



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

AAI File No. 19-1624

May 8, 2019

Craig A. Smith & Associates
21045 Commercial Trail
Boca Raton, Florida 33486

Attention: Mr. James R. Orth, P.E.

**SUBSURFACE EXPLORATION AND
GEOTECHNICAL ENGINEERING EVALUATION
WALL/BOARDWALK & FLOATING DOCK PROJECT
TORRY ISLAND, BELLE GLADE, FLORIDA**

1.0 INTRODUCTION

In accordance with your request and authorization, Ardaman & Associates, Inc. has completed a subsurface exploration and geotechnical engineering evaluation for the above referenced project. We explored the general subsurface conditions in order to provide geotechnical recommendations for the geotechnical aspects of the project. Our work included Standard Penetration Test (SPT) borings and engineering analyses. This report describes our explorations and summarizes our conclusions and recommendations based on our findings.

2.0 PROJECT LOCATION

The site is located on Torry Island (Section 6, Township 44 South, Range 37 East) in Belle Glade, Palm Beach County, Florida. The site is currently operating as a campground facility for recreational vehicles. A Site Vicinity Map is presented as our Figure 1.

3.0 PROJECT DESCRIPTION

It is our understanding that the project involves replacing an existing lakefront wall/boardwalk with a new wall/boardwalk and will include a future floating dock that will extend out to the west in the adjacent lake. It was reported that the deepest part of the existing lake was approximately 28 feet below the grade where our borings were performed. We expect finish (land-side) grades to be at or near the existing grades at the time of exploration.

If any of this information is incorrect or anticipated to change, please notify our office so that we can review the changes and make corrections to this report as needed.

4.0 FIELD EXPLORATION

To explore the subsurface conditions in the area of proposed wall/boardwalk, five (5) Standard Penetration Test (SPT) borings were performed in the approximate locations shown on our attached Figure 2: Boring Location Plan. The borings were performed using a conventional truck-mounted drilling rig in general accordance with the procedures outlined in ASTM D-1586. The borings were advanced to depths of 30 to 60 feet. The boring logs and a description of our drilling and testing procedures are attached.

Our field exploration was conducted from April 30 to May 2, 2019. The boring locations were laid out in the field in reference to existing site features and distinguishable landmarks. We estimate that the actual boring locations are within approximately 15 feet of the locations shown on Figure 2.

5.0 LABORATORY TESTING

Our field crew examined the soils recovered from the SPT sampler, placed the recovered soil samples in moisture proof containers, and maintained a log for each boring. The field soil boring logs and recovered soil samples were transported to our West Palm Beach soils laboratory from the project site. Each soil sample was then examined by a Geotechnical Engineer and visually classified using nomenclature consistent with the Unified Soil Classification System (USCS). The soil classifications and other pertinent data obtained from our explorations are reported on the attached boring logs. The soil samples recovered from our explorations will be kept in our laboratory for 60 days, then discarded unless you request otherwise.

6.0 GENERAL SUBSURFACE CONDITIONS

The attached boring logs present a detailed description of the soils encountered at the locations and the depths explored. The soil stratification shown on the boring logs is based on examination of recovered soil samples and interpretation of the driller's field logs. It indicates only the approximate boundaries between soil types. The actual transitions between adjacent soil strata may be gradual and indistinct.

The borings were performed from the existing grades (located immediately east from the top of the existing lakeside retaining wall/boardwalk). The soils in the explored locations consisted generally of organic topsoil with occasional limerock fragments to an approximate depth of 1 foot underlain by sandy to silty limerock fill to depths of about 5 to 8 feet, followed by soft silty organics with fibrous peat lenses ("muck") to depths of 13.5 to 15.5 feet. These soils were followed by slightly clayey to silty fine sands with varying amounts of shell and limestone fragments ("marl") interbedded with pockets and thin layers of hard limestone to the termination depth of our deepest boring at 60 feet. A relatively consistent hard layer of limestone was typically found in the borings between about 47 and 50 feet. Please refer to the individual boring logs for additional details.

