



## ADDENDUM NO. 1

Issue Date: January 7, 2021

Project Name: 66<sup>th</sup> Ave Widening (49<sup>th</sup> St to 69<sup>th</sup> St) – IRC-1505

Bid Number: 2021018

Bid Opening Date: **February 3, 2021**

This addendum is being released to provide information to attend the pre-bid meeting via Zoom, and answer questions received to date. The information and documents contained in this addendum are hereby incorporated in the invitation to bid. **This addendum must be acknowledged where indicated on the bid form, or the bid will be declared non-responsive.**

### Pre-Bid Meeting Link:

To facilitate social distancing, bidders are encouraged to attend the MANDATORY pre-bid meeting remotely by clicking: <https://ircgov.zoom.us/j/7837260776>

Call 772-226-1416 if you need assistance logging in. Note the meeting will not be initiated until approximately 10 minutes prior, and all attendees will be placed in the waiting room until entry is granted. Attendees will be individually added, after their contact information has been provided and entered by County staff into the sign-in sheet.

### Questions and Answers

1. For bonding purposes may you please provide the Engineers Cost Estimate.  
**The Engineers Estimate is \$34,171,848.35.**
2. Does Engineer Cost Estimate include the Force Account?  
**The Force Account will be \$3,500,000.00, which is not included in the above Engineers Estimate. Please see Section 01024 for further information about applicability of these funds.**
3. Is there any wage determination for this job?  
**No**
4. How long does it take to review shop drawings?  
**Review times will be in accordance with Section 01340 – Submittal of Shop Drawings of the specifications, specific review turnaround will be dependent upon the size, complexity, completeness and quality of the shop drawing submittal package that is being reviewed.**
5. Is possible to download from internet the following file: “Geotechnical Engineering Services Report

Addendum 1 - 2021018

for Proposed Roadway Improvements Along 66<sup>TH</sup> Avenue. Dated April 14, 2006.”

**The document is attached to this Addendum.**

6. Please advise where we can find Maintenance of Traffic plans for above referenced project.  
**Contractor is responsible for developing MOT plans.**

**Attachment:**

“Geotechnical Engineering Services Report for Proposed Roadway Improvements Along 66<sup>th</sup> Avenue.  
Dated April 14, 2006.”



April 14, 2006

ARCADIS, LNW  
420 Columbia Drive, Suite 110  
West Palm Beach, Florida 33409

Attn: Mr. Hank Deibel, P.E.

**RE: Geotechnical Engineering Services Report  
Proposed Roadway Improvement  
Along 66<sup>th</sup> Avenue, 49<sup>th</sup>, 53<sup>rd</sup> and 57<sup>th</sup> Streets  
Indian River County, Florida  
Tierra Project No.: 6611-05417-4**

Dear Hank:

Tierra, Inc. has completed our Geotechnical Engineering evaluation program for the subject project. The results of our field exploration program and subsequent recommendations are presented in this report.

Tierra, Inc. appreciates the opportunity to be of service to ARCADIS, LNW on this project and looks forward to working with you on future projects. If you have any questions or comments regarding this report, please contact our office at your earliest convenience.

Sincerely

***TIERRA, INC.***

A handwritten signature in black ink, appearing to read "Raj Krishnasamy".

Raj Krishnasamy, P.E.  
Principal Geotechnical Engineer/VP  
FL Registration No. 53567

Attachments

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## 1.0 PROJECT DESCRIPTION

The project, as we understand it, consists of the intersection improvement along the north side of 49<sup>th</sup>, 53<sup>rd</sup> and 57<sup>th</sup> Streets on the west and east sides of 66 Avenue and the roadway improvement along the west side of 66 Avenue in Indian River County, Florida.

The purpose of this study was to provide Geotechnical (i.e. soils and groundwater) input to the design team during the evaluation phase of the proposed road improvements.

## 2.0 SCOPE OF SERVICES

The study was performed to obtain information on the existing subsurface conditions along the project alignment to assist in the design of the construction plans for the referenced roadway widening at the intersections indicated in the reference. For this, the following services were provided:

1. Reviewed readily available published topographic and soils information. This information was obtained from the "Soil Survey of Indian River County, Florida" published by the United States Department of Agriculture (USDA) Soil Conservation Services (SCS).
2. Performed a Geotechnical field study for the proposed road improvements. This included a total of one hundred twenty five (125) auger borings drilled to a depth of 6 feet below the existing grade for the proposed roadway widening.
3. Performed a limited laboratory testing routine to establish the soil properties along the roadway alignment using the AASHTO/ASTM Soil Classification System. The laboratory testing included grain size analysis, moisture content determination, and organic content (if needed).
4. Prepared this Geotechnical Engineering services Report for the project.

These Geotechnical Services were performed in general accordance with FDOT Standards "Soils and Foundations Manual".

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

### 3.0 EXPLORATION RESULTS

#### 3.1 Review of USDA Soil Survey, Indian River County, Florida

Review of the "Soil Survey of Indian River County Area, Florida," prepared by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) indicates that the project alignment is mapped predominantly as Wabasso fine sand, Winder fine sand, Pineda fine sand, and Jupiter fine sand.

**Wabasso fine Sand (13):** This soil is nearly level, poorly drained in broad flat-woods. The water table is at a depth of 10 to 40 inches for more than 6 months in most years and at a depth of less than 10 inches for 1 to 2 months, for the rest of the year.

**Winder fine Sand (14):** This soil is nearly level and poorly drained. It is on low hammocks and in poorly defined drainage ways. In most years and under natural conditions, the water table is within a depth of 0 to 10 inches of the surface for 2 to 4 months and within a depth of 10 to 40 inches for about 4 to 6 months or more. Only for short periods in dry seasons is the water table below a depth of 40 inches.

**Pineda fine Sand (16):** This soil is nearly level and poorly drained. It is on low hammocks and in broad, poorly defined sloughs. The water table is above the surface for a short period, after heavy rainfall. It is within a depth of 10 inches of the surface for 1 to 6 months and at a depth of 10 to 40 inches for more than 6 months.

**Jupiter fine Sand (31):** This soil is shallow, nearly level and poorly drained. It is on low flats on hammocks. In most years and under natural conditions, the water table is within a depth of 0 to 10 inches of the surface for 2 to 4 months in the wet season. Some areas are covered with shallow water for brief periods. In drained areas, the water table fluctuates with the water table in canals and ditches. It recedes to a depth below the Limestone bedrock in the dry season.

#### 3.2 Field Explorations

Sub-soils along the proposed roadway widening were explored by a total of one hundred twenty five (125) auger borings; twenty one (21) borings were performed along 49<sup>th</sup> street, twenty two (22) borings along 53<sup>rd</sup> street, twenty (20) borings along 57<sup>th</sup> Streets and sixty two (62) borings along 66<sup>th</sup> Avenue. The auger borings were drilled to a depth of 6 feet below the existing grade. The borings were located in the field by Tierra Personnel using tape measurement and existing site features.

The samples of the in-place soils were returned to our laboratory for classification by a geotechnical engineer. The samples were visually classified in general accordance with the AASHTO/ASTM Soil Classification System.

Approximate locations of the borings are presented in the Appendix. Soil profiles in roadway auger-borings are also presented in the Appendix.

### 3.3 General Soil Condition

The sub-soils encountered in the borings typically consisted of fine sand, fine sand with shell fragments, silty sand and silty sand with shell fragments. A thin layer of topsoil was encountered at almost all the borings. The following table describes the various soil strata that were found during the study as well as usage recommendations per the FDOT Roadway Design Standards.

STRATUM	TYPE	AASTHO CLASSIFICATION	FDOT SOIL DESIGNATION
1	Top Soil	A-8	UNSUITABLE
2	Gray to brown fine Sand	A-3	SELECT
3	Gray to brown, fine Sand w/ shell fragments.	A-3	SELECT
4	Gray to brown, silty Sand	A-2-4	SELECT
5	Gray to brown ,silty Sand w/ shell fragments	A-2-4	SELECT
6	Gray to brown, clayey Sand	A-2-6	SELECT
7	Gray to brown ,sandy Silty	A-4	PLASTIC

Soil samples were performed in representative samples taken from the boring locations, at depths ranging from 1 to 6 feet below the ground surface. Once received, a Geotechnical engineer based the soil stratification on a visual review of the recovered samples, laboratory testing, and interpretation of the field boring logs.

