**Preliminary Roadway Soil Survey**
**Minneola Corridor**
**From CR 561 / US 27 to Old Highway 50**
**Minneola, Lake County, Florida**

**Ardaman & Associates, Inc.**


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Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

July 10, 2008
File No. 07-6515

HNTB
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746

Attention: Mr. Luis Diaz, P.E.

Subject: Preliminary Roadway Soil Survey
Minneola Corridor
From CR 561 / US 27 to Old Highway 50
Minneola, Lake County, Florida

Dear Mr. Diaz:

As requested and authorized, we have completed a preliminary roadway soil survey for the Minneola Corridor project. The purpose of performing this exploration was to preliminarily evaluate the general subsurface conditions within the roadway and retention pond areas relative to the preliminary design and engineering phase of the project. This report documents our findings.

This report has been prepared in accordance with generally accepted geotechnical engineering practices for specific application to the project area indicated in this report. No other warranty, expressed or implied, is made. The soils information and preliminary recommendations submitted herein are based on the data obtained from the soil borings presented on Figures 4 through 7. This report does not reflect any variations which may occur between the borings. The nature and extent of the variations between the borings may not become evident until during further exploration and/or construction.

It is a pleasure assisting you with this phase of the project. If you have any questions, or when we may be of further assistance to you, please do not hesitate to contact us.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.

M. Aries P. Cunningham, PhD, P.E.
Project Engineer
Florida Registration No. 65668

Charles H. Cunningham, P.E. 7-11-08
Division Manager
Florida Registration No. 38189

APC/CHC/nfm/ksb
07-6515 Minneola Corridor apc.wpd (2007 Geo)

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# 1.0 INTRODUCTION

## 1.1 Site Location

The project is located in Minneola, Lake County, Florida (Sections 4, 5, 6, 8, 9, 16 and 17, Township 22 South, Range 26 East). The total length of construction will be approximately 5.7 miles in length.

The general site location is shown superimposed on the Clermont West and Clermont East, Florida, U.S.G.S. quadrangle maps presented on Figure 1.

## 1.2 Project Considerations

It is our understanding that the proposed development will include the construction of a four-lane urban roadway, approximately 5.7 miles in length bounded on the west by CR 561/US 27 and bounded on the south by Old Highway 50.

It is also our understanding that 6 retention ponds are being considered.

## 1.3 Purpose and Scope of Exploration

The purposes of this exploration were to explore shallow subsurface conditions within the proposed roadway alignment and pond areas and to provide a geotechnical engineering evaluation of the conditions encountered. Our services included:

1. Conducting auger borings and measuring groundwater levels along the roadway alignment and within the proposed retention pond areas.
2. Observing recovered soil samples in our laboratory and performing tests on selected samples to aid in classification.
3. Analyzing and interpreting the field and laboratory data.
4. Performing engineering analyses to develop recommendations for site preparation.
5. Conducting falling head permeability tests within the proposed retention pond areas.

## 1.4 Review of Available Data

### 1.4.1 Soil Survey Maps

Based on the 1973 Soil Survey for Lake County, Florida, as prepared by the U.S. Department of Agriculture Soil Conservation Service, the site is located in an area mapped as the "Astatula sand, dark surface, 0 to 5 percent slopes", the "Astatula sand, dark surface, 5 to 12 percent slopes", the "Astatula sand, dark surface, 12 to 40 percent slopes", the "Lake sand, 0 to 5 percent slopes", the "Lake sand, 5 to 12 percent slopes" and the "Lake sand, 12 to 22 percent slopes" soil series. The "Astatula sand, dark surface" soil series consists of nearly level to very steep soils occurring on the undulating upland ridges. The internal drainage of the "Astatula sand, dark surface" is excessive and the soil permeability is very rapid throughout. According to the Soil Survey, the seasonal high water table for the "Astatula sand, dark surface" soil series is typically at a depth of more than 120 inches from the natural ground surface.

The "Lake sand" soil series consists of nearly level to steeply sloping soil formed in thick beds of marine and eolian sands. The internal drainage of the "Lake sand" soil series is well drained to excessive and the soil permeability is very rapid throughout. According to the Soil Survey, the seasonal high water table for the "Lake sand" soil series is typically at a depth more than 120 inches from the natural ground surface.

### 1.4.2 U.S.G.S. Quadrangle Maps

Based on our review of the Clermont West and Clermont East, Florida, U.S.G.S. quadrangle maps, the existing ground surface elevations along the project alignment varies approximately from +95 to +295 feet NGVD.

### 1.4.3 Potentiometric Maps

Based on review of the "Potentiometric Surface of the Upper Floridan Aquifer in the St. Johns River Water Management District and Vicinity, Florida" (dated September, 2002) published by the United States Geological Survey, the potentiometric elevation within the project area is approximately +79 feet NGVD, or approximately 16 to 216 feet below the prevailing ground surface elevation.

### 1.4.4 Regional Geology

According to the Soil Survey, six geologic formations are on or near the surface in the Lake County Area. From the oldest and deepest formation of Eocene age to the youngest formation of Pleistocene-Recent age, they are the Crystal River, the Suwannee Limestone, the Hawthom, the Fort Preston, the Fort Thompson, and Ocala Limestone. Recently deposited sandy and clayey marine terraces cover these formations, except in a few small areas where erosion has exposed the older strata. An overlapping, or transgressive, sea flooded and eroded the land and deposited the water-worked sediment identified in these geologic formations.

The Crystal River Formation, a hard cavernous, and porous limestone, is the only formation that underlies the entire county. This formation is not exposed any place in the County.

The Suwannee Limestone overlies the Crystal River Formation. The only exposure in the County is at the bottom of the Palatlakaha River near State Highway 48. There may be other exposure in the southwestern part of the County. The formation is so deeply buried by the sandy deposits that it has had little effect on soil formation.

