

REPORT OF
ADDITIONAL STORMWATER POND SOILS
STUDY

CONDUCTED OF

EPPERSON RANCH
Pasco County, Florida

PREPARED FOR:

EPPERSON RANCH, LLC
2502 N. Rocky Point Drive, Suite 1050
Tampa, Florida 33607

FES PROJECT NO. 09-1133

DECEMBER, 2009

PREPARED BY:



2734 Causeway Center Drive
Tampa, Florida 33619

December 30, 2009

Mr. Kartik Goyani
Epperson Ranch, LLC
2502 N. Rocky Point Drive, Suite 1050
Tampa, FL 33607

**RE: Report of Additional Stormwater Pond Soils Study
Epperson Ranch
Pasco County, Florida
FES Project No.: 09-1133**

Dear Mr. Goyani:

Faulkner Engineering Service, Inc. (FES) has completed the additional stormwater pond soils study for the referenced project. We provided our services in general accordance with our proposal No. P09-10611, dated December 9, 2009 that was authorized by Mr. Mike Lawson as a representative of Epperson Ranch, LLC. The purpose of the exploration was to explore the subsurface soil and groundwater conditions within planned stormwater pond areas to provide an opinion on the suitability of encountered soil for use as structural fill and estimated seasonal high groundwater levels. This report summarizes the field exploration performed by FES and presents our findings, conclusions and geotechnical engineering recommendations

PROJECT INFORMATION

Existing Site

Epperson Ranch is an approximately 1700+/- acre site located west of Curley Road and north and south of Elam Road in Pasco County, Florida. The site is currently undeveloped and used as pasture land for cattle. An abandoned nursery was observed in the southern portion of the site.

The site topography is generally level to gently sloping with approximate elevation changes on the order of 20+/- feet. Several wetlands were observed throughout the property during our site visit as well as a large body of water (King Lake) in the north portion of the site. Irrigation ditches were observed at the abandoned nursery.

Soil Survey Review

According to the "Soil Survey of Pasco County, Florida", as prepared by the U.S. Department of Agriculture Natural Resource Conservation Service (formerly the Soil Conservation Service) the subject property is primarily underlain by:

- *Pomona fine sand* – The NRCS describes this soil unit as nearly level and poorly drained, located on low ridges. The NRCS indicates that this soil unit has a surface layer of black fine sand about 6 inches thick that is underlain by gray, gray-brown, dark brown and pale brown fine sand to about 4 feet. Below the upper sands are gray fine sandy loam and loamy fine sand to about 6½ feet or more. The NRCS indicates the seasonal high groundwater level is within 10 inches of ground surface for 1 to 3 months.
- *Kendrick fine sand, 0 to 5 percent slopes* – The NRCS describes this soil unit as well drained, nearly level to gently sloping, located in the uplands. The NRCS indicates that this soil unit has a surface layer of dark grayish brown fine sand about 7 inches thick underlain by yellowish brown, light yellowish brown and brownish yellow fine sand to a depth of about 28 inches. Below the upper sands is yellowish brown sandy clay loam to about 14 inches thick underlying by mottled brownish yellow sandy clay loam to a depth of about 73 inches. Below is mixed very pale brown, reddish yellow and pink sandy clay loam to a depth of 80 inches. The NRCS indicates the seasonal high groundwater level is below 72 inches.

- *Lochloosa fine sand, 0 to 5 % slopes* – The NRCS describes this soil as nearly level to gently sloping, somewhat poorly drained on the uplands. The NRCS indicates this unit typically has a surface layer of very dark gray fine sand about 7 inches thick underlain by brown and very pale brown fine sand to a depth of about 35 inches. Below is yellowish brown fine sandy loam about 6 inches thick, underlain by yellowish brown and light gray sandy clay loam to a depth of 80 inches. The NRCS indicates the seasonal high water table is at a depth of 30 to 60 inches for 1 to 4 months and rises to a depth of about 15 inches for 1 to 3 weeks during rainy seasons. Water table recedes to a depth of more than 60 inches in the dry season.
- *Newnan fine sand, 0 to 5 percent slopes* – The NRCS describes this soil unit as poorly drained, located in the low ridges in the flatwoods. The NRCS indicates that this soil unit has a surface layer of dark gray fine sand about 5 inches thick that is underlain by light brownish gray to a depth of about 22 inches. Below is dark brown, dark yellowish brown, yellowish brown and pale brown to a depth of 44 inches. Below the upper sands is yellowish brown sandy clay loam to about 14 inches thick underlying by mottled brownish yellow and grayish brown sandy clay loam to a depth of 80 inches or more. The NRCS indicates the seasonal high groundwater level is at a depth of about 24 to 40 inches for about 2 to 4 months and recedes to more than 60 inches during dry periods.
- *Palmetto, Zephyr, Seller complex* –The NRCS describes Palmetto unit as nearly level and very poorly drained. The NRCS indicates that typically this unit has a surface layer of black and very dark gray fine sand about 4 inches thick that grades to gray fine sand about 6 inches thick underlain by very dark grayish brown that grades to dark brown, brown fine sand to a depth of about 28 inches. Below is pale brown fine sand to a depth of 46 inches underlying by light brownish gray sandy clay to a depth of 57 inches. Below is light gray sandy loam that grades to gray to a depth of 80 inches or more. The NRCS indicates that under natural conditions the seasonal high groundwater level is within 10 inches of the surface for 2 to 6 months and recedes at a depth of 10 to 30 inches for more than 6 months. Also, flooding occurs frequently during the rainy season. The NRCS describes Zephyr unit as nearly level and very poorly drained. The NRCS indicates that typically this unit has a surface layer of black muck about 5 inches thick and black fine sand about 7 inches thick that grades to light gray fine sand about 4 inches thick underlain by grayish brown that grades to a depth of 22 inches. Below is grayish brown fine sandy loam that grades to dark grayish brown sandy clay to a depth of 37 inches. Below is grayish brown sandy clay loam about 22 inches thick underlying by light gray loamy fine sand to a depth of 80 inches or more. The NRCS indicates this soil unit is ponded for more than 6 months. The NRCS describes Sellers unit as nearly level and very poorly drained. The NRCS indicates that typically this unit has a surface layer of dark reddish brown mucky loamy fine sand about 5 inches thick and black fine sand about 28 inches thick that grades to dark brown and yellowish brown fine sand to a depth of 80 inches or more. The NRCS indicates this soil unit is ponded for 3 to 6 months and recedes to a depth of about 30 inches or more during dry seasons.
- *Millhopper fine sand, 0 to 5 percent slopes* – The NRCS describes this soil as nearly level to gently sloping and moderately well drained soils located in the uplands. The NRCS indicates this unit typically has a surface layer of dark gray fine sand about 3 inches thick underlain by grayish brown fine sand to a depth of about 7 inches. Below is very pale brown, light yellowish brown, yellowish brown fine sand to a depth of about 59 inches. Underlain the fine sands is gray sandy clay loam to a depth of 80 inches or more. The NRCS indicates the seasonal high water table is at a depth of 40 to 60 inches for 1 to 4 months and recedes to a depth of 60 to 72 inches for 2 to 4 months in most years. In very wet years, the water table can be found at a depth of 30 to 40 inches for a period of 1 to 3 weeks.

Minor inclusions of these soil types are included within the limits of the property under study:

- *Sparr fine sand, 0 to 5 percent slopes* – The NRCS describes this soil unit as nearly level to gently sloping, and poorly drained, located on low ridges. The NRCS indicates that this soil unit has a surface layer of dark gray fine sand about 6 inches thick that is underlain by grayish brown, pale brown and light yellowish brown fine sand to about 43 inches. Below the upper sands is light yellowish brown sandy clay loam to about 80 inches. The NRCS indicates the seasonal high groundwater level is between 20 to 40 inches for 1 to 4 months.
- *Sellers mucky loamy fine sand* – The NRCS describes this unit as nearly level and very poorly drained and located in depressions. The NRCS indicates this soil unit has a surface layer of black muck about 2 inches thick underlain by black mucky loamy fine sand to about 1 foot. Below to about 6½ feet or more is dark brown, dark yellow brown and pale brown fine sand. The NRCS indicates in most years this soil is ponded during wet seasons for 3 to 6 months and the water table is within 10 inches for 6 to 12 months.
- *Adamsville fine sand* - The NRCS describes this soil as nearly level and somewhat poorly drained. The NRCS indicates this unit typically has a surface layer of dark gray fine sand about 3 inches thick underlain by grayish brown, pale brown, light gray and white fine sand to a depth about 6½ feet or more. The NRCS indicates in most years the seasonal high water table is at a depth of 20 to 40 inches for 2 to 6 months.
- *Urban sand* – The NRCS describes this unit as a soil that has been modified through cutting, grading, shaping, and filling for urban development. The soils has been so altered that identification is not feasible.
- *Kanapaha fine sand* - The NRCS describes this soil as nearly level to gently sloping, somewhat poorly drained located in the flatwoods. The NRCS indicates this unit typically has a surface layer of very dark gray fine sand about 6 inches thick that grades to light brownish gray fine sand about 7 inches thick underlying by light gray fine about 32 inches thick and white fine sand to a depth of 66 inches. Below is light brownish gray fine sandy loam to a depth of 80 inches. The NRCS indicates the seasonal high water table is at a depth less than 10 inches for 1 to 3 months, between 10 to 40 inches for 3 to 4 months and recedes to a depth of more than 40 inches during dry seasons.

SUBSURFACE EXPLORATION

Field Exploration

During our field exploration on December 15, 2009 through December 28, 2009, forty-one (41) standard penetration test (SPT) borings were drilled to a depth of 25 feet below ground surface (bgs) within the planned stormwater ponds at or near latitude and longitude coordinates provided by Hamilton Engineering and Surveying, Inc. The procedures used by FES for field sampling and testing were in general accordance with ASTM procedures, industry standards of care and established geotechnical engineering practice.

The standard penetration test (SPT) borings were advanced by means of truck accessible drilling equipment employing wet rotary drilling techniques. The drillers collected soil samples using a split barrel sampler driven by an automatic hammer system in general accordance with standard penetration test procedures (ASTM D1586). The standard penetration test was performed continuously in the upper ten feet of the borings and at five-foot intervals thereafter.

The samples recovered from the standard penetration test were placed in sealed containers and transported to the FES laboratory for further evaluation. Detailed descriptions of the soils encountered during the field exploration are presented on the attached Boring Logs in Appendix A.

A member of our staff was onsite during the fieldwork to monitor the drilling and also perform a brief cursory site reconnaissance, noting pertinent site and topographic features as well as surface indicators of soil conditions. FES staff personnel located the borings by using a handheld GPS navigation device with latitude and longitude coordinates provided by Hamilton Engineering and Surveying and correlating with a Boring Location Plan also provided by Hamilton Engineering and Surveying. Because of the methods used, the boring locations shown on the attached Boring Location Plan (Plan 1) should be considered approximate.

Soil Sample Handling and Classification

The soil samples obtained during our drilling operations were placed in sealed containers to retain moisture and returned to our laboratory. The samples were visually classified by a staff geotechnical engineer according to the "Unified Soil Classification System" (ASTM D2487) and reviewed by a Senior Professional Engineer.

FINDINGS

Subsurface Conditions

General Soil Profile

The conditions presented below highlight the major subsurface stratifications encountered during our field exploration of the site. More detailed descriptions of the materials encountered are provided on the attached soil profiles. It should be understood that subsurface conditions will vary across this site and between boring locations. Changes in subsurface strata may be more gradual than indicated.

The major subsurface stratifications encountered in the stormwater pond borings during the field exploration of the site consisted of varying colored fine sand (SP), fine sand with trace silt and clay (SP-SM/SP-SC), clayey sand (SC) and silty sand (SM) from the present ground surface to depths ranging from 2 feet to approximately 18 feet (bgs). These soils were also encountered at various depths and thicknesses interbedded within strata of clay soils. Underlying the upper sands were varying thicknesses of sandy clay (CL) and clay (CH) extending to the termination of the borings at 25 feet (bgs).

Groundwater

Groundwater was encountered in our SPT borings at depths ranging from 2 feet below the current ground surface to not encountered at the time of drilling. Rotary wash drilling introduces drilling fluids into the bore hole that can interfere with a direct and accurate measurement of the groundwater level. Groundwater levels will fluctuate with time due to seasonal rainfall and locally heavy precipitation events; therefore, future groundwater levels may be encountered at depths different from those indicated by our borings. Please refer to the attached Groundwater Data Table (Table 1) for the groundwater conditions at the time of drilling and our estimates for seasonal high groundwater table.

The seasonal high water table is typically encountered during late summer following the rainy season. Several factors can affect the seasonal high groundwater level such as drainage characteristics of the soils; land surface elevation; and relief points such as lakes, rivers and swamps. Based on our past experience, the soil indicators exposed in our borings and review of the soil survey for Pasco County, we estimate the seasonal high groundwater level within the areas explored may be encountered perched above the clay soils at depths ranging from 0.5 feet to 4.0 feet below the current ground surface.

CONCLUSIONS

Our geotechnical engineering evaluation of this site and our recommendations with respect to the proposed stormwater ponds are based on our site observations and the field exploratory data obtained from our borings. We anticipate the soils excavated from the proposed stormwater pond will be used for fill material onsite.

Our SPT borings performed within the proposed stormwater ponds at this property generally encountered fine sands (SP), fine sands with trace of clay and silt (SP-SC/SP-SM), clayey sands (SC) and silty sands (SM) from the present ground surface to depths ranging from 2 to approximately 18 feet (bgs) and interbedded with the clays at various depths and thicknesses. The SP and SP-SC/SP-SM soils if excavated will provide a good source for structural fill during site development. The SC and SM soils will also provide a source of structural fill provided they conform to the requirements presented in the following sections of this report. Underlying the upper sands was sandy clay (CL) and clay (CH) extending to the termination of borings at 25 feet (bgs). The CL and CH soils should be considered unsuitable for use as structural fill.

The groundwater was encountered at depths ranging from 2 feet below current ground surface to not encountered within the depths explored at the time of drilling. We estimate seasonal high groundwater levels within the areas explored may be encountered at depths ranging from the 0.5 feet to 4 feet below current ground surface.

It should be noted that subsurface conditions can vary across this site and between boring locations. Conditions can also vary in areas not explored by our borings. Contractors bidding earthwork requirements are urged to conduct their own borings, test pits or other investigations to determine those conditions that may affect their specific work requirements. FES can not be responsible for interpretations made by others based on the information contained in this report and the attachments.

RECOMMENDATIONS

Borrow Areas

Structural Fill Suitability

Definition

The preferred soil used for structural fill and backfill can be defined as clean fine sand containing less than twelve percent material by weight that is finer than a number 200 sieve (material conforming to SP to SP-SM or SP-SC in the Unified Soils Classification System).

Encountered material containing up to 35 percent fines (materials conforming to SC or SM in the Unified Soil Classification System) may also be utilized as structural fill, provided their plasticity index is less than 10, and the working subgrade is above the existing groundwater level.

Any muck or organic soil if encountered on site will not be suitable for fill and should be disposed of offsite or placed in landscape areas and used for planting purposes. Because of the variability of the subsurface soils encountered, additional laboratory testing should be performed on the excavated material during grading and earthwork activities to evaluate its suitability for use as fill material.

Soil Suitability

The limited borings performed at this property suggest sands conforming to SP to SP-SM or SP-SC soils are present from ground surface to depths ranging from 2 feet to approximately 13 feet (bgs) with an average depth in the areas explored of approximately 5 feet (bgs).