7.0 GROUNDWATER CONDITIONS

Groundwater was greater than 10 feet below the existing grades in our borings at the time of exploration (our crew estimated groundwater was approximately 10 to 13 feet below existing grade). A viscous drilling fluid was introduced at depths of about 10 feet to advance the SPT boreholes to the next sample interval (which precluded us from accurately measuring the groundwater depth). Fluctuations in groundwater level on this site should be anticipated throughout the year due to a variety of factors, the most important of which is recharge from rainfall and control elevations in adjacent water bodies. Groundwater levels slightly above the present levels should be expected after major storm events and periods of heavy or prolonged rainfall.

8.0 DISCUSSIONS AND RECOMMENDATIONS

8.1 General Considerations and Soil Properties

Based on our understanding of the proposed construction, we anticipate that a combination of different construction methods will be used. The new wall/boardwalk will likely consist of a preformed vinyl channel/form that is driven to a design depth and then filled with reinforced bars and concrete. It will likely be necessary to predrill past the random pockets and thin layers of limestone encountered in our borings to prevent damage to the wall segments. Additionally, the existing concrete debris and other riprap material used around the existing wall may need to be removed to help with construction of the new wall and prevent damage. Based on the observed conditions, the grading and drainage for the new wall will need to be considered carefully in the designs. Below we have listed our conservative estimate of pertinent engineering properties for the different soil strata underlying the site for others to use in the design of the proposed wall.

Table 1: Engineering Properties of the Encountered Subsurface Soils

Soil Type	Depth (ft)**	Unit Weight (pcf) *		Internal Friction Angle [degrees]	Cohesion [psf]	Lateral Soil Modulus K _H [pci]
		Moist	Saturated			
Organic fine sands with occasional limerock fragments (loose to medium dense)	0 to 1	110	115	28	0	5
Sandy to silty limerock fill (loose to medium dense)	1 to 5	115	120	35	0	45
Silty organics with random fibrous peat lenses (very soft to soft)	5 to 15.5	85	105	0	0	0
Slightly clayey to silty fine sands with varying amounts of shell and limestone INTERBEDDED WITH Slightly sandy to slightly silty limestone (moderately hard to very hard)	15.5 to 60	--	120	32	0	35
		--	130	37	250	250

* The effective unit weight can be obtained using the following equations:

Above groundwater level: $\gamma_{\text{EFFECTIVE}} = \gamma_{\text{MOIST}}$

Below groundwater level: $\gamma_{\text{EFFECTIVE}} = \gamma_{\text{SATURATED}} - \gamma_{\text{WATER}}$

** Below the ground surface

Backfill behind the wall should consist of clean sand (or perhaps gravel or #57 stone), particularly pervious, with less than 5 percent by dry weight passing the No. 200 sieve. The backfill should be free from organics and other deleterious materials with no particles greater than 3 inches in diameter. A geotextile may be incorporated behind any joints in the wall to prevent the migration of soil through joints/connections. The backfill sand should be placed in lifts six inches or less in loose thickness, individually compacted with a vibratory plate compactor to a minimum dry density of 95 percent of the Modified Proctor (ASTM D-1557) maximum dry density value of the backfill.

Care must be exercised to ensure the wall is not damaged or adversely affected by the compaction and backfilling operations. For design purposes, we recommend using a unit weight of 120 pounds per cubic foot (pcf), an internal friction angle of 30 degrees and no cohesion for the sand backfill. The installation of weep holes should be considered to allow the rapid reduction of hydrostatic pressures against the wall after heavy rains and other periods of groundwater fluctuation; alternately a layer of gravel can be placed behind the wall (or the use a geotextile sheet drain) to facilitate proper drainage. The wall should be designed to resist all hydrostatic forces, boardwalks and other associated loading conditions including any surcharge/traffic loads. The routing and proximity of irrigation systems and other utility lines (if any) should be discussed carefully before finalizing any new wall designs.