The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The boring profiles represent the conditions at the particular boring location and variations do occur among the borings.

## **4.0 GROUNDWATER CONDITIONS**

### **4.1 Groundwater**

The groundwater table was measured at the boring locations following termination of drilling and after a short stabilization period on the order of five (5) to ten (10) minutes. The depth to the water table at the sampled locations ranged from 4.0 to 6.0 feet below the existing grades. The groundwater table measured at each of the boring location is presented on the boring profiles in the Appendix.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences (i.e. existing canals, swales, drainage ponds, under drains and areas of covered soils like, paved parking lots and sidewalks). Fluctuation should be anticipated. We recommend that the contractor determine the actual groundwater levels at the time of construction to determine groundwater impact on his construction procedure.

### **4.2 Seasonal High Groundwater Estimates**

Seasonal high groundwater levels are expected to be controlled by the existing drainage features encountered throughout the proposed widening alignment. Seasonal fluctuations in ground water levels should be anticipated due to rainfall, runoff and other site-specific factors. We estimate that the seasonal high ground water table at the area will be approximately 6 to 12 inches above the observed levels at the time of the exploration.



## 5.0 ENGINEERING EVALUATION AND RECOMMENDATIONS

### 5.1 General

In general, the existing shallow subsurface soils encountered in the borings performed are suitable for supporting the proposed roadway widening after proper sub-grade preparation. Site preparation should consist of normal clearing and grubbing and followed by compaction of sub-grade soils.

The removal of topsoil and muck (if any encountered during construction) should be accomplished in accordance with the Florida Department of Transportation (FDOT) Standard Indexes 500 and 505.

Silty soils (strata 4 and 5) encountered at the site are likely to retain excessive moisture and may be difficult to dry and compact. These materials may be used in the subgrade above the water table at the time of construction.

Any buried organic soils, debris, or unsuitable fills encountered during construction, which are not shown on the boring profiles should be removed and replaced with clean, compacted, sandy soils. Plastic soils (if any encountered), within the pavement section should also be removed and placed in areas not affecting pavement performance.

Backfill should consist of materials conforming to FDOT Standard Index 505 and be compacted in accordance with Section 120-9 of the Standard Specification for Road and Bridge Construction, latest edition. The structural fill to be placed below the water level should consist of well graded gravel or clean sand with a maximum of 5 percent passing the U.S. Standard No. 200 sieve.

### 5.2 Embankment Construction

We anticipate that some fill will be required for the proposed roadway construction. Fills are anticipated to be less than 5 feet in height for the proposed roadway widening. The embankment/fills should be constructed in accordance with Section 120-8 of FDOT Standard Specifications for Road and Bridge Construction using materials in accordance with FDOT Standard Index 505.

Assuming proper sub-grade preparation and adequate fill materials are utilized, we recommend that all proposed side slopes be constructed on 2.0 horizontal to 1.0 vertical (2H: 1V) or flatter. For the anticipated new fill heights of approximately 1 to 5 feet, we expect total settlements on the order of ½ inch, or less. We expect these settlements to be elastic and should occur during construction.

### **5.3 Temporary Side Slopes**

Side slopes for temporary excavations may stand near 1H: 1V for short dry periods of time; however, we recommend that temporary excavations below 5-foot depth be cut on slopes of 2H: 1V or flatter. Where restrictions will not permit slopes to be laid back as recommended above, the excavation should be shored in accordance with OSHA requirements. Furthermore, open-cut excavations exceeding 10 feet in depth should be properly dewatered and sloped 2H:1V or flatter or be benched using a bracing plan approved by a professional engineer licensed in the State of Florida. During construction, excavated materials should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth.

### **5.4 Groundwater Control**

In our opinion, groundwater is not expected to impose any restrictions to the proposed development provided final grades are at or near existing roadway elevations. However, dewatering will be required for utility installations when the excavation bottom is below the water table during construction.

### **5.5 Pavement Design Considerations**

We anticipate that the proposed pavement structure will be a semi-flexible asphaltic concrete section. Soils existing along the majority of the project alignments should have modest sub-grade strength for pavement support. Based on our experience on similar sub-grade materials, we recommend pavement designs include a design LBR value of 25 for the sub-grade consisting of sandy subsoil and provided the site is prepared as recommended in this report.

If a stabilized subgrade is required, we recommend a sand-gravel mixture, 12 inch thick, with a minimum design LBR of 40. Base course should consist of Limerock, Shellrock or coquina, meeting the minimum requirements of the FDOT "Standard Specifications for Road and Bridge Construction," Sections 911, 913 or 915, respectively. The Limerock (coquina) should have a minimum LBR value of 100. Both the base and stabilized sub-grade should be compacted to at least 98 percent of maximum dry density (AASHTO T-180).

Asphalt thickness should be determined considering the anticipated traffic loading conditions and expected life expectancy of the pavement section.

### **5.6 On-Site Soil Suitability**

Strata 2, 3, 4, 5 and 6 consist of Select material and are good for sub-grade and embankment support. This material must be prepared and utilized according to the Standard Index 505. However, portions of silty soils in Strata 4 and 5 may retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at the time of construction.

## 6.0 REPORT LIMITATIONS

Our Geotechnical engineering evaluation of the site and subsurface conditions with respect to the planned roadway widening and bridge replacement and our recommendations for site preparation are based upon the following: (1) site observations, (2) the field exploratory test data obtained during the geotechnical study, and (3) our understanding of the project information and anticipated final grades as presented in this report.

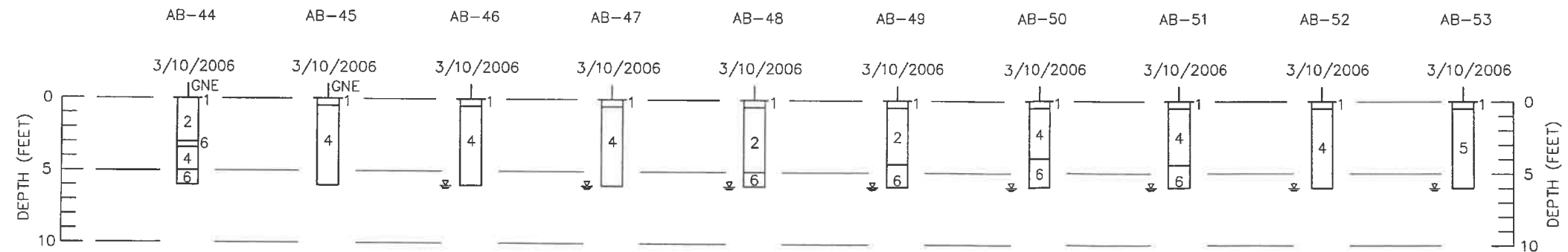
If the final grades vary considerably from those stated, or when final cross-sectional data becomes available, please contact our offices so that we can review our recommendations. Furthermore, upon the discovery of any site or subsurface conditions during construction, which appears to deviate from the data obtained during this Geotechnical exploration, please contact us immediately so that we may visit the site, observe the differing conditions, and evaluate the new information with regards to our evaluation and recommendations contained herein.

The recommendations presented previously represent design and construction techniques that we feel are both applicable and feasible for the planned construction. We recommend, however, that we be provided the opportunity to review the final foundation plans and the earthwork construction specifications to evaluate whether our recommendations have been properly interpreted and implemented.