Groundwater Control

Groundwater will likely be encountered during excavation and fill placement activities and may also be encountered during stripping and undercutting in some areas. Dewatering may be accomplished by either draining the water to sumps which can then be pumped away from the area or by the use of sanded, vacuum well points. Groundwater fluctuations can occur due to variations in rainfall and other site specific factors. These variations should be considered when planning earthwork activities.

An alternative to dewatering in shallow undercut areas where groundwater is encountered is to use clean sand classified as SP material (less than 5% fines) according to the Unified Soil Classification System as a first lift through any standing water. This first lift will create a platform to place and compact additional fill material upon.

LIMITATIONS

This report has been prepared for the exclusive use of **Epperson Ranch, LLC** and their designers for the specific application to the project previously discussed. Our conclusions and recommendations have been rendered using generally accepted standards of geotechnical engineering and geology practice in the state of Florida. No other warranty is expressed or implied.

Our conclusions and recommendations are based on the design information furnished to us, the data obtained from the previously described subsurface exploration, and our experience. They do not reflect variations in the subsurface conditions that are likely to exist in the region of our borings and in unexplored areas of the site. These variations are due to the inherent variability of the subsurface conditions in this geologic region. Should variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon our on-site observations of the conditions.

Florida is underlain by limestone bedrock that is susceptible to dissolution and the subsequent development of karst features such as voids and sinkholes in the natural soil overburden. Construction in a sinkhole prone area is therefore accompanied by some risk that internal soil erosion and ground subsidence could affect new structures in the future. It is not possible to investigate or design to completely eliminate the possibility of future sinkhole related problems. In any event, the Owner must understand and accept this risk.

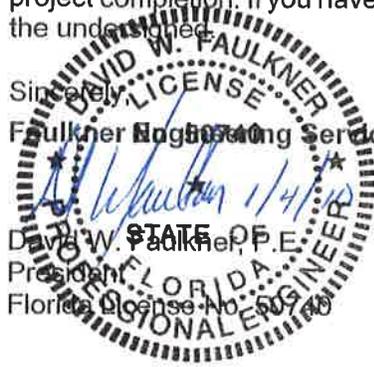
The scope of our services does not include any environmental assessments or investigations for the possible presence of hazardous or toxic materials in the soil, groundwater or surface water within or in the general vicinity of the site studied. Any statements made in this report or shown on the test boring logs regarding unusual subsurface conditions and/or composition, odor, staining, origin or other characteristics of the surface and/or subsurface materials are strictly for the information of our client and may or may not be indicative of an environmental problem.

If changes are made in the overall design or the location of the proposed stormwater ponds, the recommendations presented in this report must not be considered valid unless the changes are reviewed by our firm and recommendations modified or verified in writing. We should be given the opportunity to review the grading plan and the applicable portions of the project specifications when the design is finalized. This review will allow us to check whether these documents are consistent with the intent of our recommendations.

CLOSING

Faulkner Engineering Services Inc. appreciates the opportunity to be of service to **Epperson Ranch, LLC** by providing these geotechnical consulting services and we look forward to assisting you through project completion. If you have any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,
Faulkner Engineering Services, Inc.



David W. Faulkner, P.E.
President
Florida License No. 60740

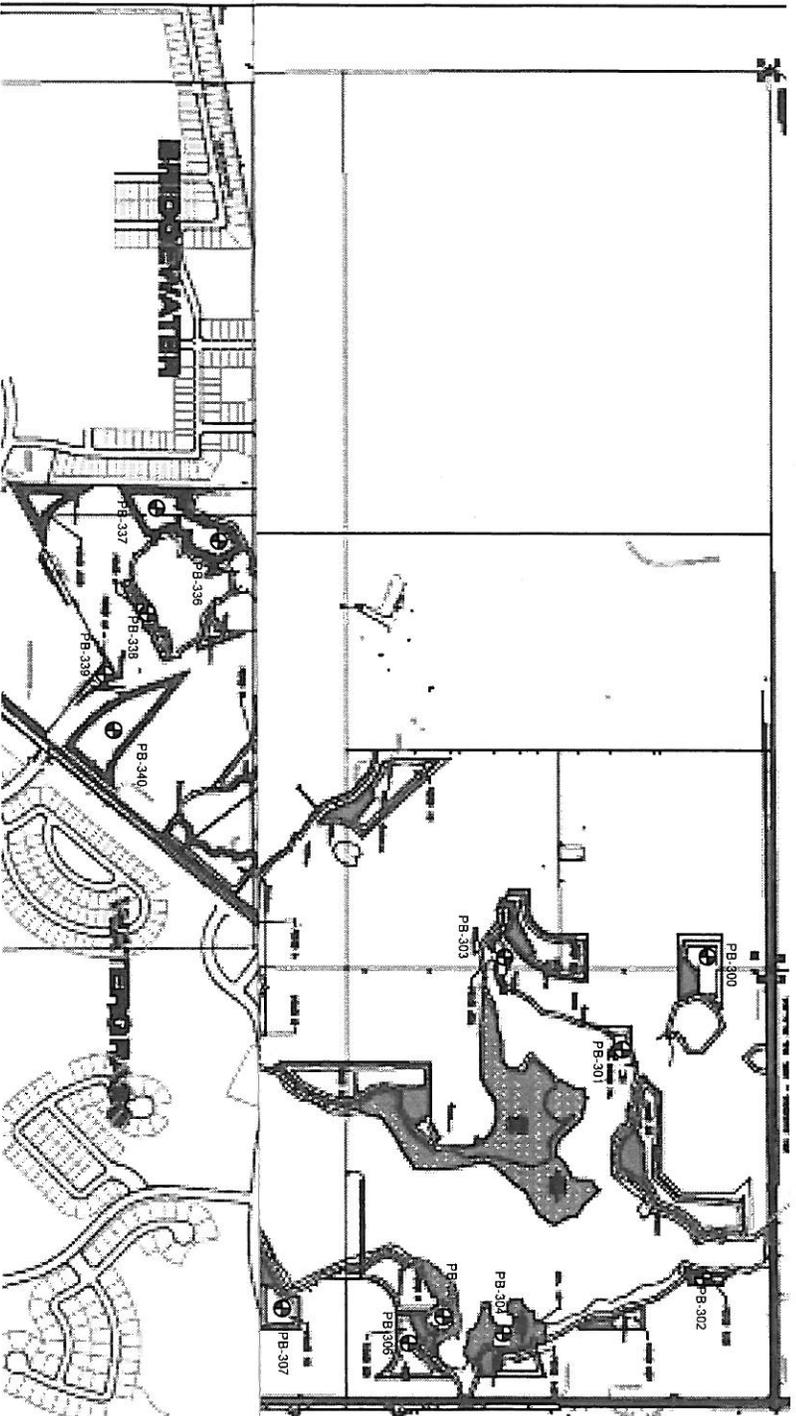
Copy to: Hamilton Engineering and Surveying, Inc. (Ms. Heather E. Wertz, P.E.)

Attachments: Boring Location Plan (Plan 1)
Generalized Soil Profiles
Groundwater Data (Table 1)
ASFЕ Information

Appendix A: Logs of Soil Borings

Appendix B: Key to Soil Classifications

BORING LOCATION PLAN



LEGEND

⊕ APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING
PB-308

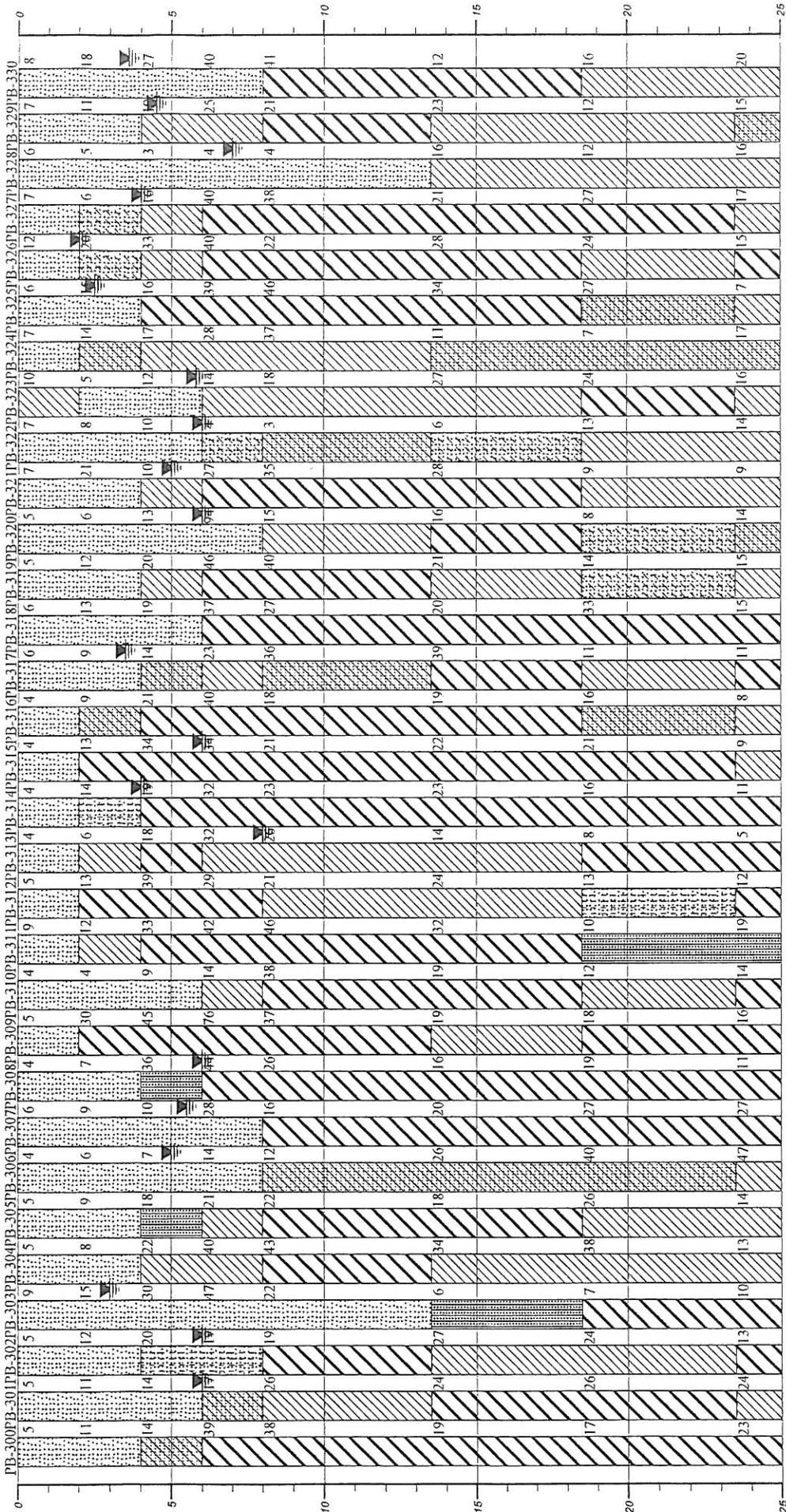
Geotechnical Engineers
Construction Material Testin

FAULKNER
ENGINEERING SERVICES, INC.
2734 Causeway Center Dr
Tampa, Florida 33619
PHONE: 813.621.8168
FAX: 813.621.8232
www.faulknereng.com

EPPERSON RANCH

DATE:	01.04.10	SCALE:	N.T.S.	JOB NO.	09-1133
DRAWN:	WK				
CHKD:	DF				PLAN 1

Depth in Feet



Depth in Feet

Plan View

Strata symbols

- Poorly graded sand
- Clayey sand
- High plasticity clay
- Low plasticity clay

- Poorly graded sand with silt
- Silty sand
- Poorly graded sand with clay

GENERALIZED SOIL PROFILE

HORIZONTAL SCALE: 1"=5'

DRAWN BY/APPROVED BY

DATE DRAWN

12/29/2009

Epperson Ranch Additional Stormwater Pond Soils

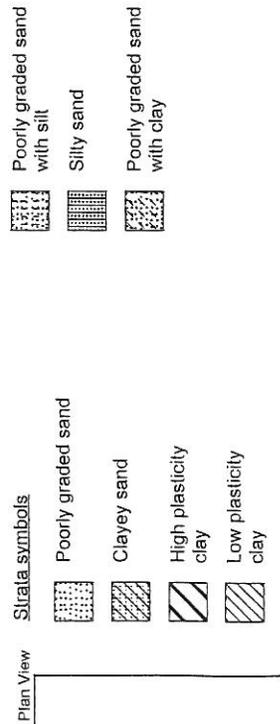
Study

PROJECT NO. 09-1133

FIGURE NUMBER

Depth in Feet

Depth in Feet



GENERALIZED SOIL PROFILE

HORIZONTAL SCALE:	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=5'		12/29/2009

Epperson Ranch Additional Stormwater Pond Soils Study

PROJECT NO. 09-1133

FIGURE NUMBER

Table 1 Groundwater Data

Project Name: Epperson Ranch Additional Stormwater Pond		FES Project No.: 09-1133			
Boring No.	Ground Elevation (ft) ¹	Groundwater Data at Time of Drilling		Estimated Seasonal High Watertable	
		Elevation (ft)	Depth (ft)	Elevation (ft)	Depth (ft)
SPT Borings					
PB-300	Unknown	--	N.E.	Unknown	1.5
PB-301	Unknown	--	6	Unknown	1.5
PB-302	Unknown	--	6	Unknown	2.0
PB-303	Unknown	--	3	Unknown	1.2
PB-304	Unknown	--	N.E.	Unknown	2.0
PB-305	Unknown	--	N.E.	Unknown	2.5
PB-306	Unknown	--	5	Unknown	2.0
PB-307	Unknown	--	5.5	Unknown	2.5
PB-308	Unknown	--	6	Unknown	2.5
PB-309	Unknown	--	N.E.	Unknown	2.5
PB-310	Unknown	--	N.E.	Unknown	4.0
PB-311	Unknown	--	N.E.	Unknown	1.0
PB-312	Unknown	--	N.E.	Unknown	2.0
PB-313	Unknown	--	8	Unknown	2.5
PB-314	Unknown	--	4	Unknown	1.5
PB-315	Unknown	--	6	Unknown	2.0
PB-316	Unknown	--	N.E.	Unknown	2.5
PB-317	Unknown	--	3.5	Unknown	1.8
PB-318	Unknown	--	N.E.	Unknown	3.0
PB-319	Unknown	--	N.E.	Unknown	2.3
PB-320	Unknown	--	6	Unknown	3.8
PB-321	Unknown	--	5	Unknown	1.8
PB-322	Unknown	--	6	Unknown	3.0
PB-323	Unknown	--	5.8	Unknown	2.0
PB-324	Unknown	--	--	Unknown	2.3
PB-325	Unknown	--	2.5	Unknown	1.0
PB-326	Unknown	--	2	Unknown	0.7
PB-327	Unknown	--	4	Unknown	1.0
PB-328	Unknown	--	7	Unknown	3.0
PB-329	Unknown	--	4.5	Unknown	1.8
PB-330	Unknown	--	3.6	Unknown	1.3
PB-331	Unknown	--	4	Unknown	1.8
PB-332	Unknown	--	3	Unknown	1.0
PB-333	Unknown	--	3	Unknown	0.8
PB-334	Unknown	--	2	Unknown	0.5
PB-335	Unknown	--	6	Unknown	1.8
PB-336	Unknown	--	4	Unknown	1.2
PB-337	Unknown	--	6	Unknown	1.8