8.2 Driven Piles

Design details for the floating docks and other structures had not been finalized at the time this report was prepared. However, based on other structures in the general vicinity, we expect 14-inch square, precast, prestressed concrete piles (PPCP) to be used for this project. Other pile sizes and foundation types can be considered upon request. The computer software FB Deep Version 2.04 was used to evaluate the estimated Davisson pile capacities for the proposed PPCP. The input soil parameters were obtained from the soil conditions encountered in our borings performed for this project. It should be noted that that the actual capacities should be expected to vary somewhat at each location

depending on the underlying soil conditions. The lateral load on the piles will depend on the height and magnitude of the applied load(s), the size and design of the pile and the surrounding soil conditions and depth of embedment. Assuming the pile is 28 feet above the lake bottom and embedded at least 20 feet into the underlying medium dense slightly clayey to silty fine sands (the "marl" encountered in our borings), the 14-inch piles should tolerate at least 0.5 tons of lateral load with less than ½ inch deflection at the embedment level. Other embedment depths, loads and pile sizes can be considered upon request.

Random pockets and layers of hard limestone may need to be predrilled in order to limit the potential for damage to the piles during installation (and achieve the necessary depth for the design lateral capacity). The depth and diameter of all predrilled piles should be considered carefully. Deeper layers of hard limestone should be expected to cause refusal conditions when of suitable thickness to resist the dynamic force of the pile driving operations. Piles that punch through the limestone will need to be driven to much greater depths to achieve capacity. Our estimates of expected pile capacity versus pile tip elevation (allowable capacity curves) for a single pile are presented in the Appendices of this report. The loads do not account for reduced efficiency related to closely spaced piles or pile groups.

The estimated capacities presented in this report need to be adjusted to reflect the actual lake depths and any anticipated scour. A minimum center to center spacing of at least three pile diameters is recommended. The piles should develop uplift capacities of at least 50 percent of their axial compression capacities. Lateral capacities will depend on the pile cap design and connection details in conjunction with the elevation of any applied loads. Additionally, while only limited amounts of fill were considered, it must be noted that additional fill added to these sites could cause a potentially damaging "negative friction" effect to occur in the piles due to the compression of soft underlying organic soils encountered in all of our boring locations.

The actual pile installation depths should be determined in the field on an individual pile basis. We recommend a WEAP analyses be performed and that a test pile program using a Pile Driving Analyzer (PDA) be implemented on this project. The selection and sequencing of equipment (predrilling, pile hammer type, etc.) will help ensure the success of the pile driving operations and determine if the deeper layers of hard limestone are hard enough and thick enough to cause refusal during driving.

9.0 CLOSURE

This report has been prepared specifically for the subject project. It is intended for the exclusive use of Craig A. Smith & Associates and their representatives. Our work has used methods and procedures consistent with local foundation engineering practices. No other warranty, expressed or implied, is made. We do not guarantee project performance in any respect, only that our work meets normal standards of professional care. Environmental concerns, including (but not limited to) the possibility that hazardous materials or petroleum-contaminated soils or groundwater may be present on the subject site, were not included in the scope of work. The recommendations submitted in this report are based on the data obtained from our exploration program and our understanding of the proposed construction and loading conditions as described herein. This report may not account for any variations that may exist between conditions observed in the borings and conditions at locations that were not explored. The nature and extent of any such variations may not become evident until construction is underway. If variations are then observed, we should be requested to review the conclusions and recommendations in this report.

In the event any changes occur in the design, nature or location of any project facilities, we should be requested to review the conclusions and recommendations in this report. We also recommend that we be requested to review the final foundation drawings and earthwork specifications so that our recommendations may be properly interpreted and implemented in the contract documents.

It has been a pleasure to assist you on this phase of your project. Please contact us whenever we may be of service to you, and please call if you have any questions concerning this report.

ARDAMAN & ASSOCIATES, INC.

