

**Geotechnical Services Report
Sadhvani Pond for
66th Avenue Roadway Widening
Indian River County, Florida**

December 12, 2007

Project No. PSL-06-2352

Prepared For:

**Kimley-Horn & Associates, Inc.
Attention: Brian Good, P.E.
1901 19th Place, Suite B-100
Vero Beach, Florida 32906**

Prepared By:

**Dunkelberger Engineering & Testing, Inc.
607 NW Commodity Cove
Port St. Lucie, Florida 34986**



Kimley-Horn & Associates, Inc.
1901 19th Place, Suite B-100
Vero Beach, Florida 32906

December 12, 2007
Project No. 06-11-2352

Attention: Mr. Brian Good, P.E...*via e-mail and US Mail*

Subject: ***Geotechnical Services Report***
Sadhvani Pond for
66th Avenue Roadway Widening
Indian River County, Florida

Dear Mr. Good:

INTRODUCTION

Dunkelberger Engineering & Testing, Inc. (**Dunkelberger**) has completed the geotechnical services for the above referenced project. Generally, our services included performing an exploratory boring in the proposed detention pond, installing a piezometer, monitoring the piezometer once a week for three weeks and preparing this report. Our findings and recommendations for the detention pond are discussed herein.

PROJECT INFORMATION

We understand an additional pond is proposed to handle stormwater management in related to the planned widening of 66th Avenue in Indian River County, Florida. This pond is triangular in shape and located at the northwest corner of the 66th Avenue and 65th Street in Vero Beach, Florida. The proposed pond location in relation to existing roads is shown on Sheet 1, *Vicinity Map*. The pond site consists of a fallow citrus grove area that is thickly over-grown.

SOIL SURVEY INFORMATION

Information available from the U.S. Department of Agriculture Soil Conservation Service Soil Survey of Indian River County Area, Florida (1987) shows that the pond lies within area mapped with the soil units described in the following table.

Soil Unit	Found In	Stratification	Water Table
Oldsmar Sand	Broad flatwoods	0 - 32" - Fine Sand (A-3) 32" - 50"- Fine Sand, Sand, Loamy Fine Sand (A-3, A-2-4) 50"-62"- Sandy Loam, Fine Sandy Loam, Sandy Clay Loam (A-2-4, A-2-6)	For most years, water table is less than 10 inches of the surface for 2 to 4 months in wet season and within 40 inches for more than 6 months.
Riviera Fine Sand	Low Hammocks, poorly defined drainage ways and broad, low sloughs	0-26" - Fine Sand (A-3) 26"- 40"- Sandy Loam, Sandy Clay Loam (A-2-4, A-2-6) 40"- 80"- Sand, Fine Sand, Loamy Sand (A-3, A-2-4)	Water table is within 10 inches of the surface for 1 to 6 months and between 10 and 40 inches for more than 6 months. Water table is above the surface during heavy rainy season. (0 to 1 feet, Apparent water table between June and December)

A "Soil Survey Map" of the proposed pond location is provided on attached Sheet 2.

SUBSURFACE EXPLORATION

One (1) Standard Penetration Test (SPT) boring (TB-6) was drilled to a depth of 25 feet below the existing ground surface within the vicinity of the proposed pond. The boring was drilled using a truck mounted (Mobile B-47) drill rig. The approximate location of the boring is shown on the attached Sheet 3, *Boring Location Plan*.

Representative samples of the recovered soils were collected from the boring, placed in moisture proof containers, and taken to our laboratory. These samples were visually classified in general accordance with AASHTO classification.

A Piezometer was constructed in the boring after completion of drilling. Well screen was placed from 15 feet to 25 feet below the ground surface and solid 2" PVC riser extended from the top of the well screen to a height of about 2 to 3 feet above the ground surface. The annular space around the screened portion of the piezometer was filled with filter grade sand. An approximately 12-inch thick layer of bentonite was placed in the annular space immediately above the well screen. Soil cuttings were used to backfill the remainder of the annular space up to the ground surface.