Table 1 Groundwater Data					
Project Name: Epperson Ranch Additional Stormwater Pond			FES Project No.: 09-1133		
Boring No.	Ground Elevation (ft)¹	Groundwater Data at Time of Drilling		Estimated Seasonal High Watertable	
		Elevation (ft)	Depth (ft)	Elevation (ft)	Depth (ft)
SPT Borings					
PB-338	Unknown	--	5	Unknown	1.7
PB-339	Unknown	--	2.5	Unknown	0.7
PB-340	Unknown	--	3	Unknown	1.3

Notes:

1. Ground Elevations were not provided at time of drilling.
 N.E. - Not Encountered

Important Information About Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one—not even you—*should apply the report for any purpose or project except the one originally contemplated.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions *only* at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an *opinion* about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

APPENDIX A
Logs of Soil Borings

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°18'05.5751"/LON:82°17'13.7333"

Driller: Orlando Geotechnical Drilling

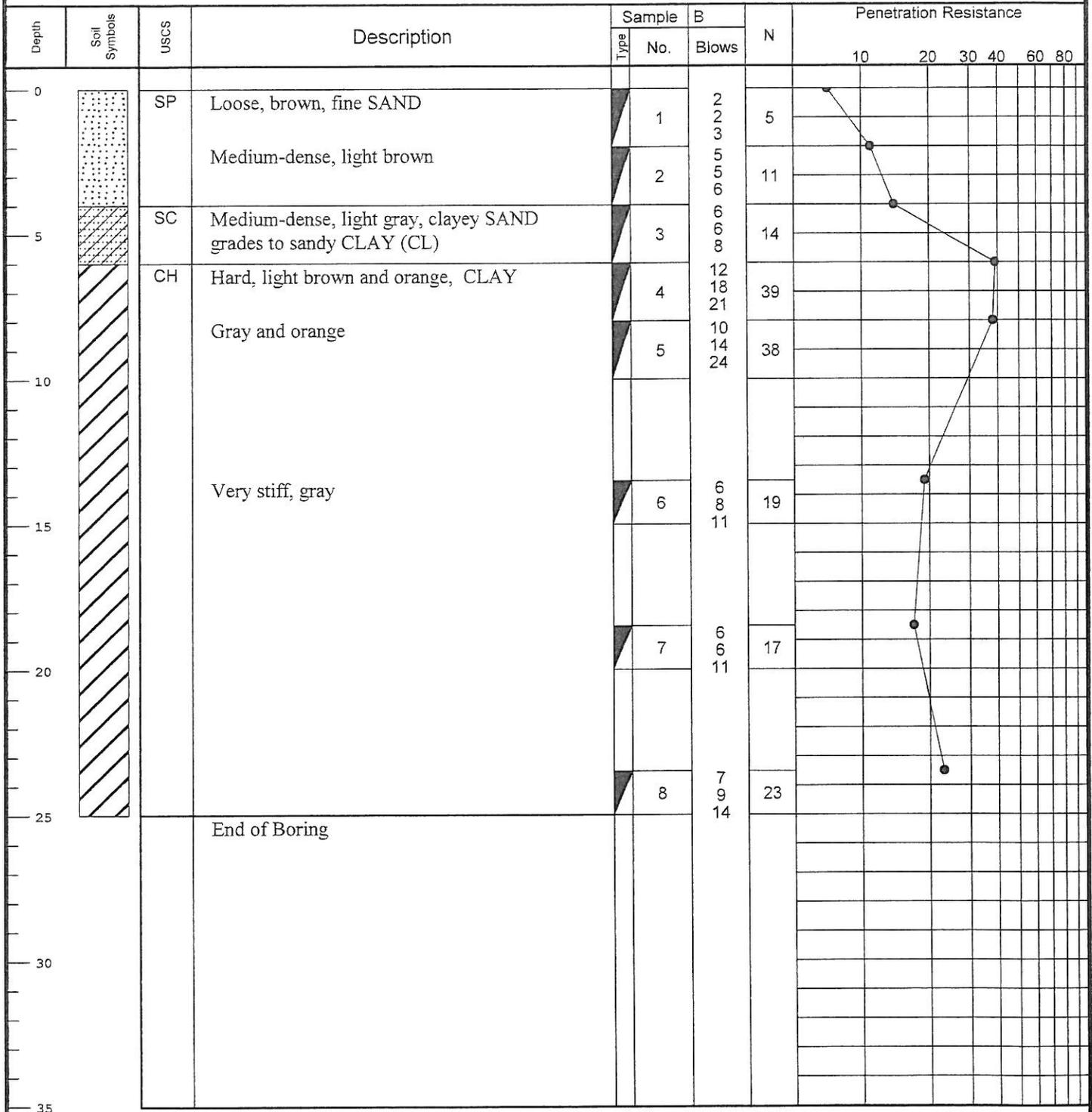
Drill Rig: Mobile B-47

Depth to Water > Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : N.E.



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°18'00.7178"/LON:82°17'07.4941"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water > Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : 6'

Depth	Soil Symbols	USCS	Description	Sample		N	Penetration Resistance											
				Type	No.		B	Blows	10	20	30	40	60	80				
0	[Dotted pattern]	SP	Loose, brown, fine SAND	[Dark triangle]	1	2	5											
			Medium-dense, light brown					2	3	11								
			Light gray								3	5	14					
5	[Diagonal lines]	SC	Medium-dense, light brown, clayey SAND	[Dark triangle]	4	7	17											
			Very stiff, gray, sandy CLAY					5	7	26								
10	[Diagonal lines]	CL	Very stiff, gray, sandy CLAY	[Dark triangle]	5	10	26											
			Very stiff, gray and orange, CLAY					6	7	24								
15			Very stiff, gray and orange, CLAY								7	10	14					
20	[Diagonal lines]	CH	Very stiff, gray and orange, CLAY	[Dark triangle]	7	8	26											
			Very stiff, gray, sandy CLAY					8	8	24								
25	[Diagonal lines]	CL	Very stiff, gray, sandy CLAY	[Dark triangle]	8	6	8				24							
			End of Boring			8												
30																		
35																		

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'53.3109"/LON:82°17'13.5697"

Driller: Orlando Geotechnical Drilling

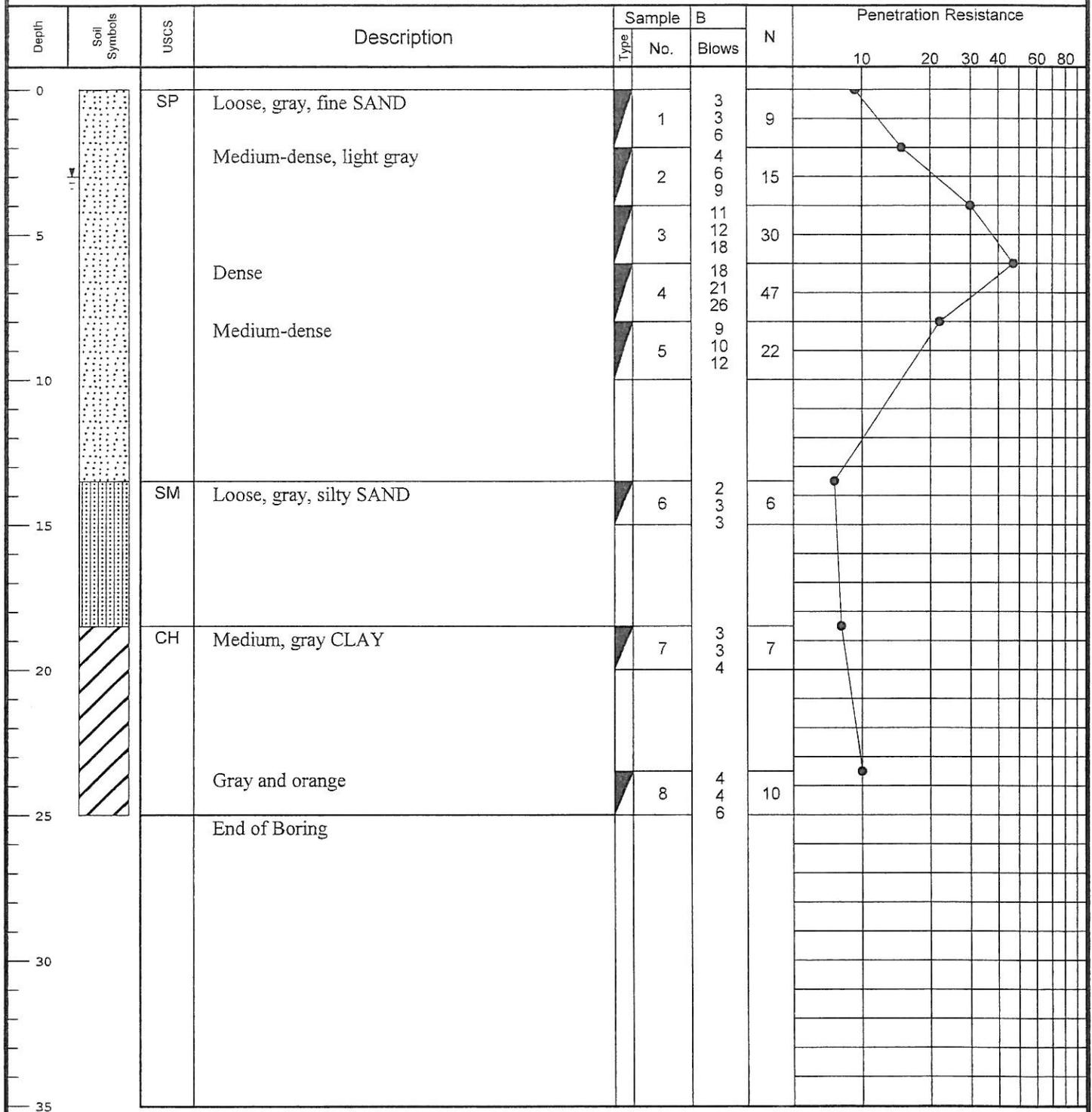
Drill Rig: Mobile B-47

Depth to Water > Initial :

Elevation: NA

Logged By: WK

At Completion : 3'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'53.1298"/LON:82°16'47.8100"

Driller: Orlando Geotechnical Drilling

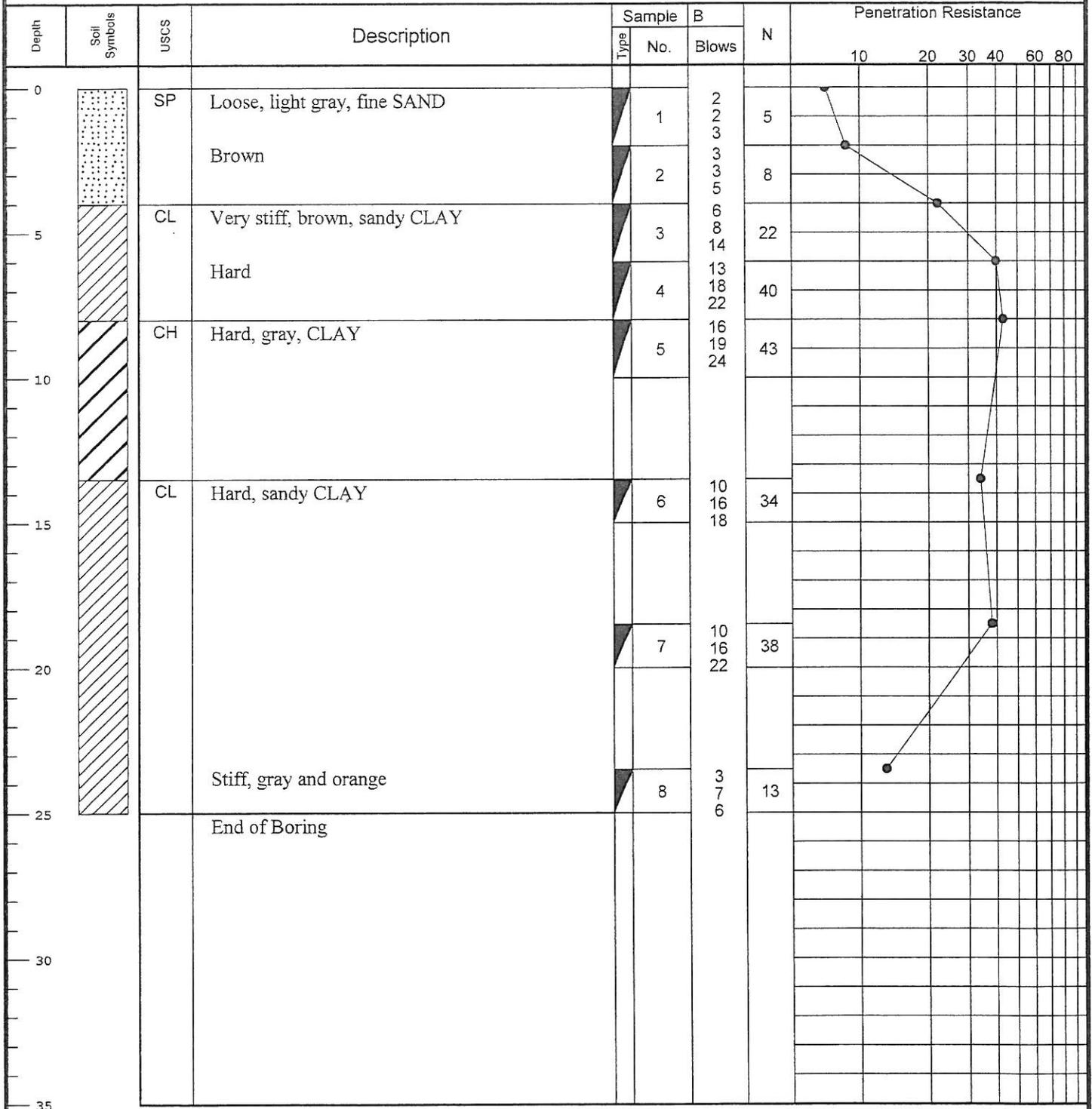
Drill Rig: Mobile B-47

Depth to Water > Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : N.E.