FL. Certificate of Authorization No. 5950

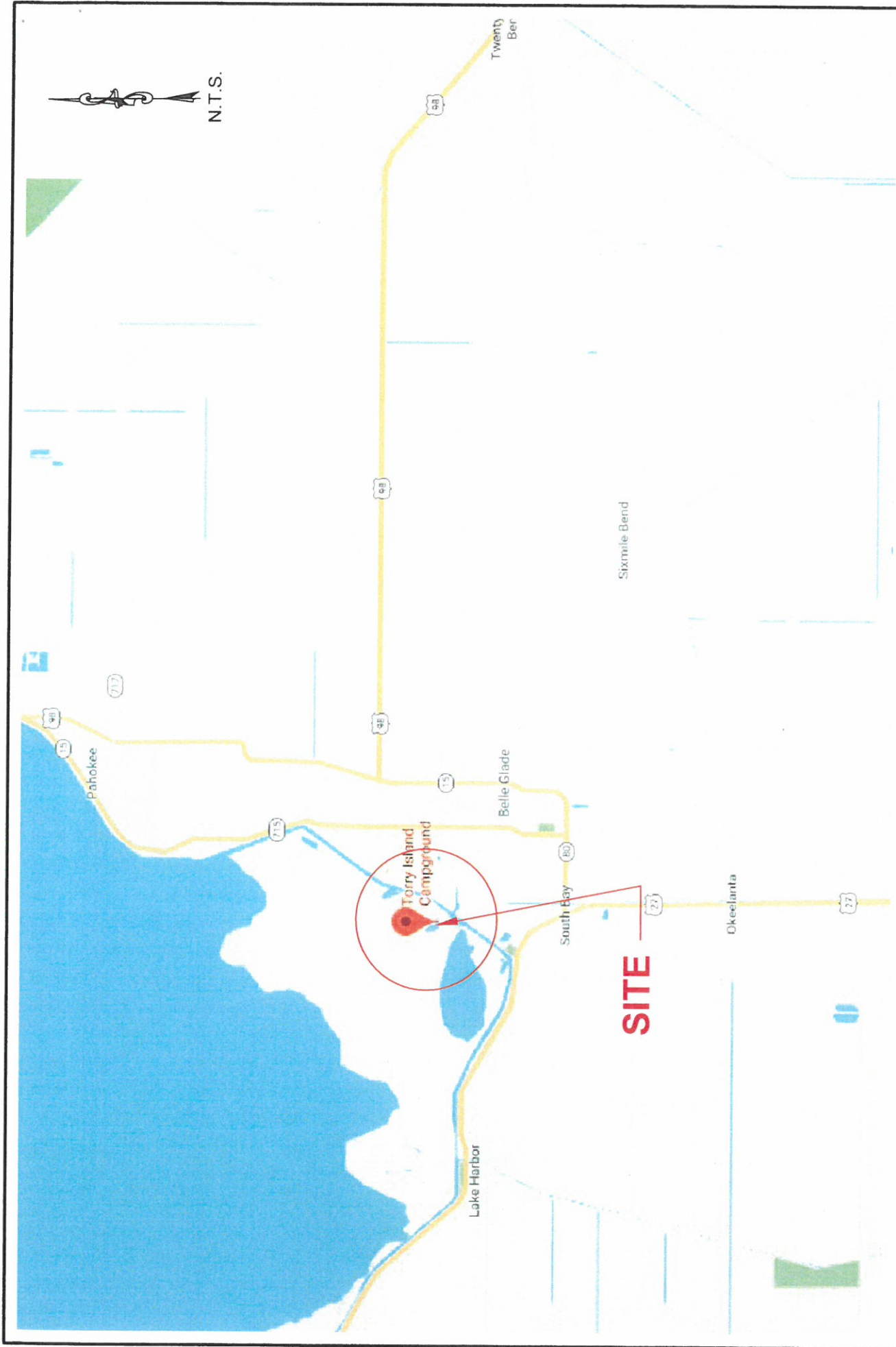
KA 5-24-19

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Attachments: Site Vicinity Map - Figure 1
 Boring Location Plan - Figure 2
 Subsurface Exploration Information
 SPT Boring Logs (5)
 FB Deep Estimated Davisson Pile Capacity Curves