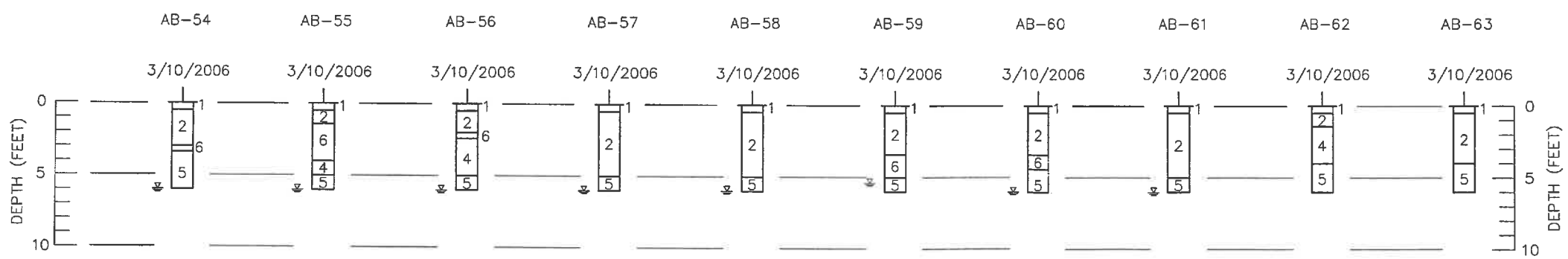
The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

This geotechnical report has been prepared for the exclusive use of ARCADIS (Lawson Noble & Webb), for the specific application to the proposed road intersection improvement along the north side of 49<sup>th</sup>, 53<sup>rd</sup> and 57<sup>th</sup> Streets on the west and east sides of 66 Avenue and the roadway improvement along the west side of 66 Avenue in Indian River County, Florida.

## **APPENDIX**



- 1- TOPSOIL (A-8)
- 2- GRAY TO BROWN SAND (A-3)
- 3- BROWN SAND WITH SHELL FRAGMENTS (A-3)
- 4- BROWN SILTY SAND (A-2-4)
- 5- BROWN SILTY SAND WITH SHELL FRAGMENTS (A-2-4)
- 6- BROWN CLAYEY SAND (A-2-6)
- 7- BROWN SANDY SILT (A-4)



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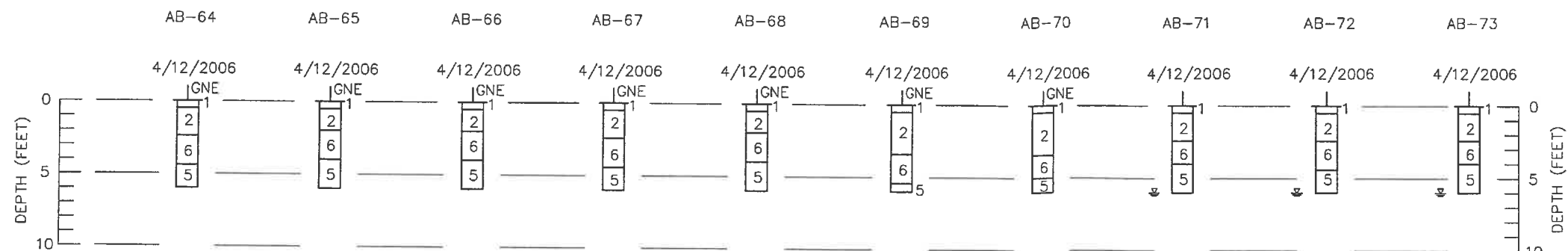
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			Designed by			Checked by			-	INDIAN RIVER	6611-05-417-4	66TH AVE IMPROVEMENTS INDIAN RIVER, FLORIDA	
			Approved by	RAJ KRISHNASAMY, P.E.									

1100 Barnett Drive  
Lake Worth, Florida 33461  
561-547-1232  
Business License No. 6485

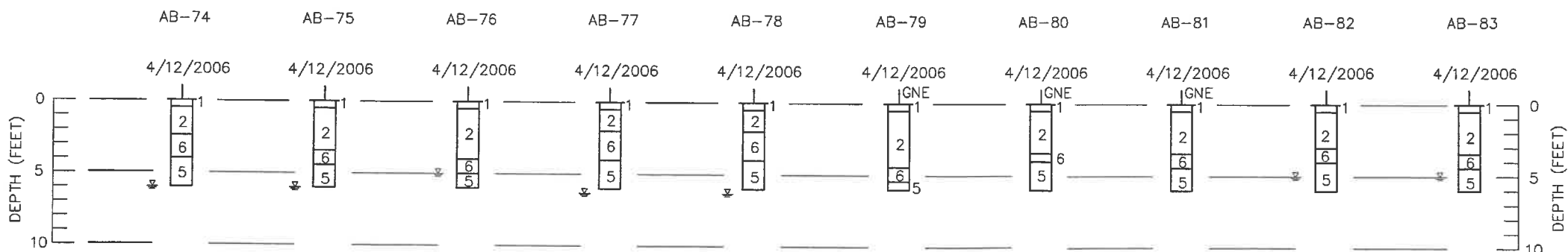
**TIERRA**  
GEOTECHNICAL MATERIALS  
ENGINEERING

ENGINEER OF RECORD:  
Raj Krishnasamy, P.E.  
P.E. License No. 53567

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- 1- TOPSOIL (A-8)
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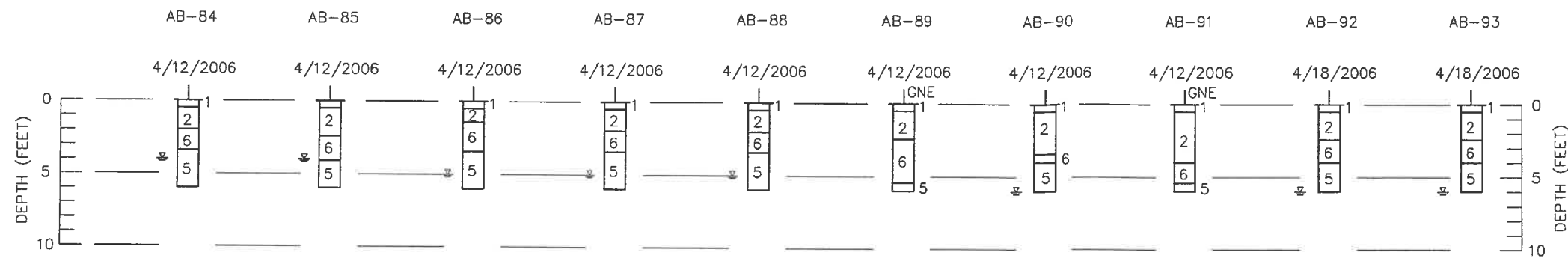