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'47.3171"/LON:82°16'47.1989"

Driller: Orlando Geotechnical Drilling

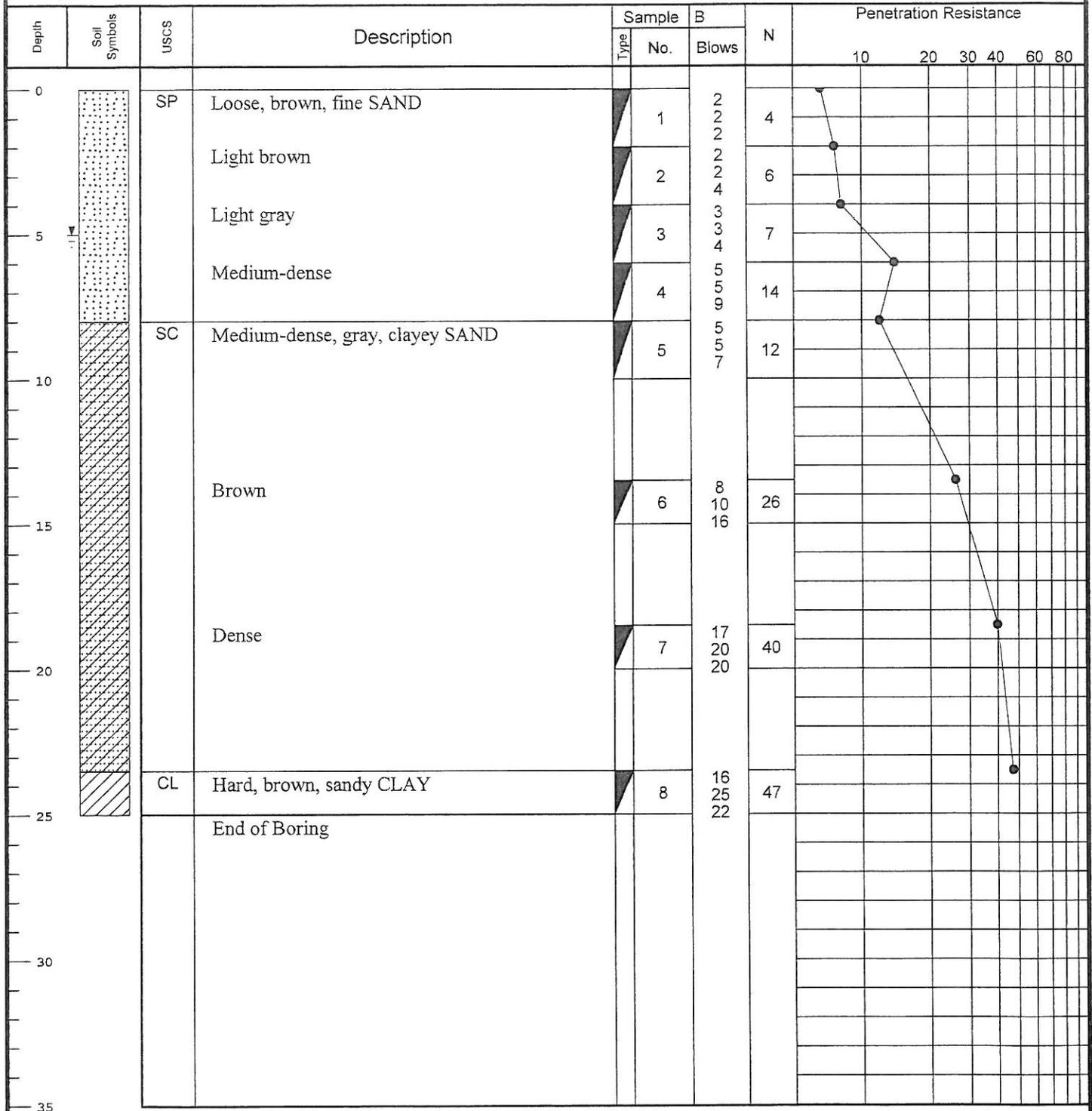
Drill Rig: Mobile B-47

Depth to Water > Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : 5'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'39.9159"/LON:82°16'49.4775"

Driller: Orlando Geotechnical Drilling

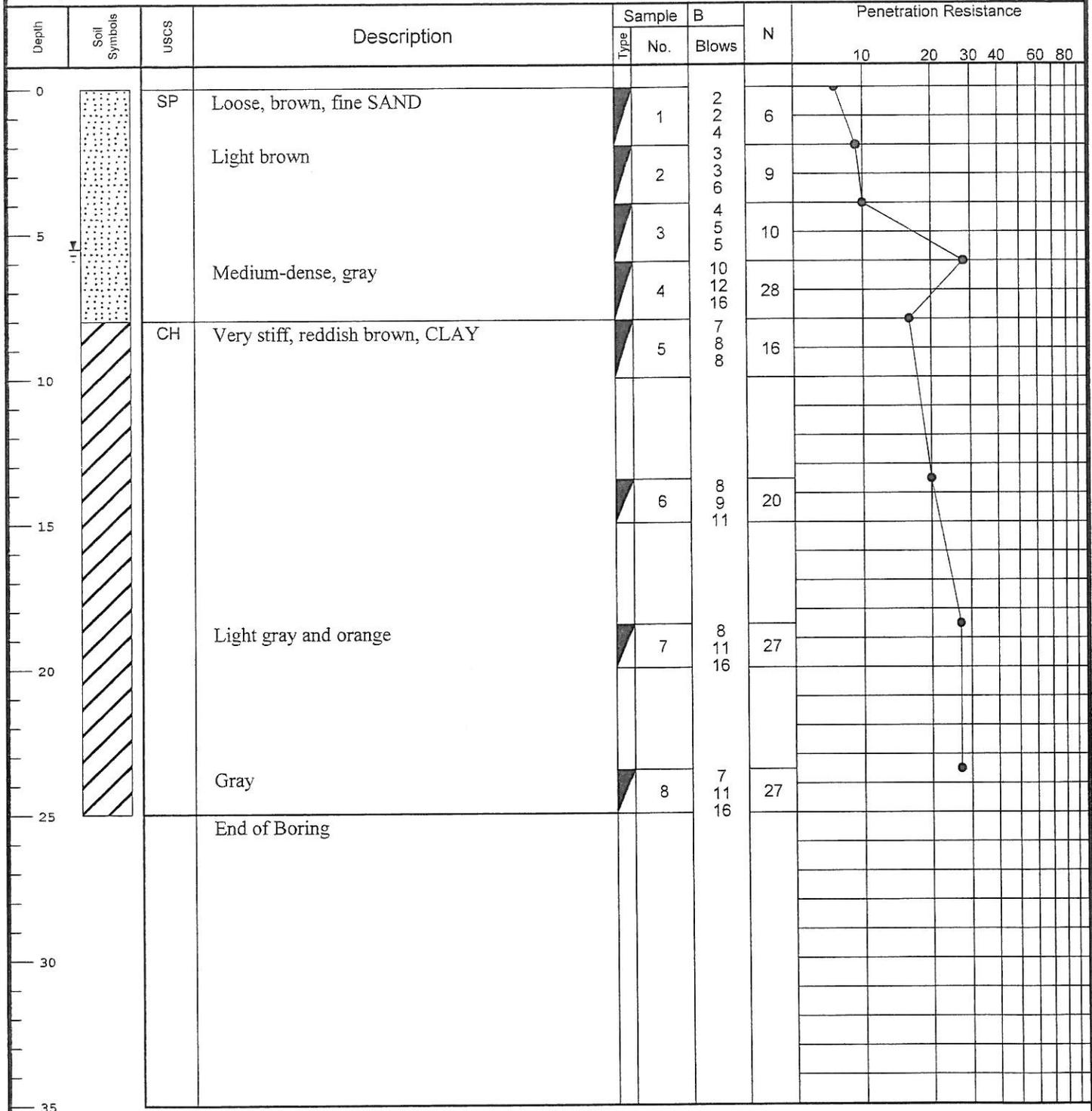
Drill Rig: Mobile B-47

Depth to Water > Initial :

Elevation: NA

Logged By: WK

At Completion : 5.5'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'36.8289"/LON:82°16'51.5293"

Driller: Orlando Geotechnical Drilling

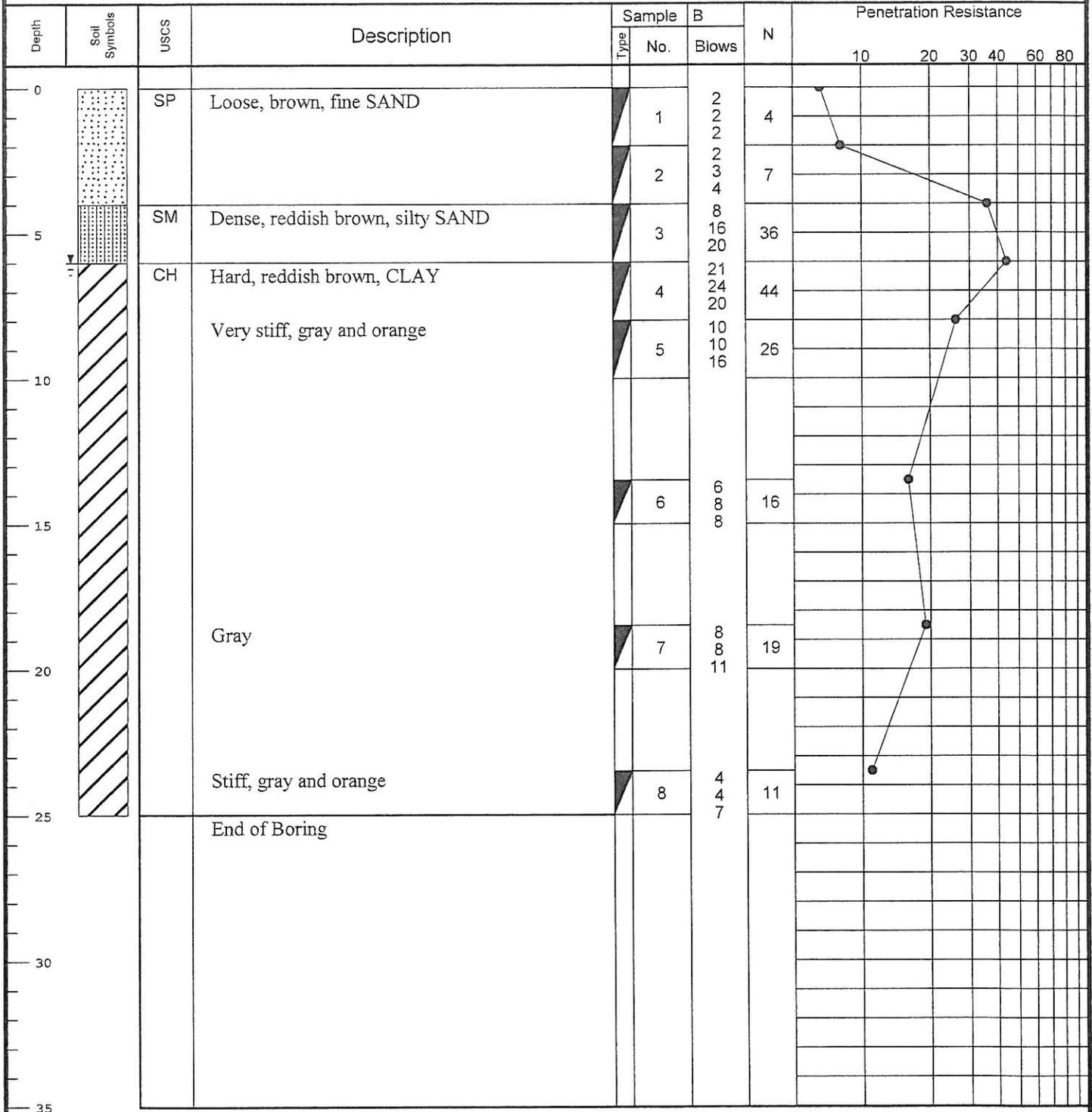
Drill Rig: Mobile B-47

Depth to Water > Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : 6'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'35.9485"/LON:82°16'56.4935"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water> Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : N.E.

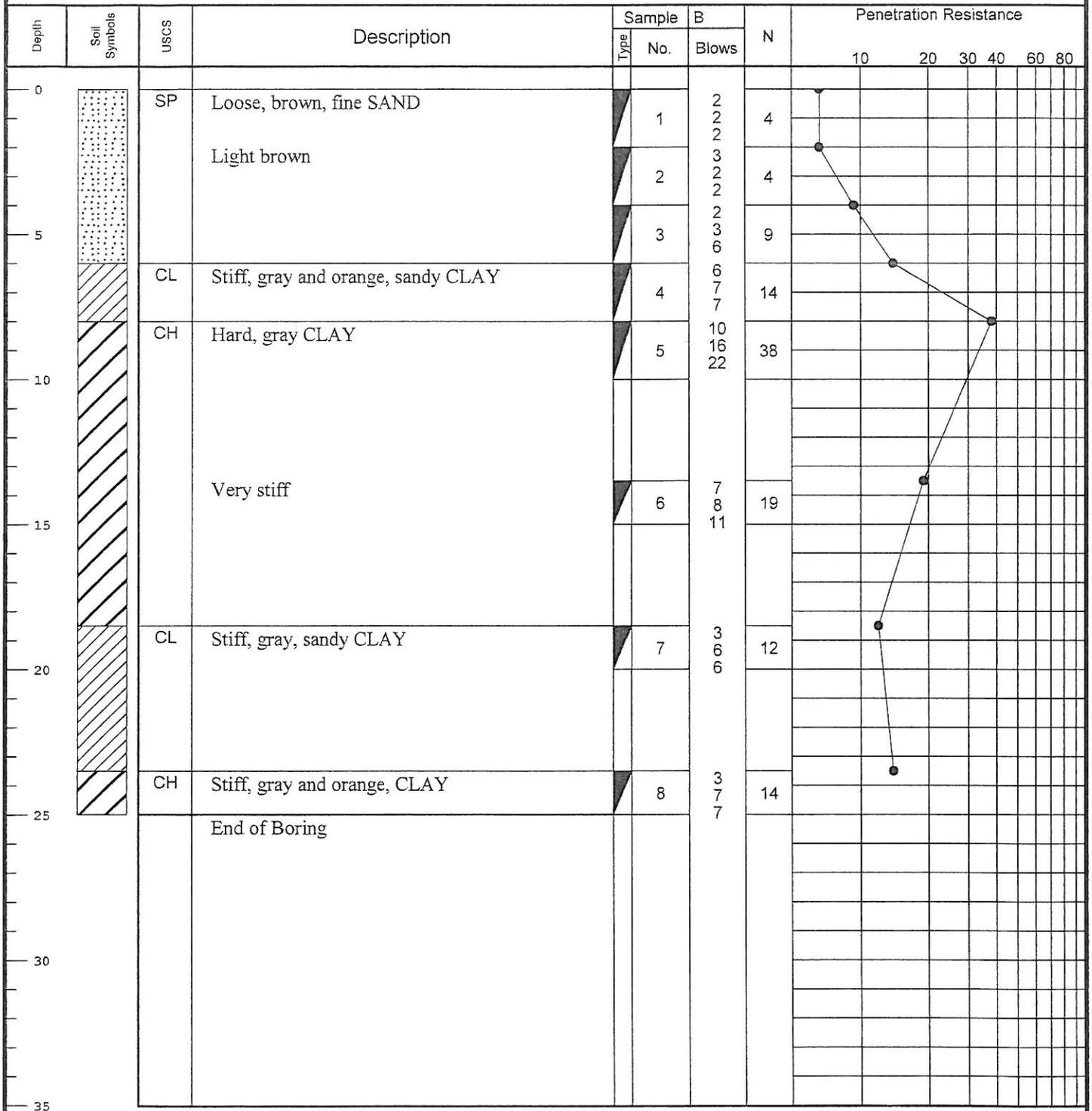
Depth	Soil Symbols	USCS	Description	Sample		Blows	N	Penetration Resistance											
				Type	No.			10	20	30	40	50	60	80					
0		SP	Loose, brown, fine SAND		1	2 2 3	5												
		CH	Very stiff, gray and orange, CLAY		2	9 14 16	30												
5			Hard		3	21 21 24	45												
					4	31 30 46	76												
					5	11 16 21	37												
10																			
			CL	Very stiff, gray, sandy CLAY		6	8 8 11	19											
15																			
		CH	Very stiff, gray, CLAY		7	6 8 10	18												
20																			
					8	4 7 9	16												
25			End of Boring																
30																			
35																			

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study
Client: Epperson Ranch, LLC
Location: LAT:28°17'23.6767"/LON:82°16'49.3711"
Driller: Orlando Geotechnical Drilling
Drill Rig: Mobile B-47
Depth to Water > Initial ∇ :

Elevation: NA
Logged By: WK

At Completion ∇ : N.E.



