandy CLAY (CL)	48/42/36	
			Very stiff green phosphatic CLAY (CH)		
60			Hard gray cemented, dolomitic SILT (ML)	8/50*	* 0.3' Penetration
65					

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 26.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO. B-4**

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

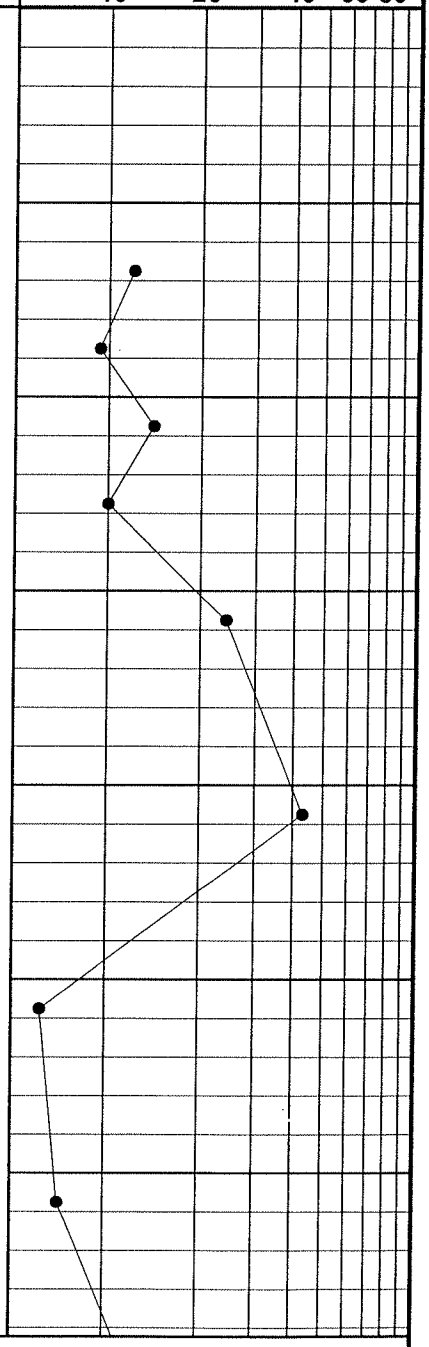
Location See Plate I **Foreman** J.R.

Completion Depth 55.0' **Date** 5/6/11 **Depth To Water** ** **Time** **Date** 5/6/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL: +34.1+/-'	
0			Light brown Fine SAND with roots (SP)	
			Dark brown Fine SAND (SP)	
			Brown Fine SAND (SP)	
5			Medium dense dark brown Fine SAND (SP)	3/8/4
			Loose to medium dense dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	3/4/5
10				4/6/8
				4/6/4
15			Medium dense dark brown slightly silty Fine SAND (SP-SM)	8/12/12
			Dense to very loose dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	
20				12/19/24
25				5/1/2
			Firm to stiff green phosphatic, sandy CLAY (CH)	
30				2/2/3

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP

10 20 40 60 80



Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 30.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO. B-4**

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

Location See Plate I **Foreman** J.R.

Completion Depth 55.0' **Date** 5/6/11 **Depth To Water** ** **Time** **Date** 5/6/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.	STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP
			SURF. EL: +34.1+/-'		10 20 40 60 80
35			Firm to stiff green phosphatic, sandy CLAY (CH)	3/5/8	
			Stiff green CLAY (CH)		
40				3/5/7	
			Stiff dark green phosphatic CLAY (CH)		
45				3/5/5	
50				4/6/8	
55			Hard gray cemented, dolomitic SILT (ML)	50*	* 0.0' Penetration
60					
65					

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 30.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO. B-5**

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

Location See Plate I **Foreman** J.R.

Completion Depth 60.4' **Date** 5/4/11 **Depth To Water** ** **Time** **Date** 5/4/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL: +28.3+/-'	
0			Brown and light brown Fine SAND (SP)	
			Brown Fine SAND with trace of limestone fragments (SP)	
			Brown Fine SAND (SP)	
5			Dark brown Fine SAND (SP)	
			Dark brown slightly silty Fine SAND (SP-SM)	
10			Loose brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	2/2/5
			Very loose dark brown slightly silty Fine SAND (SP-SM)	1/2/1
15			Loose to very loose dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	1/2/5
20				WH/WH/ WH
			Very soft dark brown silty CLAY (CH)	
25			Stiff green phosphatic, sandy CLAY (CH)	WH/4/9
			Firm green to dark green phosphatic CLAY (CH)	
30				2/3/4

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP (AUTOMATIC HAMMER)

10 20 40 60 80

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted WH = Weight of Hammer **Casing Length** 30.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO.** B-5

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

Location See Plate I **Foreman** J.R.

Completion Depth 60.4' **Date** 5/4/11 **Depth To Water** ** **Time** _____ **Date** 5/4/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.	STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP (AUTOMATIC HAMMER)
			SURF. EL: +28.3+/-'		10 20 40 60 80
35			Firm green to dark green phosphatic CLAY (CH)	2/3/4	
40			Firm dark green phosphatic, sandy CLAY (CH)	2/3/5	
45			Firm dark green phosphatic CLAY (CH)	2/3/3	
50			Dense gray phosphatic Fine to Medium Fine SAND (SP)	27/13/19	
55			Hard gray cemented, dolomitic SILT (ML)	50*	* 0.2' Penetration
60			Very dense gray cemented, phosphatic, silty Fine SAND (SM)	50*	* 0.4' Penetration
65					

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted WH = Weight of Hammer **Casing Length** 30.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO.** B-6

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

Location See Plate I **Foreman** J.R.

Completion Depth 55.5' **Date** 5/4/11 **Depth To Water** ** **Time** **Date** 5/4/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL: +25.5+/-'	
0			Brown Fine SAND (SP)	
			- fabric at depth 3.0'	
			Brown slightly silty Fine SAND (SP-SM)	
5			Brown Fine SAND with trace of clayey Fine SAND (SP)	
			Brown Fine SAND (SP)	
			Brown Fine SAND with limestone fragments (SP)	
10			Brown Fine SAND (SP)	
			Very loose dark brown slightly silty Fine SAND with trace of clayey Fine SAND (SP-SM)	1/0/1
				1/1/1
15			Loose dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	2/3/2
20			Very loose dark brown silty Fine SAND with trace of finely divided organic material (SM)	WH/WH/1
25			Firm green phosphatic, sandy CLAY (CH)	2/2/4
			Firm green CLAY with trace of phosphate (CH)	
30				2/2/4

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP (AUTOMATIC HAMMER)

10 20 40 60 80

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted WH = Weight of Hammer **Casing Length** 25.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO.** B-6

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

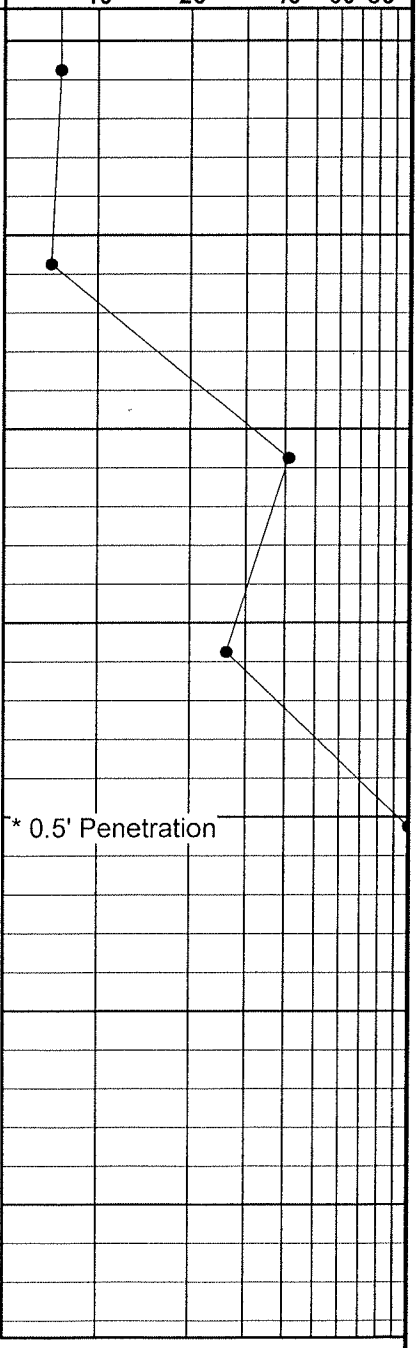
Location See Plate I **Foreman** J.R.

Completion Depth 55.5' **Date** 5/4/11 **Depth To Water** ** **Time** **Date** 5/4/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL: +25.5+/-'	
35			Firm green CLAY with trace of phosphate (CH)	2/2/4
40			Firm dark green phosphatic CLAY (CH)	2/2/3
45			Dense to medium dense gray phosphatic Fine to Medium Fine SAND (SP)	6/21/20
50				7/12/14
55			Gray phosphatic LIMESTONE and seams of gray phosphatic Fine to Medium Fine SAND	50*
60				
65				

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP (AUTOMATIC HAMMER)

10 20 40 60 80



* 0.5' Penetration

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted WH = Weight of Hammer **Casing Length** 25.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO.** B-7

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

Location See Plate I **Foreman** J.R.

Completion Depth 31.5' **Date** 5/5/11 **Depth To Water** ** **Time** **Date** 5/5/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL: +26.6+/-'	
0			Brown Fine SAND with trace of roots (SP)	
			Grayish-brown Fine SAND (SP)	
			Light gray Fine SAND (SP)	
			Dark brown slightly silty Fine SAND (SP-SM)	
			Brown to dark brown Fine SAND (SP)	
5			Grayish-green phosphatic, clayey Fine SAND (SC)	
			Dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	7/7/9
			Medium dense dark brown silty Fine SAND with finely divided organic material (SM)	7/12/15
10			Medium dense dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	5/8/12
			- trace of cemented sand at depth 12.0'	4/5/6
15			Meduim dense dark brown slightly silty Fine SAND with trace of finely divided organic material and small pockets of clayey Fine SAND (SP-SM/SC)	9/12/10
			Loose brown Fine SAND (SP)	
20				6/5/5
			Very stiff green phosphatic CLAY (CH)	
25				6/9/12
			Stiff green phosphatic, sandy CLAY (CH)	
30				3/4/6

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP

10 20 40 60 80

Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 20.0'

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 116753 **BORING NO.** B-8

Project Annual Dam Inspection, Lake Manatee Dam, Manatee County, Florida

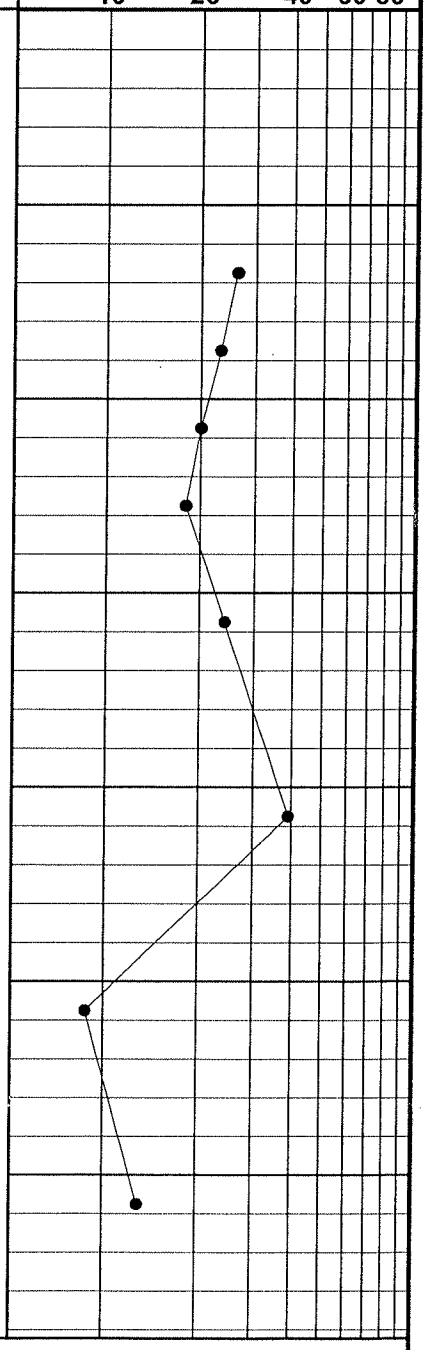
Location See Plate I **Foreman** J.R.

Completion Depth 31.5' **Date** 5/6/11 **Depth To Water** ** **Time** **Date** 5/6/11

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION (SURF. EL: +31.8+/-')	BLOWS ON SAMPLER PER 6" OR PEN. STR.
0			Dark brown Fine SAND with trace of roots (SP)	
			Brown, dark brown and light brown Fine SAND (SP)	
			Dark brown Fine SAND (SP)	
5			Dark brown Fine SAND (SP)	
			Dark grayish-brown Fine SAND (SP)	
			Medium dense dark brown and gray Fine SAND (SP)	8/12/14
				6/8/15
10			Medium dense dark orangish-brown to dark brown Fine SAND (SP)	7/10/10
				7/9/9
15			Medium dense dark grayish-brown clayey Fine SAND (SC)	7/9/15
			Dense dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	
20				9/16/23
			Firm dark green CLAY (CH)	
25				3/3/5
			Stiff green phosphatic, sandy CLAY (CH)	
30				10/6/7

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP

10 20 40 60 80



Remarks ** Water Table not encountered within depth of 10.0'

Borehole Grouted **Casing Length** 20.0'

AFW 2013 Borings

WELL NUMBER B-01

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 12/12/13 **COMPLETED** 12/12/13 **GROUND ELEVATION** 25.6 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Independent Drilling, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary (Automatic Hammer) **AT TIME OF DRILLING** ---

LOGGED BY ND **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 14+77.4, L145ft **AFTER DRILLING** 18.34 ft / Elev 7.26 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
0	AU 1			SP		(SP) brown poorly graded fine grained quartz SAND with little cemented sand and gravel (FILL)		
							2.0 / 23.6	
	AU 2			SP-SC		(SP-SC) brown, dark brown, gray, poorly graded fine grained quartz SAND with CLAY, very loose to loose, with clayey nodules (FILL)		
5	SS 1	1-2-1-2 (3)						
	SS 2	1-1-2-1 (3)						Grout
10	SS 3	1-1-1-1 (2)						
	SS 4	1-2-2 (4)						
15	SS 5	3-2-3 (5)					15.0 / 10.6	
	SS 6	1-1-3 (4)		SM		(SM) dark brown, variably SILTY SAND, very loose (FILL)		Bentonite Plug
20	SS 7	0	WOH - 2 ft					Sand Pack
	SS 8	1-2-1 (3)					21.5 / 4.1	Screen
25	SS 9	4-6-6 (12)		SC		(SC) greenish gray, variably CLAYEY SAND, very loose to medium dense (FILL)	26.0 / -0.4	
	SS 10	2-3-5 (8)		CL		(CL) greenish gray, variably SANDY CLAY, firm to stiff, trace to little sand sized phosphate particles (NATIVE)		
30	SS 11	3-3-4 (7)						
	SS 12	1-4-5 (9)						
35	SS 13	3-3-5 (8)						

(Continued Next Page)

WELL NUMBER B-01

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
35								
	SS 14	3-4-5 (9)		CL		(CL) greenish gray, variably SANDY CLAY, firm to stiff, trace to little sand sized phosphate particles (NATIVE) *(continued)*		
						- 1-inch sand lense at 37-ft		
40	SS 15	2-4-5 (9)						
	SS 16	2-4-5 (9)						
							43.0 -17.4	
	SS 17	10-50/5"		SM		(SM) greenish gray SILTY SAND, very dense, mostly cemented sand and silt (NATIVE)	44.4 -18.8	

Bottom of borehole at 44.4 feet.

WELL NUMBER B-02

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 12/12/13 **COMPLETED** 12/13/13 **GROUND ELEVATION** 28.3 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Independent Drilling, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary (Automatic Hammer) **AT TIME OF DRILLING** ---

LOGGED BY ND **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 14+77.4, L112ft **AFTER DRILLING** 23.40 ft / Elev 4.90 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
0	AU 1		SP-SM		(SP-SM) brown, pale brown, gray, poorly graded fine grained quartz SAND with SILT, loose, trace clayey nodules, trace cemented sand (FILL)		
	AU 2						
5	SS 1	3-2-3-3 (5)			- brown, trace clay		
	SS 2	2-4-5-6 (9)					
	SS 3	4-4-4-4 (8)					
10					10.0	18.3	Grout
	SS 4	2-3-4 (7)	SM		(SM) brown, dark brown, variably SILTY SAND, very loose to loose, trace clay (FILL)		
15	SS 5	2-2-4 (6)					
	SS 6	2-2-2 (4)					
20	SS 7	2-3-2 (5)			20.0	8.3	
	SS 8	1-1-3 (4)	SP-SM		(SP-SM) brown, light brown, poorly graded fine grained quartz SAND with SILT, very loose (FILL)		Bentonite Plug
					23.0	5.3	Sand Pack
25	SS 9	1-1-0 (1)	SP-SC		(SP-SC) gray, greenish gray, poorly graded fine grained quartz SAND with CLAY, very loose, few silt (FILL)		
					26.0	2.3	Screen
	SS 10	2-3-1 (4)	CL		(CL) greenish gray, variably SANDY CLAY, soft to stiff, trace sand sized phosphate particles (NATIVE)		
30	SS 11	2-3-5 (8)					
	SS 12	2-4-4 (8)					
35	SS 13	2-4-5 (9)					

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CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35			CL		(CL) greenish gray, variably SANDY CLAY, soft to stiff, trace sand sized phosphate particles (NATIVE) *(continued)*	
	SS 14	2-3-5 (8)				
40	SS 15	3-2-5 (7)				
	SS 16	2-6-4 (10)				
45	SS 17	2-4-5 (9)			45.0 Elevation -16.7	

Bottom of borehole at 45.0 feet.

WELL NUMBER B-03

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 12/13/13 **COMPLETED** 12/13/13 **GROUND ELEVATION** 25.2 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Independent Drilling, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary (Automatic Hammer) **AT TIME OF DRILLING** ---

LOGGED BY ND **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 16+10.4, L146ft **AFTER DRILLING** 18.48 ft / Elev 6.72 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
0	AU 1			SP		(SP) brown, gray, poorly graded fine grained quartz SAND, trace silt (FILL)		
						- black matting at 1.5-ft	23.2	
	AU 2					(SP-SM) dark gray, dark brown, brown, light brown, poorly graded fine grained quartz SAND with SILT, very loose to loose, few clayey nodules (FILL)		
5	SS 1	1-2-2-2 (4)		SP-SM				
	SS 2	1-1-3-2 (4)						
	SS 3	2-3-3-1 (6)						
10							15.2	
	SS 4	2-2-3 (5)		SM		(SM) brown, dark brown modeling, variably SILTY fine grained quartz SAND, very loose to lose, some cemented sand (FILL)		
	SS 5	2-1-2 (3)						
15	SS 6	1-2-4 (6)						
							7.2	
	SS 7	1-3-3 (6)		SP-SC		(SP-SC) gray, greenish gray, poorly graded fine to medium grained quartz SAND with CLAY, very loose to loose, trace organics (FILL)		
20	SS 8	0	WOR - 1.5 ft					
	SS 9	2-1-3 (4)						
25							2.7	
	SS 10	3-3-4 (7)		CL		(CL) greenish gray, variably SANDY CLAY, soft to stiff, few to some sand sized phosphate particles (NATIVE)		
	SS 11	2-4-5 (9)	loss of drilling fluid circulation at 30-ft					
30								
	SS 12	2-4-4 (8)						
	SS 13	3-6-7 (13)				- 2-inch sand lense at 34.5-ft		
35								

Grout

Bentonite Plug

Sand Pack

Screen

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
35								
	SS 14	2-5-6 (11)		CL		(CL) greenish gray, variably SANDY CLAY, soft to stiff, few to some sand sized phosphate particles (NATIVE) *(continued)*		
	SS 15	3-3-5 (8)						
40							40.0 -14.8	
	SS 16	28-50/2"		SM		(SM) greenish gray, SILTY SAND, very dense, cemented sand and silt, some sand sized phosphate particles (NATIVE)		
	SS 17	50/4"					43.8 -18.6	

Bottom of borehole at 43.8 feet.

WELL NUMBER B-04

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 12/13/13 **COMPLETED** 12/13/13 **GROUND ELEVATION** 30.8 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Independent Drilling, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary (Automatic Hammer) **AT TIME OF DRILLING** ---

LOGGED BY ND **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 16+11.1, L84ft **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
0	AU 1		SM		(SM) brown, dark brown, SILTY SAND, very loose to loose, trace clay (FILL)		
	AU 2						
5	SS 1	1-1-1-1 (2)					
	SS 2	1-1-1-1 (2)					
10	SS 3	2-3-3-4 (6)					Grout
	SS 4	1-1-2 (3)			- brown, light brown, dark brown, dark gray		
15	SS 5	1-2-2 (4)					
	SS 6	1-1-2 (3)			- wood fragments at tip of sample at 17 ft		Bentonite Plug
20	SS 7	2-3-2 (5)					Sand Pack
	SS 8	2-3-5 (8)					
					23.0	7.8	Screen
25	SS 9	6-11-11 (22)	SP-SC		(SP-SC) gray, dark gray, poorly graded SAND with CLAY, medium dense, few clayey nodules, petroleum odor (FILL)		
					25.0	5.8	
	SS 10	1-1-5 (6)	SC		(SC) greenish gray, variably CLAYEY SAND, loose, few cemented sand (NATIVE)		
30	SS 11	7-5-4 (9)			28.0	2.8	
	SS 12	2-3-5 (8)	CL		(CL) greenish gray, variably SANDY CLAY, firm to very stiff, trace to few sand sized phosphate particles (NATIVE)		
35	SS 13	2-3-4 (7)					

(Continued Next Page)

WELL NUMBER B-04

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35			CL		(CL) greenish gray, variably SANDY CLAY, firm to very stiff, trace to few sand sized phosphate particles (NATIVE) *(continued)*	
	SS 14	3-4-5 (9)				
	SS 15	4-4-8 (12)				
40						
	SS 16	10-10-8 (18)				
	SS 17	2-4-5 (9)				
45					45.0 Elevation -14.2	

Bottom of borehole at 45.0 feet.

BORING NUMBER B-05

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/19/14 **COMPLETED** 2/19/14
GROUND ELEVATION 21.4 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY ND **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 20+10.6, L120ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0							
	SS 1	2-4-5-12 (9)	MC = 13%	SC		(SC) light brown, brown, dark brown, CLAYEY fine grained quartz SAND, loose to dense, trace organics (FILL)	
	SS 2	13-16-15-12 (31)	MC = 18%				
						4.0 - 2-inch greenish gray SANDY CLAY lense at 3.5 ft	17.4
5	SS 3	7-10-9-6 (19)	MC = 10%	SM		(SM) brown, SILTY SAND, loose to medium dense (FILL)	
	SS 4	5-4-4-3 (8)	MC = 15%			- some clayey nodules	
						7.5	13.9
				SP		8.0 (SP) white, light gray, very pale brown, poorly graded fine grained quartz SAND, loose (FILL)	13.4
10	SS 5	5-3-2-2 (5)		GP		(GP) poorly graded GRAVEL with fine grained quartz SAND, loose to very dense, damp above 11 ft (FILL)	
	SS 6	16-27-35 (62)				- pale brown, light gray, gray, fine grained quartz SAND pocket below 11.5 ft	
						13.0	8.4
15	SS 7	7-3-8 (11)	MC = 30%	SC		(SC) greenish gray, gray, dark gray, variably CLAYEY SAND, medium dense, trace sand sized phosphate particles, some top soil in sample 7 (NATIVE)	
	SS 8	5-6-8 (14)	MC = 36% LL = 35 PL = 17 #200 = 19%				
20	SS 9	4-6-10 (16)	MC = 54%			- some phosphate pebbles	
						20.0	1.4

Bottom of borehole at 20.0 feet.

BORING NUMBER B-06

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/19/14 **COMPLETED** 2/19/14
GROUND ELEVATION 22.6 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY ND **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 20+23.4, L115ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	2-2-2-2 (4)	MC = 11%	SM		(SM) brown, dark brown, gray, fine grained quartz SILTY SAND, very loose to dense, trace silt, trace organics (FILL)	
	SS 2	2-2-1-1 (3)	MC = 12%				
5	SS 3	1-1-1-2 (2)	MC = 19%				
	SS 4	2-3-2-3 (5)	MC = 12%			- pockets of brown, greenish gray, variably CLAYEY fine grained quartz SAND and pockets of brown, very dark brown, fine grained quartz SAND, organic staining	
10	SS 5	3-2-2-2 (4)	MC = 13%				
	SS 6	9-32-44 (76)	MC = 23%			- light gray, gray, pale brown, possible construction rubble	
						13.0	9.6
15	SS 7	13-14-13 (27)	MC = 20%	SM		(SM) dark brown, fine to medium-grained quartz SILTY SAND, dense, few sand sized phosphate particles (NATIVE)	
						15.5	7.1
	SS 8	9-8-8 (16)	MC = 26%	SC		(SC) greenish gray, CLAYEY SAND, loose to medium dense, few to some sand sized phosphate particles	
20							
	SS 9	3-3-4 (7)	MC = 34% #200 = 31%				
						22.5	0.1

Bottom of borehole at 22.5 feet.

BORING NUMBER B-07

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/19/14 **COMPLETED** 2/19/14
GROUND ELEVATION 19.5 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY ND **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 20+13.2, L155ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0							
	SS 1	2-2-6-7 (8)	MC = 6%	SM		(SM) brown, dark brown, very dark brown, gray, fine grained quartz SILTY SAND, loose to medium dense, slight organic odor (FILL)	
	SS 2	12-15-14-14 (29)	MC = 4%				
5	SS 3	14-13-11-11 (24)	MC = 11%			- possible construction debris	
						6.0	13.5
	SS 4	19-19-21-19 (40)	MC = 6%	SM		(SM) white, light gray, pale brown, fine grained quartz SILTY SAND, dense, few cemented sands, possible construction debris (POSSIBLE FILL)	
10	SS 5	14-15-18-16 (33)	MC = 22%			- pockets of light gray and white fine to medium-grained quartz (SP-SM)	
						10.5	9.0
	SS 6	2-1-1 (2)	MC = 43%	SC		(SC) greenish gray, variably CLAYEY SAND, very loose to loose, trace sand sized phosphate particles (NATIVE)	
15	SS 7	6-5-5 (10)	MC = 28% LL = 41 PL = 23 #200 = 33%			- light gray	
20	SS 8	4-5-5 (10)	MC = 43%			- coarser with larger phosphate particles below 18 ft	
						20.0	-0.5

Bottom of borehole at 20.0 feet.

BORING NUMBER B-08

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/19/14 **COMPLETED** 2/19/14
GROUND ELEVATION 19.8 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY ND **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 19+81.6, L156ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0							
	SS 1	3-4-8-7 (12)	MC = 5%	SM		(SM) brown, dark brown, gray, fine grained quartz SILTY SAND, medium dense, trace organics, slight organic odor (FILL)	
	SS 2	8-12-12-12 (24)	MC = 7%			- trace clayey nodules	
5	SS 3	10-9-5-4 (14)	MC = 7%			- trace cemented sand	
						6.0	13.8
	SS 4	7-10-14-11 (24)	MC = 8%	SM		(SM) light brown, fine grained quartz SILTY SAND, medium dense, with pockets of light gray and white silty sand (POSSIBLE FILL)	
						8.0	11.8
	SS 5	14-12-14-9 (26)	MC = 15%	SP		(SP) white, light gray, very light gray, poorly graded fine grained quartz SAND, medium dense (POSSIBLE NATIVE)	
10							
	SS 6	11-13-9 (22)	MC = 21%				
						13.0	6.8
	SS 7	5-5-5 (10)	MC = 35% LL = 40 PL = 20 #200 = 28%	SC		(SC) greenish gray, variably CLAYEY SAND, loose to medium dense, trace sand sized phosphate particles (NATIVE)	
15							
	SS 8	4-6-7 (13)	MC = 43%			- more clayey with larger phosphate particles below 18 ft	
20						20.0	-0.2

Bottom of borehole at 20.0 feet.

BORING NUMBER B-09

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/19/14 **COMPLETED** 2/19/14
GROUND ELEVATION 19.7 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY ND **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 19+53.0, L156ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0							
	SS 1	4-4-7-9 (11)	MC = 6%	SM		(SM) brown, dark brown, fine grained quartz SILTY SAND, medium dense, trace organics, slight organic odor to 2 ft (FILL)	
	SS 2	9-12-7-7 (19)	MC = 9%				
5	SS 3	10-9-6-6 (15)	MC = 10%				
						6.0 - trace clay	13.7
	SS 4	8-13-14-15 (27)	MC = 9%	SM		(SM) light brown, fine grained quartz SILTY SAND, medium dense, pockets of light gray and white (SP-SM) (POSSIBLE FILL)	
10	SS 5	14-14-14-14 (28)	MC = 17%				
	SS 6	15-17-6 (23)	MC = 22%				
						13.0 - coarser below 12 ft with trace organics	6.7
	SS 7	5-5-5 (10)	MC = 34% LL = 33 PL = 20 #200 = 21%	SC		(SC) greenish gray, variably CLAYEY SAND, loose to medium dense, trace sand-sized phosphate particles (NATIVE)	
15							
20	SS 8	6-9-11 (20)	MC = 60%			20.0	-0.3

Bottom of borehole at 20.0 feet.

BORING NUMBER B-10

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/19/14 **COMPLETED** 2/19/14
GROUND ELEVATION 19.1 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY ND **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 18+28.4, L172ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	3-5-7-6 (12)	MC = 10%	SM		(SM) brown, dark brown, very dark brown, fine grained quartz SILTY SAND, very loose to medium dense, trace glass fragments (FILL)	
	SS 2	6-11-12-9 (23)	MC = 13%				
5	SS 3	4-4-2-1 (6)	MC = 11%				
	SS 4	1-0-1-0 (1)	MC = 10%			- roots	
	SS 5	0-1-0-1 (1)	MC = 12% WOH - 6-inches			- small light gray clayey sand clods	
10						- 2-inch greenish gray CLAY pocket at 9 ft	
	SS 6	0-0-1 (1)	MC = 27% WOH - 1 ft			- variably SILTY fine grained quartz SAND, few plastics and glass below 1	
						13.0	6.1
15	SS 7	1-2-3 (5)	MC = 38%	SC		(SC) greenish gray, variably CLAYEY SAND, loose, trace sand sized phosphate particles (NATIVE)	
						17.0	2.1
20	SS 8	4-4-7 (11)	MC = 82%	CL		(CL) greenish gray, SANDY CLAY, stiff, layers of silty sand (SM), few sand sized phosphate particles	
						20.0	-0.9

Bottom of borehole at 20.0 feet.

BORING NUMBER B-11

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 2/20/14 **COMPLETED** 2/20/14 **GROUND ELEVATION** 17.8 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Independent Drilling, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary **AT TIME OF DRILLING** ---

LOGGED BY JS **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 17+87.7, L208ft **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	4-7-9-13 (16)	MC = 11%	SM		(SM) dark brown, SILTY fine grained quartz SAND, very loose to medium dense, trace size shell fragments, light organic odor (FILL) - 1in clayey sand pocket at 1 ft	
	SS 2	8-10-14-17 (24)	MC = 4%				
5	SS 3	11-11-12-11 (23)	MC = 11%				
	SS 4	8-8-7-7 (15)	MC = 5%			- less silty 6 ft to 10 ft - trace cemented sand nodules at 6 to 6.5 ft - light gray (SP-SM) pockets below 6.5 ft	
	SS 5	5-5-3-4 (8)	MC = 4%				
10							
	SS 6	1-2-2 (4)	MC = 25%			- gray (SP) pockets - wet at 11 ft	
	SS 7	1-2-2 (4)	MC = 27%				
15							
	SS 8	1-1-6 (7)	MC = 25%				
	SS 9	2-4-5 (9)	MC = 33%			- dark brown, gray, more silty below 18 ft	
20						20.5	-2.7
	SS 10	2-2-3 (5)	MC = 93%	MH		(MH) greenish gray, SANDY elastic SILT, firm to stiff, trace silt, trace sand sized phosphate particles (NATIVE)	
	SS 11	4-4-5 (9)	MC = 82% LL = 134 PL = 68 #200 = 61%				
25							
	SS 12	4-5-7 (12)	MC = 99%				
						28.0	-10.2
	SS 13	47-50/2"		SC		29.2 (SC) gray, CLAYEY SAND, very dense, few sand sized phosphate particles, cemented zones - light gray, cemented dolomitic silt at 29 ft	-11.4

Bottom of borehole at 29.2 feet.

BORING NUMBER B-12

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/20/14 **COMPLETED** 2/20/14
GROUND ELEVATION 14.9 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY JS **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 17+34.3, L296ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0							
	SS 1	5-6-9-8 (15)	MC = 9%	SM		(SM) dark brown, SILTY fine grained quartz SAND, medium dense to very dense, organic odor (FILL)	
	SS 2	9-15-15-19 (30)	MC = 11%			- cemented sand pockets	
5	SS 3	13-21-32-26 (53)	MC = 8%				
	SS 4	24-25-27-26 (52)	MC = 9%				
10	SS 5	11-11-9-8 (20)	MC = 20%				
						10.5	4.4
	SS 6	6-5-4 (9)	MC = 24%	SM		(SM) gray, greenish gray, brown, SILTY fine grained quartz SAND, loose, trace sand sized phosphate particles (NATIVE)	
						13.5	1.4
15	SS 7	2-5-5 (10)	MC = 31%	SC		(SC) dark greenish gray, CLAYEY SAND, loose to medium dense, trace silt, trace sand sized phosphate particles	
	SS 8	5-5-7 (12)	MC = 53%				
						18.0	-3.1
20	SS 9	4-6-7 (13)	MC = 83%	CH		(CH) dark greenish gray, SANDY fat CLAY, stiff to hard, trace silt, trace sand sized phosphate particles	
	SS 10	4-4-6 (10)	MC = 109%			- layers and pockets of phosphatic silty sand	
25	SS 11	4-6-6 (12)	MC = 106%				
	SS 12	50/2"				- layer of dolomitic SILT at 25.5 ft	
						- less sandy below 28 ft	
30	SS 13	11-16-22 (38)	MC = 40% LL = 55 PL = 26 #200 = 91%			30.0	-15.1
						Bottom of borehole at 30.0 feet.	

BORING NUMBER B-13

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/20/14 **COMPLETED** 2/20/14
GROUND ELEVATION 14.7 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY JS **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 16+88.4, L404ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	2-3-9-9 (12)	MC = 7%	SM		(SM) pale brown, brown, dark brown, SILTY fine grained quartz SAND, loose to dense, trace organics, slight organic odor (FILL)	
	SS 2	8-8-9-7 (17)	MC = 9%				
5	SS 3	2-5-3-3 (8)	MC = 8%			- local construction debris (cloth and wire) at 5 ft	
	SS 4	5-8-8-10 (16)	MC = 8%				
10	SS 5	12-14-18-19 (32)	MC = 11%				
	SS 6	14-16-18 (34)	MC = 16%			- few silty nodules, slight petroleum odor (11 ft to 15 ft)	
15	SS 7	7-8-4 (12)	MC = 18%				
	SS 8	4-3-2 (5)	MC = 20%			- some shell fragments - trace construction debris (brick fragments) between 16 ft and 17.5 ft	
20	SS 9	4-4-6 (10)	MC = 20%				
						20.5	-5.8
	SS 10	4-5-7 (12)	MC = 93%	CL		(CL) greenish gray, SANDY CLAY, stiff, trace silt, trace sand sized phosphate particles (NATIVE)	
						23.0	-8.3
25	SS 11	5-12-13 (25)	MC = 51%	SC		(SC) light gray, gray, dark gray, CLAYEY fine grained quartz SAND, medium dense to very dense, dolomitic, trace silt, some sand sized phosphate particles	
	SS 12	26-50/5"	MC = 26%			- trace cemented sandy clay layers	
30	SS 13	10-16-14 (30)	MC = 47%			- layers and pockets of dark gray silty sand with sand sized phosphate particles below 28 ft	
	SS 14	32-26-50/4"	MC = 25%				
35	SS 15	15-19-38 (57)	MC = 31%			- dolomitic cemented SANDY CLAY layer	
						35.0	-20.3
						Bottom of borehole at 35.0 feet.	