The Hawthorn Formation consists of interbedded sand, clay, marl, limestone, fuller's earth, and phosphate. Pebble phosphate, old oyster shells, manatee ribs, and many different shell fragments are scattered over the land surface 1 mile southwest of Howey-In-The-Hills. Phosphatic material is exposed along the sides and bottoms of some of the nearby sinks. The recently deposited sand is so thick, however, that none of the phosphatic material was reached in the course of regular soil mapping.

The Fort Preston Formation underlies approximately 54 percent of the County. The sediment is poorly sorted quartz grains in a clay matrix. It ranges in size from very fine sand to pebbles. The clay fraction is predominantly kaolin. The coarse sands in these formations are the chief source of Florida's construction sand. The Vaucluse, Lucy, Astatula, and Apopka soils are derived from the Fort Preston Formation. In some places in the northern part of the County, soils formed in a finer textured sediment that were deposited at a later period.

The Fort Thompson Formation, just north and east of Lake Apopka, underlies about 3 percent of the survey area. These formations consist of both fresh and marine deposits that were laid down during several oscillations of the sea. Most of this area is capped with fibrous organic material.

Recent and Pleistocene deposits also influenced a large percentage of the soils of the geologically surveyed area. The greatest single area of these deposits is in the northeastern part of the County, bordering on the St. Johns River. The sediments range from sand to clay. There is also organic material and fresh water marl. The fresh water marl and the recent deposits of organic material also occur among all other formations in the County. Many stream valleys and low depressions contain pockets of recently deposited organic materials and fresh water marl.

The Ocala Limestone Formation underlies the entire survey area. This formation is as much as 98 percent carbonates. Water moved downward through the blanket of sand that overlies the Ocala Formation. The water dissolved and removed much of the carbonate material and created many caverns of various sizes and shapes. The collapse of these caverns created the many lakes in the area.

## 2.0 FIELD EXPLORATION PROGRAM

### 2.1 Roadway Borings

The field exploration program relative to the roadway alignment consisted of performing 23 auger borings within the proposed Minneola Corridor alignment. The auger borings were conducted using a 4-inch diameter continuous-flight auger advanced to a depth of 20 feet below the ground surface. All of the borings were backfilled with soil upon completion of the field exploration program. A summary of the auger boring procedure is included in the Appendix. Soil samples recovered during performance of the borings were visually classified in the field and representative portions of the samples were transported to our laboratory in sealed sample jars for further classification and laboratory testing.

The approximate locations of the borings were determined in the field by the use of a hand-held GPS unit, and should be considered accurate only to the degree implied by the method of measurement used. The approximate boring stations and offsets were referenced from the centerline of the alignment and were estimated from the plan view provided to us.

### 2.2 Retention Pond Borings

The field exploration program for the proposed retention ponds consisted of performing 6 auger borings within the proposed retention pond areas. The auger borings were conducted using a 4-inch diameter truck-mounted continuous-flight auger advanced to a depth of 20 feet below the existing ground surface.

The approximate locations of the borings were determined in the field by the use of a hand-held GPS unit and should be considered accurate only to the degree implied by the method of measurement used. The approximate boring stations and offsets were referenced from the centerline of the alignment and were estimated from the plan view provided to us.

## 2.3 Groundwater Level

An attempt was made to measure the groundwater level in the boreholes after stabilization of the downhole water level after the holes were drilled. As shown on Figures 4 through 7, groundwater was not encountered in most of the boreholes on the dates indicated. Groundwater was encountered in Boring AB-5 at a depth of 16.5 feet below the existing ground surface on the date indicated. Fluctuations in groundwater levels should be anticipated throughout the year primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted.

The absence of groundwater data at most of the boring locations indicates that groundwater was not encountered within the vertical reach of the borings on the date drilled. However, this does not necessarily mean that groundwater would not be encountered at some other time.

## 2.4 Field Permeability Tests

Field permeability tests were conducted within the proposed stormwater pond areas adjacent to Borings AB-P1 through AB-P6. For each of the tests, a 4-inch diameter solid-walled, open-ended PVC pipe was installed to a depth of 5 feet below the ground surface. Approximately 1 foot of gravel was packed at the bottom of the pipe and the pipe was then raised approximately 1 foot. Falling head permeability tests were conducted by filling the PVC pipe with water to the top of the pipe and measuring the time rate of fall of the water level. A continuous reading of the falling water level in the PVC pipe versus time was recorded. A stabilization period of 15 minutes was used for each test.

# 3.0 LABORATORY TESTING PROGRAM

## 3.1 Visual Examination and Classification Testing

Representative soil samples obtained during our field sampling operation were packaged and transferred to our laboratory for further visual examination and classification to obtain more accurate descriptions of the existing soil strata. The soil samples for the roadway were visually classified in general accordance with the AASHTO Soil Classification System (ASTM D-3282).

In addition, sieve analyses and percent fines analyses were conducted on representative soil samples to aid in classification. The resulting soil descriptions and the results of our tests are shown on Table 1 and summarized on the Soil Survey sheet presented as Figure 3.

# 4.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

## 4.1 General Soil Stratigraphy

The results of the field exploration and laboratory testing programs are graphically summarized on the Soil Survey sheet (Figure 3) and the soil boring profiles (Figures 4 through 7). The stratification of the boring profiles represents our interpretation of the field boring logs and the results of the laboratory examination of the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

The results of our test borings indicate the following general soil types:

| Strata No. | Description | Classification | |
|---|---|---|---|
| | | AASHTO | FDOT Index 505 |
| 1 | Light brown to brown, dark brown, very dark brown, orange, orange brown, yellow brown, pale brown fine sand to fine sand with silt, with occasional roots. | A-3 | S |
| 2 | Light brown, orange, orange brown red fine sand with clay to clayey fine sand and silty fine sand. | A-3, A-2-4 | S |
| 3 | Orange, orange brown, purple clayey fine sand | A-2-6 | P |

The results of our exploration indicate that the soil conditions encountered in the borings presented on Figures 4 through 7 are acceptable for construction of the proposed roadway, except where plastic soils (Stratum 3) were encountered, in accordance with standard FDOT design and construction practices.