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'20.2152"/LON:82°16'50.7574"

Driller: Orlando Geotechnical Drilling

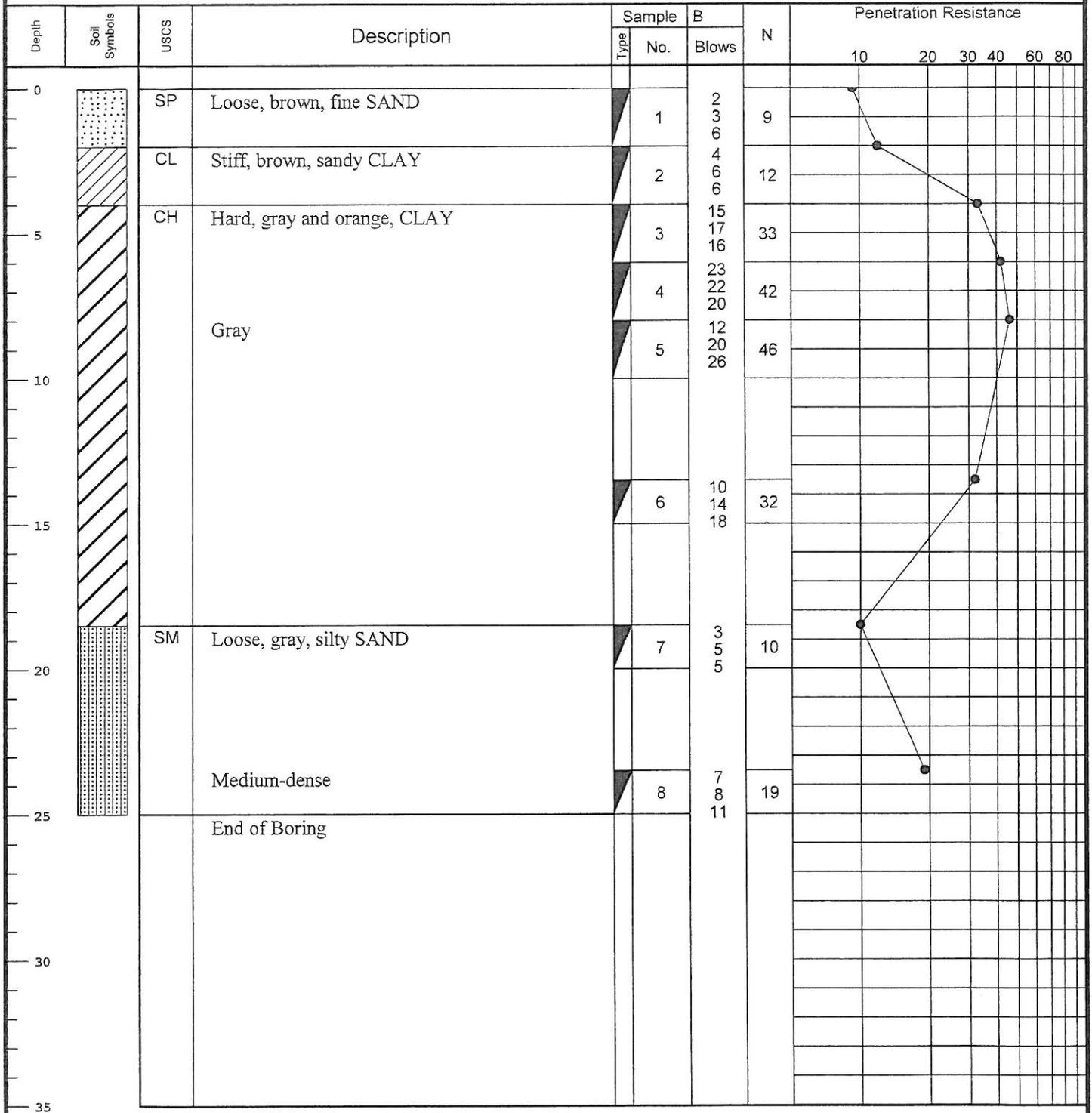
Drill Rig: Mobile B-47

Depth to Water > Initial :

Elevation: NA

Logged By: WK

At Completion : N.E.



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'01.6031"/LON:82°16'54.0882"

Driller: Orlando Geotechnical Drilling

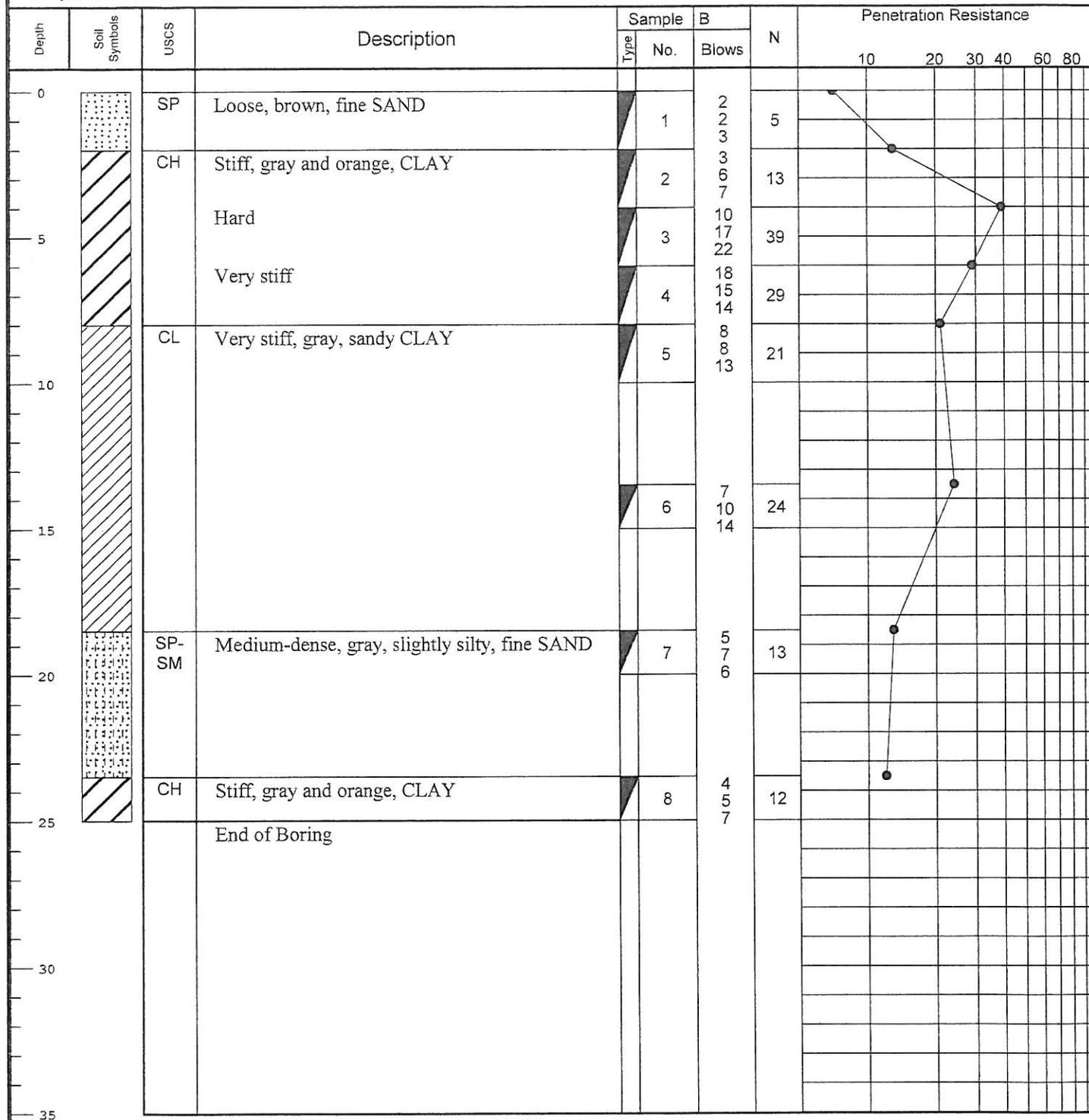
Drill Rig: Mobile B-47

Depth to Water > Initial :

Elevation: NA

Logged By: WK

At Completion : N.E.



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'00.2019"/LON:82°16'56.3837"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water > Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : 8'

Depth	Soil Symbols	USCS	Description	Sample		N	Penetration Resistance												
				Type	No.		B	Blows	10	20	30	40	60	80					
0		SP	Loose, brown, fine SAND		1	2	2	4											
		CL	Medium, light gray, sandy CLAY		2	2	2	6											
		CH	Very stiff, gray, CLAY		3	6	9	18											
		CL	Hard, gray, sandy CLAY Very stiff		4	10	16	32											
					5	8	15	11	26										
		CH	Medium, gray and orange, CLAY		6	3	5	9	14										
					7	3	3	5	8										
					8	3	2	3	5										
25			End of Boring																

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'07.4693"/LON:82°17'13.5588"

Driller: Orlando Geotechnical Drilling

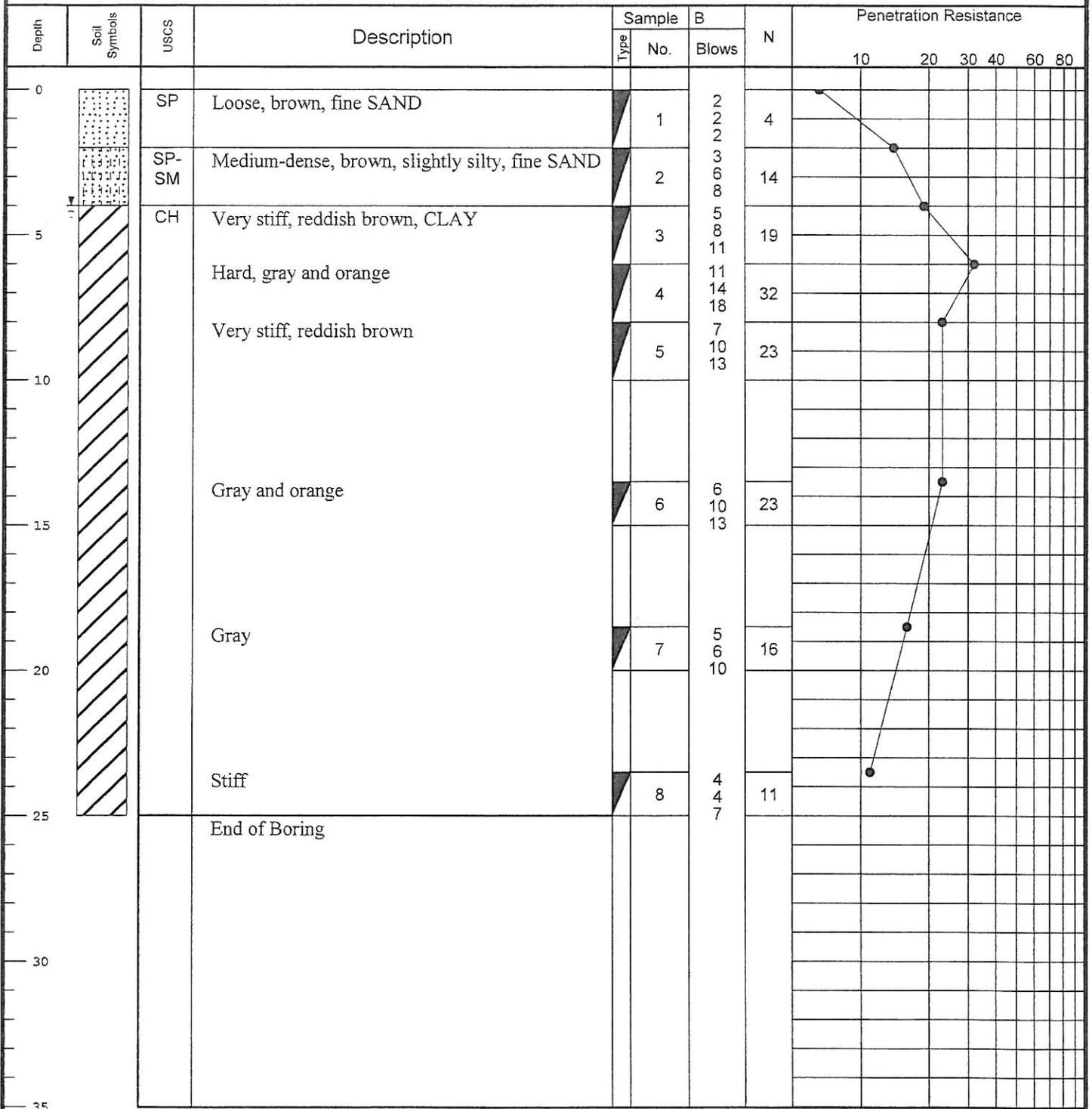
Drill Rig: Mobile B-47

Depth to Water > Initial :

Elevation: NA

Logged By: WK

At Completion : 4'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°17'03.7742"/LON:82°17'14.3102"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water > Initial :

Elevation: NA

Logged By: WK

At Completion : 6'

Depth	Soil Symbols	USCS	Description	Sample		B	N	Penetration Resistance															
				Type	No.			Blows	10	20	30	40	60	80									
0		SP	Loose, brown, fine SAND		1	2 2 2	4																
		CH	Stiff, gray, CLAY Hard Very stiff		2	2 6 7	13																
5					3	10 14 20	34																
					4	12 16 18	34																
					5	9 9 12	21																
10					6	10 11 11	22																
15		CL	Stiff, gray, sandy CLAY		7	9 9 12	21																
20					8	3 3 6	9																
25			End of Boring																				
30																							
35																							

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'54.6495"/LON:82°17'08.6233"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water > Initial :

Elevation: NA

Logged By: WK

At Completion : N.E.

Depth	Soil Symbols	USCS	Description	Sample		N	Penetration Resistance																	
				Type	No.		B	Blows	10	20	30	40	60	80										
0		SP	Loose, brown, fine SAND		1	2	4																	
		SC	Loose, brown, clayey SAND		2	2		4																
		CH	Very stiff, gray, CLAY Hard Very stiff		3	6	21																	
						9																		
5						12																		
						10																		
						24																		
		SC	Medium-dense, reddish brown, clayey SAND		6	7	19																	
						9																		
15						10																		
		SC	Medium-dense, reddish brown, clayey SAND		7	5	16																	
						8																		
20		CL	Medium, gray, sandy CLAY		8	3	8																	
						4																		
25			End of Boring			4																		
30																								
35																								

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study
Client: Epperson Ranch, LLC
Location: LAT:28°17'04.8765"/LON:82°17'42.9615"
Driller: Orlando Geotechnical Drilling
Drill Rig: Mobile B-47
Depth to Water Initial :

Elevation: NA
Logged By: WK

At Completion : N.E.