BORING NUMBER B-14

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/20/14 **COMPLETED** 2/20/14
GROUND ELEVATION 17.7 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY JS **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 17+54.5, L147ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
	SS 1	2-2-4-3 (6)	MC = 65%			(SM) dark brown, SILTY fine grained quartz SAND, very loose to medium dense, trace organics, slight organic odor (FILL)
	SS 2	6-7-10-8 (17)	MC = 12%			- 2 inch clayey sand pocket at 3 ft
5	SS 3	5-6-6-5 (12)	MC = 9%			- local cemented sand nodules
	SS 4	6-3-3-3 (6)	MC = 11%			
	SS 5	1-1-1-2 (2)	MC = 12%			- trace fine gravel size cemented sand
10						
	SS 6	2-2-3 (5)	MC = 19%	SM		
						- wet below 13.5 ft
15	SS 7	4-4-3 (7)	MC = 21%			- light gray sand zones 13.5 ft to 17.5 ft
	SS 8	6-8-7 (15)	MC = 22%			
20	SS 9	2-2-2 (4)	MC = 29%			- trace decomposing plant roots
	SS 10	5-6-4 (10)	MC = 35%			- large, coarse 3 inch decomposing wood fragment at 21 ft
	SS 11	7-5-5 (10)	MC = 55% MC = 22%			24.0 -6.3
25						(CL) greenish gray, SANDY CLAY, stiff, few sand sized phosphate particles (NATIVE)
	SS 12	4-5-5 (10)	MC = 79%	CL		
	SS 13	6-8-40 (48)	MC = 26% MC = 69% LL = 71 PL = 32 #200 = 65%			29.5 -11.8
30				CH		30.0 -12.3
						(CH) light gray, SILTY fat CLAY, hard, dolomitic, few cemented sands, trace sand sized phosphate particles
						Bottom of borehole at 30.0 feet.

BORING NUMBER B-15

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/20/14 **COMPLETED** 2/20/14
GROUND ELEVATION 15.8 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY JS **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 17+17.0, L219ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0							
	SS 1	4-6-9-9 (15)	MC = 9%	SP-SM		(SP-SM) dark brown, poorly graded fine grained quartz SAND with SILT, loose to medium dense, trace organics, slight organic odor (FILL)	
	SS 2	9-18-16-17 (34)	MC = 8%				
5	SS 3	7-11-12-10 (23)	MC = 10%				
	SS 4	8-5-4-4 (9)	MC = 12%			- light gray, gray, trace organics below 6 ft	
						8.0	7.8
10	SS 5	2-2-2-5 (4)	MC = 38%	SC		(SC) light gray, gray, greenish gray, CLAYEY fine grained quartz SAND, very loose to medium dense, trace cementation, trace sand sized phosphate particles (NATIVE)	
	SS 6	3-3-3 (6)	MC = 32%				
15	SS 7	7-6-7 (13)	MC = 43%				
	SS 8	7-7-8 (15)	MC = 68%			- greenish gray below 15 ft	
20	SS 9	5-7-5 (12)	MC = 80% #200 = 22%				
	SS 10	6-7-10 (17)	MC = 76%				
25	SS 11	4-6-6 (12)	MC = 104%				
						25.0	-9.2
						Bottom of borehole at 25.0 feet.	

BORING NUMBER B-16

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 2/20/14 **COMPLETED** 2/20/14 **GROUND ELEVATION** 15.9 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Independent Drilling, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary **AT TIME OF DRILLING** ---

LOGGED BY JS **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 17+84.8, L271ft **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0							
	SS 1	2-4-5-6 (9)	MC = 7%	SP-SM		(SP-SM) brown, dark brown, poorly graded fine grained quartz SAND with SILT, loose to medium dense, trace white sand (FILL)	
	SS 2	8-10-13-12 (23)	MC = 10%				
5	SS 3	4-7-8-8 (15)	MC = 10%				
	SS 4	8-9-6-5 (15)	MC = 11%			- dark brown, black 6 ft to 8 ft	
10	SS 5	5-3-3-3 (6)	MC = 11%			- gray, light brown 8 ft to 10.5 ft	
						10.5	5.4
	SS 6	1-0-0-1/0"	WOH - 1 ft MC = 26%	SC		(SC) gray, greenish gray, CLAYEY fine grained quartz SAND, very loose, trace sand sized phosphate particles (POSSIBLE FILL)	
						13.0	2.9
15	SS 7	6-9-10 (19)	MC = 25% #200 = 2%	SP		(SP) pale gray, gray, pale brown, poorly graded fine grained quartz SAND, loose to medium dense, trace organics, possible riverbed sediments (POSSIBLE FILL)	
	SS 8	10-13-8 (21)	MC = 22%				
20	SS 9	9-13-14 (27)	MC = 24%				
	SS 10	10-4-6 (10)	MC = 26%			- trace decomposing wood fragments	
						23.0	-7.1
25	SS 11	4-4-6 (10)	MC = 85%	CL		(CL) greenish gray, SANDY CLAY, stiff, trace sand sized phosphate particles (NATIVE)	
						25.5	-9.6
	SS 12	26-50/1"	MC = 35%	SC		(SC) light gray, greenish gray, CLAYEY fine grained quartz SAND, very dense, trace sand sized phosphate particles - 3-inch cemented silt lense at 26.5 ft	
						28.0	-12.1
30	SS 13	18-21-24 (45)	MC = 29%	CL		(CL) greenish gray, light gray, SANDY CLAY, hard, locally cemented, trace sand seams with phosphate particles, clay portions hard and dry	
	SS 14	21-50/4"	MC = 36%				
						33.0	-17.1
35	SS 15	8-8-17 (25)		SC		(SC) gray, dark gray, greenish gray, CLAYEY fine grained quartz SAND, medium dense - 3-inch partially cemented clay lense at 34 ft	
						35.0	-19.1

Bottom of borehole at 35.0 feet.

BORING NUMBER B-17

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 2/21/14 **COMPLETED** 2/21/14 **GROUND ELEVATION** 30.8 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Independent Drilling, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary **AT TIME OF DRILLING** ---

LOGGED BY JS **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 14+75.6, L72ft **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	AU 1		MC = 6%			(SM) pale brown, brown, SILTY fine grained quartz SAND, loose to medium dense, trace organics, slight organic odor (FILL)	
	AU 2		MC = 9%				
5	SS 3	2-3-2-2 (5)	MC = 12%				
	SS 4	4-5-5-3 (10)	MC = 15%				
10	SS 5	3-5-7-7 (12)	MC = 19%				
	SS 6	3-4-4 (8)	MC = 18%	SM			
15	SS 7	4-7-10 (17)	MC = 15%			- brown 13.5 ft to 15 ft	
	SS 8	6-9-9 (18)	MC = 16%			- light brown, dark brown below 15.5 ft	
20	SS 9	5-9-12 (21)	MC = 17%				
	SS 10	8-12-6 (18)	MC = 18%				
						23.0	7.8
25	SS 11	4-4-5 (9)	MC = 43% LL = 48 PL = 20 #200 = 32%			(SM) greenish gray, SILTY SAND, loose to dense, trace sand sized phosphate particles (NATIVE)	
	SS 12	3-4-3 (7)	MC = 44%				
30	SS 13	5-18-15 (33)	MC = 24%	SM		- greenish gray, light gray	
	SS 14	3-3-4 (7)	MC = 32%				
						33.5	-2.7
35	SS 15	4-7-5 (12)	MC = 39% LL = 47 PL = 32 #200 = 49%	SC		(SC) greenish gray, CLAYEY SAND, medium dense, trace sand sized phosphate particles	
						35.0	-4.2
						Bottom of borehole at 35.0 feet.	

BORING NUMBER B-18

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/21/14 **COMPLETED** 2/21/14
GROUND ELEVATION 25.7 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY JS **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 14+02.4, L160ft
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	AU 1		MC = 10%			(SM) brown, gray, SILTY fine grained quartz SAND, very loose to very dense, trace clayey nodules (FILL)	
	AU 2		MC = 10%				
5	SS 3	1-2-3-3 (5)	MC = 12%			- trace fine gravel	
	SS 4	7-6-6-6 (12)	MC = 11%				
10	SS 5	5-5-3-2 (8)	MC = 11%	SM			
	SS 6	1-1-1 (2)	MC = 20%				
15	SS 7	19-33-28 (61)	MC = 16%			- loss of circulation at 13 ft, encountered toe drain aggregate, abandoned hole and moved west 1, drilled down to 13.5 ft and began sampling	
	SS 8	21-25-24 (49)	MC = 21%				
						18.0 - wet	7.7
20	SS 9	1-2-3 (5)	MC = 46%			(SC) greenish gray, CLAYEY fine grained quartz SAND, loose to medium dense, trace sand sized phosphate particles (NATIVE)	
	SS 10	4-4-5 (9)	MC = 32%				
25	SS 11	9-9-9 (18)	MC = 24%	SC			
	SS 12	4-4-5 (9)	MC = 24%				
						28.0	-2.3
30	SS 13	4-4-5 (9)	MC = 62% LL = 92 PL = 43 #200 = 72%	MH		(MH) greenish gray, elastic SILT with sand, stiff, trace sand sized phosphate particles	
						30.0	-4.3
						Bottom of borehole at 30.0 feet.	

Piezometers Near Spillway (2014)

WELL NUMBER Well-1-D

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 8/18/14 **COMPLETED** 10/14/14 **GROUND ELEVATION** 28.1 ft **HOLE SIZE** 10 inches

DRILLING CONTRACTOR Terra Sonic Drilling Services **LOCATION** N1148782.7 , E541016.5

DRILLING METHOD Sonic Core **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY JR **CHECKED BY** DK **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0						
	SC 1	SP-SM		brown, dark brown, poorly graded fine grained quartz SAND with SILT		
5						
				- trace clayey nodules from 6 to 8 ft		
10						
	SC 2					
15				15.0	13.1	
		SP-SC		brown, greenish gray, SAND with CLAY, trace to few clayey nodules, slightly cemented		
20						Grout
	SC 3			22.0	6.1	
		SC		greenish gray, variably clayey, CLAYEY SAND, trace silt, trace phosphate particles		
25						
30				30.0	-1.9	
	SC 4	CL		greenish gray, variably sandy CLAY, few to some silt		
35				- sand lense at 32 ft		
				- sand lense at 35 ft		
40				- sand lense at 37 ft		
				- sand lense at 39 ft		
				41.0	-12.9	Bentonite Seal
		SC		greenish gray, CLAYEY SAND, few to some silt		Sand Pack
45	SC			45.0	-16.9	

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CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
45						
	5	SP-SM		greenish gray, gray, poorly graded fine grained quartz SAND with SILT, trace cemented silt nodules		
50						
				51.5	-23.4	
		ML		52.0 light greenish gray, variably sandy SILT, cemented, dolomitic	-23.9	
		SP		53.0 gray poorly graded fine grained quartz SAND, phosphatic sands	-24.9	Slotted Screen
		SP-SM		54.5 greenish gray, gray, poorly graded fine grained quartz SAND with SILT, trace cemented silt, phosphatic particles	-26.4	
55	SC 6	SP		gray, poorly graded fine grained quartz SAND, trace silt, trace cemented sand and silt nodules		
				58.0	-29.9	
		SP-SM		59.5 greenish gray, gray, fine grained quartz SAND with SILT, trace phosphatic particles, slightly desiccated	-31.4	
60						
	SC 7	ML		61.0 gray, variably sandy SILT, cemented, dolomitic, trace phosphatic particles, sandy veins	-32.9	Blank

Bottom of borehole at 61.0 feet.

WELL NUMBER Well-2-D

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 8/19/14 **COMPLETED** 8/19/14 **GROUND ELEVATION** 35.79 ft **HOLE SIZE** 10 inches

DRILLING CONTRACTOR Terra Sonic Drilling Services **LOCATION** N1148894.3 , E541146.4

DRILLING METHOD Sonic Core **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY ND **CHECKED BY** DK **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0						
	SC 1	SP-SM		dark brown, brown, poorly graded fine grained quartz SAND with SILT, trace cemented sand fragments throughout		
12.0					23.8	
	SC 2	SC		gray, greenish gray, CLAYEY SAND 2-inch sand lense		
16.0					19.8	
		SP-SM		light brown, brown, poorly graded fine grained quartz SAND with SILT, trace silty sand nodules		Grout
22.0					13.8	
	SC 3	SC		greenish gray, variably clayey, CLAYEY SAND, trace silt, small sandy pockets throughout, trace phosphate particles throughout		
32.0					3.8	
	SC 4	ML		greenish gray, sandy SILT, sand lenses throughout, sandy pockets throughout, phosphate particles throughout sandy zones		Bentonite Seal
37.0					-1.2	
		SC		greenish gray, CLAYEY SAND, sandy lenses throughout, phosphate particles throughout		Sand Pack
40.0					-4.2	
		ML		greenish gray, variably sandy SILT, trace phosphate particles throughout, trace sand veins throughout - 2-inch thick sand lense		
44.0					-8.2	
45	SC	SC		greenish gray, CLAYEY SAND, few phosphate particles throughout		

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CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
45						
	5	SC		46.0 greenish gray, CLAYEY SAND, few phosphate particles throughout *(continued)*	-10.2	
		SP-SC		greenish gray, SAND with CLAY, few phosphate particles throughout, slightly silty, some cemented clayey nodules		Slotted Screen
50				50.0	-14.2	
	SC 6	SP-SM		greenish gray, SAND with SILT, some phosphate particles throughout, some cemented silt fragments throughout		
				53.5	-17.7	
55		SC		55.0 greenish gray, CLAYEY SAND, trace phosphate particles	-19.2	Blank

Bottom of borehole at 55.0 feet.

WELL NUMBER PZ-3A-D

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

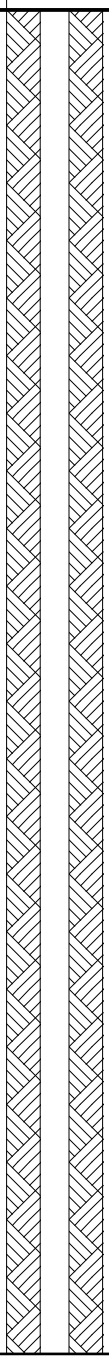
DATE STARTED 4/18/17 **COMPLETED** 4/19/17 **GROUND ELEVATION** 45 ft **HOLE SIZE** 6 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY DR **CHECKED BY** JB **HOLE COMPLETION** 2-inch diameter PVC monitoring standpipe

NOTES Location: Soil-cement upstream slope behind south approach wall.

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					Elevation	
					6-inch casing installed to 40 feet below ground surface, sampling started at 110 feet below ground surface	
5						
10						
15						
20						
25						
30						
35						

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					6-inch casing installed to 40 feet below ground surface, sampling started at 110 feet below ground surface *(continued)*	
40						
45						
50						grout
55						
60						
65						
70						

Elevation

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
70					Elevation	
					6-inch casing installed to 40 feet below ground surface, sampling started at 110 feet below ground surface *(continued)*	
75						
80						
85						
90						
95						
100						fine sand pack
105						

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER PZ-3A-D

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
105					6-inch casing installed to 40 feet below ground surface, sampling started at 110 feet below ground surface *(continued)*		
110					110.0	-65.0	
	SS 1	14-19-33 (52)	MH		dark gray, greenish gray, Sandy Elastic SILT, hard		sand pack, sceeen
115							
	SS 2	16-29-50/4"			118.0	-73.0	
120			SM		gray, greenish gray, SILTY SAND, dense to very dense		bentonite plug
	SS 3	20-17-26 (43)					
125							sand backfill
	SS 4	11-17-50/5"			126.4	-81.4	

Bottom of borehole at 126.4 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER PZ-3A-M

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 4/13/17 **COMPLETED** 4/17/17 **GROUND ELEVATION** 45 ft **HOLE SIZE** 6 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY DR **CHECKED BY** JB **HOLE COMPLETION** 2-inch diameter PVC monitoring standpipe

NOTES Location: Soil-cement upstream slope behind south approach wall.

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					Elevation	
					6-inch casing installed to 30 feet below ground surface, sampling started at 40 feet below ground surface	
5						
10						
15						
20						
25						
30						grout
35						

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
35					6-inch casing installed to 30 feet below ground surface, sampling started at 40 feet below ground surface *(continued)*		
40					40.0	5.0	
	SS 1	2-4-4 (8)	SC		greenish gray, CLAYEY SAND, loose		
45							
50					50.0	-5.0	
			SP-SM		greenish gray, SAND with Silt, medium dense		
55	SS 2	10-12-13 (25)					
					58.0	-13.0	
			MH		greenish gray, Sandy Elastic SILT, stiff to hard		
60	SS 3	4-6-9 (15)			calcareous/dolomitic silt, cemented at 63.5 feet		fine sand pack
	SS 4	50/4"					sand pack
65							
70					70.0	-25.0	

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER PZ-3A-M

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
70					greenish gray, SILTY SAND, very dense		sceeen
75	SS 5	50/1"	SM				bentonite plug
							sand backfill
80							
	SS 6	50/1"			81.1 Bottom of borehole at 81.1 feet.	-36.1	

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER PZ-4-SR

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 5/11/17 **COMPLETED** 5/11/17 **GROUND ELEVATION** 48.8 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY JD **CHECKED BY** JB **HOLE COMPLETION** backfilled with cuttings and bentonite chips

NOTES Location: Soil-cement upstream slope behind north approach wall. Piezometer installed adjacent to SPT location, installed through hollow stem auger

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					Elevation	
	SS 1	2-4-6-10 (10)	SP		gray, light brown, fine-grained quartz SAND, silty lensing, trace rock and shell fragments, very loose to medium dense, dry to moist	
	SS 2	9-7-6-8 (13)				
5	SS 3	5-3-4-4 (7)				
	SS 4	3-2-2-2 (4)				
10	SS 5	2-5-5-7 (10)				
15	SS 6	2-5-6 (11)				grout
20	SS 7	1-1-1 (2)				
25	SS 8	1-1-1 (2)				
30	SS 9	4-5-8 (13)				
					33.5 15.3	fine sand pack
35	SS 10	3-4-7 (11)	SP-SC			sand pack

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER PZ-4-SR

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
35					gray, brown, SAND with Clay, fine-grained quartz sand, trace lenses of yellow-orange phosphatic sands, medium dense to dense, moist to wet (Fill/ Possible Fill) *(continued)*		
40	SS 11	14-21-25 (46)	SP-SC				
45	SS 12	9-10-9 (19)					screen
						0.3	
50	SS 13	8-8-11 (19)	CL-ML		48.5 gray-blue, Silty CLAY with Sand, with light gray lenses of fine-grained clayey sand, very stiff, moist	-1.2	
55	SS 14	4-10-31 (41)	SC		50.0 gray, light brown, CLAYEY SAND, fine-grained quartz sand, lenses of gray-black phosphatic sands, medium dense to dense, wet		
60	SS 15	10-12-16 (28)			60.0	-11.2	sand backfill

Bottom of borehole at 60.0 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER PZ-4A-D

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 4/24/17 **COMPLETED** 4/27/17 **GROUND ELEVATION** 46 ft **HOLE SIZE** 6 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY DR **CHECKED BY** JB **HOLE COMPLETION** 2-inch diameter PVC monitoring standpipe

NOTES Location: Soil-cement upstream slope behind north approach wall.

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					Elevation	
					6-inch casing installed to 40 feet below ground surface, sampling started at 110 feet below ground surface	
5						
10						
15						
20						
25						
30						
35						

(Continued Next Page)

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

wood.*

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					6-inch casing installed to 40 feet below ground surface, sampling started at 110 feet below ground surface *(continued)*	
40						
45						
50						grout
55						
60						
65						
70						

Elevation

(Continued Next Page)

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

wood.*

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
70					Elevation	
					6-inch casing installed to 40 feet below ground surface, sampling started at 110 feet below ground surface *(continued)*	
75						
80						
85						
90						
95						
100						fine sand pack
105						sand pack

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

wood.*

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
105					6-inch casing installed to 40 feet below ground surface, sampling started at 110 feet below ground surface *(continued)*		
110						110.0 -64.0	
115	SS 1	25-23-33 (56)	SM		dark gray, greenish gray, SILTY SAND, very dense, phosphatic sands, trace dolomitic clay		sceeen
	SS 2	17-20-32 (52)				118.0 -72.0	
120	SS 3	20-50/3"	SC		greenish gray, CLAYEY SAND, very dense, interlayered phosphatic sand layers, interlayeyred clay seams	123.0 -77.0	
125	SS 4	50	SM		greenish gray, SILTY SAND, very dense, phosphatic sand layering	128.0 -82.0	bentonite plug
130	SS 5	11-18-29 (47)	CL		greenish gray, lack, Sandy CLAY, hard, slightly silty, Abundant phosphatice sands		
135	SS 6	14-19-30 (49)				138.0 -92.0	
140			SC		gray, greenish gray, CLAYEY SAND, very dense, silty, calcarious, clay lenses		sand backfill

(Continued Next Page)

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER PZ-4A-D

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
140	SS 7	16-50/5"	CL		140.5 greenish gray, sandy CLAY, hard, desiccated	-94.5	
145	SS 8	10-13-17 (30)			146.5	-100.5	

Bottom of borehole at 146.5 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER PZ-4A-M

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 4/20/17 **COMPLETED** 4/21/17 **GROUND ELEVATION** 46 ft **HOLE SIZE** 6 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY DR **CHECKED BY** JB **HOLE COMPLETION** 2-inch diameter PVC monitoring standpipe

NOTES Location: Soil-cement upstream slope behind north approach wall.

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					Elevation	
					6-inch casing installed to 40 feet below ground surface, sampling started at 65 feet below ground surface	
5						
10						
15						
20						
25						grout
30						
35						

(Continued Next Page)

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

wood.*

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
35					6-inch casing installed to 40 feet below ground surface, sampling started at 65 feet below ground surface *(continued)*		
40							
45							
50							
55							fine sand pack
60							sand pack
65					65.0	-19.0	
	SS 1	6-8-10 (18)	MH		greenish gray, Sandy Elastic SILT, very stiff to hard		sceeen
70							

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
70	SS 2	50/5"	MH		greenish gray, Sandy Elastic SILT, very stiff to hard *(continued)*		
75	SS 3	50/1"					bentonite plug
					77.0	-31.0	
			CL		greenish gray, sandy CLAY, hard, desiccated		
80	SS 4	50/3"					sand backfill
85	SS 5	10-50/5"			85.9	-39.9	

Bottom of borehole at 85.9 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER PZ-26-D

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 8/13/14 **COMPLETED** 8/13/14 **GROUND ELEVATION** 20.74 ft **HOLE SIZE** 6.625 inches

DRILLING CONTRACTOR Terra Sonic Drilling Services **LOCATION** N1148934.1 , E540729.4

DRILLING METHOD Sonic Core **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY SA **CHECKED BY** DK **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0				1.0 SAMPLES WERE BAGGED AND NOT CLASSIFIED TO CONDUCT LABOROTORY TESTING, LITHOLOGY WAS AVERAGED FROM PZ-25 AND PZ-27	19.7	
5	SC 1	SP-SM		greenish gray, poorly graded fine grained quartz SAND with SILT, trace phosphatic sands		
10						
15	SC 2			14.0	6.7	
20		SP		brown, dark brown, poorly graded fine grained quartz SAND, trace silt		
25	SC 3	SP-SC		20.0 brown, poorly graded fine grained quartz SAND with CLAY, trace sand to pebble sized phosphate	0.7	
30		MH		23.0 light gray, sandy elastic SILT, cemented, common calcareous clayey sand, few fine phosphatic sands	-2.3	
35	SC 4	SM		31.0 greenish gray, variably clayey and silty, SILTY SAND, trace phosphatic sands	-10.3	Grout
		SP		33.0 dark gray, fine grained quartz SAND, some fine phosphatic sand, trace silt	-12.3	
		MH		34.0 light gray and gray, variably sandy, SANDY SILT, cemented	-13.3	
		SP		35.0 gray, fine grained quartz SAND, few phosphatic fine sand, minor cemented silt fragments	-14.3	
40		MH		38.0 greenish gray, light gray, pale brown, sandy elastic SILT, trace clay, few fine phosphatic sands	-17.3	
45	SC					

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WELL NUMBER PZ-26-D

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
45					
	5	MH		greenish gray, light gray, pale brown, sandy elastic SILT, trace clay, few fine phosphatic sands *(continued)*	
50				50.0 -29.3	
	SC 6	SM		gray, pale brown, grayish brown, SILTY SAND	
55					
60					
				64.0 -43.3	
65	SC 7			dark gray, gray, greenish gray, sandy elastic SILT, slight cementation	Bentonite Seal
70					Sand Pack
	SC 8	MH			
75					
80				80.0 -59.3	Slotted Screen
	SC 9	SM		light gray, dark greenish gray, SILTY SAND, trace cemented silt nodules, moderately cemented, desiccated, dolomitic	
85				86.0 -65.3	

Bottom of borehole at 86.0 feet.

WELL NUMBER PZ-26-M

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 8/13/14 **COMPLETED** 8/13/14 **GROUND ELEVATION** 20.85 ft **HOLE SIZE** 6.625 inches

DRILLING CONTRACTOR Terra Sonic Drilling Services **LOCATION** N1148925.5 , E540735.2

DRILLING METHOD Sonic Core **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY SA **CHECKED BY** DK **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0				1.0 SAMPLES WERE BAGGED AND NOT CLASSIFIED TO CONDUCT LABOROTORY TESTING, LITHOLOGY WAS AVERAGED FROM PZ-25 AND PZ-27	19.9	
5		SP-SM		greenish gray, poorly graded fine grained quartz SAND with SILT, trace phosphatic sands		
10						Grout
15				14.0	6.9	
		SP		brown, dark brown, poorly graded fine grained quartz SAND, trace silt		
20				20.0	0.9	
		SP-SC		brown, poorly graded fine grained quartz SAND with CLAY, trace sand to pebble sized phosphate		
25		MH		23.0 light gray, sandy elastic SILT, cemented, common calcareous clayey sand, few fine phosphatic sands	-2.2	Bentonite Seal
30						Sand Pack
				31.0	-10.2	
		SM		greenish gray, variably clayey and silty, SILTY SAND, trace phosphatic sands		
				33.0	-12.2	
		SP		34.0 dark gray, fine grained quartz SAND, some fine phosphatic sand, trace silt	-13.2	
35		MH		35.0 light gray and gray, variably sandy, SANDY SILT, cemented	-14.2	
		SP		gray, fine grained quartz SAND, few phosphatic fine sand, minor cemented silt fragments		
				38.0	-17.2	Slotted Screen
40		MH		greenish gray, light gray, pale brown, sandy elastic SILT, trace clay, few fine phosphatic sands		
45				45.0	-24.2	

Bottom of borehole at 45.0 feet.

WELL NUMBER PZ-27-D

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 8/11/14 **COMPLETED** 8/11/14 **GROUND ELEVATION** 16.13 ft **HOLE SIZE** 6.625 inches

DRILLING CONTRACTOR Terra Sonic Drilling Services **LOCATION** N1149156.4 , E540932

DRILLING METHOD Sonic Core **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY AS **CHECKED BY** DK **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION		WELL DIAGRAM
0		SP		1.0	brown, poorly graded fine grained quartz SAND, trace silt	15.1	
		SP-SC		2.0	dark gray, brown, poorly graded fine grained quartz SAND with CLAY, trace clayey nodules	14.1	
5	SC 1	SP			dark brown and gray, poorly graded fine grained quartz SAND, minor silt		
10				10.0		6.1	
		SP-SC		12.0	brown to dark brown, poorly graded fine grained quartz SAND, trace silts with clays, local greenish gray clay nodules	4.1	
15	SC 2	SC		17.0	greenish gray, variably clayey, fine grained quartz, CLAYEY SAND, few fine phosphatic particles, slightly dolomitic, few phosphate gravel	-0.9	
		ML		18.0	pale brown, sandy SILT	-1.9	
20		SM		21.0	dark greenish gray, SILTY SAND, slight clay content, few phosphatic sands	-4.9	
		MH		22.0	light gray, sandy elastic SILT, cemented, common calcareous clayey sand, few fine phosphatic sands	-5.9	
25	SC 3	SP		24.0	dark gray, trace silt, poorly graded fine grained quartz SAND, some fine phosphoric particles	-7.9	
		MH			light gray to gray, sandy elastic SILT, dolomitic, few phosphatic sands		Grout
30				31.0		-14.9	
		SP		32.0	dark gray, poorly graded fine grained quartz SAND, some fine phosphatic sand, trace silt	-15.9	
		MH		33.0	light gray to gray, variably sandy, SANDY SILT, cemented, dolomitic	-16.9	
		SP		34.0	dark gray, fine grained quartz SAND, some fine phosphatic sand, trace silt	-17.9	
35	SC 4	MH		35.5	light gray and gray, variably sandy, SANDY SILT, cemented	-19.4	
		SP		37.0	gray, fine grained quartz SAND, few phosphatic fine sand, minor cemented silt fragments	-20.9	
40		MH			greenish gray, light gray, pale brown, sandy elastic SILT, trace clay, few fine phosphatic sands		
45	SC						

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WELL NUMBER PZ-27-D

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
45					
	5	MH		greenish gray, light gray, pale brown, sandy elastic SILT, trace clay, few fine phosphatic sands *(continued)*	
50				50.0 -33.9	
		SM		gray, pale brown, grayish brown, SILTY SAND	
55	SC 6				
				- cemented silt fragments at 57 ft	
60				- few phosphatic sands below 60 ft	Bentonite Seal
				- cemented sand at 62.5 ft	Sand Pack
				64.0 -47.9	
65	SC 7			dark gray, gray, greenish gray, sandy elastic SILT, slight cementation	
				- clayey nodules at 67ft	
70					
		MH		- cemented silt, fine phosphatic particles at 72 ft	Slotted Screen
75	SC 8				
80					
	SC 9			80.5 -64.4	

Bottom of borehole at 80.5 feet.

WELL NUMBER PZ-27-M

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 8/11/14 **COMPLETED** 8/11/14 **GROUND ELEVATION** 15.99 ft **HOLE SIZE** 6.625 inches

DRILLING CONTRACTOR Terra Sonic Drilling Services **LOCATION** N1149150.2 , E540939.7

DRILLING METHOD Sonic Core **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY AS **CHECKED BY** DK **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0		SP		1.0 brown, poorly graded fine grained quartz SAND, trace silt	15.0	
		SP-SC		2.0 dark gray, brown, poorly graded fine grained quartz SAND with CLAY, trace clayey nodules	14.0	
5		SP		dark brown and gray, poorly graded fine grained quartz SAND, minor silt		
10				10.0	6.0	Grout
		SP-SC		12.0 brown to dark brown, poorly graded fine grained quartz SAND, trace silts with clays, local greenish gray clay nodules	4.0	
15		SC		greenish gray, variably clayey, fine grained quartz, CLAYEY SAND, few fine phosphatic particles, slightly dolomitic, few phosphate gravel		
				17.0	-1.0	
		ML		18.0 pale brown, sandy SILT	-2.0	
20		SM		dark greenish gray, SILTY SAND, slight clay content, few phosphatic sands		
				21.0	-5.0	Bentonite Seal
		MH		22.0 light gray, sandy elastic SILT, cemented, common calcareous clayey sand, few fine phosphatic sands	-6.0	
		SP		24.0 dark gray, trace silt, poorly graded fine grained quartz SAND, some fine phosphoric particles	-8.0	Sand Pack
25		MH		light gray to gray, sandy elastic SILT, dolomitic, few phosphatic sands		
30				31.0	-15.0	
		SP		32.0 dark gray, poorly graded fine grained quartz SAND, some fine phosphatic sand, trace silt	-16.0	
		MH		33.0 light gray to gray, variably sandy, SANDY SILT, cemented, dolomitic	-17.0	Slotted Screen
		SP		34.0 dark gray, fine grained quartz SAND, some fine phosphatic sand, trace silt	-18.0	
35		MH		35.5 light gray and gray, variably sandy, SANDY SILT, cemented	-19.5	
		SP		37.0 gray, fine grained quartz SAND, few phosphatic fine sand, minor cemented silt fragments	-21.0	
		MH		greenish gray, light gray, pale brown, sandy elastic SILT, trace clay, few fine phosphatic sands		
40				40.5	-24.5	

Bottom of borehole at 40.5 feet.

WELL NUMBER PZ-28-M

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 1/27/16 **COMPLETED** 1/28/16 **GROUND ELEVATION** 28 ft **HOLE SIZE** 6 inches

DRILLING CONTRACTOR Adarmen & Associates, Inc. **LOCATION** N1149013.77 , E541139.81

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY JS **CHECKED BY** JB **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0							
	AU 1		SP		1.0 brown, fine grained quartz SAND, trace silt	27.0	
			SM		2.0 very pale brown, SILTY SAND, partially cemented, trace limesilt	26.0	
	AU 2				brown, fine grained quartz SAND with SILT, trace clayey nodules		
5	AU 3						
	SPT 4	7-7-13 (20)	SP-SM				
	SPT 5	6-5-8 (13)					
10					trace gravel at 9 to 10 feet		
					12.0	16.0	
					dark brown, SILT SAND, fine grained sand, local thin clay lenses, trace fine gravel		
	SPT 6	3-8-11 (19)					
15			SM				
							Grout
20	SPT 7	1-3-11 (14)			local sand lenses between 18 to 20 feet		
					22.0	6.0	
					greenish gray, CLAYEY SAND, very fine sand, sand size phosphate particles, trace silts		
	SPT 8	2-5-6 (11)					
25							
			SC				
	SPT 9	4-9-14 (23)					
30							
					32.0	-4.0	
					greenish gray, variably sandy CLAY,		
	SPT 10	3-3-4 (7)					
35							
							Sand Pack
	SPT 11	2-4-4 (8)	CL				
40							
	SPT 12	3-4-8 (12)					
45					6-inch sand lense at 43.5 to 44 feet		

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CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
45			CL		greenish gray, variably sandy CLAY, *(continued)*	
					47.0 -19.0	Slotted Screen
50	SPT 13	18-24-44 (68)	SM		gray, greenish gray, SILTY SAND, fine grained quartz sand, alternating from 1 to 3 inches thick layers of silt, silty sand and sand intervals driller noted thin hard layers between 50 to 53 feet	
	SPT 14	50/5"			53.9 -25.9	

Bottom of borehole at 53.9 feet.

WELL NUMBER PZ-28-S

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 1/28/16 **COMPLETED** 1/28/16 **GROUND ELEVATION** 28 ft **HOLE SIZE** 6 inches

DRILLING CONTRACTOR Adarmen & Associates, Inc. **LOCATION** N1148988.91 , E541151.99

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY JS **CHECKED BY** JB **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0		SP		1.0 brown, fine grained quartz SAND, trace silt	27.0	
		SM		2.0 very pale brown, SILTY SAND, partially cemented, trace limesilt	26.0	
5		SP-SM		brown, fine grained quartz SAND with SILT, trace clayey nodules		Grout
10				trace gravel at 9 to 10 feet		
				12.0	16.0	
15		SM		dark brown, SILT SAND, fine grained sand, local thin clay lenses, trace fine gravel		Sand Pack
20				local sand lenses between 18 to 20 feet		Slotted Screen
				22.0	6.0	
25		SC		greenish gray, CLAYEY SAND, very fine sand, sand size phosphate particles, trace silts		
				25.0	3.0	

Bottom of borehole at 25.0 feet.

WELL NUMBER PZ-29-M

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 1/25/16 **COMPLETED** 1/25/16 **GROUND ELEVATION** 23 ft **HOLE SIZE** 6 inches

DRILLING CONTRACTOR Adarmen & Associates, Inc. **LOCATION** N1148774.35 , E541075.78

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY JS **CHECKED BY** JB **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0	AU 1		SP-SC		brown, fine grained quartz SAND with CLAY, trace silt, clayey nodules, minor rock fragments	
2.0						21.0
	AU 2		SM		gray, SILTY SAND, fine grained quartz, thin lenses of sandy silt	
4.0						19.0
5	SPT 3	10-7-5-6 (12)	SP-SM		brown, fine grained quartz SAND with SILT	
6.0						17.0
	SPT 4	3-3-2-5 (5)	SP-SC		brown, fine grained quartz SAND with CLAY, 6-inch sand lense at 7 to 7.5 feet	
8.0						15.0
10	SPT 5	7-8-10-10 (18)	SP		brown, fine grained quartz SAND, trace silt	
12.0						11.0
			SM		gray, greenish gray, SILTY SAND, fine grained, minor clay	
15	SPT 6	2-3-6 (9)				
17.0						6.0
					light greenish gray, dark greenish gray, sandy SILT, trace fine sands, fine to coarse phosphatic sands, minor clay content	Grout
20	SPT 7	3-4-5 (9)				
25	SPT 8	3-3-6 (9)			commons sand lenses from 23 to 25 feet	
			ML			
30	SPT 9	4-9-6 (15)				
					cemented silt with interbeded sand lenses between 33 and 35 feet	
35	SPT 10	50/3"				Sand Pack
	SPT 11	50/1"			driller noted hard drilling at 35.5 feet, no sample recovered in spoon	
37.0						-14.0
			SP-SM		dark gray, fine grained quartz SAND with SILT, phosphatic sands throughout	
40	SPT 12	3-7-33 (40)				
39.5						-16.5
			ML		light gray, sandy SILT, cemented	
42.0						-19.0
			SP-SM		dark gray, fine grained quartz SAND with SILT, phosphatic sands throughout	Slotted Screen
45	SPT 13	18-22-28 (50)				

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
45			SP-SM		dark gray, fine grained quartz SAND with SILT, phosphatic sands throughout *(continued)*	-24.0	
				47.0			
50	SPT 14	7-8-9 (17)	SM		greenish gray, SILTY SAND, fine grained quartz, sand silt lenses throughout	-29.0	
				52.0			
55	SPT 15	2-6-25 (31)	ML		light gray, sandy SILT, trace clay, cemented silts (54.5 to 55 feet)	-34.0	
				57.0			
60	SPT 16	3-9-7 (16)	SM		greenish gray, olive, SILTY SAND, trace clay	-37.0	
				60.0			

Bottom of borehole at 60.0 feet.