Strata 1 and 2 soils encountered in the roadway borings are considered Select (reference Index 505 of FDOT Design Standards) for use as fill for roadway construction. Stratum 3 soils should not be used in the subgrade portion of the road and should be considered "Plastic", and therefore unsuitable and should not be used as fill except as allowed by Index 505.

### 4.2 Measured Coefficients of Permeability

The results of the soil permeability tests are presented in Table 2.

For the type of soils encountered at the test locations, a transformation ratio of 1 is considered appropriate. Therefore, the horizontal and vertical permeabilities are approximately equal.

It is noted that the fine sand with clay, clayey fine sand and silty fine sand (Strata 2 and 3) underlying the relatively free-draining soils encountered in the stormwater ponds are anticipated to be much less permeable than the fine sand and fine sand with silt soils (Stratum 1) encountered in the stormwater ponds.

### 4.3 Groundwater Control

An attempt was made to measure the groundwater level in the boreholes on the day drilled after stabilization of the downhole water level. As shown on Figures 4 through 7, no groundwater levels were encountered in most of the boreholes on the dates indicated. Groundwater was encountered in Boring AB-5 at a depth of 16.5 feet below the existing ground surface on the date indicated. Fluctuations in groundwater levels should be anticipated throughout the year primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted.

The absence of groundwater data at most of the boring locations indicates that groundwater was not encountered within the vertical reach of the borings on the date drilled. However, this does not necessarily mean that groundwater would not be encountered at some other time.

If the control of the groundwater will be required during construction, the actual method(s) of dewatering should be determined by the contractor. However, regardless of the method(s) used, we suggest drawing down the water table sufficiently, say 2 to 3 feet, below the bottom of any excavation or compaction surface to preclude "pumping" and/or compaction-related problems with the foundation soils.

Dewatering should be accomplished with the knowledge that the permeability of soil tends to decrease with an increasing silt and clay content. Therefore, a silty fine sand is typically less permeable than a fine sand. The Stratum 1 and some Stratum 2 type soils can usually be dewatered by well pointing or ditch/sump methods.

### 4.4 Seasonal High Water Table

The typical seasonal high water table each year is the level in the August-September period at the end of the rainy season during an average rainfall year. The water table elevations associated with a flood level would be much higher than the seasonal high water table elevations. The normal high water levels would more approximate the seasonal high water table elevations.

The seasonal high water table is affected by a number of factors. The drainage characteristics of the soils, the land surface elevation, relief points such as lakes, rivers, swamp areas, etc., and distance to relief points are some of the more important factors influencing the seasonal high water table elevation.

Based on our interpretation of the site conditions using our boring log data, we estimate the seasonal high water table at the 20-foot deep boring locations where groundwater was not encountered, to be greater than 15 feet below the ground surface. We note that water may perch temporarily at higher levels on top of the clayey soils (Stratum 2 on Figures 5 through 8) during periods of heavy or prolonged rainfall. For the boring where groundwater was encountered, our estimate of the normal seasonal high groundwater level is presented on the Auger Boring Soil Profile presented on Figure 4.

### 4.5 Preliminary Construction Considerations

Roadway construction should be performed in accordance with the appropriate sections of the FDOT current edition of the Standard Specifications for Road and Bridge Construction. Backfill should generally consist of Select material (A-3, A-2-4) compacted in accordance with the FDOT Standard Specification for Road and Bridge Construction. In accordance with these specifications, the removal of organic materials and any plastic soils occurring within the roadway should be accomplished in accordance with FDOT Standard Index 500 unless otherwise shown on the plans. In-place density tests should be performed on the fill soils to verify the specified degree of compaction. The minimum density test frequency should be in accordance with the FDOT Materials, Sampling, Testing, and Reporting Guide. Fill placement and side slopes for embankment construction are presented in the FDOT Standard Index 505.

If some form of groundwater control (dewatering) is required during construction, the means and methods of groundwater and surface water control should be the responsibility of the contractor. Positive site drainage should be established early during construction in order to reduce ponding of surface water during heavy or prolonged rainfall. Due to the type of soil (i.e.; relatively clean sand) that is prevalent on this project, establishing erosion control will be extremely important.