Depth	Soil Symbols	USCS	Description	Sample		N	Penetration Resistance																
				Type	No.		Blows	10	20	30	40	60	80										
0		SP	Loose, grayish brown, fine SAND		1	2	5																
			Medium-dense, light brown		2	2 3																	
		CL	Very stiff, gray, sandy CLAY		3	8	20																
5						10																	
		CH	Hard, gray, CLAY		4	16	46																
						20																	
						26																	
		CL	Very stiff, gray, sandy CLAY		5	16	40																
						18																	
10						22																	
		CL	Very stiff, gray, sandy CLAY		6	5	21																
						8																	
15						13																	
		SP-SC	Medium-dense, light gray, slightly clayey, fine SAND		7	7	14																
						6																	
20						8																	
		CL	Stiff, gray, sandy CLAY		8	6	15																
						6																	
25						9																	
			End of Boring																				
30																							
35																							

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'40.1073"/LON:82°18'19.7387"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water > Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : 6'

Depth	Soil Symbols	USCS	Description	Sample		Blows	N	Penetration Resistance					
				Type	No.			10	20	30	40	60	80
0	[Dotted pattern]	SP	Loose, dark brown, fine SAND	[Triangle]	1	2	5						
			2										
			3										
			4										
			Light yellowish brown		2	4	6						
					3								
			Medium-dense, brown		3	3							
					4								
5			Very dense, dark brown		3	4	13						
					6								
					7								
					24								
					4	44	94						
					50/6"								
					6								
					9								
10	[Diagonal lines]	CL	Stiff, light brown, sandy CLAY	[Triangle]	5	6	15						
			6										
15	[Diagonal lines]	CH	Very stiff, gray, CLAY	[Triangle]	6	5	16						
			8										
20	[Dotted pattern]	SP-SC	Loose, light gray, slightly clayey, fine SAND	[Triangle]	7	3	8						
			4										
25	[Diagonal lines]	SC	Medium-dense, light gray, clayey SAND	[Triangle]	8	4	14						
			6										
			End of Boring			8							

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'35.3009"/LON:82°18'16.6716"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water> Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : 5'

Depth	Soil Symbols	USCS	Description	Sample		Blows	N	Penetration Resistance					
				Type	No.			10	20	30	40	60	80
0	[Dotted pattern]	SP	Loose, dark brown, fine SAND	[Triangle]	1	3	7						
			Medium-dense, light brown			3							
	[Dotted pattern]	CL	Stiff, gray, sandy CLAY	[Triangle]	2	4	21						
						8							
5	[Diagonal lines]	CH	Very stiff, gray, CLAY	[Triangle]	3	4	10						
						5							
	[Diagonal lines]	CH	Very stiff, gray, CLAY	[Triangle]	4	10	27						
						11							
	[Diagonal lines]	CH	Hard, gray and orange	[Triangle]	5	11	35						
						14							
10	[Diagonal lines]	CH	Very stiff, light brown	[Triangle]	6	11	28						
						16							
15	[Diagonal lines]	CL	Stiff, gray, sandy CLAY	[Triangle]	7	8	9						
						10							
20	[Diagonal lines]	CL	Stiff, gray, sandy CLAY	[Triangle]	8	2	9						
						3							
25	[Diagonal lines]	CL	Stiff, gray, sandy CLAY	[Triangle]	8	3	9						
						3							
25			End of Boring			6							
30													
35													

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'22.1414"/LON:82°18'00.1747"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water Initial :

Elevation: NA

Logged By: WK

At Completion : 6'

Depth	Soil Symbols	USCS	Description	Sample		Blows	N	Penetration Resistance					
				Type	No.			10	20	30	40	60	80
0		SP	Loose, brown, fine SAND		1	3	7						
			Reddish brown			3							
			Brown			4							
5		SP-SC	Very loose, brown, slightly clayey, fine SAND		4	4	4						
						2							
10		SC	Very loose, brown, clayey SAND		5	2	3						
						1							
15		SP-SC	Loose, brown, slightly clayey, fine SAND		6	3	6						
						3							
20		CL	Stiff, gray, sandy CLAY		7	3	13						
						5							
25			End of Boring		8	5	14						
								6					
30						8							
35													

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'18.6831"/LON:82°17'49.8612"

Driller: Orlando Geotechnical Drilling

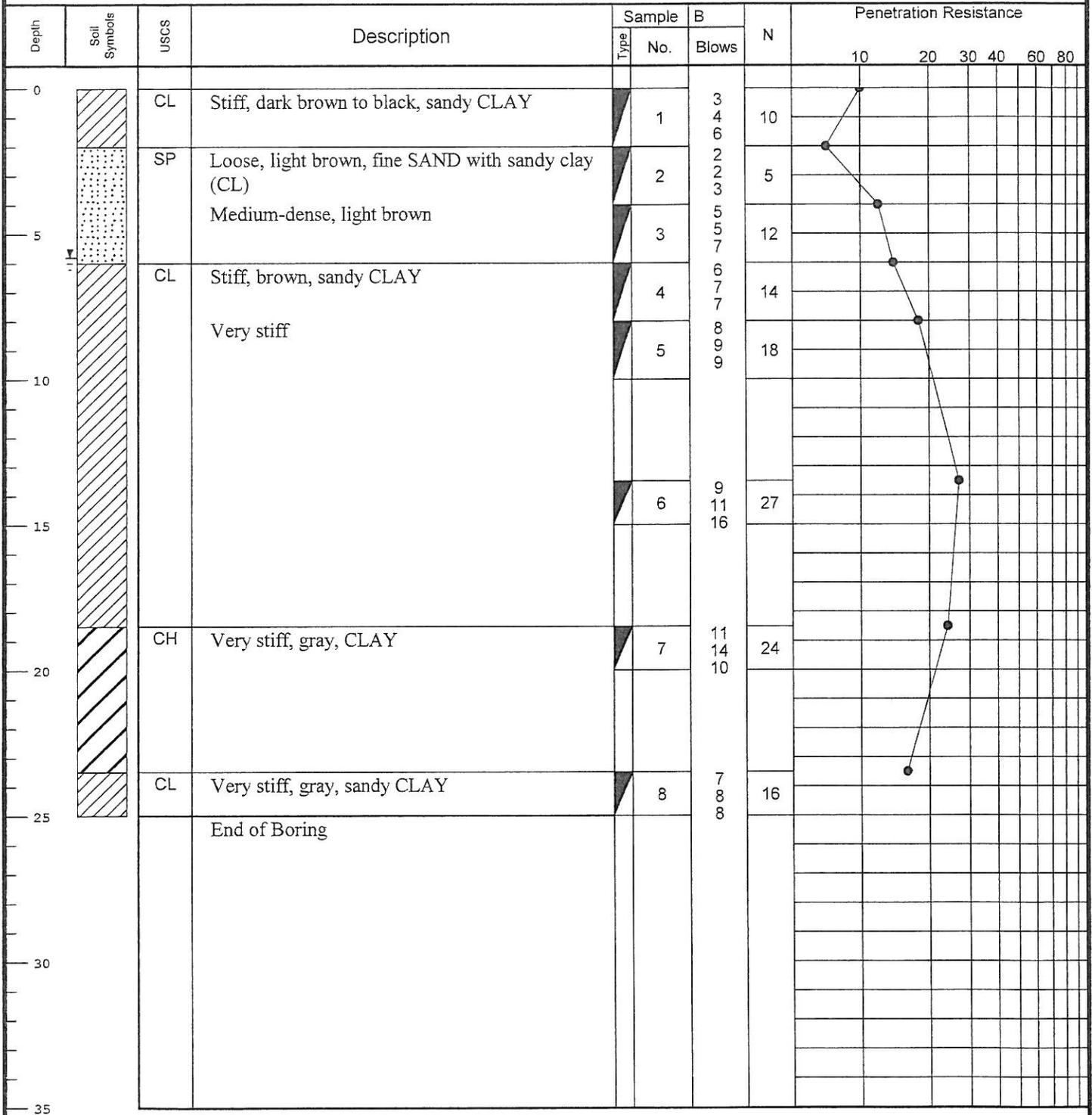
Drill Rig: Mobile B-47

Depth to Water Initial :

Elevation: NA

Logged By: WK

At Completion : 5.8'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'22.4256"/LON:82°17'42.4891"

Driller: Orlando Geotechnical Drilling

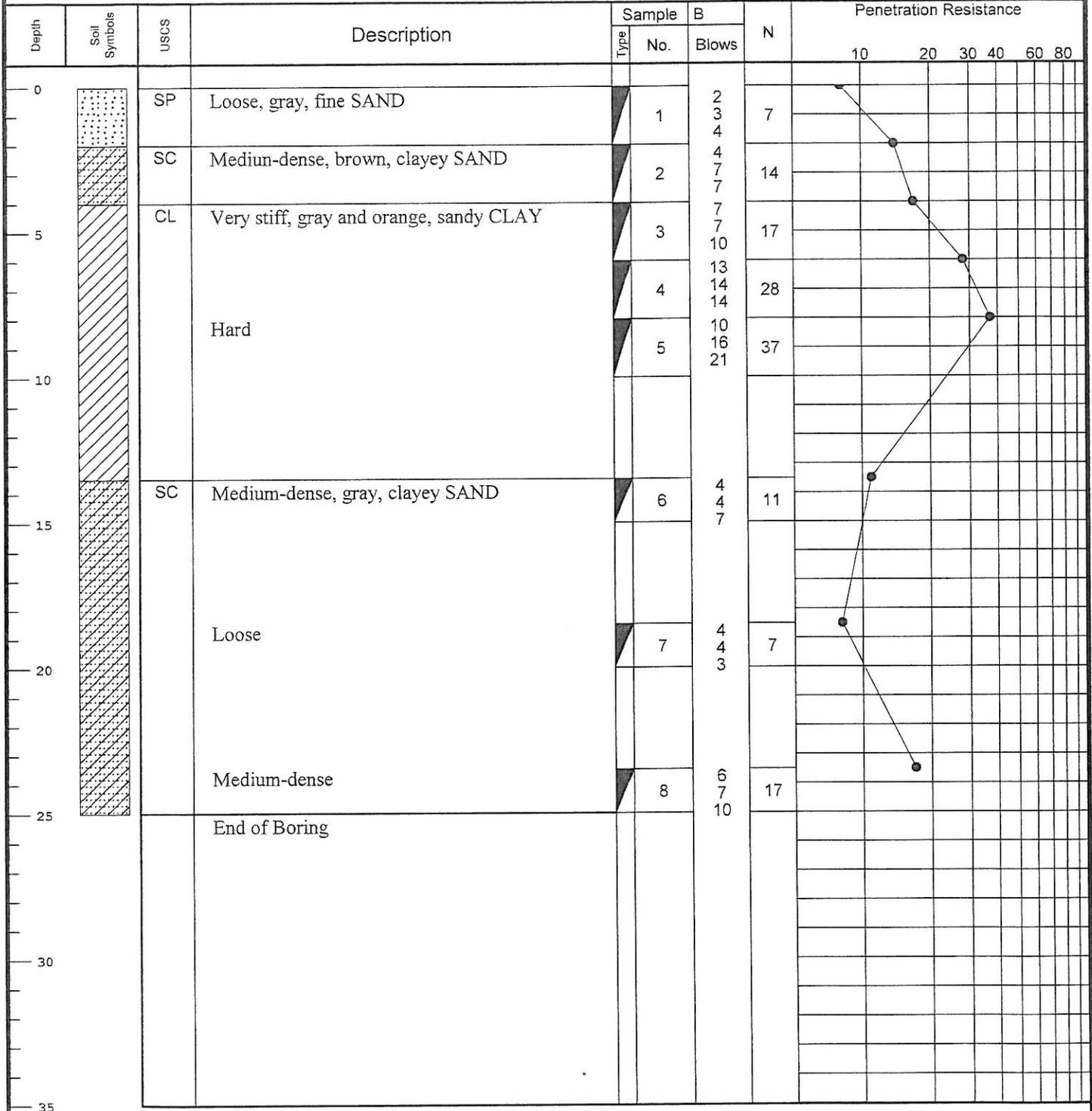
Drill Rig: Mobile B-47

Depth to Water > Initial :

Elevation: NA

Logged By: WK

At Completion : N.E.



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Figure

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'20.5166"/LON:82°17'34.1075"

Driller: Orlando Geotechnical Drilling

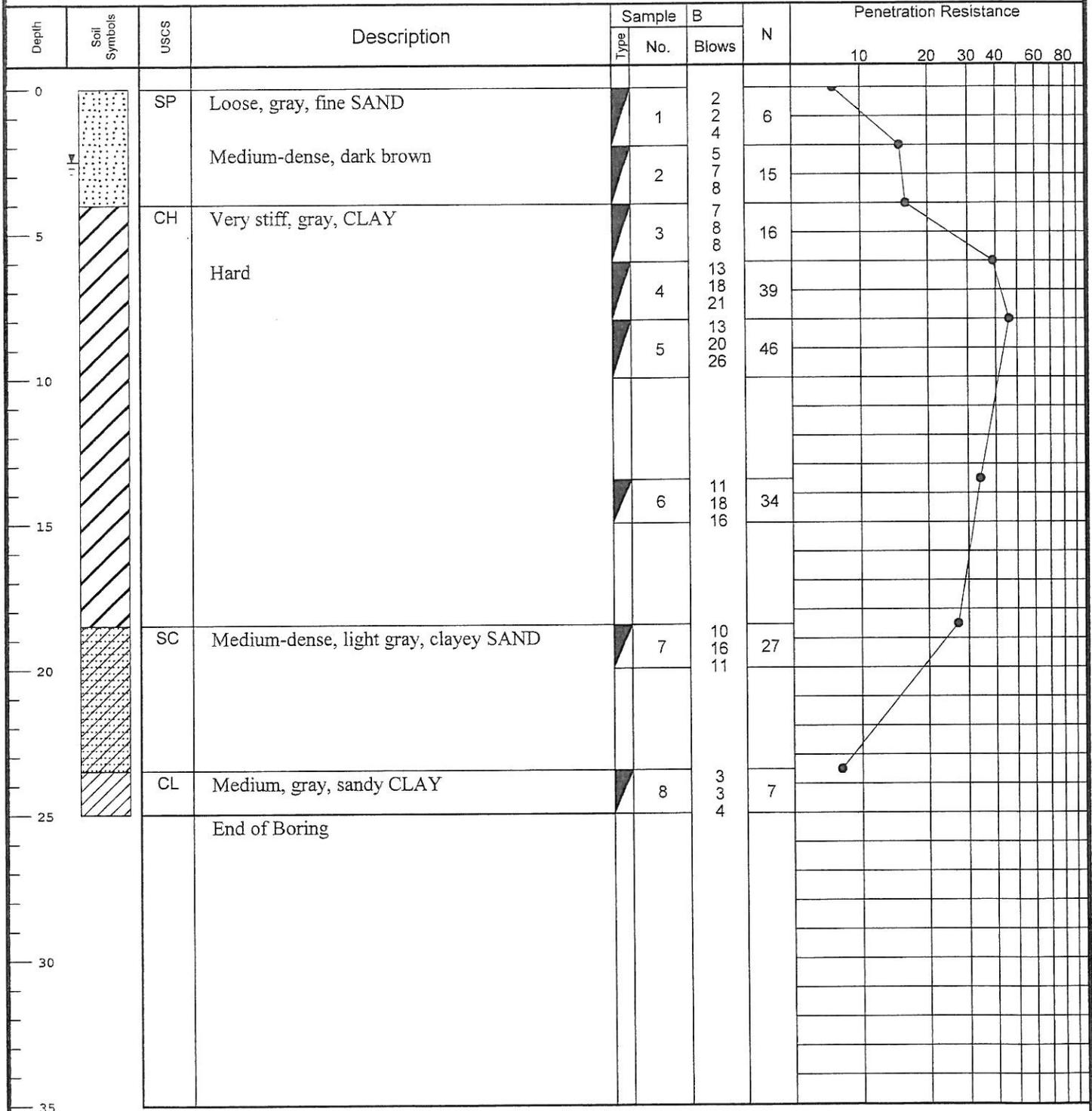
Drill Rig: Mobile B-47

Depth to Water > Initial ∇ :