WELL NUMBER PZ-29-S

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam - Phase 2

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Manatee County

DATE STARTED 1/27/16 **COMPLETED** 1/27/16 **GROUND ELEVATION** 23 ft **HOLE SIZE** 6 inches

DRILLING CONTRACTOR Adarmen & Associates, Inc. **LOCATION** N1148729.45 , E541063.17

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

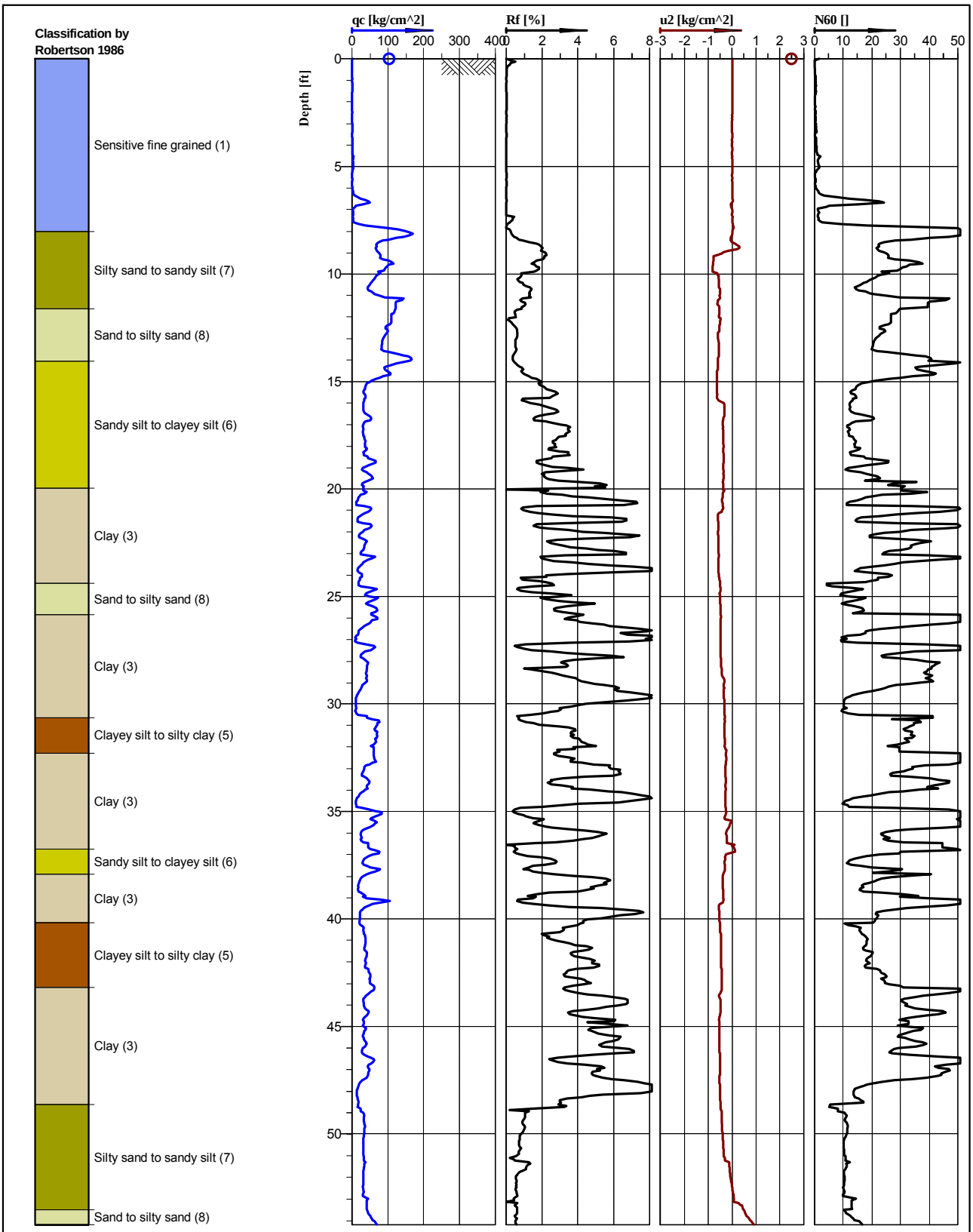
LOGGED BY JS **CHECKED BY** JB **HOLE COMPLETION**

NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
0		SP-SC		brown, fine grained quartz SAND with CLAY, trace silt, clayey nodules, minor rock fragments	2.0 / 21.0	
		SM		gray, SILTY SAND, fine grained quartz, thin lenses of sandy silt	4.0 / 19.0	
5		SP-SM		brown, fine grained quartz SAND with SILT	6.0 / 17.0	
		SP-SC		brown, fine grained quartz SAND with CLAY, 6-inch sand lense at 7 to 7.5 feet	8.0 / 15.0	Grout
10		SP		brown, fine grained quartz SAND, trace silt	12.0 / 11.0	
		SM		gray, greenish gray, SILTY SAND, fine grained, minor clay	17.0 / 6.0	Sand Pack
15						
20		ML		light greenish gray, dark greenish gray, sandy SILT, trace fine sands, fine to coarse phosphatic sands, minor clay content		Slotted Screen
25					25.0 / -2.0	

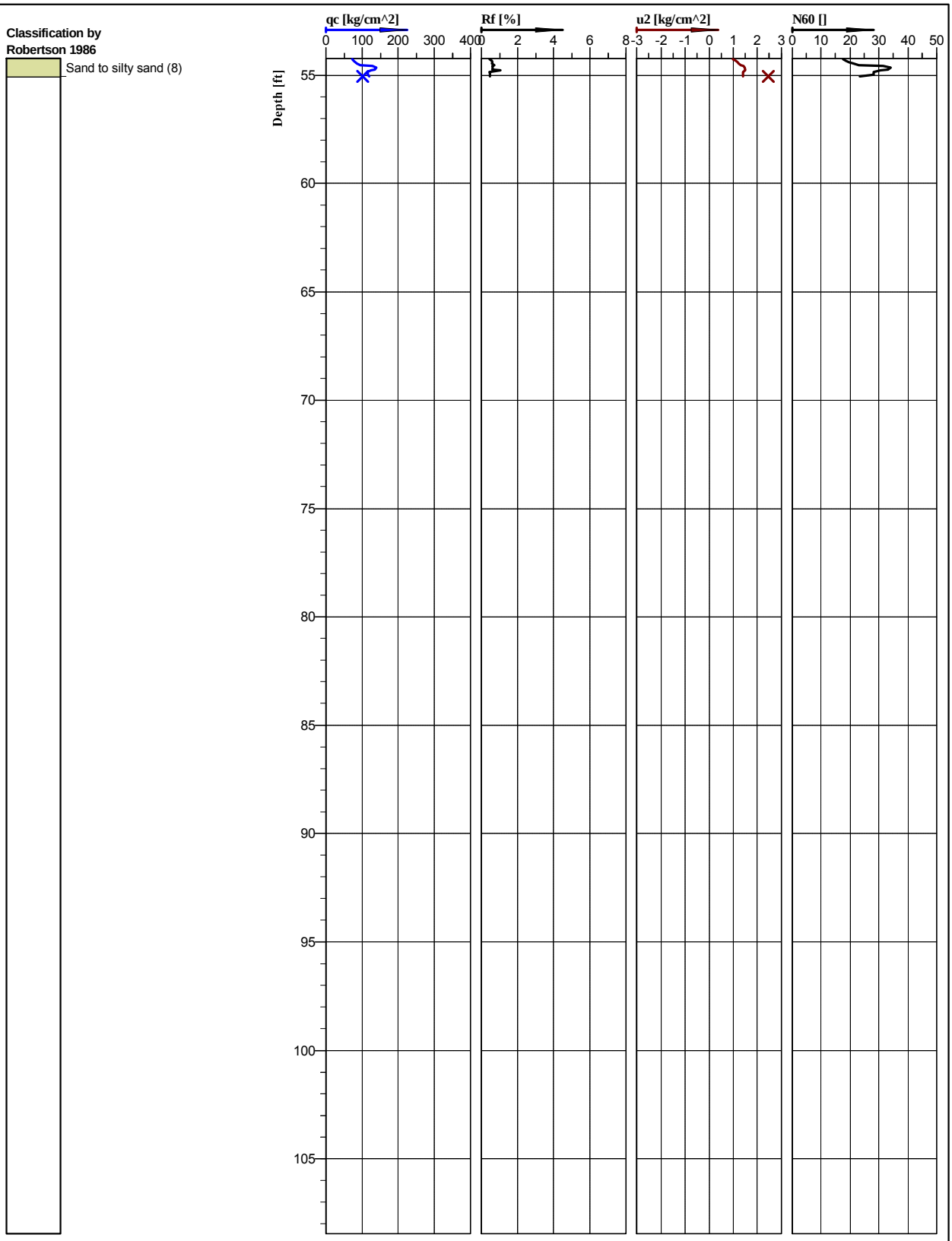
Bottom of borehole at 25.0 feet.

CPT Soundings 2014



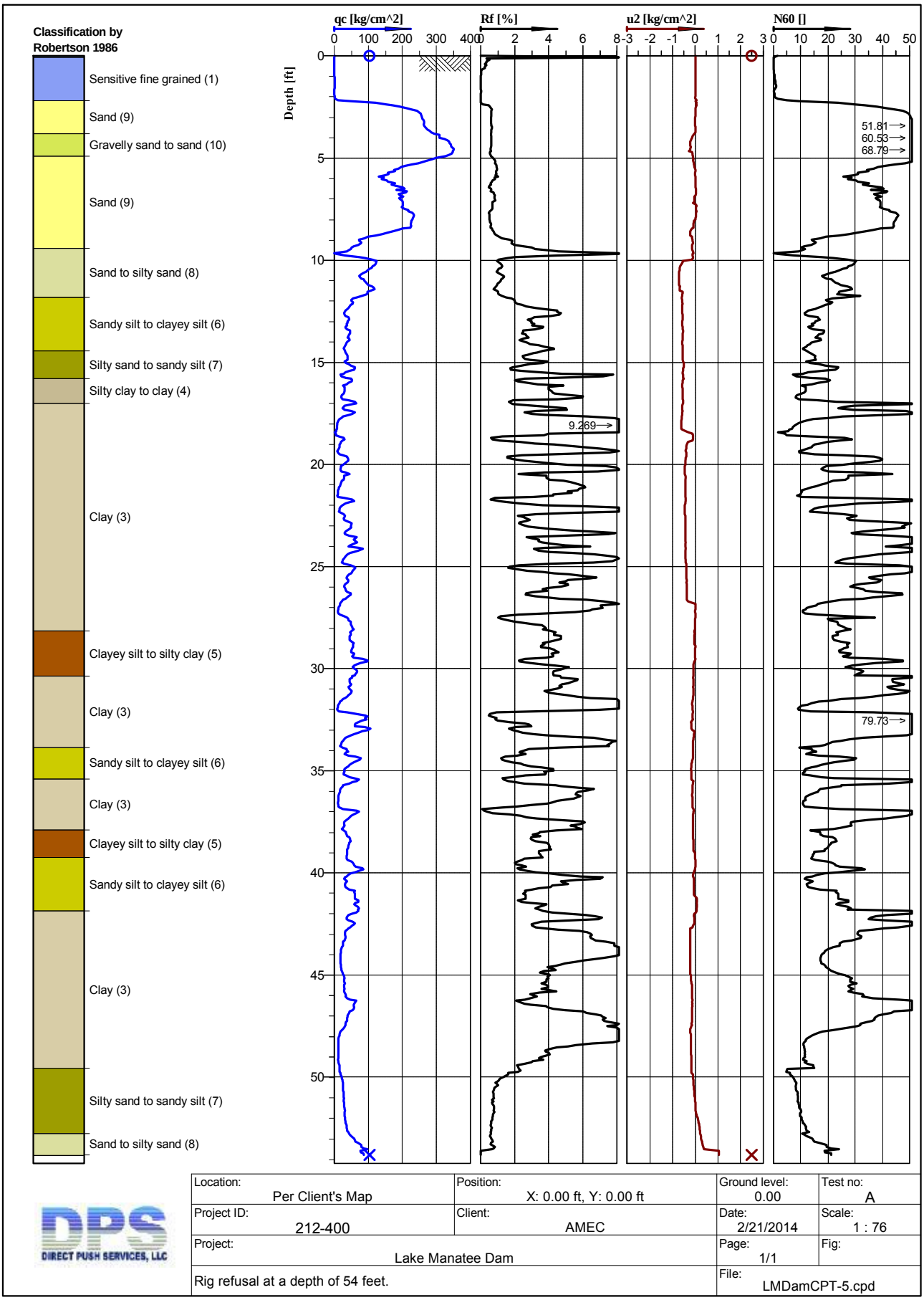
Location: Per Client's Map	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/21/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/2	Fig:
Rig refusal at a depth of 55 feet.		File: LMDamCPT-4.cpd	

DPS
DIRECT PUSH SERVICES, LLC



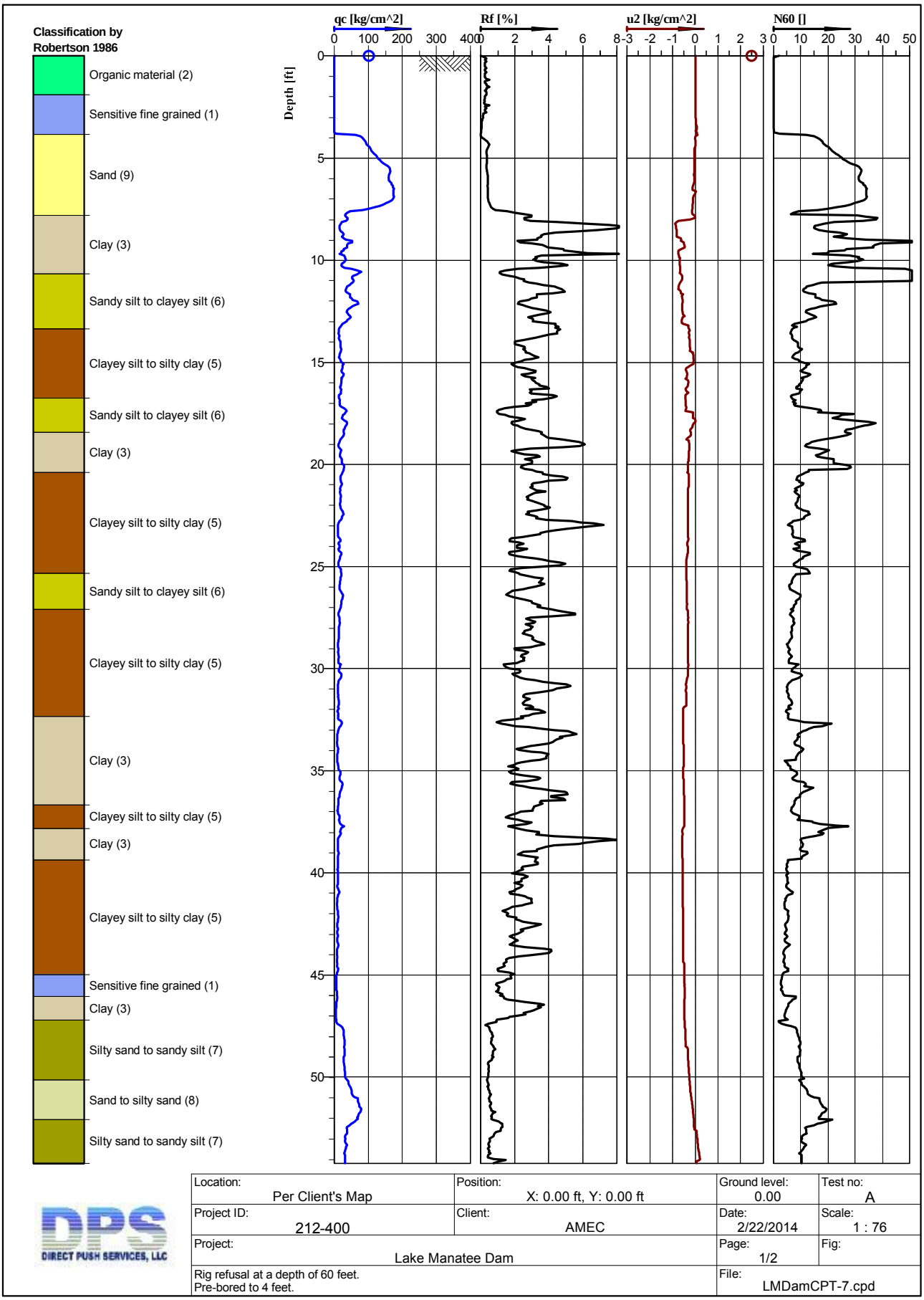
Location: Per Client's Map	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/21/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 2/2	Fig:
Rig refusal at a depth of 55 feet.		File: LMDamCPT-4.cpd	

DPS
DIRECT PUSH SERVICES, LLC



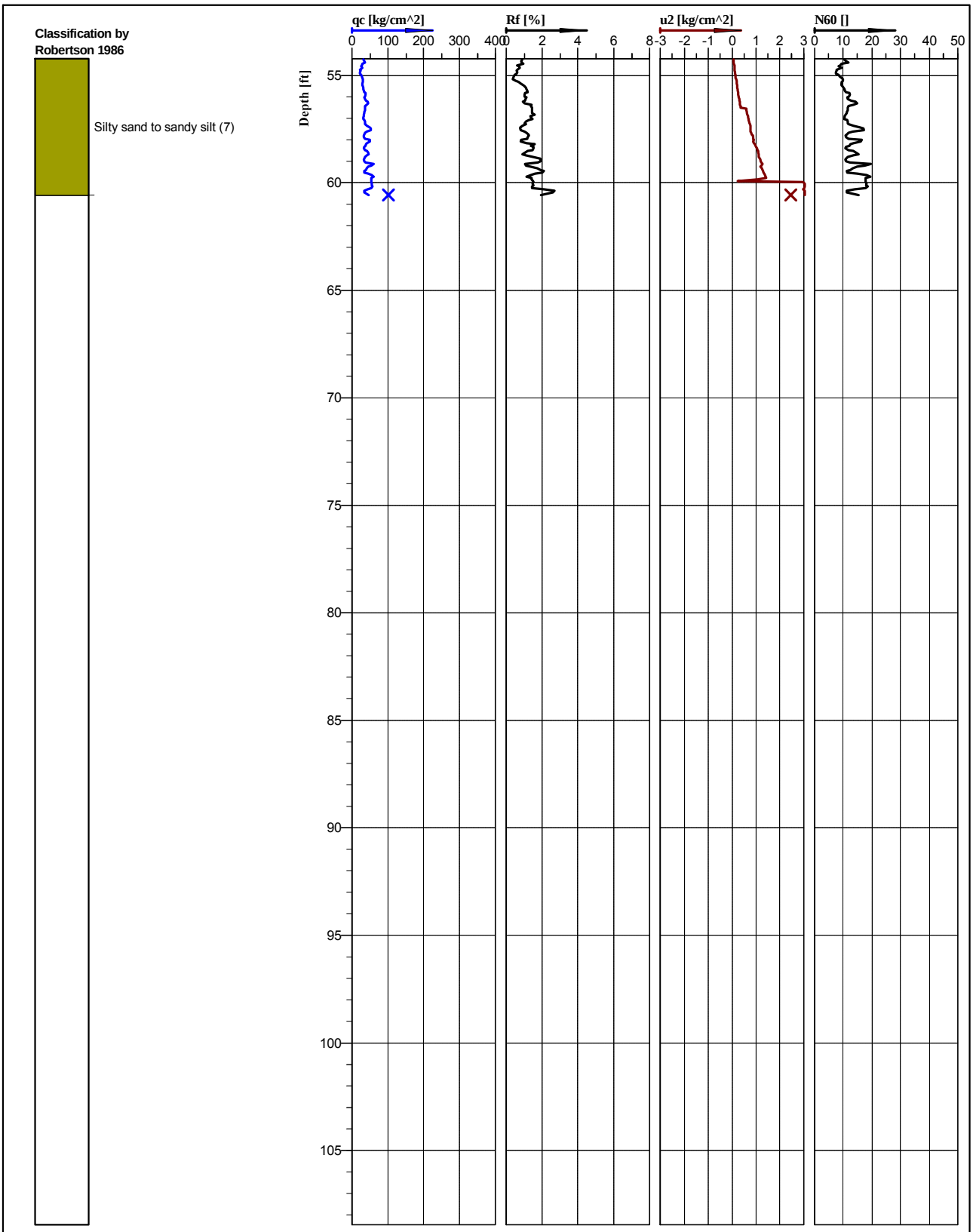
Location: Per Client's Map	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/21/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig:
Rig refusal at a depth of 54 feet.		File: LMDamCPT-5.cpd	

DPS
DIRECT PUSH SERVICES, LLC



Location: Per Client's Map	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/22/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/2	Fig:
Rig refusal at a depth of 60 feet. Pre-bored to 4 feet.		File: LMDamCPT-7.cpd	

DPS DIRECT PUSH SERVICES, LLC



Location: Per Client's Map	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/22/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 2/2	Fig:
Rig refusal at a depth of 60 feet. Pre-bored to 4 feet.		File: LMDamCPT-7.cpd	

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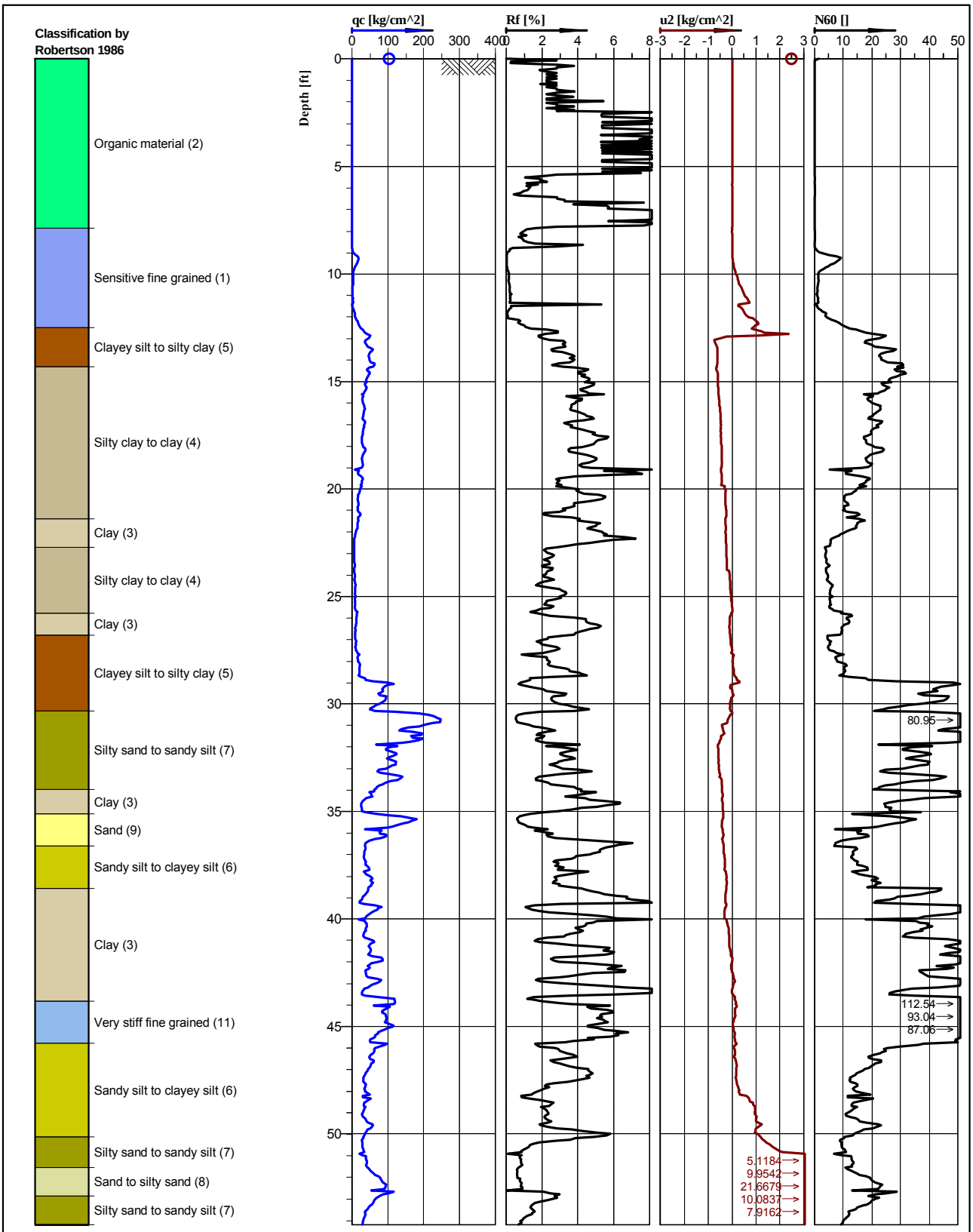
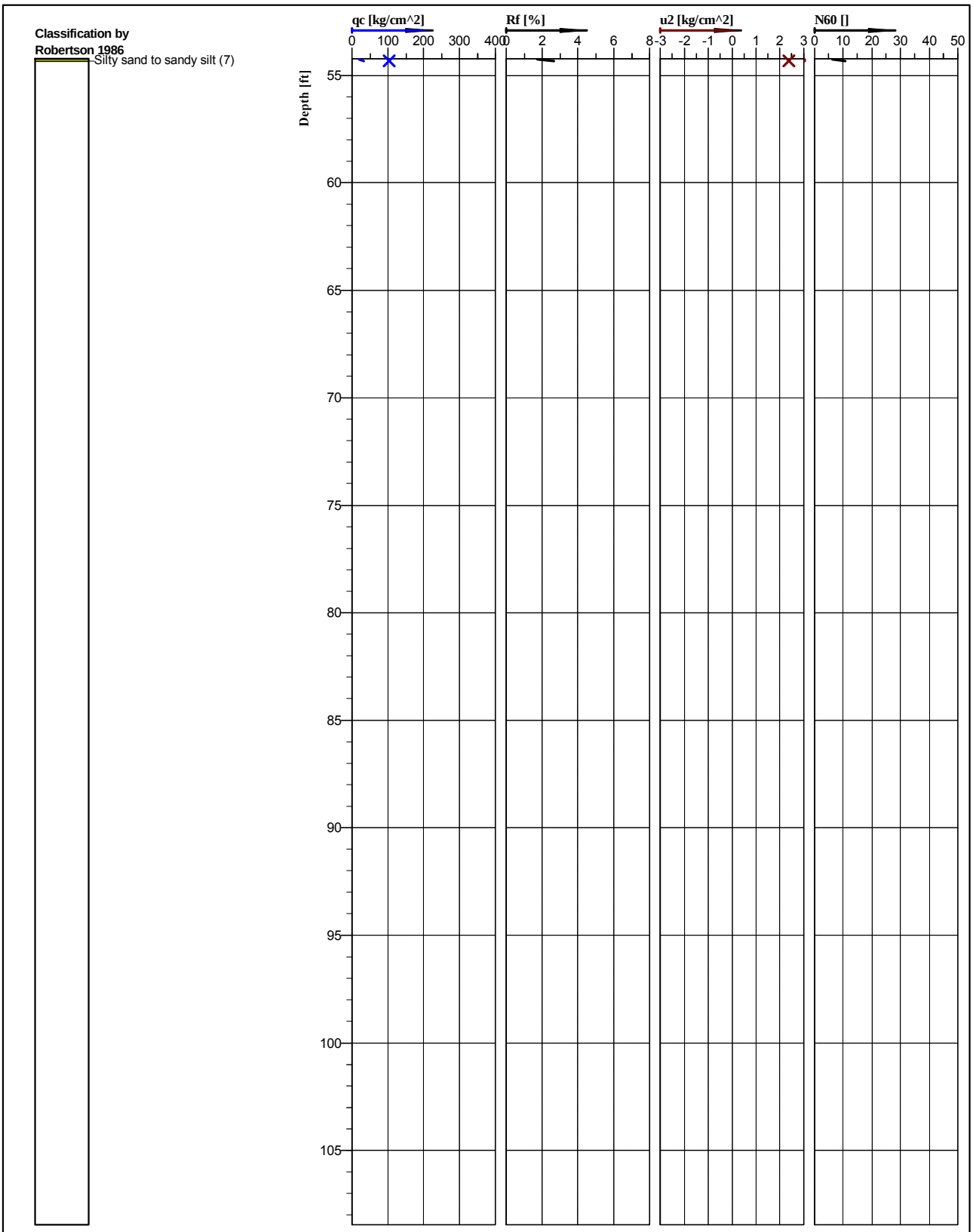
DIRECT PUSH SERVICES, LLC



Location: 200 feet north of spillway.	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/24/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/2	Fig:
Rig refusal at a depth of 54 feet. Bored to 12 feet.		File: LMDamCPT-11.cpt	

DPS DIRECT PUSH SERVICES, LLC



Location: 200 feet north of spillway.	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/24/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 2/2	Fig:
Rig refusal at a depth of 54 feet. Bored to 12 feet.		File: LMDamCPT-11.cpt	

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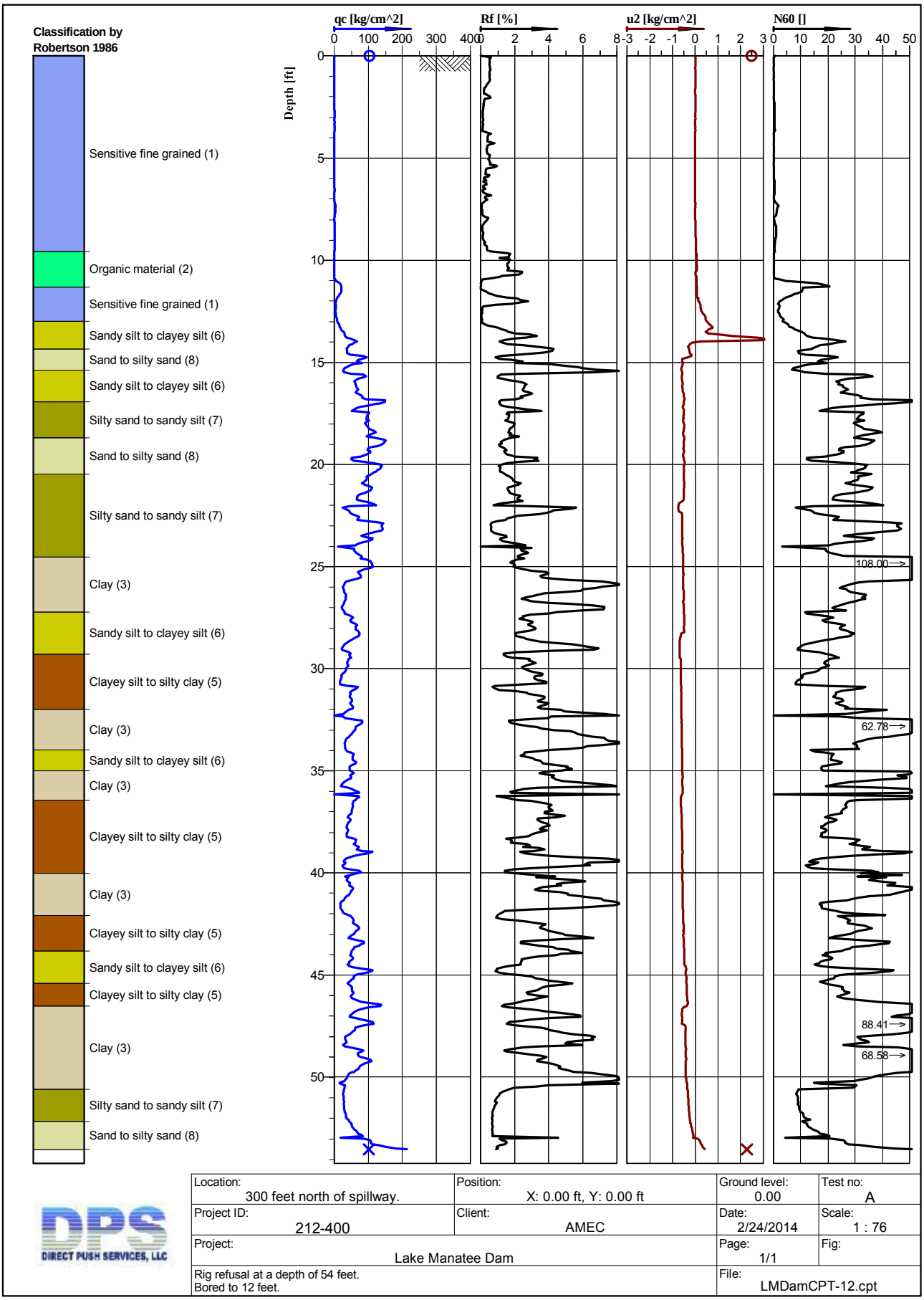
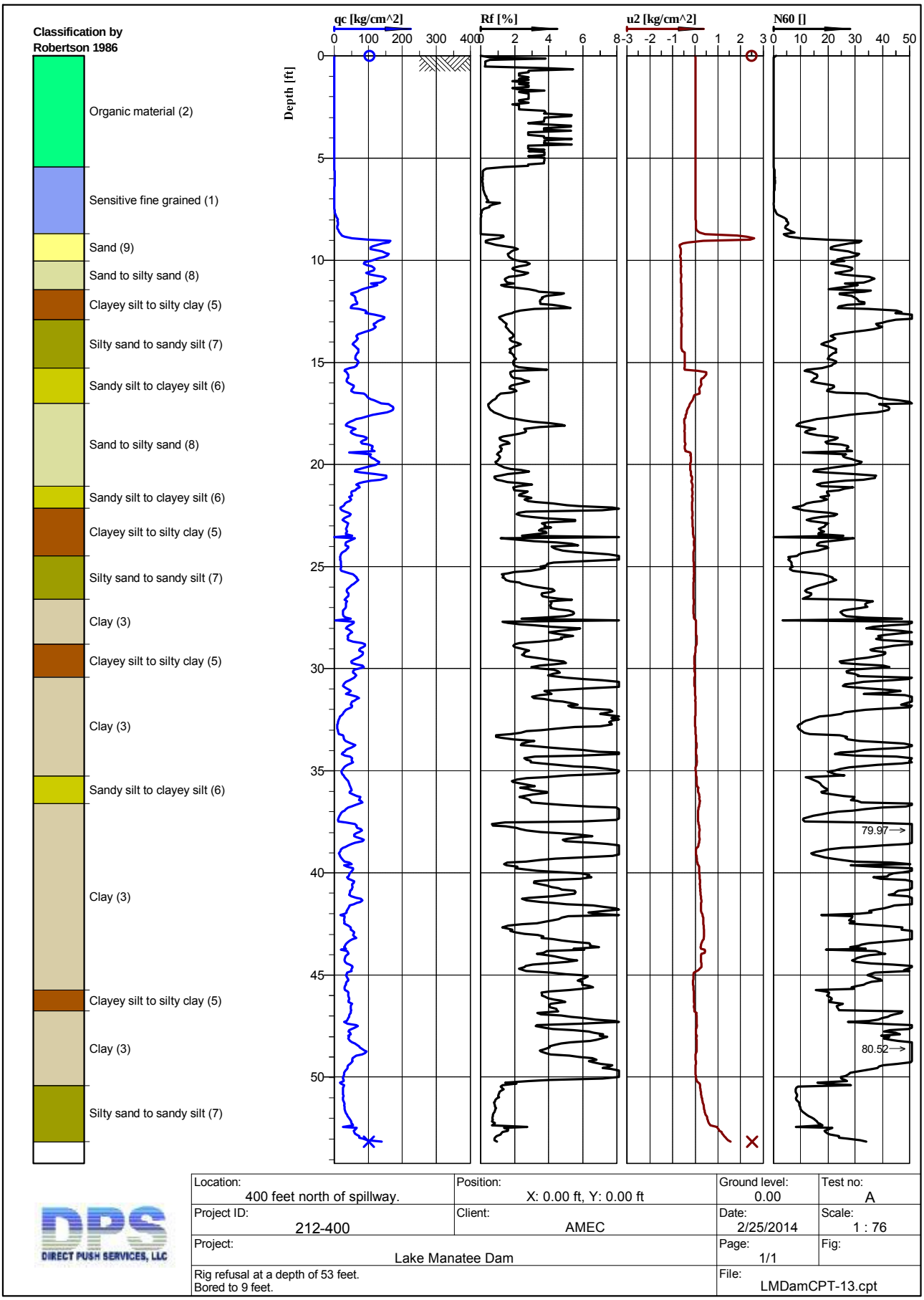
DIRECT PUSH SERVICES, LLC