## TABLE 1

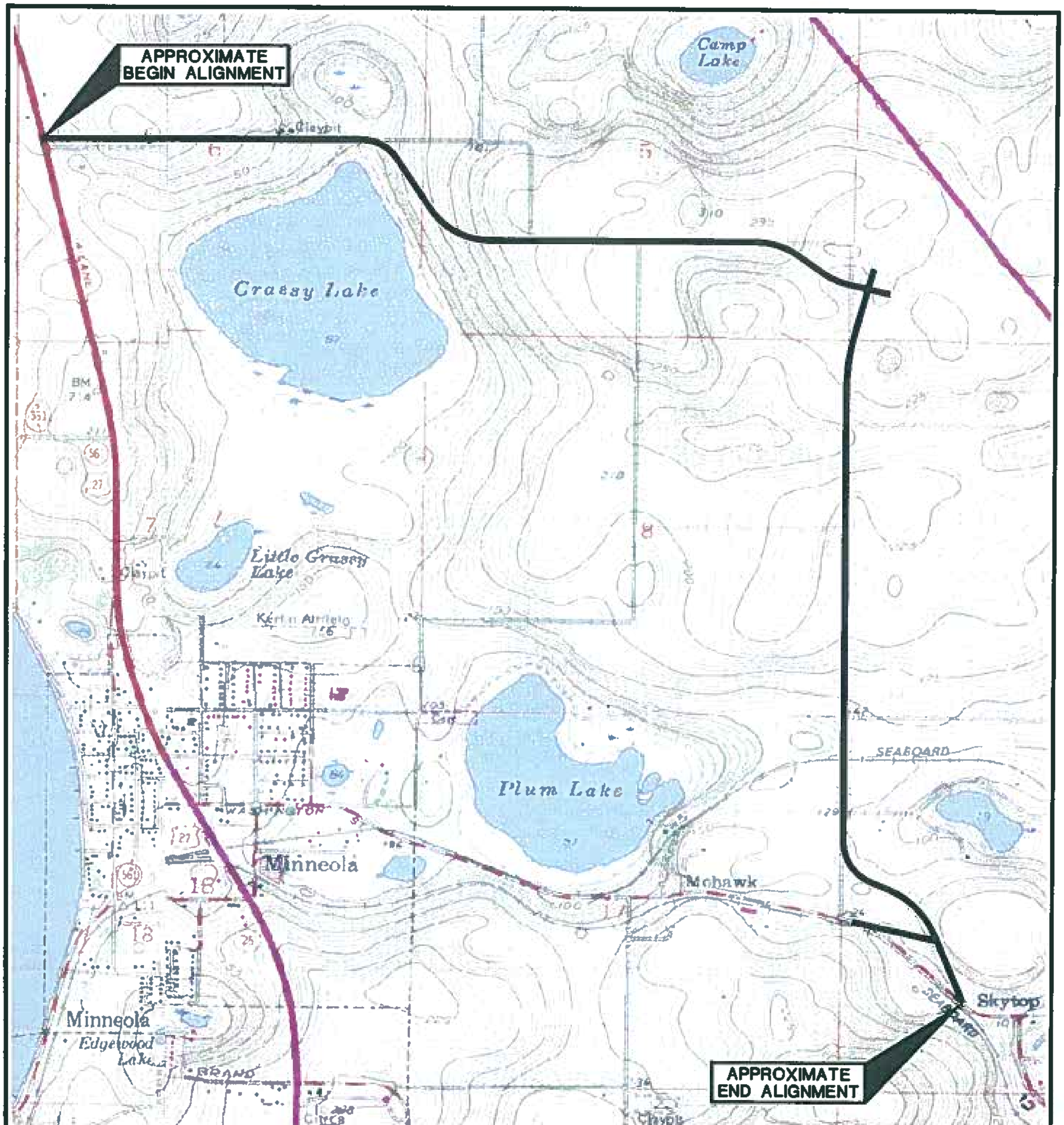
**Laboratory Test Results**
**Minneola Corridor**
**from CR561/US27 to Old Highway 50**
**Minneola, Lake County, Florida**

| Boring No. | Approx. Depth (ft) | Stratum No. | Natural Moisture Content (%) | Percent Passing Sieve Size (%) | | | | | Liquid Limit (%) | Plasticity Index (%) | AASHTO Class. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | #10 | #40 | #60 | #100 | #200 | | | |
| AB-5 | 0 - 3 | 1 | 3 | - | - | - | - | 4 | - | - | A-3 |
| AB-9 | 0 - 8 | 1 | 1 | 100 | 94 | 41 | 5 | 6 | - | - | A-3 |
| AB-11 | 6 - 20 | 1 | 3 | - | - | - | - | 6 | - | - | A-3 |
| AB-14 | 9 - 10.5 | 1 | 10 | - | - | - | - | 9 | - | - | A-3 |
| AB-16 | 0 - 8 | 1 | 2 | - | - | - | - | 5 | - | - | A-3 |
| AB-18 | 0 - 10 | 1 | 3 | 100 | 84 | 39 | 11 | 4 | - | - | A-3 |
| AB-20 | 10 - 20 | 1 | 5 | - | - | - | - | 4 | - | - | A-3 |
| AB-22 | 10 - 20 | 1 | 7 | - | - | - | - | 10 | - | - | A-3 |
| AB-P1 | 0 -6 | 1 | 4 | - | - | - | - | 2 | - | - | A-3 |
| AB-P2 | 3.5 - 20 | 1 | 5 | - | - | - | - | 6 | - | - | A-3 |
| AB-P3 | 0 - 9 | 1 | 1 | - | - | - | - | 3 | - | - | A-3 |
| AB-P4 | 4 - 12 | 1 | 3 | - | - | - | - | 2 | - | - | A-3 |
| AB-P5 | 15 - 20 | 1 | 6 | - | - | - | - | 7 | - | - | A-3 |
| AB-P6 | 0 - 9 | 1 | 1 | - | - | - | - | 3 | - | - | A-3 |
| AB-1 | 8 - 20 | 2 | 10 | - | - | - | - | 19 | NP | NP | A-2-4 |
| AB-6 | 18 - 20 | 2 | 7 | 100 | 67 | 60 | 40 | 16 | - | - | A-2-4 |
| AB-7 | 15 - 20 | 2 | 8 | - | - | - | - | 15 | NP | NP | A-2-4 |
| AB-21 | 14 - 20 | 2 | 8 | - | - | - | - | 14 | NP | NP | A-2-4 |
| AB-4 | 7 - 20 | 3 | 11 | 100 | 91 | 62 | 32 | 26 | - | - | A-2-6 |
| AB-6 | 11.5 - 14 | 3 | 12 | - | - | - | - | 29 | 34 | 18 | A-2-6 |
| AB-10 | 11 - 20 | 3 | 13 | 100 | 92 | 37 | 30 | 25 | - | - | A-2-6 |