SUBSURFACE CONDITIONS

In general, the soils consisted of sands with varying amounts of silt and clay. Based on the SPT N-values, the relative densities of sands are, in general, very loose to medium dense. A detailed graphical profile of the subsoils is provided on attached Sheet 4, *Subsurface Profile*.

The Stratum 1 consists of relatively clean sands and is classified as AASHTO A-3 soils. Stratum 2 consists of silty sands and is classified as A-2-4. Stratum 3 consisted of clayey sands and is

classified as A-2-4. The Stratum 1 soils are considered as “select” materials per Florida Department of Transportation (FDOT) Standard Index No. 505 (*Embankment Utilization*) and may be utilized as such. Technically, Strata 2 and 3 are also considered to be “select” materials; however, the Stratum 2 soils are expected to be moisture sensitive, and may exhibit instability under loads or difficulty in achieving compaction when the fines content is greater than 12% and moisture content is above the optimum value. Additionally, the Stratum 3 soils are expected to behave like AASHTO A-2-6 materials in the field and should be called out as “plastic” materials per FDOT Standard Index No. 505 when the percentage passing the U.S. Standard No. 200 sieve (fines content) is greater than 12%.

Groundwater

Groundwater level in the piezometer was measured once a week for the period of three weeks after installation. The measured groundwater elevations in the piezometer are provided in the following table.

PIEZOMETER LOCATION	GROUND SURFACE ELEVATION (feet, NGVD*)	GROUNDWATER LEVEL ELEVATION MEASUREMENTS (feet, NGVD*) ON:		
		10/30/07	11/13/07	11/21/07
TB-6	22.0	19.4	18.8	18.6

* Elevations with respect to the National Geodetic Vertical Datum of 1929

Utilizing the data collected during this study and estimating the typical variation between seasonal high and low groundwater levels on any given year with normal rainfall distribution, it is our opinion that the median (average) groundwater level at the pond site is +16.5 feet NGVD. The peak water level is estimated to be at +19.5 feet NGVD.

LIMITATIONS

Dunkelberger has completed this geotechnical services report for the Sadhwani pond site in Indian River County, Florida. The purpose of the study was to explore the subsurface conditions of the Sadhwani pond site and provide geotechnical criteria for the design and construction of the project. Dunkelberger warrants that the recommendations and professional advice presented in this report were developed based on recognized practice in the disciplines of soil mechanics and engineering geology. No other warranties are expressed or implied.

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We trust that this information is sufficient for continued development of the project. Please contact us if you have any questions, or need any additional information.

Sincerely,

DUNKELBERGER ENGINEERING & TESTING, INC.