Location: 300 feet north of spillway.	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/24/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig:
Rig refusal at a depth of 54 feet. Bored to 12 feet.		File: LMDamCPT-12.cpt	

DPS DIRECT PUSH SERVICES, LLC



Location: 400 feet north of spillway.	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/25/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig:
Rig refusal at a depth of 53 feet. Bored to 9 feet.		File: LMDamCPT-13.cpt	

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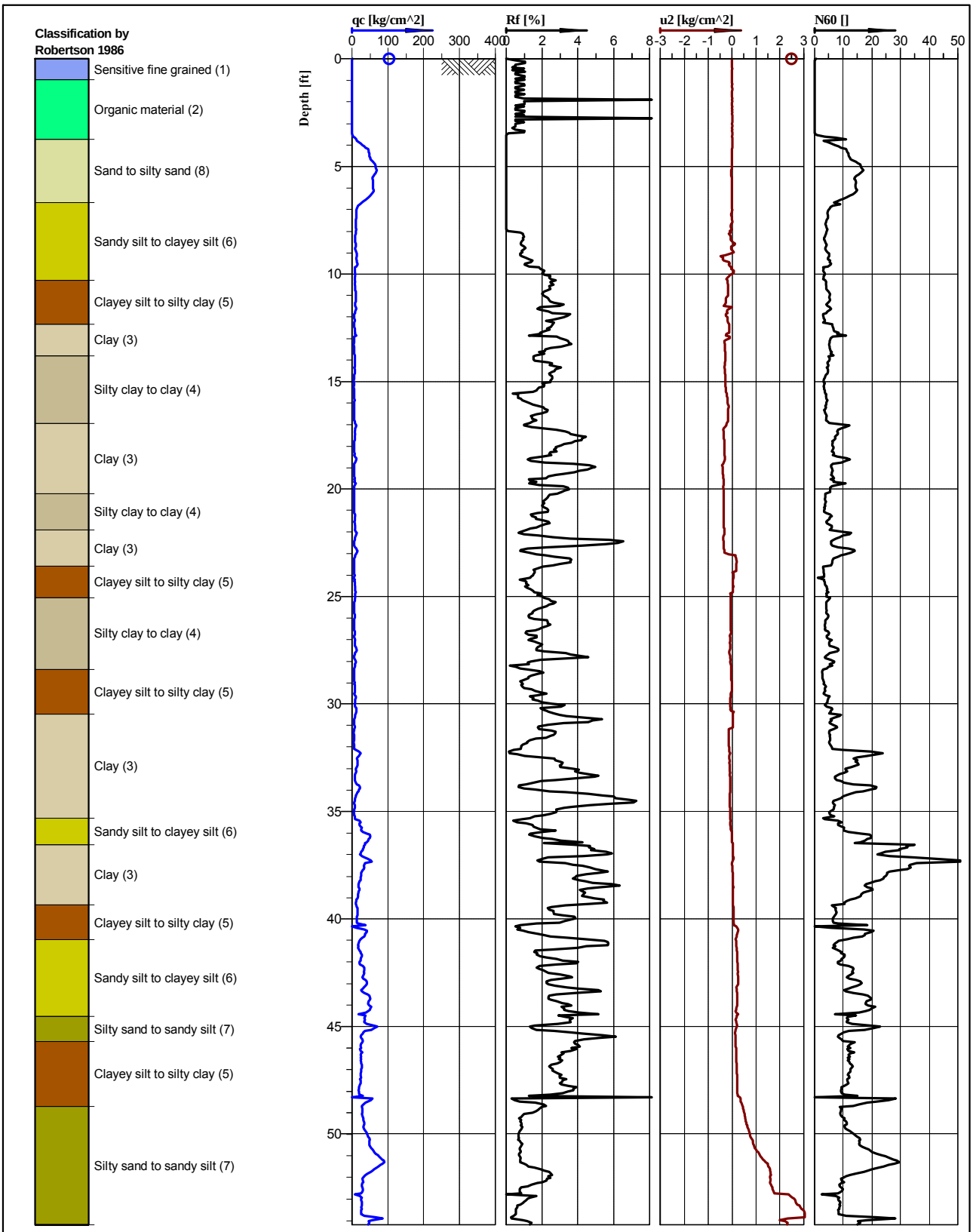

Location: North side of spillway.	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/26/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/2	Fig:
Rig refusal at a depth of 55 feet.		File: LMDamCPT-33.cpd	

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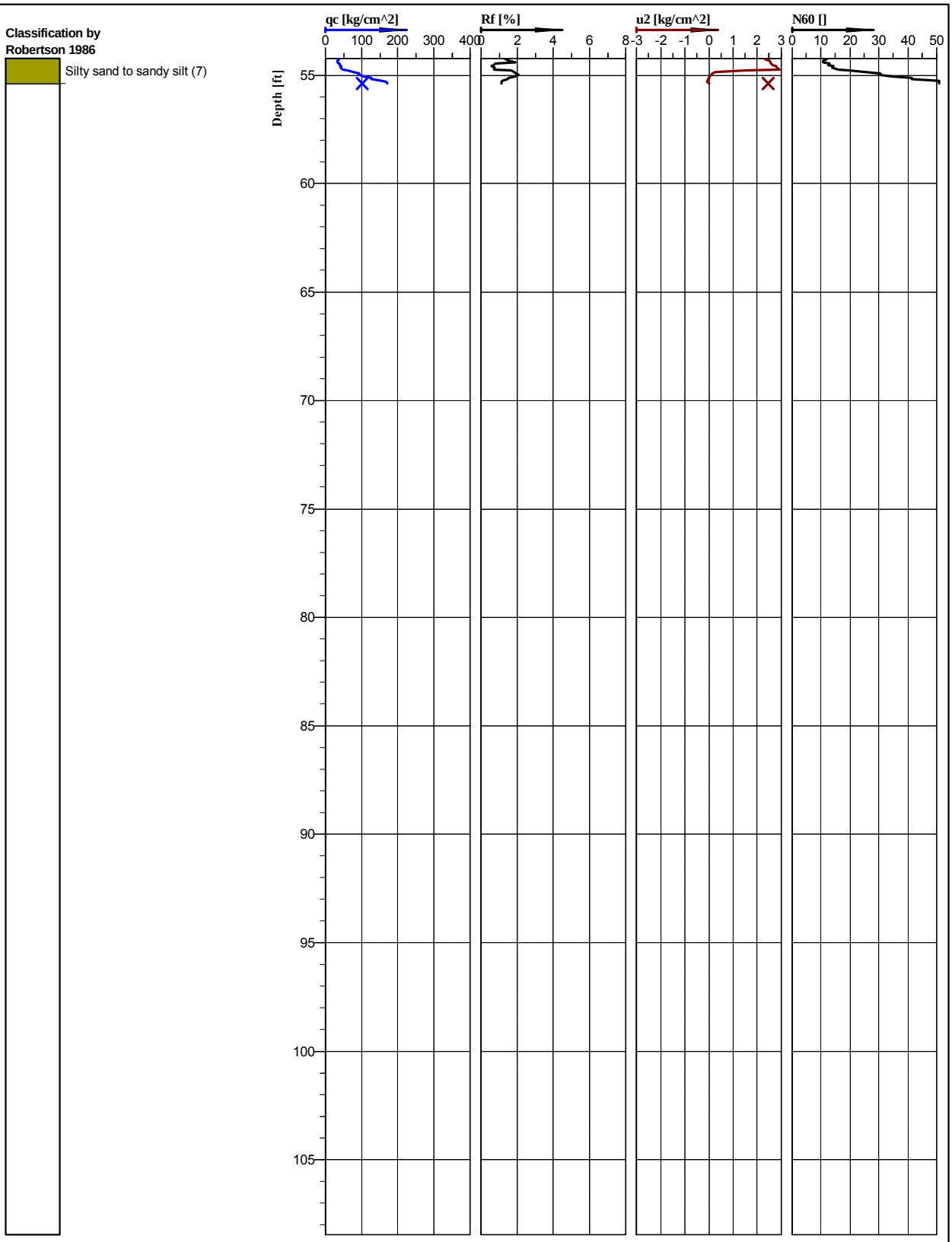
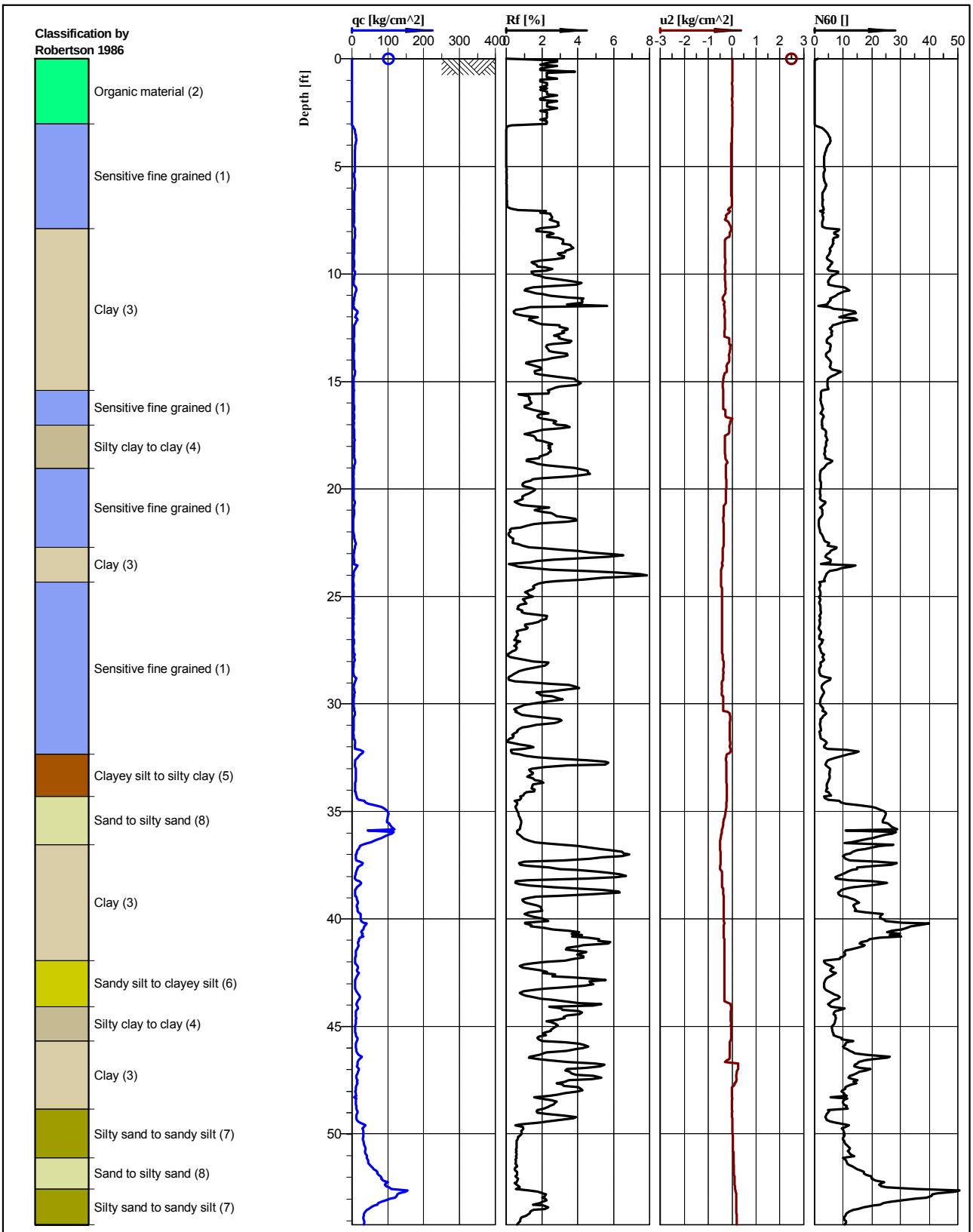
DIRECT PUSH SERVICES, LLC



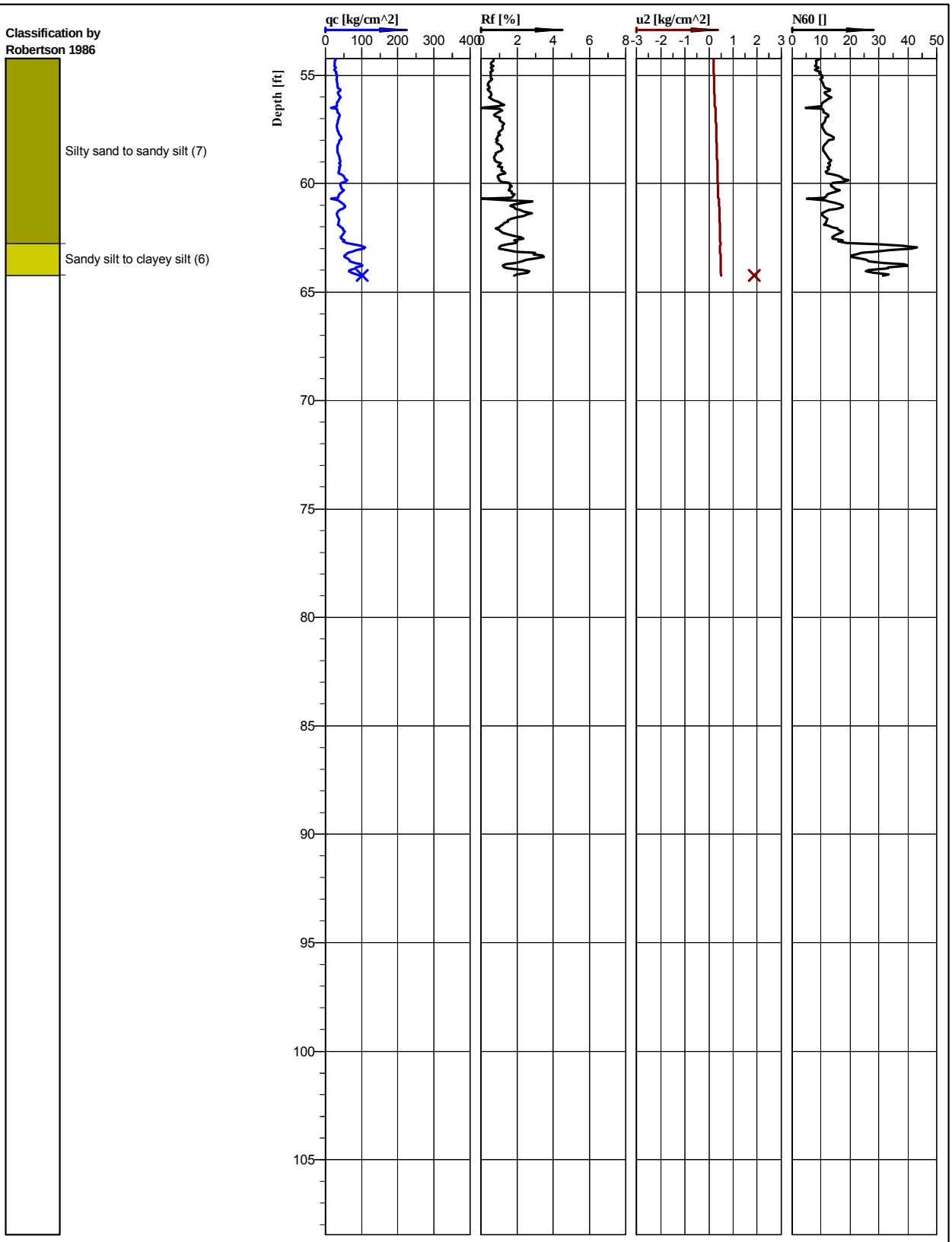
Location: North side of spillway.	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/26/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 2/2	Fig:
Rig refusal at a depth of 55 feet.		File: LMDamCPT-33.cpd	

DPS
DIRECT PUSH SERVICES, LLC



Location: South side of spillway.	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/26/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/2	Fig:
Rig refusal at a depth of 54 feet.		File: LMDamCPT-34.cpt	

DPS
DIRECT PUSH SERVICES, LLC



Location: South side of spillway.	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: A
Project ID: 212-400	Client: AMEC	Date: 2/26/2014	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 2/2	Fig:
Rig refusal at a depth of 54 feet.		File: LMDamCPT-34.cpt	

DPS
DIRECT PUSH SERVICES, LLC

SPT Borings (AFW 2015) Drilled in 2014

BORING NUMBER B-21

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 2/26/14 **COMPLETED** 2/26/14 **GROUND ELEVATION** 52.11 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Independent Drilling, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary **AT TIME OF DRILLING** ---

LOGGED BY ND **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 17+02.1; Adjacent to CPT-7 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
	SS 1	28-30	MC = 11%	SP-SM		(SP-SM) brown, dark brown, poorly graded fine grained quartz SAND with SILT, dense, local clay, trace cemented sand (FILL)
	SS 2	23-23-26-24 (49)	MC = 10% #200 = 8%			
5	SS 3	9-10-12-17 (22)	MC = 17%			
						6.0 46.1
	SS 4	10-7-6-9 (13)	MC = 17% LL = 34 PL = 20 #200 = 31%	SC		(SC) greenish gray, light gray, variably CLAYEY SAND, very loose to dense, few to some sand sized phosphate particles (FILL)
	SS 5	6-8-8-11 (16)	MC = 15%			- local silt layer
10						
	SS 6	6-8-5 (13)	MC = 19%			
	SS 7	4-4-5 (9)	MC = 21% LL = 51 PL = 18 #200 = 36%			
15						
	SS 8	4-5-4 (9)	MC = 21%			
	SS 9	4-6-6 (12)	MC = 20%			
20						
	SS 10	3-2-3 (5)	MC = 23% LL = 44 PL = 17 #200 = 33%			
	SS 11	3-4-4 (8)	MC = 20%			
25						
	SS 12	2-3-3 (6)	MC = 22%			
	SS 13	5-3-4 (7)	MC = 21% LL = 48 PL = 17 #200 = 36%			
30						
	SS 14	3-3-3 (6)	MC = 24%			
	SS 15	4-5-3 (8)	MC = 22%			
35						

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35						(SC) greenish gray, light gray, variably CLAYEY SAND, very loose to dense, few to some sand sized phosphate particles (FILL) *(continued)*	
	SS 16	2-2-2 (4)	MC = 22%			- 1-inch sand lense at 37 ft	
40	SS 17	4-4-3 (7)	MC = 22%				
	SS 18	1-1-2 (3)	MC = 20% LL = 31 PL = 15 #200 = 26%	SC		- few silt	
45	SS 19	4-4-6 (10)	MC = 34% LL = 51 PL = 26 #200 = 31%				
	SS 20	12-18-24 (42)	MC = 24% LL = 34 PL = 20 #200 = 47%				
50	SS 21	4-5-7 (12)	MC = 33% LL = 42 PL = 20 #200 = 25%				
						51.0	1.1
	SS 22	5-9-10 (19)	LL = 97 PL = 50 MC = 41%	SM		(SM) greenish gray, light gray, variably SILTY SAND, medium dense, few to some sand sized phosphate particles (NATIVE)	
						52.0	0.1
			LL = 39 PL = 21 #200 = 20%	CH		- 1-inch sand lense at 51 ft and 2-inch sand lense at 52 ft	
						53.0	-0.9
				SC		(CH) greenish gray, light gray, fat CLAY with sand, medium dense to very dense, few to some sand-sized phosphate particles	
						54.0	-1.9
55	SS 23	6-8-12 (20)	MC = 102% LL = 155 PL = 58 #200 = 83%	CH		(SC) greenish gray, light gray, CLAYEY SAND, medium dense to very dense, few to some sand-sized phosphate particles	
						56.0	-3.9
	SS 24	10-12-16 (28)	MC = 53% LL = 38 PL = 22 #200 = 45%	SC		(CH) greenish gray, light gray, fat CLAY with sand, medium dense to very dense, few to some sand-sized phosphate particles - 4-inch sand lense at 54.5 ft	
60	SS 25	27-34-30 (64)	MC = 73% LL = 97 PL = 50 #200 = 90%			(SC) greenish gray, light gray, CLAYEY SAND, medium dense to very dense, few to some sand-sized phosphate particles - pockets of clay and sand - sandy seams	
						61.0	-8.9
	SS 26	12-12-18 (30)	MC = 50% LL = 51 PL = 31 #200 = 41%	CH		(CH) greenish gray, light gray, fat CLAY with sand, medium dense to very dense, few to some sand-sized phosphate particles	
						63.0	-10.9
65	SS 27	5-12-18 (30)	MC = 41% LL = 52 PL = 22 #200 = 28%	SC		(SC) greenish gray, light gray, CLAYEY SAND, medium dense to very dense, few to some sand-sized phosphate particles	
	SS 28	37-32-50/3"	MC = 56% LL = 79 PL = 37 #200 = 61%				
						68.0	-15.9
70	SS 29	50/1"	MC = 44% LL = 39	SP-SM		- 1-inch cemented silt at tip of sample (SP-SM) greenish gray, poorly graded SAND with SILT, very dense, few sand sized phosphate particles	

(Continued Next Page)

BORING NUMBER B-21

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70			PL = 33 #200 = 43%				
			MC = 33% #200 = 27%			71.0	-18.9
						(SM) greenish gray, SILTY SAND, dense, some sand sized phosphate particles, local cemented silt lense throughout (max lense 0.5-inch)	
75	SS 30	31-26-12 (38)	MC = 21% #200 = 16%	SM			
						77.0	-24.9
						(SC) greenish gray, CLAYEY SAND, very dense, some sand sized phosphate particles, local cemented sands	
	SS 31	50/5"	MC = 24% #200 = 44%				
80							
	SS 32	50/1"		SC			
85							
						87.0	-34.9
						(MH) greenish gray, variably elastic SILT with sand, very soft to hard, trace sand sized phosphate particles	
	SS 33	0-0-11 (11)	MC = 68% LL = 105 PL = 56 #200 = 75% WOH - 1 ft				
90							
				MH		- greenish gray, light gray, more sandy, dolomitic silt, few sand sized phosphate particles, local cemented sands, trace silt, below 92 ft	
	SS 34	50/3"	MC = 20% #200 = 56%				
95							
						97.0	-44.9
						(SM) greenish gray, SILTY SAND, medium dense, trace clay	
	SS 35	8-9-16 (25)	MC = 38% #200 = 22%	SM			
100						100.0	-47.9
						Bottom of borehole at 100.0 feet.	

BORING NUMBER B-22

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 2/26/14 **COMPLETED** 3/3/14
GROUND ELEVATION 52.88 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Independent Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY ND **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 13+50.2; Adjacent to CPT-3
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
	SS 1	26-12-13-18 (25)	MC = 10%	SP-SM		(SP-SM) brown, dark brown, poorly graded SAND with SILT, medium dense to very dense, trace clay nodules at top of sample (FILL)
	SS 2	17-32-30-31 (62)	MC = 11%			- trace cemented sand below 2 ft
5	SS 3	12-14-18-21 (32)	MC = 17% #200 = 6%			
	SS 4	14-5-9-15 (14)	MC = 15%			7.0 45.9
	SS 5	6-10-16-14 (26)	MC = 15% #200 = 28%			(SC) greenish gray, variably CLAYEY SAND, medium dense to very dense, few to some sand sized phosphate particles (FILL)
10						- 1-inch of cemented silt at 9.5 ft
15	SS 6	8-6-7 (13)	MC = 18%			
20	SS 7	8-7-5 (12)	MC = 21%	SC		
25	SS 8	8-7-5 (12)	MC = 22% LL = 43 PL = 17 #200 = 32%			
30	SS 9	7-8-13 (21)	MC = 19%			
35	SS 10	9-9-11 (20)	MC = 26%			

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35						(SC) greenish gray, variably CLAYEY SAND, medium dense to very dense, few to some sand sized phosphate particles (FILL) *(continued)*	
40	SS 11	3-7-9 (16)	MC = 21% LL = 39 PL = 16 #200 = 31%				
45	SS 12	8-10-50/5"	MC = 25%			- trace silt	
				SC		- some sand sized phosphate particles, less clayey below 47 ft	
50	SS 13	6-8-10 (18)	MC = 15% LL = 43 PL = 25 #200 = 39%				
55	SS 14	8-9-12 (21)	MC = 26%			- clayey zones below 57 ft	
60	SS 15	5-6-10 (16)	MC = 17% LL = 154 PL = 74 #200 = 59%			59.5 - 2-inches of CLAY at tip of sample	-6.6
				MH		(MH) greenish gray, variably sandy elastic SILT, stiff (NATIVE)	
65						67.0	-14.1
				CL		(CL) greenish gray, CLAY with sand, hard	
70	SS 16	8-16-20 (36)	MC = 52% #200 = 82%			- sandy clay layer in between 69.5 ft and 7	

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70							
				CL		(CL) greenish gray, CLAY with sand, hard *(continued)* - 1-inch sand lense at 69 ft and 2-inch sand lense at tip of sample (7)	
75						75.0	-22.1
				SM		(SM) greenish gray, SILTY SAND, very dense, cemented sand and silt, few sand sized phosphate particles - hard drilling encountered from 75 ft to 92 ft	
	SS 17	21-50/4"	MC = 21% #200 = 19%				
80							
85							
	SS 18	50/1"	MC = 18%			- no sample recovered	
90						93.0	-40.1
	SS 19	13-50/4"	MC = 46% LL = 49 PL = 32 #200 = 39%	SC		(SC) greenish gray, CLAYEY SAND, very dense, cemented sand and silt, few sand sized phosphate particles	
95						95.0	-42.1
	SS 20	8-9-14 (23)	MC = 38%	CL		(CL) greenish gray, slightly SANDY CLAY, hard	
	SS 21	5-8-12 (20)	MC = 36% #200 = 64%				
100							
	SS 22	50/5"				102.0	-49.1
	SS 23	22-24-21 (45)	MC = 24% LL = 44	SC		(SC) greenish gray, CLAYEY SAND, dense	
105							

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
105			PL = 24 #200 = 41%	SC		(SC) greenish gray, CLAYEY SAND, dense *(continued)*
	SS 24	11-16-18 (34)	MC = 36%			
110	SS 25	6-8-12 (20)	MC = 38% #200 = 20%			110.0 -57.1

Bottom of borehole at 110.0 feet.

BORING NUMBER B-23

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 3/3/14 **COMPLETED** 3/3/14
GROUND ELEVATION 50.96 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Madrid Engineering Group
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY LG **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 16+20.6; Adjacent to CPT-33
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
						CPT pushed to 45 ft, mud rotary drilling to 43 ft prior to sampling, refer to CPT-33
5						
10						
15						
20	AU					
25						
30						
35						

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35						CPT pushed to 45 ft, mud rotary drilling to 43 ft prior to sampling, refer to CPT-33 *(continued)*	
40							
							43.0 8.0
45	SS 1	11-5-5-8 (10)	MC = 17% #200 = 42%	SC		(SC) gray, CLAYEY SAND, loose to medium dense (FILL) - phosphatic clays, few sand-sized phosphate particles	
50	SS 2	6-9-11-11 (20)	MC = 22% LL = 33 PL = 19 #200 = 42%			- trace sand sized phosphate particles	52.0 -1.0
55	SS 3	5-5-6-9 (11)	MC = 69% LL = 101 PL = 51 #200 = 92%	MH		(MH) dark gray, gray, variably elastic SILT, stiff to very stiff, few sand sized phosphate particles (NATIVE)	
60	SS 4	7-8-10-18 (18)	MC = 58% #200 = 64%			- more sandy below 58 ft	62.0 -11.0
65	SS 5	5-6-9-12 (15)	MC = 50% LL = 68 PL = 32	SM		(SM) dark gray, variably SILTY SAND, medium dense, few sand-sized phosphate particles	
70	SS 6	5-9-8-15 (17)	MC = 71% #200 = 65%	MH		(MH) dark gray, variably sandy elastic SILT, very stiff, few sand-sized phosphate particles	68.0 -17.0

(Continued Next Page)

BORING NUMBER B-23

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70				MH		(MH) dark gray, variably sandy elastic SILT, very stiff, few sand-sized phosphate particles *(continued)*	
						72.0	-21.0
	SS 7	50/1"		SM		(SM) gray, SILTY SAND, very dense, heavy cementation, sand to gravel sized phosphate particles	
75							
	SS 8	50/1"					
80							
	SS 9	50/3"					
85						85.0	-34.0
	SS 10	5-5-12-50/3"	MC = 49% LL = 91 PL = 45	SM		(SM) gray, SILTY SAND, very dense, cementation, sand to gravel sized phosphate particles - gray, greenish gray, variably silty, trace yellow calcareous sand	
90							
	SS 11	50/3"					
	SS 12	50/3"	MC = 27% #200 = 47%				
95						95.0	-44.0
	SS 13	6-6-9-15 (15)	MC = 36% #200 = 22%	SM		(SM) gray, SILTY SAND, medium dense to very dense, heavy cementation, sand to gravel sized phosphate particles	
	SS 14	22-30-30-31 (60)	MC = 26%				
100							
	SS 15	8-11-11-20 (22)	MC = 29%				
						103.0	-52.0
						Bottom of borehole at 103.0 feet.	

BORING NUMBER B-24

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 3/3/14 **COMPLETED** 3/3/14
GROUND ELEVATION 50.95 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Madrid Engineering Group
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY AB **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 14+71.1; Adjacent to CPT-34
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
						CPT pushed to 45 ft, mud rotary drilling to 43 ft prior to sampling, refer to CPT-34
5						
10						
15						
20	AU					
25						
30						
35						

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35						CPT pushed to 45 ft, mud rotary drilling to 43 ft prior to sampling, refer to CPT-34 *(continued)*	
40							
						43.0	8.0
45	SS 1	2-2-2-3 (4)	MC = 24% #200 = 37%	SC		(SC) greenish gray, CLAYEY SAND, very loose to loose, trace silt, sand sized phosphate particles (FILL)	
50	SS 2	3-4-5-10 (9)	MC = 26%				
						52.0	-1.1
55	SS 3	5-5-7-8 (12)	MC = 40% LL = 47 PL = 23	CL		(CL) dark gray, greenish gray, variably sandy CLAY, stiff to hard (NATIVE)	
60	SS 4	5-3-7-10 (10)	MC = 50%				
65	SS 5	6-6-8-16 (14)	MC = 69%			- few sand sized phosphate particles	
70	SS 6	6-19-11-28 (30)	MC = 42%				

(Continued Next Page)

BORING NUMBER B-24

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70				CL		(CL) dark gray, greenish gray, variably sandy CLAY, stiff to hard (NATIVE) *(continued)*	
						72.0	-21.1
	SS 7	50/4"	MC = 23%	SM		(SM) gray, SILTY SAND, very dense, heavily cemented	
75							
	SS 8	50/2"	MC = 27%				
80							
						- gray, dark gray, some sand sized phosphate particles below 82 ft	
	SS 9	18-12-32-50/1"	MC = 33% #200 = 13%				
85							
						87.0	-36.1
	SS 10	7-6-8-13 (14)	MC = 69% LL = 132 PL = 71 #200 = 64%	MH		(MH) dark greenish gray, greenish gray, light gray, variably sandy elastic SILT, stiff to hard, cemented	
90							
	SS 11	8-45-50/1"	MC = 62%			92.0	-41.1
			MC = 61% LL = 61 PL = 31 #200 = 48%	SC		(SC) light gray, CLAYEY SAND, dense, cemented	
	SS 12	42-25-20 (45)					
95						96.0	-45.1
	SS 13	27-50/2"	MC = 36% #200 = 67%	CL		(CL) light gray, variably SANDY CLAY, hard, cemented	
	SS 14	50/4"	MC = 29%			98.8	-47.9
						Bottom of borehole at 98.8 feet.	

BORING NUMBER B-25

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 3/3/14 **COMPLETED** 3/3/14
GROUND ELEVATION 53.04 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Madrid Engineering Group
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY LG **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 17+42.6; Adjacent to CPT-14
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
	SS 1	50/4"		SC		(SC) brown, CLAYEY SAND, very dense, possible cementation (FILL)
5						5.0 48.0
						(SP) dark brown, poorly graded fine SAND, very loose, organic staining (FILL)
	SS 2	2-1-1-1 (2)				
10						
15						
	SS 3	1-0-1-0 (1)	MC = 18% #200 = 4%	SP		
20						
25						
	SS 4	0-0-0-0 (0)	WOH - 2 ft			
30						
	SS 5	0-0-0-0 (0)	WOH - 2 ft			- no sample recovered
35						

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35				SP		(SP) dark brown, poorly graded fine SAND, very loose, organic staining (FILL) *(continued)*	
	SS 6	0-0-0-0 (0)	WOH - 2 ft			39.0	14.0
40				SC		(SC) light greenish gray, bluish gray, CLAYEY SAND, very loose to loose, sand sized phosphate particles (FILL)	
	SS 7	2-2-3-3 (5)	MC = 20% #200 = 30%				
45							
	SS 8	1-2-3-8 (5)	MC = 20% #200 = 33%				
50							
	SS 9	0-0-0-0 (0)	WOH - 2 ft				
55						57.0	-4.0
	SS 10	26-39-38-19 (77)		SP		(SP) light brown, poorly graded fine to medium grained SAND, very dense, sand sized phosphate particles (NATIVE)	
60						62.0	-9.0
	SS 11	8-11-25-22 (36)	MC = 27%	SC		(SC) gray, greenish gray, CLAYEY SAND, dense, sand sized phosphate particles, pockets/seams/vertical features of fine sand	
65							
	SS 12	8-11-25-22 (36)	MC = 33%				
70							

(Continued Next Page)

BORING NUMBER B-25

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70				SC		(SC) gray, greenish gray, CLAYEY SAND, dense, sand sized phosphate particles, pockets/seams/vertical features of fine sand *(continued)*	
						72.0	-19.0
	SS 13	50/3"		SP-SM		(SP-SM) gray, poorly graded fine grained SAND with SILT, very dense, sand-sized phosphate particles, cementation	
75						77.0	-24.0
	SS 14	21-14-30-50/3"		SM		(SM) gray, light gray, SILTY SAND, very dense, cemented silt layers	
80							
	SS 15	32-50/3"					
85							
	SS 16	4-5-5-18 (10)	MC = 71%				
90						87.0	-34.0
				CL		(CL) light green, greenish gray, variably sandy CLAY, stiff	
						90.5	-37.5
	SS 17	28-18-50/4"	MC = 94% #200 = 31%	SM		(SM) gray, dark gray SILTY SAND, sand-sized phosphate particles, cemented silt layers, medium dense to very dense	
	SS 18	50/1"					
95							
	SS 19	21-10-15-50/2"	MC = 32% #200 = 26%				
	SS 20	14-14-15-21 (29)	MC = 34%				
100						100.0	-47.0

Bottom of borehole at 100.0 feet.