## TABLE 2

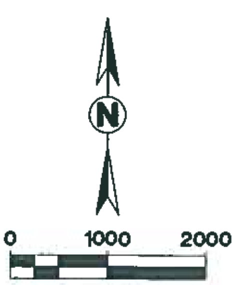
**Field Permeability Test Results**
**Minneola Corridor**
**From CR 561 / US 27 to Old Highway 50**
**Minneola, Lake County, Florida**

| Test Location | Test Depth Boring (feet) | Measured Permeability (inches/hour) |
|---|---|---|
| AB-P1 | 4 - 5 | 20 |
| AB-P2 | 4 - 5 | 20 |
| AB-P3 | 4 - 5 | 20 |
| AB-P4 | 4 - 5 | 20 |
| AB-P5 | 4 - 5 | 20 |
| AB-P6 | 4 - 5 | 20 |




**SECTIONS 4, 5, 8, 8, 9, 18 AND 17**
**TOWNSHIP 22 SOUTH**
**RANGE 26 EAST**

**OBTAINED FROM U.S.G.S. QUAD MAPS: CLERMONT EAST, FLORIDA 1980 AND CLERMONT WEST, FLORIDA 1989**




APPROXIMATE SCALE: 1"=2000'


QUADRANGLE LOCATION

| SITE LOCATION MAP | | |
|---|---|---|
| Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants | | |
| PRELIMINARY SUBSURFACE SOIL EXPLORATION MINNEOLA CORRIDOR FROM CR561/US27 TO OLD HIGHWAY 50 MINNEOLA, LAKE COUNTY, FLORIDA | | |
| DRAWN BY: AOA | CHECKED BY: | DATE: 06/18/08 |
| FILE NO. 07-6515 | APPROVED BY: | FIGURE: 1 |

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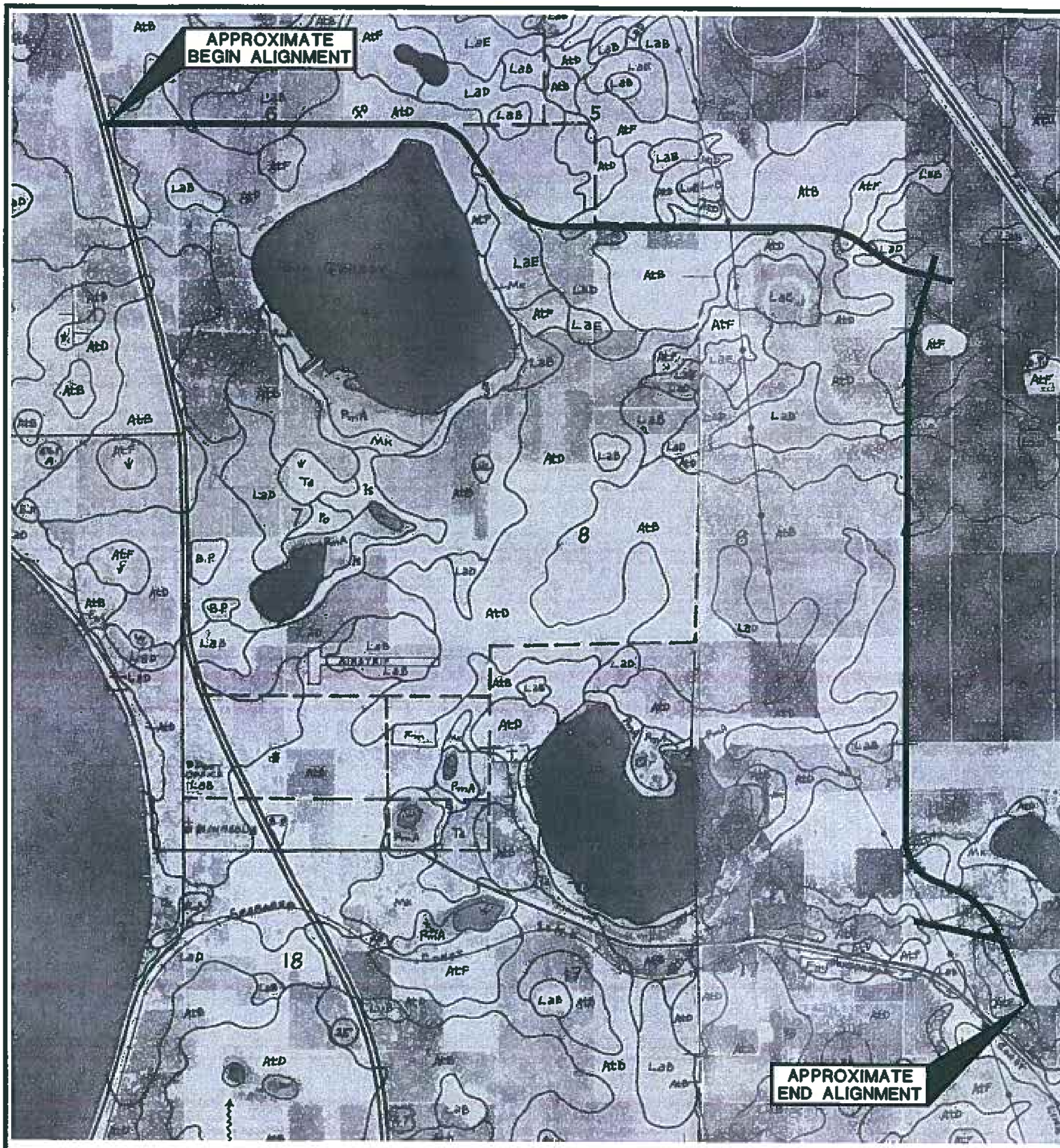


**OBTAINED FROM 1973 SOIL SURVEY MAP FROM LAKE COUNTY, FLORIDA**

## LEGEND

- AtB – ASTATULA SAND, DARK SURFACE, 0–5 PERCENT SLOPES
- AtD – ASTATULA SAND, DARK SURFACE, 5–12 PERCENT SLOPES
- AtF – ASTATULA SAND, DARK SURFACE, 12–40 PERCENT SLOPES
- LaD – LAKE SAND, 5–12 PERCENT SLOPES
- LaE – LAKE SAND, 12–22 PERCENT SLOPES