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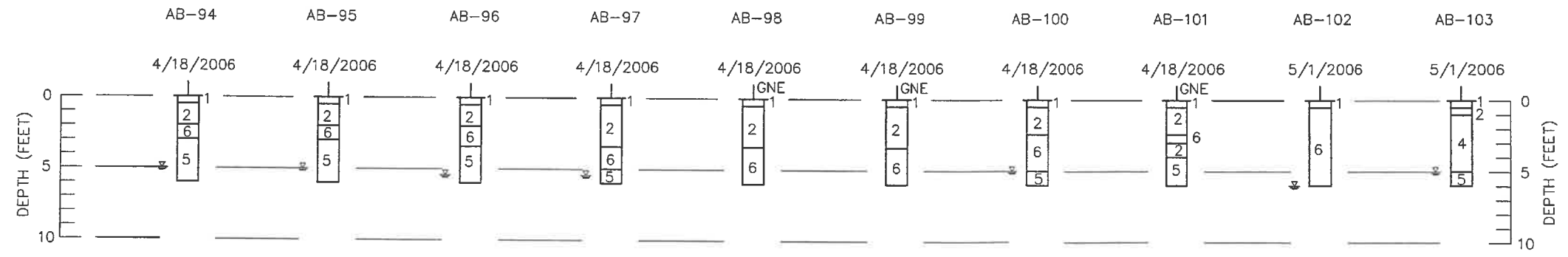
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- 1- TOPSOIL (A-8)
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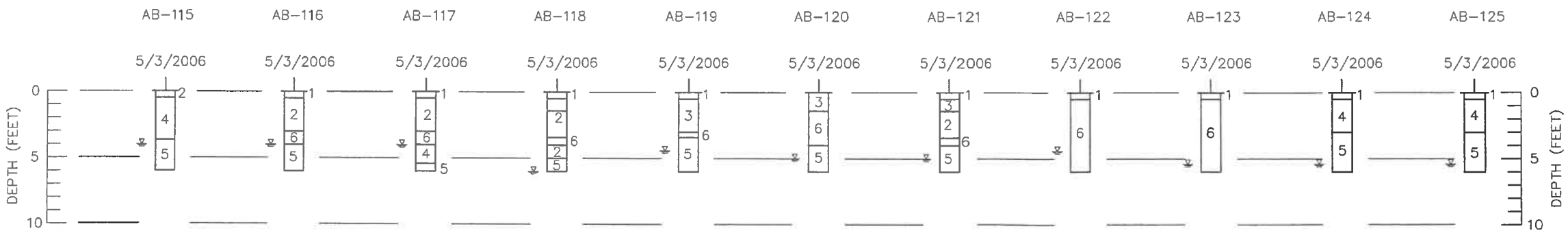
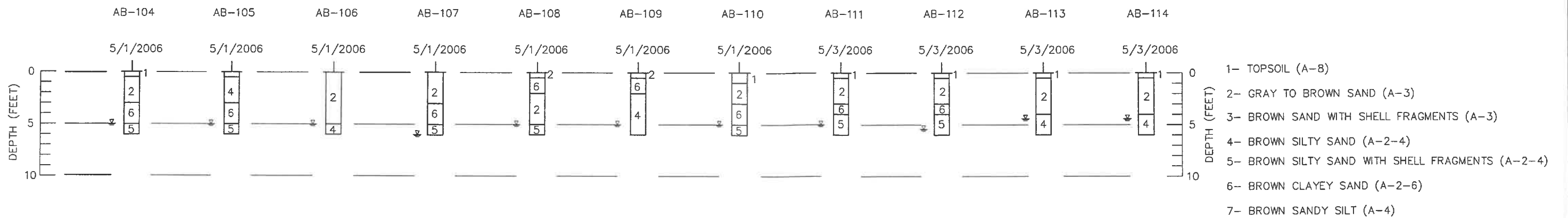


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Date	By	Description	Date	By	Drawn by	Checked by	Designed by	Checked by	Approved by	Names	Dates	ROAD NO.	COUNTY	PROJECT NO.	SOILS PROFILE		SHEET NO.
					JL	RK			RAJ KRISHNASAMY, P.E.	1100 Barnett Drive Lake Worth, Florida 33461 561-547-1232 Business License No. 6486 ENGINEER OF RECORD: Raj Krishnasamy, P.E. P.E. License No. 53567	05/06 05/06	-	INDIAN RIVER	6611-05-417-4	66TH AVE IMPROVEMENTS INDIAN RIVER, FLORIDA		6



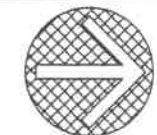
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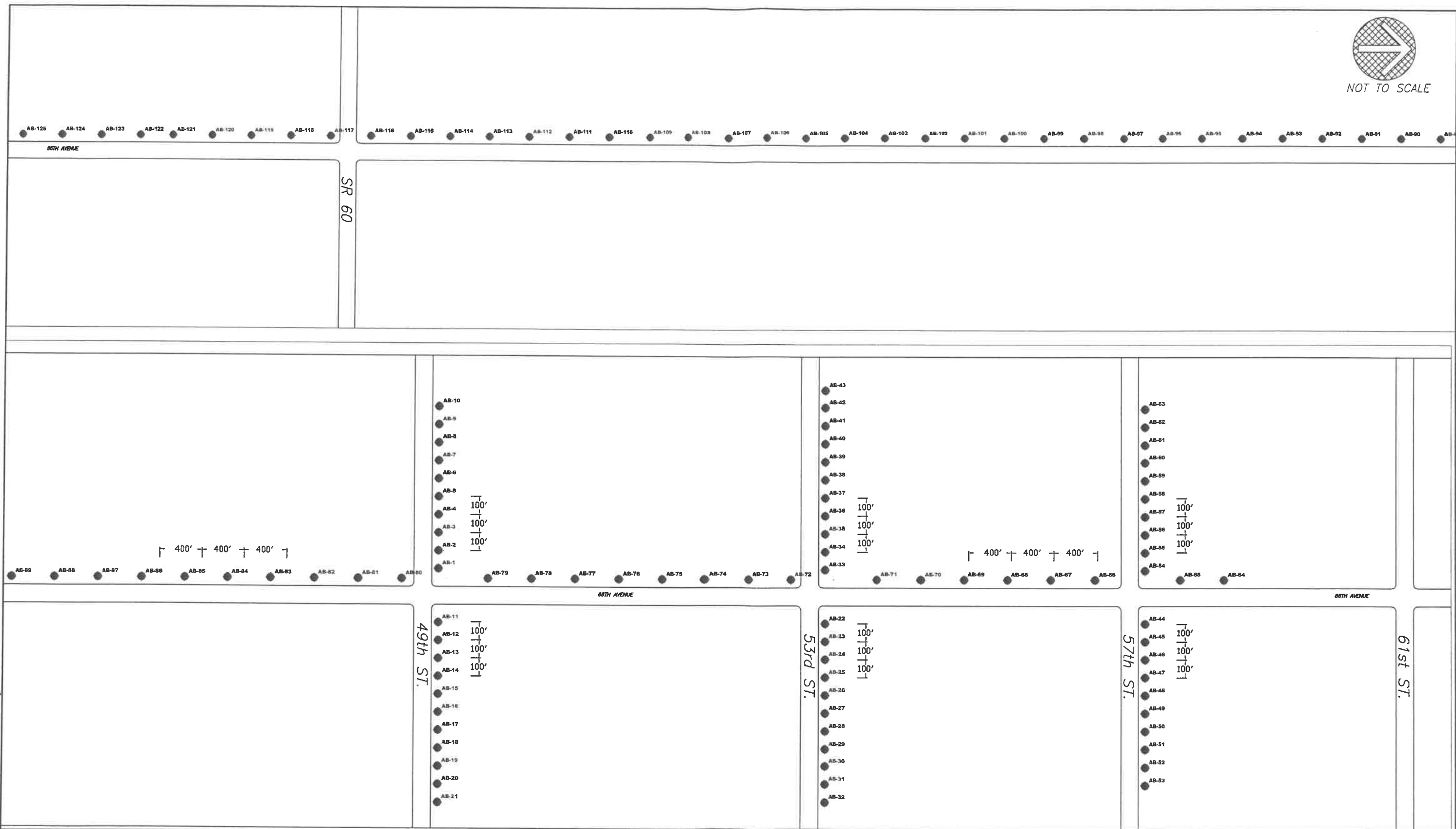
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Date	By		Date	By	Description	Drawn by	JL	05/06					SOILS PROFILE		
						Checked by	RK	05/06					66TH AVE IMPROVEMENTS INDIAN RIVER, FLORIDA		7
						Designed by							ROAD NO.	COUNTY	PROJECT NO.
						Checked by							-	INDIAN RIVER	6611-05-417-4
						Approved by	RAJ KRISHNASAMY, P.E.		1100 Barnett Drive Lake Worth, Florida 33461 561-547-1232 Business License No. 6486 ENGINEER OF RECORD: Raj Krishnasamy, P.E. P.E. License No. 53567						





NOT TO SCALE



L E G E N D

● AUGER BORING LOCATION

1-THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY.

2-TEST PIT LOCATIONS SHOULD BE CONSIDERED APPROXIMATED.

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REVISIONS		Date	By	Description

Drawn by	Names	Dates
	JL	05/06
Checked by	RK	05/06
Designed by		
Checked by		
Approved by	RAJ KRISHNASAMY, P.E.	