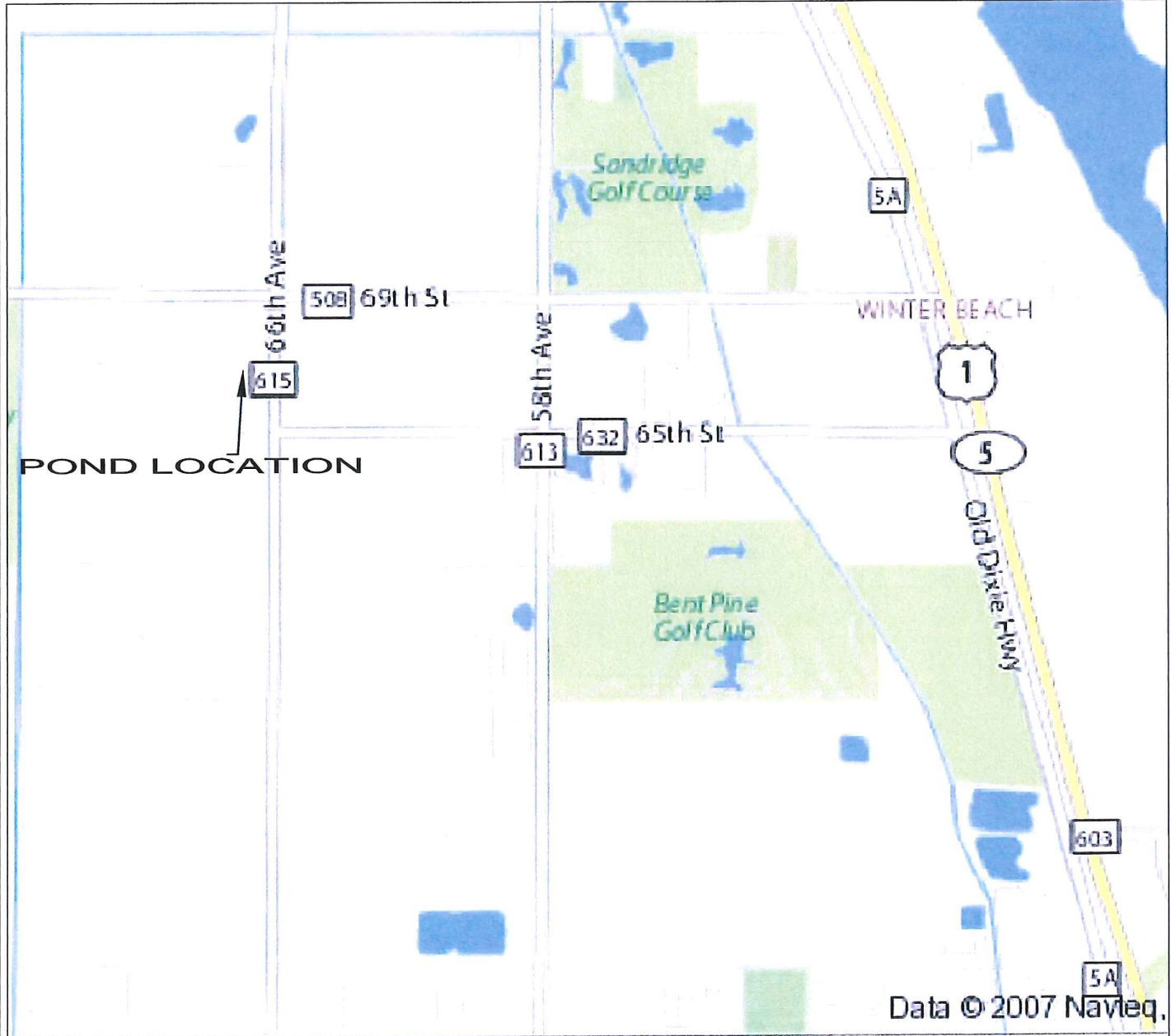


M. Bahiradhan
Project Engineer



Chris L. Mings, P.E.
Senior Geotechnical Engineer
FL Registration No. 61556

Attachments: Sheet 1 – Vicinity Map
Sheet 2 – Soil Survey Map
Sheet 3 – Boring Location Plan
Sheet 4 – Subsurface Profile



Data © 2007 Navteq.