 <p>Ardaman & Associates, Inc. Geotechnical, Environmental & Materials Consultants 2200 N. Florida Mango Road, Suite 101 West Palm Beach, Florida 33409 Phone: (561) 687 8200 / Fax: (561) 640 7375</p>	<p>SUBSURFACE EXPLORATION LAKESIDE WALL/BOARDWALK & DOCK TORREY ISLAND, FLORIDA</p>	<p>SITE VICINITY MAP Figure No. 1</p>	<p>File No.: 19-1624 Prepared By: KF Date: 5/08/19</p>
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SUBSURFACE EXPLORATION
 LAKESIDE WALL? BOARDWALK & DOCK
 TORREY ISLAND, FLORIDA

BORING LOCATION PLAN
 Figure No. 2

File No.: 19-1624
 Prepared By: KF
 Date: 5/08/19



BORING B-1

FILE No.: 19-1624

DRILL CREW: DG/MC

DATE DRILLED: 5/02/19

Depth (m)	Stratigraphic Unit	Grain Size	Color	Texture	Other	Notes
0 - 1	Black organic fine sand, trace limerock	2/6	Black	Organic	Trace limerock	
1 - 2	Light brown slightly clayey to silty fine sand, few limerock fragments, trace silty organics	3/6, 4/6, 5/6, 6/6	Light brown	Silty	Few limerock fragments, trace silty organics	
2 - 3	Gray silty fine sand, few limerock fragments, trace shell	3/6, 4/6, 5/6, 6/6	Gray	Silty	Few limerock fragments, trace shell	
3 - 4	Light brown silty fine sand, few shell and limerock fragments	3/6, 4/6, 5/6, 6/6	Light brown	Silty	Few shell and limerock fragments	
4 - 5	Black silty organics	2/6, 3/6, 4/6, 5/6, 6/6	Black	Silty	Organics	
5 - 6	Black silty organics, few fibrous peat lenses	2/6, 3/6, 4/6, 5/6, 6/6	Black	Silty	Organics, few fibrous peat lenses	
6 - 7	Gray silty fine sand, some shell and limestone fragments	1/6, 2/6, 3/6, 4/6, 5/6, 6/6	Gray	Silty	Some shell and limestone fragments	
7 - 8	Light brown silty fine sand, some silt lenses, few shell and limestone fragments	1/6, 2/6, 3/6, 4/6, 5/6, 6/6	Light brown	Silty	Some silt lenses, few shell and limestone fragments	
8 - 9	Gray silty fine sand, some shell and limestone fragments	1/6, 2/6, 3/6, 4/6, 5/6, 6/6	Gray	Silty	Some shell and limestone fragments	
9 - 10	Light brown to brownish gray slightly silty fine sand and shell, few	1/6, 2/6, 3/6, 4/6, 5/6, 6/6	Light brown to brownish gray	Silty	Light brown to brownish gray slightly silty fine sand and shell, few	

NOTES: Boring testing terminated at 60 feet.

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



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STANDARD PENETRATION TEST BORING LOG BORING B-1

PROJECT: Torry Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet (est. at 10-13' below grade)

DATE DRILLED: 5/02/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE
30		limestone fragments			
35	9/6 5/6 9/6 13/6	Gray silty fine sand, some shell and limestone fragments	11	14	
40	3/6 7/6 10/6 5/6	Gray slightly silty fine sand, some shell and limestone fragments	12	17	
45	2/6 2/6 2/6 3/6	Gray silty fine sand, some shell and limestone fragments	13	4	
50	50/1	(Driller's note: Hard drilling at about 47 feet.) No recovery (hard limestone)		50+	
55	2/6 3/6 2/6 4/6	(Driller's note: Softer drilling at about 50.5 feet.) Brown slightly silty fine sand, some shell and limestone fragments	14	5	
60	3/6 6/6 6/6 10/6	Gray slightly sandy to sandy fractured limestone, some shell fragments	15	12	

NOTES: Boring testing terminated at 60 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



STANDARD PENETRATION TEST BORING LOG

PROJECT: Torry Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet (est. at 10-13' below grade)

DATE DRILLED: 5/02/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE
		Boring testing terminated at 60 feet			
65					
70					
75					
80					
85					
90					

NOTES: Boring testing terminated at 60 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



Ardaman & Associates, Inc.