BORING NUMBER B-27

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 3/4/14 **COMPLETED** 3/4/14
GROUND ELEVATION 54.25 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Madrid Engineering Group
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY AB **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 12+52.0; Adjacent to CPT-4
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
				SC		(SC) gray, light greenish gray, CLAYEY SAND, loose to medium dense, some sand sized phosphate particles (FILL)
10	SS 1	6-10-8-8 (18)	MC = 15%			
15						- dark greenish gray, trace sand sized phosphate particles
20	SS 2	3-2-3-2 (5)	MC = 22%			
25	SS 3	3-4-1-2 (5)	MC = 26%			
30	SS 4	0-5-6-7 (11)	MC = 21%			
35	SS 5	3-2-4-3 (6)	MC = 22%			

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35						(SC) gray, light greenish gray, CLAYEY SAND, loose to medium dense, some sand sized phosphate particles (FILL) *(continued)*	
40	SS 6	2-3-3-2 (6)	MC = 20%	SC			
45	SS 7	3-3-5-5 (8)	MC = 20%				
						47.0	7.3
50	SS 8	3-3-5-6 (8)	MC = 39% LL = 46 PL = 24 #200 = 12%	SC		(SC) greenish gray, poorly graded CLAYEY SAND, loose, trace sand sized phosphate particles (NATIVE)	
						52.0	2.3
55	SS 9	4-5-14-13 (19)		CL		(CL) greenish gray, SANDY CLAY, very stiff, trace sand sized phosphate particles - trace sand sized phosphate particles	
60	SS 10	6-7-11-15 (18)	MC = 45% MC = 27%			- fine sand pockets - 3-inch sand lense at 59 ft	
						61.0	-6.8
65	SS 11	4-10-12-15 (22)	MC = 32% MC = 47%	SC		(SC) dark greenish gray, CLAYEY SAND, medium dense	
						64.0 - 3-inch sand lense at 64 ft	-9.8
70	SS 12	5-4-6-9 (10)	MC = 98%	CL		(CL) greenish gray, variably sandy CLAY, stiff	

(Continued Next Page)

BORING NUMBER B-27

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70				CL		(CL) greenish gray, variably sandy CLAY, stiff *(continued)*	
						72.0	-17.8
	SS 13	50/2"		SM		(SM) gray, dark gray, SILTY fine to medium grained quartz SAND, very dense, some sand-sized phosphate particles, heavily cemented zones	
75							
	SS 14	26-47-50/1"	MC = 18%				
80							
	SS 15	50/1"					
85						86.0	-31.8
	SS 16	12-44-50/1"		SP-SM		(SP-SM) gray, dark gray, poorly graded fine to medium quartz SAND with SILT, very dense, same sand-sized phosphate particles, cemented zones	
90						92.0	-37.8
	SS 17	30-50/1"	MC = 31%	CL		(CL) greenish gray, variably sandy CLAY, hard, trace sand sized phosphate particles, cemented zones	
95						95.0	-40.8
	SS 18	7-8-22 (30)	MC = 40%	SC		(SC) greenish gray, CLAYEY SAND, medium dense, trace sand sized phosphate particles	
	SS 19	10-10-14 (24)	MC = 36% LL = 58 PL = 29 #200 = 24%				
100						100.0	-45.8
						Bottom of borehole at 100.0 feet.	

BORING NUMBER B-28

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 3/4/14 **COMPLETED** 3/4/14 **GROUND ELEVATION** 54.32 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Madrid Engineering Group **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary **AT TIME OF DRILLING** ---

LOGGED BY AB **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 11+49.1; Adjacent to CPT-5 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
				SM		(SM) brown, dark brown, SILTY SAND, very loose to dense (FILL)
10	SS 1	8-14-18-17 (32)	MC = 17%			
20	SS 2	0-1-3-2 (4)				- no sample recovered
25						25.0 29.3
				SC		(SC) greenish gray, gray, variably CLAYEY SAND, very loose to medium dense, some sand sized phosphate particles (FILL)
30	SS 3	0-0-1-1 (1)	MC = 35% WOH - 1 ft			
35	SS 4	0-0-0-0 (0)	MC = 31% WOH - 2 ft			

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35							
	SS 5	1-2-2-3 (4)	MC = 30%	SC		(SC) greenish gray, gray, variably CLAYEY SAND, very loose to medium dense, some sand sized phosphate particles (FILL) *(continued)*	
						- some drier portions (34 to 5)	
40	SS 6	2-2-2-3 (4)	MC = 26%				
45	SS 7	2-3-7-5 (10)	PP = 2 tsf MC = 22%				
50	SS 8	3-3-10-15 (13)	PP = 2.25 tsf MC = 22%				
						51.0	3.3
				SP-SC		(SP-SC) greenish gray, gray, poorly graded fine grained quartz SAND with CLAY, medium dense, some sand sized phosphate particles, trace coarse phosphate particles (NATIVE)	
55	SS 9	7-9-10-12 (19)	PP = 2.75 tsf MC = 25%				
60	SS 10	8-7-9-12 (16)	PP = 2 tsf MC = 40% MC = 33% #200 = 9%			- sand lenses throughout sample	
65	SS 11	3-5-7-11 (12)	PP = 2.0 tsf MC = 57%				
	SS 12	6-39-50/1"	PP = 1.5 tsf MC = 23%			68.5 - 1-inch cemented clay lense at 69 ft	-14.2
70				SC		(SC) light greenish gray, pale gray, variably CLAYEY fine to medium grained SAND, very dense, some sand sized phosphate particles	

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70				SC		(SC) light greenish gray, pale gray, variably CLAYEY fine to medium grained SAND, very dense, some sand sized phosphate particles *(continued)*	
						72.0	-17.7
	SS 13	28-50/4"				(SM) gray, light gray, SILT fine to medium grained SAND, very dense, trace clay, some sand sized phosphate particles	
75						- rig chatter - heavily cemented layers throughout	
	SS 14	50/2"					
80				SM			
	SS 15	50/0"				- no recovery	
85							
	SS 16	50/1"					
90							
						92.0	-37.7
	SS 17	23-41-37-50 (78)	PP = 4.1 tsf MC = 33% LL = 52 PL = 36	CH		(CH) light greenish gray, fat CLAY with sand, hard, heavily cemented	
95							
	SS 18	14-50/4"	PP = 3.9 tsf MC = 33% #200 = 76%				
						98.7	-44.4
	SS 19	50/2"	PP = 3.5 tsf MC = 29%			Bottom of borehole at 98.7 feet.	

BORING NUMBER B-29

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 3/4/14 **COMPLETED** 3/4/14
GROUND ELEVATION 54.26 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Madrid Engineering Group
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY LG **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 18+43.2; Adjacent to CPT-11
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	50/4"	MC = 18%			0.5 - 6-inches of dam crest roadway (asphalt with base course)	53.8
				SM		(SM) brown, dark brown, variably SILTY SAND, loose (FILL)	
5							
10	SS 2	2-2-2-2 (4)	MC = 17%				
15						15.0	39.3
				SC		(SC) light gray, gray, greenish gray, CLAYEY SAND, very loose to medium dense, some sand sized phosphate particles (FILL)	
20	SS 3	0-0-2-2 (2)	MC = 22% WOH - 1 ft				
25							
30	SS 4	0-2-4-9 (6)	MC = 18%			- drier zones throughout	
35							

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35				SC		(SC) light gray, gray, greenish gray, CLAYEY SAND, very loose to medium dense, some sand sized phosphate particles (FILL) *(continued)*	
40	SS 5	5-6-9-10 (15)	MC = 19%				
45	SS 6	10-7-9-10 (16)	MC = 28%				
						47.0	7.3
50	SS 7	8-7-8-10 (15)	MC = 31%	SC		(SC) gray, dark gray, variably CLAYEY SAND, loose to medium dense, some fine to coarse phosphate particles (NATIVE)	
55	SS 8	2-4-5-8 (9)	MC = 26%				
60	SS 9	16-12-12-23 (24)	MC = 32% #200 = 18% MC = 67% LL = 104 PL = 46 #200 = 80%			- pockets of fine to medium sand	
						59.0	-4.7
65	SS 10	4-9-20-20 (29)	MC = 45%	MH		(MH) light gray, greenish gray, elastic SILT with sand, very stiff, some sand sized phosphate particles	
						67.0	-12.7
70	SS 11	6-11-13-18 (24)	MC = 35%	SC		(SC) gray, dark gray, greenish gray, variably CLAYEY SAND, medium dense, some sand sized phosphate particles	

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70				SC		(SC) gray, dark gray, greenish gray, variably CLAYEY SAND, medium dense, some sand sized phosphate particles *(continued)*	
						72.0	-17.7
75	SS 12	50/2"		SM		(SM) gray, dark gray, SILTY SAND, very dense, some fine to medium phosphate particles, heavily cemented layers	
	SS 13	30-44-50/4"	MC = 20% #200 = 13%				
80							
						83.0	-28.7
85	SS 14	14-12-14-24 (26)	MC = 45%	CL		(CL) greenish gray, dark gray, variably sandy CLAY, very stiff to hard, heavily cemented layers	
	SS 15	5-4-50/5"	MC = 56%				
90	SS 16	50/3"	MC = 30%			- light gray, yellowish gray, drier matrix	
						92.5	-38.2
	SS 17	31-17-32-50/3"	MC = 32%	SM		(SM) gray, SILTY SAND, medium dense to very dense, trace fine phosphate particles, heavily cemented layers	
95	SS 18	10-9-16-13 (25)	MC = 34%				
	SS 19	50/3"	MC = 25%			97.8	-43.5
						Bottom of borehole at 97.8 feet.	

BORING NUMBER B-30

amec foster wheeler

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DATE STARTED 3/4/14 **COMPLETED** 3/5/14 **GROUND ELEVATION** 54.21 ft **HOLE SIZE** 3 inches

DRILLING CONTRACTOR Madrid Engineering Group **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary **AT TIME OF DRILLING** ---

LOGGED BY LG **CHECKED BY** GA **AT END OF DRILLING** ---

NOTES STA 19+41.8; Adjacent to CPT-12 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
	SS 1	36-14-12-11 (26)	MC = 13%	SM		(SM) brown, dark brown, SILTY SAND, loose to medium dense, trace fine gravel, slight organic odor (FILL)
5						
10	SS 2	2-2-5-10 (7)	MC = 17%			
15						15.0 39.2
				SC		(SC) gray, light gray, CLAYEY SAND, loose to medium dense, pockets of brown silty clay, some fine phosphate particles (FILL)
20	SS 3	1-4-4-6 (8)	MC = 20%			
25						
30	SS 4	3-2-3-5 (5)	MC = 26%			
35	SS 5	6-7-10-11 (17)	MC = 20%			

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35				SC		(SC) gray, light gray, CLAYEY SAND, loose to medium dense, pockets of brown silty clay, some fine phosphate particles (FILL) *(continued)*	
40	SS 6	4-6-7-6 (13)	MC = 23%				
45	SS 7	3-4-4-7 (8)	MC = 24%				
						47.0	7.2
50	SS 8	2-4-4-6 (8)	MC = 35%	SC		(SC) gray, greenish gray, variably CLAYEY SAND, loose to very dense, sand sized phosphate particles, layers and pockets of clay and sand (NATIVE)	
55	SS 9	4-4-6-8 (10)	MC = 29%				
60	SS 10	6-17-17-22 (34)	MC = 54%				
65	SS 11	7-32-32-50/5"	MC = 16% MC = 67%			- some cemented layers below 63 ft	
70	SS 12	4-9-21-18 (30)					

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70							
						(SC) gray, greenish gray, variably CLAYEY SAND, loose to very dense, sand sized phosphate particles, layers and pockets of clay and sand (NATIVE) *(continued)*	
	SS 13	6-36-50/5"	MC = 26% MC = 27% #200 = 16%	SC			
75							
						77.0	-22.8
	SS 14	31-50/5"				(SM) gray, greenish gray, SILTY SAND, very dense, some cementation	
80				SM		- layer of sandy clay (CL)	
	SS 15	11-9-12-19 (21)	MC = 29% MC = 61%			84.0	-29.8
85						(CL) greenish gray, yellowish gray, variably sandy CLAY, hard	
	SS 16	8-7-9-50/3"	MC = 71%	CL		- cemented layers below 93 ft	
90	SS 17	50/5"	MC = 27%				
						92.0	-37.8
	SS 18	16-22-50/4"	MC = 29%			(SC) gray to dark gray, variably CLAYEY SAND, very dense, trace fine phosphate particles, heavily cemented	
95	SS 19	50/5"	MC = 25%	SC			
	SS 20	10-50/5"	MC = 34% LL = 44 PL = 24 #200 = 46%			98.4	-44.2
						Bottom of borehole at 98.4 feet.	

BORING NUMBER B-34

amec foster wheeler

CLIENT Carollo Engineers, Inc.
PROJECT NAME Lake Manatee Dam Evaluation
PROJECT NUMBER 300472x2.05
PROJECT LOCATION Manatee County
DATE STARTED 3/5/14 **COMPLETED** 3/5/14
GROUND ELEVATION 54.2 ft **HOLE SIZE** 3 inches
DRILLING CONTRACTOR Madrid Engineering Group
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY LG **CHECKED BY** GA
AT END OF DRILLING ---
NOTES STA 20+41.3; Adjacent to CPT-13
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						Elevation
	SS 1	24-25-17-10 (42)	MC = 7%	SM		(SM) brown, SILTY SAND, loose to dense (FILL)
5						
10	SS 2	4-10-21-25 (31)	MC = 17%			
15						
20	SS 3	3-4-4-3 (8)	MC = 20%			
25						25.0 29.2
				SC		(SC) gray, brown, CLAYEY SAND, loose, few sand sized phosphate particles (FILL)
30	SS 4	1-3-4-3 (7)	MC = 24%			
35	SS 5	3-4-3-4 (7)	MC = 29%			- thin layer of dark brown top soil

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35				SC		(SC) gray, brown, CLAYEY SAND, loose, few sand sized phosphate particles (FILL) *(continued)*	
						- gray, greenish gray	
40	SS 6	2-2-3-3 (5)	MC = 27%				
45	SS 7	3-2-4-5 (6)	MC = 21%				
						47.0	7.2
50	SS 8	3-5-5-6 (10)	MC = 31%	SM		(SM) gray, dark gray, SILTY SAND, loose, few sand sized phosphate particles (NATIVE)	
55	SS 9	6-4-5-6 (9)	MC = 23% MC = 30% LL = 32 PL = 19 #200 = 21%				
						54.0	0.2
60	SS 10	9-15-25-50 (40)	MC = 21%	SC		(SC) gray, CLAYEY SAND, dense, few sand sized phosphate particles	
						62.0	-7.8
65	SS 11	33-38-50/5"	MC = 21%	SM		(SM) gray, SILTY SAND, medium dense to very dense, few sand sized phosphate particles, heavily cemented zones	
70	SS 12	7-11-19-28 (30)	MC = 32%				

(Continued Next Page)

CLIENT Carollo Engineers, Inc. **PROJECT NAME** Lake Manatee Dam Evaluation

PROJECT NUMBER 300472x2.05 **PROJECT LOCATION** Manatee County

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
70				SM		(SM) gray, SILTY SAND, medium dense to very dense, few sand sized phosphate particles, heavily cemented zones *(continued)*	
	SS 13	14-10-19-50/3"	MC = 31% MC = 33%				
74.0							-19.8
75				CL		(CL) greenish gray, light gray, variably sand CLAY, hard, heavily cemented	
	SS 14	50/1"					
80							
82.0							-27.8
	SS 15	10-9-11-21 (20)	MC = 30%	SM		(SM) dark gray, greenish gray, SILTY SAND, medium dense, few sand sized phosphate particles	
85							
87.0							-32.8
	SS 16	5-4-8-13 (12)		CL		(CL) greenish gray, variably sandy CLAY, stiff to hard, heavily cemented	
90	SS 17	50/5"					
	SS 18	14-28-34-50/1"	MC = 29%			- gray, few sand sized phosphate particles, below 92 ft	
95	SS 19	21-11-50/4"	MC = 47%				
	SS 20	50/2"	MC = 20% #200 = 56%				
100							
	SS 21	4-6-12-25 (18)	MC = 38% LL = 48 PL = 28 #200 = 54%				
102.0							-47.8
						Bottom of borehole at 102.0 feet.	

GENERAL BH / TP / WELL - C-44 GINT STD US LABS.GDT - 4/29/15 15:00 - T:\300472X2 CAROLLO-LK MANATEE DAM-EVAL\REPORT\GEOTECHNICAL REPORT\APPENDIX\300472X2 - MANAEE COUNTY DAM - BORINGS.GPJ

April / May 2017 Borings

WELL NUMBER SPT-1

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 5/3/17 **COMPLETED** 5/4/17 **GROUND ELEVATION** 28.5 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

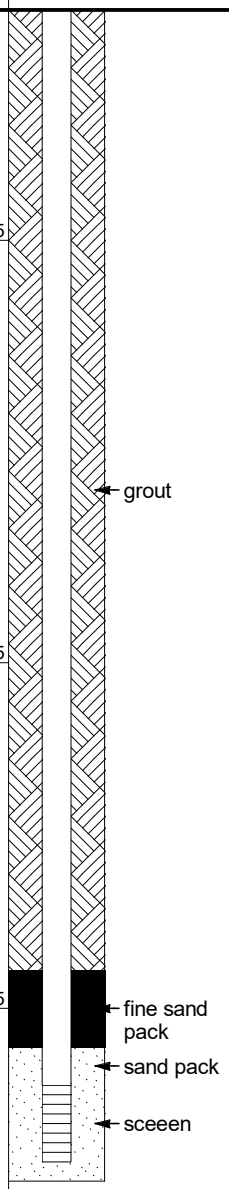
DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY CS **CHECKED BY** JB **HOLE COMPLETION** backfilled with cuttings and bentonite chips

NOTES Location: Adjacent to fine screen chamber behind south downstream training wall. Piezometer installed adjacent to SPT location, installed through hollo

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	8-9-11-11 (20)	SP		gray, light brown, brown, fine-grained quartz SAND, silty, trace rocks/gravel, medium dense to loose, dry to moist	
	SS 2	7-6-6-6 (12)				
5	SS 3	2-2-2-3 (4)				
6.0						22.5
	SS 4	2-2-1-2 (3)	SM		gray, brown, dark brown, SILTY SAND, fine-grained sands, very loose, dry to moist	
10	SS 5	2-1-2-2 (3)				
15	SS 6	1-1-1 (2)				
17.0						11.5
	SS 7	1-2-2 (4)	SP		dark brown, light brown, fine to medium grained quartz SAND, trace silts, trace cemented silt nodules, loose, moist	
20						
25	SS 8	7-5-2 (7)				
26.0						2.5
	SS 9	6-9-10 (19)	SC		brown, gray, CLAYEY SAND, trace cemented silt nodules, loose to medium dense, moist	
30	SS 10	2-4-4 (8)				
	SS 11	4-4-5 (9)				
33.0						-4.5

Bottom of borehole at 33.0 feet.



WELL DIAGRAM

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER SPT-2

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 5/4/17 **COMPLETED** 5/4/17 **GROUND ELEVATION** 25.28 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

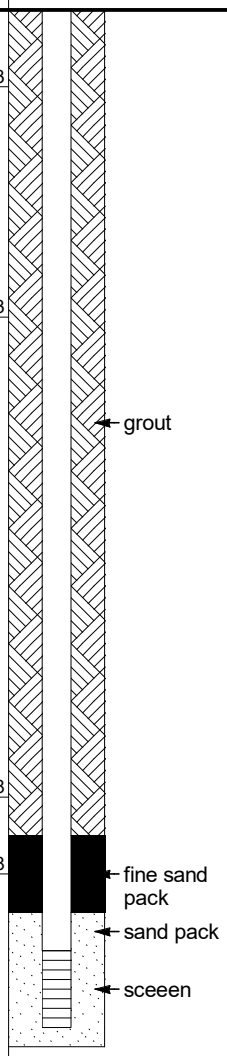
LOGGED BY CS **CHECKED BY** JB **HOLE COMPLETION** backfilled with cuttings and bentonite chips

NOTES Location: Behind south downstream training wall. Piezometer installed adjacent to SPT location, installed through hollow stem auger

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	2-5-11-10 (16)	SM		brown, SILT SAND, fine grained quartz, medium dense, dry	
2.0						23.3
	SS 2	6-6-6-8 (12)	SP		brown, fine-grained quartz SAND, trace silts, loose to medium dense, dry to moist	
5	SS 3	5-7-7-8 (14)				
	SS 4	6-5-5-4 (10)				
8.0						17.3
	SS 5	3-2-3-2 (5)			brown, gray, SILTY SAND, fine to medium grained quartz, very loose to loose, moist	
10						
15	SS 6	2-3-4 (7)	SM			
20	SS 7	1-0-0-1 (0)				
20.5						4.8
	SS 7A	0-0-0-0 (0)	SP		brown, gray, SAND, trace silt, very loose, moist	
22.5						2.8
	SS 8	2-7-9-9 (16)	SC		gray, greenish gray, CLAYEY SAND, fine grained quartz sand, loose to medium dense, moist	
25	SS 9	2-5-5 (10)				
30	SS 10	5-3-5 (8)				
30.0						-4.7

Bottom of borehole at 30.0 feet.

WELL DIAGRAM



*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER SPT-3

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 5/4/17 **COMPLETED** 5/4/17 **GROUND ELEVATION** 13.69 ft **HOLE SIZE** 4 inches

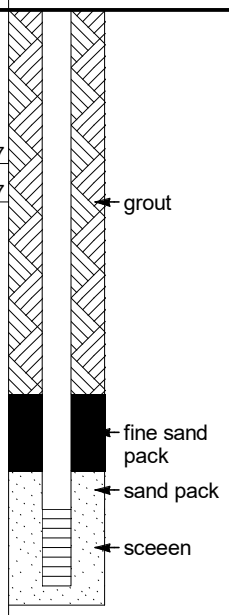
DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY CS **CHECKED BY** JB **HOLE COMPLETION** backfilled with cuttings and bentonite chips

NOTES Location: Near SW corner of downstream apron slab. Piezometer installed adjacent to SPT location, installed through hollow stem auger

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	3-5-6-6 (11)	SP		light brown, fine-grained quartz SAND, trace silt, medium dense, dry	
	SS 2	10-14-10-16 (24)				
						4.0 / 9.7
5	SS 3	16-10-5-3 (15)	SM		dark brown, SILTY SAND, fine quartz sand, medium dense, dry	5.0 / 8.7
	SS 4	3-4-5-5 (9)	SC		gray, greenish gray, CLAYEY SAND, fine grained sand, trace phosphatic sands, loose to medium dense, dry to moist	
10	SS 5	3-7-11-10 (18)				
	SS 6	1-3-2 (5)				
15	SS 7	3-4-5 (9)				
	SS 8	3-4-5 (9)				17.5 / -3.8



Bottom of borehole at 17.5 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER SPT-4

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 5/1/17 **COMPLETED** 5/1/17 **GROUND ELEVATION** 28.02 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY DR **CHECKED BY** JB **HOLE COMPLETION** backfilled with cuttings and bentonite chips

NOTES Location: Behind downstream training wall. Piezometer installed adjacent to SPT location, installed through hollow stem auger

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	5-6-5-4 (11)	SP		brown, dark brown, fine-grained quartz SAND, very loose to medium dense, dry to moist	
	SS 2	3-3-3-5 (6)				
5	SS 3	3-3-2-3 (5)				
	SS 4	2-4-4-4 (8)				
	SS 5	2-1-2-2 (3)				
10						
	SS 6	1-1-2 (3)				
15						
	SS 7	3-2-4 (6)				
20						
	SS 8	5-9-9 (18)			light brown below 20 feet	
					silty lenses below 23.5 feet	
	SS 9	1-0-0 (0)				
25					25.0	3.0
	SS 10	3-3-3 (6)	SM		gray, greenish gray, SILTY AND, fine-grained sands, trace phosphatic sands, loose, moist	
	SS 11	3-2-3 (5)				
30					30.0	-2.0
	SS 12	3-3-7 (10)	SC		gray, greenish gray, CLAYEY SAND	
					32.5	-4.5

Bottom of borehole at 32.5 feet.

WELL DIAGRAM: grout; fine sand pack; sand pack; sceeen

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER SPT-5

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 5/3/17 **COMPLETED** 5/3/17 **GROUND ELEVATION** 24.08 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY ND **CHECKED BY** JB **HOLE COMPLETION** backfilled with cuttings and bentonite chips

NOTES Location: Behind downstream training wall. Piezometer installed adjacent to SPT location, installed through hollow stem auger

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
0	SS 1	4-4-4-3 (8)	SP		gray, light brown, fine-grained quartz SAND, silty, cemented silty nodules, dry, loose		
2.0						22.1	
	SS 2	3-2-2-2 (4)	SM		brown, dark brown, SILTY SAND, 2-inch brown clayey sand lense at about 5.5ft, moist, loose		
5	SS 3	2-2-3-2 (5)					
6.0						18.1	
	SS 4	2-2-2-3 (4)	SC		gray, light gray, CLAYEY SAND, orangish brown mottling, moist, loose		
8.0						16.1	
10	SS 5	2-2-2-2 (4)	SP-SM		gray, dark gray fine to medium graiined quartz SNAD with SILT, silt content increased with depth, moist, loose		grout
12.0						12.1	
	SS 6	1-1-3 (4)	SM		dark brown, SILTY SAND, cemented reddish brown silt nodules throughout, moist, loose to very loose		
15							
20	SS 7	1-0-0-0 (0)			gray, greenish gray below 18.5 feet		fine sand pack
20.5						3.6	
	SS 8	1-0-1-2 (1)	SC		greenish gray, CLAYEY SAND, trace phosphatic sands throughout, mosit to wet, very loose to loose		sand pack
25	SS 9	4-4-4 (8)					sceeen
	SS 10	2-3-4 (7)					
27.5						-3.4	

Bottom of borehole at 27.5 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER SPT-6

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 5/5/17 **COMPLETED** 5/5/17 **GROUND ELEVATION** 9.07 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

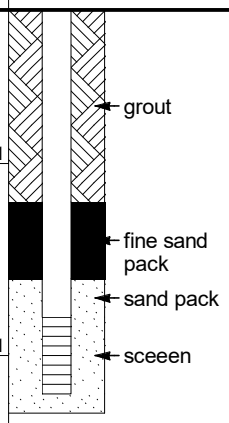
LOGGED BY CS **CHECKED BY** JB **HOLE COMPLETION** backfilled with cuttings and bentonite chips

NOTES Location: Near NW corner of downstream apron slab. Piezometer installed adjacent to SPT location, installed through hollow stem auger

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	SS 1	1-2-3-3 (5)	SP		brown, fine-grained quartz SAND, trace silts, loose, dry	
	SS 2	2-3-4-3 (7)				
						4.0 / 5.1
5	SS 3	2-4-3-3 (7)	SM		brown, gray, SILT SAND, fine-grained sands, trace clayey nodules, loose, to medium dense, dry to moist	
	SS 4	6-4-5-6 (9)				
	SS 5	5-7-9-7 (16)				9.0 / 0.1
10			SC		gray, greenish gray, CLAYEY SAND, fine-grained sands, loose to medium dense, moist	
	SS 6	4-5-5-6 (10)				12.0 / -2.9

Bottom of borehole at 12.0 feet.

WELL DIAGRAM



*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER SPT-7

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 5/9/17 **COMPLETED** 5/9/17 **GROUND ELEVATION** 50.98 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY CS **CHECKED BY** JB **HOLE COMPLETION** backfilled with cuttings and bentonite chips

NOTES Location: Along dam centerline in north approach slab. Piezometer installed adjacent to SPT location, installed through hollow stem auger

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
0					concrete bridge deck and grout		
						3.0 / 48.0	
5	SS 1	2-4-6-5 (10)	SM		dark brown, brown, light brown, gray, SILTY SAND, loose, fine-grained quartz, trace clayeys nodules		
	SS 2	2-4-4-4 (8)				7.0 / 44.0	
	SS 3	1-1-2-2 (3)	CL		light brown, greenish gray, gray, SANDY CLAY, very soft to very stiff, trace phosphatic sands throughout		
10	SS 4	1-1-3-2 (4)					
	SS 5	0-1-4-2 (5)					
15	SS 6	0-1-2-2 (3)					
20	SS 7	0-1-1 (2)					
							grout
25	SS 8	1-1-2 (3)					
30	SS 9	2-3-2 (5)					
35	SS 10	1-3-4 (7)					

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER SPT-7

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					Elevation	
					light brown, greenish gray, gray, SANDY CLAY, very soft to very stiff, trace phosphatic sands throughout *(continued)*	
40	SS 11	3-6-6 (12)				
45	SS 12	5-5-6 (11)				fine sand pack
50	SS 13	3-7-11 (18)	CL			sand pack
55	SS 14	4-5-7 (12)				sceeen
	SS 15	7-7-10 (17)				
60	SS 16	4-9-7 (16)				
	SS 17	4-5-14 (19)				
65	SS 18	4-7-12 (19)		65.0	-14.0	

Bottom of borehole at 65.0 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER SPT-8

wood.*

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 5/9/17 **COMPLETED** 5/9/17 **GROUND ELEVATION** 51.01 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY CS **CHECKED BY** JB **HOLE COMPLETION** backfilled with cuttings and bentonite chips

NOTES Location: Along dam centerline in north approach slab. Piezometer installed adjacent to SPT location, installed through hollow stem auger

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation	WELL DIAGRAM
0					concrete bridge deck and grout		
						3.0 / 48.0	
5	SS 1	1-1-1-1 (2)	SM		brown, gray, light brown, SILTY SAND, very loose, fine-grained quartz, clayey nodules		
	SS 2	1-0-0-1 (0)				7.0 / 44.0	
	SS 3	1-0-2-3 (2)	CL		light brown, gray, greenish gray, SANDY CLAY, soft to stiff, fine-grained quartz, trace phosphatic sands		
10	SS 4	1-3-4-4 (7)					
	SS 5	0-0-3-2 (3)					
15	SS 6	1-2-2-4 (4)					
20	SS 7	1-2-3 (5)					
							grout
25	SS 8	1-2-1 (3)					
30	SS 9	1-2-5 (7)					
35	SS 10	5-5-6 (11)					

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

WELL NUMBER SPT-8

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					Elevation	
					light brown, gray, greenish gray, SANDY CLAY, soft to stiff, fine-grained quartz, trace phosphatic sands *(continued)*	
40	SS 11	4-5-6 (11)				
45	SS 12	3-4-4 (8)				fine sand pack
						sand pack
50	SS 13	3-5-6 (11)	CL			
	SS 14	8-6-9 (15)				
55	SS 15	3-5-5 (10)				sceeen
	SS 16	3-4-6 (10)				
60	SS 17	4-4-5 (9)				
	SS 18	2-4-11 (15)				
65	SS 19	3-6-6 (12)		65.0	-14.0	

Bottom of borehole at 65.0 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

SPT Boring AFW Boring Locations 2017

BORING NUMBER SPT-9

wood.*

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 10/20/17 **COMPLETED** 10/23/17 **GROUND ELEVATION** 38 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY CS **CHECKED BY** AC **HOLE COMPLETION**

NOTES Location: North of ogee section behind north training wall near 2017 depression. SPT adjacent to training wall

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0						
	GB 1		SP-SM		brown, fine grain quartz SAND with Silt, loose, dry	
	GB 2				moist below 2 feet deep	
5	SS 3	3-3-4-5 (7)				
	SS 4	3-3-2-5 (5)				
					8.0	30.0
10	SS 5	4-4-3-4 (7)	SM		brown, SILTY SAND, loose, fine grain quartz, moist	
					10.0	28.0
	SS 6	5-8-10-8 (18)	SP-SM		brown, light brown, fine grain quartz SAND with Silt, medium dense	
					12.0	26.0
	SS 7	4-3-4-4 (7)	SM		brown, SILTY SAND, loose, fine grain quartz	
15	SS 8	2-2-6-4 (8)				
	SS 9	3-4-6-5 (10)				
					18.0	20.0
20	SS 10	3-2-2-2 (4)	SP-SM		brown, light brown, fine grain quartz SAND with Silt, very loose	
	SS 11	2-2-2-3 (4)				
					22.0	16.0
	SS 12	3-2-3-2 (5)	SM		brown, light brown, SILTY SAND, loose to very loose, fine grain quartz	
25	SS 13	1-0-0-1 (0)			darker material from 24'-26'	
					26.0	12.0
30					CONCRETE FOOTER	
35						

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

BORING NUMBER SPT-9

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35					CONCRETE FOOTER *(continued)*	
					37.0	1.0
	SS 14	4-4-4-4 (8)	SC		gray, CLAYEY SAND, loose to medium dense, fine grain quartz, with phosphatic sand and phosphatic sand nodules	
40	SS 15	2-3-4-4 (7)				
	SS 16	3-4-5-5 (9)				
	SS 17	3-3-5-6 (8)				
45	SS 18	5-5-7-8 (12)				
					47.0	-9.0

Bottom of borehole at 47.0 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

BORING NUMBER SPT-10

wood.*

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 10/9/17 **COMPLETED** 10/10/17 **GROUND ELEVATION** 30 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR Madrid Engineering Group **LOCATION**

DRILLING METHOD Standard Penetration / Mud Rotary **GROUND WATER LEVEL AT TIME OF DRILLING** ---

LOGGED BY CS **CHECKED BY** AC **HOLE COMPLETION**

NOTES Location: Behind north training wall near 2017 depression. SPT adjacent to training wall depression

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0	GB 1		SP-SM		light brown, brown, fine grain quartz SAND with Silt, medium dense to loose, dry	
	GB 2				moist beneath 2 feet	
5	SS 3	4-6-5-4 (11)				
	SS 4	3-2-4-4 (6)				
					8.0	22.0
10	SS 5	3-4-2-3 (6)	SM		dark brown Silty SAND, loose, fine grain quartz, moist	
					10.0	20.0
	SS 6	2-2-3-5 (5)	SP-SM		light brown, brown, fine to medium grain quartz SAND with Silt, loose to very loose	
	SS 7	3-3-4-3 (7)				
15	SS 8	1-1-1-1 (2)				
					16.0	14.0
	SS 9	0-1-2-2 (3)	SM		brown, dark brown, Silty SAND, very loose, fine grain quartz	
20	SS 10	1-1-2-1 (3)				
	SS 11	1-1-2-3 (3)			dark brown with shell fragments and angular pea-size gravel found below 20 feet	
	SS 12	1-1-2-50 (3)				
					24.0	6.0
25	SS				Concrete footer	
					28.0	2.0
	SS 13	7-4-6-5 (10)	SC		gray Clayey SAND, loose, fine grain quartz, with angular pea-size gravel and phosphatic sand	
30	SS 14	2-2-3-5 (5)				
	SS 15	2-2-4-6 (6)				
35	SS	2-2-3-5				

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*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

BORING NUMBER SPT-10

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
35						
	16	(5)	SC		gray Clayey SAND, loose, fine grain quartz, with angular pea-size gravel and phosphatic sand *(continued)*	
	SS 17	3-3-4-5 (7)			dark gray material with less angular gravel found below 36 feet	
				38.0		-8.0

Bottom of borehole at 38.0 feet.

*Note: This boring log were previously issued under the logo of our predecessor company 'Amec Foster Wheeler'.

Barge Work Borings AFW 2017

BORING NUMBER BH-01

amec foster wheeler

CLIENT Carollo
PROJECT NAME Lake Manatee Dam - Barge Work
PROJECT NUMBER 300472x4
PROJECT LOCATION Bradenton, FL
DATE STARTED 8/9/17 **COMPLETED** 8/9/17
GROUND ELEVATION 37 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR AmDrill, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
▽ **AT TIME OF DRILLING** 0.00 ft / Elev 37.00 ft
LOGGED BY CS **CHECKED BY** MC
AT END OF DRILLING ---
NOTES 19 ft of clear water
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0						▽ average water elevation 37 feet	
19.0							18.0
20	SS 1	0-4-4 (8)	6" WOH (19.0' - 19.5')	SP-SM		(SP-SM) brown to dark brown fine grained quartz SAND, loose to medium dense, slightly silty	
25	SS 2	4-7-8 (15)					
27.0							10.0
30	SS 3	9-6-4 (10)		SP		(SP) gray fine grained quartz SAND, loose	
32.0							5.0
35	SS 4	4-4-5 (9)	MC = 34% #200 = 33%	SC		(SC) light greenish gray to greenish gray fine grained quartz CLAYEY SAND, loose to medium dense, with variably calyey and fine to coarse phosphatic pebbles	
40	SS 5	4-3-5 (8)	MC = 30% #200 = 35%				

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BORING NUMBER BH-01

amec foster wheeler

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
40				SC		(SC) light greenish gray to greenish gray fine grained quartz CLAYEY SAND, loose to medium dense, with variably calyey and fine to coarse phosphatic pebbles *(continued)*	
45	SS 6	6-9-11 (20)					
						47.0	-10.0
50	SS 7	10-50	50 blows/ 6"	CL		(CL) light greenish gray to greenish gray SANDY CLAY, hard, with fine to coarse phosphatic pebbles	
55	SS 8	7-22-33 (55)					
						57.0	-20.0
60	SS 9	31-50/4"	50 blows/ 4"	SP-SM		(SP-SM) light greenish fine grained quartz SAND, very dense, with slightly silty and fine to coarse phosphatic pebbles	
65	SS 10	50	50 blows/ 6"				
						67.0	-30.0
70	SS 11	13-27-50/5"	50 blows/ 5"	ML		(ML) light greenish SANDY SILT, hard, with coarse phosphatic pebbles	
						72.0	-35.0
	SS 12	11-32-50/4"	50 blows/ 4"	SP-SM		(SP-SM) light greenish fine grained quartz SAND, very dense, slightly silty and with fine phosphatic pebbles	
						74.8	-37.8
						Bottom of borehole at 74.8 feet.	