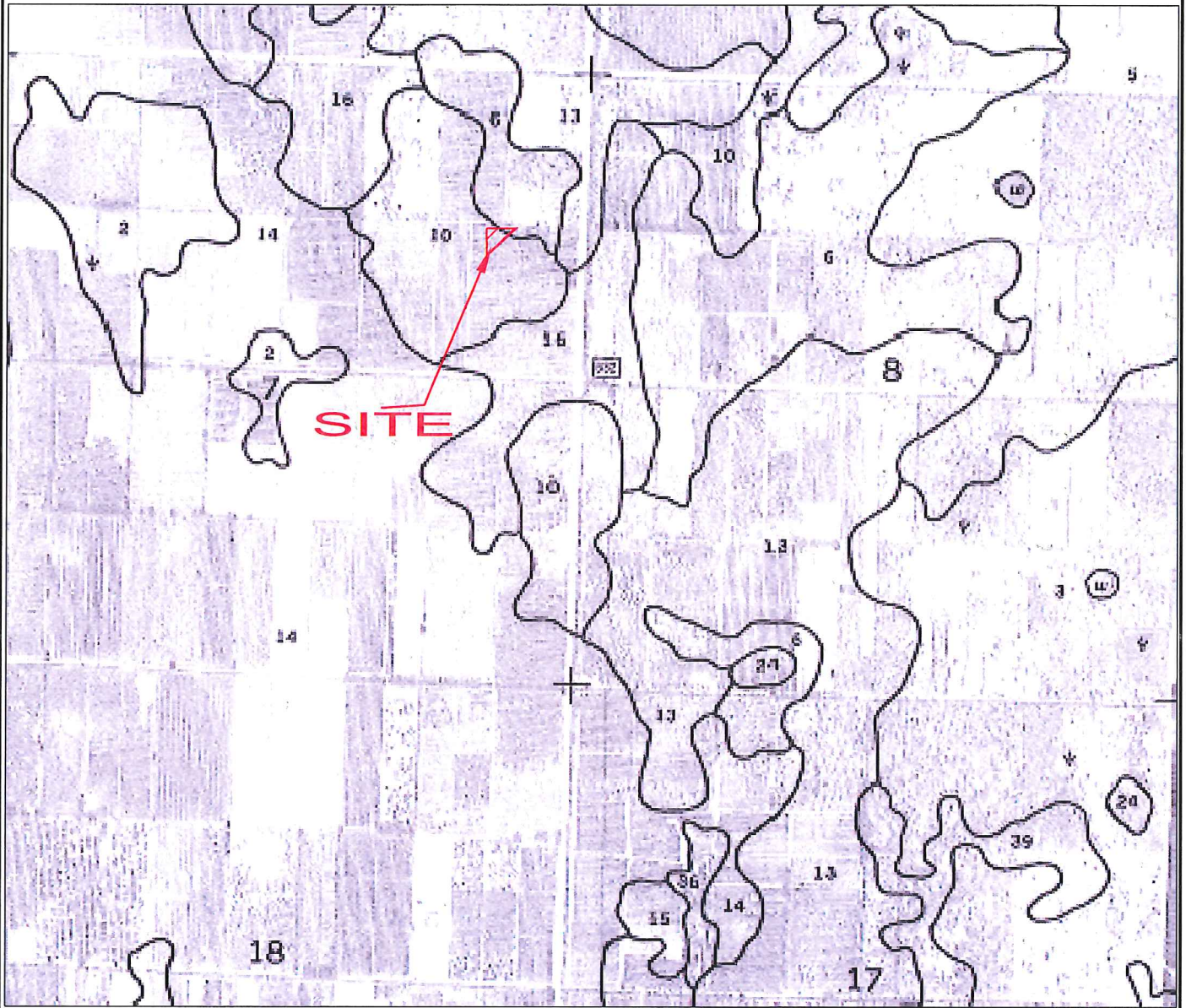
SOURCE: YAHOO INC. (2007)

DRAWN	MB
CHECKED	CLM
APPROVED	CED
SCALE	AS SHOWN
REVISED	

**VICINITY MAP
SADHWANI POND FOR
66th AVENUE ROADWAY WIDENING
INDIAN RIVER COUNTY, FLORIDA**

DET **DUNKELBERGER ENGINEERING & TESTING, INC.**
Geotechnical • Materials Testing/Inspection • Environmental

DATE	10-24-2007	PROJ. NO.	06-11-2352	SHEET	1
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LEGEND