2765 Vista Parkway, S-10  
 West Palm Beach, Florida 33411  
 561-687-8536  
 Business License No. 6485  
**ENGINEER OF RECORD:**  
 Raj Krishnasamy, P.E.  
 P.E. License No. 53567

SEAL:

ROAD NO.	COUNTY	PROJECT NO.
-	INDIAN RIVER	6611-05-417-4

SHEET TITLE	SHEET NO.
BORING LOCATION PLAN	1
PROJECT NAME	
66TH AVE IMPROVEMENTS INDIAN RIVER, FLORIDA	

**Summary of Laboratory Test Results**  
**Proposed Roadway Improvement along 66 Ave., 49th, 53rd and 57th St.**  
**Indian River County, Florida**  
**Tierra Project No: 6611-05-417**

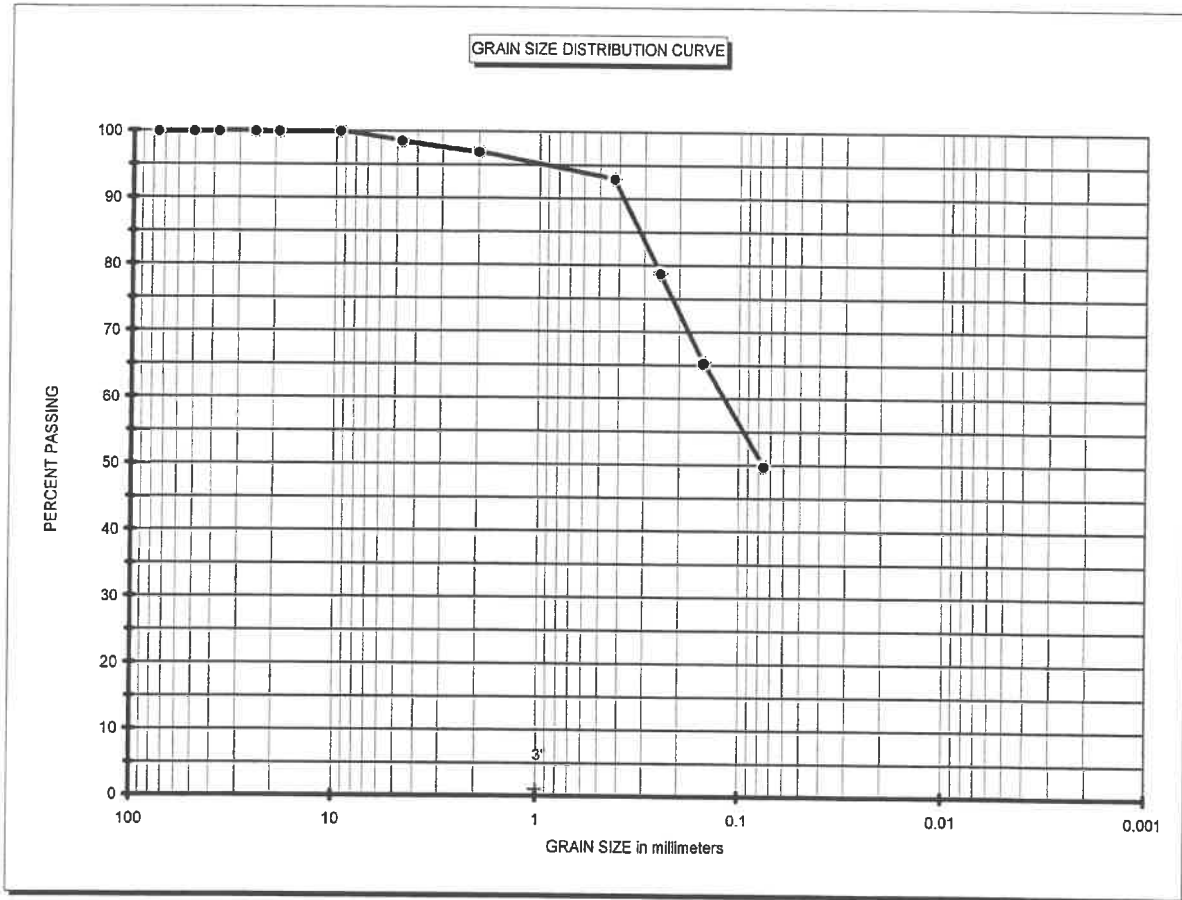
Boring Number	Sample Depth (ft)	Stratum Number	AASHTOSy mbol	Sieve Analysis								Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)	
				3/4"	3/8"	#4	#10	#40	#60	#100	#200	Liquid Limit	Plastic Limit	Plasticity Index			
AB-2	4.0 - 4.5	2	A-3	100	99	99	94	62	30	11	1						12
AB-3	4.0 - 5.0	4	A-2-4	100	100	100	100	95	60	36	23						22
AB-4	5.0 - 6.0	5	A-2-4	100	98	93	80	81	58	35	16						21
AB-23	3.0 - 5.5	7	A-4	100	100	999	97	93	79	65	50	26	18	8			21
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AB-29	4.0 - 5.0	4	A-2-4	100	100	100	100	94.1	73	48.1	20	25	18	7			19
AB-30	5.0 - 6.0	7	A-4	100	100	96	93	88	74	61	45	NP	NP	NP			19
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AB-75	5.0 - 6.0	5	A-2-4	100	100	99.5	91.6	83.3	59.4	34.9	13.6	NP	NP	NP			23

**TIERRA. INC.**

**GRAIN SIZE DATA SHEET**

PROJECT NAME: Improvements along 66th Ave., 49th, 53rd  
 PROJECT #: 6611-05-417

DATE: 4/6/2006



ASTM D 2487 Classification of Soil for Engineering Purposes		Coarse Sand	< #4 and > #10	$C_u = D_{60} / D_{10}$
Coarse Gravel	< 3" and > 3/4"	Medium Sand	< #10 and > #40	$C_c = (D_{30})^2 / (D_{10} \times D_{60})$
Fine Gravel	< 3/4" and > #4	Fine Sand	< #40 and > #200	