BORING NUMBER BH-02

amec foster wheeler

CLIENT Carollo
PROJECT NAME Lake Manatee Dam - Barge Work
PROJECT NUMBER 300472x4
PROJECT LOCATION Bradenton, FL
DATE STARTED 8/10/17 **COMPLETED** 8/10/17
GROUND ELEVATION 37 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR AmDrill, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
▽ **AT TIME OF DRILLING** 0.00 ft / Elev 37.00 ft
LOGGED BY CS **CHECKED BY** MC
AT END OF DRILLING ---
NOTES 19 ft of clear water
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0						▽ average water elevation 37 feet	
5							
10							
15							
							19.0 / 18.0
20	SS 1	0-0-0 (0)	18" WOH (19.0' - 20.5')	SM		(SM) dark brown fine grained quartz SILTY SAND, very loose, with variably silty	22.0 / 15.0
25	SS 2	14-10-6 (16)		SP		(SP) brown to dark brown fine grained quartz SAND, loose to medium dense	32.0 / 5.0
30	SS 3	4-4-4 (8)					
35	SS 4	4-4-6 (10)		SC		(SC) light greenish gray fine grained quartz CLAYEY SAND, loose, with variably clayey and fine phosphate pebbles	
40	SS 5	3-4-5 (9)					

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BORING NUMBER BH-02

amec foster wheeler

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
40				SC		(SC) light greenish gray fine grained quartz CLAYEY SAND, loose, with variably clayey and fine phosphate pebbles *(continued)*	
						42.0	-5.0
						(CL) light greenish gray SANDY CLAY, stiff to very stiff, with fine to coarse phosphate pebbles	
45	SS 6	7-4-5 (9)					
50	SS 7	4-5-8 (13)		CL			
55	SS 8	9-9-11 (20)					
						57.0	-20.0
						(SP) black fine grained quartz SAND, very dense, with fine phosphate pebbles	
60	SS 9	9-30-31 (61)		SP			
						62.0	-25.0
						(SM) light greenish gray SILTY SAND, very dense, with fine phosphate pebbles	
65	SS 10	7-50/5"	MC = 30% #200 = 48% 50 blows/ 5"				
				SM			
70	SS 11	8-8-16 (24)					
						73.6	-36.6
	SS 12	50/1"	50 blows/ 1"			No Recovery	
						Bottom of borehole at 73.6 feet.	

BORING NUMBER BH-03

amec foster wheeler

CLIENT Carollo
PROJECT NAME Lake Manatee Dam - Barge Work
PROJECT NUMBER 300472x4
PROJECT LOCATION Bradenton, FL
DATE STARTED 8/10/17 **COMPLETED** 8/10/17
GROUND ELEVATION 37 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR AmDrill, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
▽ **AT TIME OF DRILLING** 0.00 ft / Elev 37.00 ft
LOGGED BY CS **CHECKED BY** MC
AT END OF DRILLING ---
NOTES 24 ft of clear water
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0						▽ average water elevation 37 feet	
24.0							13.0
25	SS 1	0-0-1 (1)	12" WOH (24.0' - 25.0')	SP-SM		(SP-SM) light brown, tan, fine grained quartz SAND, very loose, slightly silty	
30	SS 2	1-1-1 (2)					
32.0							5.0
35	SS 3	4-1-0 (1)	6" WOH (34.5' - 35.0')	SP		(SP) light brown fine grained quartz SAND, very loose, with coarse phosphate pebbles	
37.0							0.0
40	SS 4	6-7-8 (15)	MC = 39% #200 = 40%	SC		(SC) light greenish gray fine grained quartz CLAYEY SAND, medium dense, variably clayey, with fine phosphate pebbles	

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BORING NUMBER BH-03

amec foster wheeler

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
40						(SC) light greenish gray fine grained quartz CLAYEY SAND, medium dense, variably clayey, with fine phosphate pebbles *(continued)*	
45	SS 5	4-6-7 (13)		SC			
						47.0	-10.0
						(CL) light greenish gray SANDY CLAY, very stiff, with fine phosphate pebbles	
50	SS 6	8-7-9 (16)		CL			
						52.0	-15.0
						(ML) light greenish gray SANDY SILT, hard, with fine phosphate pebbles	
55	SS 7	14-19-16 (35)		ML			
						57.0	-20.0
						(SM) light greenish gray to greenish gray fine grained quartz SILTY SAND, dense to very dense, with fine phosphate pebbles	
60	SS 8	15-14-16 (30)					
65	SS 9	14-16-27 (43)		SM			
70	SS 10	36-50/4"	MC = 32% #200 = 31% 50 blows/ 4"				
						73.6	-36.6
	SS 11	50/1"	50 blows/ 1"			No Recovery	
						Bottom of borehole at 73.6 feet.	

BORING NUMBER BH-04

amec foster wheeler

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DATE STARTED 8/11/17 **COMPLETED** 8/11/17 **GROUND ELEVATION** 37 ft **HOLE SIZE** 4 inches

DRILLING CONTRACTOR AmDrill, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD Standard Penetration / Mud Rotary ▽ **AT TIME OF DRILLING** 0.00 ft / Elev 37.00 ft

LOGGED BY CS **CHECKED BY** MC **AT END OF DRILLING** ---

NOTES 5 ft of clear water **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0						▽ average water elevation 37 feet	
5							5.0 / 32.0
	SS 1	3-5-7 (12)		SP-SM		(SP-SM) dark brown fine grained quartz SAND, medium dense, with slightly silty	
10	SS 2	5-9-12 (21)					
15	SS 3	8-12-17 (29)					
20	SS 4	8-14-21 (35)					22.0 / 15.0
25	SS 5	4-9-21 (30)		SM		(SM) dark brown fine grained quartz SILTY SAND, dense, with fine phosphate pebbles	27.0 / 10.0
30	SS 6	2-2-11 (13)	MC = 31% #200 = 44%	SC		(SC) light greenish gray fine grained quartz CLAYEY SAND, medium dense to loose, with coarse phosphate pebbles	
35	SS 7	3-3-3 (6)					
40	SS 8	3-3-4 (7)					

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BORING NUMBER BH-04

amec foster wheeler

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
40				SC		(SC) light greenish gray fine grained quartz CLAYEY SAND, medium dense to loose, with coarse phosphate pebbles *(continued)*	
						42.0	-5.0
				CL		(CL) light greenish gray SANDY CLAY, stiff to very stiff, with fine to coarse phosphate pebbles	
45	SS 9	3-4-5 (9)					
50	SS 10	4-7-10 (17)					
						52.0	-15.0
				SP-SM		(SP-SM) dark gray fine grained quartz SAND, medium dense, with slightly silty	
55	SS 11	8-18-12 (30)					
						57.0	-20.0
				ML		(ML) light greenish gray SANDY SILT, hard	
60	SS 12	22-50/3"	50 blows/ 3"				
						62.0	-25.0
				SP-SM		(SP-SM) dark gray and black fine grained quartz SAND, very dense, with slightly silty and fine phosphate pebbles	
65	SS 13	7-6-11 (17)					
70	SS 14	50/2"	50 blows/ 2"			No Recovery	
	SS 15	50/1"	50 blows/ 1"			73.6 No Recovery	-36.6
						Bottom of borehole at 73.6 feet.	

BORING NUMBER BH-05

amec foster wheeler

CLIENT Carollo
PROJECT NAME Lake Manatee Dam - Barge Work
PROJECT NUMBER 300472x4
PROJECT LOCATION Bradenton, FL
DATE STARTED 8/14/17 **COMPLETED** 8/14/17
GROUND ELEVATION 37 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR AmDrill, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
▽ **AT TIME OF DRILLING** 0.00 ft / Elev 37.00 ft
LOGGED BY CS **CHECKED BY** MC
AT END OF DRILLING ---
NOTES 4 ft of clear water
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0						▽ average water elevation 37 feet	
5							
							8.5
10	SS 1	3-6-10 (16)		SP-SM		(SP-SM) dark brown fine grained quartz SAND with silt, medium dense to dense	28.5
15	SS 2	9-14-22 (36)					
							17.0
20	SS 3	5-11-15 (26)		SC		(SC) light gray and brown fine grained quartz CLAYEY SAND, medium dense	20.0
							22.0
25	SS 4	8-25-50 (75)	50 blows/ 6"	SM		(SM) dark brown fine grained quartz SILTY SAND, very dense, variably silty	15.0
							27.0
30	SS 5	5-3-6 (9)		SC		(SC) light greenish gray fine grained quartz CLAYEY SAND, loose to medium dense, variably clayey	10.0
35	SS 6	3-3-4 (7)					
40	SS 7	3-4-4 (8)	MC = 29% #200 = 26%				

(Continued Next Page)

BORING NUMBER BH-05

amec foster wheeler

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
40						(SC) light greenish gray fine grained quartz CLAYEY SAND, loose to medium dense, variably clayey *(continued)*	
45	ST 8		Full Recovery	SC		shelby tube pushed	
						fine phosphate pebbles below 47 feet	
50	SS 9	5-7-10 (17)					
						52.0	-15.0
						(CL) light greenish gray SANDY CLAY, stiff, with fine phosphate pebbles	
55	SS 10	4-6-7 (13)		CL			
						57.0	-20.0
						(SP-SM) greenish gray fine grained quartz SAND, very dense, slightly silty with fine phosphate pebbles	
60	SS 11	4-11-16/0"					
65	ST 12		No Recovery	SP-SM		shelby tube pushed	
70	SS 13	50/3"	50 blows/ 5"			No Recovery	
						73.6	-36.6
	SS 14	50/1"	50 blows/ 1"			No Recovery	
						Bottom of borehole at 73.6 feet.	

BORING NUMBER BH-06

amec foster wheeler

CLIENT Carollo
PROJECT NAME Lake Manatee Dam - Barge Work
PROJECT NUMBER 300472x4
PROJECT LOCATION Bradenton, FL
DATE STARTED 8/15/17 **COMPLETED** 8/15/17
GROUND ELEVATION 37 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR AmDrill, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY CS **CHECKED BY** MC
AT END OF DRILLING ---
NOTES 23.5 ft of clear water
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0						average water elevation 37 feet	
23.5							13.5
25	SS 1	0-0-0-0 (0)	30" WOH (23.5' - 25.5')			Residual of Jet Grout Material	
30	SS 2	3-2-1 (3)					
30.0							7.0
35	SS 3	3-3-3 (6)		SC		(SC) light greenish gray fine grained quartz CLAYEY SAND, loose, with variably calyey and fine phosphatic pebbles	
40	SS 4	3-3-4 (7)	MC = 27% #200 = 24%				

(Continued Next Page)

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
40				SC		(SC) light greenish gray fine grained quartz CLAYEY SAND, loose, with variably calyey and fine phosphatic pebbles *(continued)*	
45	ST 5		Full Recovery			shelby tube pushed	
						47.0	-10.0
50	SS 6	9-7-8 (15)	MC = 55% #200 = 51%	CL		(CL) light greenish gray SANDY CLAY, stiff, with fine phosphate pebbles	
						52.0	-15.0
55	SS 7	5-5-9 (14)		CH		(CH) light greenish gray Fat CLAY, stiff to hard, with variably clayey and fine phosphate pebbles	
60	SS 8	30-50/3"	50 blows/ 3"				
						62.0	-25.0
65	SS 9	8-24-50/3"	MC = 17% #200 = 15% 50 blows/ 3"	SM		(SM) light greenish gray and light brown fine grained quartz SLITY SAND, very dense, with slightly silty	
70	SS 10	50/2"	50 blows/ 2"				
75	SS 11	50	MC = 23% #200 = 25% 50 blows/ 6"				
80	SS 12	4-24-50/2"	MC = 25% #200 = 76%				

(Continued Next Page)

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
80			50 blows/ 2"	SM		(SM) light greenish gray and light brown fine grained quartz SLITY SAND, very dense, with slightly silty *(continued)*	
85	SS 13	50/2"	MC = 25% LL = 39 PL = 23 #200 = 76% 50 blows/ 2"				
							87.0 -50.0
90	SS 14	7-7-10 (17)		CL		(CL) light greenish gray and light brown SANDY CLAY, very stiff to hard, with fine phosphate pebbles	
95	SS 15	10-25-23 (48)					
							97.0 -60.0
100	SS 16	8-11-15 (26)		SC		(SC) greenish gray SILTY SAND, medium dense, variably silty and with fine phosphate pebbles	
105	SS 17	8-8-8 (16)	MC = 38% #200 = 35%				
110	SS 18	11-10-15 (25)					
							112.0 -75.0
115	SS 19	50/3"	50 blows/ 3"	CH		(CH) greenish gray SANDY CLAY, very stiff to hard, with fine phosphate pebbles	
120	SS 20	10-12-12 (24)	MC = 71% #200 = 86%				

(Continued Next Page)

BORING NUMBER BH-06

amec foster wheeler

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
120						Elevation
				CH		(CH) greenish gray SANDY CLAY, very stiff to hard, with fine phosphate pebbles *(continued)*
125	SS 21	12-19-28 (47)	MC = 41% LL = 63 PL = 30 #200 = 60%			
130	SS 22	12-10-18 (28)	MC = 41% #200 = 60%			
135	SS 23	12-12-17 (29)	MC = 60% LL = 128 PL = 43 #200 = 86%			
140	SS 24	8-8-12 (20)				
						142.0 -105.0
145	SS 25	18-16-19 (35)		CL		(CL) greenish gray SANDY CLAY, very stiff to hard
150	SS 26	8-11-14 (25)				
155	SS 27	6-9-14 (23)				
160	SS 28	8-12-18 (30)				160.0 -123.0
						Bottom of borehole at 160.0 feet.

BORING NUMBER BH-07

amec foster wheeler

CLIENT Carollo
PROJECT NAME Lake Manatee Dam - Barge Work
PROJECT NUMBER 300472x4
PROJECT LOCATION Bradenton, FL
DATE STARTED 8/16/17 **COMPLETED** 8/17/17
GROUND ELEVATION 37 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR AmDrill, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration / Mud Rotary
AT TIME OF DRILLING ---
LOGGED BY CS **CHECKED BY** MC
AT END OF DRILLING ---
NOTES 23.5 ft of clear water
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
0						average water elevation 37 feet	
23.5							13.5
25	SS 1	1-0-0 (0)	12" WOH (24.0' - 25.0')			Residual of Jet Grout Material	
27.0							10.0
30	SS 2	1-3-5 (8)		ML		(ML) greenish gray SANDY SILT, firm	
35	SS 3	3-3-3 (6)					
37.0							0.0
40	SS 4	8-4-4 (8)		SC		(SC) light greenish gray CLAYEY SAND, loose, with variably clayey and fine phosphate pebbles	

(Continued Next Page)

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
40						(SC) light greenish gray CLAYEY SAND, loose, with variably clayey and fine phosphate pebbles *(continued)*	
45	SS 5		Full Recovery	SC		shelby tube pushed	
						47.0	-10.0
50	SS 6	8-8-17 (25)		CL		(CL) light greenish gray SANDY CLAY, very stiff, with fine to coarse phosphatic pebbles	
						52.0	-15.0
55	SS 7	18-15-20 (35)	MC = 67% LL = 55 PL = 20 #200 = 71%	CH		(CH) light greenish gray Fat CLAY with Sand, hard, with fine to coarse phosphatic pebbles	
						57.0	-20.0
60	SS 8	50/2"	50 blows/ 2"	SC		(SC) light greenish gray fine grained quartz CLAYEY SAND, with variably clayey and fine phosphate pebbles, dolomitic silt layering	
						62.0	-25.0
65	SS 9	16-50/5"	50 blows/ 5"	SP-SM		(SP-SM) light greenish gray fine grained quartz SAND, very dense, with slightly silty and fine phosphate pebbles	
						67.0	-30.0
70	SS 10	50/5"	50 blows/ 5"	SM		(SM) light greenish gray fine grained quartz SILTY SAND, very dense, with variably clayey and fine phosphate pebbles, cemented fragments	
75	SS 11	50/3"	50 blows/ 3"				
						77.0	-40.0
80	SS 12	29-50/2"	50 blows/ 2"	SM		(SM) greenish gray SILTY SAND, very dense, with fine phosphate pebbles	

(Continued Next Page)

CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
80						(SM) greenish gray SILTY SAND, very dense, with fine phosphate pebbles *(continued)*	
85	SS 13	27-50/4"	MC = 31% #200 = 40% 50 blows/ 4"				
90	SS 14	7-17-40 (57)		SM			
95	SS 15	8-21-22 (43)					
						97.0	-60.0
100	SS 16	8-12-16 (28)	MC = 82% LL = 112 PL = 68 #200 = 95%	MH		(MH) greenish gray SANDY SILT, very stiff, with fine phosphate pebbles	
						102.0	-65.0
105	SS 17	5-6-7 (13)	MC = 40% #200 = 57%			(MH) greenish gray SANDY CLAY, stiff to hard, with fine phosphate pebbles	
110	SS 18	15-28-31 (59)	MC = 41% #200 = 53%	MH			
115	SS 19	32-27-31 (58)	MC = 47% LL = 102 PL = 42 #200 = 95%				
						118.0	-81.0
120	SS 20	12-13-14 (27)	MC = 31% #200 = 48%	SC		(SC) greenish gray fine grained quartz CLAYEY SAND, medium dense, with fine phosphate pebbles	

(Continued Next Page)

BORING NUMBER BH-07

amec foster wheeler

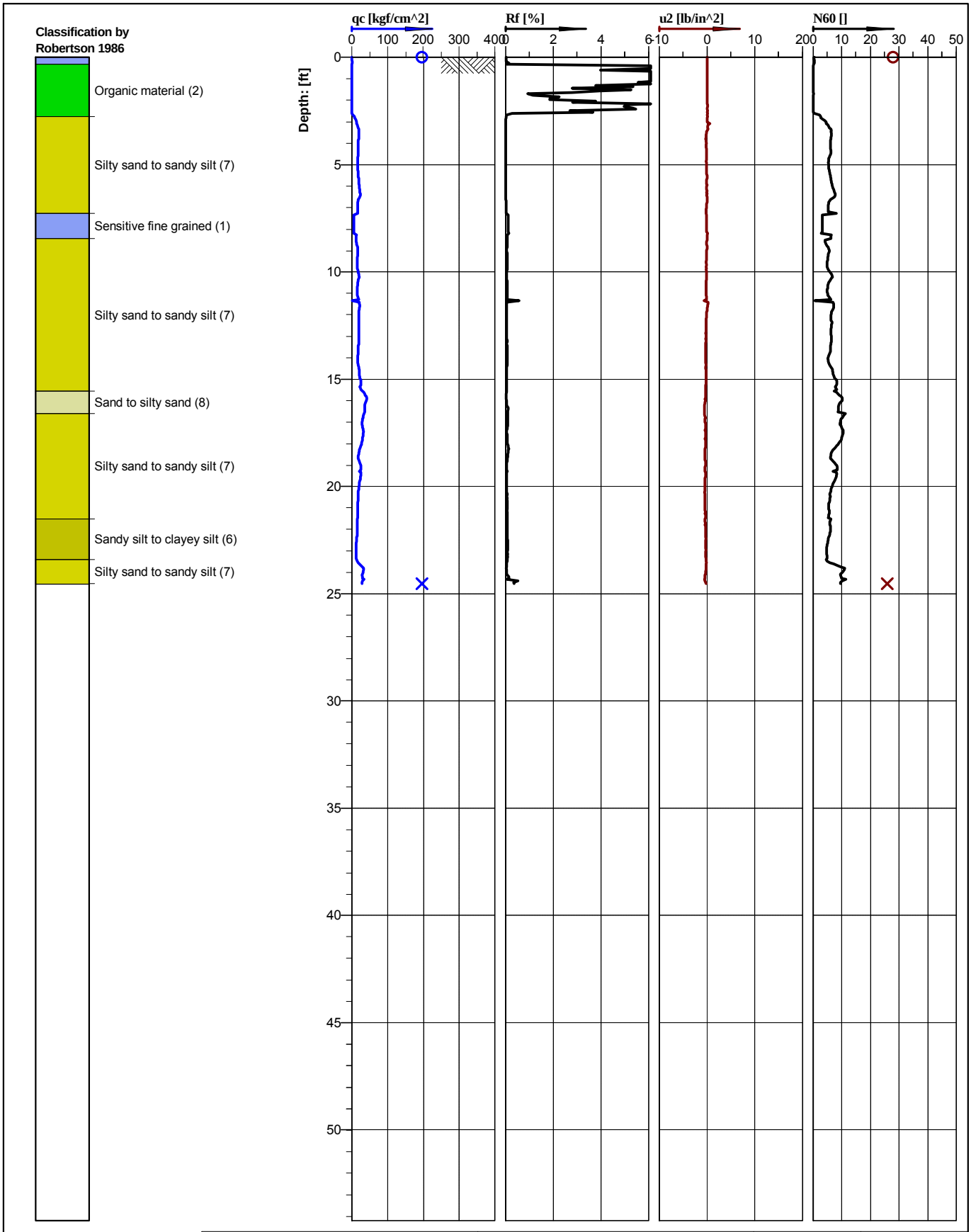
CLIENT Carollo **PROJECT NAME** Lake Manatee Dam - Barge Work

PROJECT NUMBER 300472x4 **PROJECT LOCATION** Bradenton, FL

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Elevation
120				SC		(SC) greenish gray fine grained quartz CLAYEY SAND, medium dense, with fine phosphate pebbles *(continued)*	
						122.0	-85.0
				CH		(CH) greenish gray SANDY CLAY, hard to very stiff, with fine phosphate pebbles	
125	SS 21	17-20-32 (52)					
130	SS 22	12-11-47 (58)					
135	SS 23	9-10-16 (26)					
						137.0	-100.0
140	SS 24	9-13-18 (31)		MH		(MH) greenish gray Elastic SILT, hard	
145	SS 25	10-16-15 (31)	MC = 90% LL = 114 PL = 67 #200 = 95%				
150	SS 26	9-12-16 (28)	MC = 83% #200 = 96%				
155	SS 27	11-14-16 (30)					
160	SS 28	17-19-18 (37)					
						160.0	-123.0

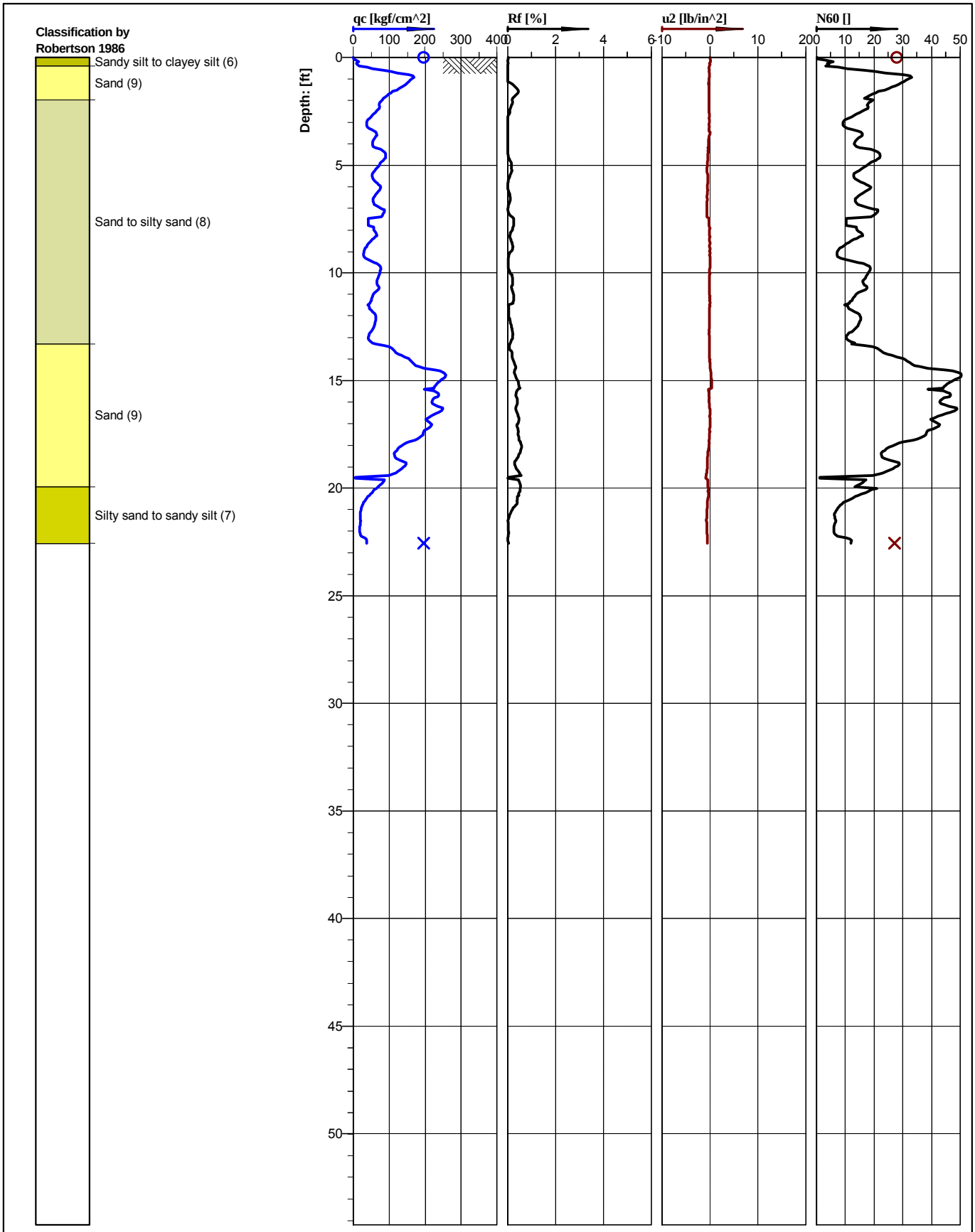
Bottom of borehole at 160.0 feet.

CPT Soundings 2017



Location: CPT-1	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 24.5 feet.		File: CPT-1C.cpt	

DPS
DIRECT PUSH SERVICES, LLC



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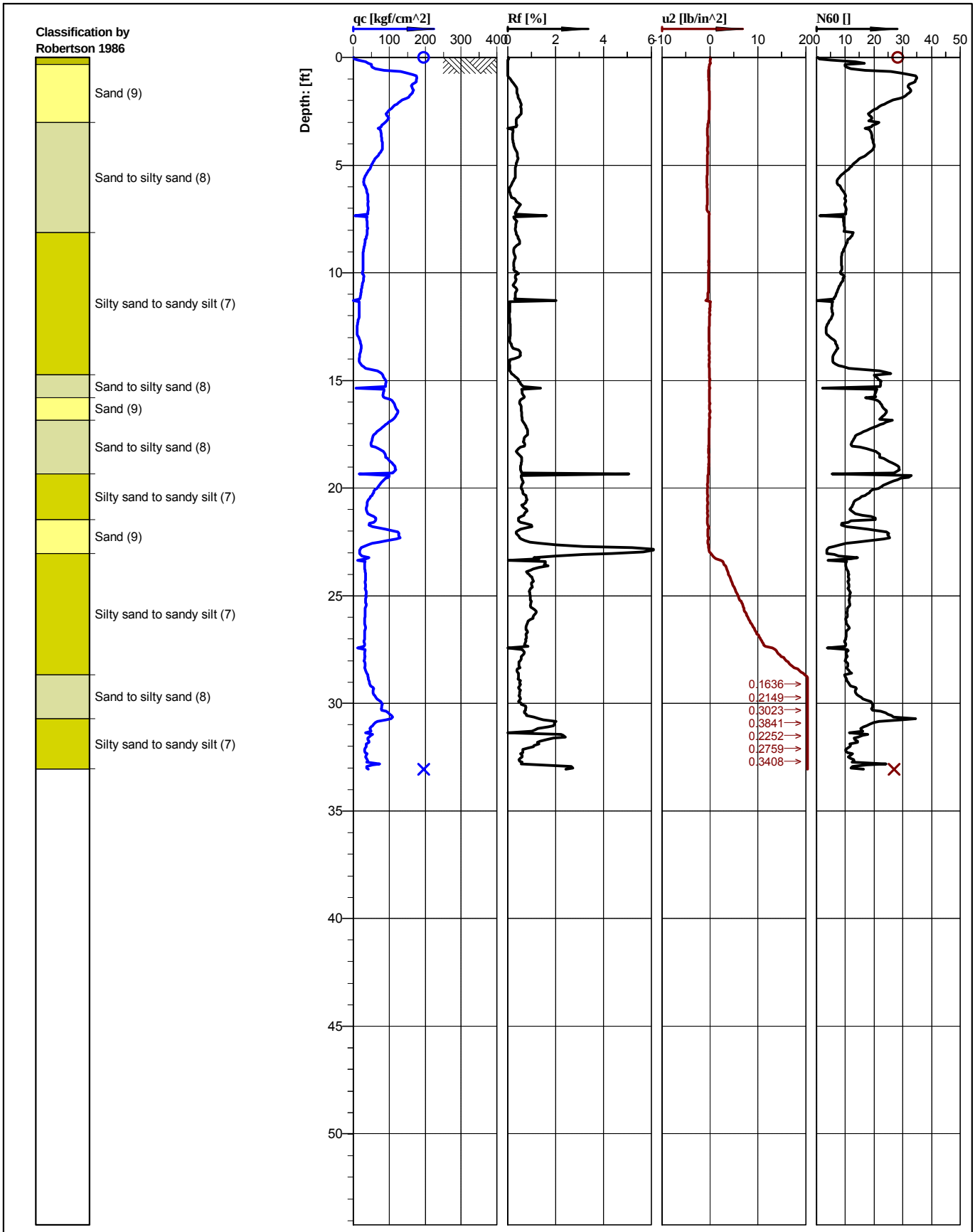
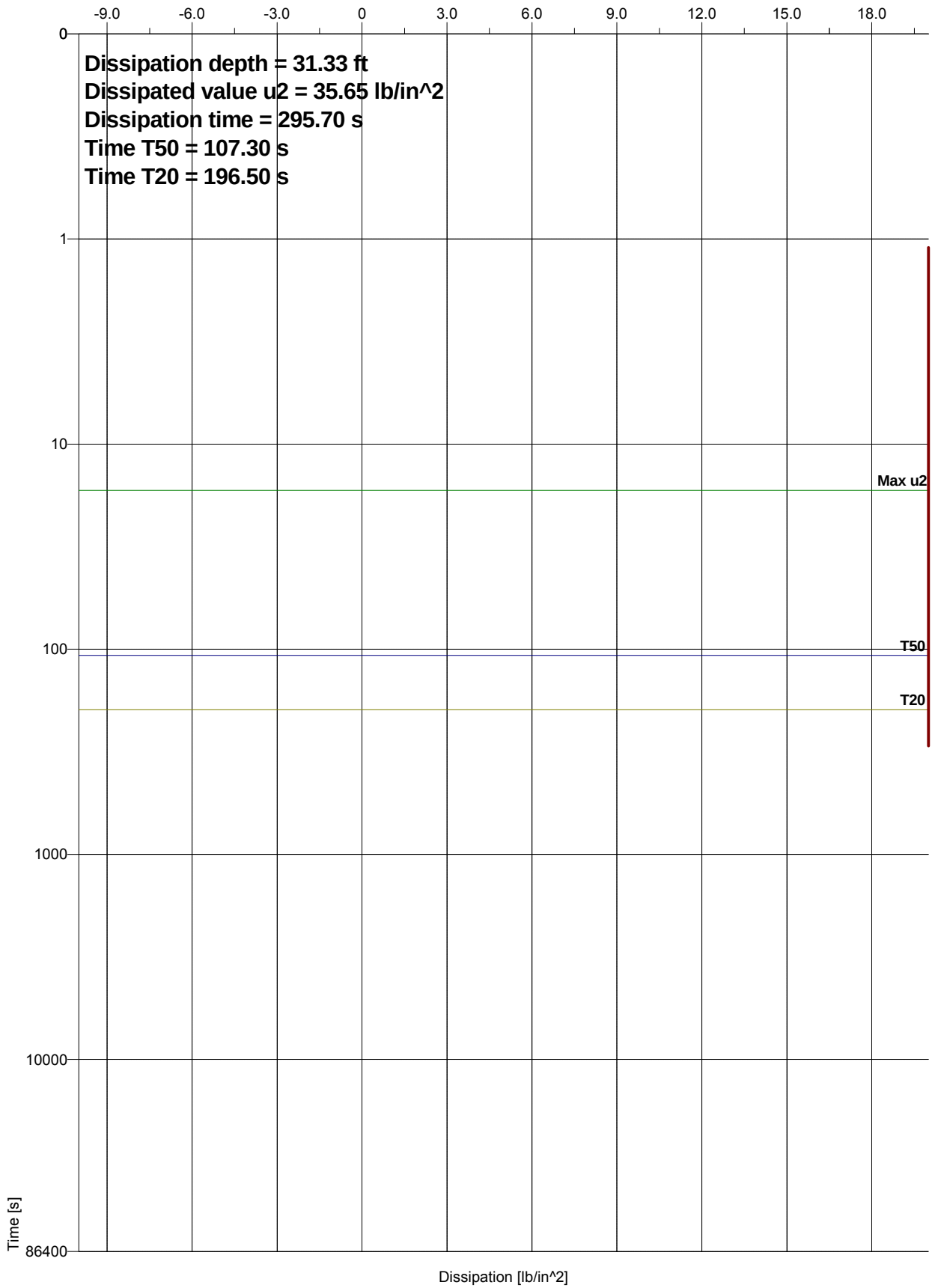
DIRECT PUSH SERVICES, LLC

Location: CPT-2	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 22.5 feet.		File: CPT-2.cpt	



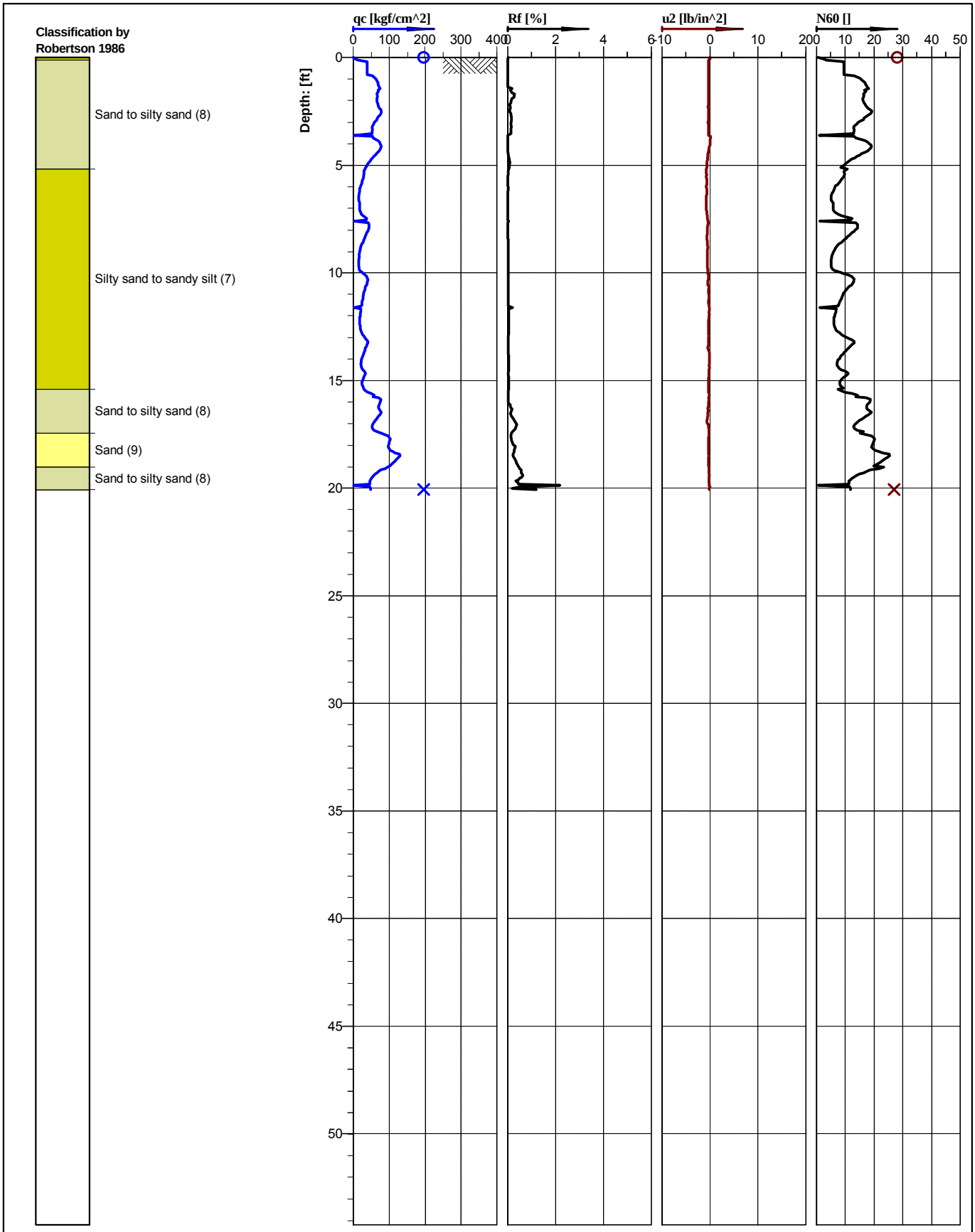
Location: CPT-3	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 33 feet.		File: CPT-3.cpt	