- 6 - OLDSMAR SAND
- 10 - RIVIERA FINE SAND

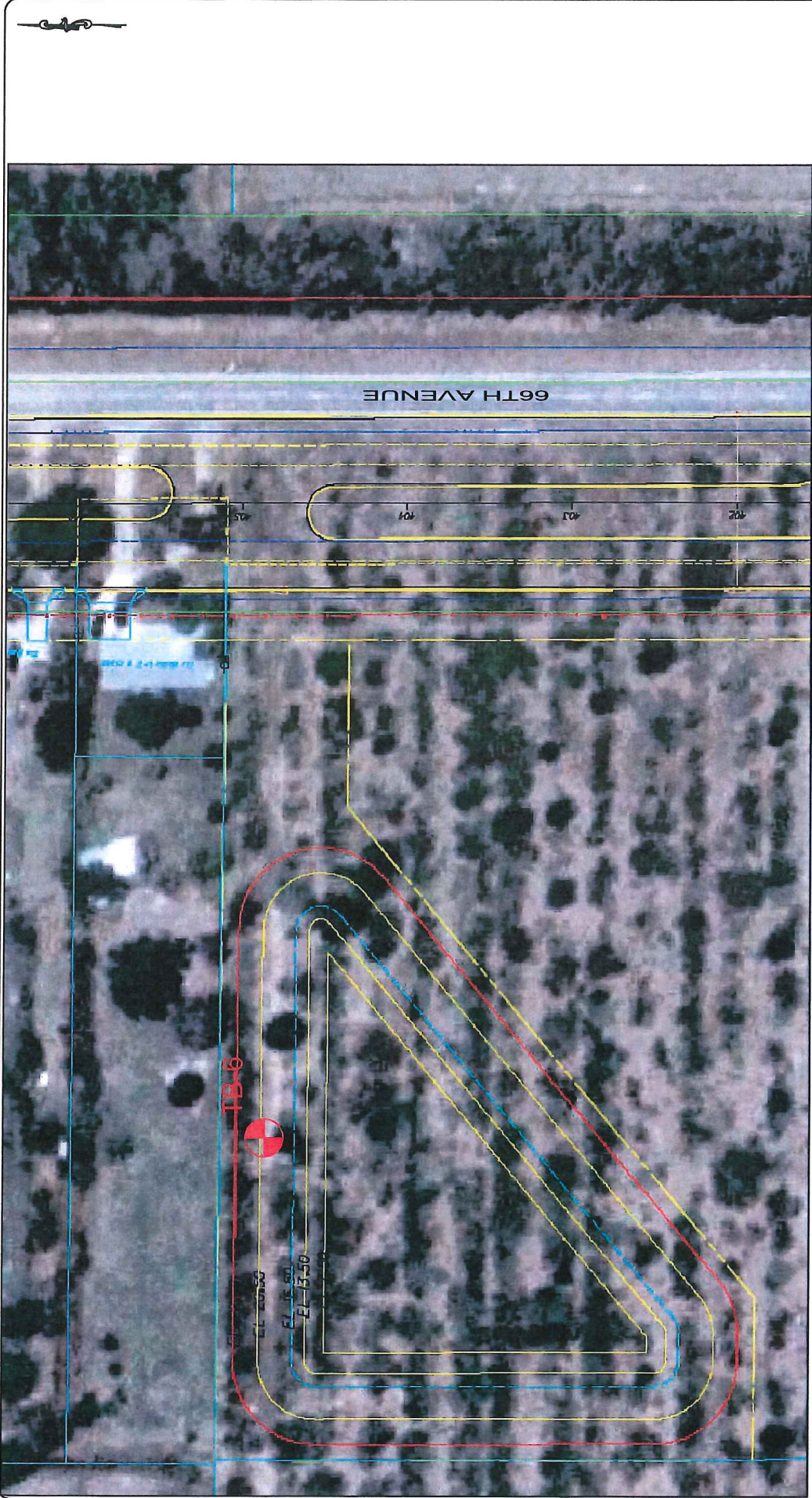


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SOIL SURVEY MAP
SADHWANI POND FOR
66th AVENUE ROADWAY WIDENING
INDIAN RIVER COUNTY, FLORIDA