N

0 1000 2000

APPROXIMATE SCALE: 1"=2000'

**SOIL SURVEY MAP**

**Ardaman & Associates, Inc.**
Geotechnical, Environmental and Materials Consultants

**PRELIMINARY SUBSURFACE SOIL EXPLORATION**
**MINNEOLA CORRIDOR**
**FROM CR561/US27 TO OLD HIGHWAY 50**
**MINNEOLA, LAKE COUNTY, FLORIDA**

| DRAWN BY: CO | CHECKED BY: | DATE: 06/19/08 |
|---|---|---|
| FILE NO. 07-6515 | APPROVED BY: | FIGURE: 2 |

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PROJECT: MINNEOLA CORRIDOR FROM CR 561/US 27 TO OLD HIGHWAY 50

FILE NO. 07-6515

# COUNTY OF LAKE
# CROSS SECTION OF SOIL SURVEY
# REPORT OF TESTS

## MECHANICAL ANALYSIS

DATE OF SURVEY: 06/08

SURVEYED BY: RYAN, TATE

SURVEY BEGINS AT APPROXIMATE STA. No.: 80+00; 300+00

SURVEY ENDS AT APPROXIMATE STA. No.: 190+00; 390+00

DATE REPORTED: 07/08

LOCATION

TOWNSHIP: 22 SOUTH

RANGE: 26 EAST

SECTIONS: 4, 5, 6, 8, 9, 16 AND 17

| STRATUM NO. | LBR VALUE | % PASSING 10 MESH | % PASSING 40 MESH | % PASSING 60 MESH | % PASSING 100 MESH | % PASSING 200 MESH | CONSTANTS MATERIAL PASS NO. 40 SIEVE: LIQUID LIMIT | CONSTANTS MATERIAL PASS NO. 40 SIEVE: PLASTIC INDEX | NO. LBR TESTS | NO. GRAD TEST | NO. LL-PI TEST | CLASSIFI-CATION GROUP | MATERIAL DESCRIPTION | pH | RESISTIVITY ohm-cm | CHLORIDES ppm | SULFATES ppm | ENVIRONMENTAL CLASSIFICATION: STEEL | ENVIRONMENTAL CLASSIFICATION: CONCRETE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | 100 | 84-94 | 39-41 | 5-11 | 2-10 | --- | --- | 0 | 2 | 0 | A-3 | LIGHT BROWN TO BROWN, DARK BROWN, VERY DARK BROWN, ORANGE, ORANGE BROWN, YELLOW BROWN, PALE BROWN FINE SAND TO FINE SAND WITH SILT, WITH OCCASIONAL ROOTS | --- | --- | --- | --- | --- | --- |
| 2 | --- | 100 | 67 | 60 | 40 | 14-19 | NP | NP | 0 | 1 | 3 | A-3<br>A-2-4 | LIGHT BROWN, ORANGE, ORANGE BROWN, RED FINE SAND WITH CLAY TO CLAYEY FINE SAND AND SILTY FINE SAND | --- | --- | --- | --- | --- | --- |
| 3 | --- | 100 | 91-92 | 37-62 | 30-32 | 25-29 | 34 | 18 | 0 | 2 | 1 | A-2-6 | ORANGE, ORANGE BROWN, PURPLE CLAYEY FINE SAND | --- | --- | --- | --- | --- | --- |

## NOTES

1. STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH TEST HOLE LOCATION ONLY. ANY STRATUM CONNECTING LINES THAT ARE SHOWN ARE FOR ESTIMATING EARTHWORK ONLY AND DO NOT INDICATE ACTUAL STRATUM LIMITS. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. FOR FURTHER DETAILS SEE SECTION 120-3.
2. LEGEND "GNE" GROUNDWATER NOT ENCOUNTERED ON DATE DRILLED
   LEGEND ▼ GROUNDWATER LEVEL MEASURED ON DATE DRILLED
   LEGEND ▽ ESTIMATED SEASONAL HIGH GROUNDWATER LEVEL (ESHWL)
   LEGEND "*" ESHWL MORE THAN 15 FEET BELOW GROUND SURFACE
3. THE SYMBOL "---" REPRESENTS AN UNMEASURED PARAMETER.
4. STRATA 2 AND 3 WILL RETAIN EXCESS MOISTURE AND BE DIFFICULT TO DRY AND COMPACT.
5. STRATUM 3 SHOULD BE TREATED AS PLASTIC.

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| REVISIONS: Date | By | Description | Date | By | Description |
|---|---|---|---|---|---|
| | | | | | |

| | Names | Dates |
|---|---|---|
| Drawn by | ADA | 06/08 |
| Checked by | ABP | 06/08 |
| Designed by | | |
| Checked by | | |
| Approved by | | |

ENGINEER OF RECORD:
MARIA ARIES P. CUNNINGHAM, P.E.
FL REG. NO. 65688

Ardaman & Associates, Inc.
8008 S. ORANGE AVENUE
P.O. BOX 593003
ORLANDO, FL 32859-3003
ENG. AUTH. NO. 5950