STANDARD PENETRATION TEST BORING LOG BORING B-2

PROJECT: Torry Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet (est. at 10-13' below grade) DATE DRILLED: 4/30/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE
0					0 5 10 15 20 25 30 35 40 45
	2/6 3/6 4/6 5/6 5/6 5/6 6/6 5/6	Black to very dark brown organic fine sand, some limerock fragments	1	7	
	4/6 4/6 4/6 4/6 8/6 5/6 4/6 4/6 4/6 5/6 5/6 4/6	Gray silty fine sand, some limerock	2	11	
5			3	8	
			4	9	
		Very dark brown silty organics, few peat lenses ("muck")	5	10	
10					
	1/6 1/6 1/6 2/6	No recovery		2	
15		(Driller's note: Harder drilling encountered at about 15.5 feet.)			
	1/6 2/6 1/6 24/6	Light brown silty fine sand, some limestone fragments	6	3	
20		Gray silty to sandy fractured limestone	7		
		(Driller's note: Softer drilling at about 21 feet.)			
	6/6 6/6 6/6 43/6	Gray slightly clayey to silty fine sand, some shell and limestone fragments	8	12	
25		Brown fractured limestone	9		
	1/6 2/6 2/6 10/6	Brownish gray silty fine sand, some limestone fragments	10	4	
30			11		

NOTES: Boring terminated at 30 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



Ardaman & Associates, Inc.

STANDARD PENETRATION TEST BORING LOG
BORING B-2

PROJECT: Torry Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet (est. at 10-13' below grade)

DATE DRILLED: 4/30/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE									
					5	10	15	20	25	30	35	40	45	50
30		Brownish gray to tan slightly clayey to silty fine sand, some shell fragments Boring terminated at 30 feet												
35														
40														
45														
50														
55														
60														

NOTES: Boring terminated at 30 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



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STANDARD PENETRATION TEST BORING LOG

BORING B-3

PROJECT: Torrey Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet (est. at 10-13' below grade)

DATE DRILLED: 4/30/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE
0					
0/6		Black organic fine sand, some limerock fragments	1	21	
8/6		Light brown slightly clayey to silty fine sand, some limestone fragments	2	13	
13/6			3	5	
11/6			4	5	
8/6			5	8	
7/6			6	65	
6/6			7	35	
6/6			8		
3/6			9		
3/6			10		
2/6			11		
1/6					
1/6					
2/6					
3/6					
4/6					
4/6					
4/6					
0/6					
21/6					
44/6					
50/6					
1/6					
5/6					
30/6					
20/6					
30/6					
47/6					
40/6					
11/6					
3/6					
2/6					
5/6					
14/6					

NOTES: Boring terminated at 50 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



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STANDARD PENETRATION TEST BORING LOG

BORING B-3

PROJECT: Torry Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet (est. at 10-13' below grade)

DATE DRILLED: 4/30/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE
30		Gray fine sand to slightly clayey fine sand, some shell			
35	5/6 45/6 11/6 10/6	Gray slightly silty to silty fine sand, some shell and limestone	12	56	56
40	4/6 4/6 5/6 6/6	Gray slightly silty fine sand, some shell, trace limestone	13	9	
45	4/6 3/6 2/6 2/6	Gray silty fine sand, some shell, few limestone fragments, few silt lenses	14	5	
		(Driller's note: Hard drilling noted at about 46.0 feet.)			
	50/2	No recovery (hard limestone)		50+	
50		Boring terminated at 50 feet			
55					
60					

NOTES: Boring terminated at 50 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



Ardaman & Associates, Inc.

STANDARD PENETRATION TEST BORING LOG BORING B-4

PROJECT: Torrey Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet.