DPS
DIRECT PUSH SERVICES, LLC



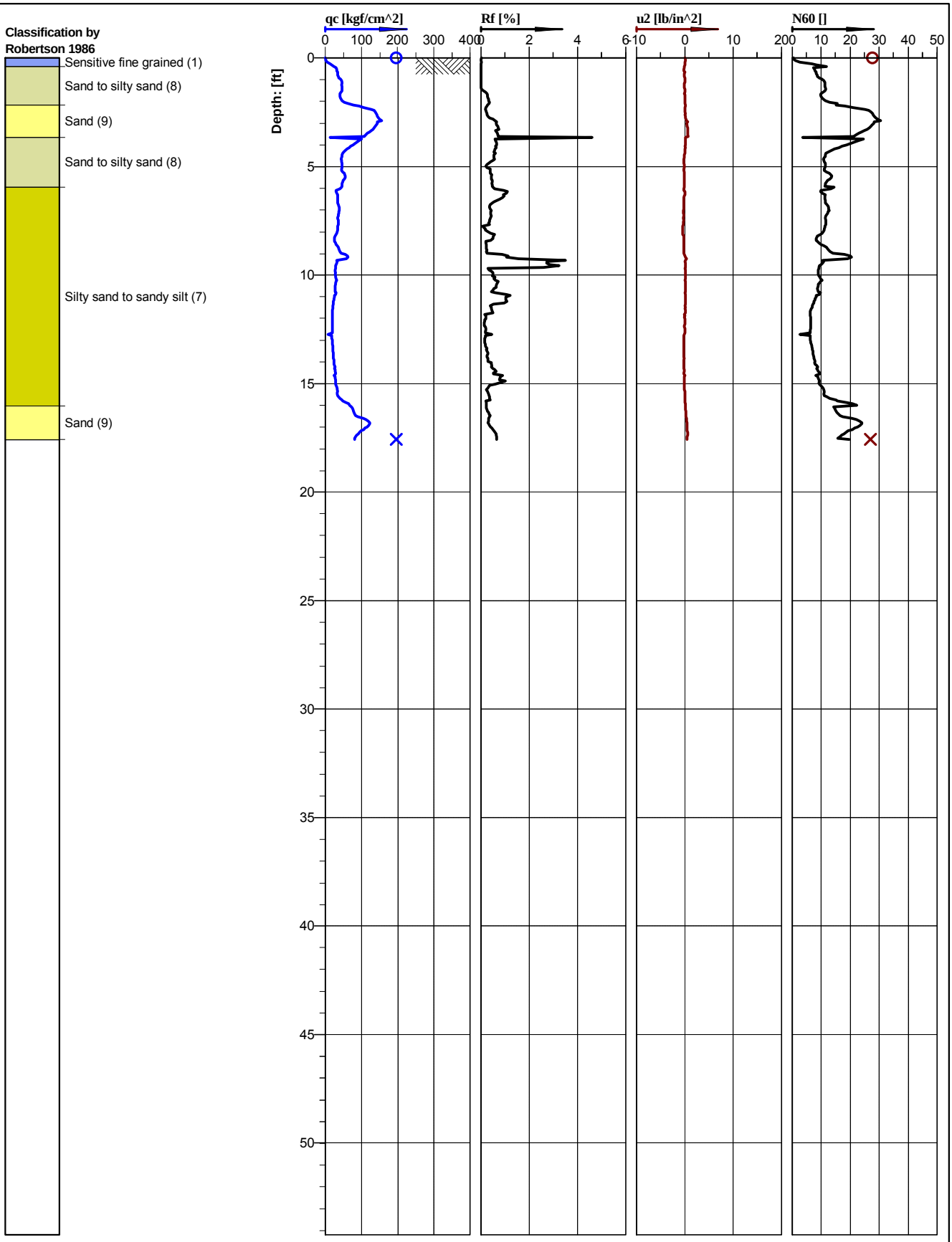
Location: CPT-3	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 33 feet.		File: CPT-3.cpt	

DIRECT PUSH SERVICES, LLC



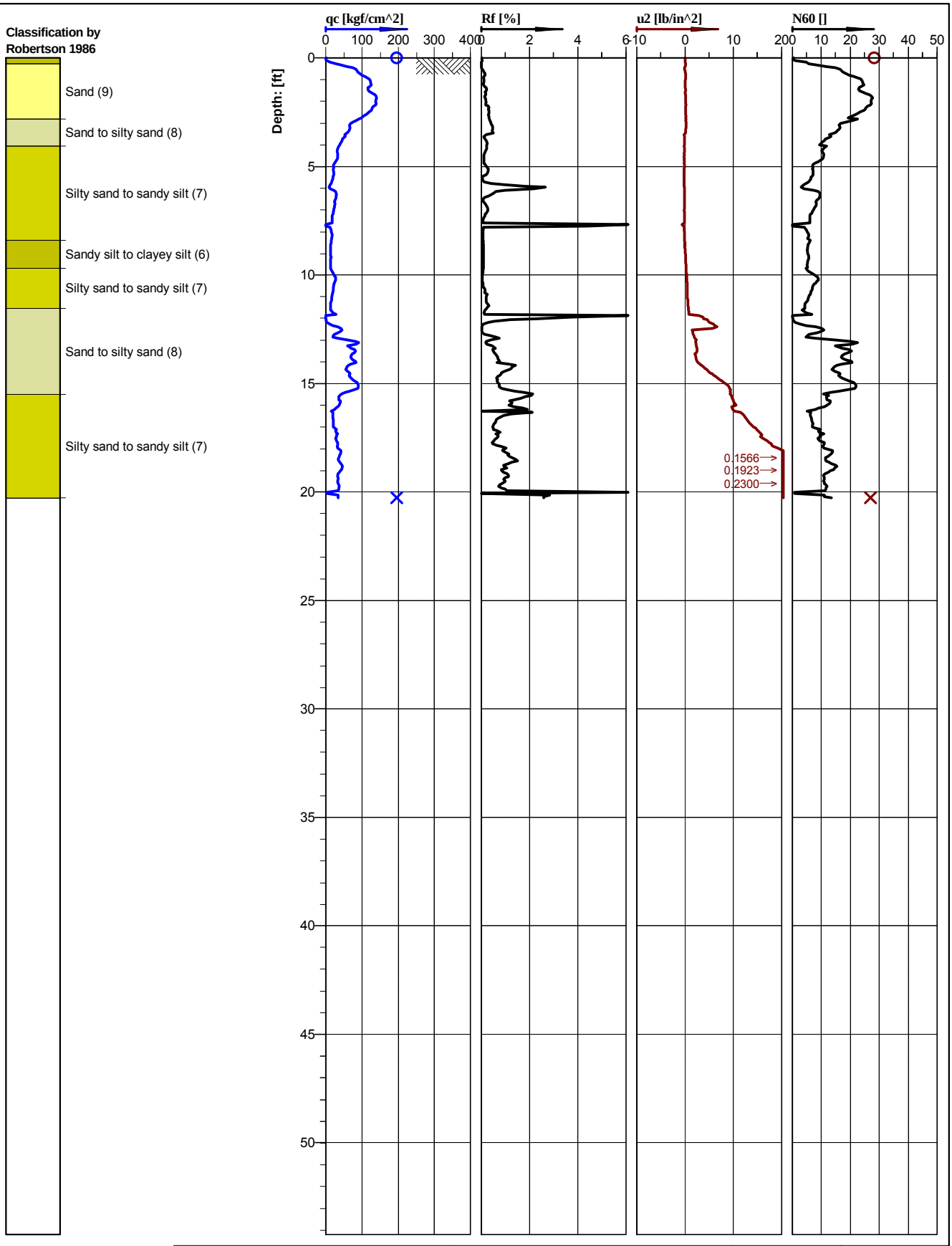
Location: CPT-4	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 20 feet.		File: CPT-4.cpt	

DPS
DIRECT PUSH SERVICES, LLC



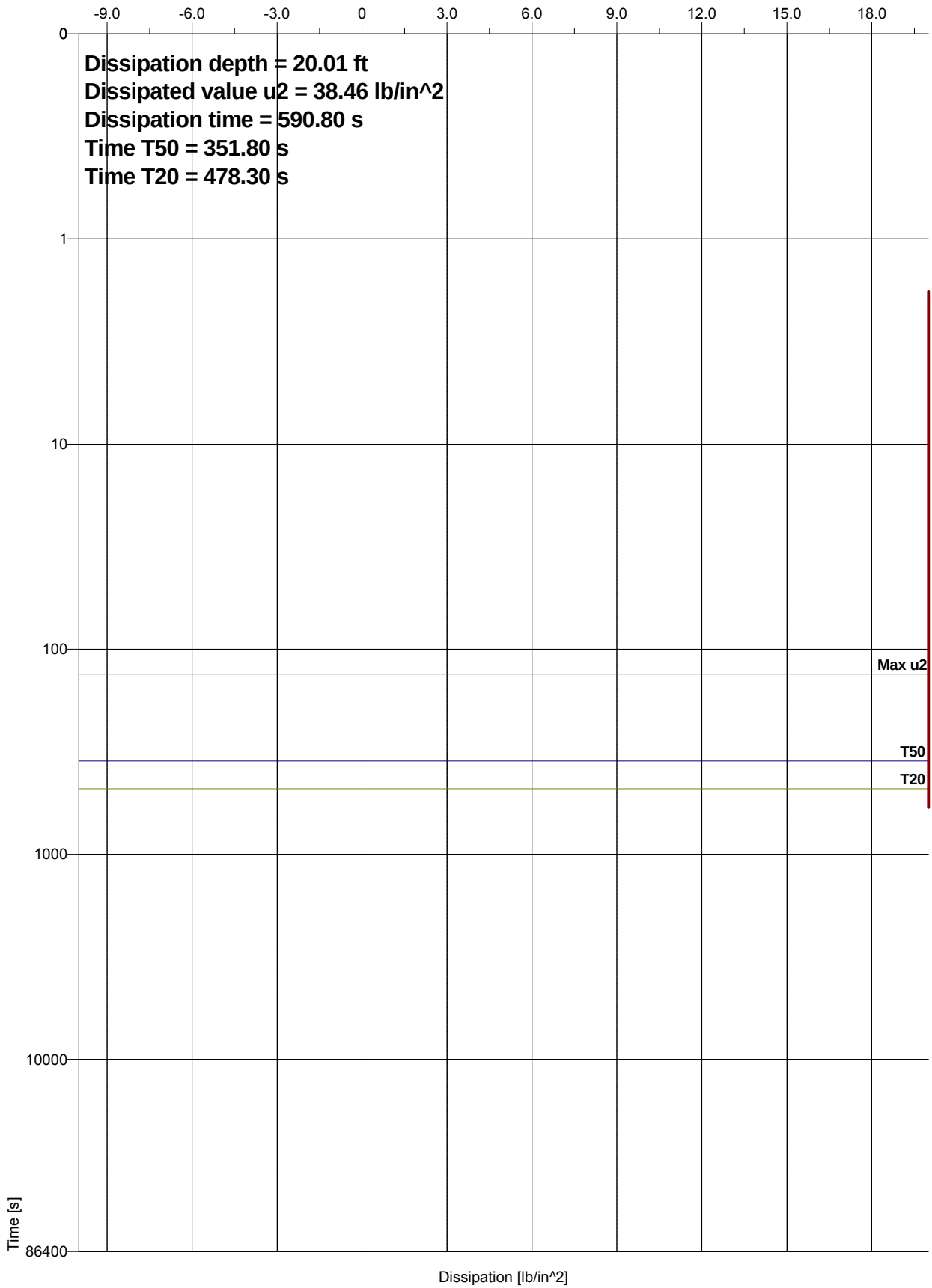
Location: CPT-5	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 17.5 feet.		File: CPT-5.cpt	

DPS
DIRECT PUSH SERVICES, LLC



Location: CPT-6	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 20 feet.		File: CPT-6.cpt	

DPS
DIRECT PUSH SERVICES, LLC



Location: CPT-6	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 20 feet.		File: CPT-6.cpt	

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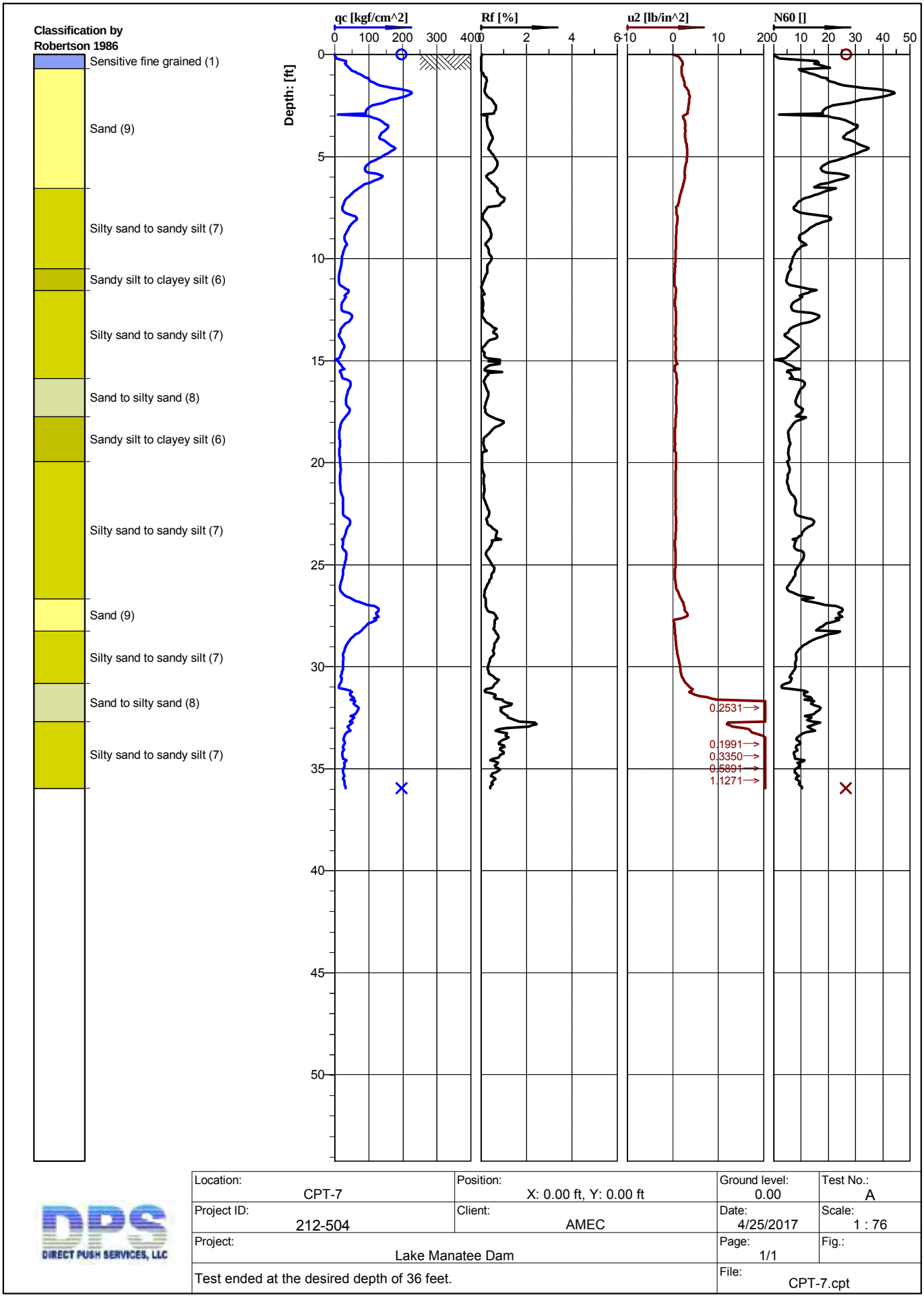

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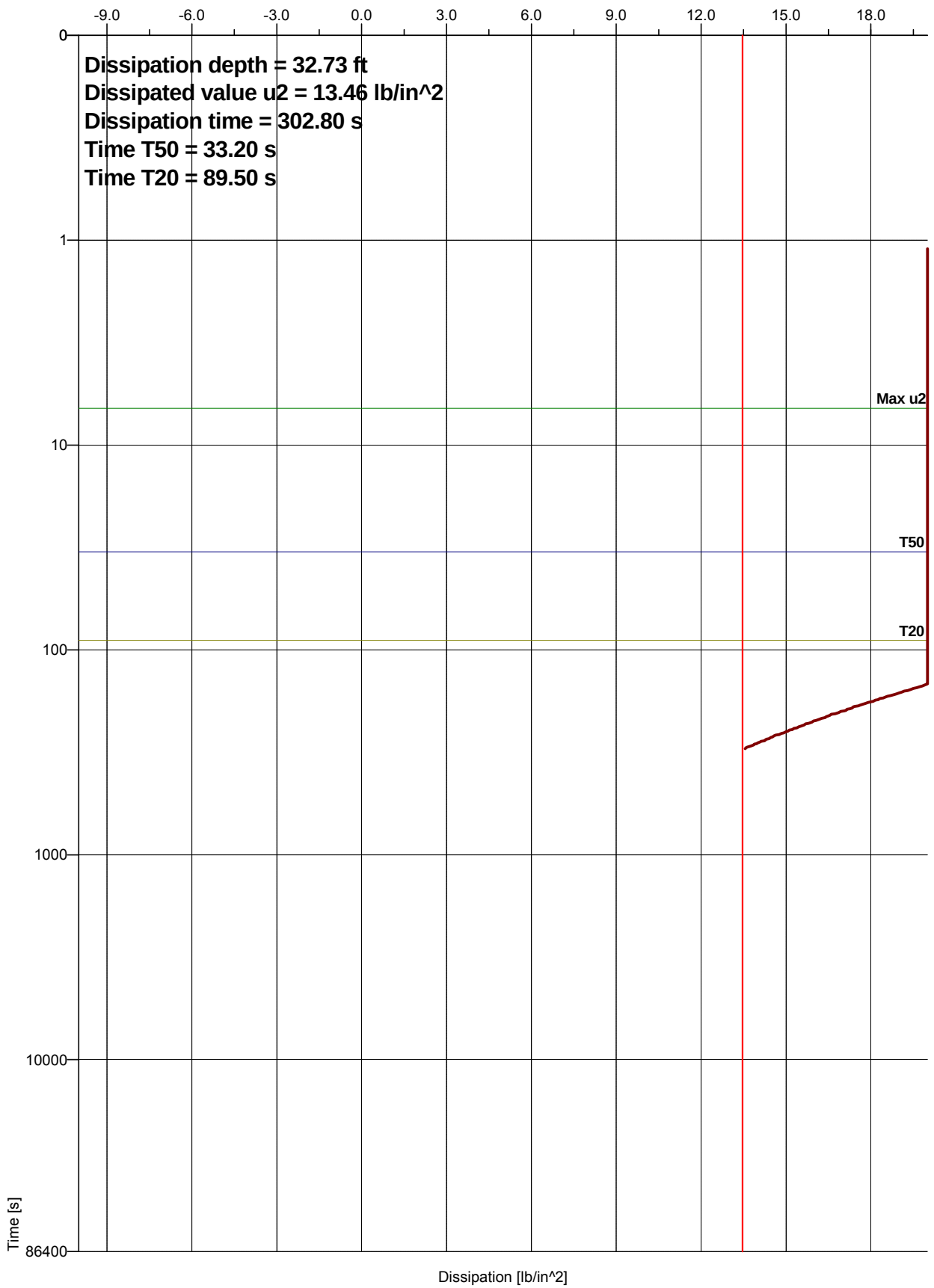
Location: CPT-7	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/25/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 36 feet.		File: CPT-7.cpt	



Location: CPT-7	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/25/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 36 feet.		File: CPT-7.cpt	

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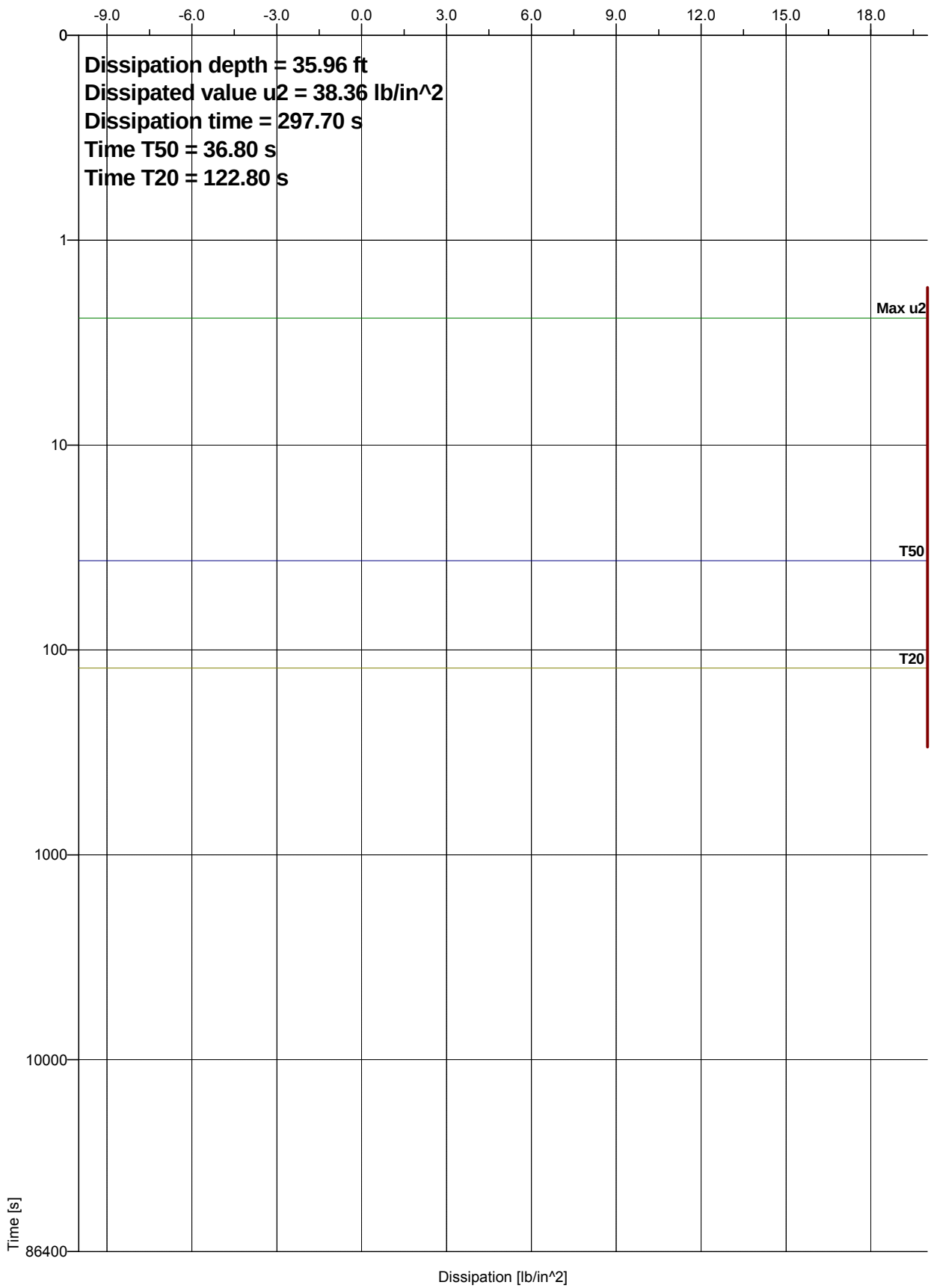
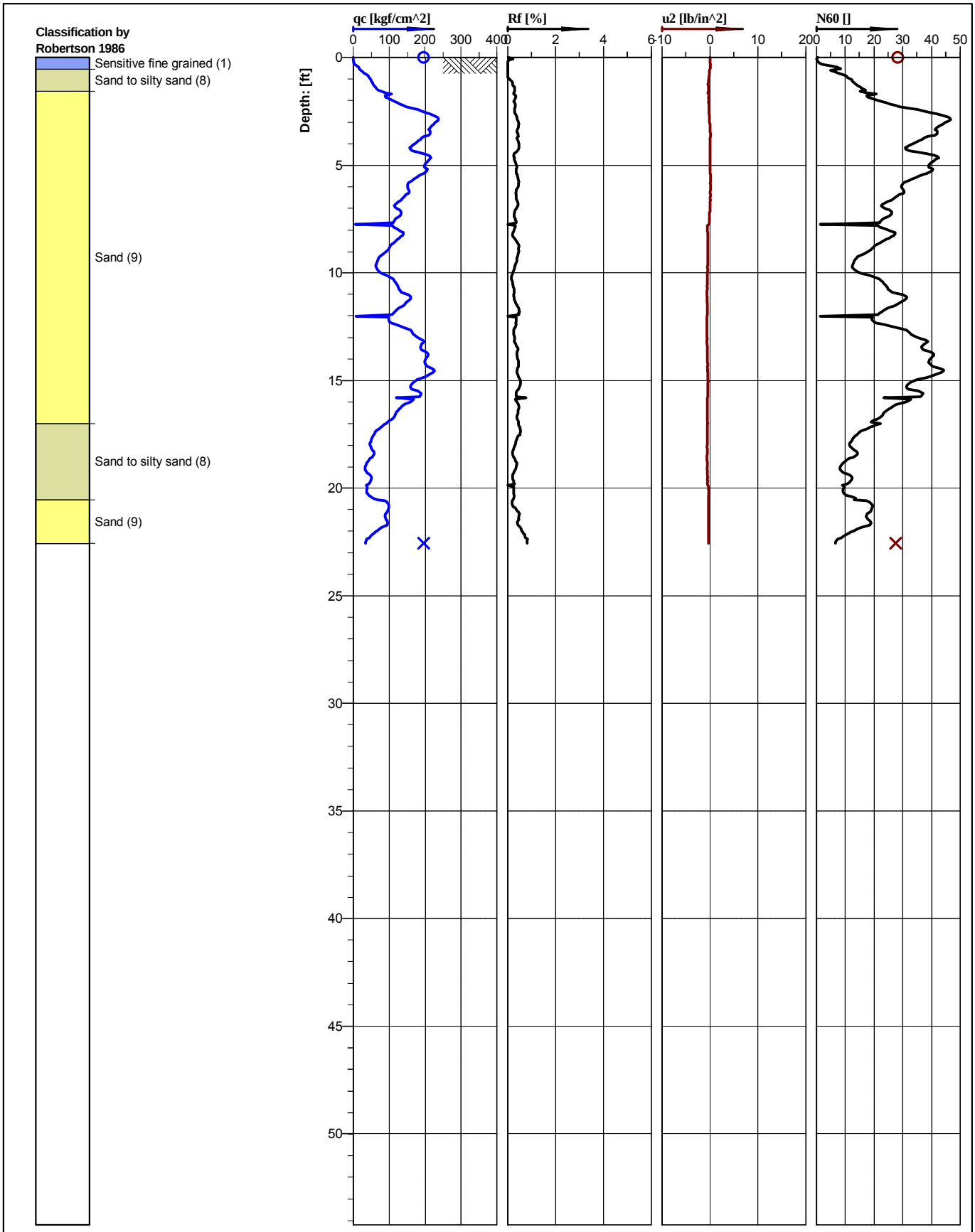


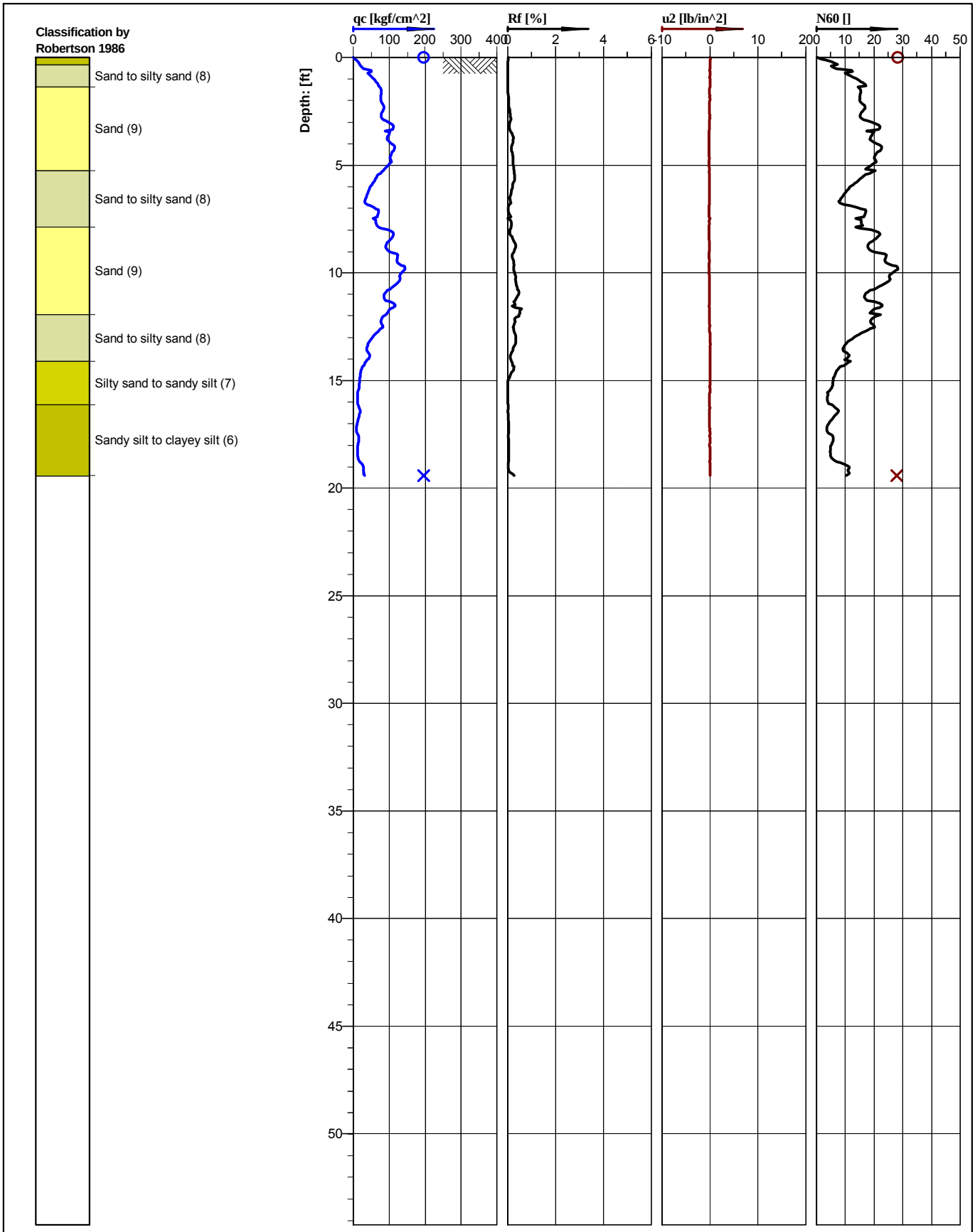
Location: CPT-7	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/25/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 36 feet.		File: CPT-7.cpt	

DIRECT PUSH SERVICES, LLC



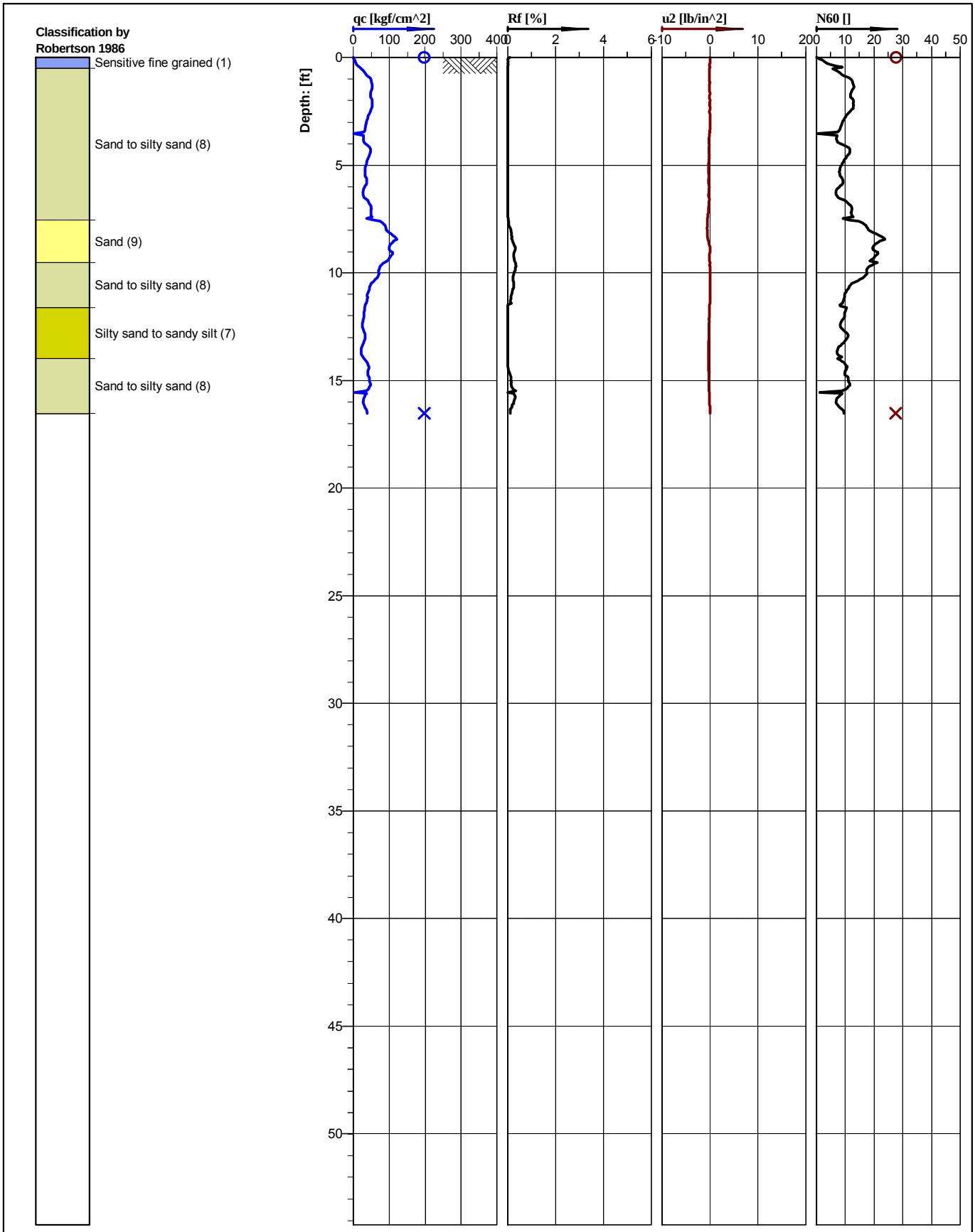
Location: CPT-8	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 22.5 feet.		File: CPT-8.cpt	