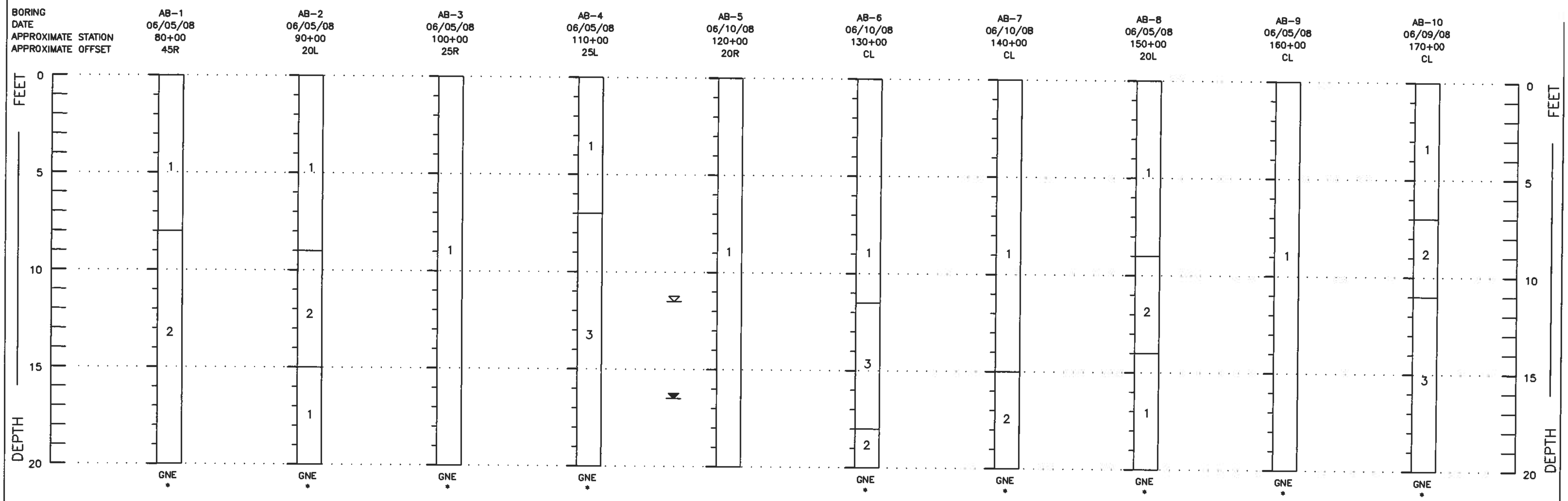
Ardaman & Associates, Inc.

SEAL:

LAKE COUNTY

ROADWAY SOIL SURVEY
MINNEOLA CORRIDOR
FROM CR 561/US 27 TO OLD HIGHWAY 50
MINNEOLA, LAKE COUNTY, FLORIDA

SHEET NO.




## LEGEND

GNE GROUNDWATER NOT ENCOUNTERED ON DATE DRILLED

▼ GROUNDWATER LEVEL MEASURED ON DATE DRILLED

▽ ESTIMATED SEASONAL HIGH GROUNDWATER LEVEL (ESHWL)

* ESHWL MORE THAN 15 FEET BELOW GROUND SURFACE

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| Date | By | Description | Date | By | Description |
| | | | | | |

| | Names | Dates |
|---|---|---|
| Drawn by | ADA | 06/08 |
| Checked by | ABP | 06/08 |
| Designed by | | |
| Checked by | | |
| Approved by | | |

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SEAL:

LAKE COUNTY

**SOIL BORING PROFILES**
MINNEOLA CORRIDOR
FROM CR 561/US 27 TO OLD HIGHWAY 50
MINNEOLA, LAKE COUNTY, FLORIDA

SHEET NO.

FIGURE 4

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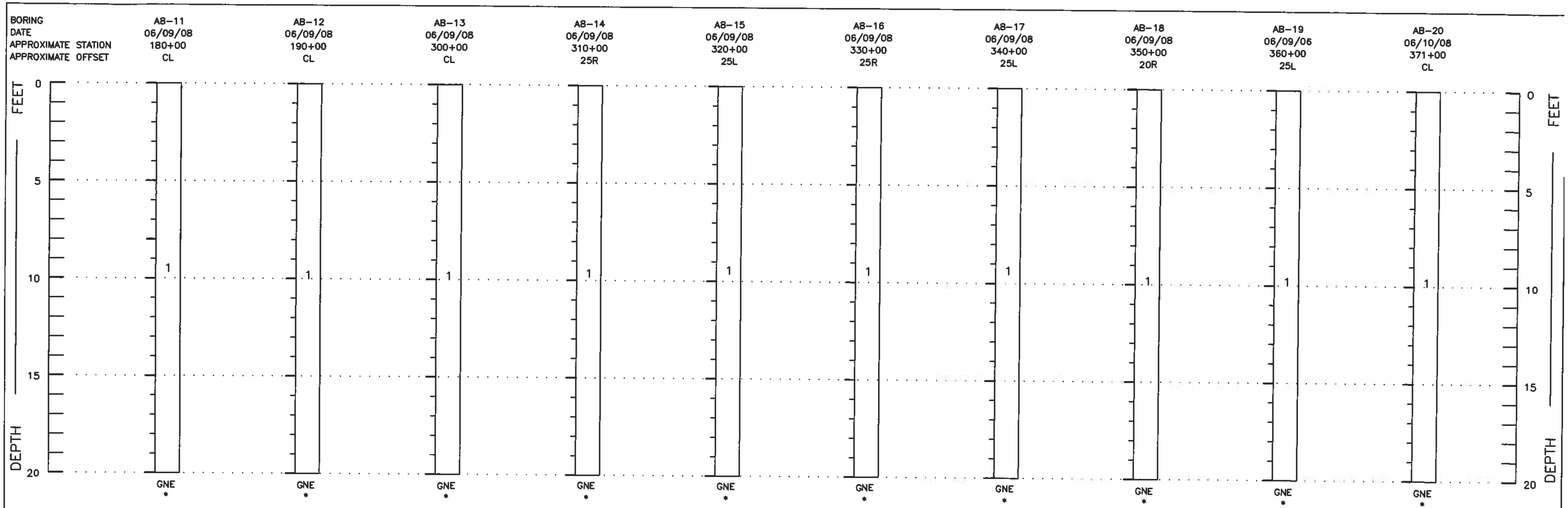