DATE DRILLED: 4/30/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE										
					5	10	15	20	25	30	35	40	45	50	55
0		Dark brown slightly organic fine sand	1	20											
		Light brown limerock													
		Light brown silty fine sand, some shell and limerock	2	21											
			3	7											
5		Black silty organics, trace limerock fragments	4	3											
		Black silty organics, few fibrous peat lenses	5	4											
10															
		Gray, slightly silty fractured limestone	6	24											
15															
		Light brown silty fine sand, some limestone fragments	7	15											
20		Gray silty fine sand, some shell and limestone fragments	8												
		Light brown silty fine sand, some shell and limestone fragments	9	28											
25															
		Gray silty fine sand, some shell and limestone fragments	10	6											
30															

NOTES: Boring terminated at 30 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



Ardaman & Associates, Inc.

STANDARD PENETRATION TEST BORING LOG
BORING B-4

PROJECT: Torry Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet.

DATE DRILLED: 4/30/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE									
					10	15	20	25	30	35	40	45	50	55
30		Boring terminated at 30 feet												
35														
40														
45														
50														
55														
60														

NOTES: Boring terminated at 30 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



Ardaman & Associates, Inc.

STANDARD PENETRATION TEST BORING LOG

BORING B-5

PROJECT: Torrey Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet (est. at 10-13' below grade)

DATE DRILLED: 5/01/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE										
					0	5	10	15	20	25	30	35	40	45	50
0		Very dark brown to black organic fine sand, few limnerock fragments	1	14											
		Light brown slightly clayey to silty fine sand, few limnerock fragments	2	11											
5		Black silty organics, few reddish brown fibrous peat lenses	3	7											
			4	9											
10				7											
		Brown limestone	5	52											
15		(Driller's note: softer drilling at about 16 feet.)													
		Light brown silty fine sand, some shell, few limestone fragments	6												
20		Brownish gray silty fine sand, some limestone fragments	7	45											
		Light brown silty fine sand, some shell and limestone fragments	8	30											
25		Light brown slightly silty fine sand, some shell, trace limestone	9	18											
30															

NOTES: Boring terminated at 60 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates



Ardaman & Associates, Inc.

STANDARD PENETRATION TEST BORING LOG BORING B-5

PROJECT: Torry Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet (est. at 10-13' below grade)

DATE DRILLED: 5/01/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE
					5 10 15 20 25 30 35 40 45
30					
35	27/6 12/6 8/6 50/5	Gray slightly silty fine sand, some shell and limestone fragments	10	20	
40	5/6 6/6 24/6 14/6	Brownish gray slightly silty fine sand, some shell and limestone fragments	11	30	
45	2/6 2/6 2/6 1/6	Gray silty fine sand, some shell and limestone fragments	12	4	
50	50/1	No recovery (hard limestone) (Driller's note: Softer drilling at about 50 feet.)		50+	
55	4/6 3/6 4/6 4/6	Brown slightly silty fine sand, some shell, trace limestone	13	7	
60	4/6 5/6 5/6 8/6	Gray sandy fractured limestone, some shell	14	10	

NOTES: Boring terminated at 60 feet.

FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates

Ardaman & Associates, Inc.

STANDARD PENETRATION TEST BORING LOG

BORING B-5

PROJECT: Torry Island Lakeside Wall & Boardwalk
Belle Glade, Florida

FILE No.: 19-1624

BORING LOCATION: As per plan

DRILL CREW: DG/MC

WATER OBSERVED AT DEPTH Greater than 10 feet (est. at 10-13' below grade)

DATE DRILLED: 5/01/19

DEPTH (FEET)	SYMBOLS FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE No.	N VALUE	N VALUE
60		Boring terminated at 60 feet			
65					
70					
75					
80					
85					
90					

NOTES: Boring terminated at 60 feet.