BORING # AB - 23 (53rd) OFFSET (ft) \_\_\_\_\_ DEPTH (ft): 3.5-5

SOIL CLASSIFICATION: A-4

MOISTURE CONTENT: 21.3%

ATTERBERG LIMIT ( - #40 Material )	
LIQUID LIMIT	26
PLASTIC LIMIT	18
PLASTIC INDEX	8

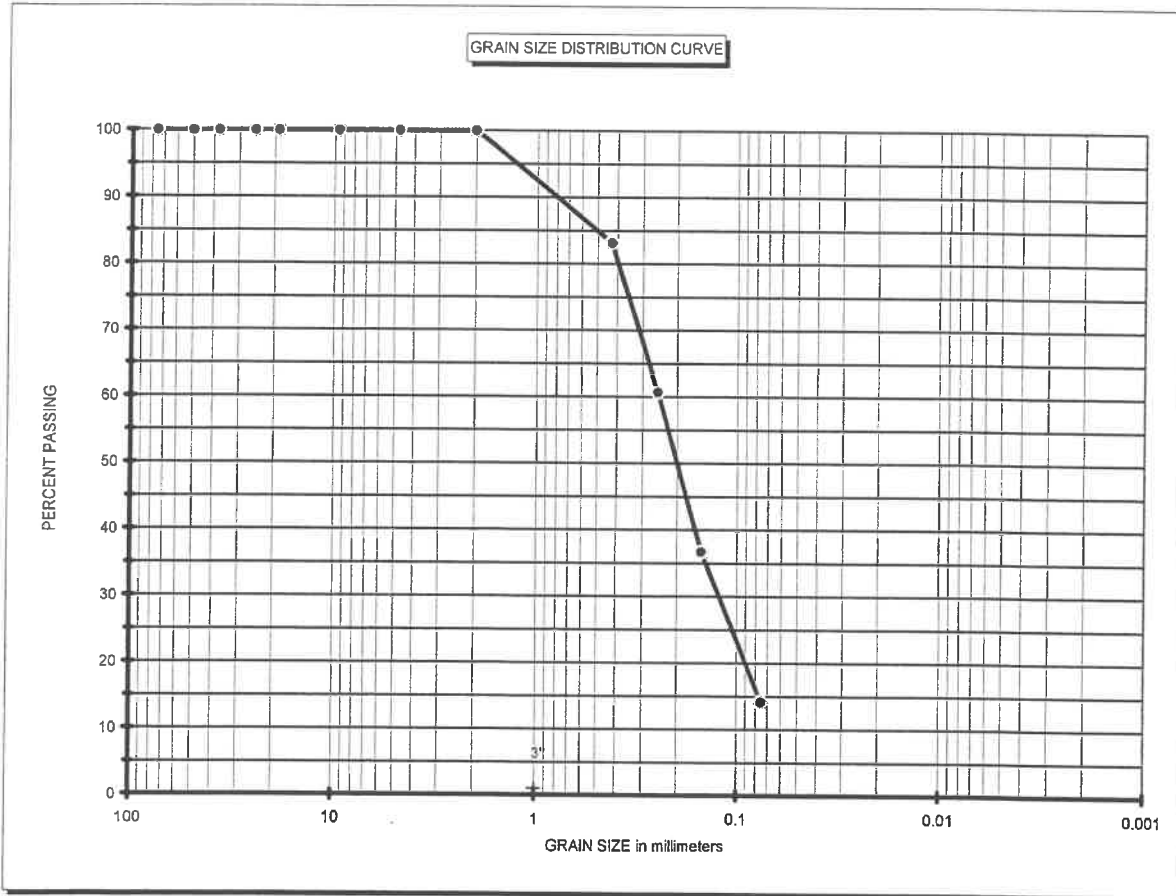
**TIERRA. INC.**

**GRAIN SIZE DATA SHEET**

PROJECT NAME: Improvements along 66th Ave., 49th, 53rd

DATE: 4/6/2006

PROJECT #: 6611-05-417



ASTM D 2487 Classification of Soil for Engineering Purposes		Coarse Sand	< #4 and > #10	$C_u = D_{60} / D_{10}$
Coarse Gravel	< 3" and > 3/4"	Medium Sand	< #10 and > #40	$C_c = (D_{30})^2 / (D_{10} \times D_{60})$
Fine Gravel	< 3/4" and > #4	Fine Sand	< #40 and > #200	

BORING # AB - 24 (53rd) OFFSET (ft) \_\_\_\_\_ DEPTH (ft): 5-6

SOIL CLASSIFICATION: A-2-4

MOISTURE CONTENT: 17.9%

ATTERBERG LIMIT ( - #40 Material )	
LIQUID LIMIT	NP
PLASTIC LIMIT	NP
PLASTIC INDEX	NP



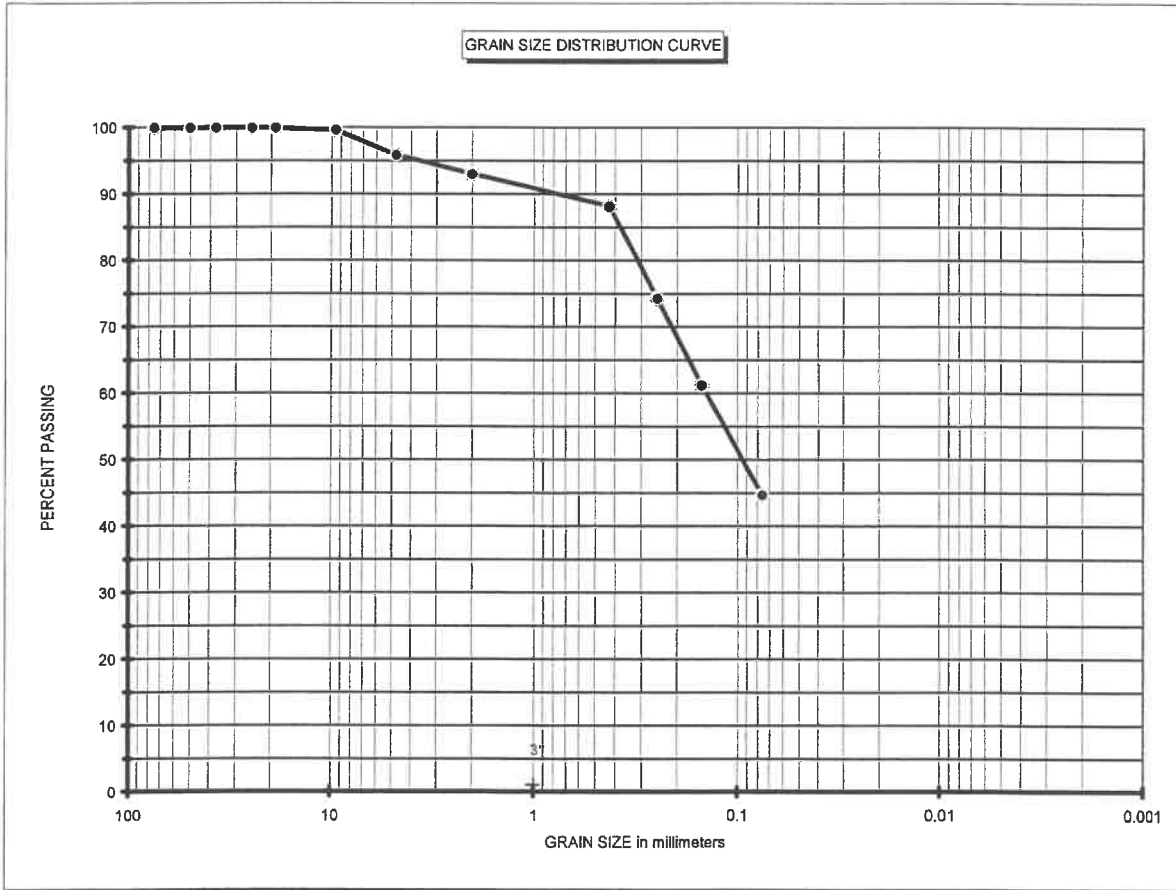
**TIERRA. INC.**

**GRAIN SIZE DATA SHEET**

PROJECT NAME: Improvements along 66th Ave., 49th, 53rd

DATE: 4/6/2006

PROJECT #: 6611-05-417



ASTM D 2487 Classification of Soil for Engineering Purposes		Coarse Sand	< #4 and > #10	Cu = D60 / D10
Coarse Gravel	< 3" and > 3/4"	Medium Sand	< #10 and > #40	Cc = (D30)^2 / (D10 x D60)
Fine Gravel	< 3/4" and > #4	Fine Sand	< #40 and > #200	