DET **DUNKELBERGER ENGINEERING & TESTING, INC.**
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BORING LOCATION PLAN
 SADHWANI POND FOR
 66TH AVENUE ROADWAY WIDENING
 INDIAN RIVER COUNTY, FLORIDA

OWNER	GD
CHECKED	MB
APPROVED	CLM
SCALE	AS SHOWN
REVISED	

DATE 10-24-2007
 PROJ. NO. 06-11-2352
 SHEET 3

LEGEND

- STANDARD PENETRATION TEST
- BORING LOCATION AND NUMBER

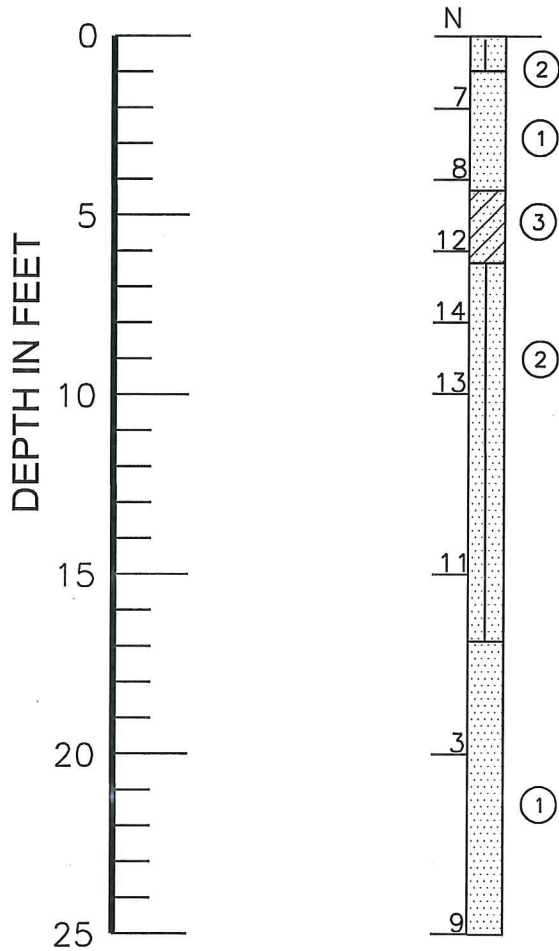
Locations are approximate

SOURCE: KIMLEY-HORN AND ASSOCIATES, INC.



BORING NO.

TB-1



LEGEND

- ① Gray and brown SAND (A-3).
- ② Gray and brown SAND with silt (A-2-4). Surficial soils contain some fine roots. Deeper soils contain some limestone and shell fragments.
- ③ Gray SAND with clay (A-2-4)

N - Indicates the number of blows of a 140 pound hammer, freely falling a distance of 30 inches, required to drive a 2-inch diameter sampler 12 inches (ASTM D 1586)

A-2-4 - AASHTO Soil Classification System Group Symbol (ASTM M 415)

TB-1 - Standard Penetration Test (SPT) boring and number

NOTES

- (1) Boring was drilled on October 29, 2007 using Mobile (B-47) drill rig.
- (2) Strata boundaries are approximate and represent soil strata at each test hole location only. Soil transitions may be more gradual than implied.
- (3) Groundwater depth was not measured during drilling.

DRAWN	MB
CHECKED	CLM
APPROVED	CLM
SCALE	AS SHOWN
REVISED	

SUBSURFACE PROFILE SADHWANI POND FOR 66TH AVENUE ROADWAY WIDENING INDIAN RIVER COUNTY, FLORIDA			
		DUNKELBERGER ENGINEERING & TESTING, INC. <i>Geotechnical • Materials Testing/Inspection • Environmental</i>	
DATE	10-30-07	PROJ. NO.	06-11-2352
		SHEET	4