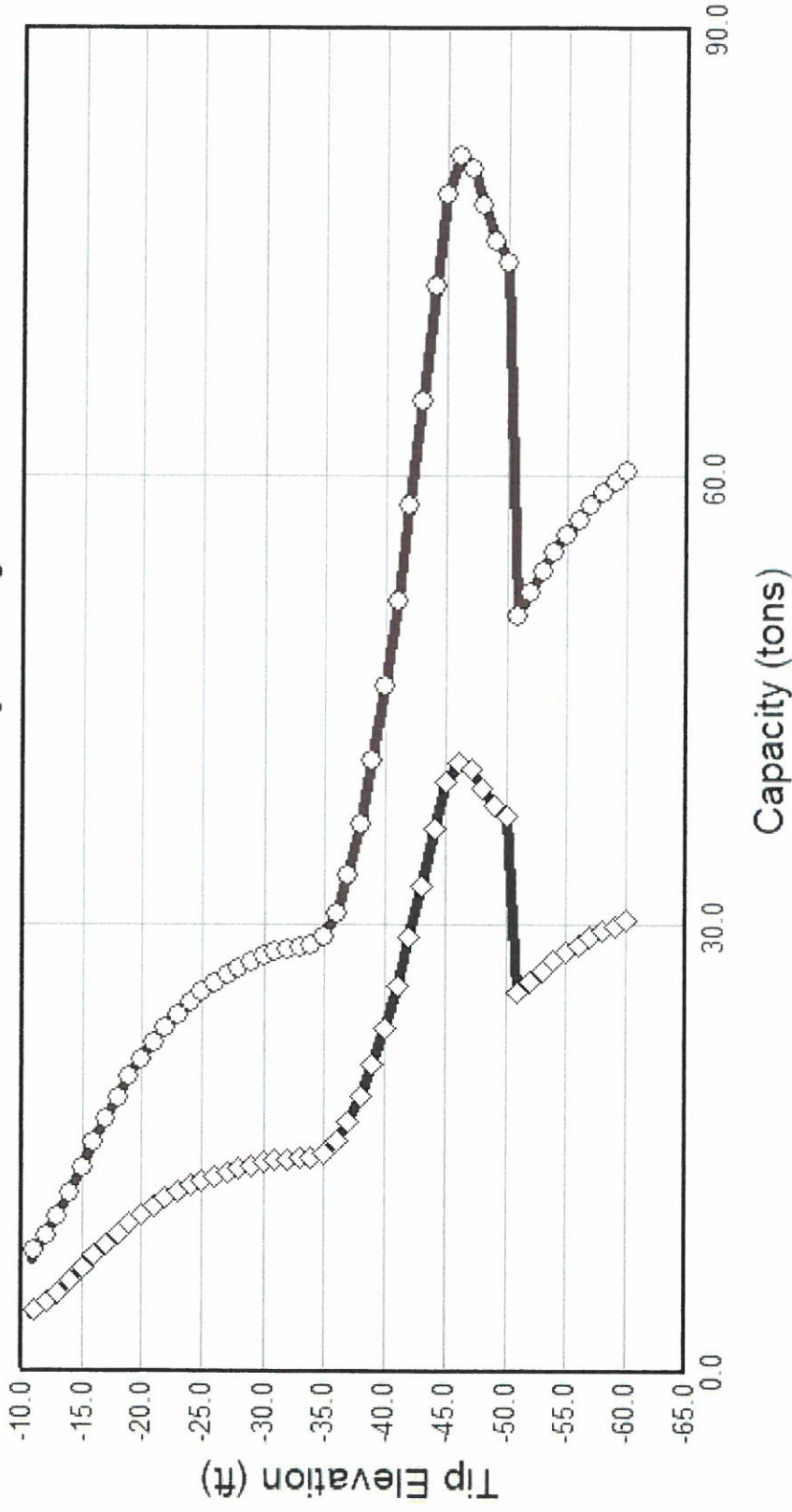
FIELD TEST DATA ARE "BLOWS"/"INCHES DRIVEN"

140-LB HAMMER, 30-INCH FALL.

(ASTM D-1586)

Ardaman & Associates

Driven Pile Capacity: IDs 1-51



Curves

- ☐ Ultimate Side Friction
- ☐ Mobilized End Bearing
- ☐ Ultimate Pile Capacity
- ☒ Estimated Davisson Capacity
- ☒ Allowable Pile Capacity

*The 'Save to File' button saves the currently selected Curves to a text file.

Driven Pile Data

Boring Number: 0.00 (ft)
Ground Surface Elevation
Section: Square
Width: 14.00 (in)

Project Data

File: *****
Date: May 08, 2019
Engineer: KF

Analysis Data

Analysis Type: SPT