Elevation: NA

Logged By: WK

At Completion ∇ : 2.5'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study
Client: Epperson Ranch, LLC
Location: LAT:28°16'48.2429"/LON:82°17'42.1798"
Driller: Orlando Geotechnical Drilling
Drill Rig: Mobile B-47
Depth to Water > Initial ∇ :

Elevation: NA
Logged By: WK

At Completion ∇ : 2'

Depth	Soil Symbols	USCS	Description	Sample Type	Sample No.	B Blows	N	Penetration Resistance										
								10	20	30	40	60	80					
0	[SP, SP-SC symbols]	SP	Medium-dense, light brown, fine SAND		1	3 4 8	12											
		SP-SC	Medium-dense, brown, slightly clayey, fine SAND		2	6 9 11	20											
5	[CL, CH symbols]	CL	Hard, brown, sandy CLAY		3	10 14 19	33											
		CH	Hard, gray, CLAY Very stiff		4	16 20 20	40											
					5	10 14 8	22											
15					6	8 12 16	28											
20		CL	Very stiff, brown, sandy CLAY		7	7 11 13	24											
25	CH	Stiff, gray, CLAY		8	3 6 9	15												
25			End of Boring															
30																		
35																		

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'49.3682"/LON:82°17'33.2736"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water Initial :

Elevation: NA

Logged By: WK

At Completion : 4'

Depth	Soil Symbols	USCS	Description	Sample		N	Penetration Resistance														
				Type	No.		B	Blows	10	20	30	40	60	80							
0		SP	Loose, gray and brown, fine SAND		1	3															
		SP-SC	Loose, brown, slightly clayey, fine SAND		2	3															
5		CL	Very stiff, light brown, sandy CLAY		3	6															
		CH	Hard, gray, CLAY		4	6															
						5	10														
						6	11														
						7	18														
						8	22														
				Very stiff		5	14														
						6	18														
10					7	20															
15					6	6															
					8	8															
					7	11															
20					7	16															
					8	8															
					7	11															
					8	16															
25		CL	Very stiff, light gray, sandy CLAY		8	5															
			End of Boring			7															
						10															
30																					
35																					

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study
Client: Epperson Ranch, LLC
Location: LAT:28°16'43.4769"/LON:82°17'26.0484"
Driller: Orlando Geotechnical Drilling
Drill Rig: Mobile B-47
Depth to Water Initial :

Elevation: NA
Logged By: WK

At Completion : 7'

Depth	Soil Symbols	USCS	Description	Sample		N	Penetration Resistance														
				Type	No.		B	Blows	10	20	30	40	60	80							
0		SP	Loose, light brown, fine SAND		1	2	6														
			Dark gray and brown					2	3	5											
			Very loose, light brown								2	1	3								
5			Brown											2	2	4					
																	1	2	4		
10																					
15		CL	Very stiff, gray, sandy CLAY		6	6	16														
			Stiff					3	4	12											
20			Very stiff								3	8	16								
25			End of Boring																		
30																					
35																					

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study
Client: Epperson Ranch, LLC
Location: LAT:28°16'35.5030"/LON:82°17'23.8375"
Driller: Orlando Geotechnical Drilling
Drill Rig: Mobile B-47
Depth to Water > Initial :

Elevation: NA
Logged By: WK

At Completion : 4.5'

Depth	Soil Symbols	USCS	Description	Sample B		N	Penetration Resistance													
				Type	No.		Blows	10	20	30	40	60	80							
0		SP	Loose, gray and brown, fine SAND		1	2 3 4	7													
			Medium-dense, light brown		2	3 4 7		11												
5		CL	Very stiff, brown, sandy CLAY		3	6 8 11	19													
					4	8 11 14		25												
10		CH	Very stiff, gray, CLAY		5	8 8 13	21													
15		CL	Very stiff, gray, sandy CLAY		6	8 10 13	23													
					Stiff	7		3 6 6	12											
20		SC	Medium-dense, gray, clayey SAND		8	3 6 9	15													
25					End of Boring															
30																				
35																				

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study
Client: Epperson Ranch, LLC
Location: LAT:28°16'27.2732"/LON:82°17'21.9381"
Driller: Orlando Geotechnical Drilling
Drill Rig: Mobile B-47
Depth to Water Initial ∇ :

Elevation: NA
Logged By: WK

At Completion ∇ : 3.6'

Depth	Soil Symbols	USCS	Description	Sample		B	N	Penetration Resistance				
				Type	No.			Blows	10	20	30	40
0	[Dotted pattern]	SP	Loose, light brown, fine SAND	[Diagonal hatching]	1	3	8	[Graph point at 0 depth, ~10 PR]				
			4			[Graph line to 4 depth, ~20 PR]						
			4			[Graph line to 8 depth, ~30 PR]						
			8			[Graph line to 18 depth, ~40 PR]						
	[Diagonal hatching]	CH	Medium-dense	[Diagonal hatching]	2	5	18	[Graph line to 18 depth, ~40 PR]				
			8			[Graph line to 27 depth, ~50 PR]						
			10			[Graph line to 30 depth, ~60 PR]						
			12			[Graph line to 40 depth, ~70 PR]						
5	[Diagonal hatching]	CH	Dense, brown	[Diagonal hatching]	3	10	27	[Graph line to 30 depth, ~60 PR]				
			15			[Graph line to 40 depth, ~70 PR]						
			12			[Graph line to 40 depth, ~70 PR]						
			16			[Graph line to 40 depth, ~70 PR]						
	[Diagonal hatching]	CH	Very stiff, brown, CLAY with rock fragments	[Diagonal hatching]	4	16	40	[Graph line to 40 depth, ~70 PR]				
			18			[Graph line to 40 depth, ~70 PR]						
			22			[Graph line to 40 depth, ~70 PR]						
			20			[Graph line to 40 depth, ~70 PR]						
10	[Diagonal hatching]	CH	Very stiff, brown, CLAY with rock fragments	[Diagonal hatching]	5	17	41	[Graph line to 40 depth, ~70 PR]				
			21			[Graph line to 40 depth, ~70 PR]						
			20			[Graph line to 40 depth, ~70 PR]						
			12			[Graph line to 12 depth, ~15 PR]						
15	[Diagonal hatching]	CL	Stiff	[Diagonal hatching]	6	5	12	[Graph line to 12 depth, ~15 PR]				
			5			[Graph line to 12 depth, ~15 PR]						
			7			[Graph line to 12 depth, ~15 PR]						
			16			[Graph line to 16 depth, ~20 PR]						
20	[Diagonal hatching]	CL	Very stiff, brown, sandy CLAY	[Diagonal hatching]	7	5	16	[Graph line to 16 depth, ~20 PR]				
			8			[Graph line to 16 depth, ~20 PR]						
			8			[Graph line to 16 depth, ~20 PR]						
			20			[Graph line to 20 depth, ~25 PR]						
25	[Diagonal hatching]	CL	Gray	[Diagonal hatching]	8	10	20	[Graph line to 20 depth, ~25 PR]				
			11			[Graph line to 20 depth, ~25 PR]						
			9			[Graph line to 20 depth, ~25 PR]						
			20			[Graph line to 20 depth, ~25 PR]						
25			End of Boring									
30												
35												

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'22.1871"/LON:82°17'18.2142"

Driller: Orlando Geotechnical Drilling

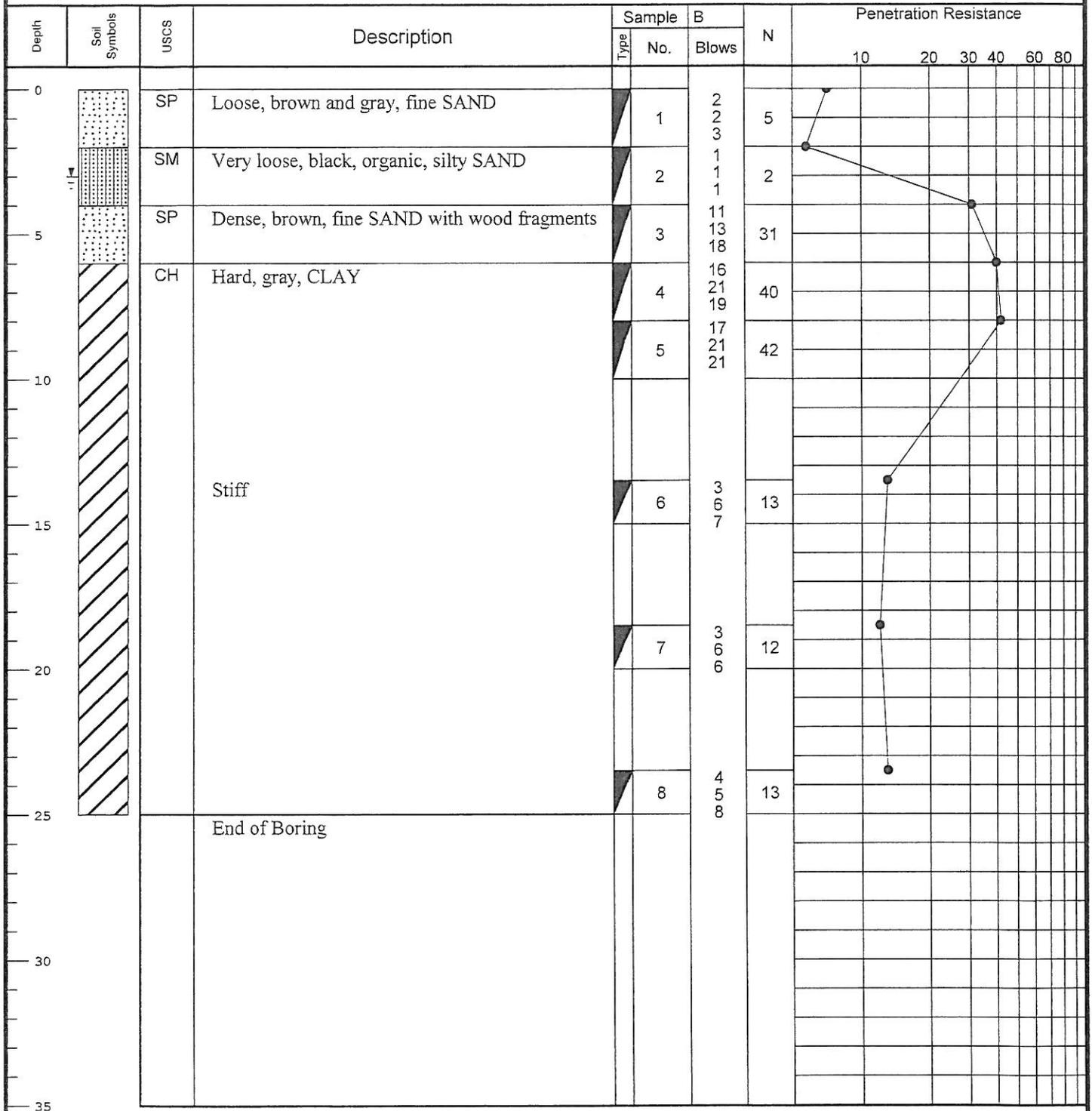
Drill Rig: Mobile B-47

Elevation: NA

Logged By: WK

Depth to Water > Initial :

At Completion : 3'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'21.5947"/LON:82°17'06.1018"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Elevation: NA

Logged By: WK

Depth to Water > Initial ∇ :

At Completion ∇ : 3'

Depth	Soil Symbols	USCS	Description	Sample		N	Penetration Resistance																			
				Type	No.		B	Blows	10	20	30	40	60	80												
0		SP	Loose, gray, fine SAND	-	1	2	5																			
2																										
3																										
5																										
			Medium-dense, brown	-	2	5	19																			
8																										
11																										
15																										
				-	3	15	26																			
15																										
11																										
11																										
		CH	Very stiff, gray, CLAY	-	4	5	12																			
5																										
5																										
7																										
			Stiff	-	5	10	27																			
10																										
11																										
11																										
		SC	Loose, gray, clayey SAND	-	6	4	14																			
15																										
7																										
7																										
				-	7	3	9																			
20																										
3																										
3																										
				-	8	3	8																			
25																										
4																										
4																										
			End of Boring	-																						
25																										
4																										
4																										

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study
Client: Epperson Ranch, LLC
Location: LAT:28°16'08.7874"/LON:82°17'30.2622"
Driller: Orlando Geotechnical Drilling
Drill Rig: Mobile B-47
Depth to Water > Initial :

Elevation: NA
Logged By: WK

At Completion : 2'

Depth	Soil Symbols	USCS	Description	Sample		B	N	Penetration Resistance							
				Type	No.			Blows	10	20	30	40	60	80	
0		SP	Loose, gray, fine SAND		1	2	5								
			Medium-dense, brown												
		CL	Stiff, gray, sandy CLAY		2	4	14								
5		CL	Stiff, gray, sandy CLAY		3	4	15								
		SP	Medium-dense, brown, fine SAND		4	7	27								
		SP	Medium-dense, brown, fine SAND		5	11	25								
10		SP	Medium-dense, brown, fine SAND		5	13	25								
		CH	Stiff, gray, CLAY		6	5	14								
15		CH	Stiff, gray, CLAY		6	6	14								
		CL	Very stiff, gray, sandy CLAY		7	7	21								
20		CL	Very stiff, gray, sandy CLAY		7	10	21								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
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25		CL	Stiff		8	5	12								
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25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								
		CL	Stiff		8	5	12								
25		CL	Stiff		8	5	12								

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°16'02.3283"/LON:82°17'44.5035"