BORING # AB - 30      OFFSET (ft) \_\_\_\_\_      DEPTH (ft): 5 - 6

SOIL CLASSIFICATION: A-4

MOISTURE CONTENT: 18.5%

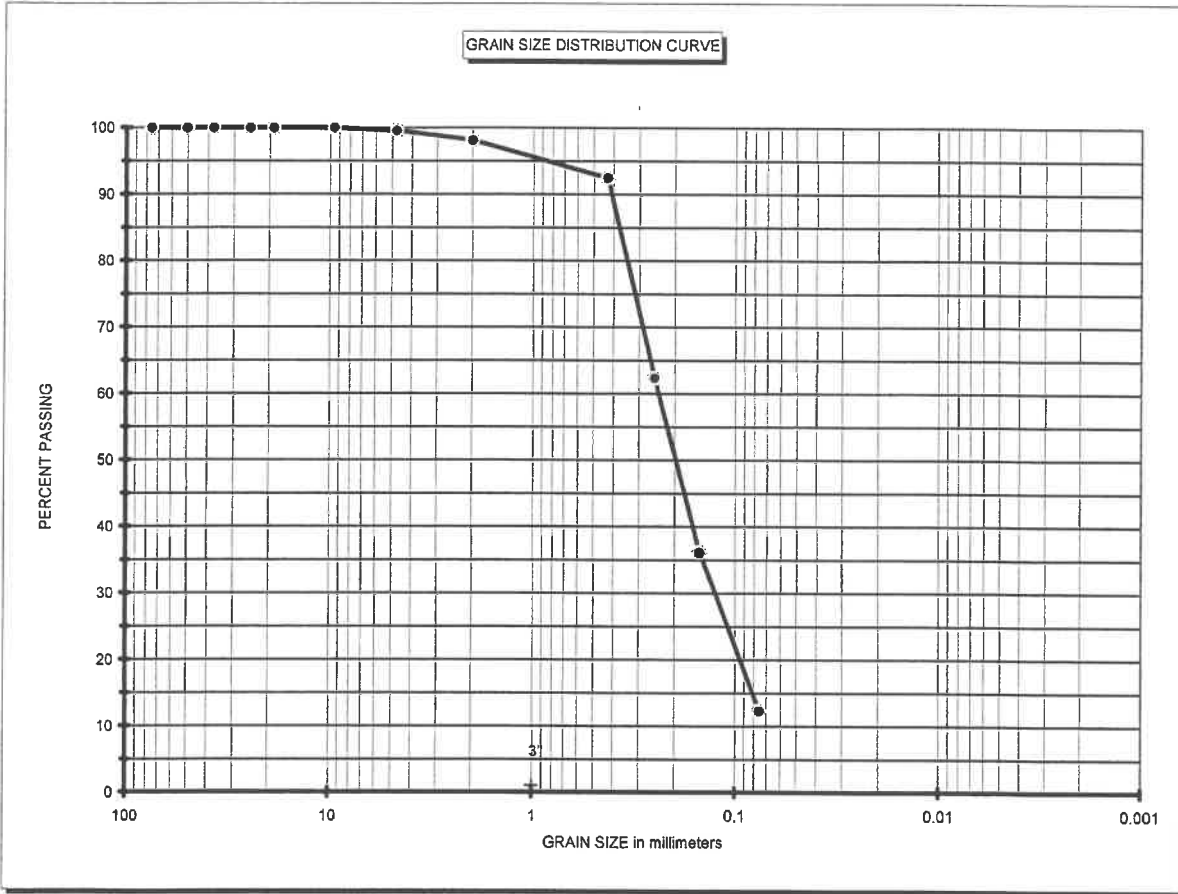
ATTERBERG LIMIT ( - #40 Material )	
LIQUID LIMIT	NP
PLASTIC LIMIT	NP
PLASTIC INDEX	NP

GRAIN SIZE DATA SHEET

PROJECT NAME: Improvements along 66th Ave., 49th, 53rd

DATE: 4/6/2006

PROJECT #: 6611-05-417



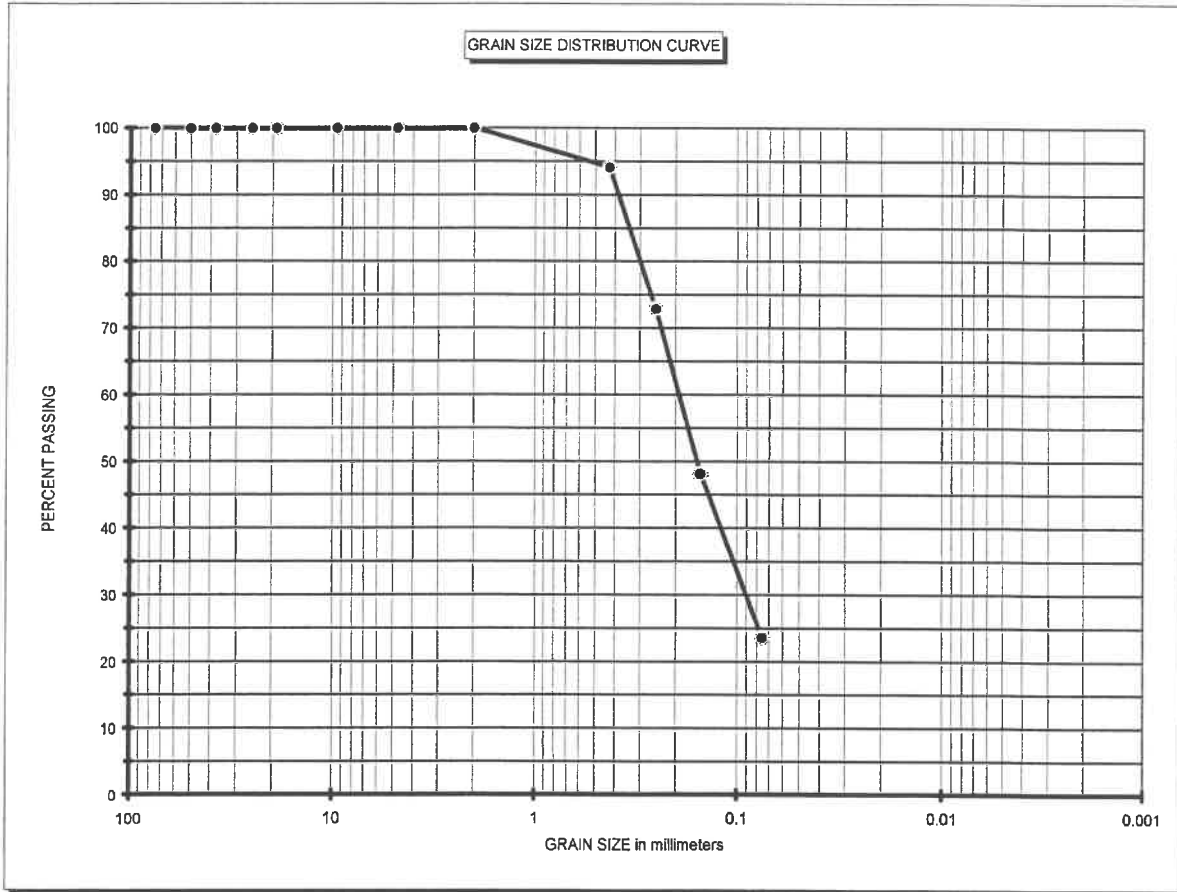




**GRAIN SIZE DATA SHEET**

PROJECT NAME: Improvements along 66th Ave., 49th, 53rd  
 PROJECT #: 6611-05-417

DATE: 4/6/2006



ASTM D 2487 Classification of Soil for Engineering Purposes		Coarse Sand	< #4 and > #10	$C_u = D_{60} / D_{10}$
Coarse Gravel	< 3" and > 3/4"	Medium Sand	< #10 and > #40	$C_c = (D_{30})^2 / (D_{10} \times D_{60})$
Fine Gravel	< 3/4" and > #4	Fine Sand	< #40 and > #200	