DPS
DIRECT PUSH SERVICES, LLC



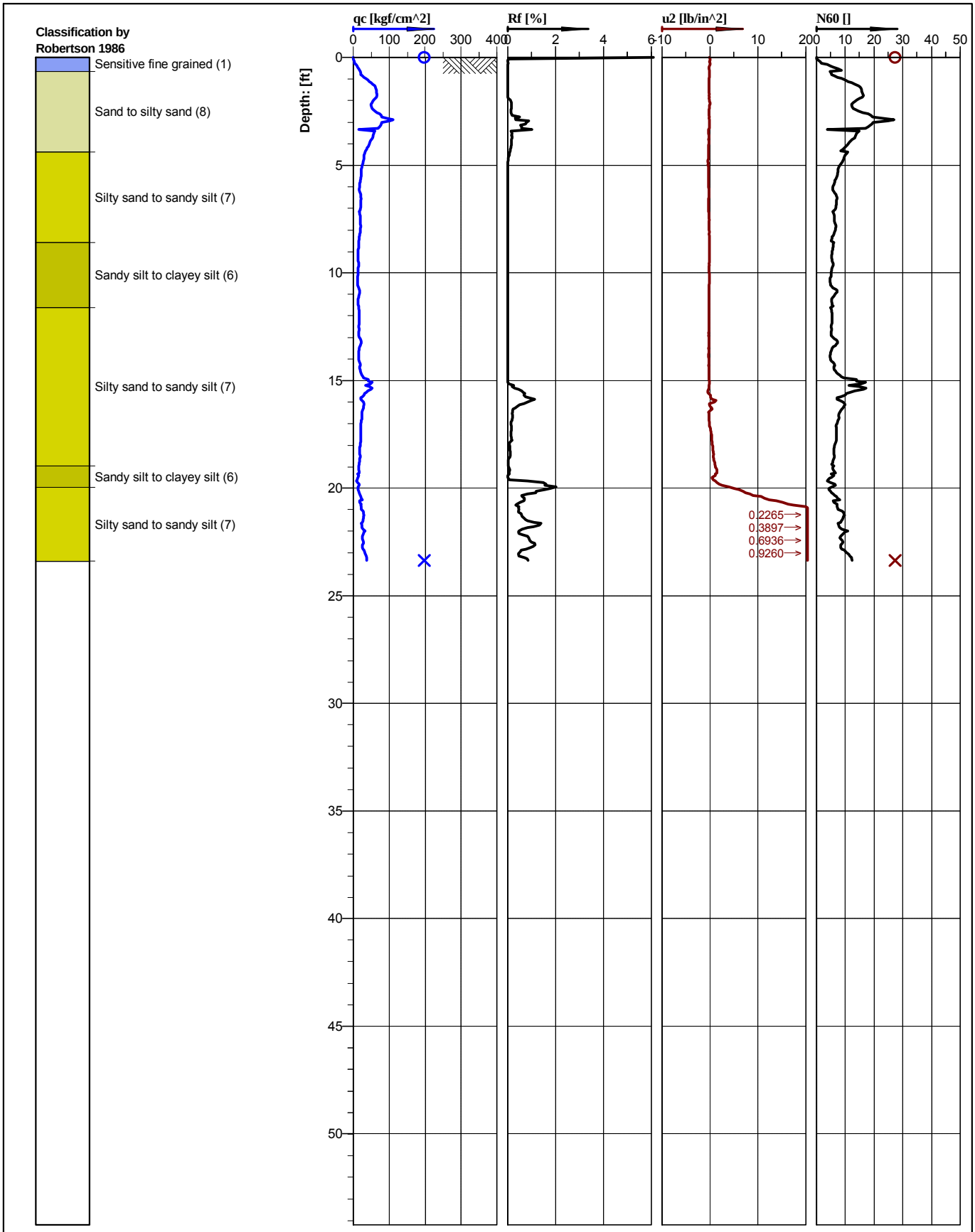
Location: CPT-9	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 19.5 feet.		File: CPT-9.cpt	

DPS
DIRECT PUSH SERVICES, LLC



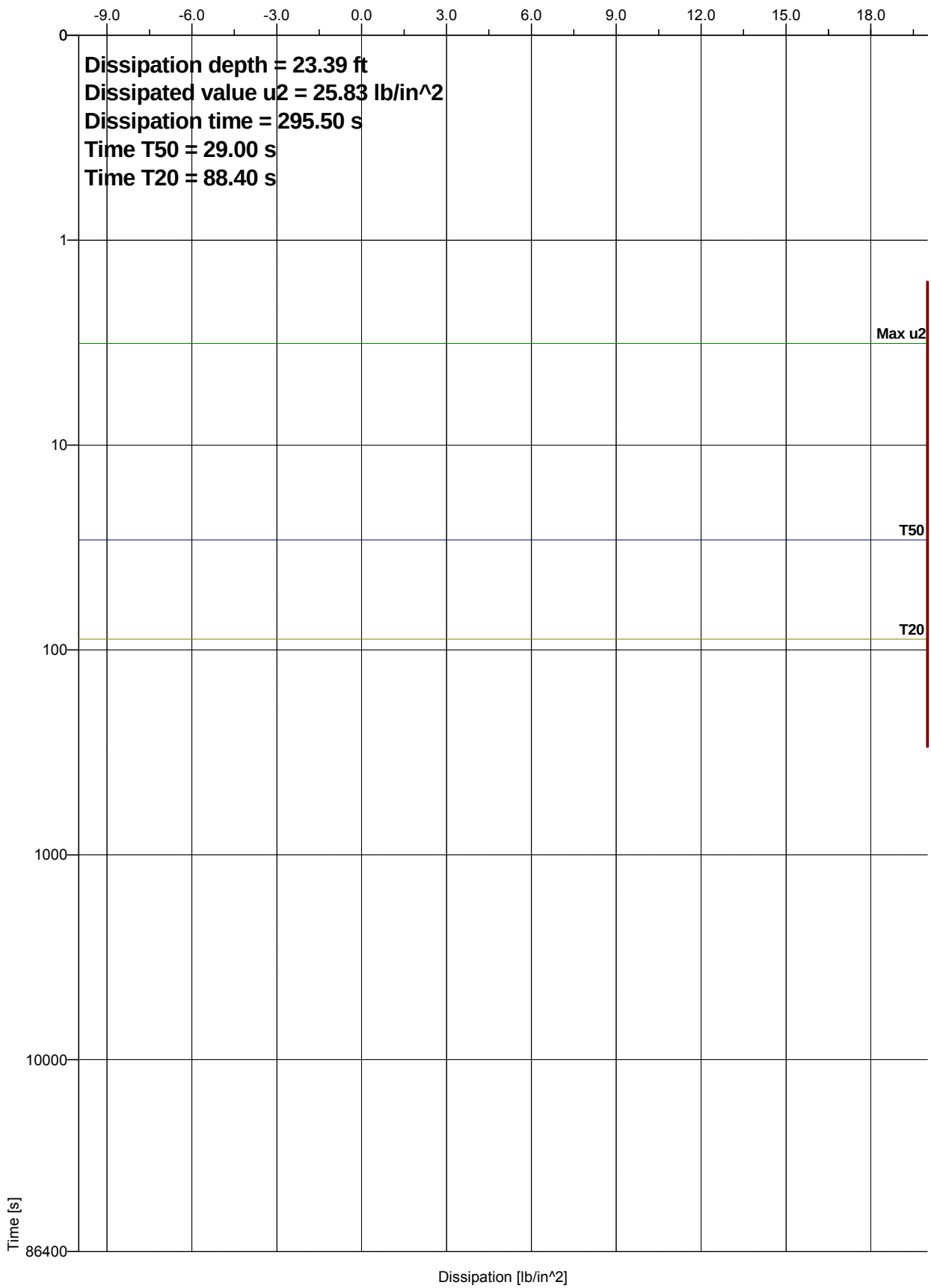
Location: CPT-10	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 16.5 feet.		File: CPT-10.cpt	

DPS
DIRECT PUSH SERVICES, LLC



Location: CPT-11	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 23.5 feet.		File: CPT-11.cpt	

DPS
DIRECT PUSH SERVICES, LLC



Location: CPT-11	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test No.: A
Project ID: 212-504	Client: AMEC	Date: 4/26/2017	Scale: 1 : 76
Project: Lake Manatee Dam		Page: 1/1	Fig.:
Test ended at the desired depth of 23.5 feet.		File: CPT-11.cpt	

DIRECT PUSH SERVICES, LLC

Kiewit Borings 2018

TEST BORING RECORD

BORING NO: K-1

Kiewit Engineering Group Inc

PROJECT NAME	Lake Manatee Dam Rehab.	**PROJECT NUMBER**	18-238-550.09.01	**DATE**	05 Sep 18 to 06 Sep 18
LATITUDE	27.49312 deg	**LONGITUDE**	-82.35467 deg	**ELEVATION**	+39.2 feet
CONTRACTOR	Amdrill	**DRILLING METHOD**	Mud Rotary	**LOGGED BY**	SJL
DRILL RIG TYPE	Barge-mounted CME 55	**HAMMER TYPE**	Auto	**HAMMER EFFICIENCY**	88.5%

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0			Barge						
			Water						
	35								
5									
	30								
10									
	25		SILTY SAND, (SM), fine sand with some organics and shells, banded gray with some brown, wet, very loose	SPT 1	8	2-1-2 (3)			▲
15									
	20		*POORLY GRADED SAND with SILT, (SP-SM); Graphic log could not be changed. Fine to medium sand, brown, medium dense	SPT 2	15	7-11-13 (24)			MC=16.24% ▲ #200=8.49%
20									
			CLAYEY SAND, (SC), fine sand with trace fine (1/4") gravel, light brown, moist to wet, medium dense						
	15		POORLY-GRADED SAND, (SP), fine sand with some silt, white to light gray, wet, medium dense	SPT 3	15	9-9-11 (20)			▲
25									
	10		CLAYEY SAND, (SC), gray, moist, loose	SPT 4	20	3-3-5 (8)			▲ MC=25.4%
30			No recovery	ST 5	0				
	5		Becoming gray-blue	SPT 6	22	4-4-4 (8)			▲
35									

*Note: After Wood's review of field and laboratory test data.

TEST BORING RECORD

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BORING NO: K-1

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 05 Sep 18 to 06 Sep 18

LATITUDE 27.49312 deg **LONGITUDE** -82.35467 deg **ELEVATION** +39.2 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
35			CLAYEY SAND, (SC), gray, moist, loose *(continued)*	ST 7	23		4.0		MC=43.1%; #200=34.6%; LL=54.9; PL=23.5 ; PI=31.4
40	0		SANDY CLAY, (CL), gray-blue, moist, firm	SPT 8	24	4-4-5 (9)			
45	-5		*CLAYEY SAND (SC); Graphic log could not be changed. Becoming blue/gray/green clay with gray 1/4" thick medium sand lenses and more silty, 1/4 inch medium sand lenses, very stiff	SPT 9	24	4-7-9 (16)			MC=64.7%; #200=41.6%; LL=71.0 ; PL=33.2; PI=37.8
50	-10		SILTY SAND, (SM), fine sand with ~1.5" thick gray-green silty clay layers, gray with black grains, moist, medium dense	SPT 10	24	11-50			
55	-15		CLAY, (CL), with silt, low plasticity, bluish to greenish gray, moist, firm to stiff	SPT 11	22	8-16-12 (28)			MC=37.8%
60	-20		SAND, (SP), fine to medium sand, white with black grains, wet, medium dense ~2" thick layer of white hard clay/calcite/limestone in gravel-sized particles at 54.8' CLAY, (CL), white, moist to dry, very hard, thin pockets of black and white medium sand	SPT 12	9	50/5"			>>
65	-25		*SILTY SAND with GRAVEL (SM); Graphic log could not be changed. GRAVELLY SAND, (SP-GP), coarse sand to fine gravel (3/8" to 1/4"), subangular to angular, gray, wet, very dense	SPT 13	19	23-28-50/3"			MC=23.0%; #200=18.4% #4=82.1% >>
70	-30		SAND (SP), medium with trace 1/4" to 1/8" subangular particles, white and black grains, wet, very dense	SPT 14	2	50/4"			>>

KIEWIT STANDARD GEOTECH LOG - GINT STD US LAB.GDT - 28-09-18 07:45 - C:\USERS\SAMUEL.LASLEY\ODIVARIOUSWORK\LAKE MANATEE DAM REHAB\BORINGS\LAKE MANATEE PROJECT DATA.GPJ

*Note: After Wood's review of field and laboratory test data.

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Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-1

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 05 Sep 18 to 06 Sep 18

LATITUDE 27.49312 deg **LONGITUDE** -82.35467 deg **ELEVATION** +39.2 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
75	-35		SAND (SP), medium with trace 1/4" to 1/8" subangular particles, white and black grains, wet, very dense *(continued)*	SPT 15	0	50/0"			>>
80	-40		Fine to medium sand with some clay, 1/2" cemented particles, black grains in white matrix, moist to wet, very dense	SPT 16	1	50/0"			>>
85	-45		SILTY CLAY, (CL-ML), with some fine sand, light gray, moist, very stiff	SPT 17	26	7-8-13 (21)	2.5 1.5 0.5		▲
90	-50		CLAYEY SAND, (SC), fine sand with silt, gray with some black grains, moist, medium dense	SPT 18	25	7-6-6 (12)	2.0		▲
95	-55			SPT 19	24	6-7-6 (13)	2.0		▲

Bottom of borehole at 95.0 feet.

KIEWIT STANDARD GEOTECH LOG - GINT STD US LAB.GDT - 28-09-18 07:45 - C:\USERS\SAMUEL.LASLEY\ODIVARIOUSWORK\LAKE MANATEE DAM REHAB\BORINGS\LAKE MANATEE PROJECT DATA.GPJ

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TEST BORING RECORD

BORING NO: K-2

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 10 Sep 18 to 11 Sep 18

LATITUDE 27.49294 deg **LONGITUDE** -82.35445 deg **ELEVATION** +39.0 feet

CONTRACTOR Amdrill **DRILLING METHOD** Mud Rotary **LOGGED BY** SJL

DRILL RIG TYPE Barge-mounted CME 55 **HAMMER TYPE** Auto **HAMMER EFFICIENCY** 88.5%

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0			Barge						
			Water						
5	35								
	30								
10									
	25								
15			SILTY SAND, (SM), fine sand with trace organics, dark brown, wet to moist, loose	SPT 1	16	4-4-4 (8)			MC=17.34%
20	20								
	15		~23 ft to 28 feet: wood fibers in drill mud	SPT 2	0	1-1-1 (2)			
25			CLAYEY SAND, (SC), fine sand, black sand grains and light gray-green clay, moist, loose				1.0 to 1.5		MC=31.3%; #200=26.1%; LL=37.2 ; PL=19.9 PI=17.3
	10			SPT 3	20	3-3-4 (7)			
30									
	5			SPT 4	24	5-5-6 (11)	4.0 2.0 to 2.5		
35									

Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-2

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 10 Sep 18 to 11 Sep 18

LATITUDE 27.49294 deg **LONGITUDE** -82.35445 deg **ELEVATION** +39.0 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
35			SILTY CLAY, (CL-ML), with sand, borderline CL-ML/SC/CL, gray-green clay with black sand grains, moist, stiff						
			*CLAYEY SAND (SC); Graphic log could not be changed.						
40	0			SPT 5	20	4-6-6 (12)	1.5 to 3.5		MC=24.6%; #200=38.4%; LL=34.8; PL=21.4; PI=13.4
			CLAYEY SAND, (SC), with trace 1/4" rounded gravel, with layering of more and less clay, black sand grains with gray-green clay, moist, loose						
45	-5			SPT 6	24	4-5-5 (10)	1.5 to 2.5		
			SAND, (SP), medium to fine sand with trace to no cohesive fines, black and white sand grains, wet, loose						
50	-10		LEAN CLAY, (CL), gray-green, moist, stiff to very stiff	SPT 7	23	5-7-7 (14)	2.0		MC=39.1%; #200=25.3%; LL=57.2 PL=24.7 PI=32.5
			*CLAYEY SAND (SC); Graphic log could not be changed.						
55	-15		SAND, (SP), medium to fine, black and white grains, moist to wet, medium dense to very dense	SPT 8	21	5-7-10 (17)	2.0		MC=24.6%; #200=38.4%; LL=34.8; PL=21.4; PI=13.4
			*SILTY SAND (SM); Graphic log could not be changed.	ST 9	0				
60	-20		Hard driving and rig chatter begin. Thin layer of hard clay/calcite/limestone, white, very hard, broken angular pieces from 1/4" to 5/8"	SPT 10	0.5	50/0"			>>
			SILTY SAND, (SM), fine sand, dark gray with white and black grains, moist to wet, very dense, with 1/4" thick silty clay layer (gray-green), continued hard driving and rig chatter	SPT 11	1.5	50/4"			>>
65	-25								
			SAND, (SP), medium sand, white and black grains, wet, medium dense to very dense, with cemented particles up to 1/4", continued hard driving and rig chatter						
70	-30			SPT 12	12	13-9-9 (18)			
				SPT 13	17	13-34-50/3"			>>

*Note: After Wood's review of field and laboratory test data.

Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-2

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 10 Sep 18 to 11 Sep 18

LATITUDE 27.49294 deg **LONGITUDE** -82.35445 deg **ELEVATION** +39.0 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
			Cemented pieces up to 3/4"	SPT 14	0.5	50/0"			
			Bottom of borehole at 73.5 feet.						

NOTES: Piezometer installed at 71 feet. Sand pack from 56 to 73.5 feet; grouted from mudline to 56 feet.

Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-3

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 31 Aug 18 to 04 Sep 18

LATITUDE 27.49318 deg **LONGITUDE** -82.35403 deg **ELEVATION** +38.9 feet

CONTRACTOR Amdrill **DRILLING METHOD** Mud Rotary **LOGGED BY** SJL

DRILL RIG TYPE Barge-mounted CME 55 **HAMMER TYPE** Auto **HAMMER EFFICIENCY** 88.5%

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0			Barge						
			Water						
5	35								
10	30								
15	25								
20	20		SAND, (SP), fine to medium sand with trace to some silt, dark gray to brown, wet, medium dense, trace to some silt	SPT 1	15	3-8-13 (21)			▲
			*POORLY GRADED SAND with SILT (SP-SM); Graphic log could not be changed.						
25	15		Fine sand, light gray	SPT 2	13	4-4-7 (11)			▲
30	10		Fine to coarse sand, brown, very loose to fine gray sand at 30'	SPT 3	12	12-1-1 (2)			MC=8.6%; #200=6.6% ▲
35	5		CLAYEY SAND, (SC), gray to light gray, moist, medium dense	SPT 4	22	8-9-12 (21)			▲

*Note: After Wood's review of field and laboratory test data.

Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-3

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 31 Aug 18 to 04 Sep 18

LATITUDE 27.49318 deg **LONGITUDE** -82.35403 deg **ELEVATION** +38.9 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
35			CLAYEY SAND, (SC), gray to light gray, moist, medium dense *(continued)*						
			*SANDY CLAY (CL); Graphic log could not be changed.						
	0			SPT 5	24	4-4-5 (9)			MC=34.19%; #200=51.8%; LL=49; PL=10; PI=39
40									
	-5		Trace black, fine, subangular 3/8" gravel	SPT 6	25	4-6-8 (14)			
45									
			*to very dense						
	-10		SAND, (SP), medium sand, light gray with some black grains, wet, medium dense	SPT 7	24	5-5-7 (12)			
50			3 inch clay layer at 49 feet						
			*SILTY SAND (SM); Graphic log is not changed.						
	-15			SPT 8	18	6-13-15 (28)			MC=29.3%; #200=18.1%
55									
	-20		SANDY CLAY, (CL), with some cemented sand, gray with black sand grains, moist, hard	SPT 9	9	50/3"			MC=27.5%; #200=26.0% >>
60			*SILTY SAND (SM), some cemented sand below 58 feet; Graphic log could not be changed.						
	-25		No recovery, hard driving	SPT 10	0	50/0"			>>
65									
	-30		SAND, (SP), medium to coarse sand, trace fine subangular gravel, gray and black grains, wet, very dense	SPT 11	10	33-50			MC=15.7%; #200=16.8%
70			*CLAYEY SAND (SC); Graphic log could not be changed.						

*Note: After Wood's review of field and laboratory test data.

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Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-3

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 31 Aug 18 to 04 Sep 18

LATITUDE 27.49318 deg **LONGITUDE** -82.35403 deg **ELEVATION** +38.9 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
			SAND, (SP), medium to coarse sand, trace fine subangular gravel, gray and black grains, wet, very dense *(continued)*						
	-35		No gravel, medium dense	SPT 12	16	7-9-13 (22)			▲
75									
	-40		Very dense. No recovery	SPT 13	0	50/2"			>>▲
80									
	-45		End of spoon came off in hole. No recovery. Hole terminated.	SPT 14	0	50/4"			>>▲
85									

Bottom of borehole at 85.0 feet.

NOTES: Centered on spillway ~250 ft out.
Hole stopped for long weekend at 75 feet at 1:30 PM on 8/31/18.

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Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-4

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 11 Sep 18 to 12 Sep 18

LATITUDE 27.4936 deg **LONGITUDE** -82.35388 deg **ELEVATION** +39.0 feet

CONTRACTOR Amdrill **DRILLING METHOD** Mud Rotary **LOGGED BY** SJL

DRILL RIG TYPE Barge-mounted CME 55 **HAMMER TYPE** Auto **HAMMER EFFICIENCY** 88.5%

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	SPT N VALUE / PL MC LL / FINES CONTENT (%)
0			Barge						
			Water						
5	35								
10	30								
15	25								
20	20		SAND, (SP), medium to fine sand with some silt, brown, wet to moist, medium dense	SPT 1	18	4-6-6 (12)			MC=2.44%
25	15		With clay, light brown to light gray (with tinge of green)	SPT 2	17	9-7-7 (14)			
30	10		Medium sand with little to no fines, light brown, wet, loose	SPT 3	8	5-5-3 (8)			MC=22.3%
35	5		CLAYEY SAND, (SC), gray-green, moist, loose	SPT 4	24	3-6-10 (16)	0.75 1.5		

Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-4

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 11 Sep 18 to 12 Sep 18

LATITUDE 27.4936 deg **LONGITUDE** -82.35388 deg **ELEVATION** +39.0 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
35			SANDY LEAN CLAY(CL); Graphic log could not be changed.						
			SILTY CLAY, (CL-ML), ~~with sand~~, gray-green, moist to dry, very stiff *(continued)*	ST 5	13		4.5		MC=30.9%; #200=53.4%; LL=46.0; PL=23.7; PI=22.3
			SANDY CLAY, (CL), with silt, clayey sand in layers, gray-green, moist, stiff						
	0			SPT 6	25	4-5-5 (10)	1.5 to 2.0		▲
40			*CLAYEY SAND (SC) with silt, gray-green, moist, loose; Graphic log could not be changed.	ST 7	12		4.5+		MC=26.7%; #200=35.8%; LL=48.3; PL=26.8; PI=21.5
	-5			SPT 8	25	4-5-5 (10)	1.0 to 2.0		▲
45			Some coarse sand/fine gravel with black, rounded particles up to 1/4"	ST 9	0				
			*CLAYEY SAND (SC), medium dense; Graphic log could not be changed.						
			SILTY CLAY, (CL-ML), with fine sand lenses and trace rounded fine gravel/coarse sand (up to 1/4"), gray-green, moist, ~~very stiff~~						
	-10			SPT 10	24	5-10-11 (21)	1.5 to 2.5		▲ MC=39.5%; #200=38.6%; LL=40.1; PL=26.1; PI=14.8
50				ST 11	8.5				MC=29.9%;#200=18.3%
			SAND, (SP), fine to medium sand, alternating with 2" thick layers of CLAYEY SAND (SC), black and white sand grains with gray-green clay, moist, medium dense						
	-15			SPT 12	21	9-11-15 (26)			▲
55									
			LEAN CLAY, (CL), gray-green, moist, stiff to very stiff, with one ~1" layer of fine sand						
	-20			SPT 13	22	7-13-15 (28)	2.5		▲
60			SAND, (SP), medium to fine sand with clay, black and white grains, moist, medium dense, hard driving						
	-25			SPT 14	18	9-23-15 (38)			▲
65			Medium to coarse sand, some cementation, dense to very dense	SPT 15	15	9-11-34-50/3"			>>▲
			At 66 feet: ~2 inch layer of strongly cemented fine-grained material, gray						
	-30			SPT 16	11	26-50			
70			More black sand particles, some cementation						

*Note: After Wood's review of field and laboratory test data.

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Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-4

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 11 Sep 18 to 12 Sep 18

LATITUDE 27.4936 deg **LONGITUDE** -82.35388 deg **ELEVATION** +39.0 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
			Strongly cemented fine-grained particles, white	SPT 17	0.25	50/2"			>>▲
			Bottom of borehole at 73.5 feet.						

NOTES: Piezometer installed at 67.5 feet, sand pack from 73.5 to 59 feet; grouted from 59 feet to the mudline.

Kiewit
Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-5

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 04 Sep 18 to 05 Sep 18

LATITUDE 27.49371 deg **LONGITUDE** -82.3542 deg **ELEVATION** +38.9 feet

CONTRACTOR Amdrill **DRILLING METHOD** Mud Rotary **LOGGED BY** SJL

DRILL RIG TYPE Barge-mounted CME 55 **HAMMER TYPE** Auto **HAMMER EFFICIENCY** 88.5%

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)
0			Barge					
			Water					
5	35							
	30							
10								
	25		SAND, (SP), fine to medium sand with trace fine subrounded gravel and shells, gray to brown, wet, loose	SPT 1	12	3-3-4 (7)		
15			SANDY CLAY, (CL), white, moist, firm to stiff					
	20		SAND, (SP), fine to medium sand with some silt, dark brown with light banding, wet, medium dense	SPT 2	17	15-13-17 (30)		
20								
	15		CLAYEY SAND, (SC), fine sand, gray to gray-blue, moist, firm to stiff	SPT 3	10	6-7-9 (16)	0.5 to 1.0	
25								
	10		SAND, (SP), fine to coarse, white to off-white, wet, medium dense.	SPT 4	13	12-3-20 (23)		
30								
	5		CLAYEY SAND, (SC), fine sand, gray-blue, moist, medium dense	SPT 5	24	4-4-5 (9)	1.0 to 2.0	
35								

▲ SPT N VALUE ▲
10 20 30 40
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

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Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-5

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 04 Sep 18 to 05 Sep 18

LATITUDE 27.49371 deg **LONGITUDE** -82.3542 deg **ELEVATION** +38.9 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)
35			CLAYEY SAND, (SC), fine sand, gray-blue, moist, medium dense *(continued)*					
40	0		Some fine (1/4") subangular gravel, light gray	SPT 6	18	5-5-5 (10)		
			SILTY CLAY, (CL-ML), low plasticity, gray, moist, firm to stiff					
45	-5		SAND, (SP), fine to medium sand with some silt, gray with some black grains, moist, loose	SPT 7	20	4-5-5 (10)		
50	-10		Fine sand with clay and silt At 49': little to no fines	SPT 8	14	6-10-12 (22)		
55	-15		Becoming dense with 2" layers of gray clay	SPT 9	22	9-15-24 (39)		
			LEAN CLAY, (CL), with silt and trace sand and ~1.5 inch layers of fine sand, gray, moist, stiff					
60	-20			SPT 10	24	6-6-7 (13)	1.0	
			SAND, (SP), fine to medium sand, gray, wet, very dense	ST 11	7			
65	-25		Fine to coarse sand with some silt	SPT 12	2.5	50/1"		
70	-30		Medium sand, 1" to 2" layer of hard clay/calcite/limestone	SPT 13	7	50/5"		

SPT N VALUE
10 20 30 40
PL MC LL
20 40 60 80
FINES CONTENT (%)
20 40 60 80

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TEST BORING RECORD

BORING NO: K-5

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 04 Sep 18 to 05 Sep 18

LATITUDE 27.49371 deg **LONGITUDE** -82.3542 deg **ELEVATION** +38.9 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
			SAND, (SP), fine to medium sand, gray, wet, very dense *(continued)*						
	-35		Fine sand, some clay, trace fine (1/8") subrounded gravel/coarse sand, light gray to white, moist to wet	SPT 14	2	50/1"			>>
75									
			LEAN CLAY, (CL), trace to some silt, gray-blue, moist, very stiff						
	-40			SPT 15	24	9-9-10 (19)	2.0 to 2.5		▲
80									
	-45			SPT 16	18	7-9-50/5"			>>
85			SILTY SAND, (SM), fine sand, some clay, gray, moist, very dense						
	-50			SPT 17	23	9-9-11 (20)			▲
90			Medium dense, trace to some clay in ~3" layers						
			CLAYEY SAND, (SC), fine sand, some silt, gray, moist, very dense						
	-55			SPT 18	12	26-50/3"			>>

Bottom of borehole at 94.5 feet.

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TEST BORING RECORD

BORING NO: K-6

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 06 Sep 18 to 07 Sep 18

LATITUDE 27.49087 deg **LONGITUDE** -82.35441 deg **ELEVATION** +38.8 feet

CONTRACTOR Amdrill **DRILLING METHOD** Mud Rotary **LOGGED BY** SJL

DRILL RIG TYPE Barge-mounted CME 55 **HAMMER TYPE** Auto **HAMMER EFFICIENCY** 88.5%

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	SPT N VALUE / PL MC LL / FINES CONTENT (%)
0			Barge						
			Water						
	35								
5			SAND, (SP), fine sand with silt and organics, brown, wet, very loose	SPT 1	2	WOH			
	30			SPT 2	24	WOH			
10									
	25		Medium sand, trace organics and little to no silt, red-brown, wet, loose	SPT 3	14	4-5-5 (10)			
15									
	20		Coarse sand, trace subrounded to rounded gravel, 1" layer of clayey sand, wet, very loose	SPT 4	5	WOH-WOH-1 (1)			
20			*SANDY FAT CLAY (CH), very soft; Graphic log could not be changed.						
			SANDY CLAY, (CL), with gravel, moist to wet, gray						
	15		~~CLAYEY SAND, (SC), gray, wet, very loose~~	SPT 5	18	1-1-1 (2)			MC=33.1%; #200=55.5%; LL=53; PL=23; PI=30
25			SILTY CLAY, (CL-ML), with trace sand, gray, moist, very soft						
			SILTY SAND, (SM), fine sand with clay, gray, moist, medium dense						
	10			SPT 6	24	5-9-10 (19)			
30			*SANDY FAT CLAY (CH); Graphic log could not be changed.						
			~~CLAY, (CL),~~ with 1/2" thick fine sand layers, gray-green, moist, stiff						
	5								
35			2" layer of white, angular gravel-sized particles	SPT 7	22	10-5-4 (9)	1.0 to 1.5		

Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-6

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 06 Sep 18 to 07 Sep 18

LATITUDE 27.49087 deg **LONGITUDE** -82.35441 deg **ELEVATION** +38.8 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
35			CLAY, (CL), with 1/2" thick fine sand layers, gray-green, moist, stiff *(continued)*						
			*SANDY FAT CLAY (CH); Graphic log could not be changed.						
	0		~~SANDY CLAY (CL)~~, with 1/8" thick gray fine sand lenses, gray-green clay, moist, stiff	SPT 8	20	4-5-10 (15)	1.0		MC=85.4%; #200=56.8%; LL=123.9; PL=36.5 ; PI=87.4
40			*CLAYEY SAND (SC), loose; Graphic log could not be changed.						
	-5		~~SANDY CLAY, (CL)~~, dark gray-green turning light gray/white with black sand grains, moist, ~~very soft to firm~~	SPT 9	26	2-3-3 (6)	0.25 0.5 0.75		MC=61.5%; #200=29.2%; LL=78.4; PL=23.9; PI=54.5
45			SAND, (SP), with two 2" layers of white strongly-cemented fine-grained material broken into angular 1/2" gravel, black and white sand grains, wet, very dense						
	-10			SPT 10	10	50/4"			>>
50			*SANDY FAT CLAY (CH); Graphic log could not be changed.						
			SANDY CLAY, (CL), gray-green clay, moist, stiff, with layers of lean clay without sand and clayey sand						
	-15			SPT 11	23	4-5-5 (10)			
55									
	-20			SPT 12	25	5-5-7 (12)	1.5 to 2.0		MC=98.9%; #200=87.6%; LL=98.3; PL=36.5 ; PI=61.8
60			SAND, (SP), fine, black and white grains, wet, medium dense						
	-25		2" clayey sand layer	SPT 13	16	10-16-10 (26)			
65									
	-30			SPT 14	14	9-50/4"			>>
70			Becoming SAND, (SP), with clay, very dense, rig chatter/hard driving begins						

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TEST BORING RECORD

BORING NO: K-6

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 06 Sep 18 to 07 Sep 18

LATITUDE 27.49087 deg **LONGITUDE** -82.35441 deg **ELEVATION** +38.8 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
75	-35		SAND, (SP), fine, black and white grains, wet, medium dense *(continued)* Medium to fine sand, trace to no clay, ~1" cemented zone, hard driving continues	SPT 15	13	11-50/5"			>>
80	-40			SPT 16	0	50/0"			>>
85	-45		SILTY CLAY, (CL-ML), trace sand, light gray-blue, moist to dry, stiff to hard	SPT 17	9	50/3"	1.5 3.5		>>

Bottom of borehole at 85.0 feet.

TEST BORING RECORD

BORING NO: K-7

Kiewit Engineering Group Inc

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 07 Sep 18 to 10 Sep 18

LATITUDE 27.49112 deg **LONGITUDE** -82.35442 deg **ELEVATION** +39.0 feet

CONTRACTOR Amdrill **DRILLING METHOD** Mud Rotary **LOGGED BY** SJL

DRILL RIG TYPE Barge-mounted CME 55 **HAMMER TYPE** Auto **HAMMER EFFICIENCY** 88.5%

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	SPT N VALUE / PL MC LL / FINES CONTENT (%)
0			Barge						
			Water						
	35								
5									
	30								
10			SILTY SAND, (SM), fine to medium sand with organics, dark brown, wet, very loose	SPT 1	7	WOH			
	25			SPT 2	17	WOH			
15									
	20		CLAYEY SAND, (SC), dark gray sand with white/gray clay, wet, loose	SPT 3	17	4-3-3 (6)			
20									
	15			SPT 4	22	2-3-3 (6)	1.0 to 2.0		MC=34.9%; #200=33.6%; LL=55.9; PL=22.2; PI=33.7
25			SANDY CLAY, (CL), with silt, light gray-green, moist, firm to stiff						
	10		CLAYEY SAND, (SC), fine sand, gray-green-blue, dry to wet, stiff to very stiff	SPT 5	20	17-12-10 (22)	4.0 1.0		MC=26.28%
30									
	5		*SILTY SAND (SM); Graphic log could not be changed. Varies between sandy clay and clayey sand. Some 1/8" thick	SPT 6	24	5-5-9 (14)	1.0 to 2.0		MC=43.75%; #200=35.8%
35									

Kiewit Engineering Group Inc

TEST BORING RECORD

BORING NO: K-7

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 07 Sep 18 to 10 Sep 18

LATITUDE 27.49112 deg **LONGITUDE** -82.35442 deg **ELEVATION** +39.0 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
35			*SILTY SAND (SM); Graphic log could not be changed.						
			fine sand lenses CLAYEY SAND, (SC), fine sand, gray-green-blue, dry to wet, stiff to very stiff *(continued)*						
			CLAY, (CL), gray-green, moist, stiff, 1/4" thick fine sand lenses every 1.5 to 3 inches						
	0			SPT 7	20	4-3-6 (9)	0.75		MC=83.55%
40			*CLAYEY SAND (SC); Graphic log could not be changed.						
	-5			SPT 8	22	9-11-50/4"	0.5 1.5		MC=61.5%; #200=29.2%; LL=78.4; PL=23.9; PI=54.5 >>
45			SAND, (SP), medium sand, black and white grains, moist, very dense						
	-10			SPT 9	16	10-50/5"			MC=23.31% >>
50			2-inch thick layer of white hard clay/calcite/limestone at 49.5 feet CLAYEY SAND, (SC), fine to medium sand, black and white sand grains with gray-green clay, moist, medium dense						
	-15			SPT 10	23	5-5-5 (10)	1.5		
55			LEAN CLAY, (CL), gray-green, moist, stiff						
	-20		With 1/4" to 1" thick fine sand lenses	SPT 11	26	5-5-5 (10)	0.75 to 1.0		
60			SILTY SAND, (SM), fine sand, black and white grains, wet, dense						
	-25			SPT 12	20	7-15-18 (33)			
65			CLAYEY SAND, (SC), fine sand, black sand grains with white clay, moist, dense						
	-30			SPT 13	20	11-13-22 (35)			MC=67.28%
70			SAND, (SP), fine to medium sand, black and gray grains, wet, very dense 3" thick silty sand layer at 70 feet						

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TEST BORING RECORD

BORING NO: K-7

PROJECT NAME Lake Manatee Dam Rehab. **PROJECT NUMBER** 18-238-550.09.01 **DATE** 07 Sep 18 to 10 Sep 18

LATITUDE 27.49112 deg **LONGITUDE** -82.35442 deg **ELEVATION** +39.0 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	PP (tsf)	PV (psf)	▲ SPT N VALUE ▲ 10 20 30 40 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
			SAND, (SP), fine to medium sand, black and gray grains, wet, very dense *(continued)*						
	-35			SPT 14	1	50/1"			>>
75									
			LEAN CLAY, (CL), white, moist, hard, trace fine						
	-40			SPT 15	1.5	50/1"			>>
80									
	-45			SPT 16	17	7-50/5"	1.5 to 2.0		>>
85			1/2" thick layer of fine rounded gravel at 83.5 feet, clay becomes silty and sandy, light gray, with 1/4" thick sand seams, stiff to hard						
	-50		At 89.5 feet: Very soft clay with some fine (5/8" to 1/8") subrounded to subangular gravel, little silt or sand	SPT 17	10	4-4-5 (9)			▲
90			Bottom of borehole at 90.0 feet.						