Driller: Orlando Geotechnical Drilling

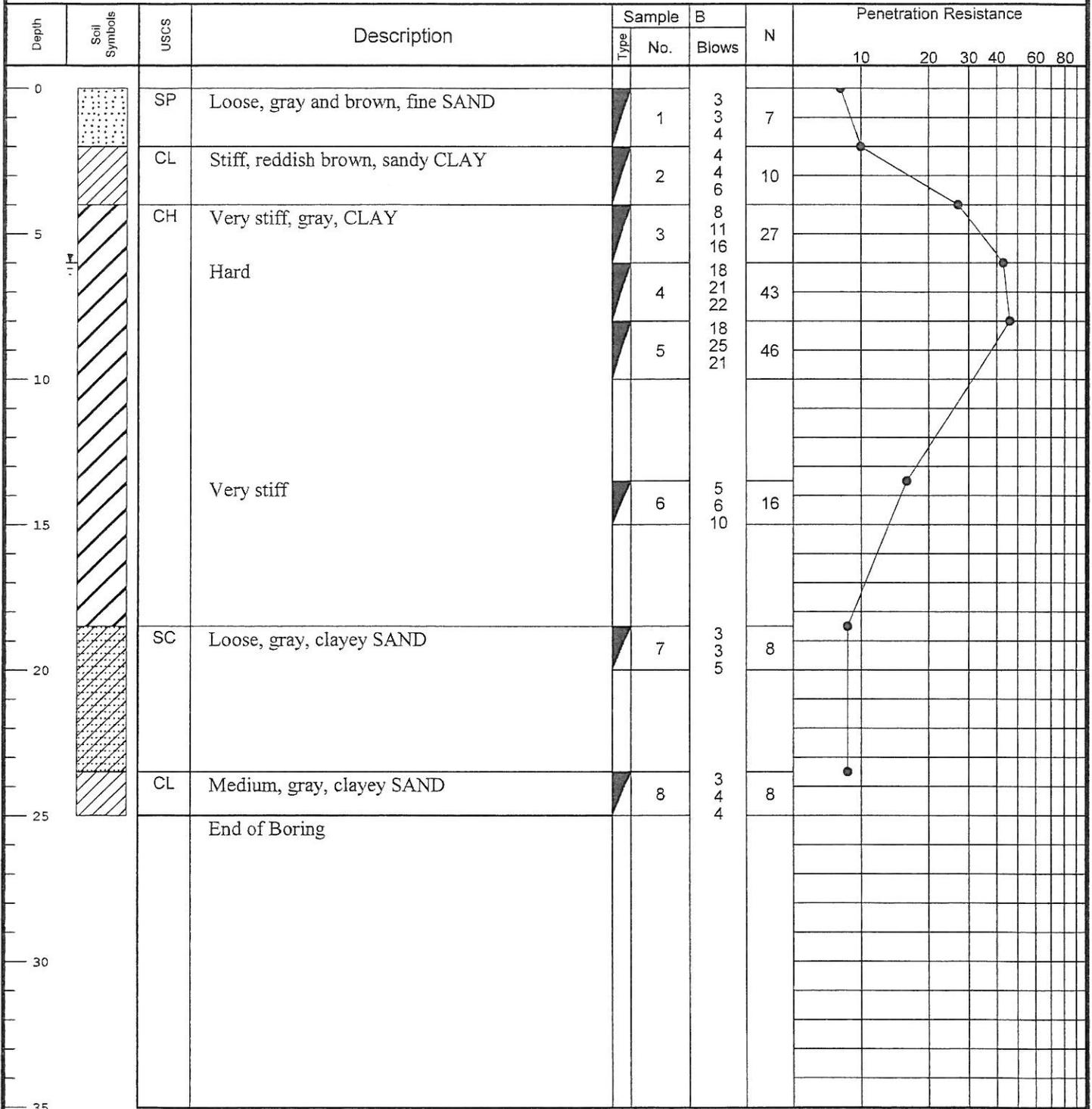
Drill Rig: Mobile B-47

Elevation: NA

Logged By: WK

Depth to Water > Initial ∇ :

At Completion ∇ : 6'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°15'56.1334"/LON:82°17'41.9178"

Driller: Orlando Geotechnical Drilling

Drill Rig: Mobile B-47

Depth to Water > Initial  :

Elevation: NA

Logged By: WK

At Completion  : 4'

Depth	Soil Symbols	USCS	Description	Sample		N	Penetration Resistance															
				Type	No.		Blows	10	20	30	40	60	80									
0		SP	Very loose, gray and brown, fine SAND		1	2 2 2	4															
		CL	Stiff, brown, sandy CLAY Very stiff Hard Very stiff		2	4	12															
						8	27															
5						11	39															
						18	26															
						21																
		CH	Very stiff, reddish brown, CLAY Gray and orange		6	8	18															
						9																
15						9																
			End of Boring		7	6	20															
20						9																
					8	6	18															
25						8																
						10																
30																						
35																						

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°15'52.4631"/LON:82°17'44.0064"

Driller: Orlando Geotechnical Drilling

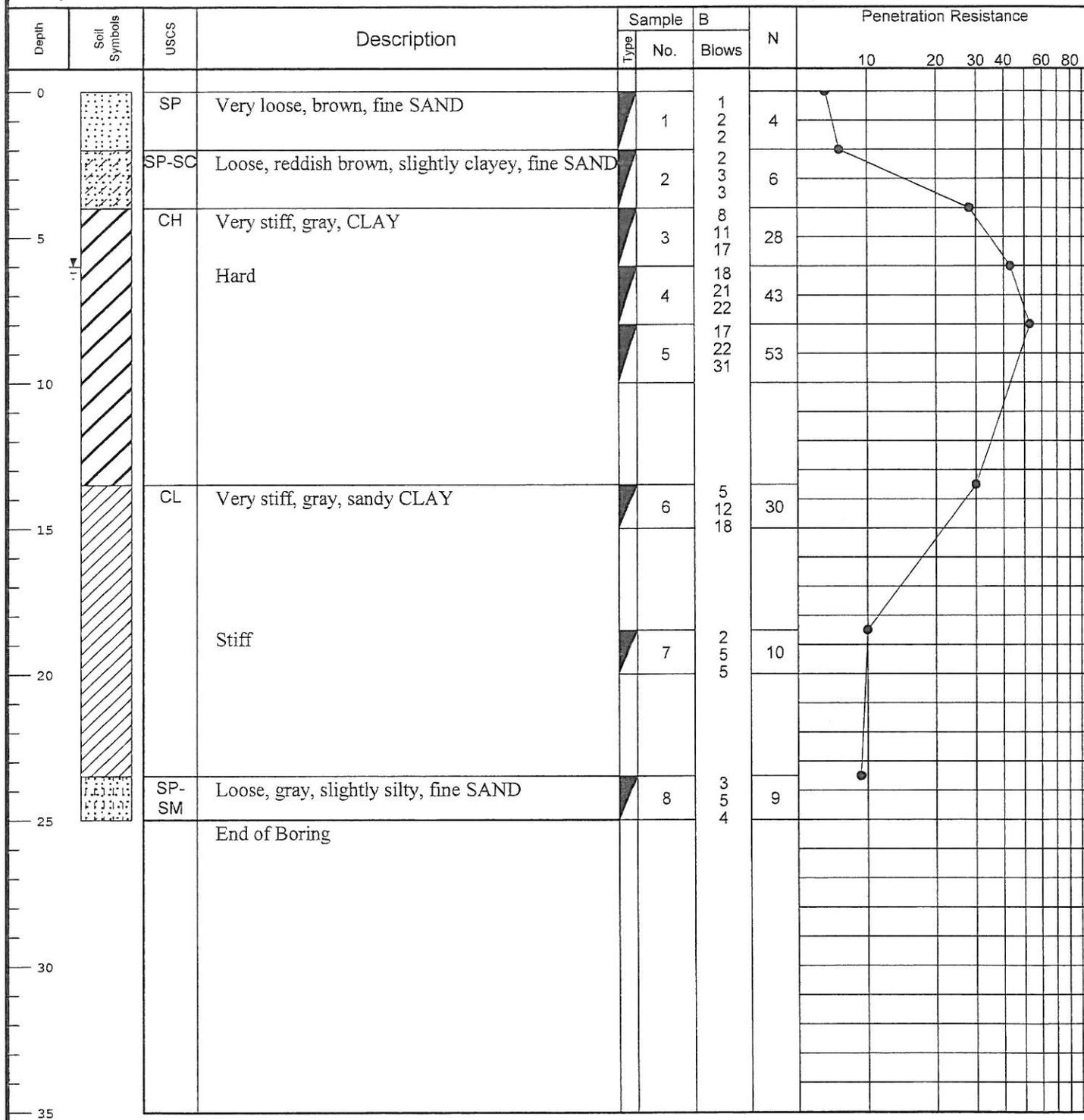
Drill Rig: Mobile B-47

Depth to Water > Initial :

Elevation: NA

Logged By: WK

At Completion : 6'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study

Client: Epperson Ranch, LLC

Location: LAT:28°15'49.4443"/LON:82°17'32.6990"

Driller: Orlando Geotechnical Drilling

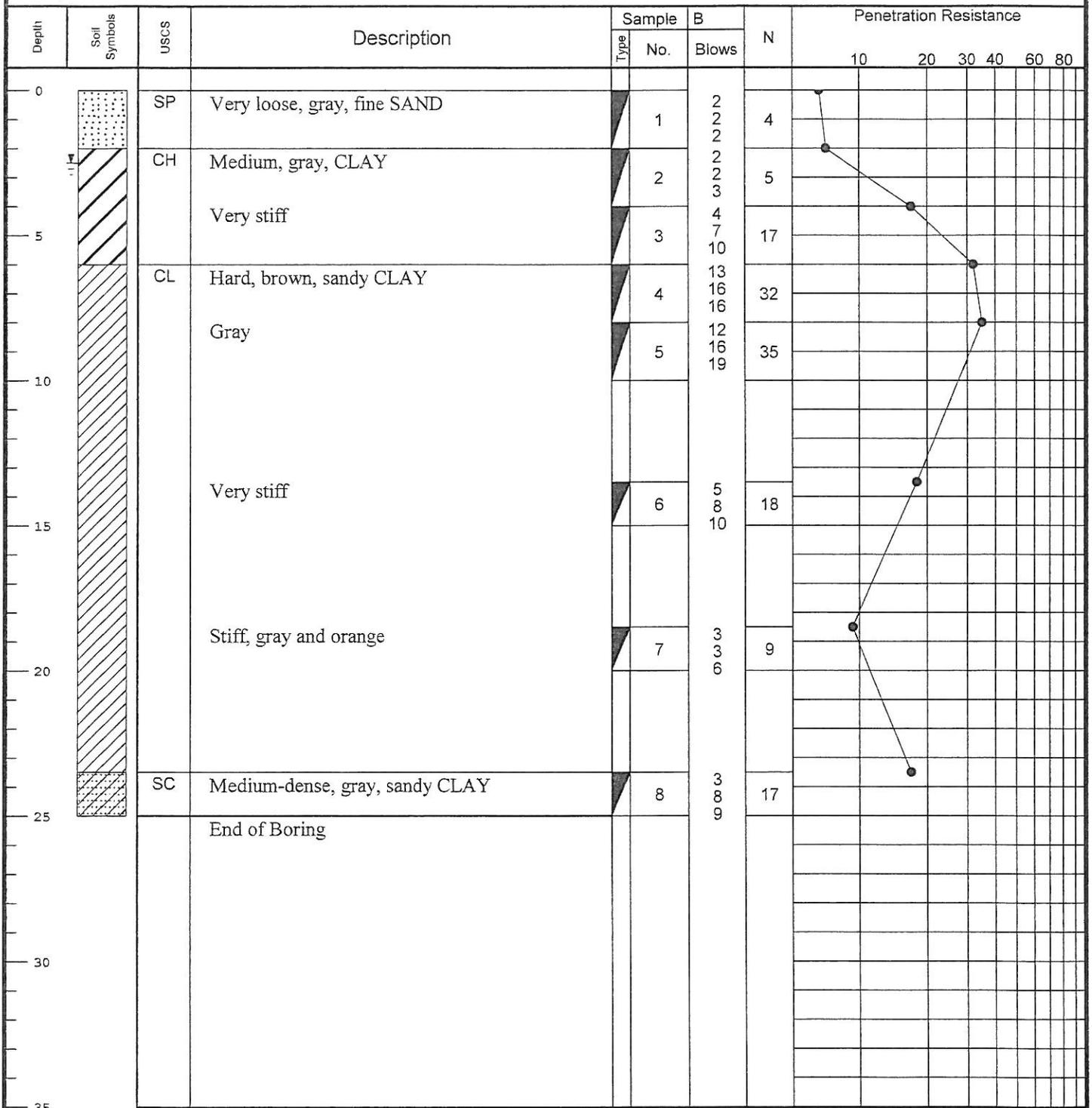
Drill Rig: Mobile B-47

Elevation: NA

Logged By: WK

Depth to Water > Initial :

At Completion : 2.5'



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Project: Epperson Ranch Additional Stormwater Pond Soils Study
Client: Epperson Ranch, LLC
Location: LAT:28°15'49.8781"/LON:82°17'28.7591"
Driller: Orlando Geotechnical Drilling
Drill Rig: Mobile B-47
Depth to Water Initial ∇ :

Elevation: NA
Logged By: WK

At Completion ∇ : 3'

Depth	Soil Symbols	USCS	Description	Sample Type	Sample No.	B Blows	N	Penetration Resistance					
								10	20	30	40	60	80
0		SP	Loose, gray, fine SAND	▲	1	2	5						
			Brown		2	3							
		CL	Stiff, gray, sandy CLAY	▲	3	5	12						
					4	6							
		CH	Very stiff, gray, CLAY	▲	5	9	27						
					6	11							
		SC	Dense, gray, clayey SAND	▲	6	16	36						
					7	20							
		CL	Very stiff, gray, sandy CLAY	▲	8	8	15						
						9							
25			End of Boring			6	23						
30													
35													

This information pertains only to this boring and should not be interpreted as being indicative of the site.

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Poorly graded sand
	Clayey sand
	High plasticity clay
	Low plasticity clay
	Poorly graded sand with silt
	Silty sand
	Poorly graded sand with clay

Misc. Symbols

	Water table at boring completion
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Soil Samplers

	Standard penetration test
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Notes:

1. Exploratory borings were performed 11.06.07 to 11.09.07 using a 2-inch diameter split barrel sampler driven by a 140 lbs hammer (In accordance with ASTM D1586 procedure).
2. Boring locations in (plan 1) were located in the field by a member of FES, Inc. based on a site plan provided by the client, so Boring location plan should be considered approximate.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.

APPENDIX B

Key to Soil Classification

UNIFIED SOIL CLASSIFICATION
(After U.S. Waterways Experiment Station and ASTM D 2487-66T)

Major Division	Group Symbol	Laboratory Classification Criteria		Soil Description
		Finer than 200 Sieve %	Supplementary Requirements	
Coarse-grained (over 50% by weight coarser than No. 200 sieve)	GW	0-5*	D_{60}/D_{10} greater than 4, $D_{30}^2/D_{60} \times D_{10}$ between 1 & 3 Not meeting above gradation for GW	Well-graded gravels, sandy gravels
	GP	0-5*		Gap-graded or uniform gravels, sandy gravels
	GM	12 or more *	PL less than 4 or below A-line	Silty gravels, silty sandy-gravels,
	GC	12 or more *	PL over 7 and above A-line	Clayey gravels, clayey sandy gravels
Fine-grained (over 50% by weight finer than No. 200 sieve)	SW	0-5*	D_{60}/D_{10} greater than 4, $D_{30}^2/D_{60} \times D_{10}$ between 1 & 3	Well-graded sands, gravelly sands
	SP	0-5*	Not meeting above gradation for requirements	Gap-graded or uniform sands, gravelly sands
	SM	12 or more *	PL less than 4 or below A-line	Silty sands, silty gravelly sands,
	SC	12 or more *	PL over 7 and above A-line	Clayey sands, clayey gravelly sands
	ML		Plasticity chart	Silts, very fine sands, silty or clayey fine sands, micaceous silts
	CL		Plasticity chart	Low plasticity clays, sandy or silty clays
	OL		Plasticity chart, organic odor or color	Organic silts and clays of low plasticity
	MH		Plasticity chart	Micaceous silts, diatomaceous silts, volcanic ash
Soils with fibrous organic matter	CH		Plasticity chart	Highly plastic clays and sandy clays
	OH		Plasticity chart, organic odor or color	Organic silts and clays of high plasticity
	PT		Fibrous organic matter, will char, burn, or glow	Peat, sandy peats, and clayey peat

*For soils having 5 to 12 percent passing the No. 200 sieve, use a dual symbol such as GW-GC.