BORING # AB - 38 OFFSET (ft) \_\_\_\_\_ DEPTH (ft): 4 - 5

SOIL CLASSIFICATION: A-2-6

MOISTURE CONTENT: 21.1%

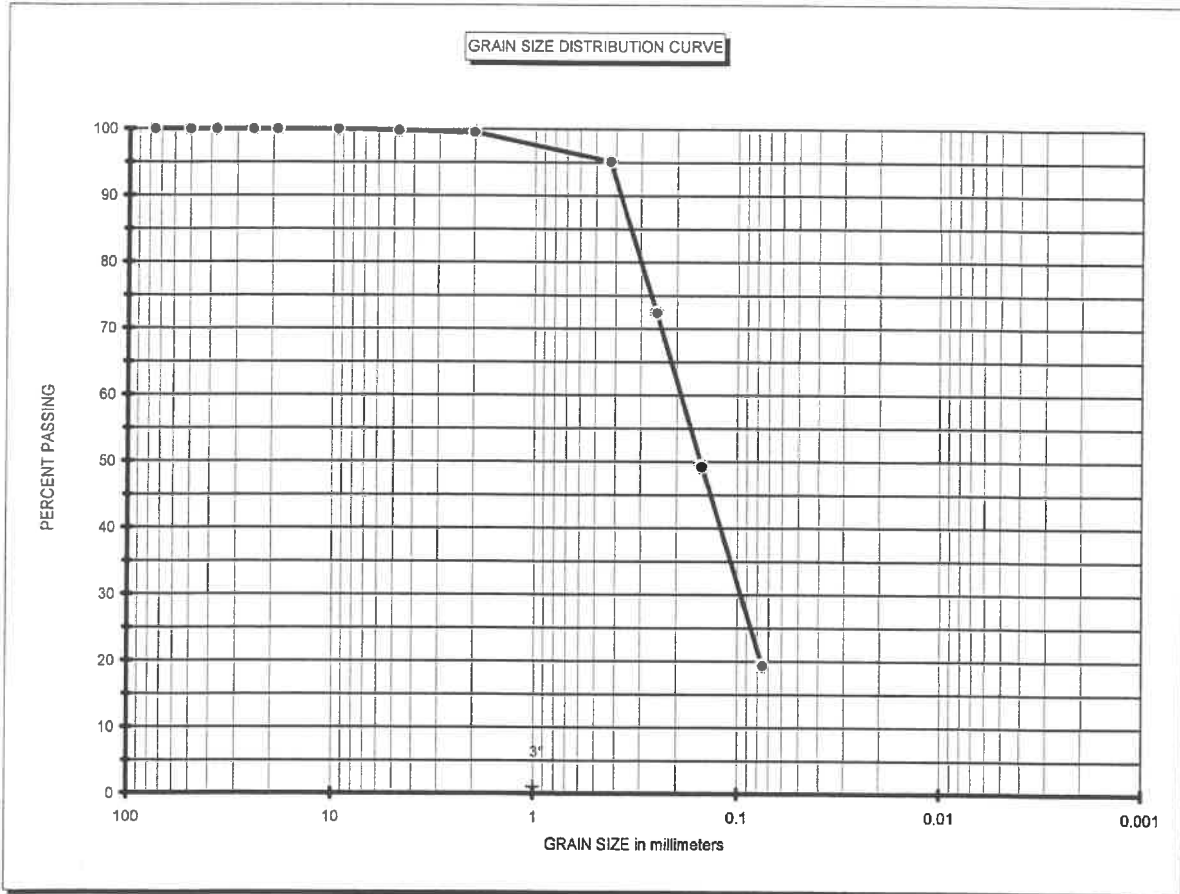
ATTEBERG LIMIT ( - #40 Material )	
LIQUID LIMIT	30
PLASTIC LIMIT	16
PLASTIC INDEX	14

**TIERRA. INC.**

**GRAIN SIZE DATA SHEET**

PROJECT NAME: Improvements along 66th Ave., 49th, 53rd  
 PROJECT #: 6611-05-417

DATE: 4/6/2006



ASTM D 2487 Classification of Soil for Engineering Purposes		Coarse Sand	< #4 and > #10	$C_u = D_{60} / D_{10}$
Coarse Gravel	< 3" and > 3/4"	Medium Sand	< #10 and > #40	$C_c = (D_{30})^2 / (D_{10} \times D_{60})$
Fine Gravel	< 3/4" and > #4	Fine Sand	< #40 and > #200	

BORING # AB - 46 OFFSET (ft) \_\_\_\_\_ DEPTH (ft): 0.5 - 6

SOIL CLASSIFICATION: A-2-4

MOISTURE CONTENT: 18.3%

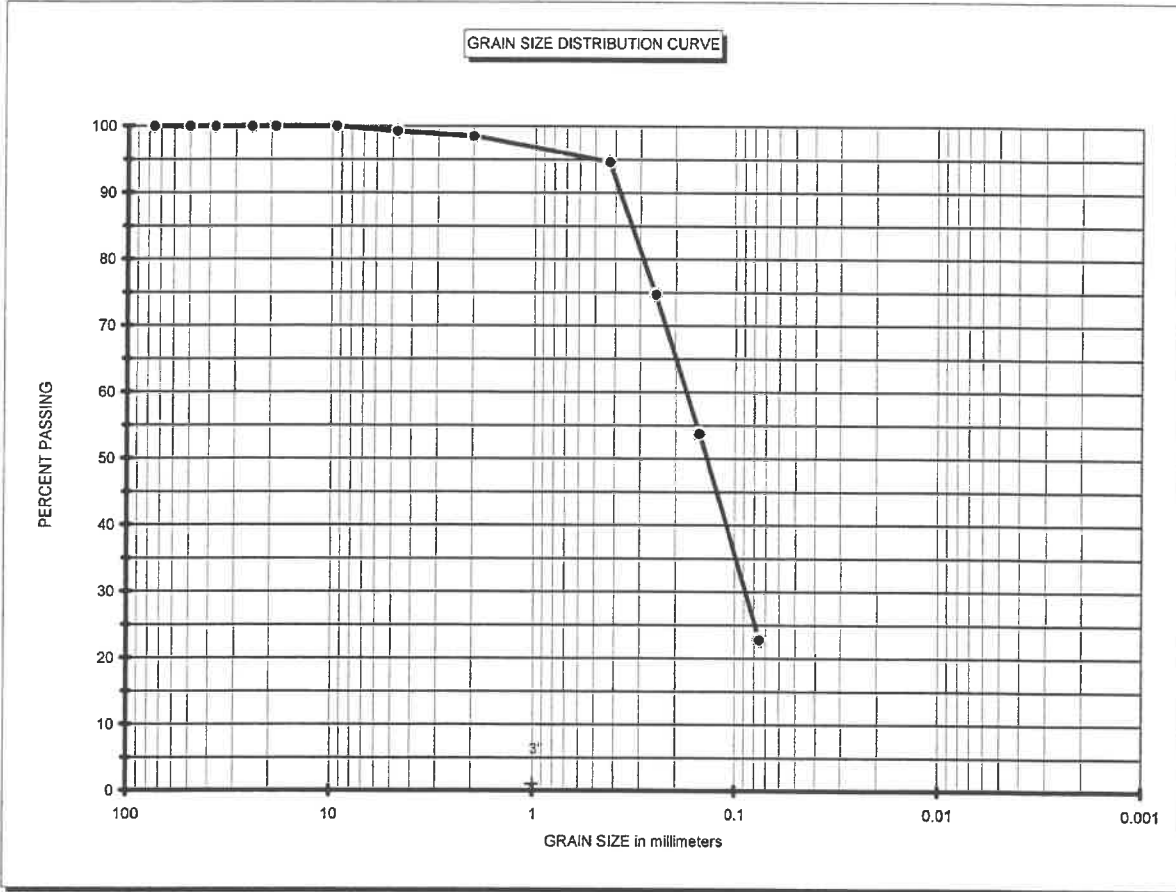
ATTERBERG LIMIT ( - #40 Material )	
LIQUID LIMIT	22
PLASTIC LIMIT	19
PLASTIC INDEX	3

**TIERRA. INC.**

**GRAIN SIZE DATA SHEET**

PROJECT NAME: Improvements along 66th Ave., 49th, 53rd  
 PROJECT #: 6611-05-417

DATE: 4/6/2006



ASTM D 2487 Classification of Soil for Engineering Purposes		Coarse Sand	< #4 and > #10	$C_u = D_{60} / D_{10}$
Coarse Gravel	< 3" and > 3/4"	Medium Sand	< #10 and > #40	$C_c = (D_{30})^2 / (D_{10} \times D_{60})$
Fine Gravel	< 3/4" and > #4	Fine Sand	< #40 and > #200	

BORING # AB - 49 OFFSET (ft) \_\_\_\_\_ DEPTH (ft): 0.5 - 4

SOIL CLASSIFICATION: A-2-4

MOISTURE CONTENT: 17.4%

ATTERBERG LIMIT ( - #40 Material )	
LIQUID LIMIT	23
PLASTIC LIMIT	18
PLASTIC INDEX	5