## LEGEND

GNE GROUNDWATER NOT ENCOUNTERED ON DATE DRILLED
* ESHWL MORE THAN 15 FEET BELOW GROUND SURFACE

T:\Orlando\07\07-6515\076515-04.dwg 7/09/2008 4:37:13 PM, chris.drew

REVISIONS

| Date | By | Description | Date | By | Description |
|---|---|---|---|---|---|
| | | | | | |

| | Names | Dates |
|---|---|---|
| Drawn by | ADA | 06/08 |
| Checked by | ABP | 06/08 |
| Designed by | | |
| Checked by | | |
| Approved by | | |

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LAKE COUNTY

SOIL BORING PROFILES
MINNEOLA CORRIDOR
FROM CR 561/US 27 TO OLD HIGHWAY 50
MINNEOLA, LAKE COUNTY, FLORIDA

SHEET NO.

FIGURE 5


## LEGEND

GNE GROUNDWATER NOT ENCOUNTERED ON DATE DRILLED
* ESHWL MORE THAN 15 FEET BELOW GROUND SURFACE

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| REVISIONS | | | | | |
|---|---|---|---|---|---|
| Date | By | Description | Date | By | Description |
| | | | | | |

| | Names | Dates |
|---|---|---|
| Drawn by | ADA | 06/08 |
| Checked by | ABP | 06/08 |
| Designed by | | |
| Checked by | | |
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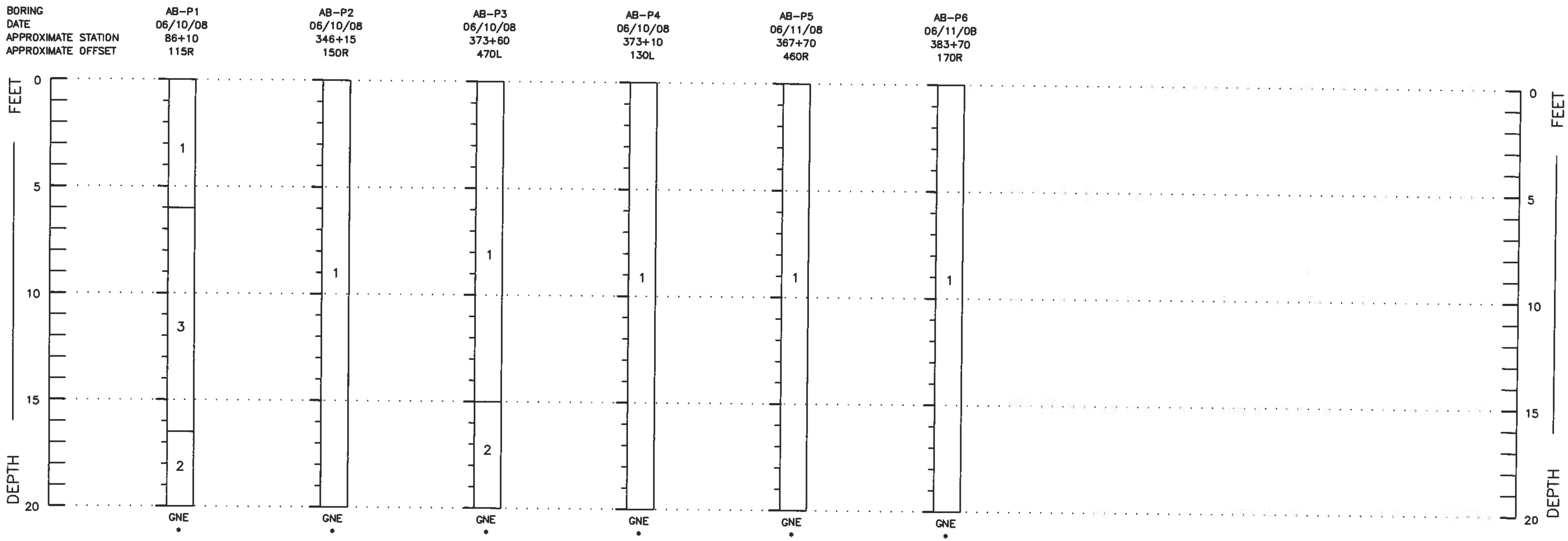
LAKE COUNTY

SOIL BORING PROFILES
MINNEOLA CORRIDOR
FROM CR 561/US 27 TO OLD HIGHWAY 50
MINNEOLA, LAKE COUNTY, FLORIDA

SHEET NO.

FIGURE 6




## LEGEND

GNE GROUNDWATER NOT ENCOUNTERED ON DATE DRILLED
* ESHWL MORE THAN 15 FEET BELOW GROUND SURFACE

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| REVISIONS | | | | | |
|---|---|---|---|---|---|
| Date | By | Description | Date | By | Description |
| | | | | | |

| | Names | Dates |
|---|---|---|
| Drawn by | ADA | 06/08 |
| Checked by | ABP | 06/08 |
| Designed by | | |
| Checked by | | |
| Approved by | | |

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SOIL BORING PROFILES
MINNEOLA CORRIDOR
FROM CR 561/US 27 TO OLD HIGHWAY 50
MINNEOLA, LAKE COUNTY, FLORIDA

SHEET NO.

FIGURE 7

## APPENDIX

Auger Boring Procedure

## AUGER BORINGS

Auger borings are used when a relatively large, continuous sampling of soil strata close to ground surface is desired. A 4-inch diameter, continuous flite, helical auger with a cutting head at its end is screwed into the ground in 5-foot sections. It is powered by the rotating action of the Kelly bar of a rotary drill rig. The sample is recovered by withdrawing the auger out of the ground without rotating it. The soil sample so obtained, is classified and representative samples put in bags or jars and brought back to the laboratory for classification testing.